

Predictable Surprises: Looking Ahead

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Pat Mooney

Let me start with what is not a surprise, and that is that we are in a century of surprises. There will be major surprises, major catastrophes during the course of this century. We've already gone through two or three. The food price crises. We've had two kinds of technological collapses already that have caused major problems, although temporary, they've certainly been serious. We had a pandemic. We have war. All Four Horsemen of the Apocalypse have been riding together and successfully, unfortunately, around the world already in this young century, and that will not get less as the decades go by, there will be more of those, so no surprise there.

The thing about predictable surprises is that they can come to us from many different directions and they can often be compound surprises. It's often the case that the surprise begins as a local event. One local event was a drought in Northeast Asia; the drought led to a migration, the migration led to war, between the drought and the migration and the war, there was a pandemic, the pandemic spread not just to Europe, where it was called the Black Death, but around most of Asia and large parts of Africa, in fact. So it was in a sense an Eastern Hemisphere disaster with many dimensions to it and not every part of the hemisphere experienced it in exactly the same way, but it was triggered in one place and spread to many other places and expressed itself in different ways. That's going to be the norm again, we'll have that happening and the problem is how do we actually identify something that is starting and recognize what it might trigger and where that event or series of events might lead us and how it might impact where we live in our own lives.

A second aspect of predictable surprises again is the fact that it is spread over time. Some of these disasters we've had historically have taken some time to move from one part of the world to the other. Climate events, of which have been many in our history, rather created by volcanoes, or long El Niño events, or shifts in general climate in the planet over the last several thousand years during human existence on the planet, that's not been unusual. Those climatic changes play out over sometimes two or three or four years before they're felt everywhere and they will again mean drought in one place, rains in another place, famines and wars all come together again. Some of them are slow rolling disasters that will still hit us, and we have to again anticipate those kinds of risks.

But again, from both of those examples, over time and from local to global or local to multi-regional, we also have the reality that predictable surprises in a community or in a region or a country or in the world are almost without exception of multi-sectoral or compound or domino crises that, again, begin with perhaps a drought but spread to other things, and

again all Four Horsemen —famine, war, disease, and so on— all come together to impact us. So if we see this is originally a food problem, it can quickly become a health problem, and quickly become a problem of violence in societies, and who knows from there where it might spread. That should be assumed that that's going to happen.

That plays out as well in terms of understanding then some of the climate changes, because if we see a locust epidemic, for example, in one part of Africa, it is not likely to simply be locust. It's likely that also the same climatic conditions that triggered locust attack will trigger other diseases in crops, fungal diseases or blights that will impact other crops in different ways. So it's not again a one problem issue, it's not one where we simply have to control the locust, we have to be looking for how it plays out in other diseases, in our fields, in our livestock as well.

When we look at our ability as societies to respond to those, there's the question of supply chains, and we've had some real shocks in our supply chains in the last few years. I think we're all familiar with some of the food supply chain crises that we've had in different places and the sort of costs involved in that as well, and we've seen that in the pandemics. Not simply the access to vaccines, which is the most obvious part of the pandemic, but also (I know Sylvia will talk more about these issues later) that the supply chain itself didn't understand that sometimes several thousand ingredients are required and materials are required to administer a vaccine, to actually develop it and move it around the world — from getting the glass in one place, plastic's another place, ingredients for the vaccine in several other places, putting it together in India and perhaps again shipping it around the world afterward. Very complicated supply chains, thousands of materials involved, and no one at all really understanding that complexity or how the absence of a certain kind of plastic being only available from a certain company in Texas can really change the capacity of the world to address the pandemic. Being aware of that vulnerability is I think extremely important in trying to understand it and advance.

Perhaps the most classic, shocking example of failures of supply chains and government failures to address supply chain issues has been around the Ukraine war, where suddenly both Russia and Ukraine and its supporters have discovered that the supply chains for bullets, for ammunition, doesn't exist in any adequate way. Just in time manufacturing, which we're used to hearing about all over the place in every sector of the economy, also applies to the production of armaments and ammunitions. Suddenly, a system which was designed really simply to supply training programs, exercises by militaries, naval exercises or land exercises and all ammunition that was needed was for that, suddenly they have to be used in a real war, in a long land battle which no one expected and no one was ready for. We see that having a major impact now in this particular war. We found that suddenly two companies produce key ingredients for missiles. One company provides the motors for those missiles and if that company goes down in one place or in another place, the two companies making some of the ingredients can't do it, can't gear up their supply, then the war effort stops or swings to even more dangerous weapons, such as nuclear.

If governments can't handle war successfully, if they can't manage a supply chain for war, we have to assume governments can't manage the supply chains for other crises that are critical for us all around the world, whether it's food or health crises.

