

Framing the Traditional: Counterrevolution and Gender in Mexican Ethnobotanical Research Through the 1970s and 1980s

Journal of Ethnobiology
2023, Vol. 43(3) 262–273
© The Author(s) 2023
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/02780771231194773
journals.sagepub.com/home/ebi



Daniela Sclavo¹

Abstract

The concept of traditional knowledge has been widely used in ethnobotanical studies from the 1970s onward. The aftermath of world-scale Green Revolution projects led to the realization that disparities were not bridged between small- and large-scale agricultural producers and between developed and developing countries. It is within this context that from the 1970s, Mexican ethnobotanical researchers began to integrate ecological, social, and political perspectives to promote alternative modalities of agricultural production. Here, ethnobotanists pushed for the revalorization of traditional agricultural knowledge as the main avenue for a more just and responsible agricultural system. However, in implementing this ideological counterrevolution, ethnobotanists constructed their own signification of the traditional, which shaped how it would be accounted for in the following decades. This paper explores the ways in which early ethnobotanical research in Mexico through the 1970s and 1980s imagined, celebrated, and constructed traditional techniques in agriculture as a counter-response to modern agriculture, and with this, how women were framed as secondary actors in a male-dominated narrative. The argument then proposes that these early works were hierarchical and gendered, which complicates celebratory accounts of the countermovement in Mexican ethnobotany and other fields of knowledge. Therefore, this analysis reflects on how the traditional within ethnobotanical research has been constructed under specific contexts, on how this directly shaped gender constructions, and on the latter's implications to the present day.

Keywords

traditional, knowledge, ethnobotany, Mexico, women

Introduction

In the 1970s, the aftermath of agricultural development projects from preceding decades led many observers in Mexico and beyond to realize that, despite promises of harnessing science and technology to improve the lives of farmers and resolve hunger and malnutrition in the developing world, disparities had not been bridged between small- and large-scale agricultural producers, let alone between developed and developing countries. The use of technological packages, including improved seeds, irrigation, and fertilizers, had been sold as the solution to hunger and the means of rural modernization by agricultural scientists, philanthropies like the Rockefeller Foundation, and the United States government. In the decades since, the hoped-for agricultural revolution sought through these technologies, often referred to as the Green Revolution (GR), looked like a failure in the eyes of many, including academics and activists who criticized the socioenvironmental damages caused by this food system and, what they judged to be, its capitalist motivations (Cotter 2003; Fitzgerald 1986; Harwood 2009; Hewitt de Alcántara 1976; Jennings 1988; Wright 2005).

One group that made such an assessment was a set of ethnobotanists in Mexico, where early GR projects took place in the 1940s through a collaboration between the Rockefeller Foundation and the Mexican government. These ethnobotanists in the 1970s embarked on a mission to guide the project of rural development in a different direction than that of the GR; by extension, they revisited their discipline's foundations by undertaking a groundbreaking revalorization of the country's indigenous cultures, including local peoples' agricultural knowledge, practices, and technologies. Therefore, this paper explores how these Mexican academics framed traditional knowledge as a way of countering the GR and as an alternative tool for rural development. More so, it shows how this framing placed women as subservient agents. I use the term

¹Department of History and Philosophy of Science, University of Cambridge, Cambridge, UK

Corresponding Author:

Daniela Sclavo, Department of History and Philosophy of Science, University of Cambridge, Cambridge, UK.

Email: ds936@cam.ac.uk

counterrevolution in reference to the pursuit of ethnobotanists to build a countermovement to industrial agriculture through including traditional agricultural knowledge into their research. I propose to use this term because these scientists sought a drastic change in rural development—as big in scale as the GR had been—and thus proportionally “revolutionary.”¹

Growing social concerns about environmental degradation linked to the GR, the neglect of peasantry and indigenous peoples, and the political turmoil over authoritarian states (propelled by developed countries), detonated social mobilizations through Latin America as the Cold War unfolded. Events such as the Cuban Revolution, the Central American agrarian struggles, and the international student movements resonated deep in the social and political landscape of Latin America. In Mexico, the student Tlatelolco Massacre of 1968 marked a turning point for repressive state politics and highlighted the generalized discontent over evident inequalities. In addition, the government’s strategy for rural development remained that of modernizing agriculture, but on the verge of the 1970s production decreased and the importation of staple crops rendered public doubts on the GR’s effectiveness (Appendini 2001). This social unrest was reflected in the academic sector, as anti-imperialist views sparked renewed interest in Mexico’s own cultural and biological richness (Cotter 2003; Gliessman 2013).

Mexican scholars developed an inward-looking interest in the traditional. This domestic reorientation took place not only in fields like anthropology² and the social sciences more broadly but also, curiously, in agricultural science. Efraím Hernández Xolocotzi, acclaimed agronomist and early collaborator of the projects that triggered the GR in Mexico, was one of the first critics of the methods and impacts of agricultural modernization as conceived of in the 1940s and 50s. Through the 1960s and more firmly in the 1970s, this agricultural scientist turned ethnobotanist voiced concerns about copy-and-pasting a model of United States–based agricultural production in Mexico’s rural context. Hernández overtly complained about the GR’s neglect of peasantry within rural development programs—especially neglect of their local knowledge and livelihoods. In this sense, Hernández set the scene for a counterrevolution in Mexican ethnobotany from the 1970s, which shaped this field’s trajectory in the following decades. Hernández guided the next generation of ethnobotanical scholars, including Javier Caballero and Alfredo Barrera, individuals who not only followed his insights but also transformed the field according to their own motivations (Caire-Pérez 2016; Ortega Packza 2013).

Consequently, these ethnobotanical works encompassed mainly indigenous groups and their territories. Hernandez covered a broad range of regions in Mexico. In his early work with native maize collection, he traveled through the *Sierra Madre Occidental* (Western Mother Range) encompassing the states of Nayarit, Sinaloa, Chihuahua, Durango, Zacatecas, and Jalisco, engaging with cultures such as the *Cora*, *Huichol*, *Mexicanero*, *Tepehuano*, *Mayo*, *Pima*, *Tarahumara*, and *Cahita* (Hernández Xolocotzi and Alanis

Flores 1970:13). More so, as part of his focus on agricultural traditional systems, he visited the Bajío in Guanajuato, the Central Valleys of Oaxaca, the Northern Sierra of Puebla, the Yucatán peninsula, and the Zongolica region in Veracruz, among others (Hernández Xolocotzi and Padilla y Ortega 1980; Hernández Xolocotzi and Solano 1982; Mariaca Méndez 2001).

The following generation of ethnobotanists, however, narrowed down the scope by focusing on specific regions or cultures, parting from Hernández’s broader framework. For example, notorious Javier Caballero studied the *Maya* of Yucatán, the *Purépecha* of Michoacán, and the *Mixtecos* of Guerrero (Blancas 2020); Alfredo Barrera worked on the *Maya* of Yucatán (Barrera and de Márquez 1976); and Arturo Gómez Pompa also researched the *Maya* of Yucatán and the tropical forests of Veracruz (Gomez-Pompa, Vazquez-Yanes and Guevara 1972; Gómez-Pompa 1987). Thus, the emerging counterrevolutionary group of ethnobotanists mainly explored Central and Southern Mexico. These regions were known for their ethnic, cultural, and biological diversity: a perfect hub for investigating traditional agricultural systems.

