



## Human Rights and Biocultural Heritage

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The Milpa System as the foundation for a culturally and environmentally sustainable public policy



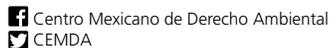
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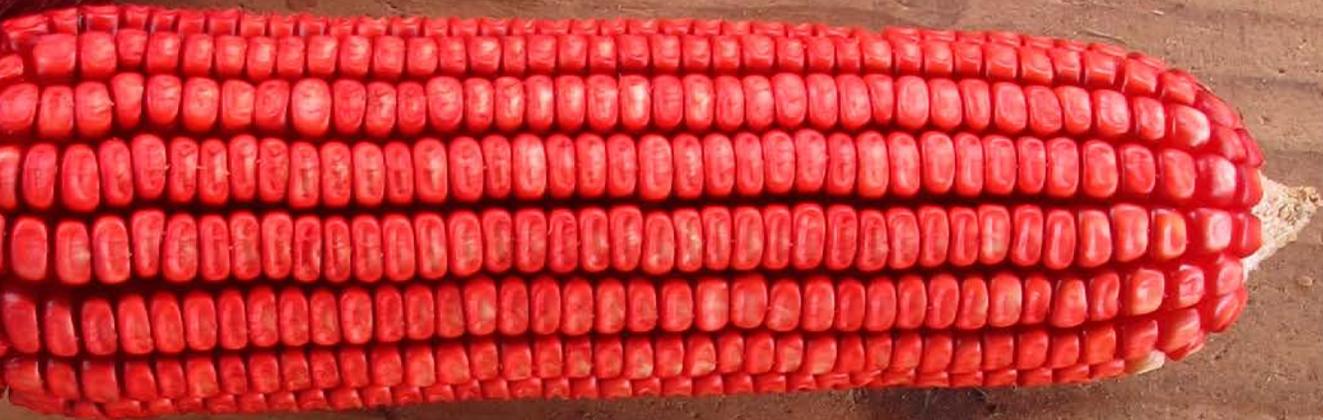
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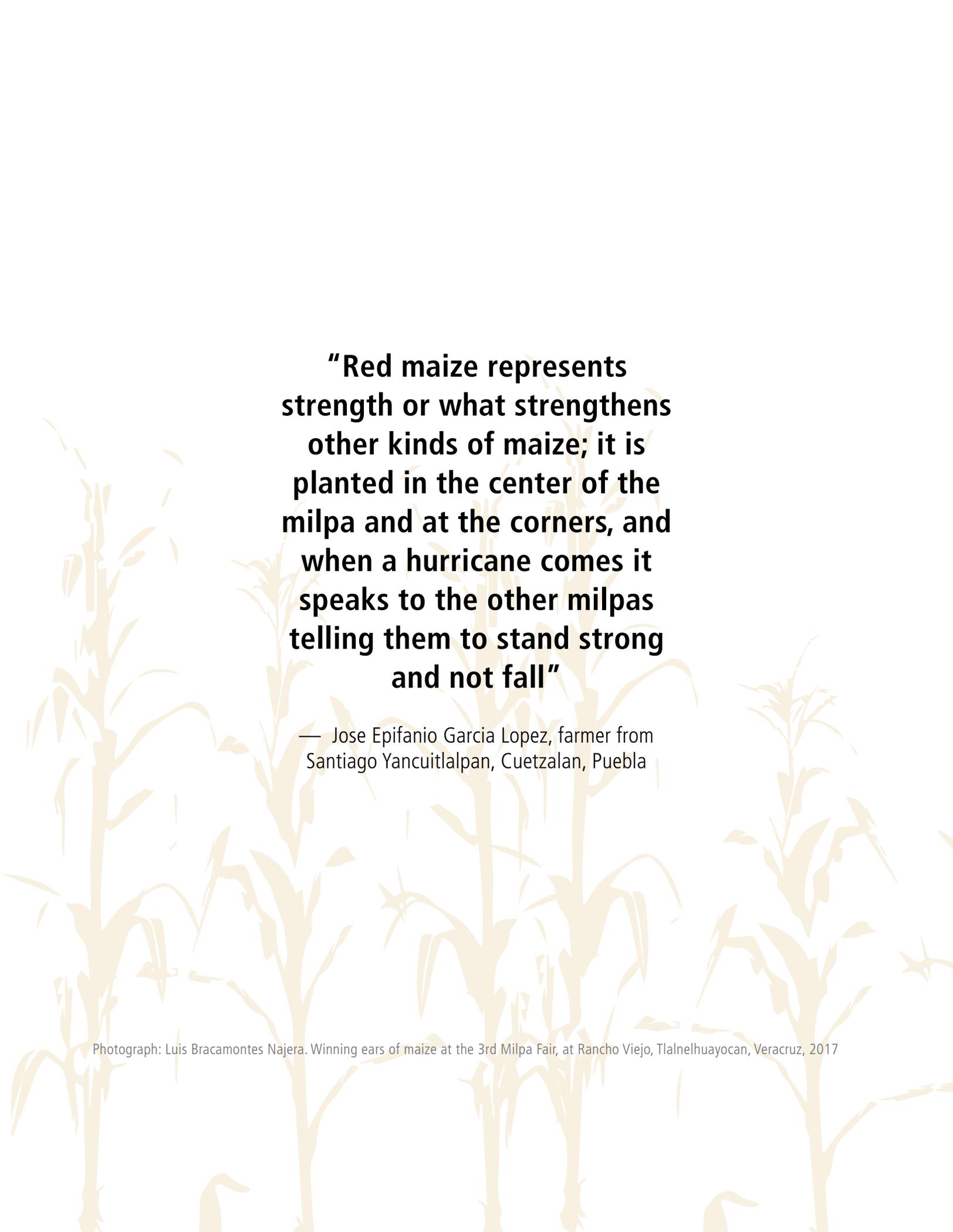
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**“Red maize represents strength or what strengthens other kinds of maize; it is planted in the center of the milpa and at the corners, and when a hurricane comes it speaks to the other milpas telling them to stand strong and not fall”**

— Jose Epifanio Garcia Lopez, farmer from Santiago Yancuitlalpan, Cuetzalan, Puebla

Photograph: Luis Bracamontes Najera. Winning ears of maize at the 3rd Milpa Fair, at Rancho Viejo, Tlalnahuayocan, Veracruz, 2017

# ACRONYMS

<b>ASF</b>	Federal Superior Office of Audits
<b>ACHR</b>	American Convention on Human Rights
<b>CDB</b>	Convention on Biodiversity
<b>CESCR</b>	Committee on Economic, Social, and Cultural Rights
<b>Cemda</b>	Centro Mexicano de Derecho Ambiental A.C.
<b>IACHPR</b>	Interamerican Court of Human Rights
<b>IACHR</b>	Inter American Commission on Human Rights
<b>Conanp</b>	National Commission on Protected Natural Areas
<b>CPEUM</b>	Mexican Federal Constitution
<b>DOF</b>	Official Gazette of the Federation
<b>DESC</b>	Economic, Social and Cultural Rights
<b>UNDRIP</b>	United Nations Declaration on the Rights of Indigenous Peoples
<b>INEGI</b>	National Institute of Statistics and Geography

# ACRONYMS

<b>LBOGM</b>	Law on Biosafety of Genetically Modified Organisms
<b>WHO</b>	World Health Organization
<b>UN</b>	United Nations
<b>SCOs</b>	Civil Society Organizations
<b>PatBio</b>	Biocultural heritage
<b>ICESCR</b>	International Covenant on Economic, Social, and Cultural Rights
<b>ICCPR</b>	International Covenant on Civil and Political Rights
<b>PNT</b>	National Platform for Transparency
<b>Sagarpa</b>	Ministry of Agriculture, Livestock, Rural Development, Fisheries, and Food
<b>Sefoa</b>	Tlaxcala State Department of Farm Promotion
<b>SIAP</b>	Agroalimentary and Fisheries Information Service
<b>NAFTA</b>	North American Free Trade Agreement



## I. ABSTRACT

**T**he milpa is the heart of our culture of maize and the Mesoamerican dietary system, combining multiple practices, crops, and varieties which vary with the culinary preferences, traditions, beliefs, traditional practices, and world views of the different groups which practice it. It is no coincidence that our forebears wrote, in the Popol Vuh, that we are men and women of maize. In Mexico, the milpa is also the most important agroecosystem in biocultural terms, forming the central pillar of the diet of peasant and indigenous families and the space where Mexico's rich gastronomy originates. Mexico's original peoples, cultivating the milpa and other traditional agroecosystems, have domesticated around 15% of the world's cultivated plants and continue to do so.

If we look closer, we will find that important human rights of indigenous peoples and peasant communities are expressed and exercised through the milpa, including: (1) the right to cultural identity, (2) the right to territory and traditionally managed natural resources, (3) the right to adequate food, (4) the right to health, and (5) the right to a healthy environment.

However, at present Mexico lacks a legal framework or public policy to protect these fun-



damental rights by promoting milpa farming. It is clear that, in view of the milpa system's importance as a fundamental element in peasant and indigenous ways of life, the Mexican state needs to implement a legal framework and public policy designed to satisfy those human rights, on the one hand, and to ensure conservation and in situ use of the native agrobiodiversity indispensable for Mexican gastronomy, on the other. In other words, Mexico needs a culturally and environmentally sustainable public policy which protects and promotes the milpa.

The aim of this report is to examine the relationship and legal implications between the milpa system and the human rights expressed therein. To that end, a logical framework as developed which analyzes: (1) biocultural heritage and commons, (2) the garantist and pluricultural state in Mexico, (3) food sovereignty, and (4) agroecology and sustainability. Then, we present a contextualization of the milpa to in turn offer an analysis of issues surrounding it related to the situation of farming in Mexico. Next, the section "Analysis and Results" links the milpa and the aforementioned human rights, public policy, and the numerous reasons to conserve this agroecological system in our country. Finally, we outline a series of conclu-

sions and recommendations focused on improving the legislation and public policy of the Mexican state in relation to the issue.

The peace Mexico aspires needs changes to our legal framework and public policy rooted in a human rights agenda. Mexico's original peoples and peasant communities hope and strive to be represented in government institutions and programs. Effecting such changes, to include the peasant perspective in the Mexican state, will require, on the one hand, eradicating one of the causes of cultural violence in the country, and on the other conserving and fomenting our biocultural heritage. In short, to nourish one of Mexico's oldest and most fertile roots is to construct a new state based in the territories, and by extension in the different faces which make up the Mexican nation. This report seeks to establish a blueprint for the construction of such a new state; therein lies its importance.



## II. INTRODUCTION



**T**he milpa is a core component in the lives of millions of indigenous farmers, peasants, Afro-descendent, and similar communities throughout Mexico and the Americas. In it, family and communal work and traditional knowledge converge to manage territory and biodiversity and obtain food, plant fibers, medicines, and other necessities. Milpa farming is a process of coevolution, in which farmers and the ecosystems they inhabit have shaped and reproduced one another over time and continue to do so; the milpa shapes ways of life and particular ways of understanding the world. Therefore, there is not just one milpa but many, each with unique traits, which manifest in a wide diversity of domesticated and cultivated species and in a diversity of knowledge, production methods, rituals, celebrations, and artistic expressions.

The milpa and other peasant farming practices have shaped or facilitated forms of land management which have permitted the conservation of life-sustaining ecological processes, resisting the deterioration produced by the prevailing economic model. Also, they have helped indigenous peoples and similar communities to perpetuate

their lifestyles and resist the marginalization or structural discrimination of the dominant political and economic system.

All these elements are part of Mexican cultures, even in communities which do not practice agriculture, and are present in our diet, our languages, our celebrations, and our daily life; they are part of our biocultural heritage and are invaluable commons, not only for farming peoples but for Mexico and the world.

However, although the Mexican Constitution states, in Article 2, that the nation has a pluricultural make up, the Mexican state has been built up from a hegemonic western perspective, with the resulting systemic cultural, economic, and political violence toward indigenous peoples and peasants. This is reflected, in particular, in a legal framework and public policies which discriminate against indigenous/peasant customs and ways of life, and against the milpa as one of their manifestations.

As a symptom of this, the Mexican government has made concentrated efforts to foment an agroindustrial model of production which, while it has helped produce high yields in some regions and for some crops, has also resulted in social,

cultural, and environmental erosion throughout Mexico. In relation to the milpa, it has promoted substitution of native seeds, fertilizers, and traditional techniques with commercial seeds, synthetic inputs (chemical fertilizers and pesticides), mechanization, and monoculture, at the same time as the bulk of public funding has gone to programs which favor agroindustry. In addition, authorization to plant transgenic maize threatens the diversity of the grain in its place of origin.

The neoliberal economic policy, enshrined in the legal framework put in place since the 1990s, centered on opening of markets and eliminating guaranteed prices, forced domestic small-scale farmers to compete against large-scale international producers and expedited the introduction of inexpensive, poor quality industrial foods in rural economies which theretofore had remained relatively autonomous. Also, the Agrarian Act was amended to permit sale of communal landholdings and as a result facilitate access for large scale extractive industries, evicting and displacing peasant and indigenous communities, many of which have become exporters of labor to the cities. This tendency has been reinforced by recently enacted reforms in the energy sector which favor extractive enterprises over any other use of land.

Against this backdrop, the aim of this report is to examine the relationship and legal implications between the milpa system and the human rights expressed therein, to emphasize respect and support for the practice of this ancestral mode of production as one of the indispensable mechanisms to guarantee the fundamental rights, not only of no original peoples and similar communities but of all Mexicans. Also, this report seeks to under-

score the importance of the different distinctive facets milpa farming, such as: (i) fundamental manifestation of biocultural heritage; (ii) practice and fundamental element of a sustainable and culturally appropriate model of agriculture; (iii) an effective option for the Mexican population to confront the social, environmental, and nutritional crisis afflicting humanity; and (iv) manifestation of the ongoing exercise of human rights. Finally, the report seeks to help answer the question of what role the milpa system should play in public policy on agriculture in Mexico.

## III. LOGICAL FRAMEWORK

**T**his report is guided by certain core concepts which are essential if we are to address its two central objectives, to underscore the importance of the milpa from different standpoints and reflect on the role the milpa system should play in public agrarian policy in Mexico. These concepts are developed below.

### 3.1 Biocultural heritage and commons

For indigenous and/or peasant communities, over centuries day-to-day management of natural resources and ecosystems in their territories has given rise to what we refer to as biocultural heritage (PatBio). PatBio refers, on the one hand, to cultural elements indispensable to the indigenous or peasant way of life, and on the other to a long-standing process of coevolution with the ecosystems they inhabit. Argumedo (S/F) has remarked that the concept of PatBio helps shed light on: (i) the deep bonds between indigenous peoples and their environment; (ii) how indigenous peoples make no distinction between biological and cul-

tural resources, but treat them holistically; and (iii) how biodiversity depends directly on the cultural practices of indigenous peoples and vice-versa, which means that culture and environment cannot be separated or commodified (Boege, 2008).

In Mexico, PatBio is expressed and kept alive by the day-to-day use indigenous and peasant communities make of biodiversity and ecosystems, creating, through the process of domestication and diversification of natural elements, different agroecological communities. Such communities, as products of constant human action on natural elements, are intimately tied to the creation and perpetuation of cultural identities (Jardon and Benitez 2016). Thus, the biocultural landscape formed by agroecological communities and natural ecosystems shapes what we refer to as the agroecosystem, which is the result of the constant confluence of ecological, social, and cultural factors, and as such can be identified as a unit of biodiversity and culture<sup>1</sup> on which indigenous and peasant communities base their cultural permanence and

<sup>1</sup> Over time, these territories became, and remain centers of origin, diversification, and use of a large number of species in the global nutritional and medicinal system.

their flourishing as a group (Boege 2008; Jardon and Benitez 2016), in other words, where they find and perpetuate their PatBio.

As defined by Argumedo (S/F), PatBio is “a complex system, formed by interdependent parts.” Such heritage refers to the existence of biocultural memory, understood as a body of knowledge which comprises beliefs-world view (kosmos), a system of knowledge (corpus), and productive practices (praxis), with which indigenous and peasant groups interpret events and guide their day-to-day actions (Toledo and Barrera-Bassols, 2008). The materialization of such memory is PatBio, which, according to Boege (2008), inexorably encompasses three elements: a) biotic natural resources subject to different degrees of intervention, b) the use of those natural resources in accordance with cultural patterns, and c) traditional agroecosystems as the expression of domesticated biodiversity. Today, such traditional management has made indigenous territories the best environmentally conserved areas in Mexico.<sup>2</sup>

PatBio also presupposes what Bonfil (1988) has called cultural control of natural resources or territory, describing it as a “system whereby people exercise the social capacity to make decisions on cultural elements. Cultural elements<sup>3</sup> are all the components of a culture which must be put in play to perform its various social actions: maintain daily life, satisfy needs, define and solve problems, [and] formulate and seek to fulfil aspirations.” In this sense, non-interference by other groups in the

decision-making processes of indigenous and peasant communities on their PatBio is fundamental for their cultural survival. Thus, to speak of PatBio is to speak of a common asset indispensable to the welfare and quality of life of indigenous peoples and peasant communities. Also, it is a fundamental depository of diversity for humanity to effectively respond to disruptions like those expected with climate change (Boege, 2008).

All peoples, throughout history, have relied on numerous indispensable common assets for their survival (Ostrom, 2003). In the case of original peoples and similar communities in Mexico, the PatBio has been, precisely, the body of commons on which they have founded their cultural identity and on which they habitually draw to sow the seeds of their future and flourish. In other words, PatBio as commons is part of those assets which “are produced, bequeathed, or transmitted in a community situation. They are assets which pertain and respond to the interest of each and every one of the members of a community” (Vercelli and Thomas, 2008:50). Also, such assets possess a broad diversity which, according to Boiller (2008), may embrace elements of nature, material creations, and intangible creations.<sup>4</sup>

Commons are actually a subsystem within a far larger economic–political system, charac-

2 Consider, for example, that the territories of indigenous peoples are home to almost 80% of the Earth’s biodiversity, while they are legal owners of less than 11% (World Bank, 2017).

3 According to this author, cultural elements may be material, organizational, knowledge, symbolic, and emotional.

4 In ancient Rome, the commons or *res communis* were made up by all things which, by natural law, were common to all, such as air and water in rivers and oceans. Jurists of the day interpreted the *res communis* as those things of such nature that they can be used and enjoyed by everyone but cannot be appropriated exclusively (Taylor 1998). Today, International Public Law has developed the so-called Pardo Doctrine, better known as “commons,” which has been expressed in instruments like the Montego Bay Convention on the Law of the Sea (1982), and is characterized by (i) the absence of ownership, (ii) common administration of uses, and (iii) distribution of benefits.

terized by their high degree of versatility, since they can be implemented under a wide range of domestic regimes (e.g. indigenous territories) and political systems (capitalism, communism, etc.). In this context, Elinor Ostrom (2003) affirms that the complexity of human reality is such that the approaches of private enterprise and the state are inadequate to explain and address the problems facing humanity; a third option is needed to complement them: the theory of commons (self-organized collective action). Numerous examples in Mexico show that it is through communal institutions (assemblies, seed funds, etc.) that people have achieved sustainable social management of diverse natural assets and processes (Toledo and Espejel, 2014).

Commons aspire to autonomy and self-determination, and managing them implicitly implies building bonds of trust and cooperation among users or members of a community (government of commons); if they are altered, the resilience of the system, in particular its social and environmental elements, will be compromised. The famous “tragedy of the commons” described by Hardin (1968) is perfectly avoidable if trust, communication, and information flow efficiently among users (Ostrom, 2003).

Thus, commons suppose systems of cooperation where pursuit of the higher good is subordinate to collective organization. Such holdings imply a “series of values and traditions which confer identity on a given community and help it self-govern” (Boiller, 2008:30). Commons may have sophisticated normative systems, usually supported by customary and traditional practices, which include mechanisms for administration,

oversight, and defense, as well as sharing of benefits among users.

Historically, legal systems have protected the commons by endowing them with properties such as inalienability and freedom from adverse possession and attachment. Their legal protection is the materialization of social justice, a product of their history as a people’s struggle against their privatization, enclosure, or closure.

As explained by CEMDA (2014)<sup>5</sup>, Pat-Bio represents a convergence of two theories of legal science, to wit that of commons and that of human rights, since through it communities exercise third generation or collective human rights, in other words economic, social, cultural, and environmental rights (e.g. cultural identity, food, environment, autonomy, territory, and access to traditionally managed natural resources), as a result of which their conservation, sustainable use, and promotion are absolutely necessary for the subsistence of the traditional way of life and for the fulfilment of those rights.

### 3.2 The guarantist and pluricultural state in Mexico

Mexico, by constitutional mandate, is a guarantist (Article One) and pluricultural (Article Two) state. The guarantist state, which Ferrajoli also calls substantial democracy, is that in which human or fundamental rights have been incorporated as

<sup>5</sup> See the report “Destrucción del patrimonio biocultural de México por megaproyectos y ausencia de legislación y política pública culturalmente adecuada para los pueblos indígenas y comunidades equiparables,” available at [http://www.cemda.org.mx/wp-content/uploads/2015/09/Informe-IACHR-PatBio.VF\\_.pdf](http://www.cemda.org.mx/wp-content/uploads/2015/09/Informe-IACHR-PatBio.VF_.pdf)

suprastate and constitutional norms, making them the substance, beginning and end of all legislation and public policy, “*precisely because they are related not to the form (the who and the how) but to the content (the what) of decisions (In other words that which it is not lawful to decide or not decide); fundamental rights turn into what we can call the sphere of the undecidable*” (Ferrajoli, 2010:51), and consequently are beyond the reach of any majority which might seek to amend them through the legislative process.

Human rights, therefore, become the source of the state’s legitimacy (Carbonell and Salazar, 2013) and are themselves a program of governance the inobservance of which may be prosecuted judicially (Abramovich and Courtis, 2002). Fundamental rights are dynamic and their contents are in constant development, especially in the international sphere.

We affirm that, as Olive (2003) remarks, in the perspective of multiculturalism there are no true and absolute values: “*human rights are not rights based on values which apply to any society; they are rights which are based on notions of dignity and basic necessity which are neither absolute nor transcendent, but rather are concepts whose meaning must be defined in each era among legitimate representatives of diverse cultures*” (Olive, 2003:74-75). On the basis of these definitions, constraints on political power and on the dominant culture must be legally and periodically constructed. For its part, the pluricultural state is that which is not exclusively committed to a single way of being and acting in the world; on the contrary, it is that which is obligated to foster and conserve all ways of being and acting which are found in its

territory, in other words that which guarantees different groups and ethnicities effective cultural control of their cultural elements to ensure the conditions necessary for their flourishing and the effective exercise of their right to difference. In such a state, the authorities should, on the one hand, guarantee all persons the satisfaction of their basic needs (homogenizing obligation), and on the other guarantee full respect for the right to difference (dynamizing obligation), understood as the creation, conservation, and realization of collective rights by virtue of the group to which one pertains (Olive, 2003).

The right to difference justifies the establishment of a public policy of recognition of individuality, in other words what distinguishes one person from another or one people from another (Bonilla, 2006). In this context, a pluricultural state has an obligation to make the adjustments necessary of peaceful coexistence of different cultures, and to constrain the reach of a dominant culture.

Jointly, indigenous peoples and similar communities possess various rights which are expressed or exercised collectively through day-to-day management of PatBio, such as the rights to autonomy, cultural identity, territory, access to traditionally managed natural resources, water, the environment, and adequate food. In this sense, the U.N. Committee on Economic, Social, and Cultural Rights, in issuing General Comment 9 of 1998, determined that “*states should modify the domestic legal order as necessary in order to give effect to their treaty obligations*” (UN, 1998) and the Interamerican Commission on Human Rights (2009) underscored the need to preserve the territories of indigenous peoples and similar

communities adopting special measures.

In other words, in the pluricultural state the authorities act as guarantors of the fundamental rights of such groups and are called upon to be a constant source of solutions to foster “*interaction and reciprocal interpretation between members of different cultures*” by building intercultural bridges to achieve the eradication of cultural violence (Galtung, 1990). Therefore, to attain peace in the pluricultural state, the authorities need to develop legislation and public policy which, as Dietz (2012) affirms, are centered around two axes, the first seeking to advance the construction of cultural identities from the territory and the second designed to respect and protect landless or migrant identities.

In practice, this means that indigenous peoples and similar communities are in a position to implement projects of their own without being subordinated to a monocultural logic. Villoro accurately observes that “*autonomy is the right to negotiate with the state on the terms of their survival and the possibility of developing a collective project, within the framework of an authentically multicultural state*” (Villoro, cited in Olive, 2003).

In summary, human rights and the pluricultural state today constitute valuable tools which indigenous and peasant groups can use to advance their endogenous development projects and protect their PatBio. The effects of the guarantist, pluricultural state should be the development and enactment of legislation and public policy which permits the flourishing of peoples and communities in their territories.

