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BIOCULTURAL IMPORTANCE AND CONSERVATION STRATEGIES FOR NATIVE MAIZE IN SAN JUAN YAUTEPEC- *NÑANTDE BÓTDA*, MEXICO

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ABSTRACT

Biocultural importance refers to the meaning or value that a human group assigns to the link between nature and culture, in time and space. The objective was to analyze the biocultural importance of native maize in San Juan Yautepec- *Nñantde Bótda*, in order to formulate conservation strategies. Research was carried out in San Juan Yautepec, Huixquilucan, State of Mexico, through participatory research, from December 2022 to February 2024. Maize was collected and ethnotaxa were identified. Seventeen in-depth interviews were conducted with peasants. Note was taken of the Food Security Index (FSI) and maize dishes. Two participatory workshops were held to document the work calendar and identify conservation strategies. The community's "white" maize (*Ma t´si taxka dethö*) pertains to the Chalqueño species or cream-colored group, and the "blue" maize (*Ma t´si modijä*) pertains to the Elotes Chalqueños sub-species; their Otomi names indicate respect for maize. We classified prepared foods as either every day, festive or survival cooking. According to the FSI, only three families are self-sufficient in maize; however, peasants continue to plant maize for reasons of taste and identity. The current calendar of maize tasks consists of 27 cultural and agricultural activities. Due to the importance of maize, the community proposed 16 groups of conservation proposals; one of these was the Maize Fair, where 11 activities focused on its revaluation were implemented.

Key words: memory, PAR, region, subalternate, *Zea mays* L.

INTRODUCTION

This study considers that biocultural importance is derived from the meaning or value that a human group assigns to the link between nature and culture in time and space, determined by: a) biological diversity, cultural diversity and agrobiodiversity (Boege, 2018 and Lukawiecki *et al*., 2022), b) biocultural memory (Toledo and Barrera-Bassols, 2008; 2020), c) territories, spaces where life is recreated (Barrera-Bassols *et al*., 2012 and Jiménez, 2019), and d) food autonomy (Gómez, 2010).

Maize is Mexico's most important traditional food. Its domestication occurred approximately 10,000 years ago and currently, 59 native maize breeds are registered in Mexico (Sánchez *et al*., 2000; Vela, 2021). Each breed corresponds to population groups with very similar morphological and phenological characteristics, environmental adaptations and genetic traits. Agricultural management directs the cultivation of numerous native maize populations that pertain to two or more breeds (Ortega-Paczka and Mota-Cruz, 2021). Maize represents the civilizing crop, generating biocultural regions; therefore, there is a close relationship between maize and indigenous peoples. In the Altiplano and Neovolcanic Axis cultures, we find races such as: Palomero Toluqueño, Cónico, Cacahuacintle, Elotes Cónicos, Pepitilla, Ancho, and Chalqueño (Boege, 2022). Specifically, in a transect of almost 2,100 m with an altitude range (between 1,100 and 3,200 masl), located in the western region of the State of Mexico, Estrada-Martínez (1987) identified the following races: Cónico, Elotes Cónicos, Palomero Toluqueño, Cacahuacintle, Chalqueño, Celaya, Pepitilla, Tabloncillo Perla, and the Elotes Cónicos sub-races.

This revaluation of maize occurs in a key context, where gastronomy is a fundamental aspect of food autonomy, as those who have cared for and protected native maize varieties on a daily basis have been silenced by the imposition of a Western outlook (Cárdenas, 2021). For decades, research has employed communities with biocultural knowledge as informants, rather than as participants or collaborators (Estrada-Martínez *et al*., 2020). This has been influenced by a modern capitalist viewpoint that considers nature as an object to be possessed (Dussel, 2014); this has enabled the discriminatory exploitation and appropriation of resources. This perception has caused peasants and native peoples, who possess a wealth of knowledge about their natural resources, to become subalternate. However, this more recent perception has resulted in research being conducted from a different perspective. For example, Hernández-Xolocotzi (2007) proposes "huarache" research, which refers to traditional agricultural technology developed by peasants, generally little appreciated academically, although it has developed over twelve thousand years, resulting in a great diversity of agricultural products (including different races of maize). González *et al*. (2023) explain that this separation between nature and culture, as promoted by modern Western thought is unsubstantiated and they address the worldview of maize in Mesoamerica and maize among contemporary peoples. This account of Mesoamerica is an approach to the biocultural memory of peoples, who consider maize and the milpa to represent the time piece (humans-deities-nature) of Mesoamerican cosmopolitics; this is based on dialogue, with the purpose of maintaining or restoring life through work, reciprocity and health, helping to maintain

communal relations (Toledo and Barrera-Bassols, 2021). The practice of the milpa is an example of resistance and autonomy, exercised by every peasant.
Recent studies focus on scientific or traditional aspects of biocultural landscapes; however, studies analyzing the biocultural aspects of native maize in Otomi communities are lacking. The purpose of this study was to analyze the factors that determine the biocultural importance of native maize in San Juan Yautepec, using Participatory Action Research (PAR) to develop local conservation strategies.