One major message for me in this is that we can't assume the governments will understand their supply chains when they're trying to address a crisis, they will not, they won't know it. And they won't think beyond immediate disaster, they won't think ever, whether it's the UN system looking at this and its disaster work or a national government or a municipal government, will not think of the regulatory and legislative legal kinds of steps can be taken to relieve a crisis. They'll think about rescuing things, getting things in place, food and drugs, but not thinking about what could alleviate the crisis —if we liberated land, for example, for food production or we changed medical purchasing practices or access to medicine issues. Those things are not things government think about and it means that civil society has to do that thinking in advance, no one else will.

I think the examples of the supply chain issues are clear enough from food and from the pandemic and from the war. The one that we still haven't really addressed, and governments certainly have not addressed, is around cyber-warfare or cyber impacts of different kinds, the Big Data collapses, and they don't have to be a war, they simply have to be a technological failure. We are in this early time of Big Data technologies and the management of that data and reliance upon artificial intelligence, we are at a time when no one really grasps the scope of the supply chains involved in that.

Last year, for example, one company outside of Berlin had a fire, it was the only company in the world that can make the machines that can be used to make the microchips that can be used in the digital world, the only company of scale. This fire caused a tremor around markets in the world and everyone was worried. This year, a few months ago, we discovered that the company that makes the lasers for the company that makes the machines that makes the microchips was in trouble and had to be rescued and we didn't know it was the only company that could make the lasers that could make..., etcetera, etcetera, etcetera. You get the idea.

That's constantly occurring to us as we discover and explore the implications of Big Data. For the global South, which depends mostly on satellite information flows, not fiber optic cables, such as in the North, there's much greater vulnerability. We tend to think, oh don't worry, the fiber optic cables get the job done almost all the time and they're relatively secure, even in the oceans, though not always. We find that the satellites' flow of information is much more dangerous, both it can be hacked more easily, but beyond that it can also fall apart more easily. In one part or another of Africa, literally every week there are at least three major failures in the data management through satellites, and that impact is on whoever is on the ground waiting to get the information, instructions, or to send information or understand markets or understand climate changes, all of that becomes vulnerable because of the failure of the satellite systems. And that's consistently happening.

Elon Musk lost 40 satellites last year at one moment because of a solar burst, and that keeps going on.

We also find, of course, that our reliance and that supply chain for data goes to Big Data storage facilities that are often held in Iceland, or Norway, or Quebec in Canada, where I live, and they can fall apart, or they can be hacked, or companies can actually simply erase the information that's vital to us by accident or intent sometimes. That again collapses the information flows, that we're told farmers need to have or we're told that the health system needs to have, suddenly it's not available.

The whole digital strategy, in fact, which is said to be a way to make life easier for us, faster and more reliable, with better more up-to-date information, actually simply adds a whole new layer of complexity on our systems, which we don't control at the local or even at the national level, which is only held and managed by a few companies we don't even know exist sometimes, and we can't trust that they will do their job properly, either in terms of security and stealing information or in terms of suddenly not giving us the information we absolutely have to have because becoming reliant upon it.

The need to have an alternative to that sort of global supply chain system of data is vital. We should never depend upon that; we need to depend upon local systems. And that's the real tragedy for us now and the real struggle for us.

Let's say that we come from the food movement and our interest is primarily from the perspective of the food movement. The crisis begins with the pandemic. Well, where does the movement fit into that, how do we take advantage of that crisis. Because every, you know, let's go back to Naomi Klein's book a few years ago on shock doctrines. She talked about the negative impact of shocks, but there's also the positive impact. If we are prepared and looking for crises, know that they're going to happen anyways, have done some basic work in our communities or at the national level to address them and prepare for them, then when the crisis is a pandemic or the crisis is a crop disease threatening food security, each system —those concerned about health, those concerned about education, those concerned about poverty, those concerned about food— knows where they fit into that process that it will impact them as well and what kinds of regulatory steps, what kinds of legislative steps are required to intervene, to help each other get through that crisis, to make sure that we are working in tandem together and it's not just one part of the system, one sector of our concerns as movements that is addressed, but we all come in into it together and recognize it's going to affect us all anyways.

So really that to me is a key thing. That history shows that our crises are multiple, multi-crop, multi-sectoral. That they spread from one place to another, you can never assume that it's going to be a local crisis, it could well become a global one. And that it can sometimes roll over a period of time or happen very quickly, like the Spanish flu or the pandemic we're just seeing hopefully the end of now, but it will happen.

We need to look at our various systems and movements to see how we collaborate and how we move governments, position governments so that when the crisis does happen, we make the kinds of system changes at whatever level we're working at that can get us through that crisis in an effective way into a safer place.

The last thing I'll say is that I think the history of crises, major climatic crises, wars and so on, show that the survival of that when it's over can lead us to a time of much greater equality than ever before, in that area at least for societies. So good things often have come out of major crises, but we have to be prepared for them.

