Debate sessions: "Let's talk about food sovereignty and native corn"
Round Table 2: Food Sovereignty and Health
5 June 2025

(Transcript)

Gabriela Martínez

Good afternoon, welcome, everyone. Once again, we are very pleased to be here at the Casa de la Ciudad to discuss issues of global concern such as food sovereignty, health, and the right to healthy food in times of socio-environmental crisis. My name is Gabriela Martínez Aguilar. I have a PhD in Regional Development and am completing a research fellowship at CIESAS Pacífico Sur, in the field of Medical Anthropology and Health. CIESAS is a public research centre with seven branches throughout the country. We have one here in the city of Oaxaca, in the northern part of the city. For information on the current project and the results of the research and dissemination of the project, please visit the website "www.embodiedanthropocene.com", which will be projected here, and which we invite you to visit, as it is a very interesting learning and dissemination tool. In this project, we seek to understand how, in the current era, which some scientists call the "Anthropocene," the socio-environmental crises fostered by the capitalist and colonial system affect the health of humans and non-humans, of all living beings that participate in the fabric of life.

As part of this project, we are currently addressing the issue of food and agricultural production within the framework of global food issues, which are governed by unequal power relations influenced by financial interests marked by industrial and commercial treaties and legislation that do not always align with public health principles. We know that globalised food systems are central drivers of the climate and environmental crisis related to the Anthropocene, as racialised and colonial capitalist forms of industrialised food production continue to expand. Well, as a result of this, we as a team in Mexico decided to focus on the disputes over genetically modified corn and native corn within the framework of the North American Free Trade Agreement. As some of you know, in December last year, a panel of experts ruled in favour of US corporate agribusiness and biotechnology companies that create, produce and export genetically modified maize, including to North America, speaking out against the Mexican government's health and environmental restrictions and thereby undermining the biocultural richness of native maize.

To this end, on May 30, last week, we began a round table discussion that introduced us to reflections on the legal, toxicological, bio-agroecological and epistemic implications of this dispute, as well as genetically modified organisms, genetically modified maize, the public health crisis, the climate crisis, among other issues. Today, together with our guest speakers, we thank you for your presence and for joining us online, as we also have one of them, , with us. Together with them, we have this round table discussion where we seek to address, among other issues, the implications of GMOs and agrochemicals for the food system in Mexico, for human health and for other species.

In any case, what threats are posed to native corn, to its defence in terms of biocultural heritage, its significance in the lives and eating habits of indigenous communities, farmers and consumers in Mexico? And in all of this, the defence of food sovereignty comes into play. So, this is a brief introduction to this second panel. I welcome the speakers and give the floor to my colleague Paola Sesia to make the presentation. Thank you very much.

Paola Sesia

Thank you very much, Gabriela. Let me introduce myself. My name is Paola María Sesia. I am of Italian origin, but I have been living in Mexico for 40 years. I am a naturalised Mexican citizen and consider myself a Oaxacan by adoption and by choice. I am a researcher at CIESAS in the field of medical anthropology, and my colleagues and I are currently working on this project. Today we have a very rich panel with four experts in different fields, some of which overlap, but each with its own specificity.

I will introduce them one by one, giving them the floor, and when it is their turn, I will introduce the others. So, I will begin with a profile of Dr José Luis García Tavera, who is connected with us here. Dr José Luis García Tavera is a researcher for Mexico at the Secretariat of Science, Humanities, Technology and Innovation (SECIHTI). He is commissioned to the Ethnobotanical Garden of the National Institute of Anthropology and History in Cuernavaca, Morelos. In this space, he is developing an ecological restoration model for a riparian-marsh wetland using techniques based on the structure and dynamics of these ecosystems, including, as an innovation, agroecological production in chinampas and melgas as part of the water phytoremediation process. The system is testing crops with high nutrient demands, such as sugar cane, bananas and maize. For the latter, they are crossbreeding with native seeds to improve their agro-economic performance in Chinampa and obtain products with high market value such as grain and corn. His professional training is as an ecological engineer, master of science with a specialisation in toxicology, and doctor of science with a specialisation in marine sciences focused on ecotoxicology, environmental diagnosis of industrial pollution, and the restoration of soils and aquatic ecosystems. He has been a collaborator in the national computerised ecosystem of toxic agents and polluting processes of strategic national projects, known as PRONACES of Conahcyt, now SECIHTI, where he was a research professor and head of the Bachelor's Degree in Environmental Sciences at La Salle University. He has led responsible soil bioremediation projects in the field and began his professional career as an environmental inspector at PROFEPA and an environmental consultant in industry. His experience in agriculture with corn dates back to his childhood, and he has become fond of testing crosses with different breeds, improving organic nutrition schemes, and controlling damage by phytophagous insects through ecological management. Welcome and thank you for being here on this panel today. If you'll allow me, , I'm going to ask you the questions we agreed on with you, so that the audience here and on YouTube can also understand what we're talking about. Starting with whether you can answer us in 10 minutes, because the first round will be 10 minutes each. These are basic but important questions for the audience:

- What are genetically modified organisms in transgenic crops? Why do these crops use chemicals? For example, glyphosate. In what types or purposes of human and non-human food are genetically modified organisms and agrochemicals currently present, and how have they become part of our food system in the context of Mexico?

And if you have time, what are the main threats that genetically modified corn can pose to human and non-human health, and what health risks does the use of agrochemicals entail? Don't worry, it's only 10 minutes, but we have a second round after the first where you can add, supplement, and share with us anything you may have left out. Thank you.

José Luis García

Okay, thank you very much. I will try to keep to the time limit, so I will just briefly share the questions with you so that we can get our bearings, and you can already see the screen. What are GMOs and transgenics in crops? Well, as we discussed a little in the previous session, they are organisms, species that have been genetically modified, but in an unnatural way. We can talk about genetic improvement in the case of hybrid development, which is based on crossbreeding and selection, but in this case it is not just genetic improvement in this sense, but rather, artificially, let's say, the genetic expression is reprogrammed by inserting a gene foreign to the species, which is the most common, which are transgenics, or genes from the species itself, which is the case with cisgenics. The latter are really just in development, they are not on a commercial scale. However, transgenics are already commercially available and have been for several years, several decades in fact, since the 1980s, and in this area the most common and commercially successful ones have been those with inserted genes that confer herbicide resistance. This gene synthesises an enzyme that helps metabolise the herbicide and prevents it from damaging the plant. This gene comes from a microorganism, a bacterium. And in the case of insect-resistant genes, which also come from a bacterium and synthesise a substance that is toxic to insects. These have been known commercially as RR, *Roundup Ready*, ready to resist glyphosate, and Bt, which is *Bacillus turingiensis*, are typically the acronyms that characterise these crops. Why do they use agrochemicals? Well, one of the historically relevant conditions in determining crop yield is the ecological interaction they have.

Crops are grown in agroecosystems, but there is usually only one species of interest, just one; however, there are ancestral techniques that still persist where polycultures are grown, the species of interest may be one, but there are other species that are also exploited within the same crop. But in the case of monocultures, this interaction with other species is costly, let's say it generates a cost in terms of yields, in terms of production, of harvest, because the species is sharing resources, it is sharing water, it is sharing nutrients, it is even sharing the space where it has solar radiation available, photosynthetically active radiation, which is what makes it produce its own tissues, and in the case of monocultures, this occurs with vegetation, with plants known as weeds, plants that arrive spontaneously. We could say that they are part of the ecological succession after the disturbance that preparing the field for sowing represents in ecological terms, and these plants begin to compete with the crop in the terms I have mentioned.

The other strong competition is... well, not competition, but rather strong ecological pressure, which comes from phytophagous organisms, the little bugs that feed on the plant, which can be anything from butterfly or beetle larvae to grasshoppers, a wide variety of invertebrates that feed on them. And that is why, in this case, the most successful GMOs have targeted these two points in particular. Resisting herbicides, herbicides actually damage any plant, they even damage other organisms, but anyway, speaking of plants, we have herbicides that can be considered selective, but selective in the sense of management and they are still really toxic. And others that are not selective, that are very, very strong in their action and definitive, and that is where the characteristic of herbicide resistance comes in in the case of GMOs such as maize, which are RR, which are *Roundup Ready*, resistant to glyphosate in particular. So, this gives you the advantage of being able to manage your crop with the freedom to apply the herbicide to the plant of commercial interest without harming it. In the case of BT, a transgenic that causes the plant itself to produce a toxin for the organisms that feed on it,

mainly phytophagous, right? But, in reality, it also affects other organisms that are not necessarily the target of this protein.