THEORETICAL FRAMEWORK

Four major concepts encompass the theoretical position in the development of this research: bioculturality, subalternation, Southern epistemology and PAR.
Bioculturality, a concept that has been formulated during the last decade, refers to the recognition of the co-evolutionary process between cultural diversity and biodiversity. It is a relationship between subjects with the capacity to build an ethical and social relationship that is sustainable (Boege, 2018). Therefore, biocultural analysis considers the coexistence of diverse peoples, with their different worldviews, ontologies, cosmologies, and knowledge, in the use and management of biodiversity (Toledo, 2018). Bioculturalism is a category, which in contrast to homogeneity is not subject to the imposition of a monetary value, as it comprehends diversity and dynamism, while simultaneously recognizing human and non-human rights (Pillado-Albarrán *et al*., 2022). In this study, based on the categories of the biocultural concept, we analyzed the native maize varieties present in the community; food autonomy, biocultural memory, and conservation strategies inherent to the region.
Colonial domination forced subaltern groups to partially learn the dominators' culture in terms of its usefulness for religious reproduction (Quijano, 2014). However, religion has also served as a context, where subaltern groups can manifest resistance to certain projects. Thus, religion plays a decisive role in the processes of cultural molding, providing resistance to these projects (Herrera, 2009). These processes have resulted in a cultural fusion that is currently difficult to separate and mostly found among native peoples. The struggle of the subaltern implies the struggle to reclaim a millennia-old biocultural legacy, rendered invisible by a hegemonic power. This struggle is part of the destruction of capitalist power, whose dominance was based not only on colonial power, but also of knowledge (Mignolo, 2002; Quijano, 2011). Therefore, a new way of thinking is required, which can be achieved through Southern learning, which revalues scientific and non-scientific knowledge (De Sousa, 2011a; 2014).
Southern epistemologies are distinguished by two premises. The first is that native peoples' understanding of the world is broader than that of the capitalist

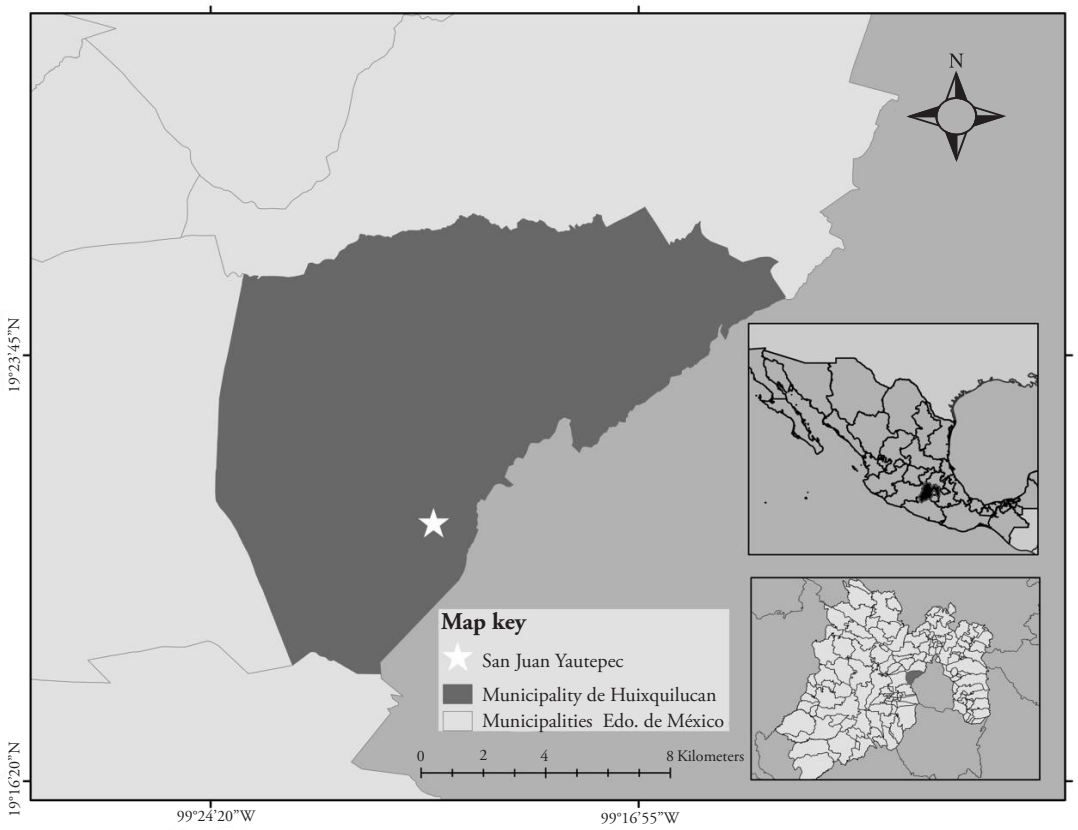
(Canto, 2022). The second is that world diversity includes different ways of being, thinking, feeling, conceiving time, the relationship between human and non-human beings, of looking at the past and the future, and of collectively organizing life (De Sousa, 2011b). Therefore, alternative thinking is required (De Sousa, 2010) giving voice to subaltern groups. Alternative and southern epistemologies are proposals aiming at transmodernity[3], which tends toward a different life project, where the biocultural legacy is made visible and the ways of life of each community are respected. Therefore, these two outlooks allow us to undertake another type of non-traditional research, taking a critical stance.

This research was conducted through PAR, taking opinions of peasants and community members into account. For this reason, we revisited the subaltern and southern epistemologies, which seek to give voice to and understand the biocultural importance of maize for peasants and community members of San Juan Yautepec. In Latin America, PAR attempts to transform the society in which it works, making it more equitable, simply by decolonizing research methods and promoting social engagement in research (Ahumada *et al*., 2012). According to Fals-Borda and Montis (1985), the main objectives of PAR are: (a) the collective process of researching social issues to produce knowledge, (b) the critical recovery of history, (c) the appreciation and use of popular culture, and (d) the transfer and dissemination of new knowledge. These characteristics make PAR an appropriate strategy, given its capacity to produce transformations through joint action between external and internal agents (Mardones and Velásquez, 2015).

METHODOLOGY

The municipality of Huixquilucan is located on the eastern slope of the Sierra de Las Cruces mountain range. It borders the municipality of Naucalpan to the north, the municipality of Ocoyoacac and Mexico City (CDMX) to the south, Mexico City (CDMX) to the east, and the municipality of Lerma to the west (Figure 1). The agricultural land area comprises 30.92 km^2, mostly terraced land located in areas that were originally forested. To the west of the municipality, land use changes have occurred; agricultural areas are also found in the areas immediately surrounding towns (PDM, 2022). The area planted with rainfed maize in the municipality consists of 1,825.55 hectares (SIAP, 2023).