### 3.3 Food sovereignty

The concept of food sovereignty was conceived in the context of social movements as a notion which favors productive restructuring and institutional innovation in unequal, fragmented, and fragile societies (Carrasco, 2008). The term was coined by *Via Campesina*, an international movement which coordinates organizations of small- and medium-scale peasants, rural women, farm workers, original peoples, youths, and landless day workers, in parallel to the World Food Summit of 1996, in response to neoliberal agriculture and trade policies which promote industrial agriculture and free markets for food. The term has been developed further since then, both in social movements and civil society organizations (SCOs) and in the government sector, especially in World Food Summits, at the SCO Forum for Food Sovereignty in Rome in 2002, and at the International Forum for Food Sovereignty in Nyeleni, Mali in 2007.

Food sovereignty is defined as the right of peoples to define their own farm policies and control their food systems, including the protection of their markets, natural resources, food cultures, and modes of production (*Via Campesina*, 1996; Rosset, 2004; Chapell et al., 2013). Such sovereignty implies:

- Prioritizing local farm production by giving peasants access to land, water, credit, and suitable farm inputs. This implies the need to enact agrarian reforms favorable to peasants, increase free access to seeds and other inputs, and maintain water as a public asset for sustainable use. Con-

sumers' right to decide what they want to consume, how, and who produces it.

- Nations' right to protect themselves from food imports which undermine local markets. This means policies which establish farm prices linked to real production costs, control of imports, and promotion of local production and consumption. Grassroots involvement in the definition of national policies on food, commerce, and natural resources. Recognition of the rights of women, who play a fundamental role in the agroalimentary system. The emergence of new social relations free of discrimination between men and women, persons, ethnic groups, and social and economic classes, and between generations (*Via Campesina*, 1996).

The concept of food sovereignty promotes an ethical conceptual framework based on control of production and access to food as an element in which economic, social, cultural, political, and environmental rights converge (Anderson, 2008).

In this context, from the perspective of food sovereignty, the argument is made that industrial agriculture generates social and ecological costs such as displacement of rural populations, invasion of lands, and loss of services from ecosystems and biodiversity (Chapell et al., 2013) and agroecology is proposed as a mode of production which will make it possible to accomplish the social, economic, political, and environmental objectives which food sovereignty proposes.

### 3.4 Agroecology and sustainability

There are multiple definitions of agroecology, arrived at from different positions and with more or less broad approaches. Ferguson et al. (2009) mention that agroecology may have three different meanings, which are closely interrelated, as follows (i) a science which studies agriculture from the perspective of ecology; (ii) a set of food production practices based on ecological, scientific, and traditional principles; and (iii) a social movement for fair and ecologically viable food production and distribution systems.

As a scientific discipline, unlike conventional agricultural science, agroecology seeks to comprehensively understand the ecological and social factors which intertwine in the structure, function, and coevolution of agricultural production systems (Altieri, 2002). Agroecology conceives such systems as complex communities shaped by interactions among various cultivated and associated species of plants, animals, microorganisms, and humans. Such interactions maintain the biogeochemical and biocultural processes which give rise to the generation and maintenance of agroalimentary systems and existing agrodiversity (Jardon y Benitez, 2016).

Agroecology implies a critique of the dominant scientific thinking, on the one hand, highlighting the ethnocentrism of a system based primarily on a single civilizing narrative, the modern, western perspective, and on the other emphasizing the need to complement scientific knowledge with traditional peasant and indigenous knowledge (Sevilla, 2011).



Photograph: Ximena Ramos Pedrueza Ceballos

From a political standpoint, agroecology can be defined as “*the ecological management of natural resources through forms of collective social action which offer alternatives to the present-day crisis of civilization, through participative approaches to the means of production and alternative circulation of products, seeking to establish forms of production and consumption which help revert the ecological and social deterioration produced by modern-day neoliberalism. [...] [Ecological and sociocultural biodiversity] is the point of departure for alternative agricultures, leading to the participative design of endogenous methods of socioeconomic progress to establish dynamics of transformation toward sustainable societies*” (Sevilla, 2011).

The principles of agroecology help construct processes of sustainability, which we understand here as ownership of ecological and socioecological systems to preserve them and to maintain their productivity and functionality permanently, ideally by maintaining or recovering biogeochemical and sociocultural processes which allow the system to be self-regulating and self-sufficient. As a related concept, from its definition, the notion of sustainability has emphasized the importance of satisfying “*the needs of the present generation without compromising the ability of future generations to satisfy their needs*” (UN, Brundtland Report, 1987). Here we embrace this vision, in the context of food sovereignty and human rights.



## IV. THE MILPA IN CONTEXT

**T**he milpa<sup>6</sup> is the most important agroecosystem in Mexico, bioculturally speaking, since it provides the nutritional foundation for peasant and indigenous families and forms the central pillar of the multiple land use strategy implemented by such groups within a mosaic formed by diverse spatial and symbolic territories to construct a cultural landscape and a social and natural history (Boege, 2008), which aspires to self-sufficiency and food sovereignty (Moreno-Calles et al., 2013; Damian-Hurtado and Toledo 2016).

The milpa is the heart of the Mesoamerican food production system. In the context of the milpa, the original peoples of Mexico domesticated and developed around 15% of the plants cultivated in the world (Conabio, 2008), where native maize constitutes the central crop. In Mexico, 64 varieties of maize are grown (Conabio, 2011), almost all of which are planted by peasants and indigenous peoples, who represent 80% of producers and grow maize on slightly more than half the total area devoted to the crop (SIAP, 2017; Kato et al., 2013).

<sup>6</sup> Word of Nahuatl origin meaning “place of planting” or “planted land.”

According to Sanchez-Morales and Hernandez-Ortiz (2014), the milpa system is “*both the physical space, the land, the plot, and the plant species, the productive diversity which grows there; the milpa system is also the embodiment of the agricultural knowledge, technology, and practices necessary to obtain from the land and from human labor the products necessary to satisfy the basic needs of peasant and indigenous families. Milpa farming encompasses the entire productive process, from choosing the land through harvest. In this sense, the milpa is a system of knowledge of nature and agriculture, synonymous with biological survival and social reproduction and peasant identity.*”

In other words, the milpa is an agroecosystem produced through a prolonged process of coevolution of societies and ecosystems (Gliessman, 2002), characterized by polyculture which has been adapted to the specific edaphological, ecological, social, and cultural conditions of the territories where it is practiced, and consequently has a variety of expressions. In effect, the milpa cannot be conceived as a particular, clearly delimited unit, but on the contrary, milpa farming incorpo-

rates multiple practices, crops, and varieties which change depending on the preferences, traditions, beliefs, customs, and world views of the different groups who practice it, as well as the ecological and geographic characteristics of each region where it is practiced. More than a set of practices or crops, milpa farming, to a great extent, is a process of experimenting, adapting, and reproducing all the biological and cultural elements associated with a maize-based agroecosystem.

Despite their diversity, different modalities of the milpa share three essential traits. The first is the presence and management of maize, often in association with squash and beans, alongside which one may also find chili peppers and multiple cultivated plants and beneficial weeds (Bartra 2013; Moreno-Calles et al., 2013). The second is a management style based on the multiple use of seeds, knowledge, interests, needs, and local agricultural exigencies (Lazos and Espinoza, 2013); and the third involves the exercise of fundamental rights of indigenous peoples and peasant communities, including cultural identity, adequate food, health, a healthy environment, autonomy, territory, access to natural resources, work, and communal property (Martinez-Esponda, 2014).

For example, in February 2017, the Tosepan Titataniske Cooperative, an organization formed by members of the Maseual and Tutunaku peoples, published a document entitled “*Soñando los próximos 40 años*” (Dreaming of the next 40 years), which we cite below:

*“The milpa is the foundation of a healthy diet for us, the Maseualmej and allows us to practice our own values, for that reason, we per-*

*form a special ceremony at every planting: we start by burning incense so that the seeds will germinate well, then we call out to the earth to ask permission because we are going to hurt it, at every corner of the plot we plant red maize because it is strong and blocks the wind. Men and women work together in communal crews, where one’s work is not rewarded with money, but with reciprocal work. We use tamakepalis (communal work crews, also known as “mano vuelta”) to do field work, to build homes, for religious celebrations with traditional dancing, and even for wakes. When one Maseual family helps another in mano vuelta, they know they can count on receiving help when they need it. In the milpa, alongside maize we plant beans, squash, tepin peppers, papalo (broadleaf), tomatoes, yucca, and amaranth greens. At planting time, the women bring food to the milpa at lunchtime and eat with the men who are working in the field so that the ears of maize grow strong with lots grain. Throughout the process, the family participates in the different stages of production: planting, weeding, and harvesting. The milpa is an example of the close relationship we Maseualmej have with our territory.”*

In addition, the document affirms that the milpa will be protected and fomented in programs organized along following strategic lines “II: Food sovereignty and security” and “IV. Biocultural productive processes and preservation of land and water,” because the traditional productive system is indispensable for their reproduction as peoples and for the exercise of their fundamental rights.



The milpa system is part of the PatBio and is a symbol of the persistence of the peasant way of life; thus, its perpetuation is the day-to-day reproduction of that way of life. Traditional agriculture or agriculture for self-consumption is one of the core defining features of these identities. Such agriculture originated nearly 10,000 years ago and is characterized by “*small scale, with high levels of diversity, self-sufficiency, and ecological productivity, and based on the use of solar and biological energy*” (Toledo and Barrera-Bassols, 2008), and by relying on family and community labor, with very little or no use of wage labor. Thus, each family member contributes, performing tasks differentiated by age and gender. The system also strives for optimization in the use of resources

like land, water, plants, and animals, promoting sustainable use, conservation, and diversification.

The Mexican diet and gastronomy are further manifestations of the milpa; for example, today, 53% of calories (carbohydrates) and 39% of protein in the average Mexican’s diet comes from direct consumption of maize as nixtamalized grain in some 600 specialized dishes (Bourges, 2013).

However, as we explain in the next chapter, the milpa is embedded in a broader context of cultural violence (Galtung, 1989), in which it can be seen as a bastion in defense of cultural identity to fend off structural violence exercised from the state, climate change, erosion of biodiversity, and nutritional and social crises (Boege 2008; CEMDA, 2016).

In other words, the milpa is, primarily, a space where cultures are perpetuated, autonomy is constructed, biodiversity is conserved, human rights are satisfied, and food sovereignty is attained. In the words of Bartra (2013):

*“The revindication of the milpa – the defense of peasant production of maize, beans, and other basic foods – is a struggle against hunger and exodus, a fight for food sovereignty and labor sovereignty. But it is also a deeper, more decisive battle, to preserve cultural plurality and biodiversity, on which depend not only the future of our country, but the future of humanity itself.”*

These remarks underscore (i) the importance and meaning of the milpa in peasant and indigenous ways of life, and (ii) the Mexican state’s obligation to protect and promote the milpa, legally speaking, as the physical and symbolic space from which peasant and indigenous communities exercise important collective human rights.

Finally, below we present significant data on the presence of peasant and indigenous groups in Mexico, related to population and landholding, production units, population by type of agriculture, and emblematic crops.

Table 1 shows that, although the rural population represents slightly more than a third of the national total, it occupies 90% of the territory. Secondly, of the total rural area, only two thirds are devoted to farming; the other third, mainly under communal and collective landholding systems, totals almost 65 million hectares under conservation. Finally, it is noteworthy that more than

half of the territory is social property, occupied primarily by indigenous, Afro-descendent, and mestizo peasants.

Since the amendment to Article 27 of the Constitution in 1992, the number of smallholdings and concentration of land have increased. Table 2 illustrates the degree of concentration of land in the hands of a small number of owners, mainly private and devoted to industrial agriculture: only 11% of all landowners control 80% of the land.

	Persons (millions)	Percentage	Hectares occupied (millions)		Percentage	
<b>Total population</b>	112.11	100%	196.4		100%	
<b>Rural population</b>	32.4	28.9%	177.4		90.3%	
<b>Heads of farm production units</b>	5.9	In relation to rural population 18%	112.3		In relation to rural area 63.3%	
<b>Private owners</b>	1.6	In relation to total unit heads 27%	70		In relation to area in production 62.3%	
<b>Communal and collective owners*</b>	4.2	In relation to total unit heads 71%	Productive area 40.8	Total managed area 105	In relation to area in production 36.3%	In relation to total area 59.2%

Table 1. Population and landholding in Mexico. \*The productive area under social tenure (communal and collective ownership) reported by the INEGI is less than the total area; this means that land under social tenure includes approximately 65 million hectares under conservation. Prepared by the authors with information from Sagarpa-INEGI 2014; De Ita, 2014; Berlanga and Ruiz, 2012.

	Persons (millions)	Percentage	Area (millions of ha)	Porcentaje
<b>Heads of farm production units</b>	5.9	100%	112.3	100%
<b>Less than 5 ha</b>	3.9	66%	6.7	6%
<b>5 to 20 ha</b>	1.3	23%	13.3	11.9%
<b>More than 20 ha</b>	.7	11%	92.3	82.1%

Table 2. Number of production units by category of size. Prepared by the authors with information from De Ita, 2014.

The following graphs show that, despite the lack of irrigation, rainfed farming, mostly by peasants, produces the bulk of two of Mexico's primary food crops, as we have observed, using primarily native seeds and traditional techniques.

**Maize production 2016**

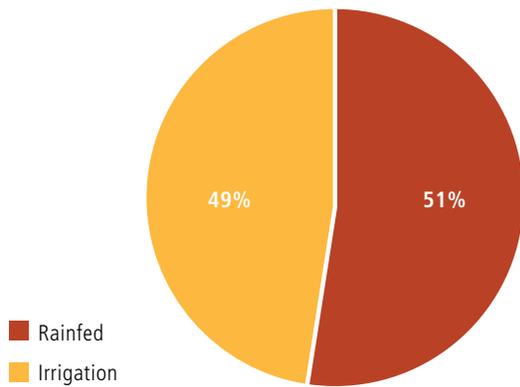


Figure 1. Maize production by type of farming. Prepared by the authors with information from SIAP, 2017.

**Bean production 2016**

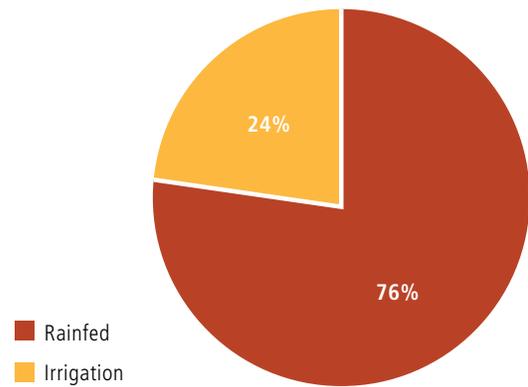


Figure 1. Bean production by type of farming. Prepared by the authors with information from SIAP, 2017.



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The milpa is not monolithic, but manifests in highly diverse ways across Mexico. This part of the report is devoted to illustrating the different aspects of milpa farming in Mexico's various biocultural regions. This documentation was assembled based on interviews with peasant farmers, members and advisors of rural organizations in Tlaxcala, Chiapas, Jalisco, Puebla, Veracruz, and Yucatan, as well as visits to milpas.





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## Biodiversity and sustainability

Peasants select and save seeds from their harvest of maize and other crops. They protect them from worms and mold with traditional techniques, and often exchange them within communities or at fairs, and experiment with seeds from other farmers on their plots. Seeds are selected at times from standing plants, at times from ears of maize, and at times from loose grain. The selection is made by both men and women, based on productive, culinary, and symbolic criteria. All this favors the constant adaptation of seeds to the socio-environmental climate and the regional seed stock under highly diverse conditions. On the other hand, many of the peasants interviewed employ practices which favor the conservation of soil and water, and by extension the functioning of ecosystems. For example, they use live barriers or trees to block erosion or incorporate organic matter in the form of green fertilizers or mulch. In the milpas documented, peasants also identify diverse edible plants and a wide variety of insects, birds, mammals, and domestic animals.

Photograph: Mariana Benítez Keinrad



## **Productivity and economics**

More than half of milpa produce is used directly as food for the peasants interviewed, whereas nearly all the products of trees and other perennials are sold (for example mezcal or fresh fruit). Often, milpa production is enough to guarantee a full year's supply of tortilla, although farmers will have to buy maize when the harvest is poor or they lack space to store the grain. Also, the milpa produces many other foods which are consumed year round. Of the factors which affect yields, interviewees identified the cost of inputs, inadequate government aid, depletion of soil, climate change, failure to perform rituals, limited plot size, and lack of appreciation of their products.



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### **Biocultural heritage**

Biocultural heritage manifests in many forms around the milpa. Planting and harvesting, for example, are the occasion for festivals or rites involving the whole family, sharing food with people who take part in planting or blessing the seeds. Gastronomy is enriched by the diversity cultivated, tolerated, or promoted in the milpa, giving rise to a great variety of beverages, seasonings, snacks, festive dishes, etc. The milpa is also a source of home remedies and materials used in fashioning utensils and decorations. Women are especially active in religious activities and rituals associated with the milpa, and in preparing traditional dishes and remedies, playing a central role in the transmission and perpetuation of biocultural heritage. In the words of the interviewees, when people stop practicing milpa farming they lose their culture and are obliged to buy food or seeds which don't have the same flavor.



## **Social organization**

Peasants who practice milpa farming and have formed organizations, cooperatives, or associations, have done so to overcome periods of scarcity of seeds or low prices for their products, to cut out middlemen and regulate or obtain better crop land. Organizing, they have found, allows them to propose and implement agroecological practices, progress in gender equality, and contribute to official programs to change farm policy, consume contaminant-free foods, and better withstand variations in prices. Some organizations also foster learning in a variety of areas, and have even started newspapers, weaving groups, and cooperatives to process and package some products. The activities of such organizations also include attending and organizing events where they can exchange seeds and experiences with other peasant farmers.



### Practices and techniques

In each locality and on each plot, farmers employ diverse practices associated with milpa farming. Practices common to many localities include returning crop residue and manure to the ground, crop rotation, and planned fallowing of lands. There are also highly local practices, like preparing a basket with poxni leaves, in which some peasants in Cuetzalan prepare their seeds before planting. Fertilization may be performed by families or with other farmers, commercial fertilizers are also used extensively, especially when provided directly through government aid programs or when program funds have to be used for inputs.



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## Life stories

Milpa farming is taught from childhood with everyday practice, through the transmission of local knowledge among peasants, with entire families participating in different activities which encompass from preparing the land to daily kitchen chores. In the case of interviewees who had not practiced it from childhood, siblings and parents-in-law or neighbors have transmitted their knowledge milpa farming techniques. The milpa is more than a maize-based polyculture, it is a source of a varied diet tailored to the family's tastes; it is a powerful bond with the Earth and also a source of income and a means of raising food for domestic animals. Depending on the region, the milpa may coexist with crops of agave, coffee, fruit trees, and vegetables and with other agroecosystems. The interviewees observe that some practices have changed, the weather is increasingly unpredictable, and they have learned new practices to make a milpa more productive. Although the whole family is often involved in activities associated with the milpa, many young people participate only occasionally, whether due to a lack of interest, because they are in school, or because they have migrated.



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## Public policy

Several of the interviewees have been beneficiaries of the aid programs Procampo, and in some cases Prospera, but they concur that participating in those programs involves cumbersome bureaucracy and time spent to receive minimal economic support. Also, they affirm, in any case, the programs support planting maize using commercial products, but not milpa farming. Options some peasants have considered include organizing among themselves to practice milpa farming, despite the lack of government aid, or demanding support for the milpa with no political agenda. Others mention that it is of vital importance for traditional producers to strengthen ties with universities

and institutions which can help them improve their methods. Moreover, some mention that, because they are under pressure to sell their lands or rent them to mining companies, it is better to continue organizing. When asked what a policy supportive of milpa farming would look like, they replied that it should include financial assistance to produce fertilizer, promote native seed banks, channel funds directly to peasants who practice the milpa system, regenerate areas where milpa farming is still practiced, and government efforts to find markets where milpa farmers can sell their products for fair prices.





### Vicente Guerrero, Tlaxcala

The community of Vicente Guerrero is in the region of the Tlaxcala plateau, near Popocatepetl and Iztaccihuatl volcanoes, in the municipality of Espanita, Tlaxcala. The region's climate is temperate with sub-freezing low temperatures and forests of predominantly pine and oak. In 1981, a group of local peasants founded Proyecto de Desarrollo Rural Integral Vicente Guerrero A. C. (Vicente Guerrero Group; GVG), motivated by the need to conserve soil lost to erosion and runoff and diminished fertility due to the excessive use of agrochemicals and monoculture. Using Peasant-to-Peasant methodology and reaching out to other peasant organizations and academic entities, the members of GVG have transformed the landscape of their community by implementing terraced farming, level curves, live fences of forest and fruit trees, magueys, and nopal cacti. Also, they have gained experience in the use of agroecological techniques, and have restored and adapted various traditional farming techniques, as well as conservation and exchange of native seeds

through fairs. Today, local farmers cultivate diversified milpas with maize, beans, squash, and lima beans, having added the latter to the milpa due to its resistance to frost. They also harvest fruits like apples, peaches, apricots, and capulin cherries, in addition to amaranth, purslane, and nopal cactus. Panfilo Hernandez, a member of GVG, remarks about the milpa: "I have to diversify my crops to withstand the weather conditions and have varied sources of income, since if I plant just one crop I am more exposed to losses in the production cycle in case of frost, drought, or heavy rainfall [...] The greater the diversity [on a plot], the more it supports life in the soil, aids in protection and management of insects, and the less prone crops are to disease; the benefits vastly outweigh those of monoculture." By diversifying their techniques and crops, farmers in Vicente Guerrero have succeeded in conserving their soil, diversifying their production, and improving their families' diet.

Photograph: Axel Maldonado

**"I keep [my seeds] because they have adapted to my plot"**

— Alicia Sarmiento Sánchez, farmer in Vicente Guerrero, Tlaxcala.





### **Zapotitlán de Vadillo, Jalisco**

Very near the Colima volcano, for generations the family of Macario Partida Ramos, master mezcal distiller from the municipality of Zapotitlan de Vadillo, Jalisco, has produced a traditional mezcal famous for its outstanding quality. However, their work goes beyond producing the distilled spirit: their production system represents a comprehensive and sustainable model which, in addition to allowing them to continue to make mezcal, enables the family to supply itself with various staple foods and conserve the natural resources of the region. Their system combines different strategies and areas of sustainable use and conservation of the

local biodiversity. In the area of conservation, it favors preservation of the biodiversity and plants of the region. Cultivation of agaves comprises several varieties, and an area for milpa planting, interspersed with mezquites, pitayo cacti, and agaves. The wealth of species found in the Partida Ramos family's milpa helps prevent potential invasion by pests, while boundaries and terraces are reinforced to reduce erosion. In recent years, they have fertilized part of their land with the byproduct of mezcal distillation, achieving very positive results.

Photograph: Mariana Benítez Keinrad





### Rayón, Chiapas

Jorge Ruiz, age 42, and Gregorio Rodriguez, age 54, are peasant farmers from the municipality of Rayon, in the Black Forest, one of the last redoubts of the Chiapas cloud forest. Since they were children, they have worked in milpa farming; however, in recent years, since they started working with ISITAME A.C., they have increased the diversity of their crops and implemented new farming techniques, in particular the Milpa Interspersed with Fruit Trees (Spanish acronym MIAF) system. Gregorio recalls: “Since I was growing up, I’ve worked our plot; it was different then, my father taught us; we burned and cleared with hoes. [...] Year by year the land was depleted, as soil was lost to erosion, caused by burning. [...] the milpa has changed a great deal; my only hope was maize and beans, but if the wind came and blew down the

plants, it wiped out my hopes for a harvest. Now the trees block the wind, the milpa does not get knocked over as easily, and I reap a good crop of fruit. [...] Since I stopped burning, the soil absorbs more nutrients from the weeds and leaves from the trees. I’m happy with my plot, I don’t have to leave home; every day I have work in the milpa and with my fruit trees.” Today, his milpas are home to several varieties of maize and beans, squash, and leafy greens, as well as black nightshade, turnips, mustard, and amaranth; vegetables like cabbage, chard, and radishes; and fruit trees like avocados, peaches, apples, and limes. For Jorge and Gregorio, family is fundamental, since field work can be divided between men and women, and between the young and their elders.

Photograph: ISITAME, A.C.

