The cultivation, uses, and festivities related to native maize (*Zea mays* L.) in the community of La Virgen, Salvatierra, Guanajuato

Ortega-Ramírez, Lizbeth A.[1]; Flores-Sánchez, Diego[1*]; Sánchez-Escudero, Julio[1]; Mendoza-Elos, Mariano[2]

[1] Colegio de Postgraduados - Campus Montecillo, Posgrado en Agroecología y Sustentabilidad, Texcoco, México, C. P. 56264.
[2] Tecnológico Nacional de México - Instituto Tecnológico de Roque.
* Correspondence: dfs@colpos.mx

ABSTRACT

Objective: To generate knowledge about the use of native maize and to identify the challenges, opportunities, and strategies for its conservation in an agrarian community.

Design/Methodology/Approach: A mixed-method approach was applied. The qualitative approach included participatory workshops, group discussions, and field visits. The quantitative approach involved a questionnaire applied to 40 key stakeholders which covered socioeconomic aspects, agricultural practices, and conservation strategies. Data were analyzed using basic statistical methods.

Results: Three types of native maize were identified: white, red, and black. White maize is the most widely cultivated and consumed, followed by red and black maize. Seeds are inherited from one generation to another, reflecting continuity in traditional practices. Recurrent droughts have limited grain production. Maize plays a fundamental role in local festivities, such as the Misa del Buen Temporal (Mass for Good Weather), although the abandonment of the Eménguaro feast highlights changes in community identity.

Study Limitations/Implications: The results are applicable to a single community.

Findings/Conclusions: The conservation of native maize reflects resistance to social pressures and current consumption trends. Although festivities linked to maize have undergone transformations, this crop remains important in the local diet. The findings highlight the importance of developing local strategies that integrate lore and agroecological approaches.

Keywords: maize, conservation, traditions, Salvatierra.

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INTRODUCTION

Mexico is the center of origin and diversification of maize (*Zea mays* L.). It concentrates the greatest diversity of maize races in the world (CONABIO, 2020a; Torres Morales *et al.*, 2022). In addition to its nutritional value, maize is a cultural symbol and holds historical significance due to its uninterrupted cultivation over approximately 350 generations (CIMMYT, 2020; SADER, 2016; Sánchez, 2014).

Maize contributes significantly to food self-sufficiency and is predominantly produced and preserved within smallholder family units operating under rainfed agricultural systems (Ramírez-Maces *et al.*, 2023). These households produce nearly 70% of the food consumed in Mexico (Hernández & Alcaraz, 2020; Ruiz-Serrano *et al.*, 2022; SEMARNAT, 2017).

Mexico records 64 recognized maize races (CONABIO, 2020b; Rangel-Lucio *et al.*, 2021; SADER, 2023), which are the result of biologically-induced variability, shaped by rural and Indigenous populations. Over the past 10,000 years, these communities have selected seeds according to their cultural and culinary preferences. More than 700 traditional maize-based dishes have been documented, characterized by a wide range of colors and flavors that contribute to the collective identity of several territories (Jönsson, 2024).

Due to the diversity of native varieties, maize remains a staple food in the state of Guanajuato (Baez Montes *et al.*, 2012). Fifteen native maize races have been reported in the region; *Cónico Norteño*, *Celaya*, and *Elotes Occidentales* are the most prevalent and widely used varieties (Aguirre *et al.*, 2000; Lazos & Chauvet, 2012; Ortega *et al.*, 2014).

Peciado-Ortiz *et al.* (2009) documented the presence of the *Cónico Norteño* and *Bolita* races in the municipality of Salvatierra, Guanajuato. However, both CONABIO (2020c) and Peciado-Ortiz *et al.* (2009) report that *Celaya* is currently the only remaining native race, raising concerns about the loss or replacement of local maize diversity.