Silvia Ribeiro

Talking about the pandemic, is similar in the sense that we cannot talk about a single crisis, as if the pandemic were only a problem of one disease or only about health. However, this month we saw that the WHO had announced that the pandemic was apparently over and let's say that's how they would end the health emergency with respect to what they call Covid-19.

However, this has left us with an enormous number of questions regarding the handling of the pandemic, to begin with, the origins of the virus itself, insofar as it is still not clear whether it was a... The only thing that is clear is that it is a virus that comes from a bat, but everything else - how the bat reaches the people, how it spreads from the people - is still under discussion, and as there are many interests, we will probably never know exactly, whether it went through a laboratory that was financed by the United States, or whether it went through another animal, or whether it went through people, in short, before it became what it is today.

Nor are we going to know, for example - or perhaps we already know, but it is difficult to understand - why, after three years of pandemic, there is basically no health or prevention system strengthened almost anywhere in the world. Instead, those that have been extraordinarily strengthened are the largest pharmaceutical transnationals, the largest technological and digital transnationals and even agribusiness. The largest agribusiness transnationals have made record profits overall, while most people have become significantly poorer.

Nor do we have an explanation as to why the world was set up as a massive experiment of transgenic vaccines that had never been tested on humans, with technologies that had never been tested, when at the same time there were vaccines of conventional methods, which were proven as a method. We will also never know if that added problems or not because the control groups of those experimental vaccines were also vaccinated.

Nor will we ever know why vaccines were developed in the public domain, for the most part, even transgenic vaccines, such as the AstraZeneca and Oxford vaccine, for example, is developed at Oxford University but sold by AstraZeneca at unfair prices, with unfair contracts in almost all countries, with secret contracts. Why are these clauses secret. Why did the governments sign that the transnationals had no responsibility.

These are some of the many things that are still pending from this pandemic that happened and that make us say, well gee, if there is another pandemic, who really benefited from this one, because there were those who benefited and did so in large numbers.

Another thing that I think you have to understand about this is that you can't think of something in isolation, an isolated pandemic, as if it were independent. I think that there is one thing that we, at least the majority of us who are here today in this talk, who are linked to the issue of food, to peasant production, agroecological, decentralized, peasant production, one thing that I think we were able to identify and it is clearer is the role of the agroindustrial food system in the emergence of pandemics.

This is clear because most of the infectious diseases that exist today and those that are expected to develop, the next pandemics, have a zoonotic origin, that is, animal origin, but it is not enough to say that it is zoonotic, that it is not only about bats and mosquitoes and pangolins, but about large-scale agro-industrial animal farms, especially pigs and chickens, and also cows. These farms have really been a factory of new viruses, of new resistant bacteria, because of the breeding conditions, that's where a lot of things are generated. Even one of the Covid-19 theories is that the bats might have made a passage through the huge pig breeding facilities in China around Wuhan, the city where this originates.

With all these pending issues, it is also important to remember that this pandemic does not reach a vacuum, it reaches a place where, according to WHO data for 2020, 76% of the causes of death in the world are non-infectious diseases. Only 26% are infectious diseases, and of the infectious diseases no less than 75% derive from zoonotic diseases, from industrial animal husbandry, directly or indirectly. But it's a small part anyway.

Most of the reasons for which we die in the world, half of those reasons are linked to the food system - to bad food, to food full of toxins, cholesterol, non-nutritious food. And among those reasons, for example, the main one in the world is heart disease, ischemic heart disease, but also hypertension, stomach cancers, cancers of the digestive system, diabetes enters for the first time as the leading cause of death, nephropathies... In other words, they are all things that have to do with the food system.

And even others that are related to these, such as respiratory diseases, in the city they have to do mainly with pollution, but in rural areas with pesticides. So, everything comes back to hit again in a food system that makes any pandemic hit in a pandemic of weakened immune system that we have in general in the world. All of that is maintained, it continues to this day.

And there is one thing that has already been mentioned before and is very important, which is to understand that the greatest pandemic we have in the world at the moment is the pandemic of a brutal, extraordinary inequality, both in terms of wealth and resources, but also in terms of corporate concentration, the control of most of the markets by the very few. In the agri-food sector, it is absolutely true in each part of the chain, but we were just listening to Pat that it is true in many other sectors, and of course also in the technological sector, which is the one that has made the great entry into the food systems, into the medical systems, into vaccines... When we talk about the pandemic, we cannot separate it from thinking about the technological titans, which in turn are the ten richest in the world, and they are men.