The town of San Juan Yautepec, in the municipality of Huixquilucan, is located at coordinates 19° 20′ 51.81″ N and 99° 20′ 27.42″ W (Figure 1), at an average altitude of 2,800 m. This is one of the 11 native communities in the municipality, which has its own normative system defined by uses and customs, constituting its own form of self-government (Paz, 2016). The



Source: self-elaborated.
Figure 1. Location of the San Juan Yautepec community, State of México.

population is 5,269 inhabitants, of which 1,282 are under 15 years old, 1,372 are between 15 and 29 years old, 2,097 people are between 30 and 59 years old, and 518 are over 60 years old. Its population is considered to be very socially backward (INEGI, 2020). San Juan Yautepec is forested with firs *(Abies religiosa*), oak (*Quercus spp*.), aile (*Alnus acuminata*) and pine (*Pinus ayacahuite* and *Pinus sp*.), and there are also areas of grassland and rainfed agriculture. The community has a temperate subhumid climate C(w2), with summer rains and an annual precipitation of 1,100 mm (INEGI, 2023).

First contact with the community of San Juan Yautepec

Before beginning the research, the community's auxiliary authorities were notified of the activities to be carried out. Subsequently, collaboration with the peasant families was agreed upon by dialogue and participant observation. Permission was requested from the community's fiscal authority 2023-2024 to carry out the activities in public community spaces. The first author of this

article is an active member of the community, enabling a closer relationship with the peasant families.

PAR in *Nñantde Bótda*

From the founding of this research community, participation was very important. A dialogue of knowledge was held with the community to provide feedback on the research problem. During the participatory workshops, the voices of peasants, young women and the public were heard through the formulation of proposals for the conservation of native maize and the community's milpa. Notably, one of the proposals was to hold participatory seed exchange fairs; thanks to this, the First Maize, Milpa, and Knowledge Fair was held, with the collaboration of community members. Among the activities carried out, some of the results of this research were presented, such as the identification of the maize varieties present in the community and their Otomi names. Part of the intention is to continue working on conservation proposals, because being part of the community entails greater commitment.

Factors of analysis of biocultural importance

Breeds and ethnotaxons in the Hiu Hú of native maize

From December 2022 to March 2023, seven samples of native maize were collected from families that had maize available during that period. Five were blue and two were white (Figure 2). Maize harvesting was carried out according to the Ortega-Paczka (2021) manual. Each sample consisted of 35 ears of maize selected in a participatory manner by the community's peasants. The samples were remunerated as suggested by the protocol, although some families preferred fruit in exchange. Following the protocol, each sample included family unit data and was fumigated with aluminum phosphide. The samples were taken to the Regional Centers Directorate of the Autonomous University of Chapingo (UACh), where they were identified at the level of species.

To identify the ethnotaxa, three "uncles"[4] representing the elderly population who speak Otomi in San Juan Yautepec, were interviewed.

Food autonomy

Seventeen in-depth interviews were conducted with individuals who still grow or use native maize. The questions emerged from a qualitative operationalization matrix, in which the broad concept was broken down into dimensions, subdimensions and codes. The open-ended question guide was based on broad categories so that interviewees could develop open-ended responses that indicated coincidences between two or more codes

Source: photograph taken by Daniela C.H.
Figure 2. Participatory collection of native maize with peasants from the community of San Juan Yautepec, State of Mexico.

from different categories. The in-depth interviews generated open-ended responses that linked two or more codes. The analysis method focused on identifying the relationships interviewees made between codes pertaining to different categories of the overall concept. In this way, coincidences were recorded, as well as ways in which collaborators related maize to social, cultural, and socioeconomic aspects. For example, the case of the old women symbolically references symbolic and religious processes due to the phenotypic characteristics of the ears of maize.

Data were recorded, including the diversity and types of dishes using native maize and species from the milpa, amount of maize harvested, number of people in their families and the area of land they planted. The data were used to determine the Huato and Toledo (2016) Food Security Index (FSI), which calculates the percentage of household maize supply. Data were displayed on a graph using SigmaPlot® software.

$$FSI = \frac{(R)(SS)/NMF}{109.5^{*}}$$

where *FSI*: food security index; *Y*: yield in kg/ha; *SA*: sown area (ha); *NFM*: number of family members of the producer; *: factor that considers that family food security (FFS) will be achieved when each family member has access to 109.5 kilograms of maize per year; If the FSI<1: FFS does not exist; but if FSI≥1: FFS exists.

Record of the biocultural memory of native maize

The calendar of agricultural and cultural practices for managing native maize and the milpa was developed in a participatory workshop, attended by 42 people (Figure 3) in February 2024. The workshop was organized using a descriptive letter. Participants introduced themselves and mentioned the identifying characteristic they liked about their community. A calendar of biocultural practices for managing native maize was created during the session (Jiménez, 2019). The following were recorded: practices, worldview, and knowledge, which have been constructed through collective memory on the part of native people. The calendar was constructed using a double-entry matrix in Excel and Canva® software for the graphics.

Regional strategies for native maize conservation

A participatory workshop was held to develop native maize conservation strategies with the first activity constituting the "First Maize, Milpa, and Knowledge Fair of the San Juan Yautepec Community."

Identification of proposals for the conservation of native maize

Conservation proposals for native maize were collected in a participatory workshop using the target image tool (Jiménez, 2019) for the short (1-5 years), medium (5-10 years), and long term (more than 20 years). The workshop was organized with participation of professors from the Intercultural University of

Source: photograph taken by Daniela C.H.
Figure 3. Group photograph of the participatory workshop in the community of San Juan Yautepec, Estado de México.

the State of Mexico (UIEM) and the UACh, in the courtyard of the community church on February 10, 2024, and was disseminated through social media and personally by invitation. The workshop was attended by 22 people who were grouped by affinity into three teams: young women, adult women, and adult men (Figure 4) as no young men attended. Each team had a facilitator and a rapporteur, who collected all the comments. Each team and each participant were provided with colored sheets on which to write their conservation proposals. Finally, a representative from each team took the floor to mention each group's proposals. All proposals were recorded in an Excel database to assess the frequency of each proposal. Power BI® was used to graph the proposals from the different teams.