Now: in which crops for human and non-human consumption are genetically modified organisms and agrochemicals found, and how are they part of our food system? Virtually all commercial crops use agrochemicals, and to a greater or lesser extent, agro-inputs. The main ones are synthetic chemical fertilisers, fertilisers formulated specifically for the crop and also formulated according to the characteristics of the soil where they will be applied. The other major agro-inputs are pesticides. As we just mentioned, depending on where you are planting, the pressure from weeds is greater or lesser, depending on the season in which you plant as well.

Typically, winter crops do not compete as much with weeds or insect pests, while summer crops typically do. It also depends a lot on fertiliser application protocols. How much trouble will you have with weeds and other pests? Why? Because the more fertiliser you use to maximise the genetic potential of your crop, the more you are also giving other plants the opportunity to grow. So, typically, if you used fertiliser, you will also have to use herbicides and insecticides. Insecticides too, because many pests thrive on the over-nutrition that fertilisers give to crops. That is why I put here to emphasise that fertilisers are not typically seen as directly toxic, but they are the main reason why toxic substances are used. This does not mean that there is no rational management; there can be rational management, but typically it is not done. Typically, the aim is to achieve the highest possible yield, and that is what encourages the use of these substances.

When it comes to GMOs, GMOs here in Mexico, well, in general around the world, it is not easy for us to know how many GMOs are grown and how much of them is available in the markets. Here in Mexico, permits have been granted for cotton, soya, canola, alfalfa, and lemon, but the amount of these crops available on the domestic market is not public information, and in fact, it is not known exactly how many of these crops are grown for commercial purposes. However, they do exist, and they are mainly the ones I have mentioned.

Now let's move quickly on to the following: what are the main threats that genetically modified corn can pose to human and non-human health? Well, there is a significant gap in research here because the subject itself is complex. GMOs have a certain deregulation in the genetic expression of other proteins, right? We do not know exactly which ones, how many, when, or how. There may be some instability in the expression of these proteins, and that changes the final composition of the food. This can lead to sensitivity, allergic hypersensitivity to these foods, and could eventually reach certain levels of toxicity. However, there is very little evidence regarding these health effects. Therefore, in accordance with the precautionary principle, we should keep these products off the consumer market. Now, although the modification *per se* does not include agrochemicals, they are used more, as we have seen, and this can lead to these foods being much more likely to have higher concentrations of agrochemicals once they reach the final market.

Paola Sesia

Thank you very much, José Luis. There will be time to return and conclude. We will now move on to the second presentation, to our second participant, and it is with great pleasure that I will quickly read the profile of Dr Alejandro de Ávila Blomberg, which is as follows. His family roots are intertwined from Oaxaca to San Luis Potosí and Finland. He was born and raised in Mexico City. He

earned a bachelor's degree in anthropology and physiological psychology from Tulane University in New Orleans, followed by a master's degree in psychobiology and then a doctorate in anthropology from the University of California, Berkeley. A researcher for Mexico, like José Luis, he is the founder of the Oaxaca Ethnobiological Garden, which he proposed in 1993 at the invitation of the great master Francisco Toledo. To date, the garden has a collection of more than 7,000 living plants representing nearly 1,000 species native to the state, along with a herbarium, a seed bank, and a specialised library. The garden also protects resident populations of various animal species and is now starting a mushroom collection. Alejandro is also curator and advisor to the Oaxaca Textile Museum, where he has assembled a collection of just over 10,000 pieces from the same state, as well as from other regions of Mexico and other countries around the world. He is currently collaborating on the creation of a new museum of national importance in the Casa del Marqués del Apartado, just opposite the Templo Mayor in Mexico City. His love for plants and indigenous peoples began during his childhood, when his family lived near Chapultepec and the National Museum of Anthropology. As a teenager, Alejandro became an apprentice in a handmade tablecloth workshop in Oaxaca, where he taught himself to work on the loom with patience and imagination. Alejandro, thank you for being here with us. I am going to ask you the questions we agreed on:

- First, we are making a quantum leap from genetically modified organisms to native corn, so: how can we sustain the legal defence of Mexico's native corn in terms of biocultural heritage, and what implications does the complex ecological and cultural history of corn have for its future as a food and as a component of more resilient and equitable agrosystems? You have the floor. We will give you two minutes before the ten minutes are up. And remember that there is a second round.

Alejandro de Ávila

Thank you very much, it is an honour for me to participate in this event. We should congratulate ourselves. We are part of a new model of intellectual collaboration, stimulation and dissemination, which links us from Oaxaca to London and Brazil. I find this unprecedented. I congratulate the organisers, I think it is an extraordinary achievement. I would also like to mention at the outset that we are together in the house of my great-great-grandfather, the house of Vicente Cervantes, which was the house of my great-great-grandfather, and that is where I learned to weave, as Paola mentioned. Paola was shocked that I have 70 images that I want to share with you. I am going to speak very quickly. I did not want to scare anyone. Most of them are to illustrate points that will go by very quickly, and if there are any questions or doubts, we will try to address them in the second round.

If a Martian were to arrive in Mexico, the first thing that would catch their attention when seeing the vegetation, the ecosystems of Mexico, would be the number of thorns on different groups of plants. We are used to seeing them on cacti and maguey plants, but we also see them on tropical plants such as ceiba trees and many palms. At the same time, the Martian would be amazed at the number of large, juicy, sweet fruits that are part of our flora. Not only sapotes, cuajinicuiles, avocados, but also plants with fruits that are not edible, but which respond to what an ecologist to whom I pay tribute, Daniel Janzen, taught us since the 1980s. He published a work that I highly recommend, which has not been translated, on the fruits eaten by gofoterios. What are gofoterios? These animals were part of the fauna of our Mexico. They were not exclusive to Mexico, but were widely distributed throughout the tropics of this continent. However, in our Mexico, there was an

extraordinary megafauna, a diversity of large mammals greater than what we find today in East Africa, which is the reason for photographic safaris. How is the ancestor of corn related? It is related to this megafauna, to this ecology full of thorns, in a very interesting way that we do not see explained in publications. This is something that I have deduced and shared, and if you have already heard me, please bear with me. I will try to explain it very briefly.

This is a quote: "In areas of thorny forest today, abandoned cornfields are very quickly invaded by *teosinte*, which is the wild ancestor of corn that grows up to 2 metres tall." Here we see images. in fact, the person here in the following image is Dolores Piperno, a great researcher on maize. If we have time in the second round, we will talk about her work. "Annual teocintles" — I quote again — "are pioneer plants that colonise natural scars in the landscape such as fallow cornfields, but especially unstable slopes where the soil collapses or areas opened up by fire". But in the tropical forests of Mexico, fire is not part of the natural dynamic, so what can we attribute these natural scars on the landscape to if not fire? The answer lies in megafauna. Although we no longer have them, the ghosts are still with us. Elephants in East Africa and also in South Asia are tree destroyers. And this is very well quantified. Elephants knock down trees six times more often than would happen naturally. Understand, this covers 20% of the range from 5 to 8 metres, which is the range of the tropical deciduous forest. And if there is only one species of elephant in Africa, in Mexico we had four. Imagine what this means in terms of dynamics. Well, but Daniel Janzen, apart from relating the fruits, due to the dispersal of these large mammals, the characteristics of these fruits and the thorns that protect them are related to this megafauna, published a second paper years later where he relates plants similar to *teocintles*. He does not include teocintles in his discussion, but we can infer this from what he observes.

First, note that plants germinate in elephant dung, as documented in this photograph taken today. A small tree is growing in elephant dung. This is referred to as *endozoochory*. Forgive me for throwing in some terminology, but I think it's a nice term and I hope it sticks. What is *endozoochory*? The dispersal of seeds or spores, because ferns and fungi do not have seeds, when they are ingested by animals that later defecate them in their excrement. Plants with small seeds associated with dispersal by *endozoochory* have a number of characteristics, which I will not highlight all of, only those in yellow. First, they lack toxic defence compounds. Secondly, they are plants that protect their seeds. We see this in teocintle. And here I would like to make a reflection, a first observation, that the absence of defence toxins, a trait associated with seed dispersal by *endozoochory*, may explain the harmlessness of maize, which our colleague Ana Wieger referred to in the first panel of this symposium.

