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Welcome to this workshop, which is devoted to what in French we would call the “défi alimentaire”. I would much rather use the English term “food challenge” because I really do believe that it represents one of the major challenges of the 21st century. Let me come back to that. First, I will introduce myself: Philippe Chalmin. I am a lecturer at Paris Dauphine University and founder of *Cyclope*, which is a big book, a copy of which I have here, that tells you everything about world markets for raw materials in general and agricultural products in particular. We have two other speakers, and it is part of the magic of this World Policy Forum that we have people here from very different countries. Mr. Kairat Umarov is the Deputy Minister of Foreign Affairs in the Republic of Kazakhstan. Kazakhstan now plays an important part in the food and agriculture global arena. Along with the other former Soviet republics, in particular Russia and Ukraine, Kazakhstan plays a very important role as a cereals exporter. Let’s not forget that Kazakhstan, Ukraine and Russia represented a third of Russian wheat exports for the 2009-2010 growing season.

Problems of drought, followed by the fires in Russia we saw on the television this summer, have reduced supplies from the whole area we refer to as the Black Sea region, prompting the sharp price increases we have seen in the past three months. I would also like to welcome Mr. Yashwant Thorat, who asked a question to Jean-Claude Trichet earlier. You may be wondering why the former head of India’s Central Bank, the Indian Federal Reserve Bank, is here at a round-table discussion about the food challenge. The answer, quite simply, is because Mr. Thorat has dealt with all the issues involved in rural credit for 35 years and that India is fundamentally the one country that did not suffer too badly during the hunger riots of 2008. God knows whether Indian agricultural policy was criticised in the corridors of power in Washington. Indian agricultural policy, however, put up a robust defence. India today is a country that has almost achieved food self-sufficiency, and that is very largely the result of its agricultural policy, in which, as we shall see, credit plays a very significant part. We will also have the opportunity to talk to Mr. Thorat about issues such as biotechnology, the use of fertilisers, and so on.

One of the real pleasures of a meeting such as this is that we are relatively small in number. As a result, our discussions can be really wide-ranging. I have already identified a number of resource people amongst the participants we will be able to address questions to, for example Amit Roy, who is a leading specialist in the economics of inputs and in particular fertilisers, which we know is one of the problems facing agricultural development in the world. I hope that Jean de Kervasdoué, whom you saw this morning, will join us, as he also - among other expertise - specialised just a little in all the issues around biotechnology. Given this background, I would like perhaps, initially, to take advantage of my role as facilitator to present an overview of the current situation and talk to you about where we stand at the moment. This morning we talked about health, we talked about monetary issues and we talked about the economic crisis, so why go back to the problems of agriculture?

Fundamentally, who would have believed, when people at the start of the 21st century have mastered practically everything in terms of technology and controlling space and time that we would still find ourselves facing food problems, just as our ancestors did during the great famines of previous centuries? Most of us experienced 2008 primarily as a huge crisis in the economic world. The worst crisis the world had seen since the Second World War and in reality, since 1920. May be we have forgotten, that something else happened in 2008: 2008 was the year when prices soared on most raw materials markets. Of course we remember oil prices getting close to 150 dollars a barrel. They are talking about energy in the workshop just next door. We remember the sharp increase in the price of metals, and so on, and then we also remember soaring agricultural prices, and everyone recalls the television footage of hunger riots in a number of developing countries which, if I remember correctly, resulted in the government of Haiti

being overthrown. It's fair to say that Haiti may not be the perfect role model in terms of governance, but the fact that people were hungry prompted riots in a large number of countries.

The riots were caused by four - or fivefold increases, depending on the country, in the prices of the world's basic foodstuffs, including wheat, secondary cereals, soya, rice and dairy products, compared with 2006. What's more, we found ourselves in an extremely serious situation at the end of the 2007-2008 growing season, with stock relative to consumption at an almost unprecedented low level. Do you also remember the crisis meeting held at that time, in early June 2008, in the form of a World Food Summit in Rome organised by the FAO? All the world's leaders were there, all of them to some extent crying crocodile tears, saying: "Yes, yes, of course, we finally need to start thinking about agriculture." I remember, in particular, Bob Zoellick, President of the World Bank, saying that it was now time to put agriculture back at the top of the agenda in terms of development problems. Why had he not done so before? That's a different matter.

Firstly, the problems of agriculture have been largely swept aside by the intensity of the economic crisis. There were so many people to save that, as Mo Ibrahim said somewhat cynically just now, it was easier to save bankers than farmers. That's no great surprise, and it's true that we moved more quickly to save a number of the world's leading banks than a number of its agricultural systems. Then, as it happened, the two years that followed (2008-2009 and 2009-2010) were relatively good ones for agriculture. Cereals, for example, moved back into surplus. World prices returned to quite manageable levels without, however, falling back to where they were previously. The agricultural arena did not see the sharp fall in prices seen in other areas, such as oil, which fell from 147 to 30 dollars a barrel. Even so, there was a fairly marked fall in the major markets such as wheat, rice, maize, etc. Basically, everyone forgot about agriculture again.

And then 2010-2011 arrived. I should remind you that in agriculture, we talk about growing seasons, which traditionally begin, at least for cereals, on 1st July. For other products, the year begins on 1st October. So, we were living in a sort of precarious security, again with climatic problems. The problems came from my right, i.e. from Central Asia, Russia and Ukraine. Very severe droughts had a significant impact on cereal production in Russia and slightly less in Ukraine, though the reduction there was still considerable. Russia had probably its worst harvest in 40 years. Forty years put us back in the time of the USSR. At that time, the figures may have been slightly inflated. It was probably one of the lowest levels of production ever, and as I was saying earlier, in 2009-2010 Russia, Ukraine and Kazakhstan accounted for a third of world wheat exports.