So this is the context of syndemia. What are these new pandemics that could emerge? To begin with, I spoke, for example, about breeding farms. Sometimes they say: well, but for example Covid-19 comes from a bat, what does it have to do with hatcheries. It has everything to do with it, because 60 to 70% of the planet's agricultural land is used either for grazing or to grow feed for industrial animal breeding. This is the major cause of deforestation, for example, in Latin America and Asia, actually world-wide, but 70 to 80% of deforestation has to do with the expansion of the industrial agricultural frontier. Again, it hits the industrial agricultural food system. In general, it is not to feed, it is to produce things that seem like but, in reality, do not reach food quality and produce weakness, etcetera.

So in this context where all these different forms come together, where the agro-industrial food system has such a preponderant role, from health, from the individual to the ecosystems, because these viruses and these bacteria that come out of these ecosystems, for example, that are controlled within a population that is controlled by the agro-industrial food system, come out because of the devastation of ecosystems, and that devastation, in addition to what I have already mentioned, has to do with other causes as well - with the expansion of cities, with megaprojects, etcetera - but above all I think that we have to focus on this in this context.

I wanted to mention this because it seems as if we are ending a pandemic, but not only are we not ending it: the factors that cause pandemics have increased.

Right now, we are talking about avian flu. Avian flu this year has had an extraordinarily worrying development. Let's say that avian flu at the moment is a flu that, of the approximately 900 cases of human infection that have occurred since it became known in the late 1990s, 50 to 60% have died. In other words, we are talking about a type of influenza that has a very high mortality rate (that of Covid has been less than 3% globally).

Between 2021 and 2022, 54 countries recorded that they had cases of animal infections. When one speaks of avian flu one thinks of birds, but no, in reality there are 30 species of mammals that have already been infected and have had avian flu; one of the mammals is

humans, but there are others, such as pigs, sea lions and seals, dogs and cats, pets and many other mammals.

What is really worrying is that avian flu until now had remained in Asia, with outbreaks in Europe and some in the United States, but we already have many outbreaks in Africa and at this moment it is present in 10 countries in Latin America. It has had a presence at animal level for the last two years, but also in the year 2023 two cases of avian influenza in humans were registered for the first time in Latin America.

So there is a very worrying geographical expansion, because do not forget that there are all the other latent causes. Then, for example, in the case of swine flu, which is the one generated in one of the largest pig farms in Mexico in 2009, what happens is that two strains of swine flu are combined by the breeder, because precisely what these farms of enormous genetic uniformity do is that they are a factory because they mix different strains, and they mix two strains of swine flu with one of avian flu and one of human influenza from one of the breeders. Then they mix these three strains and produce H1N1.

This is what could happen at this moment with the avian flu. Because China, the largest pig breeder in the world, is exporting pig farms to try to contain the issue of these virus factories, not only in humans: there is the issue of African swine fever, China had to slaughter almost half of its pig farms, exporting them to Argentina and Brazil, among the main countries, but also to many others.

That is this hatchery, these conditions that I mentioned before are the ones that are currently on the table for avian flu.

The same is happening on a much smaller scale with the West Nile virus, with the Nipah virus in Bangladesh, which also have zoonotic origin and this type of things.

So what is it that we have to think about this issue, what is it that we have to prepare for? That conditions remain exactly the same. That what the transnationals did was to kidnap or collaborate with the majority of governments so that instead of preparing us, even from the public health systems, what was strengthened was the private systems of the transnationals. Even Covax is a private mechanism, instead of developing a public vaccination mechanism, a private mechanism controlled by the Gates Foundation is developed.

So, however we look at it, I think it is our opportunity to make a critique again that the causes of pandemics are still present, and it's not about the bat, it's not about the birds, the seagulls, the poor little wild migrant birds, which now seem to be the biggest threat that we have. No, it's about the crisis of immune systems that make people so weak. It's about the pandemic of corporate control, the pandemic of inequity. And that we have the solutions, we can, because the strengthening of local, decentralized food and health systems, with all

the things that movements around the world practiced during the pandemic, is a huge resource that we have to build on to think about how to prevent these future pandemics.

Itziar Urquiola Guerrero

Hello everyone. My name is Itziar, I live in Mexico in a state called Querétaro, and within this state I am both in the city and in the rural area, in Tolimán, and I'm dedicated there to beekeeping, although I'm also a transhumant beekeeper, that is, I move to different territories, just to be able to bring the bees closer to uncontaminated blooms. I am also part of the Collective of Narrative Practices, with whom we also do work related to the defense of territory and working with people.

It is from this practice, from beekeeping, that I was invited here, I was summoned, and on the other hand, it is about this local perspective that I want to speak to you. I prepared a very small piece of writing that has more to do with imagining or thinking about these future scenarios, these surprises that can be predictable, and a little bit of everything that has been happening lately, this year in the last few months, that I believe will unfortunately start to be more and more constant and for which we will have to be prepared.