And if you did not see this first panel, we highly recommend it. It was extraordinary. Well, so that is a first observation. A second observation: *Teosinte* seeds have very hard shells. You need a hammer to crack them. You will break your teeth if you want to eat *teosinte,* which is a very interesting observation.

Another line of research stems from what we derive from Janzen's work. Two different teams, working independently, observe that maize and its relatives have evolved very rapidly over the last 200,000 years, which is unusual. The first team was from California, and the second was in China, and they reached the same conclusion: that maize and its relatives, let's say wild maize, are part of a lineage that evolves very rapidly.

Let me introduce another colleague, Robert Spengler, from Germany, who is continuing the work begun in the 1980s by Dan Jenzen. He makes the following observations: "Rapid annual growth, self-compatible pollen and ovules, a substantial investment in reproduction, high genetic plasticity and rapid evolutionary capacity are an adaptive syndrome precisely for seeds dispersed by large mammals." Well, *teosinte* fits very well with what they are describing.

The second observation is that *teocintle* plants themselves, their reproductive physiology and genetics show traits typical of dispersal by large mammals, now extinct.

And how did these animals become extinct? We now know that, in essence, it was due to climate change. How do we know this? Because this extinction of megafauna occurred at different times as humans arrived in Madagascar, Australia, etc. Therefore, we need to look at this as a recurring cultural process that occurred at different times in different regions of the planet and that we can visualise as an early prelude to the Anthropocene.

What's up with *teocintle*? Why would anyone start cultivating it if it has such a hard shell, even though it doesn't contain any toxic compounds and you have to break it open with a hammer? It has been suggested in the literature that perhaps they ate it by popping it like popcorn. We tried it, but in our experiment it didn't pop. And even if it did pop like popcorn, imagine eating popcorn that's full of hard shells, which are protection against megafauna. Well, that's not desirable. There is a hypothesis that I find very accurate, and I think it gives us an explanation. These are colleagues in British Columbia, Canada. This is published in *Current Anthropology*, not in a biology journal. And what they propose is that it was the reeds that caused the existing domestication. The sweet cane would be squeezed and the juice used to make *tepache*, which would be fermented. This would be social life. It is a purely cultural motivation. It is not that they were hungry and that is why they began to cultivate teocintle, they wanted to get drunk and socialise. I think that is very much in line with human nature.

So, the fourth observation is that, along with the megafauna, it was human communities that spread *teocintle* and began its domestication with a cultural motivation apparently linked to their social and cultural life. What about what is happening in Oaxaca? Well, in Oaxaca we have the earliest remains of the transition process from *teocintle* to maize. We see this in charred remains, which are the earliest found so far here in Mexico. But we will see that in the second round, which completely changes the picture. Thank you.

Paola Sesia

Thank you, Alejandro. We have listened to you very carefully. Let us now move on to our third panellist, Dr Abelardo Ávila Curiel. Thank you, Abelardo, for coming from Mexico City to join us today. Abelardo is a surgeon who graduated from the Faculty of Medicine at the National Autonomous University of Mexico (UNAM). He holds a master's degree in Social Medicine, specialising in Epidemiology, from the UAM, Universidad Autónoma Metropolitana. He completed his doctoral studies in Social Sciences, specialising in Population Studies at the COLMEX ( ). He has been a researcher in Medical Sciences at the Salvador Zubirán National Institute of Medical Sciences and Nutrition since 1988. His main areas of interest are research into the nutritional situation in Mexico, child malnutrition and health damage caused by chronic diseases associated with poor nutrition, as well as the development of epidemiological intelligence computer systems. In 2019, he received the

Gerardo Varela National Award for Merit in Public Health from the General Health Council. In 2023, he published the book "The Social Construction of the Mexican Health System." Thank you very much, Abelardo. And with Abelardo, we take another quantum leap. The questions we have prepared according to his areas of interest and expertise are as follows:

- Abelardo, following the ruling in favour of the United States in December 2024 by the USMCA Commission in relation to the genetically modified corn-native corn dispute, and now in the current context of the US government's protectionist onslaught and Mexico's dependent links to the United States in its food system and, of course, in its trade relations, we would like to ask you: what threats and what possible opportunities are emerging for Mexico in promoting its population's right to healthy food in the context of these bilateral relations? In addition, there are other questions that are also very complex, but go beyond these bilateral relations: what threats and opportunities do we face in terms of promoting food sovereignty in the country? You have the floor, Abelardo. Thank you again for being here.

Abelardo Ávila

Thank you very much for being here, for my homeland. In fact, perhaps a group of my ancestors participated in the feat of domesticating corn in the Mixteca and Apoala regions, so I am very proud of that. Regardless of the subtleties of the transformation of *teocintle* into corn, once corn was transformed, an impressive demographic revolution took place. Historical demographic studies indicate that in what we now recognise as Mesoamerica, there were nearly 30 million human beings when the Spanish arrived. This is impressive and speaks to an extraordinary agroecological feat to be able to sustain that population... It is truly a feat that was not achieved again in the country until 450 years later. There was genocide on the part of the Spanish, which meant a demographic catastrophe where more than 90% of the population declined with extremely high mortality associated with epidemics, hunger, destruction and slavery. This meant that taking refuge in the cornfields became a matter of basic survival, of surviving in precarious conditions and scarcity, and making a series of cultural adaptations, a series of adaptations in survival strategies in order to sustain the population. Our genes adapted in a process of mutual enamourment between the domestication of maize and the formation of polymorphisms in our genes that were the product of that dynamic of feeding ourselves, increasing the probability of survival through better use of the nutrients we were eating, and we were also modifying the crops of maize, beans, squash, in short, all of the milpa. It is a very beautiful process that we must not lose sight of because it leads us to the logic of what are the current alternatives to face this new demographic catastrophe represented by the food crisis generated not only by food shortages—which in many parts of the world and the country are still present—but also by the transition to a food model based above all on the economic interests of this infamous part that is the Anthropocene, the Capitalocene. In other words, we cannot blame human beings in the abstract for our capacity to destroy nature and destroy ourselves in the process, but rather it is specifically the set of power relations, the set of relationships of economic subordination and economic interest that merge into an entire agro-industry and a complete transformation and destruction of the agri-food systems of the milpa that can be friendly to nature, to wildlife, to life, to culture, to the aesthetic beauty of human society, and which are currently being extraordinarily destructive to human health. If we have a specific biogenetic makeup, a very similar makeup that allows us to feed ourselves very well on maize and beans, to be healthy, not have chronic diseases, have high intellectual and physical performance, and also adapt to our entire

culture, our entire cultural, historical, and emotional life, for the family, the community, our traditions, our songs, our dances, our clothes, which are always associated with this system of agroecological wisdom.

However, from the very beginning, the first aggression was the introduction of sugar, sugar crops and the slavery that came with it in America, Africa, the Caribbean, and especially in parts of Mexico, very important parts where, in that first phase when sugar began to be introduced as a central component of human energy consumption, which occurred with the refining crops of the sugar mills from the 17th, 18th, 19th, 20th centuries and today, is now closely associated with the cultivation of genetically modified corn, and high fructose is a product derived from the cultivation of genetically modified corn. It no longer comes from sugar cane. I am not going to explain the terrible damage that high fructose causes to health, but rather all the mechanisms that were devised and that have to do with the controversies of the trade panels, Mexico's defeat in its attempt to eliminate the cultivation of GM maize and, therefore, also the production of this type of substance.

Currently, for example, Mexico is one of the countries, if not the country, that consumes the most added sugars in its diet. Nearly 30% of the calories consumed by our children come from added sugars, refined sugars. When one considers all the metabolic damage that this entails, that is, consuming and replacing breast milk with Coca-Cola in baby bottles, as is happening in a terrible way, both in Chiapas and here, as well as in Yucatán in indigenous communities, when we see how we are, for all practical purposes, the country with the highest rate of childhood obesity. In a population that has these wonderful genes, I spent years searching for polymorphisms, for the genes associated with metabolic damage in children. I found some genes that seemed very bad because they were associated with metabolic damage in obese children. We thought they were the genes, but those genes are the good genes, the genes for corn domestication, which, when instead of consuming corn, they consume this type of food, damage us metabolically. That is why we have the highest rates of obesity and obesity growth. That is why 600,000 Mexican died from excess mortality in the pandemic, and that is why we are suffering these health consequences, which also make it a food system associated with everyone, the pharmaceutical industry, the medical model, and the universal health trade. I believe we should always keep this reflection in mind so that we can see the problem in all its complexity and not simply reduce it to risk factors or episodes that can be quickly assimilated into the narrative that the individual is responsible for their own harm.