Maize, milpa, and knowledge fair as a conservation strategy

One of the most interesting collective initiatives for the conservation of native maize was the seed exchange fair, which coincided with one of the specific objectives of this research. For this reason, the "First Maize, Milpa, and Knowledge Fair in the community of San Juan Yautepec" was held in collaboration with community members. Peasant families participating in the previous workshops and peasants from three surrounding communities were invited. Besides this, two community-based collectives, a network, three educational institutions, a civil association, and local researchers committed to the community were invited to participate and collaborate. The fair was

Source: photograph taken by Daniela C.H.
Figure 4. Participatory workshop for native maize conservation proposals in the community of San Juan Yautepec, State of México.

publicized through social media, posters were placed at strategic points in the community and invitations were personalized for community members and outsiders. Activities were described and organized in a descriptive letter.

RESULTS

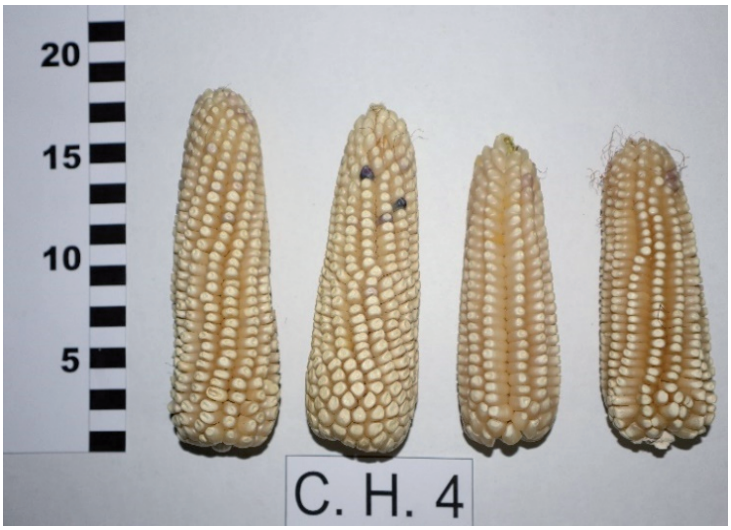
Factors that determine biocultural importance

Breeds and ethnotaxons in Hiu Hú of native maize

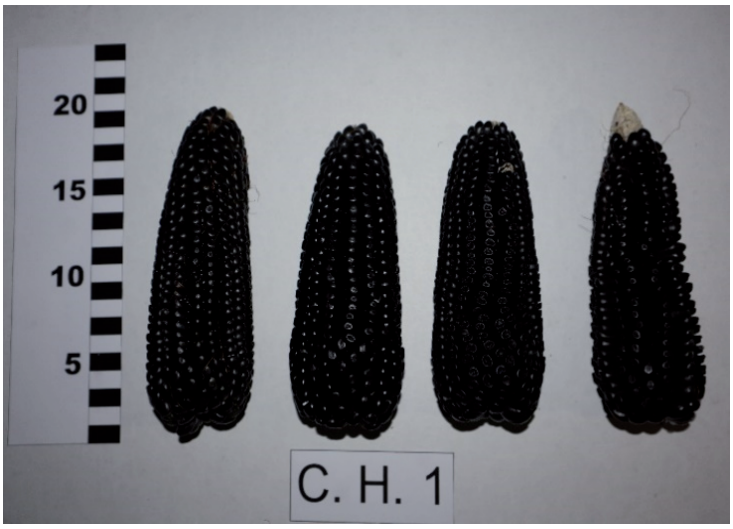
Community maize varieties were basically identified to form part of the Chalqueño breed, with those locally termed "white" referring to the Chalqueño Creamy Group variant (Figure 5), and those locally termed "blue" referring to the Elotes Chalqueños sub breed (Figure 6). Some "blue" maize varieties, with a somewhat shorter vegetative cycle, represent a cross between the Elotes Chalqueños sub breed and the Elotes Cónicos breed. The local classification system coincides with the identification system for breeds. The interviewed "uncles" refer to maize in *Hiu Hú* (Otomi) as *Ma t'si dethö*, which means "My little maize." They identify blue and white maize by different *Hiu Hú* names: *Ma t'si modijä* (blue maize) and Ma t'si taxka dethö (white maize). The term *Ma* means sacred and the term *T'si*, is an expression of affection and respect.

Food autonomy

The native maize grown in the community's milpas has resulted in a variety of dishes classified as every day, festive or survival cuisine (Table 1). In addition



Source: photograph taken by Daniela C.H.
Figure 5. Native maize from Mr. Cirilo Tovar's family unit, pertaining to the Chalqueños Creamy Group breed.



Source: photograph taken by Daniela C.H.
Figure 6. Native maize from the family unit of Mr. Martin Mulato, pertaining to the Chalqueño breed.

to maize, non-cultivated plants, which grow in the milpa are also used in the preparation of dishes. Preparation of certain foods by the group imparts a sense of community, as is the case with tamales (*Tdi dí*) (Figure 7). Handmade tortillas (*Mí*) are made with nixtamalized maize, and pinole is made with toasted blue maize.

According to the FSI only three people obtain enough maize to support their families throughout the year (Figure 8). Those with a score higher than 1 were Mr. Candelario Gutiérrez, Mr. Cirilo Tovar, and Mr. Valentín Flores, due to the number of people in their families and the area of maize they cultivate.