We entered the apiary and barely had we taken two steps, there they were, like drained puddles, at the foot of the boxes, tiny inert, gray, stiff pebbles. Millions of bees, dead, dusty. We began to look at them all. Twenty-five hives, three hives, two hundred hives, forty-five, one hundred and fifteen. Outbreaks all over the region. We were calling each other from different parts of the country and it started happening all over the globe. We wanted to sit down and stay calm. A hot uncertainty began to rise throughout the body and settled for seconds in the chest, kept it fluttering until it was shedding cold droplets from the back of our necks to our shoulders. We would go back to the apiary and talk to our friends and colleagues. This uneasy feeling pervaded for months and more and more events of mass bee deaths.

We talked every day on the phone. We were mapping, listening to the territory. What's happening to the bees is going to happen to us. Mass poisoning by toxic agro-chemicals. And with the "pollinator protection" law, the vaccination programs, the enslavement of bee cells, we weakened the species in one generation. Well, we have been weakening it since genetic manipulation, since the instrumental insemination of queens, and we didn't understand anything. We didn't understand their rhythms and their times and their contexts that produce fecundation through their dance in the air, which is the way in which the queens are fecundated and then lay their eggs naturally in the hives. We selected, according to us, to be productive, to be tame, privileging production, and then the vaccine to avoid the disease that was telling us something, that was also telling us about the contamination of our territories.

What is happening to her is happening to us. Who is going to pollinate. And with them, all insects. Intervening a species has effects on the territories and their fine weaving of relationships. We noticed it with them because we were observing them. They were an indicator that was only a number in another statistic and we didn't understand what this quantification was telling us. Without pollination, there are no reproductive cycles of flowering plants, there is no food.

Now, artificial intelligence increasingly takes on the role of insects and the effects are territorial. Relationships are with the whole. At the end, power, dominant thinking and human technology in the struggle for survival. With technology, we have swept away everything, at whatever cost, realizing in this massive death how we all belong to a network of relationships.

And well, this is what I would share, what we realize from pollination and bees, which has to do a little bit with what Silvia said: poisoning of the territories by all the diversity or multiplicity of agro-toxins that exist, herbicides, pesticides. But also this weakening of the immune system, which I think is also present in all animals.

And then the last thing that has not yet started but is being proposed, vaccines for bees, for the diseases that are killing them, which we think will have devastating effects. At first it will perhaps be seen as the only way to make bees resistant, but in terms of resistance this will have to do with the total weakening of the species, with no selection of anything at all, and therefore a total or quite large dependence on technologies.

And together with this, in various parts of the world, but specifically in Mexico, the so-called pollinator protection law has been launched, which does not even provide for all the regulation and legislation that should be in place for all companies, which without any kind of margin or anything else can use pesticides, including the State itself, which uses pesticides and a whole series of genetic manipulation elements within the technological packages. In the plants themselves, which is where they are having effects on pollinators, and we who work with bees, is where we see very specific cases.

In the Abejas Trabajando webpage, we have a survey where we are collecting all the cases of massive bee deaths, and in a year there are easily at least fifteen documented cases of massive bee deaths, of more than two hundred hives, one hundred and fifteen, forty, fifty, in different parts of the country and unfortunately this is becoming more and more constant.

On the other hand, the diseases we see in bees are already a combination of many elements, a very present weakening that we are trying to face with herbal medicine and the feeding of the bees themselves, which is in agreement with everything Silvia said, we are applying to bees. We understand that we have to strengthen the immune system of the bees, we have to understand how it works, and let us say that the answer is in the territories. Let them eat the best and healthiest food possible. But in this war of

contamination of the territories themselves, we are trying to make food, which is already crazy, as close as possible to nectar and as close as possible to pollen, because many territories are very contaminated.

Noemí Arnold

Good morning everyone, good afternoon to others from the other side of the world. I am Noemi, I am from Switzerland but I have been working in Mexico for about sixteen years and I have been working with stingless bees for about twelve years, and I would like to talk to you today about this group Meliponinos.

The problem, as Itziar said, is that the bees are under stress and so are the stingless bees, for different reasons. The global problem that happens to all pollinators with deforestation, with insecticides, with herbicides, with transgenics and all these points, also happens to stingless bees, but there are additional points that perhaps are not well known yet.

First, I have to tell you that stingless bees are very local. They depend a lot on their climate, on their altitude; they are not like the common European bee, *Apis mellifera*, which has been taken all over the world and they adapt to different climates and different altitudes. Stingless bees have well-defined natural distributions and it is very difficult for them to move out of these distributions. Worldwide there are about five hundred different species and they are in different regions. In Mexico, for example, there are forty-six and they have very different niches each.