The Bajío region of Guanajuato is one of the most productive areas for grain and vegetable cultivation under intensive agricultural models (Cárdenas-Bejarano *et al.*, 2023). However, this productivity is also linked to significant environmental costs, accounting for at least 80% of deforestation and biodiversity loss in various areas (Reyes Palomino and Cano-Ccoa, 2022). These intensive models have replaced and transformed traditional agricultural systems, despite their ecological, social, and cultural consequences (Gil-Méndez and Vivar-Arenas, 2015). This transition entails the substitution of native varieties with high-yield crops, even though native varieties remain fundamental to rainfed agricultural systems.

In recent years, climatic events and increasing migration processes have further threatened the production and conservation of these genetic resources (Segura-Nieto and Cueva-Torres, 2012). This study explores how local agricultural practices and lore contribute to the preservation of native maize genetic resources. It also examines the impact of agricultural modernization and the erosion of traditional practices. The objective was to generate knowledge about the current use of native maize within rainfed production systems in a rural community.

MATERIALS AND METHODS

This study was conducted in the community of La Virgen, municipality of Salvatierra, state of Guanajuato, Mexico (100° 54' 22.304" W, 20° 08' 29.974" N).

The mixed-method approach chosen for this research incorporated both qualitative and quantitative components. The qualitative approach included participatory workshops, focus group discussions, and field visits to maize cultivation plots. These methods enabled an in-depth exploration of traditional agricultural practices, the perceptions of farmers, and the challenges related to the conservation of native maize.

The quantitative component involved a structured survey with 40 key stakeholders —80% of the active *ejidatarios* (communal landholders) who grow maize. The questionnaire collected information on socioeconomic characteristics, risks and opportunities associated with native maize production, technical management practices, and conservation strategies. The data were analyzed in Excel spreadsheets (Microsoft Office, 2016) using frequency distributions, percentages, and trends.

Maize ears from the native types were collected and their morphometric traits were characterized, including ear length, number of rows, grains per row, grains per ear, ear weight, and the weight of 100 grains. The data obtained from the ears were subjected to an analysis of variance (ANOVA). When significant differences were found ($P<0.05$), mean comparisons were conducted using Tukey's test.

RESULTS AND DISCUSSION

Characteristics of the *Ejidatarios*

The results provided a detailed overview of native maize production and conservation, as well as the agricultural practices and their connection to local traditions. In average, the interviewees were 65 years-old, with an age range of 26 to 88 years. This demographic trend involves a critical issue: while older adults play a key role in maintaining agricultural knowledge and traditions, the aging farming population poses a significant risk to the continuity of native maize cultivation and the related sociocultural practices. In the territory of Salvatierra, climatic, economic, and productivity-related risks are major drivers of youth migration, because younger generations migrate to meet basic needs and pursue alternative economic opportunities (Gómez and Tacuba, 2017).

Seventy percent of the interviewees were men and 30% were women. Nevertheless, women play a crucial role, both at home and in the maize plots. Women possess deep knowledge about the cultivation, processing, and culinary use of native maize (Maldonado and García, 2023). In fact, women have been the main pioneers in the conservation of maize. Every day, they are in charge of nixtamalization, grinding, and preparing food (mainly tortillas). Their involvement in food production contributes not only to food security of their households, but also to the diversification of their income (FAO, 2024).

Types of Maize

Ejidatarios differentiate between native maize varieties by the color of their grain. These varieties do not have specific names: they are identified solely by color, reflecting a simplified classification of local native maize. White maize is cultivated by 49% of the *ejidatarios*, followed by red maize (39%) and black maize (13%) (Figure 1). The cultivation of each type is closely tied to family culinary preferences, as well as to certain properties that extend its storage potential. White maize is more resistant to insect damage during storage.