Paola Sesia

Thank you very much, Abelardo. I'm sure you'll be able to explore the questions and issues in greater depth in the second round. We will now move on to the last presentation of the first round with Dr. José Luis Chávez Servia. He is a professor and researcher at CIIDIR Oaxaca, part of the great National Polytechnic Institute. I understand that he is an agricultural engineer, but not a conventional one. Thank you very much for being here. The questions we have prepared, because I know you are a great defender of native corn, are as follows:

- Beyond legal and commercial intervention, in your opinion, is the ban on genetically modified maize sufficient to defend native maize? What other socio-political initiatives and actions should be promoted or are currently being promoted? In particular, what role do organisations and social movements play in actions such as the defence of food sovereignty and the evolution of agroecology in the current context of the defence of native corn? Over to you, José Luis.

José Luis Chávez

Yes. Well, thank you for the invitation and the questions. I wish I had the answers. I don't have the answers, I don't have the answers, I can tell you that in advance. What I do have are comments, as I put it, a couple of comments that I would like to share, perhaps because we all have a bias in our assessment and I am responsible for my own bias, I say this in the sense that I am going to give the presentation. I tried to take the questions as a starting point for my comments, and perhaps there are more questions than one might imagine. So, in relation to the first one, I took it as a starting point: if there is a ban on genetically modified maize, what do we do to defend native maize? For this, for that, I may seem a bit rude for what I am presenting here, but perhaps it will be the only opportunity to read the recent amendments to Articles 4 and 27 of the Constitution verbatim, and I reiterate that it may be too much to ask, but at least let it be read in public once. I am not going to read it here so that you can read it, but in essence, the law is based on these principles of defending native maize.

The first principle establishes that corn cultivation in the territory must be free, which is very strong, it must be free of genetic modifications. And from there we already have a problem. Who guarantees that everything that is grown is free of transgenes? Who guarantees it? From there we already have problems with the general context. Obviously, they tell us, on the other hand, there is quite a lot of text here, but I am guided by the rest. The protection of biodiversity is prioritised, which is still quite strong. What are the protection mechanisms? How? What are the strategies? What is the programme? What do we have in this regard? The constitutional text also states that we are going to promote scientific and humanitarian research. Well, we have been doing that for centuries. So, this is just an excerpt, I just want you to see it as an excerpt.

On the other hand, part of the text tells us that the State will promote the conditions. I will just leave it at that. Perhaps it provides some elements, gives priority to native seeds, and especially mentions what our colleagues have already said, in particular, the milpa system. But the challenge, the challenge is greater: the infrastructure, the inputs and everything you can imagine that is part of this historical debt to the peasantry in Mexico. That is the historical debt we carry. It is no *small matter*. I put it that way literally in the text, for the sake of provocation.

But now, when I turn to the local level, I say, how is this going to be implemented? SADER in Oaxaca is promoting improved seeds, introduced seeds and so on. And the question is: what about the promotion of native corn? Where do we leave that? Promoting improved seeds is an official action, it is an official programme here in Oaxaca. I'll just leave that there for your own reflection, if the official institution is promoting this, then I'm left with the question.

Well, then, where could we get involved a little? We still lack all the legislation and secondary law, we still lack all the regulations where things can be done; that is, the legal regulations below the Constitution. So far, with this question in mind, I have dedicated myself to finding out which states are promoting native seeds, where there are official programmes for their promotion, but I have not found any at the national level.

Well, and I emphasise this point: who can guarantee that the improved varieties being distributed in Mexico, I stress, who can guarantee that the improved varieties being distributed in Mexico are free of GMOs? No one, because the question has not even been asked. Because, in addition, this is

already our evidence, in a project we collaborated on with monitoring between 2000, 2023 and 2024. In one of the samples, we detected that the seeds being distributed by a seed company contained transgenes. That is already part of the context here in Oaxaca. So, the issue is not a minor one. On the other hand, I would say that we do not know our native corn either. But well, I have had technicians visit me who do not know the difference between native corn and improved corn. I will leave it at that.

Right, next question. What socio-political initiatives and actions can we implement? As I mentioned, we have to get involved in secondary legislation. Those of us who are involved in this are obliged to do so. The second thing is what I just mentioned: if consumers are not familiar with native corn, I think we have a huge task ahead of us—and I actually call this "information dissemination." We have to inform and educate at all levels. In other words, if we can't tell the difference between a MASECA tortilla and a native corn tortilla, we're screwed, pardon my French. Well, then I say, if we don't know anything about what is native, how are we going to defend it? We have to socialise all that information, and here I am willing to socialise all these elements. We can say that there are many corn products that have been tested, to give you one example. We have researched here with the working group and other working groups the nutritional value of native corn throughout the countryside and we have tackled new things. We are all doing work and it is good that many groups are doing work. Now, we must always recognise the contribution of indigenous peoples in the conservation of native varieties. And we have to make that visible too. It is necessary to make it visible. Who can tell us about our traditional recipes? That rescue is necessary; a revaluation and rescue of all knowledge is necessary. There is a lot of work to be done there, enough for a lifetime.

On the other hand, what we have found to be "echoed" is that municipal initiatives and ordinances are beginning to take hold. We have to make them visible, we have tried some and I think that's where we can get started. In general terms, we have mainly found this in municipalities that are governed by customs and traditions, as we commonly call them (which does not mean that others are not); at least there, we have found a lot of echo. Obviously, regulations at the municipal level can be issued, and they can do so. And we can make declarations; some municipalities have already proposed that I make declarations of GMO-free municipalities. Well, I will quote some notes here: "the expert knows a lot, but has never planted a piece of land alone".

On the other hand, organisations have their own survival agenda, not necessarily with native corn. Their main focus is on generating survival and resources, which is understandable, I get that, but there has to be more, we have to work harder. And finally, just give me a minute, finally, this transition from conventional, traditional agriculture to ecological and organic agriculture is still very costly. It doesn't happen overnight. It's not like next week I'll be an agroecological farmer... No, because it involves a whole doctrine or a whole way of thinking: it can take 10 years for some, but above all, I tell you this with full knowledge of the facts, as the son of a farmer, my immediate family lives off the land, transitions in the countryside are sometimes hard, nothing is done overnight. I'll tell you, some of my brothers and I have been at it for 10 years, 12 years, and we still can't get to the other side. Thank you.

Paola Sesia

Thank you. Thank you very much, José Luis. We will now move on to the second round. Due to time constraints, as we started a little late, I would say 5 minutes each. We'll start with José Luis García,

who is connected. José Luis, if you would like to add anything that you may have left out in your first intervention, or if you would like to contribute your own opinions and knowledge to other questions that were asked to other participants, whatever you decide and whatever you prefer. The microphone is yours.

José Luis García

Thank you. Well, I'll just round off the last part I left out and try to put it into context with what has just been said. The last question referred to "the health risks involved in the use of agricultural inputs". Well, here I would like to emphasise that all pesticides are intentionally designed and formulated to destroy life. And in this sense, it is not unreasonable to think that a molecule that has these effects on a plant h r insect could have a cross-effect or biological activity at least in humans and other organisms that are not precisely the target of these substances, right?

This is especially important in the use of hybrids and particularly serious in the use of GMOs. GMOs ultimately depend on their use: the success of using GM seeds depends on the use of these substances precisely in order to achieve those yields. Something that José Luis just mentioned, which I think is very important in terms of defining public policy around maize, is that we may have, off the top of my head, two scenarios: one, the scenario of the producer who is geared towards production, towards the agribusiness and food industry market, and the other, the small producer or farmer who grows crops to survive or for local markets, nothing more. These are two very, very different agronomic management schemes. The first is highly dependent on all these inputs, and the second is not necessarily so, although it does use them. I have come across many small plots of land belonging to farmers who do use so-called liquids to seal weed emergence or to control pests, often because of the degree of ecological deterioration in which the agroecosystem is immersed.