A first point that concerns me since I started working is the destruction of wild nests. When I began to investigate in the state of Oaxaca what is happening or where are they, which stingless bees and how they are working them, I found that in many communities they still know very well the medicinal properties of these bees, the honey of these bees, and they are being used a lot, but the knowledge of how to manage them has been lost. This has led to the situation that many simply go to the forest, take the honey from the wild nests and many hives die.

So, in my eagerness to rescue these bees, I thought that the promotion of meliponiculture, which is the cultivation of these bees, would be the solution. It sounds very nice, but in the last few years there has been a boom in the promotion of meliponiculture, which in reality is causing much more dramatic effects. It is much more stress on the bees and on the ecosystem.

One is because the big question in the promotion of meliponiculture is where to get hives from to begin with. The hives are in the forest, so let's get the hives out of the forest to give people hives, so they can have these nice bees that don't sting. It has become a little bit cool to have stingless bees and many people go and take the hives out of the forest, but the

problem is that in the forest we need these hives to continue pollinating the forests. And the other thing is that if people have not received good management support, these hives normally or in many cases are dying. In the end, these hives that have been taken out of the forest are being lost.

There is still the question of where to get hives. If not from the forest, now I can buy hives online from different places, mostly in Mexico from the Sierra Norte de Puebla, where there is a lot of hive production, and from the Yucatan Peninsula, where there is also a lot of production. They say, let's say someone from Oaxaca, well, I am going to order some from Yucatan to Oaxaca, but that is just a movement of beehives out of their natural distribution and that movement can cause several problems.

The most obvious is the death of hives because they are not adapted to different climates. Some species do adapt to different climates, so let's say, well, I'm going to take these species, but no, it can cause an imbalance of species. It is not yet seen, but it has been seen, for example in bumblebees, that this has already happened, there was displacement and the local species died.

There is another cause for concern, the transmission of diseases and parasites. A very good example is the *Apis mellifera* mite. The mite native to Asia was transported with some *Apis mellifera* hives all over the world and now it is a big problem all over the world. So fatal that, for example, in Switzerland all the native beehives in Switzerland have died, they have become extinct, there are only medicated beehives, with everything they need to keep the bees. We hope to avoid this scenario for native stingless bees.

Another concern is the loss of genetic diversity, which is a very complex issue and is so far difficult to prove, but there has been this problem in other species.

And with all the promotion of meliponiculture, one concern is also how it is promoted. If it is an exploitative management, just as it is happening with honey bees, they will also become weak and sickly. And if it is a management based on knowledge about beekeeping, without emphasizing the big differences between beekeeping and meliponiculture. So those are additional points of concern for stingless bees.

Soledad Vogliano

I believe that among these three major scenarios that have been presented, we can see things that are in dialogue with what we see in the panorama of the underlying conditions of food systems – these extractive perspectives of appropriation of forms of production and natural production spaces in order to industrially transform them – and the relationship that we are seeing with the creation of new diseases, both through the industrialization of the food system, the appropriation of territories, environmental devastation, with the

precariousness of food systems that go hand in hand, and how this also ends up in major pandemics.

Well, now the proposal is that we open the space for all of us to contribute. We are not such a big group today and all of us present here have a lot of experience and knowledge, so the idea is that this should be horizontal.

The question we are giving back to the room has to do with, on the one hand, what links can we make with what has just been presented by our colleagues, if this has to do with what we are seeing, with the scenarios that are approaching us, if there are already some of these realities that we have in front of us on the table. And also, what other scenarios we think we should go into more depth and look at in more detail, because they are what we are seeing on the horizon and that can also contribute to this collective diagnosis.

Dr. Hugo Ramiro Melgar-Quiñonez

Well thank you very much, my name is Hugo Melgar Quiñones, I am of Guatemalan origin, but I work as a professor in the school of human nutrition at McGill University in Montreal and I am a visiting professor at universities in Peru, Brazil, Colombia and Mexico. My topic is food security, and I received the invitation to this very nice meeting through a network linked to the Landless Movement of Brazil, so I am very grateful to begin with and I congratulate you for this.

Many ideas came to my mind, I am an academic, a teacher and we see many of these things from different perspectives, and I wanted to react a little to that term that I found very interesting that you have been developing about predictable surprises, and link it to the issue of food systems and hunger specifically.

It turns out that there are things that we don't see because there is a lack of information, there are things that we don't want to see even though they are obvious, and there are things that we hide because we don't want to look for the information. And I am referring specifically to the issue of hunger in Latin America. My work has been a lot about working with food security scales that somehow reflect the experiences of people when they suffer from food insecurity and hunger. These measurements are very much in contrast to the international data that show that the entire continent of Latin America, with the shameful but very obvious exception of my home country, is in the green, that is, we have enough food, we produce enough food to feed twice the population we have, but nevertheless the obvious thing is that there is hunger in Latin America.