In this paper, I aim to account for how ethnobotanists throughout the 1970s and 1980s promoted the restructuring of their field by examining Hernandez’s work and following his influence. I show how these scientists asserted their socio-political roles by taking traditional knowledge as a banner of change and as an appropriate alternative for Mexican agriculture. Here, I claim that by positioning themselves as bridges between communities, institutions, and government, they built their own accounts of nation building, and very importantly, of the modern and the traditional. The extent to which this counterrevolution was successful will be addressed in the discussion. Very importantly, I will also discuss how their agenda placed women as part of the family unit and, therefore, as passive actors, while men were presented as the main agents and knowledge carriers. That is, within their celebratory and politically charged discourse, ethnobotanists also defined who had a place—or not—in traditional agricultural knowledge.

This analysis adds to two recent accounts of Mexican agriculture and the history of the GR; mainly to that of Caire-Pérez (2016) and more broadly to Gutiérrez Núñez (2017). The former takes Hernández as a central trigger for the death of the GR within the halls of the University of Chapingo and the College of Postgraduates and follows the different negotiations and debates between academics, students, and government officials regarding the future of agriculture in the country in the 1950s until 1970. Caire-Pérez marvelously describes the life and trajectory of Hernández and his early critiques of modern agricultural science. Meanwhile, Gutiérrez focuses on maize production to uncover the complex entanglements of the expansion of capitalism and the modernization of Mexican agriculture from 1920s to 1970s. My argument builds on these accounts by framing the subsequent events of the 1970s and 1980s—decades in which Hernández and a subsequent generation of ethnobotanists consolidated their field’s

viewpoints and methodologies in relation to traditional knowledge, and in opposition to capitalist agriculture. I delimit my account to this period since the next decade brought about significant changes that are beyond the scope of this analysis.³

In extending the existing historiography on the GR in Mexico and responses to it, the paper calls attention to two crucial elements. Firstly, I highlight the ways in which early counterrevolutionary studies in ethnobotany constructed the roles of *campesinos* and *campesinas* in traditional agricultural systems—a topic that has not yet been explored in the history of Mexican ethnobotany. Secondly, by attending to this gendering of the tradition, I add nuance to the over-celebratory rhetoric that many authors have presented in describing the work of ethnobotanists in revalorizing indigenous peoples, particularly in the case of Hernández or “Maestro Xolo” (Caire-Pérez 2016; Gliessman 2013; Gómez-Pompa 1993; Friedberg 2013; Lira, Casas and Blancas 2016; Ortega Packza 2013). Analyzing the ways in which Mexican ethnobotanists in the 1970s and 1980s framed the traditional within a specific sociopolitical context sheds light onto how and why they wanted the possessors of traditional knowledge to be acclaimed, recognized, differentiated, and valued. It also shows how ethnobotanists’ early work was gendered. Therefore, this historical example draws an interesting parallel through which to think about how, where, and by whom traditional knowledge is framed—or contested—today.

The structure of this paper is as follows. First, I present the history of Efraím Hernández-Xolocotzi and the subsequent generation of ethnobotanists, explaining the development of the movement for a new approach to traditional knowledge, its transformation over time, and its intersections with other disciplines such as agroecology. I explore how Mexican ethnobotanic researchers framed their role as that of mediators between the institutional and the local. I then turn to their conceptualization of traditional knowledge and agricultural techniques in more detail, as well as their juxtaposition of these with modern agriculture. Next, I account for how ethnobotanical researchers presented the role of women in traditional agriculture, specifically their representation as passive agents. Finally, I discuss how the history of ethnobotany in Mexico can inform today’s use of the traditional, considering the situated sociopolitical contexts of research relations. Here, I emphasize how history and philosophy can serve as fundamental tools to revisit, challenge, and understand the traditional concept under a critical eye.

Background History of the “Counter-Revolution” in Mexican Ethnobotany

Efraím Hernández Xolocotzi (1913–1991) was born in the state of Tlaxcala, Mexico, to a peasant family that migrated to the United States in 1922. Achieving academic excellence from a young age, Hernández was able to make his way to Cornell

University. There, he pursued a degree in agricultural science. This interest was motivated by a trip to Mexico after finishing high school where he was able to witness peasant life first-hand and the contrasting conditions of poverty and segregation that most small-farmer families experienced (Caire-Pérez 2016:77). From this trip, he developed a profound interest in tackling the rural fragmentation he observed in Mexico’s agricultural context.

As noted by Caire-Pérez, it is curious that Hernández, an early and vocal critique of the GR, worked within its main institutions in his early years as an agricultural scientist. In 1945, Hernández began working as a germplasm collector in the Mexican Agricultural Program at the Office of Special Studies. This was a collaboration between the Rockefeller Foundation and the Mexican government, and the preamble to the later GR. Through the Office of Special Studies, Hernández was able to explore Mexican territory and develop an inclination toward *campesinos*’ agricultural and botanical knowledge. However, he became disillusioned with the technocratic approach of the program (Caire-Pérez 2016:104, 112). By the 1960s, now working as an established botanist at one of the main educational centers for agricultural science in Mexico, the National School of Agriculture, he articulated his critiques more clearly. Hernández voiced concerns over the adoption of foreign technologies and the neglect of the domestic socio-cultural context with their application. He explicitly recognized the knowledge of *campesinos* and indigenous populations with respect to their local environments (2016:170). Thus, in contrast to his former colleagues at the Office of Special Studies, Hernández presented local farmers as active agents in breeding and agriculture.

Yet, it was only after his 1968 trip to South America that Hernández came back as an ethnobotanist with radical views (Caire-Pérez 2016:278). In this journey, Hernández integrated ethnographical insights to his knowledge of plants and agriculture, an interest that eventually brought him closer to the field of ethnobotany than to his initial path as an agricultural scientist. In the early 1970s, Hernández consolidated his views on plants and humans, especially the interactions of different cultures with their environments including through their local agricultural systems (1970). His vision for ethnobotany sharpened, and he differentiated his ethnobotany from that of the past:

Ethnobotany was initially established as the study of the use of plants by primitive cultures. We have now established that ethnobotany is the study of the mutual relations between man and the plants through the dimensions of time, space, and culture. This approach is expressed in the following way: ethnobotany is the study of the various ways that man has used to achieve the optimal use of renewable natural resources in order to obtain products that meet their anthropocentric needs (generated by the same man) for the benefit of the human group (Hernández Xolocotzi et al. 1975:1).⁴

Not only did Hernández challenge previous ethnobotanical research by promoting a more horizontal framework between local knowledge and academia but he also emphasized the political aim of the field. For example, while describing the ethnobotanical histories of local populations in his explorations through Latin America, he positioned industrial agriculture as the destroyer of culture:

Slowly, day after day, for millennia, in all corners of human culture, the history [of local peoples] has been weaved—and whose beginning we still do not describe and whose end, in its elementary phase, is glimpsed before the use of improved seeds, the cultural dispersion of indigenous groups, industrial expansion, the mechanization of agriculture and the coercion of agricultural dissemination (1970:8–9).