Biocultural memory of native maize

Twenty-seven agricultural and cultural practices were identified, throughout the 12 months of the year (Figure 9); notably several of these activities are related to the Catholic religion. Agricultural and cultural practices begin in January with land preparation by weeding. Most peasants rent a team of workers but occasionally use the tractor, which they hire from the municipality. Part of land preparation involves tilling, meaning breaking up the clumps of earth that form. Subsequently, they apply a yoke of harrows to cover the soil pores and retain moisture. One of the relevant activities is seed selection, grain removal based on the "full moon" and the blessing of these seeds on February 2 (in the town's Catholic church). Carnival is a custom that takes place in February or March, eight days before Ash Wednesday, and marks the initiation of the agricultural cycle.

Table 1. List of dishes prepared in everyday, festive and survival cuisine, using native maize and cultivated and uncultivated crops, grown in the milpa of San Juan Yautepec, State of Mexico

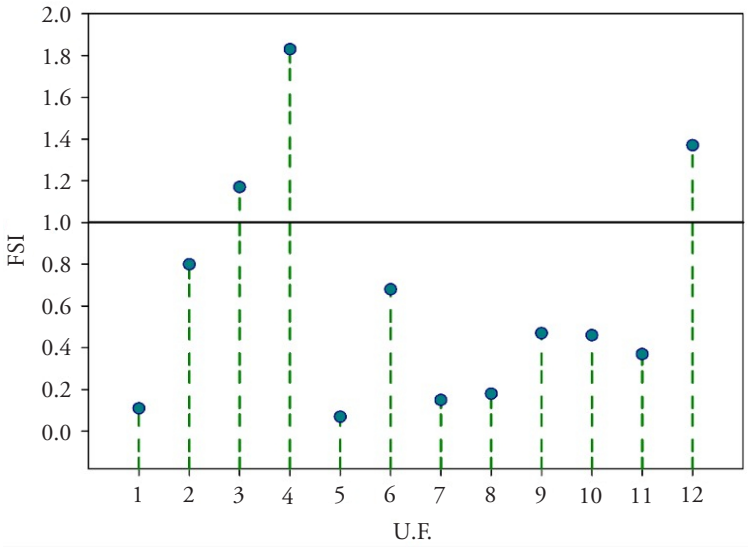
Everyday cuisine	Festive cuisine	Survival cuisine
Tortillas (*Mí*)	Tortillas (*Mí*)	Tortillas (*Mí*)
	Tamales (*Tdi dí*): in green sauce with mint and pork or chicken; with wild edible mushrooms; quelites; pumpkin seeds; broad beans (*Vicia faba*); beans (*Phaseolus* spp.); green leaf tamales; white tamales with pork fat and anise (*Tagetes micrantha*). For weddings, this includes pumpkin seeds, meat, tender maize, wild edible mushrooms, broad beans (*Vicia f.*) and chilacayote (*Cucurbita ficifolia*).	Memelas: with pork fat
	Maize cobs: boiled with pericón (*Tagetes lucida*), aniseed (Tagetes m.), and tequesquite Esquites with epazote (*Dysphania ambrosioides*)	Quelites: boiled, roasted, and fried (*Chenopodium berlandieri* subsp. *berlandieri*), quintoniles (*Amaranthus hybridus*), nabos (*Brassica rapa*), pale stalks (*Stellaria media*), and cochineal (*Medicago polymorpha*))
	Atole: made with pinole, maize dough, and tender maize Memelas nejas (white maize memelas) (placed in the coffin of the deceased before burial)	Sweet gorditas
		Xocoyol or *Xina* in sauce or roasted on a comal
		Atole made with pinole, maize dough, and tender maize stems with aniseed (*Tagetes* m.)

Source: self-elaborated.

Sowing takes place during the months of March and April; during this process, most people hire a team to excavate (make the furrow). Simultaneously, a "seed sower" (usually a woman) places the seed in the furrow, and behind her or him, two "coverers" cover the seed with soil. Those who sowed first begin reseeding in April. Later, on May 3, a cross is placed at the edge of the maize field, and reseeding continues throughout May and June. In June, the first weeding also begins, along with fertilization with manure and urea. June 24 is the celebration of the community's saint, "San Juan Bautista," and rain is expected, which will help the maize field. During July, the second weeding and the harvest of various quelites (wild plants) takes place (these are sometimes dehydrated to be consumed out of season).

On August 15, the first ears of maize are harvested and in token of gratitude are offered to the shrine of the Divine Face, located on the hill of Santa Cruz Ayotuxco in Huixquilucan. During the month of September, the maize harvest takes place, and families enjoy this in various ways. The streets are opened, meaning the maize plants are pushed along the main furrow into the side furrows. In October

Source: photograph taken by Daniela C.H.
Figure 7. Making tamales (with native blue maize) for the guest house in the Loma Bonita area of the community of San Juan Yautepec, State of Mexico.



Source: self-elaborated. If the FSI value<1: FFS does not exist; but if FSI>1: it means maize is being stored. UF 1: Andrés Filomeno Flores, 2: Ángeles Coxtinica, 3: Candelario Gutiérrez, 4: Cirilo Tovar, 5: Dionisio Urbina, 6: Guadalupe Mulato, 7: Martin Mulato†, 8: Ma. Del Carmen Valverde, 9: Martina Mulato, 10: Pablo Coxtinica†, 11: Rosa Granados and 12: Valentín Flores.
Figure 8. FSI values in San Juan Yautepec, State of México.

Source: collaborative elaboration with data from the participatory workshop.
Figure 9. Calendar of agricultural and cultural practices related to native maize in the community of San Juan Yautepec, State of México.

and November, the cempasuchil) marigolds planted in June in the maize fields are harvested to be placed on the altars on All Saints' Day. In November, sweet gorditas are prepared with the maize in a milky, doughy state. Some peasants begin to pick (harvest the maize) and form their five lots, a structure they build for drying the maize between November, December, and January. At the end of the harvest, the grass is cut and used to create toritos (small bulls) or "torean el zacate" (a type of bullfighting game). Some peasant families who harvest less maize, dry their maize on their rooftops or in ventilated rooms.