Table 1 shows the characteristics of the ears from the three native maize types. Ear length was the only trait that showed statistically significant differences among the three types. Red maize had the longest ears; their length was statistically similar to the length of the ears of white maize. Although the remaining traits did not show significant differences,

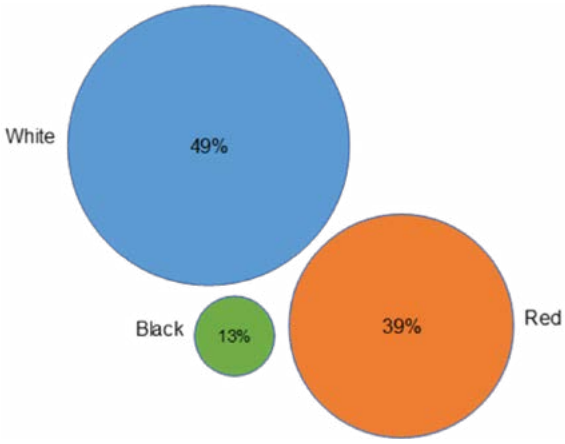

Figure 1. Types of native maize grown in La Virgen, Salvatierra, Guanajuato, Mexico.

Table 1. Morphological characteristics of ears from native maize grown in La Virgen, Salvatierra, Guanajuato, Mexico.

Type of maize	Length (cm)	Number of rows	Grains per row	Grains per ear	Ears weight (g)	100 grains weight (g)
White	15.1 ab	10.7	31.3	309.3	134.9	33.8
Red	17.8 a	8.5	29.3	248.5	129.0	44.3
Black	13.6 b	10.7	28.8	314.5	115.5	34.8

Different letters show significant differences between treatments ($P<0.05$).

white and red maize recorded more grains per ear, greater ear weight, and greater weight of 100 grains. Although the ears were not classified by race, previous studies have reported the presence of the *Cónico Norteño* and *Bolita Cónico* in the municipality of Salvatierra (Peciado Ortiz *et al.*, 2009).

Origin of the Seeds

Three sources of origin for the maize seeds grown in the community were identified (Figure 2). Seeds are mainly inherited from family ancestors, which allows the continuity and preservation of native maize varieties. No cases of replacement or introduction of other maize types were reported. Just like in other regions of the country, this seed reproduction strategy contributes to the safeguarding of native seeds and involves approximately three million farming families in Mexico (Orozco-Ramírez *et al.*, 2017).

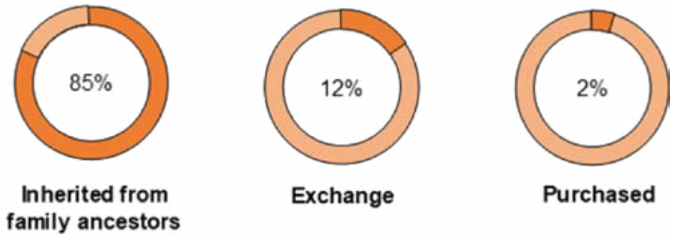

Figure 2. Origin of native maize seeds grown in La Virgen, Salvatierra, Guanajuato, Mexico.

The second alternative for the acquisition of seed is the exchange within the same community. Although this alternative is less popular, it promotes, facilitates, and ensures access to seeds for cultivation. This mechanism supports the conservation of the deeply-rooted biocultural heritage of Mesoamerican agriculture (García and Giraldo, 2021).

A smaller proportion of participants purchased seeds in the locality, perhaps due to the drought conditions experienced in the community over the past five years. *Ejidatarios* noted that 2023 was a particularly dry year, during which most of them were unable to harvest. In response to such adverse events, the local exchange or purchase of seeds has become a viable mean to ensure seed availability, thereby promoting their reproduction and conservation (Flores-Pérez *et al.*, 2024). However, in several regions of Mexico, extreme climate events have severely impacted grain production, threatening household food security and accelerating migration processes (Guzmán, 2021).

Uses of Maize in Daily Life and Festivities

At least six different forms of maize consumption were identified within the community (Figure 3). White maize is the preferred type and is primarily used to make tortillas, but it is also used to prepare atole and tamales. Five uses were reported for red maize, the second most cultivated variety, mainly in the preparation of pozole and for consumption as roasted or boiled elotes (young corn cobs). This preference is linked to its longer ears and larger grains (Table 1); additionally, it is the only variety used for pinole.