Thus, his work on ethnobotany became a banner denouncing the negative consequences of the GR and revalorizing native peoples' knowledge.

Furthermore, Hernández largely promoted interdisciplinary research. He linked approaches from anthropology to his botanical studies and collaborated with acclaimed anthropologists such as Arturo Warman and Angel Palerm (Caire-Pérez 2016). Within this interdisciplinary framework, he collaborated with and supported the program “Traditional Agricultural Technology” (TAT), an interdisciplinary and inter-institutional endeavor. Through TAT he advocated the inclusion of peasant agricultural knowledge in rural development programs, which had, so far, mishandled “attempts to improve the living conditions of the rural population” (1977:321). In this sense, Hernández underlined ethnobotanists' role in linking traditional agricultural knowledge and technologies with institutional efforts for rural transformation through science.

Through the teachings of Hernández-Xolocotzi, a new generation of ethnobotanists emerged in Mexico in the 1970s. The new cohort proceeded with degrees in biology and agricultural science at institutions such as the Universidad de Chapingo, the College of Postgraduates, the National Polytechnic Institute, and the National Autonomous University of Mexico. Moreover, there was a significant increase in the number of ethnobotanical works that integrated analytical approaches such as cultural, ecological, evolutionary, and theoretical ethnobotany. Descriptive and cultural approaches grew to become equally—or even more—relevant as theoretical tools than the conventional activities of economic botany (Camou-Guerrero et al. 2016).

Taking Hernández's inspiration in *campesinos*, indigenous knowledge, and interdisciplinary research, young ethnobotanists such as Javier Caballero and Alfredo Barrera promoted a more pointed political discourse regarding the role of ethnobotanists in society. For example, in 1979, Javier Caballero defined ethnobotany as an activity that had to deconstruct academic methods and address social change as a radical discipline by acknowledging the popular science built by indigenous

populations. He described their knowledge as “obtained with methods and procedures largely equivalent to those of modern science, thus constituting a true popular science or concrete science” (1979:13). Similarly, Barrera 1979 denounced the classism of academia and stated:

“We [scientists] frequently place ourselves, identified with the ideology of the ruling class, as intellectuals who can treat the objects of our study with the superiority conferred on us by pretending to be able to do so with scientific objectivity and not with empiricist logic (also object of study) of our informants, belonging to different cultures and subcultures that are not always well understood and even underestimated” (1979:9).

In this sense, the new generation of ethnobotanists openly condemned the imperialist motivations of Western science. The counterrevolution was growing.

This critical approach initiated by Hernández was advanced by the nascent generation of Mexican academics in conversation with scholars abroad who debated the socioenvironmental deficiencies of the GR in rural Mexico. Similar to Caballero and Barrera, these scholars held blunt views against industrial agriculture. For example, anthropologist Cynthia Hewitt de Alcántara accounted for the process of modernization in Mexican agriculture between 1940 and 1970 and signaled the unequal distribution of investment between small and large producers (1976). Historian Barbara Tuchman argued that privately owned farms and big producers were the ones that profited from the GR, worsening the economic gaps (1976 in Harwood 2009:1246). These pointed accounts are essential to understand how Mexican ethnobotanists framed their task and why their conceptualization of traditional agriculture acquired a tone that, above all, denoted their resistance.

Finally, it is imperative to outline the entanglements between ethnobotany and other avenues of knowledge to understand these scientists' take on the traditional through the 1970s and 1980s. Hernández's work on TAT and what he defined as agroecosystems in 1977 (Astier et al. 2017; Hernández Xolocotzi 1977) influenced two separate but interlinked branches of research through the 1980s: agroecology and ethnoecology. The former largely overlapped with ethnobotany insofar as both countered the GR and revalorized traditional agricultural knowledge. Moreover, agroecology was developed under the doings of ethnobotanists themselves, such as Hernández Xolocotzi (1977) and biologist Gómez-Pompa (1987)—for which the conception of traditional intertwined in both fields through this period.

However, agroecology's theoretical genealogy parted from ecology (Gliessman, Garcia and Amador 1981; Wezel et al. 2009) rather than botany. This means that agroecology focused on a systems vision of the environment to generate socioecologically resilient agricultural techniques for food production (Altieri 1999; Gliessman 2013). Moreover, agroecology developed as a practical field; it transcended academic

halls and became a social movement with active participation of farmers, producers, and local people (Astier et al. 2017; Hecht 1999). In this line, Altieri and Toledo have been defined it as the “scientific, methodological, and technological basis for a new ‘agrarian revolution’ worldwide” (2011:587). Hence, ethnobotany engaged with topics beyond agriculture (such as medicinal and ritual uses of plants) but it also remained more descriptive. As the two fields collided in these scientists’ trajectories, in the next section, I will use examples from their work in agroecology to explain how they defined traditional agricultural knowledge—especially in Hernandez’ edited volume “Agroecosystems of Mexico” (1977).

The expansion of ethnobotanical studies and TAT also had an important influence on other ecological approaches in the 1980s: that of ethnoecology and within it, Traditional Ecological Knowledge (TEK). In this area, Victor Toledo’s work on ethnoecology is particularly representative, as he developed an approach in TEK that aimed at understanding local knowledge more profoundly. This resulted in what he later proposed as the triad of *kosmos* or beliefs, *corpus* or systems of knowledge, and *praxis* or practices (Alarcón-Cháires and Toledo 2003). Through this methodology, he aimed at “interpreting the models of the natural world that peasants, families, and communities have in traditional cultures, with the goal of comprehending local knowledge in all its entirety” (2003:7). Yet, Toledo’s work can be considered as part of the next generation of research in the 1990s and early 2000s (Toledo 1992, 1995). Even when ethnoecology is significantly entangled with Mexican ethnobotanical research, here I will concentrate on how the traditional was defined through a focus on agriculture, which was the basis of the countermovement against the GR for the period considered in this paper.

Defining the Traditional

As described so far, the field of ethnobotany was profoundly shaped in the 1970s and 1980s by the work of Hernández—and by his background as an agricultural scientist. He stressed the recognition of *campesino* knowledge as a key alternative to the state’s approach of modernizing rural Mexico through industrial agriculture, which was expanded later by ethnobotanists like Caballero and Barrera. Thus, ethnobotany -and interlinked fields such as agroecology- formulated a countermovement or counterrevolution to the GR. Mexican scientists propelled a national-scientific endeavor based on the revalorization of Mexico’s ethnic and cultural diversity—a political project where researchers acted as mediators between different institutions and local populations, and between traditional and scientific knowledge. In this section, I will explore the ways in which these ethnobotanists imagined, celebrated, and constructed the traditional and with it, how they framed other people’s knowledge and livelihoods.

By the 1970s, the field of ethnobotany in Mexico was being regarded as an intellectual and material bridge between “the peasant and the gardener, the agricultural scientist, the

ethnobotanist, the biochemist, the geneticist and the plant breeder” (Hernández Xolocotzi 1970:9). The inclusion of culture, as being vital for the evolution and diversification of species, allowed for a consideration of plants as having different values and importance to social groups. That is, explaining the diverse cultural values attached to plants in local settings, their uses, and techniques, paired with a nonutilitarian valorization that became essential for the profession, ethnobotanists collaborated with and served these same communities (Hernández Xolocotzi 1979:3).