These types of measurements, which we have somehow called the voices of the hungry or the voices of hunger, have allowed us to identify a different magnitude of the problem of hunger. The latest United Nations reports show that using these tools we can see that at

least 40% of the population in our region is suffering from hunger or food insecurity, and that does not include the milder or less severe stages of food insecurity.

This is an issue that, when I listened to Pat, I was fascinated by this thread that he was building, this fabric that he was weaving, because this is an issue that is precisely the basis of many of the crises and movements and the consequences we see in Latin America in terms of violence, the wars we have experienced, the dictatorships, migration, etcetera, etcetera, etcetera.

And just to finish, I do not want to take up too much of your time, I want to tell you that two weeks ago we had a meeting in Mexico City with academics from more or less eight Latin American countries, from Mexico to Argentina, passing through Uruguay, Peru, Brazil, Panama, etcetera. We are working on a topic that we believe can help us highlight the experiences of people when they don't have access to water, that is, they have a water tap in their homes, but nothing comes out and the quality of the water is just....

So I leave it there, these are issues that are quite obvious, but that are going to generate many surprises that are predictable. Excuse me for taking so much time, thank you.

Yamil Alis

Good morning, good afternoon. I'll try to be synthetic. About Pat's talk, a lot of things resonated with me. I am a computer consultant, I am working in an Argentine company, Arsat telecommunications, and also a goat production cooperative, systematizing and automating goat breeding, so I have come across situations related to food and on the other hand technology, and I am always aware of all the advances that are emerging.

As Pat said about the effects of systems, it is something that I see and I see it over time, that the essential problem that has been mentioned several times is the dependence that we have with those systems, with systems in general. With years of development, it is not indispensable, it is not a reality that it has to be that way. When one considers the development of a system, one can add requirements, and one of the requirements that we can add from these talks is that they should be resilient to catastrophes, for example. This opens up a lot of questions so that a system, for example, in the event that the electricity is cut off or there is no internet, what would happen, so that the system continues to function without dependence on these inputs.

I think it is important to ask that question every time you are making your system or to ask yourself that question also with every system you use, from the internet connection you hire, if you belong to a cooperative or if you belong to a large corporation, it opens that conversation and at that moment you can choose between two options for when something happens, a catastrophe, which one is more resilient to a problem.

A little bit about what Pat had said, it applies to all kinds of cases, from cell phone applications, for example also, if the security of the messages of the applications that we are using goes through WhatsApp by a centralized company or by systems where that security is guaranteed by other types of cryptographic security. That was a topic that I didn't hear in the talk and that is being talked about a lot in the computer science world. There is progress being made, I don't know if it's as fast as it should be, about cryptography. In ten years there are expected to be post-quantum computers and those computers are going to be able to break all the security we have today, probably sooner, but to the extent that these systems do not have post-quantum security, there may be security problems, even swiping a credit card may be vulnerable data, whether it is a credit card, the identity of people or confidential information of any kind that is important, the sovereignty of personal data. It's a huge topic to talk about, but well I'll leave it there.

The other topic that was mentioned several times and has advanced very fast in a year or so, so fast that it is the most obvious thing that has advanced so fast, is artificial intelligence, the advances in language models, the capacity that they are having and the versatility that they are having. They are not only useful for chatbots, but for recognizing images, generating images, content, videos, and all that has happened in a year or so. At the rate it is growing, we don't know where we'll be in two years from now. So that would be one of the most urgent points that we should be more attentive to in terms of technology.

Fernando Frank

Thank you very much for the content of the workshop and for the willingness to share knowledge. Some issues that arise from what I heard.

The first one, as a contribution that I think is complementary to the discussion on pollinators, is that there is very strong evidence of the importance of pollinators other than bees, which are many. There is systematized evidence from international teams and here in Argentina very clearly from some researchers such as Garibaldi, that prove the importance of non-bee pollinators and how this importance is complemented with that of bees that are intentionally placed in productive systems, and how this links with crop diversity, that is, the abysmal difference between monocultures and diverse agroecological systems. I believe that, as I said, this is complementary to the knowledge transmitted by my colleagues and I offer to bring it to you because it seems to me that it is useful knowledge.

With respect to Silvia and Pat, a question I propose to think about is that, as it happened with some war issues, war conflicts, my opinion is that the most powerful groups in the world, from what we have been able to observe in these recent crises, I am referring both to the pandemic and the war as well, it is very clear to me that they are going to let the collapses happen, both in health and in data management.

This issue that Silvia emphasized, that those who won are in control of important life processes, my opinion is that they have already made the reading that they are going to win from new crises, so they are going to let them happen soon, in the two levels of which Pat spoke about – the crisis of the collapse of the data systems and the sanitary with respect to the pandemics, on the specific problem and on the manipulation of what's happening, inflating health problems to impose drugs and health policies.