Regional native maize conservation strategies

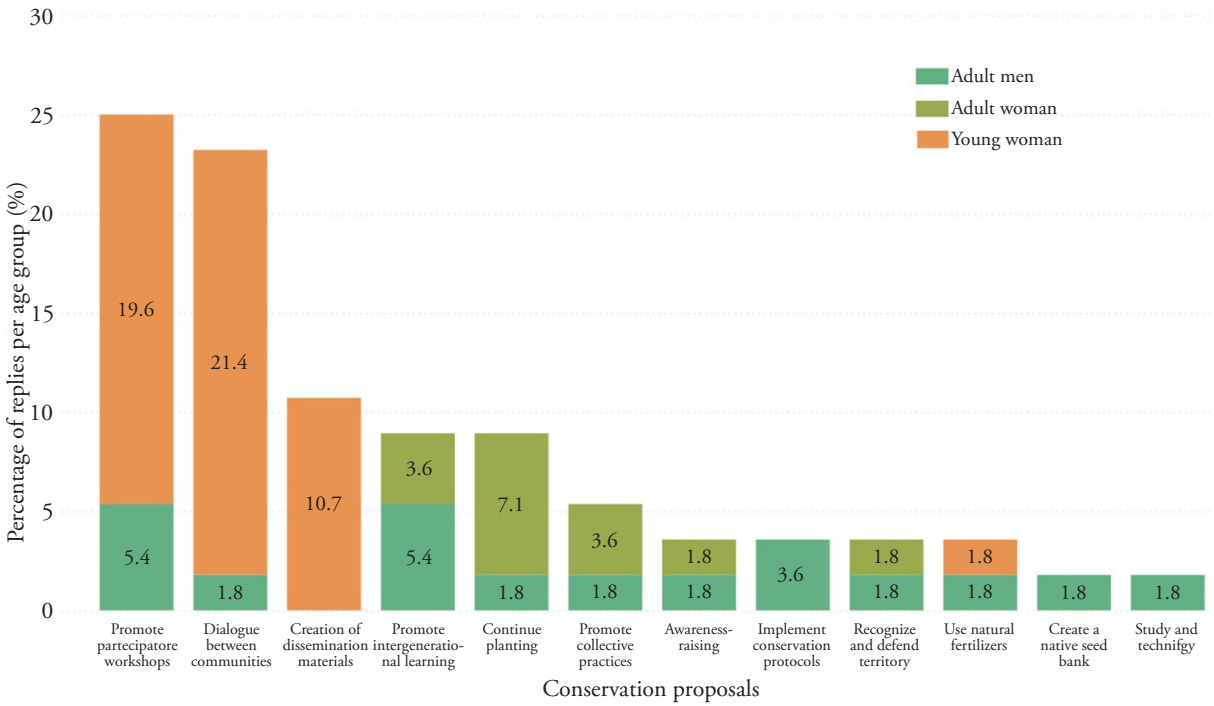
Proposals for the conservation of native maize

Sixteen groups of proposals for native maize conservation were identified during participatory meetings. Of these, three short-term conservation

proposals (1 to 5 years) predominate among young women: dialogue between communities (21.4%), promoting participatory workshops (19.6%), and creating dissemination materials (10.7%). In contrast, adults' proposals focus on the general transmission of knowledge: continued planting, intergenerational learning, collective practices, awareness-raising, and territorial defense (Figure 10).

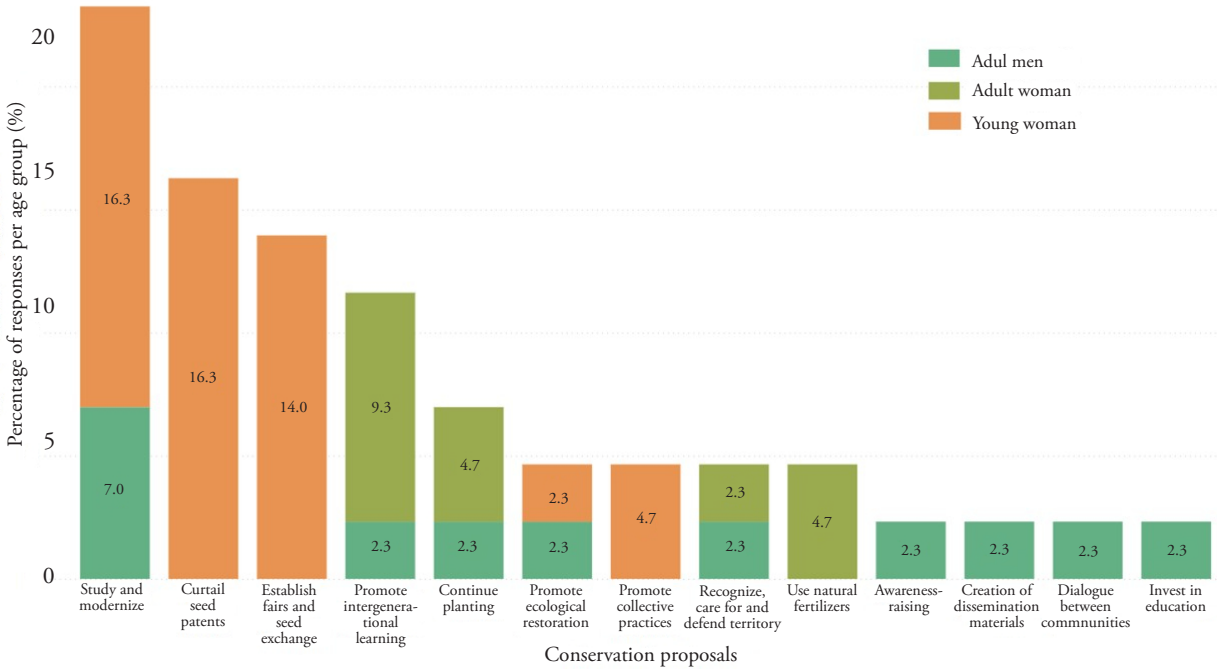
Among their medium-term conservation proposals (5 to 10 years), young women primarily advocate curtailing seed patents, studying and modernizing farming and holding seed exchange fairs. This is in contrast to adults, who recommend fostering intergenerational learning, continuing to plant crops, and promoting collective practices, among other aspects (Figure 11).