However, this management is not the strict management applied to production aimed at satisfying industrial demand. And well, that is what I would like to point out, it is the complex scenario that can be seen in the crossbreeding that can occur in maize. We know that GMOs are already present in many of the seeds used nationally, and we want to think that this was unintentional, accidental, but at the same time it was not. I agree that there is no conservation policy, no formal policy for the conservation of native corn varieties that is serious enough to make this a reality. And this, it seems to me, is the critical part. The criticism has to do precisely with these market pressures.

Mexico has been under pressure and is currently under a lot of pressure at the governmental level, including to achieve self-sufficiency in corn. And in those terms, there is a lot of pressure on productivity and yield. Yields of 2 to 4 tonnes per hectare are now seen as totally unviable. It is no longer commercially viable for any producer. Yields of over 10 tonnes are being sought, and these yields are achieved with significant consumption of agricultural inputs, right? You invest more, but you are forced to produce a higher tonnage so that the industry will buy it from you, right? It is basically a yield for the food industry. It is not designed for high-quality tortillas, it is designed for the machines that will make the flour, to facilitate the industrialisation and commercialisation processes of this input. I think that is a rather critical situation when it comes to defending native corn. Although there are small markets, let's say gourmet markets, for native seeds and agroecological techniques, the extra cost required to make these crops profitable often discourages many producers from turning to them. This has meant that efforts to conserve native seeds are sometimes amateur efforts.

Paola Sesia

Thank you very much. We will now give the floor to Alejandro with his 55 remaining slides, or whatever Alejandro decides to share.

…

Alejandro de Ávila

Look, we have these charred remains in Oaxaca, but it is not yet a cob, it is something in between teocintle and corn as we know it. This is consistent with a crop not grown for its seeds, but for its juice, for fermentation, which seems to be the motivation. Some time later, because the discovery of the Guilá Naquitz cave, just 40 kilometres from where we are now, dates back between 6 and 7 thousand years before the present. It is slightly more recent than the San Marcos Cave in the Tehuacán Valley. Here, we have more recently excavated remains where deoxyribonucleic acid, the molecule of heredity, is sequenced, something that could not be done in Guilá Naquitz, and the study indicates that these materials retain genetic traits of teocintle. There is no cob. These researchers characterise this plant as "incipiently" domesticated; that is, it is not the maize we know today.

These data lead us to the question: what is happening here? The oldest thing in Mexico is not corn as we know it today. The question becomes even more pressing thanks to the work of this extraordinary researcher. I am impressed by what I have read about him. Miguel Vallebueno-Estrada. Miguel Vallebueno has been working with Peruvian colleagues, and last year they published this work based on findings at a site called Paredones, on the north coast of Peru. How are the cobs? These Peruvian cobs are older than anything found in Mexico. So what is going on here? Well, this particular discovery is the oldest, and this specimen (Par-N1) is so far the oldest specimen, approximately 500 years older than the remains found in the Guilá Naquitz cave. Significantly, it shows a genetic sequence without introgression, that is, without gene flow from highland teosinte. All other maize sequenced to date shows introgression from highland teosinte maize. Therefore, these samples excavated in Paredones, on the north coast of Peru, which are approximately 7,000 years old, many years before Guilá Naquitz, indicate that maize had arrived in Peru at that time, via a rapid migration route along the Pacific. What these authors do not say, but what I assume, is that along this route, maize must have been subject to selection, a posteriori.

Now, we also have data from an intermediate site, which is what I am showing here: the Gigante Cave in south-eastern Honduras, where we have work from a team led by a colleague and friend of mine, Raúl Kennet, who has been sequencing an impressive amount of maize remains, much more diverse in terms of dating than those from Peru. The study of these remains in this cave confirms that there were two waves of crop diffusion from Mexico to the south, but also diffusion back again. That is what is incredible. Not only did maize travel from north to south, but it also returned.

The corn cobs from this cave indicate that in South America, where domesticated maize had already arrived at least 7,000 years ago with the first wave, the crop was subject to further selection, which fixed more desirable characteristics for human consumption. What characteristics would those be? Well, larger grains and longer, thicker cobs. This could have happened more easily in Central and South America; we think that the cob is probably not a Mexican result, it probably occurred outside

of Mexico, because there would be no introgression there, no genetic flow from wild plants that would dilute the desired characteristics through selection.

So, fifth observation, and I'm almost done, the genetic evidence provided by recent archaeological findings indicates that the history of maize links ancient Mexico closely and complexly to the cultures of the South. We are not isolated, we were never isolated. And this is reflected in our extraordinary diversity.

The sixth and final observation. The great diversity of native corn varieties, which agribusiness continues to seek to appropriate, as Aldo González highlighted in the first panel of our symposium, is the result of this long relationship between the indigenous peoples of Mexico and the cultures of Central and South America. It did not occur solely through local selection processes. This is what recent archaeological data shows us, and this process is linked to the formation of the cultural diversity in which Oaxaca is embedded. We can address this further with questions from the audience.

Now, here are the conclusions I promised.

First conclusion: the genetic modifications of maize by the agro-industry reveal ignorance of the complexity of its domestication as the most transformed and humanised plant on the planet. Second conclusion: this ignorance of the history of maize translates into damage to human and ecosystem health, as we have heard today and heard at the first panel, in addition to constituting a cultural crime that has yet to be punished. It is good that we heard José Luis Chávez's presentation, in which he quoted the constitutional articles that refer to this reform. There is no mention of cultural damage. It is yet to be defined. And the legislation that protects cultural rights, promoted, incidentally, by a senator from Oaxaca whom you know, does not mention maize. Final conclusion: in the future, maize may resume its course of evolution and diversification, of renewal and decolonisation, because colonisation does not encounter these geographical barriers that we think are immovable, and of decolonising the interaction between peoples of the north and south. Thank you very much.

Paola Sesia

Thank you very much, Alejandro. We now give the floor to Abelardo Ávila for his remarks.

Abelardo Ávila

Apart from the recognisable historical ignorance being promoted by agrotechnological corn executives, we must acknowledge their enormous capacity to destroy agroecological systems and impose their food model. , if one looks at the change that has taken place in eating patterns, which is very well documented in health and nutrition surveys, they have achieved what seemed impossible, reaching a level of irrationality, against all scientific evidence, even relying on pseudoscientific evidence, which is evidence paid for so that researchers arrive at the industry's conclusions in advance. The food industry has achieved fiscal feats of transferring public money to its industrial assets and has had the ability to shape the entire fiscal design of the Mexican State and the States of other countries, but now we are talking about Mexico, so that, for example, instead of paying taxes, FEMSA can open an OXXO every eight hours with tax consolidation deductibility, with all that that represents. And that is hundreds of billions of dollars constantly flowing into the agri-

food industry, mainly based on these agrotechnological models, many of them associated with high fructose, with junk food. Very little is understood, and very little is analysed from this point of view. The challenge is to see it as a structured system, not just as something we are rebelling against. We need to analyse it thoroughly. And it is also important to know that there is active resistance in Oaxaca: the "Oaxaca sin Chatarra" (Oaxaca without Junk Food) campaign, which is a very respectable movement, part of the Alliance for Food Health, and which was also expressed in the 17-year battle for the Adequate and Sustainable Food Law a year ago, which is worth reading. as it contains many elements that are very useful for this resistance in principle and for the conception of alternatives that have human well-being at their core.

Paola Sesia

Thank you very much, Abelardo. José Luis:

José Luis Chávez

Okay, following the line that our friend just established here, I remembered the subsidies that MASECA used to receive. It no longer receives them, but now it has what they call 'administrative facilities'. Around 193 million pesos a year. What I want to point out and continue to emphasise from the few points I put on the table. Too much is being asked of small producers. That is, from a Western perspective, small producers are being asked to generate income. That is a very biased view, in my opinion, because our history shows that their first priority is to feed their families. And in that sense, we are the ones who are screwed, because they somehow manage to feed themselves. Several studies have documented that a quarter of a hectare or less provides enough food in the milpa system for a family of five, enough for the whole year. What do you want that producer to produce for the market? That's another thing, that's a different vision from the one we bring from history. In other words, don't ask this small farmer to produce for export, don't ask this small producer to send his product to different regions of the country. No, no. The vision is a little different. From the community, communities meet their needs in a very collective and interesting way. I think there is another area that needs to be explored with great precision and that needs to be worked on. I think there is more science, yes, but we also have to change our views on how we are approaching things. That is where I would like to end my speech.