**“Where I don’t plant beans, I turn over the soil or plant cabbage, but I don’t plant the same thing in the same place every year because the plants need new soil.”**

— Gregorio Rodriguez Lopez, peasant farmer in Manzanillo, Rayon, Chiapas





## Cuetzalan, Puebla

Cuetzalan del Progreso is a municipality in the Northern Mountains of Puebla State. There, we can find tropical forest and cloud forest, both supporting ecosystems rich in biodiversity. The region is home to Jose Amador, age 55; Epifanio Garcia, age 63; and Maria Carcamo, age 65, peasants who from their childhood learned to farm the land and plant the milpa conserving their native seeds and traditions, the way their parents and grandparents taught them. For Jose, the milpa is the “the first food,” for Epifanio “it’s something certain, not like money,” and for Maria “it means many things, [but] above all health.” Today, all three cultivate the milpa to raise healthy food for their families without using any chemical products. They plant maize, beans, squash, chayote (vegetable pear), and chili peppers (tepin peppers) and whatever else they need. Also, they cultivate organic shade-grown coffee in a system that combines coffee bushes with fruit trees, called Kuojtakiloyan or

“coffee gardens” and market it through the NGO Union de Cooperativas Tosepan A. C. of which they are members. Jose recalls how “People used to use chemical herbicides and fertilizers [...] people saw it as miraculous because they saw things change rapidly, and since they didn’t know what it could cause, they applied it. Later, as they became more informed, their practices changed; first, in the 1990s, they stopped using the fertilizers and then the herbicides, and in 1994 people started thinking about farming organically.” The organization has helped us diversify and certify our organic products (coffee, honey, pepper, cinnamon, and fruit), which in turn helps get better market prices. Also, it has given people the opportunity to acquire training, and over time pass on what they learn to help others improve their life, with nutritious food, health, and a stronger economy. As Jose says, “we can accomplish a lot more if we stay united.”

Photograph: Benito Vázquez Quesada

**“Before, we used chemical herbicides and fertilizers; around 45 years ago, people saw it as miraculous because they saw things change rapidly, and since they didn’t know what it could cause, they applied it.”**

— José Francisco Amador Esteban, peasant farmer in Yancuictlalpan, Cuetzalan





## Chacsinkin, Yucatán

The municipality of Chacsinkin is located in the southwest region of the state of Yucatan. It lies on a barrier plain with a rocky floor, with no streams of surface water. Nevertheless, there are a substantial number of cave reservoirs, where, in some cases, the ceilings collapse forming basins. The climate is sub-humid, with rains in summer. The predominant vegetation semi-deciduous medium forest, which is home to a wide variety of trees, among which the chaca, the breadnut, and the ceiba abound. Also, the large extensions of the territory are devoted to agriculture. Wildlife native to the municipality includes: deer, rabbits, badgers, armadillos, racoons, chachalacas, quail, ducks, iguanas, and snakes. All the municipality's inhabitants identify as Mayan and the majority speak the indigenous language and preserve the

customs and traditions unique to their culture. One of the strongest local organizations is Guardianes de las Semillas or Kaa nan iinajoob, which represents local maize growers, seeking to improve their communal and commercial organization, assist in production and conservation of native and criollo seeds and other related products, recover Mayan identity, and know and defend their rights. Mayan milpa farming has existed since pre-Hispanic times, and continues to be practiced today, with some changes. Farmers plant different kinds of maize, beans like lima beans, squash, chili peppers, and pumpkin seeds. Plots are prepared using the traditional slash-and-burn technique. Most farmers still perform rites related to planting the milpa, like the rain ceremony or Chachaac.

Photograph: Ximena Ramos Pedrueza Ceballos

**“On July 25, we all get together and celebrate the chac cha. People bring maize, chickens, and whatever else they can, like tomatoes, onions, and so forth. We share the expenses. We give the first fruits, and the food is divided. A man comes and sings. It’s an investment. To ask for water and give thanks. In the chac cha, the women prepare the food and the men take everything to the milpa”**

— Antonia, peasant farmer in Chacsinkin, Yucatan



## VI. THE MILPA AT RISK MEANINGS OF NEOLIBERALISM IN MEXICAN FARMING

All peoples use natural resources in accordance with their cultural patterns, which implies the existence of cultural control over them (Bonfil 1988); however, today humanity faces an unprecedented environmental crisis and the scientific community has proposed the name “Anthropocene” to describe the current geological epoch, during which human activity has had global impact on the biosphere (Crutzen and Stoermer et al., 2000). The Anthropocene is inextricably linked to the dominant models, specifically the modern-Western paradigm and neoliberalism, and its effect has been the violation of fundamental rights and erosion of the PatBio.

In these terms, the contemporary crisis is, actually, “the crisis of an economic, technological, and cultural model which has pillaged nature and negated alternative cultures. The dominant civilizing model degrades the environment, undervalues cultural diversity, and negates the Other” (Ambiente & Sociedad, 2002). Other facets of this crisis with far-reaching implications are the dissolution

of symbolic supports of the productive process (Leff, 2001), and the weakening of the national state (absence or transferal or ineffectiveness of controls on power) and the social state, understood from the perspective of incoherence and normative inflammation, and above all by the inexistence of an effective system to protect collective human rights (Ferrajoli, 2010).

The consolidation of the modern-Western model has triggered what Santos (2009) has described as the “production of inexistence,” in other words the disqualification of an entity so that it is made invisible by the operation of five logics: (i) the monoculture of knowledge and the rigor of knowledge, consisting of the transformation of modern science and high culture in exclusive criteria of truth; (ii) the monoculture of linear time, where history has a single meaning and direction; (iii) the monoculture of naturalization of differences, consisting of the classification and hierarchical ordering of populations; (iv) the logic of the dominant scale which, in the view of West-

ern modernity, is universal and global; and (v) the productivist logic which applies both to nature and to work.

Some of the most emblematic features of the neoliberal legal regime in agriculture are the promotion of monoculture dependent on petroleum-based inputs and focused on export, the privatization of commons (e.g. seeds) through plant breeder's rights regulated in the Federal Law on Production, Certification, and Commerce of Seeds and the Federal Law on Plant Varieties; the prohibition and/or discrimination of ancestral practices which created the PatBio (e.g. free exchange of seeds); the use of technical and scientific criteria as the sole basis of truth to the detriment of traditional knowledge; the production of the lion's share of the benefits for large domestic and transnational companies; and casting peasant farmers as a group which needs to be modernized through public welfare programs. Defined thus, this framework is, in itself, the antithesis of the peasant and indigenous way of life.

In Mexico, such monocultures have been adopted and fomented by the legislative and executive branches, a situation which translates into implementation for agriculture of legislation and public policy which discriminate against and relegate traditional forms of production, organization, and management of agrodiversity and violate the human rights of indigenous peoples and similar communities, creating widespread discontent among rural inhabitants.

Gordillo and Wagner (2004) describe how, between 1975 and 2000, the world transitioned from an interventionist state model to a neoliberal model. A key moment in this transition was

the signing of the General Agreement on Tariffs and Trade (GATT) in 1986, which would give rise, in 1995, to the World Trade Organization. This marked a shift in Mexican economic policy which was reflected in the agroalimentary sector. The planned economic reforms in turn required a constitutional amendment. In 1983, Article 25 of the Constitution was amended to recognize the state's guiding role in national development, to stimulate economic growth and create the conditions necessary to support and promote businesses in the social and private sectors of the economy.

In 1989, Mexico reformed its rural banking system, cutting off access to credit for large numbers of peasant farmers (Steffen and Tarrio, 2010). Organizations which supported domestic production like the National Fruit Growing Commission, the Mexican Coffee Institute, and state suppliers of seeds and fertilizers disappeared or suffered drastic budget cuts (Garduno, 2002). From 1989 to 1994 alone, the number of organizations serving the agricultural sector fell from 103 to 25 (Sagarpa, S/F).

In 1992, Mexico amended Article 27 of its constitution and a new Agrarian Law took effect, bringing an end to the agrarian land distribution and paving the way for privatization of lands held in so-called social property (Quintana, 2007). In 1994, the North American Free Trade Agreement (NAFTA) took effect, opening the domestic market to free trade and terminating administrative measures like the Ejido Collective Marketing Support Program and the Popular Subsistence Company (Garduno, 2002). This had a twofold impact, on the one hand putting peasant farmers at a disadvantage to imports from the north, and on the other

triggering a transformation in consumer habits in Mexico (Reyes and Galindo, 2015).

Most aid was concentrated in agroindustry and groups which accumulated large landholdings, like the fruit and vegetable growing and livestock sectors, which grew 60%, 40% and 75% on average, respectively (Quintana, 2007). The same author mentions that food imports rose from 17% in 1990 to 50% in 2008, a level which has held steady to date, and is composed primarily of grains, oleaginous fruits, and meat.

Revenue from small-scale producers fell; in 1996, 37.4% of the population lived in food poverty, mainly in rural communities (De Schutter, 2012). This in turn boosted internal migration by 352% and migration to the United States by 452% between 1980 and 2002 (Yunez and Taylor, 2003). Many peasants became farm workers; in Mexico alone, there are 5 million day laborers, making them the largest sector in the country's workforce (Jaloma, 2017).

The changes described in the preceding paragraphs reflect a far-reaching process implemented by the Mexican state for the construction and implementation of a legal framework which responds only to the modern-Western way of life, one of the aims of which involves the biocultural transformation of the farm sector in the interests of boosting production and competitiveness, as mentioned in the Law on Sustainable Rural Development.<sup>7</sup> In

7 Article 4 reads "To achieve sustainable rural development, the state, with the involvement of various organized agents, will advance a process of social and economic transformation which recognizes the vulnerability of the sector and furthers the sustained and sustainable improvement of living conditions for the rural population, by promoting activities for production and social development executed in the different rural regions, striving for optimum use, conservation, and improvement of natural resources and focusing on the diversification of productive activity in rural

other words, the model embodied and fomented by the Mexican legal framework operates on the erroneous and discriminatory premise that self-consumption agriculture, misnamed subsistence farming, and small- and medium-scale farming should be modernized<sup>8</sup> because they do not produce the expected yields or respond to the demands of the free market.

The results of this process are many and several of them are in plain sight, for example: the dismantling and privatization of state agricultural services, the end of the agrarian land distribution and internal mechanisms to regulate farm prices, the promotion of land appropriation for extractive enterprises, the migration of indigenous peasants, the opening to and dependence on international markets, the shift away from maize to focus on other, more remunerative crops, government support for nixtamalized flours, uninterrupted use of farming plots, overly short fallow times between crops, reduction of cultivated area by producer, substitution of ecological processes like nutrient recycling and biological pest control with chemical inputs, increasing use of hybrid or improved seeds, the shift from a diversified agriculture to one focused on monoculture (Ortega-Packza, 2003, and Bartra, 2013). The relentless advance of this process of modernization eliminated most of the favorable conditions which remained for indigenous peasant agriculture, and from the state has made a decisive, significant impact on the disintegration

areas, including non-agricultural enterprises, to boost productivity, profitability, competitiveness, income, and employment in the rural population."

8 The word "modernization" has a strong negative tone given that, as mentioned by Santos (2009), it is directly linked to processes of cultural assimilation.

of rural communities and the rapid erosion of their biocultural heritage.

This pattern of action deployed by the Mexican state in its drive toward modernization is highly questionable in the light of the human rights regime, as we discuss in the following chapters. For now, it can suffice to say that agriculture in a pluricultural state should possess and reflect the same character; in other words, in the pluricultural state there is no place for a single way of practicing agriculture, and therefore the state must construct and provide the structures and conditions for respect and equality which the human rights regime demands. This situation is rooted in Articles One and Two of the Constitution, Article Two of the American Convention on Human Rights, Article Two of the International Covenant on Civil and Political Rights, [and] Article Two of the International Covenant on Economic, Social, and Cultural Rights and implies the unavoidable duty for the Mexican authorities to progressively adopt, in the case of indigenous peoples and similar communities, all necessary legislative and administrative measures to ensure that such groups can maintain cultural control of their PatBio and flourish.

## VII. THE MILPA IN THE MIRROR OF HUMAN RIGHTS

**F**or the state to contribute with a policy which helps put a stop to socioenvironmental and biocultural deterioration, it is necessary to implement a policy centered on recognition and local use of territory and the biocultural landscape. In this context, the protection and promotion of the milpa system should be seen as the keystone. In the milpa system, we can observe, on the one hand, a subject of law which the international community has recognized as the holder of important collective human rights, such as original peoples or peasants, and on the other, a day-to-day management and control of territory and natural resources indispensable for the group's survival. The persistence of indigenous peoples and peasant communities necessarily requires that the state guarantee them cultural control of their territories and biocultural heritage, which can be achieved only if the legislation and public policy enacted are rooted in the human rights regime and the principle of pluriculturalism.

Protecting the milpa system is key since, as

observed in previous sections, it is an institution which has crucial importance for the reproduction of those collective rights. In effect, traditional agriculture seeks, above all, to create the means which assure the biological and cultural sustenance of all members of the family, for which different kinds of funds are created, including (i) a replacement fund, which serves to replace the means of production (De Ita, 2014), (ii) the ceremonial fund, created for leisure activities and cultural reproduction (e.g. weddings, community celebrations, and other social responsibilities), and (iii) a rent fund, made up by work, products, or money which are transferred to superordinated social groups such as employers, lenders, intermediaries, tax collectors, and others (Wolf, 1966).

In the milpa, therefore, we see reflected the day-to-day exercise of fundamental rights, such as:

- The right to cultural identity.
- The right to traditionally managed territory

and/or natural resources.

- The right to adequate food.
- The right to health.
- The right to a healthy environment.

In accordance with Article One of the Constitution, all authorities are “*obliged to apply the principle pro persona as a criterion for interpretation of norms on human rights, which seeks to maximize their effectiveness and observance, to opt for the application or interpretation of the norm most favorable to them, or that which implies the least onerous restrictions on their exercise*” SCJN (2014), which underscores how the contents of human rights are dynamic, since they are in constant evolution in both the domestic or international arenas. To this we should add that, because the Mexican state is pluricultural, as established in Article Two of the Constitution, the contents of human rights should be equally so.

Santos (2009b) maintains that human rights are a Western construct, and as such their contents have been developed based on a Western worldview and values; thus, there is a profound relationship between human rights and colonialism, and human rights have been conferred only on persons of whom certain duties can be expected. For human rights to be the universal language of a progressive policy, they need to undergo a radical reconstruction based on what the author refers to as “*constitutive rights or ur-rights*,” which presupposes the recognition of alternative knowledge and democratic self-determination.

At the international level, peasants have articulated, from grassroots organizations and social movements, a struggle for revindication of their fundamental rights, and for that they have proposed that the United Nations issue a declaration like it did for the rights of indigenous peoples in 2007 (Via Campesina, 2009). The product of these efforts is that, since 2013, the Commission on Human Rights has a draft “*Declaration on the rights of peasants and other people working in rural areas*,” which defines and seeks to recognize peasants as holders of fundamental rights.<sup>9</sup>

Without a doubt, this international effort should be reproduced at the domestic level.

Below, we present our arguments for the need to protect the milpa system, from the perspective of redefining the contents of human rights and their protection under the highest standard of protection.

<sup>9</sup> “As used in this declaration, peasant is understood as: 1. A peasant is a man or woman of the land, who has a direct and special relationship with the land and with nature through the production of food or other agricultural products. Peasants work the land themselves and depend above all on work in family groups and other forms of small-scale organization of labor. Peasants are traditionally integrated in their local communities and tend to the local natural environment and agroecological systems. 2. The term peasant may be applied to any person who is employed in agriculture, livestock, transhumance, crafts related to agriculture, or other similar occupations in a rural area. The term comprises indigenous people who work the land. 3. The term peasant also applies to landless persons. According to the definition of the Food and Agriculture Organization of the United Nations, landless persons include the following categories of persons, who probably face difficulties to earn their livelihood: a) Families of farm workers with little or no land; b) Non-farming families in rural areas, with little or no land, whose members engage in various activities like fishing, crafts for the local market, or provision of services; c) Other rural families of cattle herders, nomads, peasants who practice migratory agriculture, hunters and gatherers, and persons with similar means of subsistence.”

## 7.1 Right to cultural identity

Cultural identity is a body of values, traditions, symbols, beliefs, practices, and customs resulting from a historical process, which work as agglutinants of a social group and act so that the individuals who form that group can anchor their sense of belonging in relation to the interests, codes, norms, and rituals of other cultures. In the case of the traditional rural way of life, it encompasses not only indigenous cultural identities, but those of peasants, afro-descendants, producers, shepherds, fishermen, artisans, etc.

Edelman (2013), for example, claims that all these groups can be cataloged as part of the peasantry because it is a heterogeneous group which has a multidimensional identity with regard to ethnic origin, religion, political position, and gender; a common feature of the peasantry is that it has primary activities as one of its defining traits (Boyer, 2003). All these groups represent the cultural diversity of the world and today that diversity embraces an estimated total of some 1.2 to 1.5 billion humans (Toledo, 2013).

In the case of indigenous peoples and peasant communities, Toledo and Barrera-Bassols (2008:54) affirm that:

*“Indigenous peoples have a very long history of practicing use of resources, and have developed cognitive systems on their own natural resources which are passed down from generation to generation. Such knowledge is transmitted through language, producing a largely unwritten body of knowledge. Memory, therefore, is the most important intellectual*

*resource among indigenous or traditional cultures” (Toledo and Barrera-Bassols, 2008:54).*

Collective or biocultural memory is, then, a conglomerate of knowledge and experience which cannot be separated from cultural identity, in other words from the indigenous, traditional, or peasant way of life. This cultural identity is also a territorial identity, since the territory is the axis along which this traditional way of life moves, and therefore its present and future are contingent on their being guaranteed a high degree of control over their territories and the natural resources they have managed since time immemorial.

The right to cultural identity is enshrined in Articles Two and Four of the Constitution; Articles 8 and 33 of the UNDRIP; Articles 1, 2, and 14 of the San Salvador Protocol; Articles 1 and 15 of the ICESCR; Article 27 of the ICCPR; and Articles 1.2 and 2.2, paragraph b), 4.1, and 5 paragraph a), of ILO Convention 169.

The right to cultural identity imposes on the state an obligation to recognize and protect the spiritual and cultural relationship which indigenous peoples and similar communities maintain with nature, their territories, and their social, cultural, religious, spiritual, and productive practices. In its jurisprudence, the IACHPR has repeatedly found (e.g. Mayagna (Sumo) Awas Tingni Community vs Nicaragua (2001), Saramaka People vs Surinam (2007), Kichwa Indigenous People of Sarayaku vs Ecuador (2012), and Yakye Axa Indigenous Community vs Paraguay (2005)) that:

*“The land is intimately related to their traditions and oral expressions, their customs*

*and languages, their arts and rituals, their knowledge and practices related to nature, their culinary arts, consuetudinary law, their dress, philosophy, and values. Based on their environment, their integration with nature, and their history, the members of indigenous communities pass down from generation to generation this immaterial cultural heritage, which is constantly recreated by the members of indigenous communities and groups.”* (IACHPR, 2005)

The obligation to protect the fundamental right in question by adopting special measures is widely accepted. On the subject, the United Nations Commission on Human Rights has affirmed:

*“The Committee recalls its general comment on Article 27, which states that, especially in the case of indigenous populations, enjoyment of the right to their own culture may require a state party to implement positive protective legal measures and measures to guarantee members of minority communities effective participation in decisions that affect them.”* (Apirana Mahuika).

The milpa system is intricately linked to the cultural identity of peasants in Mexico because it constitutes a traditional productive practice whose origin is rooted in biocultural memory and involves the perpetuation of ancestral institutions, whose effect is material -more than 600 maize-based dishes- (Bourges, 2013) and spiritual -celebration of All Saints- reproduction of the group. In the milpa, one can easily see a series of acts which

reveal a world view, knowledge, and a series of practices, which vary from the ritual and symbolic to the festive.

In addition, in the milpa system one can also observe the day-to-day practice of the so-called shared economy, through ancestral institutions of labor like *la mano vuelta*.<sup>10</sup> Experts have called this model the “*peasant economy*,” in reference to farming activity, where the productive process is carried out by family units as a means of ensuring, cycle by cycle, the reproduction of their living and working conditions, in other words the reproduction of producers and their production units (Schejtman, 1982).

The milpa system, therefore, is a manifestation of this cultural identity, which can only exist in a territory and through the use of traditionally managed natural resources like seeds, and consequently there is an evident obligation and need for the Mexican state to design and implement, as soon as possible, territorial legislation and public policy which contribute to the use and conservation of the milpa system.

## **7.2 Territory and access to traditionally managed natural resources**

This right forms the other side of the coin of the right to cultural identity; it is the face or the material part of that other right, since territory is the physical and symbolic space where a culture is exercised. In that regard, the IACHR (2009) has held that territory is a broad concept which “*includes*

<sup>10</sup> Form of reciprocal and unpaid collective work, rewarded with work instead of money, used in peasant and indigenous communities for planting, clearing, and harvesting milpas.

*not only spaces physically occupied, but also those which are used for cultural or subsistence activities,”* which encompasses different spaces such as the household, natural resources, crops, plantations, hunting, fishing, and gathering. This right likewise extends to traditionally managed natural resources, in other words those found in territories which have been managed traditionally and are necessary for the survival and reproduction of a specific group; examples include seeds, water, lumber, hummus, animals, plants, forests, and wildlife.

In this regard, the IACHPR (2005) has affirmed that:

*“146. (...) states must bear in mind that indigenous territorial rights embrace a broader, different concept which is related to the collective right to survival as an organized people, with control of their habitat, as a necessary condition for the reproduction of their culture [...], for their own development, and to realize their life plans. Land ownership guarantees that members of indigenous communities conserve their cultural heritage.”*

This fundamental right implies the capacity for control by original peoples and/or peasants of such spaces and resources with no kind of external interference (IACHPR, 2007), in other words the ability to maintain their cultural control under a constitutional framework of pluriculturalism. Therefore, the authorities are compelled to respect, promote, protect, and guarantee that such peoples and communities can continue to administer and manage their territory in accordance with their tra-

ditions, such as managing the biocultural landscape formed by various traditional agroecosystems like the milpa (including the diversity of ways of practicing milpa farming), intervened fields or forests, the field where crops are produced, pastures, yards, etc.

The milpa, as a significant space in ancestral territory, obliges the authorities not only not to interfere (which assumes the duty to eliminate all legal restrictions which could affect it), but primarily to foment and protect it, through the development and implementation of a legal framework and public policy centered on the construction of peasant cultural identities based on territory (Dietz, 2012), which may include the adoption of special measures like public programs designed to support exchange and safeguarding of native seeds, production of organic fertilizers, setting guarantee prices for milpa crops, protection of traditional knowledge, organization of seed fairs and agroecological markets, promotion and recovery of local gastronomy, etc.

The right to territory is regulated in Articles Two, Section A, Items V and VI, and 27, Item XX, second paragraph, of the Mexican Constitution; Article 21 of the ACHR; Articles 13, 14, and 15 of ILO Convention 169; and Articles 25, 26, 29, and 31 of the UNDRIP.

### **7.3 Right to adequate food**

This fundamental right is based on the assumption that each people produces its food in accordance with a unique biocultural paradigm, hence the adjective “adequate.” UN General Comment 12

stated that the dietary regime should be culturally acceptable, for which reason the state is obliged to take all measures necessary to strengthen that regime through diversity and guidelines for nutrition and consumption. In relation to the milpa as part of agriculture as practiced by indigenous and/or peasant groups, the right to food obliges the Mexican state to: (i) avoid adopting laws or policies which prevent enjoyment of the right; (ii) design and execute a national strategy; (iii) protect the basic food resources of the people; and (iv) enact a framework law. Also, access to food is one of the elements of the right to nutrition.

As defined in General Comment 12, the right to adequate food includes: *“the possibilities either for feeding oneself directly from productive land or other natural resources, or for well-functioning distribution, processing and market systems.”* Indigenous and/or peasant groups have always opted to feed themselves through this ancestral system of production, which is culturally appropriate and provides nutritious foods; we should recall that the milpa is a component of the diversified strategy such groups implement and is characterized by achieving high levels of self-sufficiency.

The authorities should develop a normative and policy framework based on a national plan which encompasses both a strategy for self-consumption and one for distribution of food under a framework of food sovereignty, all based on the premise that the system should be culturally acceptable. In this context, the milpa constitutes one of the key institutions to guarantee the first axis and contribute significantly to accomplishing the second, underscoring the obvious need to protect

and foment it as a key component in the Mexican food system.

In addition to the biocultural relevance of the milpa, the right to adequate food obliges the authorities to adopt a strategy which necessarily guarantees the population access to nutritious foods, an issue which the milpa addresses amply and generously. In effect, despite the tendencies, today maize accounts for nearly half of the calorie and protein intake of the average Mexican’s diet (FAOSTAT, 2013). Although these percentages do not distinguish the type of maize consumed, it is important to note that native varieties offer superior nutritional value. The native maize varieties cultivated in Mexico, with their vast diversity of types, varieties, and colors, not only provide high-quality calories and protein, but also contain essential amino acids, anthocyanins, and other antioxidants which have been associated with the prevention of various chronic and degenerative diseases (Fernandez Suarez et al., 2013; Vazquez Carrillo et al., 2003).