The revalorization of local and indigenous traditional knowledge became a pivotal element in the foundational turn of the discipline. In this respect, unlike previous ethnobotanical studies, farmers and peasants received credit and agency for the diversification, domestication, and conservation of species. Local markets, regional plantations, and home gardens and parcels started to be conceptualized as the “biggest germplasm banks”—in comparison to institutionalized seed banks (Hernández Xolocotzi 1970:8). Ethnobotanists celebrated peasant agriculture as a sign of resilience against centuries of colonial oppression and violence (Caballero 1979; Hernández Xolocotzi 1970, Zizumbo and Colunga 1982). As Hernández Xolocotzi stated: “It is easy for us to classify them as ignorant, obviating the affection, the meditation, the creative effort that they have invested in the domesticating process of plants and in the same process of agricultural science” (1970:15). In this sense, local knowledge and techniques were revalorized and reframed as valid knowledge.

But what did traditional mean to these scientists? In “Agroecosystems of Mexico,” which is considered one of the founding works of Mexican Agroecology and edited by Efraim Hernández Xolocotzi, several emerging scientists agreed on the importance of recognizing traditional agricultural techniques as elemental to the process of crop diversification and highlighted their necessary incorporation into agricultural studies to improve the country’s rural sector (Hernández Xolocotzi 1977). Although the term traditional was not unanimously defined, Joaquín Ortiz Cereceres—agricultural scientist at the College of Postgraduates—argued that:

There is a great diversity of traditional agro-systems, which are the result of biological, ecological and cultural interrelationships, and the evolution of these interrelationships, which has allowed the definition and stabilization of those that optimize the use of the factors of the ecosystem in relation to anthropocentric needs....some are highly efficient and reach levels of productivity, which in many cases equal or exceed modern production systems (1977:278).

In the same text, Xolocotzi and Ramos framed traditional as “the series of practices and cultural elements, not originated by modern mechanisms of science and technology, that serve as the basis for the use of natural resources by our rural population in almost all of our territory and that together we have called

traditional agricultural technology” (1977a:321). According to these scholars, the historical links between indigenous cultures, land, and resource management resulted in a set of diverse agricultural practices and techniques—ones not related to modern science and technology.

Most ethnobotanical works in this period imply that the traditional is that which originated in pre-Hispanic times, which can be embodied in practices, epistemologies, habits, rituals, oral stories, or ways of understanding the world, that in one way or another survived until contemporary days. Although some authors acknowledged the fact that traditional does not refer to a static or immutable essence (Hernández Xolocotzi and Ramos 1977a; Niño Velasquez 1977), most used the dichotomy with modern agricultural science and sometimes framed both concepts in contrast, a trend that would linger in the literature well until the 1990s.

For example, Leobardo Jimenez Sanchez, Hernandez’s student at Chapingo, associated traditional agricultural knowledge with the temporal flow of cultural processes as it relates through time to the “security and hope of peasant groups in the geography and history of Mexico, which in turn has seen the birth and growth of modern agriculture, with which to compare” (1977:xxiii). By explaining how traditional agriculture is more widely extended in the country than modern agriculture (found in more concentrated patches), he then continued to assert that both types of agriculture “are configured, coexist and at the same time differ and contrast in the national territory” (1977:xxiii). By doing this, ethnobotanical and agroecological researchers emphasized their role in appreciating and describing the traditional as an alternative path to contemporary strategies on agriculture.

Contrast with the modern came to signify a departure from Green Revolutionary approaches to food security, crop improvement, and rural development; and also, a way of rendering visible the negative consequences of the latter—both socially and ecologically. By setting a contrasting language (but using the same terms), ethnobotanical scientists declared their disciplinary standing point as a counterforce to the GR ideology, yet as intermediary agents, as most held posts in academic or state institutions. While both approaches pushed for development, ethnobotanists and agroecologists highlighted the sociopolitical context of agricultural settings as essential to attain just and environmentally friendly production systems. In a way, they thought of their profession as the path to understand and then apply traditional knowledge for a generalized rural development (Gómez-Pompa 1993; Gómez-Pompa and Kaus 1999) in contrast with modernizing initiatives, such as the GR, focused more on agricultural development (Ellis and Biggs 2001).

It is important to recognize that even if they countered the GR-led ideology, this cohort of Mexican ethnobotanists also worked through it and at certain points, with it. For example, many authors mention the necessity to conserve crop varieties primarily for improvement—possibly baggage inherited from Hernandez’ background in agricultural science. More so, by

describing the traditional as a contrasting designation—even if positive—to the modern agricultural techniques of industrialized agriculture, the communities that embraced these practices were not part of modern Mexican society, as many plant breeders and politicians openly stated in this period. Scientists speculated, based on agroecosystems analysis, that traditional systems would inevitably go through a remodeling process to comply with changing social necessities (Jiménez Sánchez 1977:xxvii). In a similar line, others pushed for the incorporation of modern technology into traditional technology, with the former eventually becoming traditional technology itself (Niño Velasquez 1977:153). This implies, in a way, that the traditional would have to become modern at some point and integrate to Western science—with ethnobotanists and agroecologists as the link between both.

However, the line between modern and traditional was not always clearly defined. While ethnobotanists sometimes celebrated and even romanticized the traditional, they also portrayed it as primitive and imagined peasants as ignorant—even if not with the intention of criticizing traditional knowledge per se. Referring to the state of Mexican agroecosystems, Leobardo Jiménez argued that:

Surely these, in their development, are in a phase that could be called primitive to others that could be described as modern... the [first] one pointing to a lag of centuries and its potentialities and limitations, the other one as the rich vein of possibilities that constitute the broadest security in the capacity of man, but at the same time point out vices and problems that must be overcome in the former and avoided in the latter (1977:xxvi).

Moreover, Edilberto Niño—researcher at College of Postgraduates—stated that peasants’ agricultural framework was limited to the family unit and the community, which in turn limited their understanding of broader national and social issues—a factor that could change through education. He explains:

...the degree of formal education that tries to introduce the sense of nation and homeland has grown [in Mexico], the degree of cultural integration has grown through the extension of the national language, the degree of economic integration through the market has grown; the frame of reference of the rural population, for the most part, has remained the same and, possibly, will have been reduced to the family only. The rural producer does not understand... the social world in which he is living; he does not understand the natural processes that affect his life and his activity (1977:153).

Therefore, contrasting and sometimes contradictory assertions on the traditional permeated ethnobotany’s counterrevolution in Mexico, and by extension, areas such as agroecology and agricultural science.

It is worth reflecting then on how the emergence of the conceptualization of traditional agricultural knowledge in this field and period, shaped ethnobotany in Mexico in a unique way. The counterrevolution not only meant a departure from GR values in agriculture. It also allowed for critical views about Western science as the sole way of creating valid knowledge. Hernández Xolocotzi clearly summarized this back in 1970:

This group of farmers has been facing the most difficult problem of agricultural research and in reality, we have failed by not learning much more from their knowledge....In more advanced countries they may laugh, but let us not forget that their progress and our battle against the scarcity of corn, springs from the cultural roots of these people (1970:15).

