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Without further delay, I will turn to Mr. Torero Cullen to start our discussion.

Máximo Torero Cullen

Let me start by saying that the medium or long-term future of agri-food systems cannot be predicted, meaning that it is a system that works under risk and uncertainty. Risk is something where you can predict the probability of the loss function and therefore you should be able to insure. However, uncertainty is something you cannot predict and that makes the system extremely complex. This system has a complex set of interconnected activities that go from primary production, processing and distribution, which includes the trade issues you mentioned. In the last year, the maximum level of restrictions was about 17% of the calories traded, which creates significant exacerbation on prices. It also brings consumption and all of them are integrated with socioeconomic and environmental systems that depend upon the behavior of billions of people. All that we can predict is that we will be facing significant challenges in the future. What we observed in the seventies, in 2007-2008, in 2011, and today, brings up the complexity of the system, brings up a system that has some market structure that is very concentrated on exports – especially on cereals – and also brings a system that has significant interrelationships and interlinkages. The way and extent to which we decide to address them will pretty much depend on how we determine the future of the agricultural system as well as our future and the future of coming generations.

In the FAO, we have been focusing on 18 drivers of agricultural systems. For instance, they comprise population dynamics, economic growth, macroeconomic stability, which is something we have not normally looked at. For example, today there is the high level of indebtedness of countries, exchange rate variability and the link between energy and food have been significant issues we need to look at. Just to mention some of the 18 drivers, there are also both science and innovation, poverty and inequality, capital and information, intensification of production processes, scarcity of natural resources, of course, climate change.

I just want to highlight three key challenges that clearly emerge from the analyses we have been doing on these drivers. The first challenge is that food is very unequally distributed across countries and households, and this is essentially why trade today, with the current distribution of food, is crucial. Between 702 and 828 million people faced chronic hunger in



2021. More than 3.1 billion people cannot afford a healthy diet because they lack sufficient income to buy the necessary nutritious food. Many people have experienced unexpected income shortfalls as a result of lockdowns due to the pandemic and more recently the rising food and input prices connected to the war in Ukraine, which are now creating an additional burden for low-income families. For example, if we look at having the nine food groups, we need to consume to be able to have access to have a healthy diet, most of Sub-Saharan Africa and some South Asian countries will not be able to get access to those nine food groups. The percentage of them that they can produce for themselves is extremely low, which again raises the importance of trade today.

The second challenge is climate change and the fact that if we continue as today, our agri-food systems will be unsustainable. Climate affects us in four dimensions, one is extreme temperatures. Second, an excess or lack of water, and we have just seen what happened in Pakistan and the flooding problems. It is also the fourth largest rice producer in the world, which as a result led India to impose restrictions. Third, there is volatility and variability. Fourth, how diseases will evolve, and in the previous session you heard that is changing because of climate. Agriculture is already affected by climate change and more frequent and more extreme events such as droughts, floods, extreme temperatures and saltwater intrusion due to rising water levels. Furthermore, land, water, soil and biodiversity are progressively degrading. Soil nutrient depletion, extensive deforestation, overexploitation of marine resources and pasture and pollution at all levels, raise serious concerns not only for agricultural systems but also for the broader socioeconomic system and the stability of the environment. At the same time, agriculture itself and related land use generates more than 20% of global greenhouse gas emissions and it is estimated that altogether agricultural systems contribute approximately one-third of greenhouse gas emissions.

The third challenge is that we will need to produce more with less and, again, we need to distribute it better. The United Nations Population Division projects in one scenario that the world's population could reach close to 10 billion by 2050. This means that it is very likely that farmers will have to nourish an additional 2 billion people less than 30 years from now. They will need to do so while drastically reducing emissions, since this will be a requirement for all sectors if we are to avoid catastrophic climate change.

Addressing the challenges to move away from business as usual implies facing contrasting objectives. Just to mention a few of them, we have to increase agricultural output while reducing its environmental footprint, pursuing sustainable deals while minimizing land use expansion, and increasing productivity while preserving employment. We need an agricultural system transformation that brings future sustainability and resilience, or these trade-offs will create a great imbalance and can only materialize if the agricultural systems evolve and adapt on both the demand and the supply side. However, for this we also need to highlight the concept of the real cost of food to incorporate the externalities, positive or negative. That is the only way we will be able to align the support for agriculture and the incentives we have in place. For instance, on the demand side we need a shift in the diets for the ones who overconsume protein, by increasing the share of plant-based protein sources. Not only will this be beneficial to mitigating emissions, it would reduce the risk from zoonotic diseases, limit pesticide use and contribute to reducing some anti-microbial resistance. Different choices regarding quantity, safety, nutritional content, social and environmental footprint of food, to



consume and waste may trigger completely different agricultural system outcomes. Demand side policies and provision of general public goods such as education and transparent information may promote critical thinking and awareness, for example, campaigns that raise our awareness about food waste have proved very effective in reducing it. On the supply side, optimal use of outputs, agricultural approaches, could not only reduce greenhouse gas emissions but also provide co-benefits in terms of additional ecosystem services and full integration with the broader circular economy. Food adapted for appropriate use by smaller scale producers could in addition lead to sustainable intensification and resources spurring improved logistics. This is clear today in the use of fertilizers and pesticides. However, the climate mitigation potential of some new agri-food system technologies will depend on access to low-carbon energy since they are relatively more energy-intensive. This is also true of the deployment of the cold chain and packaging technologies that can help to reduce food loss and waste by increasing energy and materials used.

Dear colleagues, let me just say that the challenges ahead are daunting and would bring about a world of plain risk and uncertainties. We need smart government policies and to bring in all the science, innovation and data as well as good governance, to be able to implement this, so that we can trigger the change we need now to be able to transform the system that could allow us to produce more with less in a sustainable way but especially to improve the distribution of food across the world.

Jean-Michel Severino

Thank you very much for that tour de force, Mr. Torero Cullen, and for highlighting the challenges of predicting, instability and the importance of the necessary public policy responses. I would add the importance of the role that the food industry's major actors must increasingly play in providing solutions to increase the system's stability.