Milpa farming favors the use and diversification of local plants, and milpa cultivation and preparation are associated with agricultural and culinary practices which are also part of our biocultural heritage. An example of this is nixtamalization, which consists of alkaline cooking and soaking kernels of maize before making it into dough, and increases the availability of most of the essential amino acids present in maize (Fernandez Suarez et al., 2013). On the other hand, beans, another core component of milpa farming, contain between 14 and 33 g of protein per 100 g, provide vitamins and minerals, are an important source of fiber, and are an adequate food for diabetics

due to their low sugar content. In addition, beans contain antioxidants which have been associated with antitumoral and anti-inflammatory properties (Galvez and Salinas, 2015). It is noteworthy that, although beans lack some essential amino acids, they are found in foods derived from maize, while beans contain lysine which offsets one of the deficiencies of most varieties of maize (Galvez and Salinas, 2015). In fact, the parallel domestication of plants in the milpa may have been incentivized by their nutritional and sensory complementarity, ultimately attaining agroecological complementarity (Zizumbo-Villarreal et al., 2012).

The milpa is the source of a wide variety of foods which play a crucial part in prevention and mitigation of the effects caused by deficiency of

micronutrients, which is recognized as a public health problem in Mexico and other countries (Nabhan, 2012; Frison et al., 2004). An example of the biodiversity associated with the milpa are the edible greens (*quelites*) or weeds which grow in or around the milpa when pesticides are not applied intensively. Some *quelites* (chipilin (*Crotalaria longirostrata*), *quelite cenizo* (*Chenopodium album*) and *quelite rojo* (*Chenopodium rubrum*) (both types of goosefoot), chaya or tree spinach (*Cnidoscolus chayamansa*), huauzontle (*Chenopodium nuttalliae*), and *romeritos* (seepweed)) contain more protein than many vegetables, while others are important sources of vitamins and inorganic nutrients such as calcium, potassium, magnesium, and phosphorus (Linares and Bye, 1992).



Photograph: Luis Bracamontes Najera, Dishes in the gastronomic contest at the 3rd Milpa Fair, Rancho Viejo, Tlalnelhuayocan, Ver., 2017.

Edible greens and the diversity of plants which peasant farmers cultivate, encourage, or tolerate in the milpa significantly increase the biomass produced on their plots, favor the nutritional status of producers, and also perform complementary agronomic and ecological functions (control of erosion, retention of moisture, incorporation of organic matter in soil, etc.) (Vieyra-Odilon and Vibrans, 2001).

Despite abandonment, migration, lack of support, and appropriation of lands and markets by the industrial agroalimentary system (Chappell et al., 2013; Robles Berlanga, 2013), in Mexico, production units of less than 5 hectares are the leading producers of basic foods, like maize and beans, contributing nearly 40% of the value of agricultural products on less than 20% of the work surface, typically on farmland of medium to marginal quality (Boege, 2008; Robles Berlanga, 2013). Such smaller units have generated, and have the potential to maintain, much of the agrodiversity necessary to guarantee the right to adequate food and achieve food sovereignty for Mexico (Turrent 2012; Oxfam 2013).

The right to adequate food is contained in Article Four, fourth paragraph, of the Constitution, Article 12 of the ICESCR, and Article 12 of the San Salvador Protocol, and the specifics of that right have been developed in General Comment 12 of the UN Committee on Economic, Social, and Cultural Rights and in the Voluntary Guidelines in Support of the Progressive Realization of the Right to Adequate Food in the Context of National Food Security of the FAO.

## **7.4 Right to health**

As regards the right to health, Article 12 of the International Covenant on Economic, Social, and Cultural Rights established the standard the authorities would have to maintain uphold: the greatest possible enjoyment to live with dignity. This right comprises several aspects which the authorities must address so that the right can be considered guaranteed, such as food and nutrition, access to clean drinking water, and a healthy environment, among others. As the CESCR remarks in General Comment 14 “*the right to health must be understood as a right to the enjoyment of a variety of facilities, goods, services and conditions necessary for the realization of the highest attainable standard of health.*”

In relation to the topic that concerns us here, the right to health imposes two obligations on the authorities, to adopt measures to prevent and reduce exposure of the population to harmful substances which may directly or indirectly harm their health and to prevent third parties from compromising it in any way. However, we have remarked that over several decades, the Mexican state has fomented an agroindustrial model without significant restrictions, despite the negative impact the use of petroleum products may cause in agriculture and the harm to human health associated with consumption of processed foods, which has led to a transformation of dietary habits in Mexico, and concomitantly to the prevalence of obesity and various chronic degenerative diseases in the population (Frison et al., 2011; Becerril, 2013; Galvez Mariscal and Pena Montes, 2015).

The Special Rapporteur on the right to food

(UN, 2017) has found that “*while scientific research confirms the adverse effects of pesticides, proving a definitive link between exposure and human diseases or conditions, or harm to the ecosystem presents a considerable challenge.*” The effects are most significant for farmers and farm workers, communities adjacent to croplands and/or plantations, indigenous peoples, pregnant women, and children. Moreover, as regards consumers and effects on our natural heritage and environmental services derived from them (sic), we should recall that recent findings show that inputs used in industrialized agriculture, such as fertilizers and pesticides, and in particular neonicotinoids, are responsible for pollution of soil and water, and for the collapse-decline of pollinators indispensable for agriculture and life itself (IPBES, 2016).

The CESCR has affirmed, in General Comment 14, that the right to health implies adequate and nutritious food and that, per General Comment 12, includes not only the quantity but also the quality of food, guaranteeing which requires the authorities to fulfill certain obligations, first to ensure that food is free of harmful substances and second sustainability understood as the responsibility for the authorities to protect food production from any future threat, in other words the need to ensure access to food for present and future generations. For that purpose, it is crucial to put a stop to the loss of biodiversity, pollution of water and soil, and the negative impact on productivity of croplands. In other words, the highest standard of protection of this fundamental right implies an obligation for our authorities to initiate a process of agroecological transition, in which the milpa

represents a magnificent alternative.

The milpa system, associated with other traditional agroecosystems, fulfils various agronomic and ecological functions which ultimately may allow farmers to eliminate or drastically reduce the use of commercial inputs which may be harmful to human health (Guyton et al., 2015; Gonzalez-Ortega et al., 2017). On the other hand, such diversity may increase productivity and availability of healthy and nutritionally complementary foods in a wide interval of morphoedaphologic, climatic, and cultural conditions (Frison et al., 2011; Ebel et al., 2017), and even in the presence of catastrophes or abrupt environmental variations (Holt-Gimenez, 2001). For all these reasons, the practices, biodiversity, and social and ecological processes associated with the milpa are invaluable in terms of food security and sovereignty, and therefore help guarantee the right to health.

The right to health is regulated in Article 4, fourth paragraph, of the CPEUM, Article 12 of the ICESCR, Article 10 of the San Salvador Protocol, CESCR General Comment 14, and the Report of the Special Rapporteur on the Right to Food (2017) presented to the UN Commission on Human Rights on January 24, 2017.

## 7.5 Right to a healthy environment

According to the CEMDA (2017), the welfare of persons, communities, and peoples depends directly on their use and enjoyment of their natural heritage; consequently, successful management and conservation of ecosystems and biodiversity are an indispensable condition for the enjoyment

of human rights.

Environmental damage implies endangering the human rights regime (IACHPR, 2009). As John Knox, United Nations independent expert on the issue of human rights obligations related to the enjoyment of an environment without risk, clean, healthy, and sustainable (UN, 2013), has affirmed, environmental deterioration threatens “a broad spectrum of human rights, among them the rights to life and health.” In these terms, the right to a healthy environment obliges the authorities to: (i) prevent and if necessary repair environmental damage; (ii) adopt and apply a legal framework; and (iii) transition to sustainable development.

On the intimate relationship between biodiversity and the human rights regime, the United Nations Special Rapporteur on the right to a healthy environment (UN 2017b), recently observed that:

*“The full enjoyment of human rights, including the rights to life, health, food, and water, depends on the services which ecosystems provide. The provision of such services depends on the health and sustainability of ecosystems, which in turn depend on biodiversity. Consequently, full enjoyment of human rights depends on biodiversity, and degradation and loss of biodiversity undermine people’s ability to enjoy their human rights.”*

This situation underscores an additional obligation for the authorities: protect and foment biodiversity from a rights perspective based on the rule of ecology, which holds that the more diverse an ecosystem is, the more resilient it will be to threats (Botello A. et al., 2012). In the area of agriculture,

this should translate into promotion of polyculture integrated in a biocultural landscape.

In this sense, the United Nations Special Rapporteur on the right to a healthy environment (UN 2017b) stated that:

*“Biodiversity is especially important for the stability and resilience of food sources;” furthermore “the resilience of farm ecosystems in the face of environmental change depends on the innate attributes of the varieties cultivated, which makes preserving the biodiversity of crops (...) a fundamental component of food security. Access to a wide variety of local plants helps to protect vulnerable rural communities, in particular, which recur to them when their harvests are poor or they face unforeseen expenses.”*

In this context, on the use of native agrobiodiversity, the World Health Organization, jointly with the Secretariat of the Convention for Biodiversity (WHO, 2015), reported that:

*“Increased use of agricultural biodiversity will play an essential role in the measures of adaptation and mitigation necessary to confront climate change and guarantee sustainable and sustained supplies of healthy foods, providing capacity for adaptation, varied options to handle future changes, and greater resilience in food production systems.”*

In summary, the food security of persons, communities, and peoples depends directly on the implementation of strategies which favor in situ

conservation of native agrobiodiversity, as well as wild and semi-domesticated biodiversity.<sup>11</sup>

The Rapporteur argued (UN, 2017b) that, while the loss of biodiversity affects everyone, the harm is much greater for indigenous peoples and similar communities, since they are human communities with stronger ties to and direct dependence on ecosystems (and PatBio) to satisfy their fundamental rights to food, water, culture, etc. Therefore, if the aim is to conserve biodiversity and guarantee human rights, at the same time it is indispensable to expand and develop mechanisms which permit the greatest possible exercise and enjoyment of their rights of access to information and participation in decision making, given that, as we have remarked, traditional knowledge and practices are often the best or the only means of protecting biodiversity (Kothari, et al., 2012).

The milpa, as part of traditional agriculture, involves multiple aspects of what is considered a sustainable model of agriculture. In effect, traditional agriculture is largely based on highly productive, diverse, adaptable, and resilient systems (Altieri and Toledo 2011; Holt-Gimenez, 2002; Moreno-Calles et al., 2013). Seen in these terms, the milpa is an agroecosystem of great biodiversity, which produces environmental services for the community, such as support, provision, and cultural services. Also, the milpa, in partnership with regional gastronomic cultures, promotes the use and conservation of traditional knowledge and practices, as well as native agrobiodiversity.

In our opinion, the milpa system meets and

exceeds all the standards cited in this section for the protection of the fundamental right to a healthy environment, because it conserves biodiversity and environmental services in situ by promoting the use of native agrobiodiversity in polyculture and wild and semi-domesticated biodiversity, allows farmers to adopt better and more suitable measures of mitigation and adaptation in response to the risks imposed by climate change, and promotes traditional knowledge and practices (cultural control of natural resources), while helping to guarantee human rights from the paradigm of food sovereignty. Thus, promoting the milpa system means, on the one hand, protecting biodiversity, and on the other guaranteeing human rights, especially the right to a healthy environment.

The right to a healthy environment is contained in Article 4, fifth paragraph, of the CPEUM, Article 11 of the San Salvador Protocol, and Article 12 of the ICESCR and in the Convention on Biodiversity.

## 7.6 Analysis of legislative and administrative measures in place to protect the milpa and maize

Centro Mexicano de Derecho Ambiental A.C. (CEMDA 2016) has observed that the farm legislation and public policy constructed by the Mexican state do not respond to the meso-American cultural matrix; in other words, the principle of pluriculturalism is absent, and therefore the state seeks to transform-modernize traditional agriculture, despite the fact that it is one of the foundations on which the peasant and indigenous way of life is built.

<sup>11</sup> Recall that biodiversity in general is responsible for the pollination and dispersion of seeds, and today, populations of pollinators have diminished drastically, as mentioned previously in the IPBES study (2016).

Such legislation and public policy are not consistent with: (i) the world view and values of indigenous and peasant groups, even though they represent the majority of the rural population and are the principal users and custodians of Mexico's PatBio, and (ii) the human rights and principles enshrined in the Mexican Constitution and the constitutional framework.<sup>12</sup>

The paradigm of the guarantist state, regulated in Article One of the Constitution, assumes that the human rights regime constitutes “*the ethical and moral foundation and the object of action of the state and a prerequisite for the welfare of society*” (Bernales Ballesteros, 2004) and, consequently, the source of legitimacy of state activity (Carbonell and Salazar, 2013). For that reason, human rights are assumed as the bedrock and inspiration of legislation and public policy, which in turn are considered necessary instruments for their realization and enjoyment (Segob, 2014). In other words, the Mexican Constitution, combined with the constitutional framework, order that all legislative and administrative measures be designed, implemented, and evaluated from, and with, a human rights perspective.

In the year 2016, CEMDA conducted an analysis to determine if, in the light of the human rights

12 The constitutional framework is understood as the set of norms which have constitutional standing in the legal system, although there is not yet a precise generally accepted meaning (Manuel Eduardo Gongora Mera, 2007, cited in Rodriguez Manso, Graciela et al., 2013, Bloque de constitucionalidad en México, Supreme Court of Justice of the Nation, Office in Mexico of the UN High Commissioner for Human Rights and the Commission on Human Rights of the Federal District). The First Chamber of the Supreme Court, in Jurisprudence 1/J. 29/2015, has found that “the norms on human rights contained in international treaties and in the Mexican Federal Constitution are not related among themselves in hierarchical terms, since they are parts of the catalog of rights which serves as a parameter of constitutional regularity.”

regime, the pluricultural state, agroecology, and food sovereignty, Mexican legislation and public policy, particularly the program Sustainable Modernization of Traditional Agriculture (MasAgro), are bioculturally pertinent, in other words if they satisfy and guarantee the fundamental rights of indigenous peoples and peasants. This investigation was documented in the *Report on the biocultural pertinence of Mexican legislation and public policy for farming. The case of the program “Sustainable Modernization of Traditional Agriculture” (MasAgro)*.<sup>13</sup> In this study, we aim to expand and deepen this analysis, exploring fulfilment of the constitutional and conventional obligation for the authorities to take all special measures necessary to guarantee the cultural survival of indigenous peoples and peasant communities, and specifically, we examine whether different levels and branches of government throughout Mexico have adopted legislative and/or administrative measures, from a rights perspective, to protect one of the pillars on which indigenous and peasant ways of life are reproduced, specifically the milpa and maize. For this purpose, 74 requests for information were filed<sup>14</sup>, 8 directed to the federal government and 66 to the states, as well as 3 appeals entered with the National Institute for Access to Information and Protection of Personal Data (INAI).<sup>15</sup>

13 Available at: <http://www.cemda.org.mx/wp-content/uploads/2016/12/InformeMasAgro.pdf>

14 It is noteworthy that, for various reasons, like the poor functioning of the National Platform for Transparency, and various linkage and/or information units, which unduly restrict the human right to access la information, it proved impossible to enter the corresponding motions for review with the competent local authorities, and therefore much of the information presented below is limited to that which was made available to us in good faith.

15 For more information, see Annex 1, which contains a listing of requests for information.

As regards the adoption of legislative measures, it is noteworthy that, at the federal level, there is no legislation designed to protect the milpa system as an instrument or mechanism focused on respecting, protecting, promoting, or guaranteeing the human rights expressed and exercised therein. In any case, there is only the so-called “*special maize protection regime*,” regulated in Article 2, Item XI, of the Law on Biosafety of Genetically Modified Organisms (LBOGM) and Title Twelve of its Regulations, an institution which could constitute the cornerstone of a public policy centered on safeguarding the human rights of peasants and indigenous peoples, and the custody and propagation of native Mexican strains of maize. However, the fact of the matter is that there is no substantial difference between the system of permits which the LBOGM implements and the special regime, given that the latter consists simply of a series of additional restrictions on planting of genetically modified maize (Martinez-Esponda 2014). In other words, the special maize protection regime was not constructed from a rights perspective, and much less in accordance with the biocultural and plural nature which native strains of maize require.

At the state level, some states, like Tlaxcala, Michoacán, and Morelos, have enacted legislation designed to protect criollo strains of maize which are cultivated in their jurisdictions; respectively, the state congresses enacted:

- The Law on Promotion and Protection of Maize as Original Heritage, in Constant and Dietary Diversification, for the state of Tlaxcala -Tlaxcala Law- (published January 18, 2011);
- The Law on Promotion and Protection of Criollo Maize as Dietary Heritage of the state of Michoacán de Ocampo (published March 1, 2011); and
- The Law on Protection and Conservation of Criollo Maize in its Genetic State for the state of Morelos -Morelos Law- (published June 25, 2014).

In general, these laws name, as competent and responsible authorities for their observance and enforcement, the departments of rural development or farm promotion, create a state board for criollo maize, and state as their objectives: (i) guarantee protection for cultivation of native maize; (ii) promote its sustainable development; foster productivity, competitiveness, and biodiversity of native maize; (iv) establish mechanisms for promotion and protection of maize, in relation to the investigation, production, commercialization, consumption, and constant diversification as Dietary Heritage; and (v) establish the institutions and procedures necessary for state and municipal authorities to apply for and obtain federal declarations of areas free of genetically modified maize in accordance with the LBOGM.

It is important to note that between the Tlaxcala Law and the Morelos Law there was an important shift in the definition of the public policy to follow. In the former, the local legislature sought to enact an ordinance which would complement the LBOGM and oblige the state authorities to take all actions necessary to ensure that the state would be declared an area free of genetically modified maize (Articles 21 and 22), whereas in the Morelos Law,

the legislature made no effort to align its provisions with the LBOGM, and instead sought to create a state-level institutional framework to protect and more vigorously promote traditional agriculture, for which purpose the law specifically references traditional milpa farming (Articles 34 and 37), and orders the competent agency to allocate 5% of its annual budget to promotion and development of native strains of maize (Article 30).

Ribeiro (2011) and De Ita (2011) have criticized this legal framework, on the grounds that the aforementioned laws do not prevent planting of transgenic maize, and instead promote a system of intellectual property of peasant heritage. Also, they maintain that the only way to protect native maize and slow the advance of transgenic strains is to fully recognize the rights which original peoples and peasant communities claim for themselves.

In light of these criticisms, it remains to be seen if the public policy conceived and developed under this legal framework is accomplishing the ends and objectives defined by the legislature. In this regard, the investigation conducted for the emblematic case of Tlaxcala found that, more than six years after its enactment, effective observance remains in an incipient stage, given that:

1. The state of Tlaxcala does not have a single area free of genetically modified maize (Informative Response 00313517 [PNT (2017a)], despite the years which have passed since the law took effect. In ac-

cordance with Articles 19<sup>16</sup> and 21<sup>17</sup> of the Tlaxcala Law, the Department of Farm Promotion (Sefoa) must file documentation with the competent federal authorities for the declarations of areas free areas deemed necessary to protect Tlaxcala's native strains of maize. However, the agency has reported that, for the procedure in question, they are currently working on gathering information (Item I) and on preparing the public registry where such documentation will be published (Item III).

2. The State Council on Maize (Informative Response 00313317 [PNT (2017b)], which, under Article 12 of the Tlaxcala Law, is the advisory body to the governor on matters of coordination, planning, formulation, execution, and evaluation of programs established

16 Article 19. The protection and promotion of criollo maize include administrative actions by the Sefoa, with the opinion of the CEM, which must be taken before the competent instances, to obtain the necessary declarations established in Federal regulations, like declaring Tlaxcala a Free Zone as defined by the LBOGMS, as well as denominations of origin, patents, and rights to plant varieties.

17 Article 21. The Sefoa must: I. Collect all information in the possession of Semarnat, Sagarpa, the National Institute of Statistics and Geography (INEGI), the National Institute of Forest, Agricultural, and Livestock Research (INIFAP), the National Institute of Ecology (INE), the National Commission for Knowledge and Use of Biodiversity (Conabio), and the National Forest Commission (Conafor), and International Agreements and Treaties, for the protection of the Original and Dietary Heritage; II. Obtain the corresponding determination by Semarnat and Sagarpa; III. Keep a public registry with the information collected and relevant actions taken, classifying the information and making it public knowledge by electronic and bibliographic means; IV. Rule, in coordination with the CEM, on authorizations of State Heritage; V. Authorize and supervise, in coordination with the CEM, criollo maize seed banks; VI. Rule on authorizations: communal, state heritage, and health; and VII. Hear the administrative appeals provided for by this law.

to ensure the protection of criollo maize, does not exist.

3. There is no state program of criollo maize seeds as ordered in Articles 25 and 26 of the Tlaxcala Law (Informative Response 00314017[PNT (2017c)]). The Sefoa found that a majority of producers in the state plant criollo maize, that the program ordered in the law does not exist, although those implemented are, inexplicitly, of the kind ordered by the law. From a simple reading of the response, we can conclude that such programs do not favor or are detrimental to milpa farming and/or traditional

agriculture, as has been discussed in the logical framework.

4. To date, the governor has not issued the State Sanitary Regulations of the Tlaxcala Law (Informative Response 00313017[PNT (2017b)]), a failure by the executive branch of its obligation to issue normativity which ensures its exact observance.

The information provided by the Tlaxcala government underscores its lack of vision and commitment to the peasant way of life. In fact, despite the Tlaxcala Law, it is clear that the state authorities see farming from a monocultural perspective, and



Photograph: ISITAME, A.C.

accordingly propose roadmaps which originate and conclude in the agroindustrial model.

As regards administrative measures, such as public programs, below we examine actions taken at the federal level, especially by the Ministry of Agriculture, Livestock, Rural Development, Fisheries, and Food (Sagarpa), because it developed, and has implemented, two programs which are of interest due to their direct impact on traditional agriculture, and by extension on the milpa system, and the large amount of public funds disbursed: MasAgro and Proagro. We will not devote much attention to the former, since it has been analyzed by CEMDA (2016), which concluded that it was not bioculturally pertinent and therefore should be discontinued.<sup>18</sup>

As regards the federal program Proagro (formerly Procampo), it was created in 1993 under the framework of the North American Free Trade Agreement (NAFTA), for the apparent purpose of addressing the competitive disadvantages domestic producers faced against their counterparts in the other signatory states (who received subsidies) and thereby compensate for their loss of earnings. Another of its purposes was to offset, with the disappearance of other programs, the end of guaranteed prices, making it, at that stage, the most important policy instrument for the farm sector.

Initially, the program consisted of payment by hectare or unit of land surface planted in any of the three crop cycles with any of the following: cotton, rice, safflower, rye, beans, maize, sorghum, soy, and wheat (Sagarpa, 2014a). Proagro gave beneficiaries freedom to choose when and how to

use the funds distributed; they decided whether to increase their level of consumption or savings or make productive investments. Notwithstanding, peasants interviewed in different states affirmed that the aid they received from Procampo was insufficient for all the inputs needed to practice milpa farming. In 2014, the program was given its current name and its operating rules were amended, establishing the condition that program funds be used in investments to increase productive competitiveness, confirming the interrelationship of incentives in actions in technical, productive, organizational, and investment areas. Today, Proagro has a roster of 2.6 million producers and 3.4 million farms, covering nearly 12 million hectares. For the year 2014, it received a budget of almost 13.6 billion pesos (Sagarpa, 2014b).

Proagro is, by far, the farm program which reaches the largest number of low-income producers. However, although producers with less than 5 hectares receive slightly more than others, the allocation of funds is designed to pay more to farmers with more land (Fox and Haight, 2010). On the other hand, the condition that aid recipients prove that the funds they receive are used for productive purposes, while it helps channel spending toward the program's goals, obliges producers to purchase inputs and increase their dependency on external players, favoring the adoption of an agroindustrial model at the cost of loss of traditional practices.

Also, the program incentivizes simplification of traditional agricultural systems, since the rules of the program consider only monoculture. On the other hand, Proagro payments have had limited impact in terms of reducing migration, since almost half the families benefitted by the program

<sup>18</sup> See report available at: <http://www.cemda.org.mx/wp-content/uploads/2016/12/InformeMasAgro.pdf>

have members who have crossed the border into the United States (Fox and Haight, 2010).

Fox and Haight (2010), who analyzed information from two national surveys, found that a majority of producers with less than 5 hectares were completely excluded from the program, when they were among its alleged beneficiaries, whereas producers with irrigated lands had the privilege of receiving two payments a year. Also, over time the part of the farm budget destined to the program has diminished considerably, mainly for self-sufficient farmers, as has the purchasing power of the payments (which is insufficient to offset the cost farmers have paid due to the opening of markets), while programs focused more on large-scale or commercial agriculture have benefitted. The table below shows amounts, beneficiaries, and the change in purchasing power of incentives granted by Procampo (2010) and Proagro (2014):

Program / Category	Amount of aid	Beneficiaries	
<b>PROCAMPO 2010</b>			
Alianza Quota	\$1,300	Farmers with plots cultivated in the Spring-Summer cycle. Granted for a maximum of 5 hectares.	
Preferred Quota	\$1,160	Farmers with plots cultivated in the Spring-Summer cycle, whose eligible landholdings varied between 5 hectares and the maximum, which varies from state to state.	
Normal Quota	\$963	Farmers who cultivate in the second fall-winter cycle (usually irrigated) or on large plots in the Spring-Summer cycle.	
<b>PROAGRO 2014</b>		<b>Drop in real purchasing power in relation to cumulative inflation 2010-2013 (15.76%)</b>	
Self-sufficiency	\$300	-\$47.28	Farmers with up to 5 hectares of rainfed land and 0.2 of irrigated land who are not in municipalities served by the National Program México Sin Hambre.
Self-sufficiency (National Program México Sin Hambre)	\$1500	-\$236.4	Farmers with up to 3 hectares located in municipalities served by the National Program México sin Hambre
Transition	\$963	-\$151.8	Farmers with 5 to 20 hectares of rainfed land and 0.2 to 5 hectares of irrigated land.
Commercial	\$963	-\$151.8	Farmers with more than 20 hectares. The maximum incentive per individual and/or production unit per agricultural cycle will be 100 hectares.