Long-term conservation proposals (more than 20 years) are required, with more than 15% indicating that investment in education and the creation of a native seed fund in the community are necessary. Less than 10% of all three age groups propose raising awareness; adults propose promoting ecological restoration; and adult men propose recognizing and caring for the territory, among other conservation proposals (Figure 12).



Source: collaborative development through a participatory workshop.

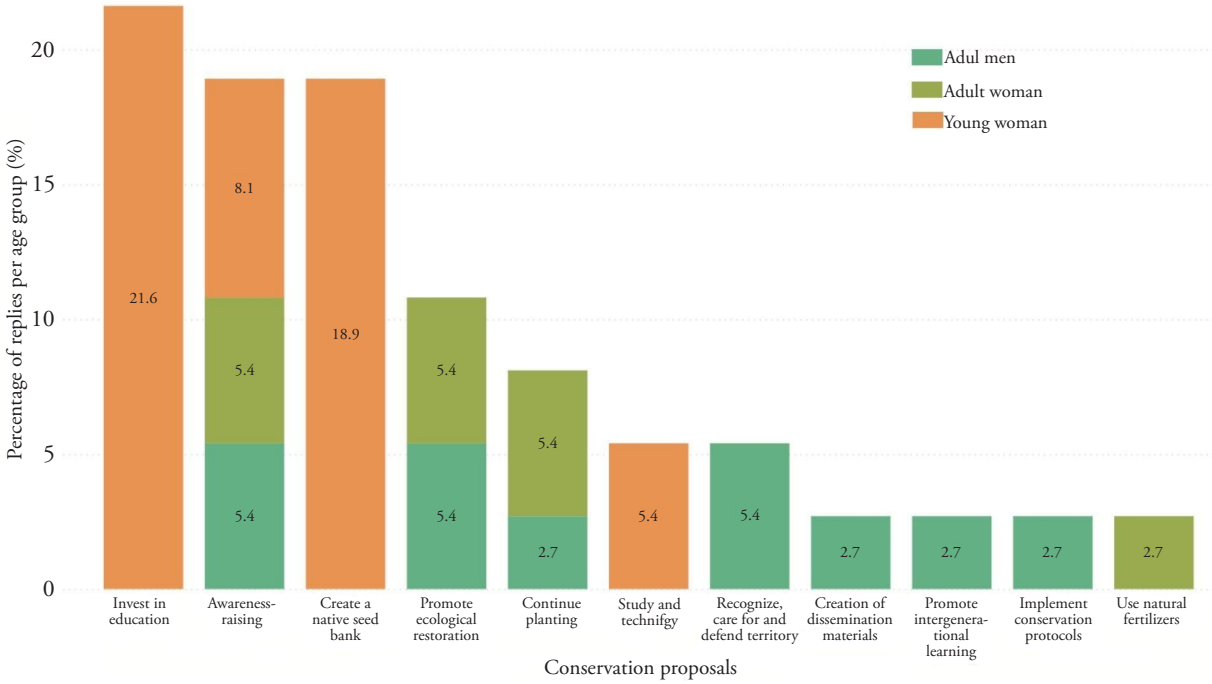
Figure 10. Short-term conservation proposals (1 to 5 years) among the three age groups in the community of San Juan Yautepec, State of Mexico.



Source: collaborative elaboration through participatory workshops.
Figure 11. Proposals for the conservation of native maize in the medium term (5 to 10 years) among the three age groups of the community of San Juan Yautepec, State of Mexico.

Maize, milpa, and knowledge fair in San Juan Yautepec, State of Mexico

During the "First Maize, Milpa and Knowledge Fair" (Figure 13), 11 activities were carried out to disseminate the importance and biocultural legacy, associated with native maize and the milpa in the community of San Juan Yautepec: 1) an exhibition of the native maize collected (with the name of the peasant, his name in *Hiu Hú*, his name in Spanish and the species to which they belong); 2) presentation by the Huehuenches who entertained with their melodies, dance steps and phrases; 3) a talk about the back-strap loom and its relationship with the milpa presented by the environmental biologist Helí Cruz; 4) presentation of the book "Cuidando nuestras semillas, experiencias campesinas en la conservación, defensa y protección del maíz native" (Taking care of our seeds, peasant experiences in the conservation, defense, and protection of native maize) by Dr. Malin Jönsson and Dr. Erik from the Semillas de Vida A.C. Foundation; 5) seed exchange between peasants from San Juan Yautepec and peasants from the municipalities of Lerma, Ocoyoacac, and the Cuajimalpa Delegation in Mexico City; 6) presentation of the article Maize,



Source: collaborative elaboration through participatory workshops.
Figure 12. Proposals for long-term conservation of native maize (more than 20 years) among the three age groups in the community of San Juan Yautepec, State of Mexico.

Source: photograph taken by Daniela C.H.
Figure 13. Group photo of attendees at the 1st Maize, Milpa and Knowledge Fair in the community of San Juan Yautepec, State of México.

the Grain that America Gave to the World by Dr. Mario Paz, followed by a discussion of knowledge with the attendees; 7) screening of the documentary Children of Maize: Maize, a Grain in Dispute; 8) exhibition of photographs Living Memories of Maize and the Milpa taken during this research (with prior permission from the collaborators); 9) exhibition of works of art related to maize, milpa, and the countryside by the NoControl Graphic and Painting Workshop; 10) sale of local products from different communities in the municipality and the municipality of Ocoyoacac; and 11) back-strap loom weaving workshop.