Black maize only has two main uses (tortillas and atole), which explains its low production levels. *Ejidatarios* reported that the cultivation of black maize has declined in recent years. This decline is attributed to limited access to black maize seed and to the lack of interest in the cultivation of diverse maize types. Likewise, most *ejidatarios* avoid mixing different grain types during the milling process, because it could alter the desired characteristics of the final product.

In addition to daily consumption, *ejidatarios* reported various celebrations where maize consumption plays a fundamental role (Figure 4). Maize is used in at least eight cases: five national festivities, two local celebrations, and daily consumption. Unlike

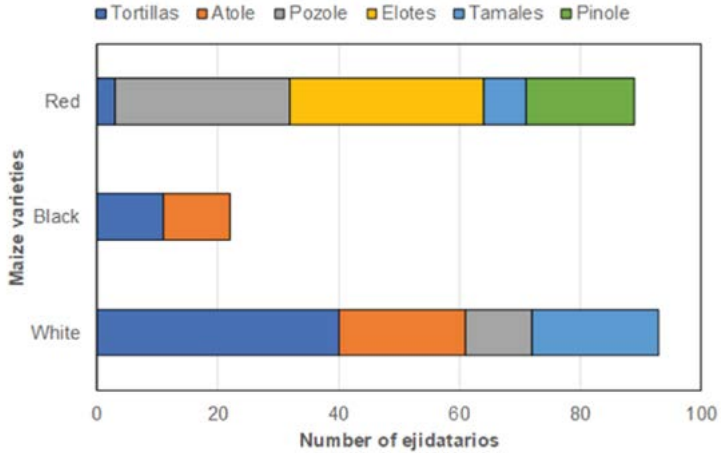

Figure 3. Common uses of native maize varieties in La Virgen, Salvatierra, Guanajuato, Mexico.

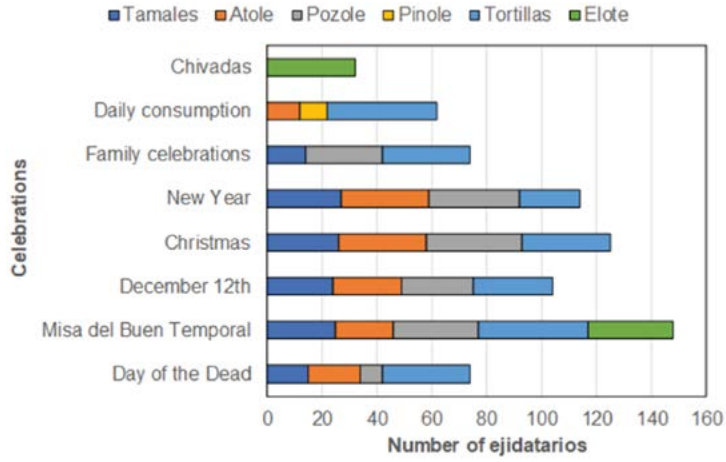

Figure 4. Uses of maize in daily consumption and festivities in La Virgen, Salvatierra, Guanajuato.

other maize-based foods, the consumption of *elotes* and *pinole* is essential during specific celebrations.

The celebrations where the greatest number of *ejidatarios* consume maize in up to four different ways are the Misa del Buen Temporal, Christmas, and New Year's.

Regarding *elotes*, they are mainly used for *chivadas* (a local term referring to roasted corn cobs). This event takes place during the last weeks of August and throughout September, often simultaneous with the feast day of Saint Michael the Archangel on September 29th. During this time, families gather near their fields to share food and roast *elotes* —mostly red maize varieties, which are usually the sweetest.

Pinole tends to be part of the daily diet for some individuals, predominantly older adults. Younger generations have just begun to consume this maize product. Initial discussions with community members revealed two main celebrations where native maize varieties play a significant role.