Table 3. Incentives granted by Procampo/Proagro. Source: prepared by the authors with information from Sagarpa, 2014a and 2014b.

The Federal Superior Office of Audits (ASF, 2014) analyzed Procampo in the period 1994-2013 and found that the program's aid quota fell by 1.9% annually, going from 24.3 to 17 times the minimum daily salary, and the number of producers benefitted fell 2.3% annually. The report also mentions that in 2013, the bulk of aid was distributed to producers with areas exceeding 32.8 hectares (ASF, 2014), in other words the budget fell, becoming increasingly concentrated in fewer

producers with larger cultivated areas.

This means that the farm program most directly focused on producers of maize and beans (who are practitioners of milpa farming) excludes the majority of its target population, and also promotes the simplification of traditional agriculture and dependence on commercial inputs. In other words, Procampo cannot constitute a special administrative measure to protect the fundamental rights of original peoples and peasant communities

for the simple reason that, like MasAgro, it is not bioculturally pertinent.

In addition to MasAgro and Proagro, in the period 2009-2015 the National Commission for Protected Natural Areas (Conanp) implemented the Program for Conservation of Criollo Maize (Promac) and in 2016 launched the Program for Recovery and Repopulation of Species at Risk (Procer), which has a component for Conservation of Species at Risk and Conservation of Criollo Maize. These programs had as their goal *“to promote conservation and recovery of strains and varieties of criollo maize and their wild relatives in their natural settings, using different growing systems depending on regions and customs.”* Although it can be said that these programs may constitute a special measure to further protection of the rights of indigenous peoples and peasants, and their Pat-Bio, the fact is that their scope is limited because they operate only in municipalities in the priority regions identified by the Conanp.

As regards allocated public funds, there is also an important comparative point: Procer was assigned a budget of 17 million pesos for 2016 (PNT, 2017e) and for 2017 there was no budget at all (PNT, 2017f). Such situations underscore the cultural, territorial, and budgetary disparity between programs implemented by the federal government.

At the state level, the investigation found that all the states reported a lack of specific programs to promote and protect the milpa, except the states of Tlaxcala, Michoacán, Morelos, Chihuahua, and Puebla, which underscores the lack of interest or knowledge of the issue. The states which confirmed that they have such programs failed to

submit information supporting their claim (e.g. Chihuahua), or provided information which suggests that the programs contradict the practice of milpa farming (e.g. Tlaxcala and Puebla). A noteworthy example is the case of Yucatan, where the state departments of Urban Development and Environment and Rural Development claimed, in their informative responses under folios 670517 and 670417 respectively, first that they were not the authorities competent to address the issue and second that they had not designed, implemented, or evaluated any state program for the protection of native and criollo maize and/or milpa farming, although the fact of the matter is that those departments operate the milpa program as part of the Strategy for the Development of Mayan Communities in the State of Yucatan, which makes the answers given even stranger.

Thus, the legal and public policy framework implemented by the Mexican state writ large for the farm sector has caused substantial changes and pressures in the small production units where peasant agriculture is primarily practiced, with the result that the milpa has been “eroded” or simplified (Bartra 2013). The imposition of a single legal framework and public policy for industrial agriculture (Morales, et al., 2016) constitutes a violation of the human rights of indigenous peoples and/or communities.

Mexico is obliged to guarantee the highest attainable standard of protection of human rights; in the specific case of the rights of indigenous peoples and similar communities, it is compelled to *“adopt special measures to guarantee its indigenous peoples the effective enjoyment of human rights and fundamental freedoms, without restrictions, and*

*include measures which promote the full attainment of their social, economic, and cultural rights, respecting their social and cultural identity, their customs, traditions, and institutions”* (IACHR, 2009). However, in this report we have discussed the deterioration of the milpa system resulting from the failure to construct legislation and public policy which respond to the agriculture practiced by peasants and indigenous peoples, which reflects the perpetuation of structural and symbolic violence by the Mexican state through a systematic pattern of violation, a situation prohibited by the CPEUM and the constitutional framework.

In effect, in accordance with the jurisprudence of the IACHPR (1998), for such a pattern to exist, Mexico needs, *mutatis mutandis*: (i) a plurality of acts and (ii) a similar pattern or patterns in actions taken, in other words conduct repeated over time. Therefore, in the case under consideration, the pattern is defined by legislation and public policy constructed from a monocultural perspective to exclusively promote industrialized agriculture, and by the administrative actions (permits) habitually taken by the Mexican authorities on the basis of that legislation and public policy.

The pattern of violation described must be eradicated, for which it is essential that the Mexican state fulfil its obligation to enact bioculturally pertinent legislation and public policy. In the case of traditional agriculture, and particularly the milpa, the only way to conserve them is by promoting their use and enjoyment, which can be achieved only through participative improvement and in situ conservation (Ortega-Packza, 2003), respecting and promoting native agrobiodiversity, local knowledge, customary practices, and participative

democracy in decision-making processes. Ending this situation of violence requires, therefore, finding alternatives for development which ensure the continuity of humanity, cultural diversity, and the Earth system (Boff, 2012).

## **7.7 Other reasons to make milpa farming public policy**

### *7.7.1 The milpa helps conserve biodiversity*

Today, changing land use is the main threat to biodiversity, and agricultural activities are the leading cause of change in natural plant cover in countries with tropical ecosystems (Morales, et al., 2008; Perfecto and Vandermeer 2010), like Mexico. This has caused agriculture to be perceived as contrary to conservation and maintenance of biodiversity.

There is, however, a confrontation of two different positions on the relationship between agriculture and biodiversity which have driven a lengthy debate. On the one hand, it is considered necessary to liberate areas currently devoted to agriculture and incorporate them in conservation (land-sparing), by increasing productivity by area. To achieve that, technological solutions have been proposed which make the work more efficient, increase productivity, and are less labor intensive. Such actions would in turn reduce demand and pressure on cultivated area, and could even reduce it, liberating it for purposes of conservation (Garcia-Barrios et al., 2009). On the other hand, agriculture need not necessarily harm biodiversity. Rather, the type of agriculture practice defines

whether the impact is positive or negative for the persistence of species (Perfecto and Vandermeer 2010). The latter position (land-sharing) invites us to analyze the problem from a broader perspective, since the persistence of species at the regional level occurs through a dynamic of migration and local extinction (extirpation) of species lodged in fragments of natural vegetation. This phenomenon is known as metapopulation dynamics.

Metapopulation ecological theory is based on the fact that local extinctions are normal natural processes which occur even in habitats with continuous natural vegetation, and the process of migration reverses extirpations and maintains a metapopulation structure which prevents regional extinctions of biological species (Hanski et al., 1991). This dynamic highlights the importance of the capacity agricultural areas offer to temporarily or permanently support native species (permeability), in other words it emphasizes the relevance of the quality of the agricultural matrix in which fragments of natural vegetation are embedded. Agricultural activities which facilitate the migration of species among fragments of natural vegetation promote the preservation of the metapopulation structure which prevents regional extinction (Perfecto et al., 2009).

In the context of land-sharing, it has been proposed that agricultural areas may be the most important habitat on which conservation efforts should focus (Perfecto and Vandermeer 2010), for which reason this position seeks to improve the quality and productivity of agricultural areas by means of sustainable agroecological techniques which favor the permeability of species through them.

Moreover, the discussion of productivity and ways to increase it presupposes a dilemma regarding the proposed models. On the one hand, industrialized agriculture (which prefers the land-sparing model) portrays itself as more productive than traditional, organic, or agroecological agriculture and assumes that peasants are inefficient and that technological progress is the only way to boost productivity. However, most studies which reach these conclusions compare only the productivity of commercial crops and do not consider the net productivity of each system (Perfecto and Vandermeer 2010). For a comparison of productivity between the two models to be accurate, it must consider the net productivity and energy balance associated with each mode of production. Considering this, Badgley et al. (2007) found, in a comparison of productivity in 293 study cases, that organic or agroecological agriculture, on average, achieves the same levels of productivity (per unit of area) as industrialized agriculture, and in some cases even surpasses it.

Although both models can achieve, on average, the same productivity per unit of area, the land-sparing models assumes that an increase in productivity reduces demand for farmland. However, economic theory suggests that, through technological progress, agriculture becomes increasingly lucrative and gives farmers an incentive to expand production to new cultivated areas (Angelsen and Kaimowitz 2001).<sup>19</sup> Empirical studies have shown that, under the industrial model, the net rate of deforestation increases (Garcia-Barrios et al., 2009) and suggest that the results of technification depend on the sociopolitical and ecological

<sup>19</sup> This phenomenon is also known as the Jevons paradox.

context and should not be analyzed simplistically based only on theoretical models.

Similar studies have found that productivity per unit of area is greater in small areas and that, as their size increases, productivity lessens (Cornia 1985). Such studies suggest that peasant farmers, in small production units have extensive knowledge of the land and its ecological conditions, which informs their crop planting decisions. Usually, they use a polyculture model to take advantage of the peculiarities of the land and its environmental variability to ensure productivity and availability of food across crop cycles (Altieri and Toledo 2011). For its part, industrialized agriculture, based on monoculture and planting on large areas, ignores regional ecological and

environmental conditions and/or proposes costly technical solutions to address the problems it entails (precision agriculture), reducing the system's net yield (Cornia 1985).

Both models are opposed in how they confront the problem of productivity, but also in the results they produce in terms of the quality of the agricultural matrix. Industrial agriculture is considered impermeable to migration of most species due to its high use of external inputs (herbicides, pesticides, fertilizers, irrigation, and mechanization), in addition to the low environmental heterogeneity it offers (refuges, habitats) because it is centered on monoculture (Perfecto et al. 2009). This causes a disruption in ecological processes affecting biotic interactions, fertility, and soil retention, as well as



the availability and quality of water, all of which are necessary to conserve biodiversity (Gonzalez-Gonzalez et al., 2016).

For its part, traditional and agroecological agriculture not only is able to produce food sufficiently and efficiently, it increases agrodiversity and promotes the temporary or permanent establishment of wild species through the agroecosystem, promoting their regional persistence (Perfecto et al., 2009; Chappell et al. 2013). The milpa and other traditionally managed agroecosystems are clear examples of systems which help improve the quality of the matrix and favor the conservation of biodiversity (Chappell et al. 2013; Gonzalez-Gonzalez et al. 2016).

*7.7.2 The milpa produces more food than an agroindustrial system on the same area*

As a system in constant change which adapts to varying environments and needs, the milpa stands out for the diversity of species which are reproduced there. Due to the need to produce diverse foods for the family diet and the application of ecological principles based on the different positive relationships which elements can establish in the system, the milpa is a polyculture which can support dozens of species.

Such diversity is also a strategy which helps confront different scenarios, for example that in which one of the crops or varieties is affected by a pest or natural phenomenon and another species or variety may prosper and help withstand the harmful effects (Ebel et al., 2017). The capacity for tolerance in a diversified system depends on the level of interaction between the biotic, domesti-

cated, wild, and abiotic components of an agroecosystem, and on management by producers (Altieri 2009). Diversity of crops also permits better use of time, obtaining different harvests throughout the agricultural cycle (Aguilar et al., 2003).

Many traditional crops are polycultures and may offer different advantages over monocultures. For the milpa in particular, there are different advantages over maize monoculture.

<p><b>Niche complementarity.</b> Each cultivated species has a specific architecture and specific nutritional needs, and accordingly draws on different sources of resources at different times in the cycle. The different root structures of maize, beans, and squash, for example, reduce competition for nutrients and optimize their absorption, whereas aerial structures optimize absorption of light.</p>	<p>Postma and Lynch, 2012; Iverson et al., 2014.</p>
<p><b>Mutualism.</b> Two or more species are beneficially related. Beans, for example, may establish symbiosis with a nitrogen fixing bacterium (<i>Rhizobium</i> sp); the fixed nitrogen can be used by maize and other species. Maize supports beans.</p>	<p>Aguilar et al., 2003; Gliessman, 1990; Wang et al., 2010.</p>
<p><b>Biological control.</b> Biological suppression of diseases and lower incidence of pests due to the presence of predators and parasitoids.</p>	<p>Guzman and Alonso, 2000; Khan et al., 2008.</p>
<p><b>Greater biological activity of soils compared with monoculture.</b> Squash grows on the surface and hinders growth of weeds, reduces erosion, and traps moisture in the soil.</p>	<p>Gliessman, 1985; Iverson et al., 2014.</p>

Table 4. Various advantages association of species in the milpa can offer. Source: prepared by the authors.

The association of crops in the milpa, in addition to boosting the system’s capacity to overcome adverse conditions, helps increase the yield of each species compared with production in monoculture, due to the interactions mentioned in Table 4. Comparing polycultures and monocultures of maize, beans, and squash planted over two years, in the United States, Zhang et al. (2014) found that associations of maize, beans, and squash and maize and beans, with native varieties, had better yield and biomass production than corresponding monocultures on the same cultivated area. (Ebel et al., 2017) observed that all associations of maize, beans, and squash had better yield compared with corresponding monocultures, using native varieties and organic management in the State of Mexico. The results of these investigations are summarized in the table below:

Table 5. Combinations, varieties, and equivalent land indices for milpa crops in two studies. Mg ha<sup>-1</sup>= tons per hectare. The equivalent land index represents the quantity of land that would be needed in monoculture to obtain the same production as in polyculture. It is calculated by dividing production in polyculture by that of monoculture and then adding for each crop in polyculture. Ebel et al. (2017) use yields in the zone for reference, M=7 Mg ha<sup>-1</sup>, F= 1.5 Mg ha<sup>-1</sup>, C=12 Mg ha<sup>-1</sup>.

Association	Varieties	Increase in yield vs. monoculture (%)	Equivalent Land Index	Source
Maize-beans	Maize (Oaxacan green), beans (Cherokee trail of tears), squash (table queen)	30-50%	1.3-1.5	Zhang et al. (2014)
Maize-beans-squash		30-60%	1.3-1.6	Zhang et al. (2014)
Maize-beans	Maize (criollo white), beans (pink bush beans), squash (criollo runner)	90%	1.9	Ebel et al. (2017)
Maize-squash		60%	1.6	Ebel et al. (2017)
Maize-squash		70%	1.7	Ebel et al. (2017)
Maize beans squash		60%	1.6	Ebel et al. (2017)

Milpa polyculture offers many advantages, although it also has characteristics which may constitute disadvantages in a context of negligence and institutional abandonment, such as high demand for labor due to lack of mechanization, competition among cultures in poorly designed systems, possible allelopathic interactions, difficult application of statistical methods to evaluate experiments and lack of experts in the field (Ebel et al., 2017). However, the studies conclude that the capacity of polycultures to withstand external disruptions may be a very important tool in adapting to climate change, and therefore diversification is a functional strategy to maintain, and even increase, production of various key crops for the Mexican diet.

### *7.7.3 The milpa maintains genetic diversity and increases the resilience of the system*

The different strains of maize (like other crops) are the result of past and contemporary processes of gene flow, natural selection, and domestication (Mercer et al. 2008; Mercer and Perales 2010), which act through cross pollination between different strains of maize and their wild relatives (teocintle and *trispacum* sp), the exchange of seeds among peasants, natural selection under different environmental conditions, and selection of seeds and other phenotypic characteristics of crops (Mercer and Perales et al., 2010). Therefore, a strain can be understood as a dynamic population which has a historical origin with distinctive characteristics developed through traditional improvement, and high genetic diversity and local adaptation associated with management in traditional cultivation systems (Camacho-Villa et al., 2005).

The different crops and their strains have the potential to respond and adapt to environmental changes and disruptions through two processes: natural selection and phenotypic plasticity. The responses to both processes depend on the genetic diversity of each strain, which in turn is related to the ecological context, evolutionary history and history of management which have produced it. The greater the genetic diversity of a strain, the higher the probability that, through natural selection, its adaptation will increase, in other words its capacity for growth, survival, and reproduction (Mercer and Perales 2010). Phenotypic plasticity, on the other hand, refers to the ability to adjust the phenotype (appearance, physiology, growth, reproduction, etc.) in response to changes in environmental conditions without undergoing genetic modifications (Mercer and Perales 2010). In some cases, the effect of phenotypic plasticity may maintain, and even increase, yield of a crop in response to environmental changes, and in that sense, act as a “buffer against change” (Scheiner 1993). However, environmental changes affect more than one environmental variable simultaneously (e.g. temperature, precipitation, and humidity), and therefore plastic responses also occur in more than one phenotypic characteristic at the same time (e.g. size, rate of photosynthesis, and number of seeds per fruit). Consequently, we cannot predict if changes due to plasticity which could potentially increase or maintain adaptation in response to an increase in temperature, for example, would do the same in the event of a change in precipitation (Mercer and Perales 2010). Therefore, one way to explore and mitigate the response to different climate scenarios is by conserving the genetic

diversity of crops.

Maintaining crops with high genetic diversity provides a form of insurance against environmental changes and disruptions which are expected to be more frequent and intense under different climate change scenarios (Ureta et al., 2012). For that purpose, it is essential to continue to plant and conserve different varieties or strains in situ, in other words to conserve the cultural and social processes which have produced different traditional agroecosystems through traditional management and improvement. Thus, in addition to confronting climate change, social and economic needs can be met, making the milpa system more resilient to unpredictable economic and environmental scenarios.

# VIII. CONCLUSIONS AND RECOMMENDATIONS

## Conclusions

- The Mexican state has been remiss in fulfilling its obligation to enact bioculturally appropriate farm legislation and public policy, in accordance with the highest standards of protection of human rights to cultural identity, territory, and traditionally managed natural resources, health, food, and a healthy environment of indigenous peoples and similar communities. Its omission has resulted in a pattern of systematic violations of human rights which must end.
- To help ensure the peace and flourishing of the Mexican nation in general, and of indigenous peoples and similar communities in particular, it is necessary that the Mexican state protect and promote the PatBio, from a human rights perspective, which is possible if it constructs and implements legislation and public policy articulated and founded on the milpa system, as we have outlined in this report.

## Recommendations

### II. Legislation

1. In accordance with the standard of protection of rights to food and a healthy environment, it is imperative that the Mexican state enact, as promptly as possible, legislation which promotes the milpa system as an institution to safeguard human rights to cultural identity, traditionally managed territory and natural resources, health, food, and a healthy environment.
2. Refocus and amend the agroalimentary legal framework<sup>20</sup> to favor food sovereignty, protection and use of the PatBio and traditional agriculture, and promotion of small and medium-size production units, to stop the systematic pattern of human rights violations which we have described.

*20 See analysis of the agroalimentary legal framework in the Report on the biocultural pertinence of Mexican legislation and public policy for farming. Case of the program "Sustainable Modernization of Traditional Agriculture" (MasAgro), available at: <http://www.cemda.org.mx/wp-content/uploads/2016/12/InformeMasAgro.pdf>*

3. Recognize and protect the rights of small producers (peasants and indigenous), prioritizing local farm production by giving peasants access to land, water, credit, and bioculturally appropriate farm inputs. This includes promoting free access and circulation of native seeds, protecting traditional knowledge, and customary practices used in governance of traditional agroecosystems, traditional production systems, and native agrodiversity as commons, in other words, develop a legal framework which guarantees them cultural control over their PatBio.
4. Amend the agroalimentary legal framework to effectively protect the so-called “plant varieties of common use,”<sup>21</sup> for which it is necessary to promote native agrodiversity, animal and plant wildlife, traditional local markets, and traditional and agroecological farming and silvopastoral practices.
5. Protect peasant producers of food imports which undermine local markets, guaranteeing farm prices linked to real production costs, controlling imports and particularly protecting milpa products in commercial treaties, and promoting local production and consumption.
6. Amend the agroalimentary legal framework to expand mechanisms for information

and involvement in decisions by small and medium size producers (peasant and indigenous), since they are the main players in the *agroalimentary system - participative democracy*.

## **II. Public policy**

1. Reformulate the National Development Plan in the interest of constructing the strategy which the right to food demands from a biocultural perspective which foment the use of local knowledge, native agrodiversity, and traditional production systems, especially the milpa.
2. Enactment of public programs which promote:
  - The practice of traditional agroecosystems through productive diversification, native agrodiversity, fairs, and live communal seed banks and participative improvement.
  - Economic and non-economic incentives for use of the milpa, which trigger endogenous development processes, which slow migration and foment gender equality.
  - Promotion and regulation of traditional street markets and various types of markets which guarantee fair purchase and sale of milpa products.

21 “Used by rural communities whose origin is the result of their practices, traditions, and customs.” Article 3, Item XXIX, of the Federal Law on Production, Certification, and Trade in Seeds.

3. Enactment of regional-local and participative ecological ordinances nationwide, to prevent appropriation of land, irregular urban development, and loss of agricultural and forest zones and in general regulate the change of land use to promote a high quality agroecological matrix.
4. Promote agroecological techniques of conservation and management of water, soil, and local varieties which further the transition to independence from synthetic inputs with the aim of protecting and conserving biodiversity and human health and nutrition.
5. Promote public investigation to address the technology and human development needs of peasant agriculture from a dialog on traditional knowledge and agroecology. Promote the construction of an agricultural and environmental citizenry, in other words construct articulated public policy on education, health, and agriculture which strengthen peasant and indigenous agriculture and balance relations between rural and urban areas.



## IX. EPILOGUE



### **The milpa system and the biocultural heritage of indigenous peoples and similar communities in Mexico**

*By Eckart Boege*<sup>22</sup>

**T**he milpa is an emblematic Mesoamerican agricultural system and the heart of the biocultural heritage of indigenous peoples and peasant communities.

In the global context, Mexico, jointly with Guatemala, Honduras, El Salvador, and part of Nicaragua, is recognized as one of the 8 centers of origin of agriculture, domestication, and constant diversification (Vavilov 1926; Harlan 1973, 1975; and Engels et al., 2006), which means that our geographic region is the center of origin and diversity of approximately 225 cultivated or semicultivated plant species (Kato et al., 2009; Hernandez X. 1985; and Ortega-Paczka 2003).

Each center of origin has its dynamic and in general indigenous peoples and similar communi-

ties (local or peasant) keep alive both agrobiodiversity and biocultural landscapes in different ecosystems, as well as the genetic lineage of useful plants as the result of the process of domestication. This Mesoamerican agrobiodiversity is the encounter of biological megadiversity and vast cultural diversity. Domestication and constant diversification is a permanent historical biocultural process in different ecosystems whose expression is most concentrated in the present-day territories of indigenous peoples (Boege 2008).

What does it mean that indigenous territories and similar peasant communities are the historical laboratories for domestication and genetic diversification? Plants which originally grew spontaneously as “weeds” become basic components of the global food system: beans, squash, tomatoes, prickly pear cacti, and all kinds of edible greens. Even today, we often see constant and occasional exchange of domesticated species with their wild

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or semi-wild counterparts. Genetic diversification of domesticated species is practiced today by thousands of peasant and indigenous farmers on subsistence production units where they are established and give rise to varieties adapted to the local environment and cultural preferences.

Maize is the Mesoamerican civilizing cultivar created in the *biocultural laboratories* of what we generically refer to as the milpa system. The milpa, or “*milaj*,” in the Nahuatl language of the northeastern Puebla mountains, is an indigenous agroecosystem which encompasses large and diverse environmental units, occupying a large part of the indigenous territories. A distinctive feature of mountainous indigenous territories is the variety of natural ecosystems, where the milpa is adapted to different local and regional conditions. The resulting process forms dynamic biocultural landscapes with differentiated ecosystemic complexes with varied mosaics of forest, jungle, prairie, and grassland, as the case may be.

If we cross reference the inventory of strains of maize with territories of indigenous peoples in geographic information systems (Boege 2008), we conclude that practically all the strains of maize known in Mexico can also be found on indigenous territories. This diversity of maize is the product of adaptations made by generations of indigenous farmers in different and extreme agroecosystemic conditions like drought or abundance of rainfall, altitude, shallow soils or hillside plots, etc.

One of the great civilizing achievements of Mexico’s indigenous peoples is the strategy they deployed with maize, which they adapted from 0 masl (meters above sea level) to 3200 masl, and with annual rainfall patterns ranging from 200

mm (the Opata in Sonora) to 4500 mm in the Mixe mountain range. No other cereal in the world is as adaptable to so many different environments. The milpa, then, constituted a laboratory of domestication where indigenous farmers accomplished the civilizing feat of adapting maize to practically all Mexico’s ecosystems.