Some years later, Hernández Xolocotzi and Ramos added that “the study of traditional agricultural technology will take us to a cosmos alien to the crystalline and immaculate of our scientific world and that our implantation will incur in fragmentary, distorted, deformed appreciations due to our incomplete and alienated preparation” (1977a:325). However, Hernández also described science as “the most powerful process available to man and for the acquisition of knowledge” (1985:3). Along with their own celebrations and contradictions, these ethnobotanists built a specific identity and meaning for their role as mediators of the traditional and modern worlds. They set themselves as defenders and contributors of the former—and as a bridge between both worlds.

By appropriating the task of studying, protecting, and improving traditional agricultural knowledge and systems, they defined their identity as ethnobotanists in Mexico. That is, they engaged both politically and socially to improve rural conditions taking traditional agricultural systems as their main tool. As ethnobotanist Javier Caballero explained, the objective of ethnobotany would be to “collect information about all the possible uses of plants as a contribution to the design of new forms of exploitation of ecosystems, which oppose current destructive forms” and as a series of “practices that take up traditional knowledge and technologies and that, enriched by Western scientific knowledge, recreate, and develop them to their ultimate consequences, both locally and at broader levels” (1979:15). Similarly, Cereceres argued that “the analysis of traditional agroecosystems will allow the formulation of working hypotheses, which, when subjected to experimental verification, will have the information that allows clearly defining the strategies of the production programs within a given ecosystem, likewise, it will serve to define the objectives of agricultural science and plant breeding research programs” (1977:284). Thus, it was their responsibility to build a framework, a methodology, to bridge the local with the wider national context.

From this, it becomes evident that ethnobotanists in the 1970s and 1980s constructed their own way of describing and denoting the importance of local and small farmers’

knowledge, social issues, and environmental concerns in their early revolutionary projects. Most importantly, they framed the revalorization of local or indigenous cultures in relation to their scientific knowledge and expertise in agriculture—that is, linked to production, crops, and plants. In this sense, Hernández envisioned the study of traditional knowledge in ethnobotany as linked to genetics, plant breeding, and crop improvement (1985:5)—which again resonates with his background in agricultural science. This research agenda had an influence on how local communities’ livelihoods would be framed by specific actors and practices. This is pertinent to the way that Mexican ethnobotanists described the role of women in traditional agricultural knowledge, as will be discussed next.

Women in Traditional Agricultural Knowledge

Hernández Xolocotzi, in 1979, included the following questions as part of an outline for ethnobotanical research that would define the field for at least two decades: “What relationships are generated between food preparation processes and the amplitude and intensity in the use of resources? What interrelationships are found between food resources and the characteristics of individuals and the socio-economic organization?” (1979:7). One might think that these questions would bring about an interest to study culinary traditions and more specifically, the role of women (as they, generally, are who prepare, cook, and manage the household’s food resources) in traditional agricultural systems, and in domesticating and conserving landraces. However, by portraying the relationship of ethnobotany as one that worked with local knowledge and techniques, early ethnobotanical and agroecological works gave lopsided attention to male farmers that worked directly on the land, or to social interactions more generally, as the main responsible agents for the domestication, diversification, and conservation of plants. Texts, articles, and books on ethnobotany or agroecology from this period mainly touch on traditional knowledge as drawn by peasant men (Hernández-Xolocotzi 1970; Hernández-Xolocotzi 1977; Hernández-Xolocotzi and Alanís Flores 1970).

It is important to note that the counterrevolution in ethnobotany and agroecology was defined by a particular set of actors: men with strong educational backgrounds in academia. Most of them held degrees in either biology or agricultural science from universities such as the National Autonomous University of Mexico, the National School of Agriculture, or even from the United States, such as the case of Hernández-Xolocotzi, who studied at Cornell University and Harvard University. Considering that the first women to ever study at the University of Chapingo enrolled in 1967 (Castro and Gómez 2007; Caire-Pérez 2016), it is plausible that most researchers overlooked the role of women not only in their professional environment but also in their fieldwork.

The active agency of women is not present in the texts because the agricultural field and the production techniques

were the central focus. Ironically, the role of flavor and culinary uses of crops were identified by ethnobotanists as elements of diversification and conservation but left at that. When briefly mentioned, as by Hernández-Xolocotzi (1979:7), the relationship between food preparation and natural resource management, as well as the interrelations between alimentary resources and socioeconomic organization, came to be considered as “key ethnobotanical research questions.” Yet, these key questions would not be addressed until much later.

Despite general neglect in this literature, women are present in men-centered discussions of agriculture. For example, Hernández-Xolocotzi held that “The indigenous farmer [*as in him*], forced by the need to maintain types of corn with better adaptation to the ecological niches of its cultivation and to preserve culinary characteristics related to the form of its regional consumption, has favored the break of the continuum corresponding to a panmictic population” (1970:3). In this sense, flavor is described as a factor that shaped crop’s diversity, which was encouraged by the monotony of diets and regional taste preferences (Hernández-Xolocotzi 1970:27). Even this important culinary perpetuation of crops was adjudged to *el agricultor*, as the one that selected and maintained varieties with specific culinary characteristics dependent on the modes of consumption (1970:25).

Moreover, Hernández Xolocotzi stated:

For me, the most convincing measure of a good gardener, a good farmer, a good agronomist, is *his* ability to provide the most favorable environment for the desired development when cultivating... despite his ordeal with the spread of Western culture - persecution, displacement, violence against *his* culture, kidnapping of *his women*, death [emphasis added] (1970:15).

Further on, he repeatedly described men’s agency in domesticating landraces (1970:16). Even if “man,” “he,” and “his” are used as general pronouns in Spanish, I argue that these texts refer to male peasants and farmers, since the discussion specifies men and not women as the main agents and carriers of traditional agricultural knowledge. A supporting proof is that women *campesinas* are mentioned (explicitly in feminine) when describing the family unit or in female-related activities.

The conceptualization of the family came to be built as the center of peasant subsistence production and its analysis (Hernández and Ramos 1977b). With respect to this, Leobardo Jiménez Sanchez established that:

... the rural family, as the central unit of society, whatever its magnitude, geographical location and economic possibilities, should be recipients of the benefits of the development that it promotes through its work, of the use of the natural resources that possesses, of the application of the available scientific elements and of the support of the agricultural services that the State has to put at its disposal...(1977:xxii).

He then stated that social and economic aspects such as “the consequences of increasing production, aspects such as family organization, the potential of the family, the role of *campesinas* in improving the community, etc.” are fundamental to understand traditional agricultural systems of production (1977: xxvii). Women, then, are mostly framed under a joint role in family or community, and not as individual participants and creators of agricultural knowledge.