The first of these celebrations, which unfortunately is no longer held, is the Eménguaro festival, celebrated on September 21st. This event consisted of a pilgrimage from the community of La Virgen to San Miguel Eménguaro, one of the main communities in the municipality, due to its historical and cultural significance. San Miguel Eménguaro ("Place of Early Maize" in Purépecha) is remarkable for the influence of agricultural traditions, especially maize production.

During this festival, the participating communities, including La Virgen, would offer their harvests, flowers, and food as signs of gratitude and devotion. However, a dispute between the two communities led to "*La Virgen distancing itself from Eménguaro*," marking a deep shift in cultural identity and traditional practices. After this break-up, La Virgen dropped "de Eménguaro" from its name and became "La Virgen," thereby ending its participation in the pilgrimages. This change not only caused a rupture in inter-community relations, but also resulted in a significant loss of rituals and cultural expressions related to native maize.

The second festivity, which is still celebrated to this day and where maize plays a significant role, is the "Misa del Buen Temporal." This event features the greatest variety

of maize uses (Figure 4). The celebration takes place on November 2nd to honor the Señor del Socorro and is an expression of gratitude and faith for the harvests of that year. During the festival, the population participates in processions to the main churches, where special masses are held. However, this celebration has deeper roots in the San Juan neighborhood, where five arches are constructed with a Christ figure in the center, decorated with all the harvest products found in the municipality, with colored maize (black and red) playing a prominent role.

In conclusion, despite changes and the loss of certain celebrations, such as Eménguaro, native maize continues to hold a place in the culture and traditions of the community. The continuation of celebrations like the Misa del Buen Temporal underscores the desire of the people of La Virgen to maintain their connection with their culture and spirituality.

No municipal program is specifically focused on the promotion and conservation of native maize. However, maize-related gastronomy is promoted in certain events. The first is the tamale and atole fair held in February. This fair offers a wide variety of traditional tamales and beverages from the region. In addition, this fair includes live music, talks with tamale makers, and tastings of tamales and atoles prepared with maize dough in various flavors.

The second event is the "Festival de la larga y la quesadilla," held in June, where local women gather in the municipal seat to prepare *largas* and quesadillas, which are consumed with typical local stews. However, *largas* are no longer prepared according to the original recipe. The traditional method to prepare this dish has changed; consequently, what is currently offered is closer to a taco, reflecting a cultural transformation in the region.

Furthermore, the dough used to prepare *largas* and quesadillas usually comes from local tortilla shops, which often use hybrid maize rather than native varieties. These events promote local gastronomy, boost the local economy, and are a fundamental part of the culture and collective identity (Baez Montes *et al.*, 2012; Rangel-Lucio *et al.*, 2021; Torres *et al.*, 2024). Encouraging the production, consumption, and dissemination of native maize consumption practices in the territory is essential for its ongoing contribution to local nutrition (Venegas-Martínez *et al.*, 2024). Beyond its role as food for the community of La Virgen, native maize is a key element in local culture. It faces major challenges related to climatic phenomena, migration, and limited incentives for its production and conservation. Nevertheless, resistance processes have enabled its continuity (Guzmán, 2021). Programs and research work could address the challenges and provide effective conservation strategies, based on the contribution of native maize to the local economy and gastronomy.

The conservation of native maize within the community of La Virgen reflects resistance to social pressures and current consumption trends. Although production and consumption practices have been maintained primarily by older *ejidatarios*, agroecological strategies should be promoted to encourage not only the preservation of maize, but also its appreciation as an essential part of local identity.

CONCLUSIONS

Although festivals, events, and traditions linked to maize have undergone transformations and losses, they show the importance of maize, not only as a food source, but also as a symbol of community cohesion. The predominance of white maize reflects both practical and cultural decisions, while the decline of black maize indicates a trend toward a simplified crop selection. Local fairs and events offer valuable opportunities to recover, preserve, and promote native maize.

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