Milpas are almost always home to a reserve of mostly unplanted spontaneous useful plants. These include varieties of plants which coexist with crops and are tolerated by producers. The milpa is a polyculture which forms small agroecosystems (Hernandez, 1985) with different approaches depending on the varied physical, climatic, and biotic conditions; it respects diverse ecological principles and is home to the synergic interaction of maize, squash, beans, chili peppers, and various spontaneous plants like edible greens or *quelites*, as the Nahua indigenous people call them. Their importance is variable, but as a system of “spontaneous greens” they are part of the milpa’s agroalimentary diversity and an excellent supplement to bolster food security. Today, we are starting to see an abundance of studies on *the importance of underused traditionally used species (Spanish acronym ETSS) in the milpa*. In Mexico, Linares and Bye (2015) have concentrated on studying such greens, focusing on three core topics: 1) these plants’ contribution in combating hunger and achieving food self-sufficiency and sovereignty, 2) the vast biodiversity they represent for milpas in a complex agroecosystem, 3) their role in the culinary culture. In entire regions, industrial agriculture based on monoculture and use of herbicides has exterminated these “spontaneous plants” and all the animals which accompany them. Indigenous

people do not consider most spontaneous plants weeds but rather see them as highly useful in their diet and for medicinal use.

Many production units farmed by indigenous peoples and peasant communities have three productive spaces where they continue cultivating, adapting to the most minimal climatic changes with local expression and selecting seeds from the most diverse Mesoamerican cultures, in a relationship of landscapes with the composition of intervened natural vegetation: a) primary and secondary vegetation, often for common use, which can be interpreted as an ethnoagroforest system; b) the fixed or moving milpa as a specific agroecosystem; and c) family plots. Many indigenous landscapes are a mix of natural, seminatural, and artificial plant communities in combinations which encompass extraordinary biological wealth (Boege 2008). As spaces of domestication, the family plot (Mariaca (ed) (2012) and the milpa, and even the fallow plots or *acahuales* (secondary forest and jungle) are areas in constant transformation. In many regions and territories, Mexico's biocultural landscapes are made up by family plots, which have medicinal plants, stingless bees to produce raw honey, useful plants for various purposes, annual, perennial, and y semi-perennial vegetables, farm animals, and fruit or timber trees transplanted from the forest. To ensure food security and sovereignty, Mayans in Yucatan leave plants with tubers, which withstand drought and/or flooding, in their fallow plots.

It is possible to relate certain associations of strains of maize and their varieties with some indigenous peoples or related linguistic groups (Benz 1997; Munoz 2003). The *Pepitilla* or Mexi-

can landrace strain, which is the closest from a genetic standpoint to Teosinte (*Zea mays parviglumis*) is found in the territories of several indigenous peoples in the Balsas river basin, in the states of Morelos, Guerrero, and Michoacán and in the Central Valleys of Oaxaca. Strains like *Naltel*, *Olotillo* (*Dzi't bakal*), *Tehua*, *Tepecintle*, *Vandeno*, and *Comiteco* can be associated with the Mayan peoples of the Yucatan Peninsula, Chiapas, and Guatemala; small-grain chapalote, which started its process of differentiation from other strains some 2500 years ago, combines no less than 22 favorable genetic complexes not found in any other strain, making it a perfect indigenous selection (Munoz 2003). Small-grain chapalote can be associated with the Zapotecs of the Isthmus of Tehuantepec and the Southern Mountains of Oaxaca, including the "Chontales" of Oaxaca, and Chatinos; Bolita, large-grain chapalote, Mixteco, and Mushito with the Mixtecs and Zapotecs; yellow *arrocillo*, Tuxpeno, and northern Tuxpeno with the tropical and semitropical cultures of the lowlands and mountains of the Gulf of Mexico; associated with the cultures of the central plateau and the neovolcanic axis, we find *Palomero toluqueno*, *Conico*, *Cacahuacintle*, *Elotes conicos*, *Pepitilla*, *Ancho*, and *Chalqueno*; *Reventador*, *Tablilla de 8*, *Chapalote*, *sweet maize*, *Conejo*, *Conico norteno*, *Celaya*, and *Jala* (which produce the largest ears, measuring up 71 cm long) of the western cultures. Benz (1997) presents an association between the *Grueso* of Nayarit, *Tabloncillo* of Jalisco, Broad maize and *conejo* of Guerrero, *Olotillo* of Chiapas, *Bolita*, *Cornon*, and small-grain chapalote of Oaxaca, distributed over the territories of the indigenous peoples of the Otomanguan language

family, which suggests a common cultural and biological history. These strains also suggest that maize was domesticated by forebears who spoke root languages of Otomi, Matlazinca, Tlapaneco, Amuzgo, and Zapotec, among others. The richest lexicon surrounding maize is found in the Otomanguan protolanguage. From this perspective, the strains Nal-tel, of Yucatan, and Chapalote, of Sinaloa, are not as primitive (original) as formerly thought. The group of strains from the central plateau: Arrocillo, Cacahuacintle, Conico Chalqueno, and Palomero Toluqueno, are classified as conical and have existed at least since the first century of the common era (Benz B. 1997). A recent article examines the possible origins of the phenotypic differentiation of the same strains of maize, Oloton and Comiteco, as cultivated by the Tzeltal and Tzotzil indigenous peoples. Peasant and indigenous farmers use a common base of germplasm; however, certain morphological characteristics are selected by each indigenous culture, thereby favoring certain traits of only a fraction of the genome (Perales et al., 2005). In other words, in the case of maize, the different strains and varieties are the product of traditional farmers preferring some traits and inhibiting others, which is usually expressed in the phenotype. Intimately linked to these biocultural landscapes are local food systems, which determine both the needs for agriculture and regional culinary culture. Over some 300 to 350 generations of ancestors, the original peoples have domesticated, adapted, diversified, and introduced species with their thousands of varieties in the indigenous and national food system. Today, the different culinary preparations related to maize number over 600.

More than half of maize crops are grown on slopes in polycultures, and in some cases as part of agroforest systems. This means of cultivation teaches the successful adaptation of a set of farming practices in challenging environments or situations of environmental stress, with drought, frost, heavy rainfall, altitude, and precarious soils (Boege 2008). We also see crops grown in rocky areas inaccessible to machinery. It is precisely such exposure of crops to selective pressures, both cultural and from environmental stress and the exchange of seeds that gives them their vigor and genetic plasticity. Such genetic plasticity is a strong antidote to the genetic erosion and collapse of diversity promoted by industrial agriculture (Fowler and Mooney. 1990, Vandana Shiva 1998).

The biocultural heritage of indigenous peoples and similar communities is found in greater concentration in biocultural regions which overlap with the territories of indigenous peoples (Boege 2008). The ethnomaps of indigenous territories are filled with toponyms imbued with symbols (geosymbols), many of them sacred. Such ethnomaps are different from the western geographic charts we are familiar with. When we speak of geosymbols, we are referring to places, mountains, rivers, trees, rocks, or other “geographic accidents” which organize, in symbolic terms, space as it is experienced and undergoes constant transformation through work on farm plots, fallow land, or forests and jungles. The meeting of indigenous subsistence farming with the land produces tension with the living things of nature which have the capacity for agency and contribute or not to the optimum results of planting or hunting. The indigenous relationship with the beings of nature

is built on an ethic of reciprocity, of requesting permission and protection, of respect, of symbolic exchange, which reinforces attitudes and feelings in the act of cultivating and harvesting. If such relations of reciprocity are not formed with the beings of nature, it will result in “imbalance,” natural disasters, and communal and/or personal misfortune. See, for example, the contents of beautiful prayers which refer to a symbolic reciprocal exchange between *tłaltikpak* (land surface) and the *Maseual* who cultivate the *milpa*. These prayers were originally recorded in the Nahuatl language, recited by Leonardo Martinez in the municipality of Benito Juarez, Veracruz (Boege 1988, Reyes L. and D. Christensen 1989).

The polarized vision of modernity-traditionalism prevalent in modern society has its difficulties when seen in the context of the processes of colonial domination of subordinate groups, such as indigenous peoples and similar peasant communities in multiple spheres of society and culture (Stavenhagen 2013). In effect, there is a constant contradiction between different ways of life and of conceiving the relationship between nature and society. We observe movements of resistance and defense of territory by indigenous and peasant groups opposed to the destruction of the *milpa* by official programs, with efforts of re-appropriation and cultural reflexivity of the indigenous “being” and its relationship with living space under an environmental ethic of respect, reciprocity, and spirituality where biocultural heritage is a core component in their reinvention as indigenous peoples.

For example, local and regional Mesoamerican seed banks, adapted to local ecosystems, are cre-

ated, and are exhibited in *milpa* fairs, with activities including contests for ears of maize produced by peasant and indigenous farmers. These fairs are also important because they provide an opportunity to exchange seeds and even to rescue lost seed. The conservation and defense of native seeds are part of the defense of food sovereignty and culinary culture. Some fairs promoted by peasant and indigenous organizations also showcase the finest traditional gastronomy. Food sovereignty goes hand-in-hand with the defense of small scale producers and their traditional resources derived from the *milpa*.



Mayan altar for the defense and protection of native maize and seeds. Mesoamerican Encounter of Native Spirituality in Huehuetenango, Guatemala 2007. Photograph courtesy of Alvaro Salgado

A serious colonial relationship for the biocultural heritage is a public policy which promotes the use of “improved” hybrid seeds without considering that their germplasm displaces local strains of maize. Federal and state subsidies are used to promote planting of seeds mainly from an oligopoly of seed and agrochemical companies,

so that peasant and indigenous farmers abandon their ancestral seeds and biocultural knowledge and preferences favoring protection and cultural use. Such policies follow a “productivist” logic to “combat poverty” and imply loss of millenarian cultural control of indigenous and peasant seed stocks. Notwithstanding, we have seen how, in some cases, so-called improved seeds “nativize” and mix with local specimens producing a band of “mixed” seeds. Today, this phenomenon takes on a special dimension when official programs indiscriminately distribute seeds of genetically modified maize imported from the United States or South Africa. The genetic contamination of native maize by genetically modified strains is in progress, with uncertain consequences. Likewise, we have seen how, under the NAFTA, public policies on subsidies favor industrial production of maize over a majority of peasant producers, among them indigenous peoples.

The domestication and genetic diversification of maize is only part of the historical accomplishment of indigenous peoples and peasant communities (Boege 2008). International and domestic institutions devoted to the study and conservation of “genetic resources” have deposited *ex situ* thousands of specimens of seeds collected in peasant communities and indigenous territories. Their collections are freely accessible to public and private universities, as well as transnational agrochemical and seed companies or Mexican seed producers. With the genetic materials collected “new seeds” are produced, which are commercialized and increasingly subjected to a regime of private intellectual property rights without considering the biocultural origin of the

genetic material. Collections from commons and private appropriation of the biocultural heritage of indigenous and peasant groups would appear to be the currency of transnational and globalizing modernity. There is no legal protection for collective intellectual property, even that referring to the *sui generis* property postulated in the Convention on Biodiversity (1992), subscribed by a majority of the world’s nations. The dispute over biocultural heritage – and especially so-called biocultural genetic resources, in the interests of globalized markets – has been exacerbated in recent years. The major transnational agrochemical companies monopolize seeds usually produced, at some point, from original indigenous peasant germplasm from Mexico and other countries. Thus, they begin to control the global food system, which produces enormous profits for them. Also, the pharmaceutical and cosmetics industries have appropriated the genetic stores and uses of the biocultural heritage of the world’s indigenous peoples and peasants. The industrialized agriculture practiced by the northern countries and their subsidiaries or “sister” companies in the south displace the peasant agriculture of the southern countries with its high diversity and agrodiversity. Industrial agriculture includes large-scale clearing of forests for extensive cattle grazing, to produce transgenic soy and maize, or to create vast forest plantations for biofuels. To document how industrial agriculture foments the genetic erosion of the global food system – in other words the loss of seed diversity – suffice it to say that the FAO (Esquinas 2003) reports that the global food system is restricted to only 12 plant and five animal species, which supply more than 70% of the world’s food. Only four plant species

(potato, rice, maize, and wheat) and three animal species (cows, hogs, and chickens) provide more than half. Diversity is being undermined in agriculture as an antidote to mitigate the effects of global warming.

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*Conclusion. The different domesticated species and wild plants used in milpa farming are culturally and historically constructed commons, which shape the modern-day biocultural landscape of the different regions and territories of indigenous peoples. They are components in genetic stores and ancestral farming systems which base their productive strategy on diversity. This contrasts with the monocultures of industrial agriculture under the dictates of transnational seed and agrochemical companies. Mexico is in danger of losing its diversity of seeds, which, it should be noted, is one of its most important resources to combat the ravages of climate change.*



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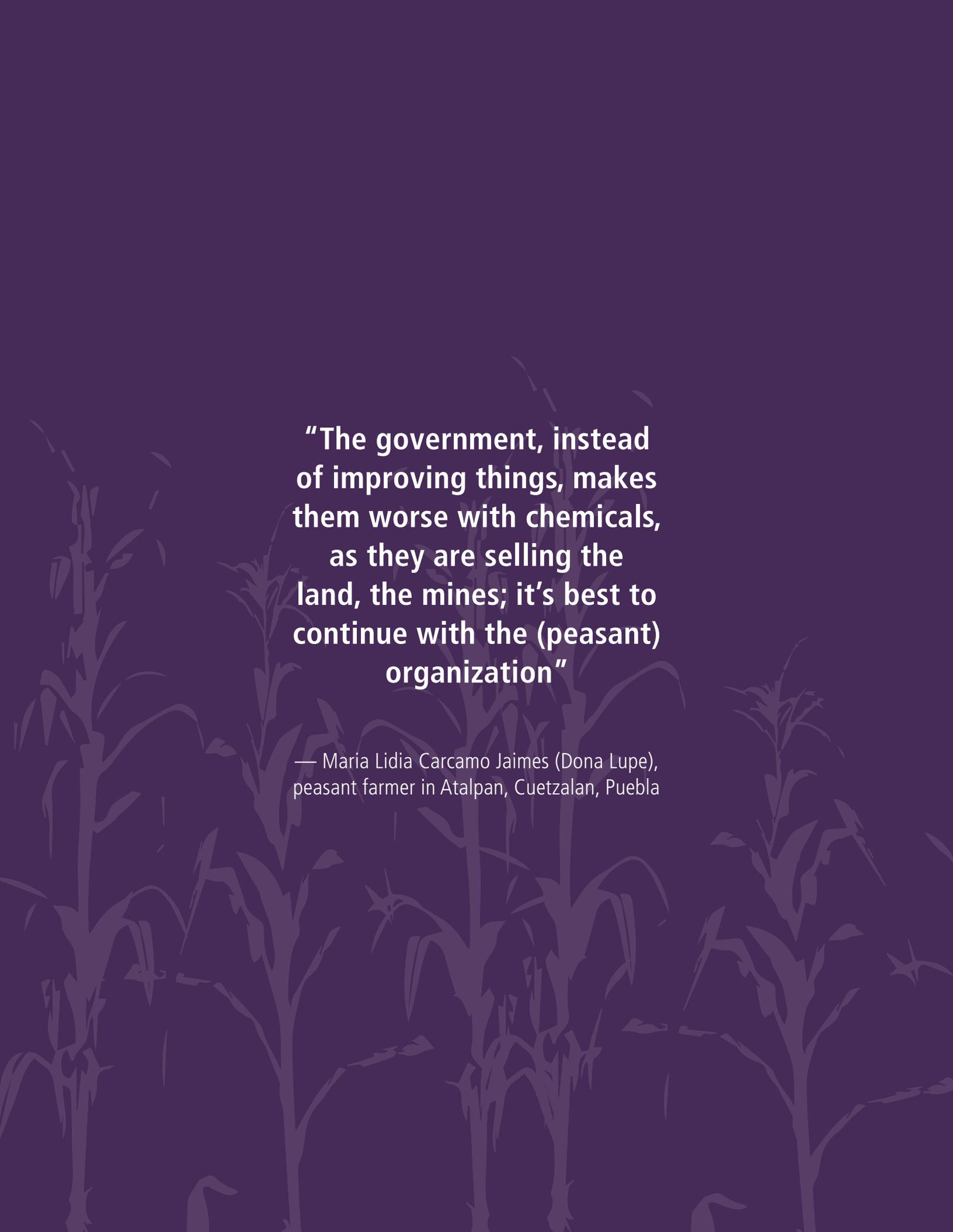
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**“The government, instead of improving things, makes them worse with chemicals, as they are selling the land, the mines; it’s best to continue with the (peasant) organization”**

— Maria Lidia Carcamo Jaimes (Dona Lupe),  
peasant farmer in Atalpan, Cuetzalan, Puebla

# ANNEX 1

**Date:** 9/3/2017

**Folio:** 1615100016117

**State:** Federal

**Agency:** CONANP

**Information requested:** Please provide complete and sufficient information on whether, since 2012, any program has been implemented in the protected natural areas you administer involving the milpa cultivation system.

**Date of response:** 9/3/2017

**Response:** In response to your request for access to information, I hereby inform you that this National Commission for Protected Natural Areas has provided public funds through the following subsidy programs: - In the years 2012, 2013, 2014, and 2015, it implemented the Criollo Maize Conservation Program (PROMAC) - In the year 2016, it implemented the Program for Recovery and Repopulation of Species at Risk (PROCER), including a component for Conservation of Species at Risk and Conservation of Criollo Maize. The information on these subsidy programs is public and can be consulted online at: <http://www.gob.mx/conanp/acciones-y-programas/maiz-criollo> [http://www.conanp.gob.mx/procer/procer\\_2016.php](http://www.conanp.gob.mx/procer/procer_2016.php)

**Date:** 9/3/2017

**Folio:** 0000800075517

**State:** Federal

**Agency:** SAGARPA

**Information requested:** Please provide complete and sufficient information on the present legal situation of the milpa production system.

**Date of response:** 29/03/2017

**Response:** Information nonexistent. A motion for review was filed with the INAI, under file number 2080/2017, and

the ruling was amended. In response to the ruling, it was stated that the milpa is not considered a basic or strategic product which needs to be protected under the terms of the “product system” in accordance with Article 179 of the Law on Sustainable Rural Development.

**Date:** 9/3/2017

**Folio:** 0000800075417

**State:** Federal

**Agency:** SAGARPA

**Information requested:** Please provide complete and sufficient information on whether, from 2012 to date, any program has been designed and implemented for the protection of milpa polyculture, and if it has, I request all documents, studies, operating rules, budgets, audits, lists of beneficiaries, and any documentation generated in relation to such programs.

**Date of response:** 29/03/2017

**Response:** Information nonexistent. A motion for review was filed with the INAI, under file number 2078/2017, and the ruling was amended. In response to the ruling, it was restated that the information was nonexistent.

**Date:** 9/3/2017

**Folio:** 0000800075617

**State:** Federal

**Agency:** SAGARPA

**Information requested:** Please provide complete and sufficient information on whether, from 2012 to date, any program has been designed and implemented to incentivize and protect traditional agriculture and the milpa in the states of Oaxaca, Michoacán, Yucatan, Jalisco, Veracruz, and Tlaxcala.

**Date of response:** 28/03/2017

**Response:** Information nonexistent. A motion for review was filed ante el INAI, under file number 2079/2017, and the ruling was amended. In response to the ruling, it was restated that the information was nonexistent.

**Date:** 25/4/2017

**Folio:** 1615100025017

**State:** Federal

**Agency:** CONANP

**Information requested:** Please provide complete and sufficient information on the budget allocated and disbursed from 2009 through 2015 for the Criollo Maize Conservation Program (PROMAC), and the budget allocated and disbursed in 2016 for the Component “Conservation of Criollo Maize” in the Program for Recovery and Repopulation of Species at Risk (PROCER).

**Date of response:** 25/05/2017

**Response:** See file here: <https://drive.google.com/file/d/0B55g3G8TxFSzUmZKRoQoLVRqYXc/view?usp=sharing>

**Date:** 12/5/2017

**Folio:** 1615100029217

**State:** Federal

**Agency:** CONANP

**Information requested:** Please provide the “Information system for monitoring actions and projects for conservation of criollo maize (SISMAC)”

**Date of response:** 9/6/2017

**Response:** It is an IT tool, for the exclusive use of the CONANP.

**Date:** 18/5/2017

**Folio:** 1615100031617

**State:** Federal

**Agency:** CONANP

**Information requested:** Please inform me if, for the year

2017, the Criollo Maize Conservation Program (PROMAC) and the Component “Conservation of Criollo Maize” will be implemented as part of the Program for Recovery and Repopulation of Species at Risk (PROCER). If applicable, please provide the rationale for implementing them or not.

**Date of response:** 31/05/2017

**Response:** It will not be implemented this year because there was no budget.

**Date:** 23/5/2017

**Folio:** 1615100032117

**State:** Federal

**Agency:** CONANP

**Information requested:** Please inform me if, in any protected natural area, the practice of milpa farming has been prohibited, and if so provide the legal basis and rationale for such prohibition.

**Date of response:** 31/05/2017

**Response:** Each area may prohibit practices in accordance with its management program.

**Date:** 10/08/2017

**Folio:** 233817

**State:** Aguascalientes

**Agency:** Department of Welfare and Social Progress

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** It is not possible to enter the section on Requests Registered specifically for the state of Aguascalientes, because the following error constantly appears: “Communication with the linked application does not respond. Try again.”

**Investigation:**

“SUSTAINABLE RURAL COMMUNITY

**Objective**

Promote the sustainable development of marginalized rural communities in Aguascalientes, through training in ecotechniques and organization for environmental problem solving.

**Activities**

Training of community promoters.

Community advice for development of ecotechniques: solar oven and stove, wood-saving stove, biointensive garden.

Design of manuals as support materials: Manual to build a wood-saving stove and Manual to build a solar oven.

Advice and training by other government agencies like the state DIF [and] Women's Instance, on building wood-saving stoves, solar ovens, and biointensive gardens.

Development of the didactic package "How to improve the environment in our community", a series of 23 capsules.

Support and advice for municipalities.

**Courses**

Three-day workshop on the Biointensive Cultivation Method, practical skills.

Five-day workshop on the Biointensive Cultivation Method, theoretical foundation and skills.

How to build a solar box oven. How to build a parabolic solar stove.

How to build a wood-saving stove.

Composting. \*Source: <http://www.aguascalientes.gob.mx/SMA/Educaambiental/crs.aspx>"

**Date:** 10/08/2017

**Folio:** 233917

**State:** Aguascalientes

**Agency:** Department of Rural and Farm Development Information requested: Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** is not possible to enter the section on Requests Registered specifically for the state of Aguascalientes, because the following error constantly appears: "Communication with the linked application does not respond. Try again."

**Investigation:**

AGROALIMENTARY PRODUCTIVITY AND COMPETITIVENESS PROGRAM

COMPONENT ON AGROALIMENTARY CERTIFICATION AND STANDARDIZATION

A. Target population (Who can apply for aid from this Component?)

The Program's target population includes Rural Economic Units (REU) mainly in transition, businesses with fragile profitability, emerging businesses and dynamic businesses, linked to the agroalimentary sector, whether individuals or legal entities, which are currently traditional producers and satisfy the requisites established in Articles 6 and 25 of the Rules to become organic producers through certification of processes and with them of agroalimentary products.

The "Priority Target Population" includes REUs in the target population which are located in the municipalities mentioned in the Decree establishing the National System for the Crusade against Hunger ("SIN HAMBRE"), in the states included in the Component for Productive Development of the South-Southeast and Special Economic Zones and in localities of high and very high marginalization based on the CONAPO classification. B. Objectives (Why request aid from the Component)

The specific objective is to provide producers in REUs incentives to transition from traditional producers to organic producers and certify their processes.

C. Coverage (Where will the Component be applied?)

It is national; therefore, members of the target population in any state in Mexico may participate. Source: <http://campo.aguascalientes.gob.mx/sedrae/actualizaciones/archivos/ConvocatoriaCompetitividadCertificacion2017.pdf>"

**Date:** 10/08/2017

**Folio:** 234017

**State:** Aguascalientes

**Agency:** Department of Environment

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 14/08/2017

**Response:** For the reasons given, we confirm the manifest inexistence (sic) on the part of the Department of de Environment to provide the information requested, because it is nonexistent, and therefore the request is deemed inadmissible.

**Date:** 10/08/2017

**Folio:** 447817

**State:** Baja California

**Agency:** Department of Social Progress

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, I request such programs.

**Date of response:** 10/08/2017

**Response:** In response to your request for information, I inform you that this department does not have jurisdiction in the matter, and therefore we suggest that you submit your request for information to the SEFOA. We appreciate your participation and interest. Kind regards. In the Government of the State of Baja California, we are at your service.