DISCUSSION

The maize in the community mainly corresponds to the Chalqueño breed, locally known as "white" along with its variant Chalqueño Grupo Cremoso, as well as those known as "blue" with the subspecies Elotes Chalqueños; some "blue" maize with a somewhat shorter vegetative cycle, represents a cross between the Elotes Chalqueños sub breed and the Elotes Cónicos breed. The scientific classification of maize breeds is based on several phenotypical aspects, while the local classification system (ethnotaxa) of maize in San Juan Yautepec is based on the grain color of each maize breed. The results obtained in the study community correspond to the breeds reported by previous studies in the Macro-Region of the High Central Valleys, where it is located. The Chalqueño breed is found in high areas starting at 1,800 meters above sea level; the grain color is usually white, yellow, red, pink, and blue (Herrera-Cabrera *et al*., 2004; CONABIO, 2020a). Elotes Chalqueños is a sub breed of Chalqueño descibed by Herrera-Cabrera *et al*. (2004). The Elotes Cónicos breed predominates at altitudes exceeding 2,000 meters and is mostly endemic to the Valley of Mexico (CONABIO, 2020b).

The names of maize varieties in *Hiu Hú* (Otomi) reflect the profound significance that is attributed to the value and respect for maize among the residents of San Juan Yautepec. The "uncles" interviewed mentioned that this community was known in Otomi as *Ñantde Bótda*, which means "hill of black maize." This was documented by *Shopate* (teacher) Gutiérrez-Meza (2012) during his research in the Otomi communities of Huixquilucan. Further evidence of the profound relationship between maize and the population is the name "Nixcomel" used by some workshop attendees, which refers to nixtamal.

For the peasants of San Juan Yautepec, maize is a living being who provides nourishment and remains a part of their daily diet, despite Mexico City's influence and proximity to the community. Therefore, blue maize is often appreciated for its sweet flavor, which is used to make sweet gorditas, tamales, tortillas, and also to make pinole flour, which they use abundantly, together

with food available from the milpa. All of the above is part of the community's every day, festive, and survival cuisine passed down from generation to generation (Cano and Gómez, 2017).

Only three families obtain maize for yearly consumption, and the rest are unable to obtain that sufficiency, as maize is not necessarily planted to be available all year round or for economic benefits. Rather, the community's peasants continue to plant maize in their maize fields because it is a form of resistance and signifies care of their land and seeds. For the "uncles", making a maize field is a way to ensure their existence. Likewise, factors such as healthy eating, identity, and attachment to their maize and maize field encourage them to continue planting. This free self-determination on the part of the community is what Collin (2017) and Vía Campesina (2021) refer to as food sovereignty, autonomy, and the way of life of each native population.

Biocultural memory related to native maize in the community of San Juan Yautepec focuses on the practices, knowledge, and worldview associated with this grain, without neglecting the milpa, where ties between the human and the non-human are recreated through communality, and knowledge is passed down from generation to generation. The milpa is where native maize is planted, cared for, harvested, and social ties are recreated; a space that keeps the territory alive. This is how Toledo and Barrera-Bassols (2020) define biocultural memory through the practices, worldviews, and knowledge of peoples, as was the case with agriculture, which has co-evolved with humanity for around 10,000 years. Hernandez (2022) gives as an example that when a peasant sows, a series of knowledge, practices, and sacred procedures are carried out that represent the fabric of biocultural memory: knowing, believing, and knowing how to do. For this reason, the biocultural memory of native and peasant peoples is organized in areas perceived from an agricultural perspective (Boege, 2022).

Conservation proposals for the three age groups are divided into 16 groups, with varying percentages per mention. However, it is important to comment on the high participation of young women, especially concerning the proposal to hold seed exchange fairs. Therefore, the realization of the "First Maize Fair in San Juan Yautepec" represented an act of conservation and revaluation of the community's biocultural diversity, with collaboration between residents, community-based organizations and institutions, among other committed stakeholders. These activities aim to empower local communities through self-help, commitment, and social awareness, enabling them to continue being guardians of their own seeds (Cortez and Ávila, 2022; Jönsson *et al*., 2023). The participatory workshops and the fair strengthen the PAR, which promotes an encouraging trend as peasant history is recovered, moving towards social

transformation, while providing a network of interaction and exchange of knowledge within the community (Fals-Borda, 2014; Careaga, 2018).

CONCLUSION

The biocultural importance of native maize for the community of San Juan Yautepec predominates in the cultivated maize varieties, as well as in the local classification system, which corresponds to the scientific system for species identification. The cultivation of milpa and native maize has resulted in a diverse traditional cuisine that forms part of community identity. Although most peasants are unable to achieve self-sufficiency in maize and face the pressure of "modernity" due to their proximity to Mexico City, they continue to care for these spaces that bring their land to life. This is part of their identity, providing them with healthy food and safeguarding the native seeds they have improved over the years. The existence of 19 agricultural practices and eight cultural practices currently being implemented demonstrates that collective memory is exercised in the territory year after year, despite current pressures. Furthermore, the conservation proposals generated by the three age groups were constructed from the territory and the community. The young women show great interest in continuing to conserve and defend maize. They focused on establishing links between communities and promoting native seed exchange fairs.

NOTES

[3]Transmodernity as proposed by Dussel from a theoretical, methodological and ethical perspective aims to break with the coloniality of power, knowledge and being of the Western world (Córdoba and Vélez-de la Calle, 2016).

[4]The term uncle or aunt is used to refer to older people as a form of respect, and in some cases they represent those who still speak Otomi.

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