I also think it is important to discuss something recent and which is gaining in intensity, what was raised about the supposed artificial intelligences. I have been following it and, in my opinion, it is not about what they can develop in terms of intelligence, but about how they are manipulating the political analysis of these technologies to make people believe that they can solve problems, when in fact they are only being very efficient in conjugating verbs, for example, language models. They are not producing knowledge nor do they have the capacity to produce knowledge or solutions, but the construction of political discourse is very strong, of political subjects focused on saying that we have the answer to the problems and we need them to believe in it. I find this very worrying, because what it produces is an erosion of knowledge and a surrender of personal and collective sovereignty that worries me a lot.

Pablo Galeano

Hello, good morning to all of you, it is a pleasure to see so many familiar and unfamiliar faces and to participate in this area.

I simply wanted to take this opportunity to comment on the foreseeable surprise that we are experiencing today regarding the lack of drinking water in the metropolitan region, in a country that is at the mouth of one of the largest fresh water basins in the world, which is located above the Guarani aquifer. Today, here in the south, salty water is coming out of the faucet. So, as Hugo commented on the water issue, it is one more example of how crises are managed and the causes of the crises are blamed on. Here La Niña is to blame, which is the climatological effect that is responsible for the drought we are experiencing in this region. But little or nothing is said about deforestation in the region and how it impacts the water cycle. Little is said about the mismanagement of the watersheds in the interests of agribusiness and the large pulp mills that have set up here in Uruguay. And so, while water is being taken from the aquifer to produce green hydrogen and to produce cellulose, we are running out of drinking water for the population.

And just this morning I was listening to a program on the radio about crisis management and how the government handled the Covid pandemic crisis and how it handled now the water crisis, and how for the crisis caused by the Covid pandemic there was like a script to follow, a protocol to follow on how to deal with the crisis, that the government was very careful in that, although we don't know the results. We don't know if it was better here in

Uruguay than in Africa, if it wasn't better in the countries where everybody got vaccinated, there were people who got up to six doses of vaccine, or how was it in the countries where the vaccines didn't even arrive. Here too, that crisis has been declared over.

Regarding the water crisis, the government's behavior was disastrous because there was no foresight whatsoever. There was talk in January that there could be a problem, but no measures were taken, and as water in Uruguay is a human right enshrined in the Constitution, it cannot be privatized, that was plebiscized almost 20 years ago and it is in the hands of the State to manage water, there was a total absence on the part of the State to prevent this. Even now the solutions proposed are not to improve the management of the basins, but to build a mega water plant, to take water from the Río de la Plata, for which there will be Israeli funding.

I simply think that this concept of predictable surprises is very important and that what is happening today with water is one more example of the effects it has on the agrifood supply chain as well.

Soledad Vogliano

I could also talk about the situation here where I live, in La Rioja, where we see all these multidimensional crises in a small way: the water crisis, the supply crisis, the energy supply crisis, which makes food prices go up because we are not sovereign in vegetables. I think any of us can begin to use this lens to describe some of the situations that we live in and how they are local and global at the same time. I think a little bit of the spirit of the process laid out to analyze these predictable surprises has to do with learning to use this lens of analysis to be able to think ahead.

In perspective, the idea is to work on these contributions, both those of the first session and those of the second session, to be able to arrive at a third session where we focus on looking at what are the next steps we would have to take to be more prepared, how to prepare for some of these scenarios. The next session will be held on June 9. We are sharing a systematization of Pat's intervention in the first session and we are also working on the systematization of all the participations as a second input.

Verónica Villa

Well, as you can see it is an enormous challenge, but I really liked the image that Soledad used to describe what we would like to do with these sessions. It is like starting to have a common lens to see these signs on the horizon of things that could happen and how well we are deciphering these signs and what would be needed in our organizations, in our struggles, in the movements, to face them or not to be so naked in the face of collapses.

On the last session we will try to highlight the most reiterated ideas, for example, the issue of water came up very little last time, now it was mentioned more and there was no approach, no description of a possible trend or catastrophe with the issue of water. The specific topic within digital technology, the topic of data, the topic of energy has only been mentioned on the side. There are several things that have not come out. There are others that are very clear, perhaps because many of us come from these areas of struggle for food systems, so the issues related to health and food are very present, and also the health of the territories.

So, along with these exchanges in dialogue, we are doing, in ETC Group and especially Pat Mooney, research on this idea of looking into the future. In the last session, we will unpack and develop all that we have seen and bring it back. The idea is to end up with a collective product of these reflections, that's kind of the most obvious thing, maybe a text, but we are also in the construction of a website where we are hosting the videos of the sessions and other materials that we have used. The introduction where we explain what this concept of predictable surprises is and where it comes from, the summary of the previous session, which is a history of civil society's achievements for better food systems. All of this material is going to have a home, the website of the ***Long Food Project***.