**Date:** 10/08/2017

**Folio:** 447917

**State:** Baja California

**Agency:** Department of Farm Promotion

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented,

or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 10/08/2017

**Response:** Good morning. Dear citizen, In response to your request for information on programs for protection of native, criollo, o milpa maize, I inform you that this agency does NOT operate such programs. Do not hesitate to contact us if you have any further questions.

**Date:** 10/08/2017

**Folio:** 448017

**State:** Baja California

**Agency:** Department of Environmental Protection Information requested: Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 10/08/2017

**Response:** Goof afternoon, citizen. I hereby inform you that the Baja California State Department of Environmental Protection is not the authority empowered to issue the studies you mention, in accordance with the Organic Law of the Public Administration for the State of Baja California, the information in question can be requested from the Baja California State Department of Farm Promotion, at the state level, and from the Ministry of Agriculture, Livestock, and Fisheries at the federal level.

**Date:** 10/08/2017

**Folio:** 318817

**State:** Southern Baja California

**Agency:** Department of Development, Environment, and Natural Resources

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo

maize and/or milpa farming. If so, describe such programs.

**Date of response:** 14/08/2017

**Response:** We want to inform you that this department lacks jurisdiction, in its area of competence, to resolve your request and we encourage you to direct your enquiry to the proper subject in the Department of Fisheries, Aquaculture, and Farm Development, which has jurisdiction in your areas of interest.

**Date:** 10/08/2017

**Folio:** 319117

**State:** Southern Baja California

**Agency:** Department of Economic Development, Environment, and Natural Resources

**Information requested:** Information on the state program devoted to the protection of native and criollo maize and/or milpa farming.

**Date of response:** 14/08/2017

**Response:** We want to inform you that this department lacks jurisdiction, in its area of competence, to resolve your request and we encourage you to direct your enquiry to the proper subject in the Department of Fisheries, Aquaculture, and Farm Development, which has jurisdiction in your areas of interest.

**Date:** 10/08/2017

**Folio:** 100407317

**State:** Campeche

**Agency:** Department of Social and Human Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 16/08/2017

**Response:** This department lacks jurisdiction.

**Date:** 10/08/2017

**Folio:** 100407117

**State:** Campeche

**Agency:** Department of Rural Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** In the heading of the response appears the text: "Response free of charge with attached ruling" Instead of attaching a response to the request, they attach the acknowledgement of receipt of the request, dated August 10, 2017

**Investigation:** "[They] presented a Rural Development working plan to foster greater coordination and cooperation among institutions, technical specialists, and farm producers, the Working Plan of the Rural Development agencies was presented as part of the component Food Security Project for Rural Areas, which serves more than 100 localities in the state of Campeche, with the participation of five ADRS.

The coordinator of Regional Directorates of the Department of Rural Development (SDR), Abid Moo Cruz, emphasized the importance of implementing strategies focused on creating self-sufficiency and sustainability in rural communities, where farm projects originate, with the aim of obtaining satisfactory results in improving the quality of life of rural men and women.

[He] explained that the Food Security Project for Rural Areas helps to transform the living conditions of families in rural communities with high and very high levels of marginalization, focusing on Food and Nutritional Security (FNS) through production of food, generation of income, and sustainable development of human and social capabilities.

Greater coordination is needed to achieve short-term objectives, but with palpable benefits, giving producers the necessary support, technical training, and monitoring, to achieve

the project goals, guaranteeing food security.

The Food Security Project for Rural Areas has, among its areas of intervention, the Garden-Corral Yard, Basic Grains-Milpa, Predominant Productive Systems, and Local Markets, in 9 of the state's 11 municipalities, diagnosed with high and very high marginalization and devoted to farming.

The five Rural Development agencies have the task of identifying communities which have the necessary characteristics to participate in the project, work with the method of promotion, conduct participative planning with families, and identify, design, implement, and provide technical assistance and oversight for actions and projects, jointly with the communities. \*Source: <http://www.desarrolloruralcampeche.gob.mx/boletines/presentan-plan-trabajo-agencias-desarrollo-rural/>

**Date:** 10/08/2017

**Folio:** 100407217

**State:** Campeche

**Agency:** Department of Environment and Natural Resources

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** In response to your enquiry, I inform you that the Campeche State Department of Environment and Natural Resources has not implemented or evaluated any state program which seeks to protect native or criollo maize.

If you consider it a point of interest, I inform you that, within the State Technical Advisory Council for Conservation and Sustainable Use of Wildlife, a Technical Operative Group on Native Maize has been formed, with the aim of promoting actions which promote the culture and conservation of native maize in Campeche.

**Date:** 10/08/2017

**Folio:** 100407017

**State:** Campeche

**Agency:** Department of Economic Development Information requested: Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 14/08/2017

**Response:** This department lacks jurisdiction.

**Date:** 11/08/2017

**Folio:** 90272017

**State:** Chihuahua

**Agency:** Department of Urban Development and Ecology

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 17/08/2017

**Response:** Having conducted an exhaustive search in the archives of this agency, no records from previous years have been found in which any program addressing this issue has been implemented. However, in this administration, it is a priority to preserve criollo and native maize (blue maize, crystalline maize, primarily), for which purpose we are already working on designing activities and strategic plans in various municipalities of the Tarahumara Mountain Range and the Babicora, and the community will be informed opportunely of the efforts and advances on the issue of preservation of criollo and native maize.

**Date:** 11/08/2017

**Folio:** 90282017

**State:** Chihuahua

**Agency:** Department of Social Development

**Information requested:** Please inform me if, from 2012

to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 17/08/2017

**Response:** Having conducted an exhaustive search in the archives of this agency, no records from previous years have been found in which any program addressing this issue has been implemented. However, in this administration, it is a priority to preserve criollo and native maize (blue maize, crystalline maize, primarily), for which purpose we are already working on designing activities and strategic plans in various municipalities of the Tarahumara Mountain Range and the Babicora, and the community will be informed opportunely of the efforts and advances on the issue of preservation of criollo and native maize.

**Date:** 11/08/2017

**Folio:** 90292017

**State:** Chihuahua

**Agency:** Department of Rural Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 17/08/2017

**Response:** Having conducted an exhaustive search in the archives of this agency, no records from previous years have been found in which any program addressing this issue has been implemented. However, in this administration, it is a priority to preserve criollo and native maize (blue maize, crystalline maize, primarily), for which purpose we are already working on designing activities and strategic plans in various municipalities of the Tarahumara Mountain Range and the Babicora, and the community will be informed opportunely of the efforts and advances on the issue of preservation of criollo and native maize.

**Date:** 11/08/2017

**Folio:** 90302017

**State:** Chihuahua

**Agency:** State Commission for Indigenous Peoples Information requested: Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 23/08/2017

**Response:** In the period from 2012 through 2016, no work was done on design or evaluation of any program with the purpose of protecting native and criollo maize; however, I inform you that the current administration has worked on implementing a Program named Food Security, which seeks to strengthen traditional production systems through actions such as providing farming tools, conservation and fertilization of soil, promotion of criollo seeds, and distribution of vegetable seeds, as well as water harvesting, technical assistance to strengthen fruit production, reforestation with native species, and promotion for domestic animal husbandry by operating a mobile veterinary clinic, in addition to training for care of the environment, in order to boost production of food for self-consumption and encourage families to stay in their communities of origin.

**Date:** 10/08/2017 Folio: 585717 State: Chiapas

**Agency:** Department of Social Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 29/08/2017

**Response:** The heading of the response reads "Registration of Request;" however, on looking for the response, there is no sign of a response.

**Date:** 10/08/2017 Folio: 585817

**State:** Chiapas

**Agency:** Department of Rural Affairs

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 01/09/2017

**Response:** In this regard, I inform you that this office under my charge handles information on farm issues, and therefore we do not have the information requested.

**Date:** 10/08/2017 Folio: 585917

**State:** Chiapas

**Agency:** Department for the Sustainable Development of Indigenous Peoples

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 31/08/2017

**Response:** In relation to your Memorandum.: No. SEDESPI/DCCSJ/256/2017, dated August 16, 2017, I inform you that there is no state program related to the protection of native and criollo maize in this agency.

**Date:** 10/08/2017 Folio: 586017 State: Chiapas

**Agency:** Department of Environment and Natural History

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 11/08/2017

**Response:** This department lacks jurisdiction. Please direct your enquiry to the Department of Environment and Natural History

**Date:** 11/08/2017 Folio: 911917

**State:** Coahuila

**Agency:** Department of Rural Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** The heading of the response reads: "4. Define terms;" however, on looking for the response, no indication of a response was found.

**Date:** 11/08/2017 Folio: 912017

**State:** Coahuila

**Agency:** Department of Environment

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 13/08/2017

**Response:** This department lacks jurisdiction.

**Date:** 11/08/2017 Folio: 912117

**State:** Coahuila

**Agency:** Department of Social Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 15/08/2017

**Response:** This department lacks jurisdiction.

**Date:** 11/08/2017 Folio: 342617

**State:** Durango

**Agency:** Department of Social Development

**Information requested:** Please inform me if, from 2012

to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** The heading of the response reads: “Receive orientation,” but when we click on the button to open the response, the platform shows the following error: “Internal Server Error The server encountered an internal error or misconfiguration and was unable to complete your request. Please contact the server administrator, root@localhost and inform them of the time the error occurred, and anything you might have done that may have caused the error. More information about this error may be available in the server error log. Apache/2.2.15 (Red Hat) Server at www.plataformadetransparencia.org.mx Port 80”

**Investigation:** “Program Vamos al Mandado: Family Farms GENERAL OBJECTIVE. Help the population with deficient nutrition gain access to accessible and varied food, fostering a better quality of life.

COVERAGE. Coverage in the state’s 39 municipalities. TARGET POPULATION. The actions of the Program identify as subjects of its services the population with deficient nutrition residing in any of the municipalities or localities of the state of Durango.

Aid for installation of gardens for families in poverty or residing in localities with social deficiencies in the state of Durango. TYPE OF AID. Providing in-kind aid for the installation and outfitting of a garden, which may be open air or in protected conditions, for families in conditions of poverty and nutritional need to produce vegetables.

AMOUNTS OF AID. For family gardens, in-kind aid worth \$ 30,000.00, as a maximum.

BENEFICIARIES. Program beneficiaries will be persons who satisfy the requisites and criteria of eligibility. \*Source: [http://desarrollosocial.durango.gob.mx/es/man\\_hue](http://desarrollosocial.durango.gob.mx/es/man_hue)”

**Date:** 11/08/2017 Folio: 342717

**State:** Durango

**Agency:** Department of Agriculture, Livestock, and Rural Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** The heading of the response reads “Receive information via infomex,” but when we click on the button to open the response, the platform shows the following error: “Internal Server Error The server encountered an internal error or misconfiguration and was unable to complete your request. Please contact the server administrator, root@localhost and inform them of the time the error occurred, and anything you might have done that may have caused the error. More information about this error may be available in the server error log. Apache/2.2.15 (Red Hat) Server at www.plataformadetransparencia.org.mx Port 80”

**Date:** 11/08/2017 Folio: 342817

**State:** Durango

**Agency:** Department of Natural Resources and Environment

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** The heading to the response reads “Receive orientation,” but when we click on the button to open the response, the platform shows the following error: “Internal Server Error The server encountered an internal error or misconfiguration and was unable to complete your request. Please contact the server administrator, root@localhost and inform them of the time the error occurred, and anything

you might have done that may have caused the error. More information about this error may be available in the server error log. Apache/2.2.15 (Red Hat) Server at www.plataformadetransparencia.org.mx Port 80”

**Date:** 10/08/2017 Folio: 469117

**State:** Guerrero

**Agency:** Department of Indigenous Affairs and Afro-Mexican Communities

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:**

**2012**

Educational and Retroactive Aid for the Indigenous and Afro-Mexican population.

Strengthening Indigenous and Afro-Mexican Culture.

Emergency Services for the Indigenous and Afro-Mexican Population

**2013**

Comprehensive and Sustainable Development for Indigenous and Afro-Mexican peoples.

Training and Development of Demonstrative Productive Projects for the Indigenous and Afro-Mexican Population.

Defense and Legal Advice for the Indigenous and Afro-Mexican Population.

Strengthening the Culture, Organization, and Self-Determination of Indigenous and Afro-Mexican peoples.

Attention and Emergency Support for Indigenous and Afro-Mexican Migrant Workers.

**2014**

Comprehensive and Sustainable Development for Indigenous and Afro-Mexican peoples.

Training and Development of Demonstrative Productive

Projects for the Indigenous and Afro-Mexican Population.  
Defense and Legal Advice for Indigenous and Afro-Mexican peoples.

Strengthening the Culture, Organization, and Self-Determination of Indigenous and Afro-Mexican peoples.

Attention and Emergency Support for Indigenous and Afro-Mexican Migrant Workers.

Scholarships for Indigenous Students

**2015**

Attention and Emergency Support for Indigenous and Afro-Mexican Migrant Workers.

Training and Development of Demonstrative Productive Projects for the Indigenous and Afro-Mexican Population.

Defense and Legal Advice for Indigenous and Afro-Mexican peoples.

Strengthening the Culture, Organization, and Self-Determination of Indigenous and Afro-Mexican peoples.

Juntos Podemos, providing scholarship for indigenous students.

**2016**

Training and Development of Demonstrative Productive Projects for the Indigenous and Afro-Mexican Population.

Defense and Legal Advice for Indigenous and Afro-Mexican peoples.

Strengthening the Culture, Organization, and Self-Determination of Indigenous and Afro-Mexican peoples.

Juntos Podemos, providing scholarship for indigenous students.

Emergency Services for the Indigenous and Afro-Mexican Population

**2017**

Scholarships for Indigenous and Afro-Mexican Students

Defense and Legal Advice for the Indigenous and Afro-Mexican Population

Emergency Services for the Indigenous and Afro-Mexican Population”

**Date:** 11/08/2017

**Folio:** 469017

**State:** Guerrero

**Agency:** Department of Social Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 22/08/2017

**Response:** The department lacks jurisdiction, because its programs do not include protection of native and criollo maize and/or milpa farming; the enquiry should be directed to the Guerrero State Department of Agriculture, Livestock, Fisheries, and Rural Development.

**Date:** 11/08/2017 Folio: 468917

**State:** Guerrero

**Agency:** Department of Environment and Natural Resources

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 14/08/2017

**Response:** A search in the archives of this department found no program or public policy referring to protection and conservation of native plants, of the kind you mention; moreover, while it is true that protection and conservation of native species should be a shared effort between government and citizens, in this fiscal year we have no authorized budget item for such actions.

**Date:** 11/08/2017

**Folio:** 3491417

**State:** Jalisco

**Agency:** Department of Development and Social Integration

**Information requested:** Please inform me if, from 2012

to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 14/08/2017

**Response:** The request for information is declined because it does not pertain to information which the subject generates, administers, or possesses, given that the requesting party refers to information which is the purview of the "UNIT FOR TRANSPARENCY OF THE DEPARTMENT OF RURAL DEVELOPMENT"

**Date:** 11/08/2017 Folio: 3491517 State: Jalisco

**Agency:** Department of Rural Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** The heading to the response reads "Process Finalized;" however, searching for the response produces no sign of a response.

**Date:** 11/08/2017 Folio: 3491617 State: Jalisco

**Agency:** Department of Environment and Territorial Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.  
Date of response: 14/08/2017

**Response:** Based on your analysis, the subject LACKS JURISDICTION to provide the information requested, because it is not part of its functions as contained in Article 21 of the Organic Law of the Executive Branch of the State of Jalisco. Consequently, the request for information should be referred to other subjects, like federal agencies SEMARNAT and the

Jalisco State Department of Rural Development.

**Date:** 11/08/2017

**Folio:** 615817, 616417, and 616117

**State:** Morelos

**Agency:** Department of Social Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 15/08/2017

**Response:** This department lacks jurisdiction to provide the information requested.

**Date:** 11/08/2017

**Folio:** 616317, 616017, and 615717

**State:** Morelos

**Agency:** Ministry of Farm Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 16/08/2017

**Response:** In relation to criollo or native maize, this agency has taken the following actions:

Law for the Protection and Conservation of Criollo Maize in its Genetic State for the State of Morelos,” published in the Official Daily Tierra y Libertad no. 5199 of June 25, 2014.

“Regulations to the Law for the Protection and Conservation of Criollo Maize in its Genetic State for the State of Morelos,” published in the Official Daily Tierra y Libertad no. 5335 of October 14, 2015.

The State Public Investment Program (PIPE) for fiscal year 2016, in coordination with the National Institute of Forest, Agricultural, and Livestock Research (INIFAP), is in the process of diagnosing the population of native maize in the

state of Morelos.

**Date:** 11/08/2017 Folio: 616617

**State:** Morelos

**Agency:** Department of Farm Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 16/08/2017

**Response:** In relation to criollo or native maize, this agency has taken the following actions:

Law for the Protection and Conservation of Criollo Maize in its Genetic State for the State of Morelos,” published in the Official Daily Tierra y Libertad no. 5199 of June 25, 2014.

“Regulations to the Law for the Protection and Conservation of Criollo Maize in its Genetic State for the State of Morelos,” published in the Official Daily Tierra y Libertad no. 5335 of October 14, 2015.

The State Public Investment Program (PIPE) for fiscal year 2016, in coordination with the National Institute of Forest, Agricultural, and Livestock Research (INIFAP), is in the process of diagnosing the population of native maize in the state of Morelos.”

**Date:** 11/08/2017 Folio: 621817 State: Michoacán

**Agency:** Department of Rural and Agroalimentary Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 06/08/2017

**Response:** The types of aid provided, in relation to criollo maize, implemented by this department, are described below; This year, the Economic Development Program, in its

component Farm promotion, segment Improved Seeds, is in the process [...] has plans to support different organizations and/or work groups with equipment (weed cutters, sprayers, and seeders) for effective conservation and management of criollo maize, in different localities of the state of Michoacán. In 2016, through the program Fomento Agrícola, with the establishment and conservation of criollo maize, aid was provided to 12 organizations and/or work groups in different municipalities of the state of Michoacán. See attached listing. In 2014, aid was provided for the establishment of criollo maize modules in the municipalities of Zamora, Uruapan, and Patzcuaro, in the state of Michoacán, on an area of 50 hectares, benefiting 37 producers. See attached listing.

**Date:** 11/08/2017

**Folio:** 621917

**State:** Michoacán

**Agency:** Department of Environment, Natural Resources, and Climate Change

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 21/08/2017

**Response:** The department lacks jurisdiction to implement state programs for the protection of native and criollo maize and/or milpa farming.

**Date:** 11/08/2017 Folio: 622017 State: Michoacán

**Agency:** Department of Indigenous Peoples

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** The heading of the response reads “Registration

of Request;” however, on looking for the response, there is no sign of a response.

**Date:** 11/08/2017 Folio: 306117 State: Nayarit

**Agency:** Department of Rural Development and Environment

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 30/08/2017

**Response:** During the present administration, this department has not implemented any state program in relation to the protection of native and criollo maize and/or milpa farming.

**Date:** 10/08/2017 Folio: 1005317 State: Nuevo Leon

**Agency:** Sustainable Development

**Information requested:** The contents of Ecology Permits a) 547/2017 and b) 674/2017, granted to justify logging in the SPGG zone. AREAS a) CHARCAS Park, Area of Morones Prieto and Calzada del Valle, and B) Gaza MIRAVALLE and Morones Prieto, both in San Pedro Garza Garcia, Nuevo Leon.

**Date of response:** 17/08/2017

**Response:** The agency lacks jurisdiction.

**Date:** 11/08/2017 Folio: 466217

**State:** Oaxaca

**Agency:** Department of Indigenous Affairs

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** 24/08/2017

**Response:** After reviewing our archives from 2012 to date, no state program has been designed, implemented, or evaluated for the protection of native and criollo maize and/or milpa farming. In addition, I suggest that you contact the SEDAPA

38, Item IV; 146; and 151, paragraph 1, of the Tamaulipas State Law on Transparency and Access to Public Information, and based on Resolution No. 05/2017-A of August 15, 2017, issued by this Unit's Committee on Transparency, confirming the finding of lack of jurisdiction, the request under consideration is considered addressed, advising you of the finding by means of this electronic notification; also, we will gladly examine any other enquiry you may see fit to submit to this Unit in the future.

**Date:** 11/08/2017 Folio: 545917 State: Tamaulipas

**Agency:** Department of Rural Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** I inform you that your request was referred to the Department of Farm Development and they inform us that, the area in charge of programs operated mentions no program for the protection of native and criollo maize and/or milpa farming. Kind regards.

**Date:** 03/07/2017

**Folio:** 312917

**State:** Tlaxcala (litigation)

**Agency:** Department of Farm Promotion

**Information requested:** Please provide complete and sufficient information on whether you have prepared or are in the process of developing state health regulations, as ordered in the transitory provisions of the Law on Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala.

**Date:** 03/07/2017

**Folio:** 313217

**State:** Tlaxcala (litigation)

**Agency:** Department of Farm Promotion

**Information requested:** Please provide complete and sufficient information on the procedure for authorizations for storage, distribution, and commercialization of genetically modified organisms (GMOs) of maize, in accordance with the Law on Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala.

**Response:** Regarding the procedure for authorizations for storage, distribution, and commercialization of genetically modified organisms (GMOs) of maize, in accordance with the Law on Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, a specific process has not been determined, given that, under the same law, it must be approved by: the municipal authority; the Department of Farm Promotion with the State Council on Maize; and the Department of Health, as stipulated in Article 2; Items I, II, and III, of the referenced law. Moreover, in this regard, the following Articles should be considered: Article 9 of the Law on Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, which states that Genetically Modified Organisms of maize may be stored, distributed, and commercialized only when they have federal authorizations (Law on Biosafety of Genetically Modified Organisms (LBOGMS) in Article 32, and Article 5 of the Regulations to the above-cited Federal Law, the Federal Law on Plant Health, the Law on Production, Certification, and Commercialization of Seeds, and other applicable ordinances) and corresponding state ordinances. In addition, the contents of Article 10 of the local law indicating that the Department of Health, in its sphere of competence, will rule on authorizations for storage, distribution, and commercialization of GMOs of maize, in matters of State Health, should be considered. Finally, in accordance with the provisions of

Article 19 of the above-cited local law, the protection and promotion of criollo maize includes the SEFOA's soliciting and obtaining the opinion of the State Council on Maize before the competent agencies, to obtain the necessary declarations established by federal norms, like declaring Tlaxcala a Free Zone as defined in the Law on Biosafety of Genetically Modified Organisms (LBOGMS), and denominations of origin, patents, and rights by plant varieties. Furthermore, Article 22 states that, in soliciting a declaration of a Zone Free of GMOs of maize, the SEFOA must: I. prepare the file for Tlaxcala to be declared a Zone Free of GMOS of maize; II. Promote and assist communities in properly preparing the application mentioned in Article 90, Item III, paragraph A, of the Law on Biosafety of Genetically Modified Organisms (LBOGMS); III. Promote and assist the corresponding municipalities and ejidos in obtaining the favorable opinion mentioned in LBOGMS Article 90, Items III, paragraph B, and IV. Provide evidence and arguments, file remedies and complaints, and take any other actions needed to prevent genetic contamination of criollo maize.

**Date:** 03/07/2017

**Folio:** 313417

**State:** Tlaxcala (litigation)

**Agency:** Department of Government

**Information requested:** Please provide complete and sufficient information on whether the state has created a State Council on Maize, as ordered in the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, and if so, I request minutes of meetings held since its creation, and semiannual reports presented to the executive and legislative branches. If not, please inform me of the reasons why such a council has not been created.

**Response:** A State Council on Maize has not been created; notwithstanding, this department, under the terms of Article

14 of the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, is evaluating procedures to prepare a proposal for its members, which are established in Article 13 Items III, IV, V, and VI, of the above-cited law, so that, when it is created, it may establish coordination, planning, formulation, execution, and evaluation of programs for the next fiscal year, 2018.

**Date:** 03/07/2017

**Folio:** 313617

**State:** Tlaxcala (litigation)

**Agency:** Department of Government

**Information requested:** Please provide complete and sufficient information on the amount allocated in the state budget from the year 2012 to date, for purposes of compliance with Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, and specifically for the creation and implementation of the State Criollo Maize Seed Program.