In addition, women appear in these early revolutionary ethnobotanical texts as either attached to other actors or limited to certain spaces. For example, Hernández Xolocotzi and Koeppen García acknowledge women’s plant knowledge in house gardens (Hernández Xolocotzi 1970:14; Hernández Xolocotzi et al. 1975:14; Hernández Xolocotzi et al.1975:14). Also, Hernández Xolocotzi mentions *campesinas* or *intermediarias* (intermediary or trader in feminine) referring to women that sell their harvest and products on a local market (1975:6). While describing markets as important ethnobotanical spaces of study, Hernández Xolocotzi denoted the interest of housewives in buying and comparing the best prices they can find (not *campesinas*, as they are generally related to a lower social status). Thus, the recognition of women, although seldom, was narrowed to specific actions or scenarios.

One possible response to this gendered explanation is that the rural context prevented male ethnobotanists from engaging with women and their knowledge. In other words, access rather than oversight determined the bias presented in the literature. Indeed, factors such as language, patriarchy, and the norms governing social spaces could have influenced their visibility in ethnobotanical research. Even when considering all these factors, the scientists’ discourse suggests more than a lack of observation. First, as mentioned above, ethnobotanists explicitly mention the role of cuisine and flavor as important for crop domestication and diversification—which denoted a recognition of spaces such as the kitchen and the house in knowledge-making. Also, these same scientists framed markets as important places of research, where many women worked as crop vendors. Contact at the market, outside the household, was an acceptable public sphere of interaction. If the role of *campesinas* had been considered, but scientists were unable to engage with them, this detail could have been stated in the work, but it is not.

The absence of women’s agency is visible beyond the research. While referring to professional settings, actors such as the sociologist, the economist, and finally the ethnobotanist, are concepts mainly related to the masculine (1975:6). As Leobardo Jiménez expressed about the systematic study of México’s agricultural situation:

This effort undoubtedly requires men trained to investigate, organize knowledge, systematize it, teach it and continue with the process of generating it through research that must return to its point of origin: the

individual, the family, the community, the region, the country (1977:xxv).

Therefore, it is clear from this case that social perceptions significantly shaped how women would become part of—or not—ethnobotanical studies on traditional agricultural knowledge from this period. With this, I do not state that ethnobotanists in the 1970s and 1980s were wrong. Rather, that ethnobotanical research in this context was gendered and hierarchical, at the same time that women's role in maintaining crop diversity was referenced obliquely through culinary tradition.

The explicit acknowledgement of women's knowledge of traditional agricultural systems and their agency in the preservation of crop diversity would occur a couple of decades later. In the 1970s and 1980s, however, the understanding of farmer and traditional knowledge remained focused on agricultural production, and thus maintained a masculine gaze. As I speculate, the research and political priorities of ethnobotanists and agroecologists remained focused on forwarding a departure from the modality of industrial agriculture. The biggest challenge for these scientists was figuring out how to formulate and bridge the traditional knowledge and growing concerns about the consequences of capitalist agrarian policies, inequality, and loss. How ethnobotanists framed traditional agricultural knowledge in Mexico, and how women came to be represented, can help us think more broadly about the generalizations, assumptions, and future avenues of what we understand as the traditional in ethnobotany. Moreover, it complicates the overcelebratory accounts of this generation of researchers that pushed for social change, but who were also limited by their period's context. In this sense, history and philosophy are important tools for constructing responsible accounts of previous—and future—research.

Discussion and Final Remarks

In this paper, I have shown how early ethnobotanists, and later, agroecologists, framed their own approach to the study of agriculture as an alternative path to industrialized agriculture. They cast themselves as mediators between modern and traditional agriculture. Furthermore, I reflected on how this vision was invariably gendered. By thinking of traditional techniques as the answer to a more just rural development, these researchers were crucial in promoting social awareness about the inequality between agricultural systems. To do so, ethnobotanists constructed their own definitions of local cultures, traditional techniques, and human–plants relations.

Yet, they created a way of thinking about the traditional that inevitably had its own consequences, such as delegating women's agency to a secondary, subservient role. Even when this related to a generalized patriarchal society, ethnobotanists' construction of women within the traditional highlighted the ways in which indigenous women were even more marginalized and neglected. This adds a racial and socioeconomic layer to the ways in which scientific infrastructure was built at the time. More so, this story reflects ethnobotanists' main

incentive of defining traditional knowledge: to shape sentiments of belonging and to build a national identity on Mexican ethnobotanical research.

The extent to which this counterrevolution was successful is two-fold. On the one hand, their work on revalorizing traditional knowledge was crucial for generating social awareness on the marginalization of indigenous peoples, and on forwarding environmental concerns and social mobilization. Moreover, this countermovement marked a starting point for future research, particularly in the avenue of biocultural heritage (Boege 2021). The latter instantiated changes in policy regarding rural production and the conservation of native crop genetic resources, for example, with the prohibition of maize GMOs and the creation of a National System of Plant Genetic Resources for Food and Agriculture in the early 2000s (Massieu 2005). In this sense, the counterrevolution resonated in many sectors of the population and propelled political transformation.

On the other hand, even when the views of this movement were clearly counterrevolutionary, responses from the government in the following decades remained largely aligned with a GR-like ideology. Albeit the advancement on laws concerning the conservation of biocultural diversity, on a bigger scheme the Mexican state promoted neoliberal policies through the modernization of the countryside and export agriculture, especially with the North American Free Trade Agreement signed in 1994. This limited the aims of ethnobotanists, and academics more generally, of transforming rural development in Mexico dramatically.

History can be an anchor to reflect on the contexts that shape traditional knowledge and how it is constructed, envisioned, and institutionalized. It allows us to grasp the commonalities and the inescapable particularities of a geographical region, a period, a place, or a group of actors. In a way, it grounds what philosophy asks more abstractly. This history of Mexican ethnobotany, for one, allows us to reconsider and expand the ways in which traditional knowledge has been approached outside the Global North. As a concept widely used in ethnobiology, assumptions about the meaning of traditional can be sometimes taken for granted. This article has shown that researchers in Mexico constructed different ways of imagining, envisioning, and approaching the concept within ethnobotanical studies. Yet, future research can significantly enrich our understanding of the construction of the traditional by unveiling how it was framed in other places and periods. In this sense, historical research can bring about more inclusive and diverse understanding of how ethnobiology approached traditional knowledge—and of how this is done today.

Exploring the ways in which Mexican ethnobotanists worked on the traditional in the 1970s and 1980s, brings actual instances of how issues such as gender, race, and colonized territories and bodies materialize in the ethnobiological endeavor. The scientific vision was clearly gendered. This consequently influenced how agency on crop diversity,

conservation, and alternative agricultural techniques was discussed, institutionalized, and valued. In parallel, this can be helpful toward analyzing if and how other conceptualizations of traditional knowledge are still structured by research bias. Can we still notice trends toward male-dominated narratives? If so, in what shapes and forms? How have the discursive, ideological, and material tools in ethnobiology changed since the 1970s?

Undoubtedly, the ethnobotanists discussed opened a path for the recognition of marginalized local cultures and their worldviews, as well as for the importance of crop landraces in agricultural systems and the intrinsic relationship between cultural and biological diversity. This was vital for the implementation of conservation strategies throughout the country, as for wider calls to question stultic ideals of modernization and progress. In this sense, scientists enacted their role as mediators of the modern versus the traditional and between the state, academic institutions, and communities of rural Mexico; they framed themselves as counter-actors of industrial agriculture and defenders of the local and indigenous populations of Mexico. In short, they shaped the traditional and with it, how it was to be studied and imagined by future generations.