Paola Sesia

Thank you very much. We will now move on to the last phase of today's round table and we would like to open up a space for those of you who are with us to ask questions to the panellists. OK, so the question would be: is there anyone who would like to speak, if you have any questions, any doubts, any comments you would like to share? If you could stand up, and the only, let's say, technological requirement would be if you could come closer, because we have a double microphone for the YouTube broadcast. Is there anyone who would like to speak? Ana, please, if you can. Yes, please. Thank you.

Audience participation

Thank you very much. My question has to do with, let's say, it's an open secret and I've seen it in various non-scientific publications, because I don't know about these publications, that genetically modified corn has health implications, and yet I've also seen in the media that the argument that

we lost, let's say the panel with the United States, is that we couldn't provide scientific certainty about the damage caused by genetically modified corn, so I wanted to know: why? I mean, is it because there is a lack of research to measure the effects it has on human health? Or what is the reason? Because somehow we all intuitively know that we do not want to consume this other corn because it harms us, but what is needed for us to get there and be able to prove it? That is my question. Thank you.

Paola Sesia

Thank you very much. Is there anyone else here who would like to make comments or ask questions? Are there any questions or comments on YouTube? No? OK, then let's move on to Ana's question, for anyone who would like to comment on this. Abelardo.

Abelardo Ávila

As for scientific character, with scientific evidence, starting with the fact that what you call it is highly ideological and closely associated with interests that ultimately prevail, but within the international system, for example, there are two mechanisms for determining the risk of any substance, mainly food and medicines: in the case of food, there is the CODEX Alimentarius, which detects proven risk. So, in the same week that the news said, "the UN rejects that glyphosate is harmful," there were other media outlets that said, "the UN verifies and declares that glyphosate is harmful." The WHO declared it because the WHO has the principle of presumption. If there is presumption, health must be protected. In contrast, the Codex Alimentarius is to put it into the regulatory system of proven risks to avoid it. In other words, they are two different things. In Mexican legislation and in many countries, there is the Precautionary Principle, especially the Precautionary Principle for the Protection of Children. In other words, it must be demonstrated that something is not harmful, right? In other words, the demonstration that it is not dangerous is that it does no harm. For example, this happened with non-caloric sweeteners. It has now been proven that they are harmful; that mechanism has already been proven. But at one point it was said, well, as there is not enough evidence, you can't... What we have now and all the knowledge we have leads the WHO to say that it is not recommended, it should not be given to children, there should be a Precautionary Principle, contrary to the nature of the Codex. Both can be said to be complementary.

Now, the legislation, what they told the US lawyers when this was discussed in a very interesting forum, is that the precautionary principle does not operate in the United States. So, there, the legislation is dominated by industry and commercial interests. So, that's where we lost, even though there is sufficient scientific argumentation to be sure, through the Principle of Protection, that it does no harm. And that had to do, for example, with the revocation of the Segalini Ceralini article, which is a classic case involving rats, where both mechanisms were present. One was to demonstrate that they did cause harm, and thus with the strictest code that existed, and the other was to show evidence that they could cause harm, that they were potentially dangerous, and commercial interests prevailed.

Alejandro de Ávila

I would like to share an experience we had with Francisco Toledo, a teacher whose memory we never tire of honouring. During Peña Nieto's term, the maestro was concerned about what was happening and was reading about what was being reported. And so, in conversation, he, I, and others—I wasn't the only one—decided to write a letter to the leading expert in toxicology at the time at the Salk Institute in San Diego, who sadly has since passed away and did not receive the recognition he deserved; he was in line for a Nobel Prize. He sent us a very long letter detailing both the effects, as a toxicologist, on human health of the transgenes known at that time, we are talking about 2018, and the effects of glyphosate, because most of the genetic manipulations up to that point were to make corn resistant to glyphosate, to eliminate competing weeds, especially in the summer cycle, as our colleague José Luis told us. And after giving us this very detailed review, telling us, look at this study and this one and this one, published in such-and-such a journal, peer-reviewed, not some shoddy piece of work, but very well-founded, he said to us, please do everything you can to spread the word to the Mexican people that commercial agriculture is not in their best interests. And I think that's the crux of the matter. It's not that we have doubts about whether we are going to consume tostadas or garnachas, and I'm not going to mention products because we'll get sued. I believe that we must be aware that it is not a question of whether or not a particular company is using materials imported from the United States, where they are applying agrochemicals and genetically modified seeds liberally. The point is that "it is a cultural war". That is the point I would like to summarise again with the presentation I gave, and if we had more time, we would elaborate further. At stake is the survival of a model that prioritises human needs and collective benefits, which is what we see in rural communities, which continue to supply us in Oaxaca with tlayuda and handmade tortillas, atole, pozole and tejate. If we have social responsibility, let's consume that, and not consume tortillas from tortilla factories or packaged products. And it's not just because of the health risk, I believe it's an ethic of commitment, of what culture we want. Do we want to follow the model where individual profit is privileged at all costs and commercial rights are valued above individual and collective rights, health, education and culture, as we saw in the first panel? Or do we want to be consistent with our own cultural history? I hope I have explained myself clearly and not been carried away by passion.

Paola Sesia

I think it's okay to be carried away by passion. José Luis also asked to speak online.

José Luis García

Yes, very briefly. Well, yes, regardless of giving more strength, more weight to the evidence and generating more evidence to justify the health risks of genetically modified products, I mean, regardless of the fact that there are many technical difficulties in designing the experiments, and there are also many tricks, as has already been mentioned. I think something very important is that weight should also be given to the fact that genetically modified products are not necessary. Right now, what the other panel members have just commented on. Native corn, creole corn, or at least non-GM corn, has everything we need. There is no need to resort to GMOs, especially in Mexico, where the agroecological characteristics of this country's great mosaic make the use of GM seeds unprofitable.

Genetically modified seeds became profitable in the United States and with subsidies in Argentina and Brazil, but on huge tracts of land such as the corn belt and the Pampas region, where there are hundreds of thousands of hectares of monoculture and maximum profitability logistics for that seed.

And that seed, as we have already mentioned, goes to industry. Whether or not it contains an extra molecule makes no difference to them. It will be used to produce animal feed, to be transformed, as you have just mentioned, into high fructose, syrups and even drugs obtained from flour. It is not even intended for direct human consumption. So, in that sense, I think we also need to give more weight to the fact that, at least in our country, genetically modified maize is not necessary because, well, first of all, the industry can also supply non-genetically modified maize. It is not even profitable to handle genetically modified maize here. The large producers themselves mention this. You don't get a higher yield with that maize, and the seed is expensive and there are no subsidies, fortunately, here in Mexico for that seed. And all the material that is available right now, as you were explaining to us in the history of maize here in Mexico, the genetic wealth that the native seed already brings, gives us what we need and even more. With that same genetic potential, we can find what we need for drought resistance, pest resistance, soil tolerance, etc., and continue to produce a high-quality food product, because native maize meets the food needs we have here in our country. Basically, this is what I wanted to say. As for glyphosate and herbicides, I don't even need to tell you, as I said, they are made to kill, there is no doubt that they are toxic and that the risks are obvious, But yes, perhaps one detail that is missing in scientific terms is that this information needs to be systematised, organised and designed in the most appropriate way, because there is a lot of misleading information where they compare corn that is not comparable and argue different things in terms of health and yields, etc., right? Well, that's what I wanted to say.

Paola Sesia

Thank you very much. José Luis, would you like to respond? Are there any other questions, concerns or comments, including from you ladies? Laura, would you like to say something?