**Response:** Most producers in the state plant criollo maize, for which reason programs target them, although not with the name special program for criollo maize; therefore, we give information on program, subprogram, and investment made in fiscal years 2012 through 2016. WORKS AND ACTIONS IN AGRICULTURE FOR THE YEARS 2011 THROUGH 2016 YEAR PROGRAM SUBPROGRAM STATE INVESTMENT 2012 AID FOR FARM PRODUCTION  
 Chemical fertilizer \$ 51,361,332.00 Worm compost \$ 1,996,200.00 Foliar fertilizer \$ 48,285.00 Criollo Maize Seed \$ 1,675,400.00 CONCURRENCE WITH STATES Tractors \$ 2,813,714.00  
 Warehouses \$ 2,910,870.00 Implements \$ 2,147,495.00 Irrigation systems \$ 880,014.00 SUSTAINABILITY OF NATURAL RESOURCES (COUSSA) Storage tanks \$ 61,093.00 Broad base terraces \$ 467,984.00 Tamped earth borders \$

987,455.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 315,881.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 221,354.00 Campaign against grasshoppers \$ 383,847.00 2013 AID FOR FARM PRODUCTION Chemical fertilizer \$ 32,356,900.00 Worm compost \$ 4,294,838.00 CONCURRENCE WITH STATES Tractors \$ 1,952,300.00 Warehouses \$ 1,827,325.00 Implements \$ 1,593,305.00 Irrigation systems \$ 562,280.00 SUSTAINABILITY OF NATURAL RESOURCES (COUSSA) Storage tanks \$ 317,034.00 Broad base terraces \$ 671,632.00 Tamped earth borders \$ 766,258.00 Water vats \$ 144,208.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 3,984,216.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 183,496.00 Campaign against grasshoppers \$ 328,562.00 2014 AID FOR FARM PRODUCTION Chemical fertilizer \$ 24,902,777.00 Worm compost \$ 8,537,490.00 CONCURRENCE WITH STATES Tractors \$ 3,115,795.00 Warehouses \$ 5,557,172.00 Implements \$ 3,191,531.00 Irrigation systems \$ 285,886.00 SUSTAINABILITY OF NATURAL RESOURCES (COUSSA) Storage tanks \$ 276,339.00 Broad base terraces \$ 318,475.00 Tamped earth borders \$ 514,997.00 Live barriers \$ 222,766.00 Water vats \$ 122,107.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 2,903,700.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 183,496.00 Campaign against grasshoppers \$ 328,563.00 2015 AID FOR FARM PRODUCTION Chemical fertilizer \$ 22,545,589.00 Worm compost \$ 16,785,333.00 CONCURRENCE WITH STATES Tractors \$ 1,870,500.00 Warehouses \$ 4,450,438.00 Implements \$ 3,435,716.00 Irrigation systems \$ 235,400.00 SUSTAIN-

ABILITY OF NATURAL RESOURCES (COUSSA)

Storage tanks \$ 351,467.00 Broad base terraces \$ 204,064.00 Tamped earth borders \$ 634,625.00 Live barriers \$ 66,484.00 Water vats \$ 326,060.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 5,265,728.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 175,985.00 Campaign against grasshoppers \$ 315,113.00 2016 AID FOR FARM PRODUCTION Chemical fertilizer \$ 18,421,669.00 Worm compost \$ 19,800,000.00 CONCURRENCE WITH STATES Tractors \$ 1,934,000.00 Warehouses \$ 3,228,775.00 Implements \$ 2,544,200.00 Irrigation systems \$ 88,000.00 RURAL PRODUCTIVITY (IPASA) Storage tanks \$ 205,703.00 Broad base terraces \$ 205,460.00 Tamped earth borders \$ 313,990.00 Water vats \$ 723,597.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 3,400,000.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 200,000.00 Campaign against grasshoppers \$ 330,000.00

**Date:** 03/07/2017

**Folio:** 313717

**State:** Tlaxcala (litigation)

**Agency:** State Congress

**Information requested:** Please provide complete and sufficient information on the amount allocated in the state budget from the year 2012 to date, for purposes of compliance with the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, and specifically for the creation and implementation of the State Criollo Maize Seed Program.

**Response:** Most producers in the state plant criollo maize, for which reason programs target them, although not with the name special program for criollo maize; therefore, we give

information on program, subprogram, and investment made in fiscal years 2012 through 2016. WORKS AND ACTIONS IN AGRICULTURE FOR THE YEARS 2011 THROUGH 2016 YEAR PROGRAM SUBPROGRAM STATE INVESTMENT 2012 AID FOR FARM PRODUCTION Chemical fertilizer \$ 51,361,332.00 Worm compost \$ 1,996,200.00 Foliar fertilizer \$ 48,285.00 Criollo Maize Seed \$ 1,675,400.00 CONCURRENCE WITH STATES Tractors \$ 2,813,714.00 Warehouses \$ 2,910,870.00 Implements \$ 2,147,495.00 Irrigation systems \$ 880,014.00 SUSTAINABILITY OF NATURAL RESOURCES (COUSSA) Storage tanks \$ 61,093.00 Broad base terraces \$ 467,984.00 Tamped earth borders \$ 987,455.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 315,881.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 221,354.00 Campaign against grasshoppers \$ 383,847.00 2013 AID FOR FARM PRODUCTION Chemical fertilizer \$ 32,356,900.00 Worm compost \$ 4,294,838.00 CONCURRENCE WITH STATES Tractors \$ 1,952,300.00 Warehouses \$ 1,827,325.00 Implements \$ 1,593,305.00 Irrigation systems \$ 562,280.00 SUSTAINABILITY OF NATURAL RESOURCES (COUSSA) Storage tanks \$ 317,034.00 Broad base terraces \$ 671,632.00 Tamped earth borders \$ 766,258.00 Water vats \$ 144,208.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 3,984,216.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 183,496.00 Campaign against grasshoppers \$ 328,562.00 2014 AID FOR FARM PRODUCTION Chemical fertilizer \$ 24,902,777.00 Worm compost \$ 8,537,490.00 CONCURRENCE WITH STATES Tractors \$ 3,115,795.00 Warehouses \$ 5,557,172.00 Implements \$ 3,191,531.00 Irrigation systems \$ 285,886.00 SUSTAINABILITY OF NATURAL

## RESOURCES (COUSSA)

Storage tanks \$ 276,339.00 Broad base terraces \$ 318,475.00 Tamped earth borders \$ 514,997.00 Live barriers \$ 222,766.00 Water vats \$ 122,107.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 2,903,700.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 183,496.00 Campaign against grasshoppers \$ 328,563.00 2015 AID FOR FARM PRODUCTION Chemical fertilizer \$ 22,545,589.00 Worm compost \$ 16,785,333.00 CONCURRENCE WITH STATES Tractors \$ 1,870,500.00 Warehouses \$ 4,450,438.00 Implements \$ 3,435,716.00 Irrigation systems \$ 235,400.00 SUSTAINABILITY OF NATURAL RESOURCES (COUSSA) Storage tanks \$ 351,467.00 Broad base terraces \$ 204,064.00 Tamped earth borders \$ 634,625.00 Live barriers \$ 66,484.00 Water vats \$ 326,060.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 5,265,728.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 175,985.00 Campaign against grasshoppers \$ 315,113.00 2016 AID FOR FARM PRODUCTION Chemical fertilizer \$ 18,421,669.00 Worm compost \$ 19,800,000.00 CONCURRENCE WITH STATES Tractors \$ 1,934,000.00 Warehouses \$ 3,228,775.00 Implements \$ 2,544,200.00 Irrigation systems \$ 88,000.00 RURAL PRODUCTIVITY (IPASA) Storage tanks \$ 205,703.00 Broad base terraces \$ 205,460.00 Tamped earth borders \$ 313,990.00 Water vats \$ 723,597.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 3,400,000.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 200,000.00 Campaign against grasshoppers \$ 330,000.00

**Date:** 03/07/2017

**Folio:** 313817

**State:** Tlaxcala (litigation)

**Agency:** Office of the Governor

**Information requested:** Please provide complete and sufficient information on the amount allocated in the state budget from the year 2012 to date, for purposes of compliance with the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, and specifically for the creation and implementation of the State Criollo Maize Seed Program.

**Response:** Most producers in the state plant criollo maize, for which reason programs target them, although not with the name special program for criollo maize; therefore, we give information on program, subprogram, and investment made in fiscal years 2012 through 2016. WORKS AND ACTIONS IN AGRICULTURE FOR THE YEARS 2011 THROUGH 2016 YEAR PROGRAM SUBPROGRAM STATE INVESTMENT 2012 AID FOR FARM PRODUCTION Chemical fertilizer \$ 51,361,332.00 Worm compost \$ 1,996,200.00 Foliar fertilizer \$ 48,285.00 Criollo Maize Seed \$ 1,675,400.00 CONCURRENCE WITH STATES Tractors \$ 2,813,714.00

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19,800,000.00 CONCURRENCE WITH STATES Tractors \$ 1,934,000.00 Warehouses \$ 3,228,775.00 Implements \$ 2,544,200.00 Irrigation systems \$ 88,000.00 RURAL PRODUCTIVITY (IPASA) Storage tanks \$ 205,703.00 Broad base terraces \$ 205,460.00 Tamped earth borders \$ 313,990.00 Water vats \$ 723,597.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 3,400,000.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 200,000.00 Campaign against grasshoppers \$ 330,000.00

**Date:** 03/07/2017

**Folio:** 313917

**State:** Tlaxcala (litigation)

**Agency:** Department of Planning and Finance **Information requested:** Please provide complete and sufficient information on the amount allocated in the state budget from the year 2012 to date, for purposes of compliance with the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, and specifically for the creation and implementation of the State Criollo Maize Seed Program.

**Response:** Most producers in the state plant criollo maize, for which reason programs target them, although not with the name special program for criollo maize; therefore, we give information on program, subprogram, and investment made in fiscal years 2012 through 2016. WORKS AND ACTIONS IN AGRICULTURE FOR THE YEARS 2011 THROUGH 2016 YEAR PROGRAM SUBPROGRAM STATE INVESTMENT 2012 AID FOR FARM PRODUCTION Chemical fertilizer \$ 51,361,332.00 Worm compost \$ 1,996,200.00 Foliar fertilizer \$ 48,285.00 Criollo Maize Seed \$ 1,675,400.00 CONCURRENCE WITH STATES Tractors \$ 2,813,714.00 Warehouses \$ 2,910,870.00 Implements \$ 2,147,495.00

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**Folio:** 314017

**State:** Tlaxcala (litigation)

**Agency:** Department of Farm Promotion

**Information requested:** Please provide complete and sufficient information on the amount allocated in the state budget from the year 2012 to date, for purposes of compliance with the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, and specifically for the creation and implementation of the State Criollo Maize Seed Program.

**Response:** Most producers in the state plant criollo maize,

for which reason programs target them, although not with the name special program for criollo maize; therefore, we give information on program, subprogram, and investment made in fiscal years 2012 through 2016. WORKS AND ACTIONS IN AGRICULTURE FOR THE YEARS 2011 THROUGH 2016 YEAR PROGRAM SUBPROGRAM STATE INVESTMENT 2012 AID FOR FARM PRODUCTION Chemical fertilizer \$ 51,361,332.00 Worm compost \$ 1,996,200.00 Foliar fertilizer \$ 48,285.00 Criollo Maize Seed \$ 1,675,400.00 CONCURRENCE WITH STATES Tractors \$ 2,813,714.00 Warehouses \$ 2,910,870.00 Implements \$ 2,147,495.00 Irrigation systems \$ 880,014.00 SUSTAINABILITY OF NATURAL RESOURCES (COUSSA) Storage tanks \$ 61,093.00 Broad base terraces \$ 467,984.00 Tamped earth borders \$ 987,455.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 315,881.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 221,354.00 Campaign against grasshoppers \$ 383,847.00 2013 AID FOR FARM PRODUCTION Chemical fertilizer \$ 32,356,900.00 Worm compost \$ 4,294,838.00 CONCURRENCE WITH STATES Tractors \$ 1,952,300.00 Warehouses \$ 1,827,325.00 Implements \$ 1,593,305.00 Irrigation systems \$ 562,280.00 SUSTAINABILITY OF NATURAL RESOURCES (COUSSA) Storage tanks \$ 317,034.00 Broad base terraces \$ 671,632.00 Tamped earth borders \$ 766,258.00 Water vats \$ 144,208.00 COMPONENT FOR RESPONSE TO NATURAL DISASTERS IN THE FARM SECTOR AND FISHERIES INDEMNIFICATIONS \$ 3,984,216.00 PLANT HEALTH AND AGROALIMENTARY SAFETY Campaign against regulated weeds \$ 183,496.00 Campaign against grasshoppers \$ 328,562.00 2014 AID FOR FARM PRODUCTION Chemical fertilizer \$ 24,902,777.00 Worm compost \$ 8,537,490.00 CONCURRENCE WITH STATES Tractors \$ 3,115,795.00 Warehouses \$ 5,557,172.00

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 grasshoppers \$ 330,000.00

**Date:** 03/07/2017

**Folio:** 313017

**State:** Tlaxcala (litigation)

**Agency:** Department of Government

**Information requested:** Please provide complete and sufficient information on whether you have prepared or are in the process of developing state health regulations, as ordered in the transitory provisions of the Law on Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala.

**Response:** The State Regulations on Plant Health are in the process of preparation.

**Date:** 03/07/2017

**Folio:** 313117

**State:** Tlaxcala (litigation)

**Agency:** Department of Farm Promotion

**Information requested:** Please provide complete and sufficient information on the procedure for authorizations for storage, distribution, and commercialization of genetically modified organisms (GMOs) of maize, in accordance with the Law on Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala.

**Response:** Regarding the procedure for authorizations for storage, distribution, and commercialization of genetically modified organisms (GMOs) of maize, in accordance with the Law on Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, a specific process has not been determined, given that, under the same law, it must be approved by: the municipal authority; the Department of Farm Promotion with the State Council on Maize; and the Department of Health, as stipulated in Article 2; Items I, II, and III, of the referenced law. Moreover, in this regard, the following Articles should be considered: Article 9 of the Law on Promotion

and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, which states that Genetically Modified Organisms of maize may be stored, distributed, and commercialized only when they have federal authorizations (Law on Biosafety of Genetically Modified Organisms (LBOGMS) in Article 32, and Article 5 of the Regulations to the above-cited Federal Law, the Federal Law on Plant Health, the Law on Production, Certification, and Commercialization of Seeds, and other applicable ordinances) and corresponding state ordinances. In addition, the contents of Article 10 of the local law indicating that the Department of Health, in its sphere of competence, will rule on authorizations for storage, distribution, and commercialization of GMOs of maize, in matters of State Health, should be considered. Finally, in accordance with the provisions of Article 19 of the above-cited local law, the protection and promotion of criollo maize includes the SEFOA's soliciting and obtaining the opinion of the State Council on Maize before the competent agencies, to obtain the necessary declarations established by federal norms, like declaring Tlaxcala a Free Zone as defined in the Law on Biosafety of Genetically Modified Organisms (LBOGMS), and denominations of origin, patents, and rights by plant varieties. Furthermore, Article 22 states that, in soliciting a declaration of a Zone Free of GMOs of maize, the SEFOA must: I. prepare the file for Tlaxcala to be declared a Zone Free of GMOS of maize; II. Promote and assist communities in properly preparing the application mentioned in Article 90, Item III, paragraph A, of the Law on Biosafety of Genetically Modified Organisms (LBOGMS); III. Promote and assist the corresponding municipalities and ejidos in obtaining the favorable opinion mentioned in LBOGMS Article 90, Items III, paragraph B, and IV. Provide evidence and arguments, file remedies and complaints, and take any other actions needed to prevent genetic contamination of criollo maize.

**Date:** 03/07/2017

**Folio:** 313317

**State:** Tlaxcala (litigation)

**Agency:** Department of Farm Promotion

**Information requested:** Please provide complete and sufficient information on whether the state has created a State Council on Maize, as ordered in the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, and if so, I request minutes of meetings held since its creation, and semiannual reports presented to the executive and legislative branches. If not, please inform me of the reasons why such a council has not been created.

**Response:** A State Council on Maize has not been created; notwithstanding, this department, under the terms of Article 14 of the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, is evaluating procedures to prepare a proposal for its members, which are established in Article 13 Items III, IV, V, and VI, of the above-cited law, so that, when it is created, it may establish coordination, planning, formulation, execution, and evaluation of programs for the next fiscal year, 2018.

**Date:** 03/07/2017

**Folio:** 313517

**State:** Tlaxcala (litigation)

**Agency:** Department of Farm Promotion

**Information requested:** Please provide complete and sufficient information on how this department has exercised its powers under Article 21 of the Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, for which I request all documents, minutes, and reports and any others related to the performance of such functions.

**Response:** In relation to the contents of Article 21 of the

Law for the Promotion and Protection of Maize as original heritage, in constant and dietary diversification, for the state of Tlaxcala, the following actions have been implemented: I. We are gathering all information available from SEMARNAT, SAGARPA, the National Institute of Statistics and Geography (INEGI), the National Institute of Forest, Agricultural, and Livestock Research (INIFAP), the National Institute of Ecology (INE), the National Commission for knowledge and use of Biodiversity (CONABIO), and the National Forest Commission (CONAFOR), as well as International Agreements and Treaties, for the protection of the Original and Dietary Heritage; II. When the necessary requisites are met and documentation provided, appropriate measures will be taken for the pertinent finding on the part of SEMARNAT and SAGARPA; III. A public record is being created with the information collected and relevant actions taken; IV and V. As regards actions in coordination with the State Council on Maize, it needs to be created. (Which (sic) are in the process of preparing calls for the selection of participants). VI. No application has been made for authorizations: communal, State Equity, and Sanida; and VII. To date, no means of defense has been entered through an administrative motion for review.

**Date:** 11/08/2017 Folio: 1089317 State: Veracruz

**Agency:** Department of Social Development

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the protection of maize.

**Date of response:** 18/08/2017

**Response:** I inform you that, this Directorate General has no records of any actions for design, implementation, or evaluation of any state program for the protection of native and criollo maize and/or milpa farming.

**Date:** 11/08/2017 Folio: 1089417 State: Veracruz

**Agency:** Department of Environment

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the protection of maize

**Date of response:** 17/08/2017

**Response:** I hereby DELIVER THE INFORMATION you have requested, for which I attach A FOLDER titled 01089417\_Entrega\_Inf in .rar format, which contains SIX FILES in .pdf format; of particular interest is the file entitled 01089417\_R=\_DGGARN, which contains notice SEDEMA-DGGARN/DCRRN/889/2017 signed by the Director General of Environmental Management and Natural Resources, which provides the information you have requested, and another entitled 01089417\_R= containing this notification.

**Date:** 11/08/2017 Folio: 1089217

**State:** Veracruz

**Agency:** Department of farm development, rural affairs, and fisheries

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the protection of maize.

**Date of response:** 25/08/2017

**Response:** I hereby inform you that, to date, no program has been implemented for the protection of native and criollo maize.

**Date:** 11/08/2017 Folio: 670417

**State:** Yucatan

**Agency:** Department of Rural Development

**Information requested:** "Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs."

**Date of response:** 15/08/2017

**Response:** After an exhaustive search in the archives of

this agency, we declare the inexistence of the information requested, given that no state program for the protection of native and criollo maize and/or milpa farming has been designed, implemented, or evaluated in this department. \*\*\*I hereby inform you that, in the period mentioned, this Department of Rural Development has not designed, implemented, or evaluated any state program for the protection of native and criollo maize and/or milpa farming, and therefore we declare such information nonexistent. However, this department has approved aid for acquisition of maize seeds to incentivize farm production.

**Date:** 11/08/2017 Folio: 670517 State: Yucatan

**Agency:** Department of Urban Development and Environment

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** In response to your request, I hereby inform you that this Department of Urban Development and Environment (SEDUMA) is not able to provide the information requested, since the competent authority to handle your request is the State Department of Rural Development (SEDER), in accordance with the provisions of RECAPY Article 498 as it refers to the request made, in accordance with the provisions of Article 136 of the General Law on Transparency and Access to Public Information, and Article 80, third paragraph, of the Yucatan State Law on Transparency and Access to Public Information.

**Date:** 11/08/2017 Folio: 670317 State: Yucatan

**Agency:** Department of Social Development

**Information requested:** “Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo

maize and/or milpa farming. If so, describe such programs.”

**Date of response:** 14/08/2017

**Response:** In response to your request, under folio number 00670317, I hereby inform you that this Department of Social Development lacks jurisdiction to provide the information requested; however, we suggest that you refer your request to the Yucatan State Department of Rural Development (SEDER).

**Date:** 11/08/2017 Folio: 459817

**State:** Zacatecas

**Agency:** Department of Social Development

**Information requested:** “Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.”

**Date of response:** N/A

**Response:** In response to your request, I hereby inform you that this agency (SEDESOL) does not have the information requested; I suggest that you resubmit your request to the Department of Rural Affairs, which may have it.

**Date:** 11/08/2017 Folio: 459917

**State:** Zacatecas

**Agency:** Department of Rural Affairs

**Information requested:** Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.

**Date of response:** N/A

**Response:** The heading to the response reads “Registration of request,” but when we look for a response, no sign of a response is displayed. [http://secampo.zacatecas.gob.mx/documentos/ventanilla\\_secampo.pdf](http://secampo.zacatecas.gob.mx/documentos/ventanilla_secampo.pdf) (page 6 Incentives Program for Maize Producers)

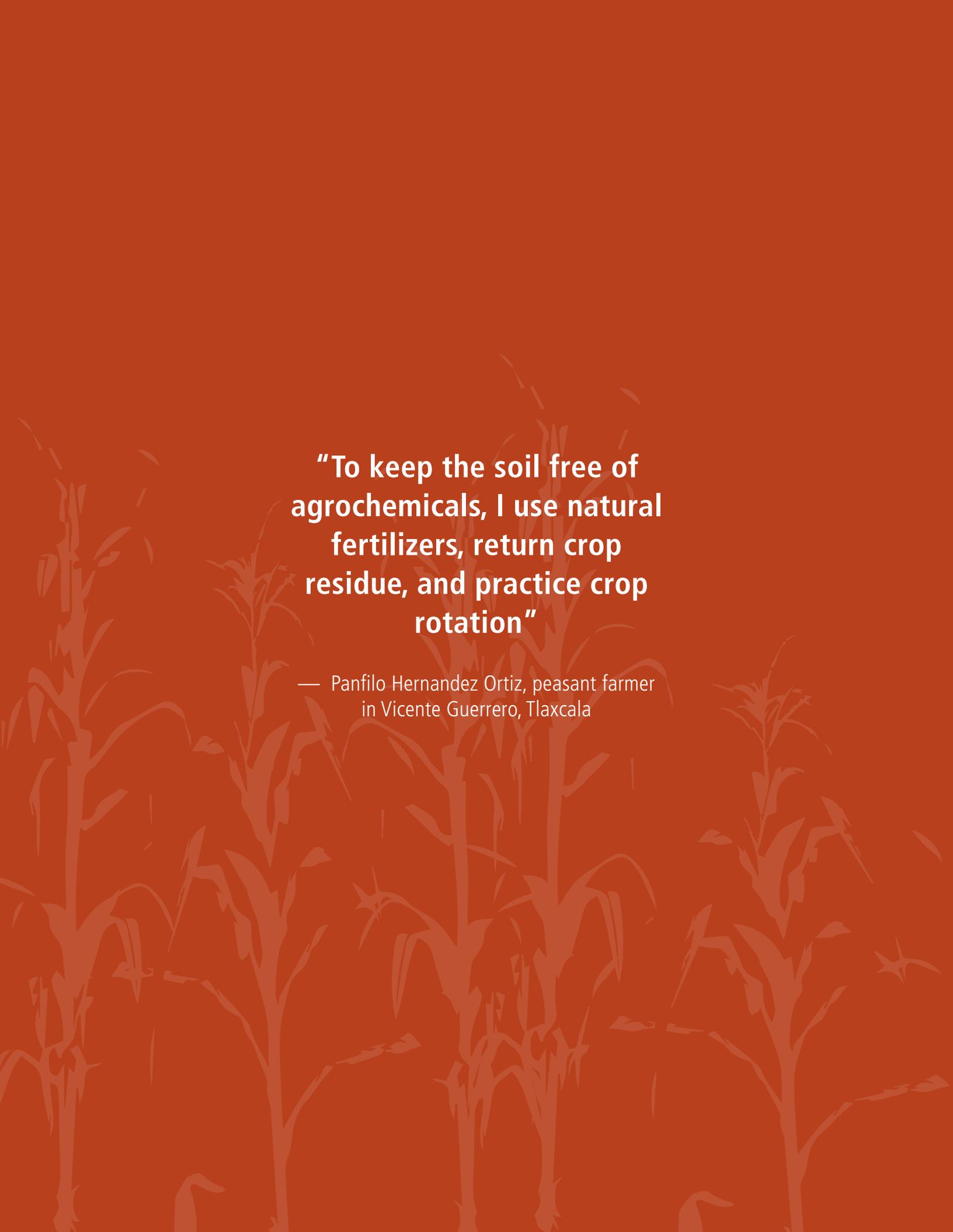
**Date:** 11/08/2017 Folio: 460017 State: Zacatecas

**Agency:** Department of Water and Environment

**Information requested:** “Please inform me if, from 2012 to date, any state program has been designed, implemented, or evaluated for the purpose of protecting native and criollo maize and/or milpa farming. If so, describe such programs.”

**Date of response:** N/A

**Response:** I hereby inform you, in response to your request for information, that this department does not have the information requested and in view of its nature, we suggest that you refer your request to the Department of Rural Affairs.



**“To keep the soil free of agrochemicals, I use natural fertilizers, return crop residue, and practice crop rotation”**

— Panfilo Hernandez Ortiz, peasant farmer  
in Vicente Guerrero, Tlaxcala