The historical case presented in this paper only reflects the complex entanglements of single group researchers, in a delimited period, in a particular country. Yet, it denoted how traditional knowledge came to be both celebrated and framed as both a solution and the thing to be improved. These contrasting, even contradictory characteristics, showed the inevitably human aspect of the scientific enterprise. Also, they reveal how different actors play a part in the conceptualization of traditional knowledge; that is, who defines, who conveys it, who enacts it, and more. Future avenues of practice in ethnobiology can be significantly enriched with mixed approaches in history and philosophy. Interdisciplinarity can prove the most fruitful, not only to critically analyze what happened in the past in order to understand our present but also to assess what ethnobiology could achieve in the future. One hopeful glance is that more and more spaces will be open to carriers of local knowledge. Then, they will be able to define and teach us, in their own terms, what it means.

Acknowledgments

The author thanks CONACYT-Cambridge Scholarship. Also, to the project team “From Collection to Cultivation.” The author specially thank Helen Anne Curry, Abigail Nieves Delgado, and Tad Brown for their insightful comments and feedback.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

Notes

- 1 In addition, this countermovement also resonated with legacies of the Mexican Revolution. For example, Gutiérrez Núñez (2017) comments on how Mexican historiography in the 1970s and 1980s focused on peasant movements during the revolution and during the agrarian reform (p. 20).
- 2 One key anthropologist in this period was Guillermo Bonfil Batalla, who engaged on a groundbreaking work on recognizing the indigenous heritage of Mexican society from the 1960s until his death in 1991. See *México Profundo: Una civilización negada* (1987).
- 3 For example, treaties such as the Convention on Biological Diversity (1992), the North American Free Trade Agreement (1994), and peasant movements such as the Ejército Zapatista de Liberación Nacional (1994) and la Via Campesina (1996).
- 4 All translations are mine.

References

- Alarcón-Cháires, P., and V. M. Toledo. 2003. *La etnoecología. Hacia una transición epistemológica de la ciencia*. México: Universidad Autónoma de Chapingo.
- Altieri, M. A., ed. 1999. *Agroecología: Bases Científicas para una agricultura sustentable*. Montevideo.: Editorial Nordan-Comunidad.
- Altieri, M. A., and V. M. Toledo. 2011. “The Agroecological Revolution in Latin America: Rescuing Nature, Ensuring Food Sovereignty and Empowering Peasants.” *Journal of Peasant Studies* 38 (3): 587–612. <https://doi.org/10.1080/03066150.2011.582947>.
- Appendini, K. 2001. *De la milpa a los tortibonos: la reestructuración de la política alimentaria en México*. El Colegio de México, Centro de Estudios Económicos: Instituto de Investigaciones de las Naciones Unidas para el Desarrollo Social. c1992, 2001.
- Astier, M., J. Quetzal Argueta, Q. Orozco-Ramírez, M. V. González, J. Morales, P. R. W. Gerritsen, and M. A. Escalona. 2017. “Back to the Roots: Understanding Current Agroecological Movement, Science, and Practice in Mexico.” *Agroecology and Sustainable Food Systems* 41 (3–4): 329–348. <https://doi.org/10.1080/21683565.2017.1287809>.
- Barrera, A., and V. B. de Márquez 1976. *Nomenclatura etnobotánica maya: una interpretación taxonómica* (Vol. 35). SEP Instituto Nacional de Antropología e Historia, Departamento de Investigaciones Históricas, México.
- Blancas, J. 2020. “Javier Caballero.” *Revista Etnobiología* 18 (1): 5–7.
- Boege, E. 2021. *Acerca del concepto de diversidad y patrimonio biocultural de los pueblos originarios y comunidad equiparable. Construyendo territorios de vida con autonomía y libre determinación*. Secretaría de Cultura: INAH, BUAP. ISBN: 978-107-525-757-0.
- Caballero, J. 1979. Perspectivas para el quehacer etnobotánico en México. In *La Etnobotánica: tres puntos de vista y una perspectiva*, edited by A. Barrera, 14–16. Cuadernos de Divulgación N°5, Instituto Nacional de Investigaciones sobre Recursos Bióticos, Veracruz, México.
- Caire-Pérez, M. 2016. “A different shade of green: Efraím Hernández Xolocotzi, Chapingo, and Mexico’s green revolution, 1950–1967.” PhD Dissertation, University of Oklahoma.
- Camou-Guerrero, A. A., A. Casas, J. Moreno Calles, D. Aguilera, S. Garrido Rojas, I. Rangel-Landa, E. Torres-García, et al. 2016.