Laura Montesi

Well, the first is a comment and the second is a question. The first comment is actually to express our delight at this round table because I believe that, we work in the field of medical anthropology, so what we try to communicate in our day-to-day work is that we should not conceptualise and manage health in an individual, reductionist way. As Paola said at the beginning, and Gabriela, this panel, which is about transnational trade disputes, and ultimately what comes before us, reflects this complexity. Above all, I really liked that we moved through very different time frames, based on Alejandro's account: we are talking about a time that in fact goes beyond the historical and that also makes us see how the teocintle could have a relationship with megafauna, and that is to put on the table something that is actually obvious, but that we tend to make invisible; that is, how we as contemporary human beings are intertwined with the other species that preceded us. So, it is about the fabric of life, which then disappears in very reductionist conceptualisations of health, it is not noticeable. In addition to this, we have touched on historical periods in our history that are still alive in the open veins of Latin America and Mexico, linked to colonisation, when Abelardo clearly mentioned the genocide that resulted from contact between the native populations and the Europeans, and how this disrupted production systems, cultural systems, forms of organisation, and food systems. we must not forget that throughout the colonial period there were also attempts to eradicate the consumption of certain foods in favour of others, so there is a whole food ethnocentrism that in many cases persists today, right? So these are actually very old issues, but they are very present and contemporary. There was also a call to decolonise ourselves and to

understand this genetic, cultural and biosocial wealth that we have in our hands and that seems to be fading away. And also to recognise the changes of the last 100 years, of the last century, basically, with industries, the agri-food model that goes hand in hand with the pharmaceutical and medical models, which Abelardo also mentioned to us, and these are extremely rapid changes that can also be seen when analysing epidemiological curves of overweight, obesity, metabolic and endocrine disorders, etc.

So there we see all this complexity that makes us who we are and causes us to become ill with what we are becoming ill with today. And, well, I think it is very important in what José Luis presented to us in relation to the fact that we are all involved with different degrees of responsibility, but we see that it is a social issue, it is a cultural, economic, productive issue, each of us has a weight and a capacity for action, and it is good that we talked about social movements, about what is being done despite the difficulties.

So, well, I think the purpose of the round table was fulfilled, which is to talk about health in a much broader and also historically and temporally profound framework, and I want to thank all the speakers for that, including José Luis, who is connected.

My question also arises from what I have seen on social media in relation to these conferences, where some comments have been made. I was looking at Facebook, because the event was reposted on other pages, where in some way they brought up the issue of chains, that is, the production and marketing chain, which José Luis has touched on a lot. So, to stir things up a bit, basically there are these narratives, right? They can also be dominant, such as, "how beautiful native corn is, but we have to produce it on a massive scale, how beautiful the small producer is who can produce food and support his family, but in Latin America and Mexico and throughout the world, most of the population is urban, not rural". So basically, we are not, let's say, capable of taking responsibility for the production of what we eat.

So, given this scenario, perhaps it is an open question, but I think our colleague touched on it a little more here, because he also spoke about promoting the consumption of native corn as the optimal solution, and if not, at least products, as Alejandro said, that are handmade, etc., with maize that in many cases we don't really know where it comes from, promoting this culture of consumption of native maize and the rich agri-food products of Mexican cuisine and indigenous populations, but that often translates into high prices for end consumers, for example. Not always, not in all cases, but often. So, if it could be addressed, as people were demanding on social media, this issue of production, distribution and consumption chains, what does it mean for us in terms of transforming the economic system that governs us? I'll leave it there, and, well, thank you.

Paola Sesia

Who would like to speak? José Luis? Please.

José Luis Chávez

Well, social media is a virtual world that doesn't exist. I can agree with that. The other thing is that we are in a market context. In that market context, everyone wants to go to any little shop and buy what they need, as an element of the market, as an individual in the market. If I think about production chains, it's a market axis and system. So, when we say that the Mexican food system is

dominated by the market system, then the gaps left for other things are almost minimal. Let's see, who dominates the corn seed system in Mexico? Well, the transnational companies that sell seeds. Beyond that, the small space for any other seed is just that, tiny. So, when I think of a production chain, I immediately think of a system that is designed for those who get juic s from the system. At no point do they realise that in these market chains, where does the consumer appear? As the last link, remember? Not the first, they always appear at the end. So, if the food market system that provides us with food is dominated by all these companies, agribusinesses, which are input companies, which are agrochemical companies, which are whatever you want to call them.

As part of the system, I would like to see seeds promoted, as we said in the photo. I would like to see native seeds promoted equally, at least, and I don't know why, because consumers don't know they exist, they don't know they exist anymore, they don't ask for them, in fact, they don't even look for them because they don't know they exist. I'm just going to comment on something else that I found very pleasant. I travel to South America quite often, and I found something extraordinary in the market, which was native potatoes, as they call them, but of all colours, as part of a system. In the same way, I also found cassava and jicama as part of the system. We haven't done that in Mexico; it's a pending task. I would love to go to a convenience store and buy popcorn of all colours, for example. I would love that. But if I don't create the demand, if I don't propose it from the bottom up, I won't get it. I'll leave that comment there.

Paola Sesia

Thank you very much, José Luis. Did you want to speak, Alejandro? Go ahead.

Alejandro de Ávila

I was very moved to read repeated statements from the FAO, the Food and Agriculture Organisation, that it is a myth that agribusiness is feeding humanity, because the majority of the urban population on the planet continues to be fed by small-scale agriculture, based mainly on traditional knowledge and seeds passed down from family to family, from generation to generation. According to the FAO, this is a reality. That it does not apply to North America is another matter, but in global terms, most of the human population is still connected to what we might call traditional agriculture. That is what the FAO says.

What is happening in Mexico? I think it would be very useful for us to read someone who also has her family roots in the house next door, and I am referring to Ana de Ita. Ana de Ita is very critical of public policies. She was during the years of PRIanism and she is now with the 4T. And what is Ana de Ita pointing out? She is pointing out that public policies, both from the previous six-year term and so far in this one, are aimed at harvesting votes, but not at actually achieving food self-sufficiency. Why? Because producers have the potential to partially increase their yields, unlike cornfield, hillside, and seasonal agriculture, which are mainly practised by farmers in the northwest who have several rivers crossing their states. We are talking about Sinaloa, part of Nayarit, and mainly southern Sonora, in the area with surplus food production capacity. But those medium-scale farmers—we are not talking about the large ones, nor are we talking about the indigenous populations in these areas, but rather the medium-sized farmers, not the —are not being favoured. Public policies are not designed with them in mind. They are privileging small farmers who will hopefully keep our country's genetic heritage alive, but who are not going to feed the local areas. So, I think that is where we can

have an impact with a change in public policy as responsible citizens. And hopefully Claudia Sheinbaum, as a professional and a scientist, understands this. I think she does understand it, but perhaps there are political power games at play, but the capacity is there.

Paola Sesia

Gabriela, how are we doing for time? Well, you wanted to say something. So I think we'll pass you the microphone.

Gabriela Martínez

Okay, I'll keep this quick and to the point. Thank you for your contributions and comments, Dr. José Luis, who is also online. Well, what I would like to say is a kind of comment and question that stems from the previous round table we had last week. There was a person in the audience who identified with the rural and farming population. They made a comment that was initially a complaint, but then turned into more of a question. As colleagues, as fellow academic researchers, but also as people who are in direct contact with people in the field, in this case because of the topics they deal with, they asked us and said: "So, we appreciate that these topics are being discussed at a high-level round table because of the quality of the contributions and presentations that have been made. It is very good that these types of forums are held, but how do we get this information to the populations where it does not reach them in this way?" It may be because of the language used, because of the different profiles we have, but they also tell us: "The thing is, in our assemblies they don't talk to us like this, they don't tell us that we are consuming or buying genetically modified maize, our authorities don't raise the issue, which is the highest authority in an assembly, in a community with its own customs and traditions, they don't raise it with us. How can we ensure that this information reaches the communities? Not all of them, but most of the more remote communities, which do consider themselves to be rural, above all, need this type of information to reach them in a slightly simpler way so that people can incorporate it into their daily lives." This is a question for anyone who would like to answer in terms of methodology. Thank you.

Paola Sesia

Juan, would you like to come up, please?

Audience participation

Thank you again for your contributions and insightful comments. I wanted to make a general comment, which is to also take into account the factors, the externalities in this quest for food sovereignty that derive from these policies, which in my opinion sometimes border on a kind of food or agri-food populism. The comment stems from two basic anecdotes. I am a reporter, and two months ago I was investigating a methane leak that was identified by international organisations via satellite images at Pemex's Minatitlán-Cosoleacaque plant. So, I went to take a look, and it turns out that this is a result of the increase in the production of this raw material, which is then sent to the Pajaritos plant in the same complex to produce fertilisers. All of this made sense to me; that is, we are seeing how methane is a problem because it is a powerful greenhouse gas that contributes to climate change, which is causing us problems. It turns out that on a trip to the Isthmus two weeks later, I saw many friends and colleagues we have there with their bags of fertiliser for welfare, and the instructions on the packaging made it very clear that it was sourced from the Minatitlán-

Coatzacoalcos industrial zone. So, to what extent are we contributing to climate change by accelerating fertiliser production? That is the question.