- "Ethnobotany in Mexico: History, Development, and Perspectives." In *Ethnobotany of Mexico: Interactions of People and Plants in Mesoamerica. Ethnobiology*, edited by R. Lira, A. Casas, and J. Blancas, 21–40. New York, NY: Springer New York.
- Castro, R., and V. Gómez. 2007. "La universidad como espacio de reproducción de la desigualdad de género. Un estudio de caso en la Universidad Autónoma de Chapingo, México." XXVI Congreso de la Asociación Latinoamericana de Sociología, Guadalajara, México.
- Cotter, J. 2003. *Troubled Harvest: Agronomy and Revolution in Mexico, 1880–2002*. Westport, Conn: Greenwood Publishing Group.
- Ellis, F., and S. Biggs. 2001. "Evolving Themes in Rural Development 1950s–2000s." *Development Policy Review* 19 (4): 437–448. <https://doi.org/10.1111/1467-7679.00143>.
- Fitzgerald, D. 1986. "Exporting American Agriculture: The Rockefeller Foundation in Mexico, 1943–53." *Social Studies of Science* 16: 457–483. <https://doi.org/10.1177/030631286016003003>.
- Friedberg, C. 2013. "La Etnobotánica Mexicana." *Etnobiología* 11 (3): 8–13.
- Gliessman, S. R. 2013. Agroecología: Plantando las raíces de la resistencia, *Agroecología*, 8: 19–26.
- Gliessman, S. R., R. E. Garcia, and M. A. Amador. 1981. "The Ecological Basis for the Application of Traditional Agricultural Technology in the Management of Tropical Agro-Ecosystems." *Agro-Ecosystems* 7 (3): 173–185. [https://doi.org/10.1016/0304-3746\(81\)90001-9](https://doi.org/10.1016/0304-3746(81)90001-9).
- Gómez-Pompa, A. 1987. "On Maya Silviculture." *Mexican Studies/Estudios Mexicanos* 3 (1): 1–17. <https://doi.org/10.2307/4617029>.
- Gómez-Pompa, A. 1993. "Las raíces de la etnobotánica mexicana." In *Logros y Perspectivas del Conocimiento de los Recursos Vegetales de México en Visperas del Siglo XXI*, edited by S. Guevara, P. Moreno-Casasola, and J. Rzedowski, 26–37. Instituto de Ecología A, C. Y Sociedad Botánica de México, Xalapa, Veracruz, México.
- Gómez-Pompa, A., and A. Kaus. 1999. "From Pre-Hispanic to Future Conservation Alternatives: Lessons from Mexico." *Proceedings of the National Academy of Sciences* 96 (11): 5982–5986. <https://doi.org/10.1073/pnas.96.11.5982>.
- Gomez-Pompa, A., C. Vazquez-Yanes, and S. Guevara. 1972. "The Tropical Rain Forest: A Nonrenewable Resource." *Science* 177 (4051): 762–765.
- Gutiérrez Núñez, N. L. 2017. "Cambio Agrario y Revolución Verde: Dilemas científicos, políticos y agrarios en la agricultura mexicana del maíz, 1920-1970." PhD Dissertation, Colegio de México.
- Harwood, J. 2009. "Peasant Friendly Plant Breeding and the Early Years of the Green Revolution in Mexico." *Agricultural History* 83 (3): 384–410. <http://www.jstor.org/stable/40607496>
- Hecht, S. 1999. "La Evolución del Pensamiento Agroecológico." In *Agroecología: Bases Científicas para una agricultura sustentable*, edited by M. A. Altieri, 15–30. Montevideo.: Editorial Nordan-Comunidad.
- Hernández Xolocotzi, E. 1970. *Exploración etnobotánica y su metodología*. Chapingo, México: Colegio de Postgraduados, Escuela Nacional de Agricultura.
- Hernández Xolocotzi, E. 1977. *Agroecosistemas de México: contribuciones a la enseñanza, investigación y divulgación agrícola*. Chapingo, México: Colegio de Postgraduados.
- Hernández Xolocotzi, E. 1979. "Estudios etnobiológicos. Definición, relaciones y métodos de la etnobiología" In *La Etnobotánica: tres puntos de vista y una perspectiva, Cuadernos de Divulgación N°5*, edited by A. Barrera, 6–9. Instituto Nacional de Investigaciones sobre Recursos Bióticos, Veracruz, México.
- Hernández Xolocotzi, E. 1985. *Lecturas en Etnobotánica*. Universidad Autónoma de Chapingo-Colegio de Postgraduados, México, D.F., México.
- Hernández Xolocotzi, E., and G. Alanis Flores. 1970. "Estudio morfológico de cinco nuevas razas de maíz de la Sierra Madre Occidental de México: implicaciones filogenéticas y fitogeográficas." *Agrociencia* 5 (1): 3–30.
- Hernández Xolocotzi, E.J., and T. Montes Meneses Gómez Hernández, and Teodoro. 1975. "Guía de la excursión y de las prácticas de etnobotánica." Paper presented at VI Congreso Mexicano de Botánica 21-26 de septiembre de 1975, Xalapa, Veracruz.
- Hernández Xolocotzi, E., and R. Padilla y Ortega, ed. 1980. *Seminario sobre producción agrícola en Yucatán, Gobierno del Estado de Yucatán*. Mérida: SPP, SARH y Colegio de Postgraduados.
- Hernández Xolocotzi, E., and A. Ramos. 1977a. "Metodología para el estudio de agroecosistemas con persistencia de tecnología agrícola tradicional." In *Agroecosistemas de México: contribuciones a la enseñanza, investigación y divulgación agrícola*, edited by E. Hernández-Xolocotzi, 321–333. Chapingo, México: Colegio de Postgraduados.
- Hernández Xolocotzi, E., and A. Ramos. 1977b. "Reflexiones sobre el concepto de agroecosistema." In *Agroecosistemas de México: contribuciones a la enseñanza, investigación y divulgación agrícola*, edited by E. Hernández Xolocotzi, 531–538. Chapingo, México: Colegio de Postgraduados.
- Hernández Xolocotzi, E., A. Ramos, M. A. Martínez Alfaro, and Miguel Ángel. 1979. Etnobotánica, in *Contribuciones al conocimiento del frijol (Phaseolus) en México*. Colegio de Postgraduados, México.
- Hernández Xolocotzi, E., and B. Solano. 1982. Proceso de producción agrícola en los aluviones bajos de Ocotlán, Oaxaca. In *Memorias del Simposio de Etnobotánica 1976*, edited by A. Barenas, A. Barrera, J. Caballero, and L. Duran. Instituto Nacional de Antropología e Historia, México, D.F., México.
- Hewitt de Alcántara, C. 1976. *Modernizing Mexican Agriculture: Socioeconomic Implications of Technological Change, 1940-1970*. Geneva: United Nations Research Institute for Social Development.
- Jennings, B. 1988. *Foundations of International Agricultural Research: Science and Politics in Mexican Agriculture*. Boulder, CO: Westview.
- Jiménez Sánchez, L. 1977. Los agroecosistemas, el desarrollo agrícola y el bienestar de la familia campesina en México. In *Agroecosistemas de México: contribuciones a la enseñanza, investigación y divulgación agrícola*, edited by E. Hernández-Xolocotzi. Chapingo, México: Colegio de Postgraduados.
- Lira, R., A. Casas, and J. Blancas, eds. 2016. *Ethnobotany of Mexico: Interactions of people and plants in mesoamerica. Ethnobiology*. New York, NY: Springer New York.
- Mariaca Méndez, R. 2001. "Agronomía mexicana: Andares de Efraím Hernández Xolocotzi." *ECOfronteras* 14: 32–34.
- Massieu, Y. C. 2005. "México y su necesaria Ley de Bioseguridad: Intereses económico-políticos y movimiento social." *Estudios Sociales* 14 (27): 59–91.
- Niño Velasquez, E. 1977. "Las interrelaciones sociales para el desarrollo." In *Agroecosistemas de México: contribuciones a la enseñanza, investigación y divulgación agrícola*, edited by E. Hernández Xolocotzi, 151–155. Chapingo, México: Colegio de Postgraduados.

- Ortega Packza, R. 2013. Vida y aportes del maestro Efraím Hernández Xolocotzi. *Revista de Geografía Agrícola* (50–51): 31–36.
- Ortiz Cereceres, J. 1977. Inter-relaciones ambientales de los agroecosistemas y su investigación. In *Agroecosistemas de México: contribuciones a la enseñanza, investigación y divulgación agrícola*, edited by E. Hernández Xolocotzi. Chapingo, México: Colegio de Postgraduados.
- Toledo, V. M. 1992. "What is Ethnoecology? Origins, Scope and Implications of a Rising Discipline." *Ethnoecología* 1 (1): 5–21.
- Toledo, V. M. 1995. "New paradigms for a new ethnobotany: Reflections on the case of Mexico." In *Ethnobotany: Evolution of a Discipline*, edited by R. E. Schultes, and S. von Reis. Netherlands: Springer.
- Wezel, A., S. Bellón, T. Doré, C. Francis, D. Vallod, and C. David. 2009. "Agroecology as a Science, a Movement and a Practice. A Review." *Agronomy for Sustainable Development* 29: 503–515.
- Wright, A. L. 2005. *The Death of Ramón González: The Modern Agricultural Dilemma*. Rev. ed. Austin, TX: University of Texas.
- Zizumbo, D., and P. Colunga. 1982. "Aspectos etnobotánicos entre los Huaves de San Mateo del Mar, Oaxaca, México." *Biotica* 7 (2):223–270.