The other anecdote has to do with the fact that I am currently investigating the cancellation of this underwater mining project in the Gulf, on the Baja California Sur peninsula. Well, the project refuses to die, even though it was crazy. It involved dredging the seabed to separate phosphate sand from the rest of the compounds there, and then returning it, destroying all the biodiversity on the seabed in the process. Well, this phosphate sand would also serve as raw material for producing fertilisers. This was a totally crazy venture by an American company called Odyssey Marine Exploration, which had a history of recovering treasures from the seabed, not really doing underwater mining. At the time, it was promoted in partnership with Alonso Ancira, the mining entrepreneur we all know well, who later fell from grace. And so, the project had died, but it turns out that an arbitration award under NAFTA ordered the Mexican government to pay compensation because the cancellation of the project had been unfair, in the eyes of this highly ideological perception of free trade. The thing is that now the project is trying to be revived because apparently they have an ally in Mexico's agricultural production chambers, which is posing as the internal counterpart that would make this project a reality. And with the precedent of the arbitration award, there is a possibility that underwater mining will be revived in an area rich in marine biodiversity. So, all of these are pointing to the new barriers in this era of food sovereignty and how we include them in the conversation.

Paola Sesia

Well, who would like to speak? I think this will be the last round, otherwise we will be expelled from this beautiful venue.

Abelardo Ávila

It is very interesting when talking about the relationship between academia and the people. I think we should not confuse terms. Suddenly, it is said that we have to speak more simply, that 'we have to lower ourselves to their level'. No, no, not at all, the level of popular wisdom, I believe that it far exceeds ours, because we are the intelligence of our lives, the population has a millennial intelligence of culture, and we also have that millennial intelligence of culture. When we as academics deny it, that is where we collapse and then we feel that we are superior or that we are the ones who know and we confront our wisdom with an ignorance that is wiser than ours. I believe that the dialogue of knowledge is very important—a term that I also like very much. At first, I did not understand it well; at first, it seemed demagogic to me—but looking at it in depth and seeing it in practice, I believe that the dialogue of knowledge is important methodologically, not ideologically, but methodologically. The most important thing, as dialogue, as mutual recognition of wisdom; the abilities that one sees and the other does not, in a sphere of joint action, which is what we need. This joint action between the demands of the population, the producers, what Marx once called the 'old mole'; that is, society's ability to build alternatives to dominant societies. It is a long historical process that, if we do not have it clearly conceptualised methodologically, epistemologically (I loved the use of the term epistemological for this process that is taking place), we do have to understand: science, the ability to recognise reality, but above all the ability to transform reality towards a clearly expressed collective and human goal, and not towards a commercial goal and private interests. I believe that this is what can enable these types of activities to engage in dialogue, to integrate, to become integrated, not us integrating that knowledge, but us integrating ourselves into that process.

It is a historical process that must be built, isn't it? In the last 30 or 40 years, we were defeated, but for those who like football, it was worse than Chivas de Guadalajara, it was a total debacle, a massacre, a thrashing, they gave us a good beating, neoliberalism gave a good beating to those of us who did not agree with that model, they imposed it on us, they built it, they took many of our comrades away, they became just like them, and now I think we are at a turning point of rebirth, which is what we need to conceptualise and rebuild, and I am optimistic about the future; in the few years of life I have left, I think we are going to see some very beautiful things.

Paola Sesia.-

Would anyone else like to speak?

Alejandro de Ávila

Since José Luis isn't going to jump in, I'd like to talk about a joint project that José Luis and I did, financed once again by our dear Francisco Toledo. We edited it—when was that, José Luis? It's been about 15 years, right? Fifteen pills, a mass-market publication, simple, basic language. As Abelardo says, it's not about lowering the intellectual level, it's about making it accessible in language that can be understood. And it was given away for free to people who could afford to buy it, as it cost three pesos at the time. That was an effort to disseminate this information, and now, it will be shown. We are in dialogue with a colleague from Oaxaca at CIBIOGEM—I think you know what CIBIOGEM is—where we want to update this information because in the 15 years that have passed, we now have new information that we want to disseminate. This includes the issue of maize capable of fixing nitrogen with adventitious roots, which we consider a case of biopiracy, involving the University of California at Davis and the transnational company MARS. So that is one way to respond, Gabriela, to what our colleague so eloquently raised in the last session, but at the same time I think it is a little incisive on something that I believe we need t te on together. In other words, it is not just our responsibility, I think it is a collective responsibility.

Now, with regard to methane, methane is a time bomb. The biggest concern with methane is not what is emitted at the Cosoleacaque plant or at the huge concentration of hydrocarbon plants in Texas or other regions of the planet. It is the melting of the ice caps. The melting ice caps, exactly. And also livestock farming and rice paddies, of course. Rice paddies are also methane emitters. Methane, as Abelardo and I were just discussing, is at least 70 times more potent than carbon dioxide as a greenhouse gas. And the projections are dramatic because it's not just the melting of the permafrost, but also the fact that in the northern hemisphere, on the continental shelf, there are what are called latrates, which are long-term deposits (apparently the result of microbial activity in the substrate, on the seabed), which are water crystals surrounding methane molecules, but are now bubbling up.

And one of our heroes, a colleague from the University of Alaska in ..., has been sacrificing her health, with no funding for part of her work, to quantitatively show the amount of methane that is being emitted into the atmosphere naturally. Forget about emissions from hydrocarbon plants. This is a process that seems irreversible, and if we do not act now as an enlightened global society, putting Trump and his henchmen aside, we will be caught in a trap. It is truly dramatic. And we would not want to end on such a negative note, but you brought it up, you opened that topic.

Paola Sesia

Those journalists who always come along and destroy the positive note with which we wanted to conclude this round table! I think we have to wrap up. I also have many comments and some questions that I will save for later. But I think we do have to come to the end of this session. Before passing the microphone on to my colleagues, companions and friends Laura and Gabriela, I would like to thank you all very much for your participation today, the two José Luises, Abelardo, Alejandro, and of course you, the audience, Cuauhtémoc for always accompanying us with such care in the technical and technological aspects, and of course the Casa de la Ciudad de la Biblioteca Henestrosa for once again offering us this beautiful space that represents so much of the history of the city and the culture of Oaxaca, for allowing us to be here.

We would also like to take this opportunity to make a small announcement that is not commercial, commercial in the conventional sense of the term, but we have some Istmo tortilla chips for sale that are produced by a cooperative of women, I believe from San Dionisio del Mar in the *Ikojts* Huave area. They are for sale, in case anyone is interested in purchasing them here from Laura, and with that, I think we can conclude. Thank you very much again. Gabriela, would you like to add anything else?

Gabriela Martínez

I just want to thank everyone who has been with us here. Thank you to our speakers, Dr José Luis Chávez, Dr José Luis García, Dr Abelardo and Dr Alejandro. Thank you very much. We are new to this, we are learning, and the truth is that since the last panel, which we invite you to review, it is now on the CIESAS Pacífico Sur website, where you can find an introduction... And finally, we would also like to thank CIESAS and the Casa de la Ciudad for allowing us to hold this second panel of these conferences. Thank you!

Paola Sesia

José Luis, go ahead.

José Luis García

Ah, no, well, I was going to comment on fertilisers, but maybe another time. But anyway, very quickly, yes, it is part of the problem, I think more of an agronomic nature, isn't it? Agricultural soils are already exhausted, and I think we could organise a whole new panel on how to deal with this reality, which is going to be problematic, restoring soil productivity as part of the reason why little maize is produced; it's not so much the seeds, but the fact that the soil is already very tired... But, well, I think that's a topic for a new panel. And thank you for the invitation, it was a pleasure to listen to you all, very informative, it was also a pleasure for me to listen to you and I hope there will be more round tables like this one.

Paola Sesia

A very informative discussion. Once again, thank you very much. I think we should give our speakers a round of applause. Once again, thank you for the opportunity. Thank you. An announcement from home: today's discussion was recorded, so the second discussion, which is today's, like the first one, will be available on YouTube for those who are interested in the talks and also in the video. Thank you.