It can be estimated that they exported 20 million tonnes less on a world market of 120 million tonnes. Add to that, quite simply, the demand associated with the economic recovery of a number of countries and changes in dietary habits. Add to that, and I will come back to it, programmes for producing energy from agricultural products, particularly in the United States. The bioenergy programme, for example, pumps out 100 million tonnes of maize in the United States every year. Once again, we saw a sharp increase in prices, initially marked, particularly in July and August, by an embargo on wheat exports to Russia and quotas on wheat exports to Ukraine; the situation was also characterised in September and October, as US maize and soya harvests came in lower than expected, by very considerable pressure on the markets for both cereals.

To give you a few figures, and I'm not going to bombard you with numbers, it's clear that in Europe for example — and I'm not forgetting that life in Morocco is very closely associated with Europe — the price of wheat increased from 120 to 220 euros a tonne during July and August. The increases for maize and soya were slightly lower. So, as ever, people again began to start talking about relaunching a coordinated programme for world agriculture. It has to be said that there were not too many people at the FAO's previous Food Summit, which took place in November 2009, exactly a year ago. Only two heads of State attended the event. Berlusconi because it meant he could avoid a court hearing in Milan and the Pope because it was being held in his State. No other heads of State were there. It was clear that agriculture had faded into the background and now it is suddenly in the foreground again. You may already be aware, and we will no doubt discuss it tomorrow, that the problem of the regulation of agricultural markets has been heavily emphasised in the G20 programme, which France will be leading next year. It is fair to say that there will be a lot of discussion around speculation in particular, the negative effect of speculation, and so on.

So I think the first question we need to address is: why were there such sharp increases in prices in 2008-2010? We need simply to remember one thing. We reached the end of the 20th century with extremely depressed agricultural prices. As most of you are not in the agricultural world, you won't have realised, but agricultural prices at the end of the 20th century, in real terms, i.e. taking inflation into account, and in spite of Mr. Trichet there was still a bit of inflation, reached probably their lowest levels in the whole of the 20th century. We lived through this period with an illusion of abundance and, as prices were depressed and we were producing surpluses, the policies we followed were ones that involved dismantling agricultural policies. It was at this time that we began to unravel common agricultural policies in developed countries, particularly in Europe, but above all, and this was the most serious issue, in developing countries.

Except for a few countries such as India, which were able to withstand it, how many nations subjected to the rigour of the structural adjustment plans coming out of institutions in Washington, were obliged to do away with their cereals boards and the systems they had retained offering guaranteed prices to producers, etc.? The response was quite simple: "You'll see that with the free market, things will be fantastic; it's much better for you to buy on the world market to feed your urban consumers. As for the peasants, they don't vote anyway." That's a secondary issue. And of course, it was me who added that to the argument. It was also the time and it still is the time when many right-thinking people said, "Our systems of agriculture are much too intensive. We're going to the wall. We need to reject biotechnologies." I come from a country that has banned GMOs (Genetically Modified Organisms) completely. We'll be able to speak to Jean de Kervasdoué, who is here with us, in a little while. But I recall that in a perfectly fine country like Germany, the Minister of Agriculture, Renate Künast, was the leader of the Green Party and she dreamed of one thing only, namely switching the whole of German agriculture to bio-organic systems, which generally result in reducing yields by half. But that was fundamentally a secondary issue in a world characterised by abundance.

For 10 or 15 years, we have not seen a dismantling but the complete abandonment of any such idea. There was even talk of agricultural productivity and productivism. In countries like France it was practically a dirty word. At the same time, without people realising it, demand was increasing as a result of economic growth. The fact that many developing countries and emerging countries were accessing slightly richer dietary models resulted in ever-higher consumption of animal products. As luck would have it, that was not the case with my Indian and, theoretically at least, vegetarian neighbour. I say theoretically, because we were sitting next to each other at lunch and it seemed it was not entirely true. But it definitely was the case in a country like China. Young Chinese people have got richer. They have improved their diet and started eating pork, glazed duck, and so on. To take China as an example, it has become the world's largest importer of soya, with a growth in imports that is still continuing today to a considerable extent. Demand has also increased.

So, two areas that had not been expected up till then, but which can be explained to some extent by the search for new outlets, are both connected to biofuels. Biofuels were not the primary cause of the sudden increase in prices in 2008, but they did aggravate it. Today, the bulk of biofuel programmes are based around sugar cane, primarily in Brazil, which is understandable; the other main element is the bioethanol programme in the US, based primarily on cereals and mainly on maize. I have said that the world market is very simple. World production: 750 million tonnes, US production 300 to 350, use of maize for ethanol production: 100 million tonnes. The result is that there is more maize used in US ethanol than US maize available for export.

It's clear that at some point there was a kind of disarmament on the supply side even as demand was increasing. At some point, in around 2007-2008, the two crossed over. There was a lot of talks at the time about speculation. It's a word people don't like. It's a word politicians love to use to lambast unscrupulous speculators. It's fair to say that in agriculture, as in the whole of the raw materials sector, we have seen a number of bankers, some of whom are here with us today, take an interest in raw materials. Raw materials have become a new class of investment, with their own indices and so on. It has caused quite a stir in the markets. Nonetheless, I don't think we can attack speculation. Speculation can amplify an existing movement. It can add to its volatility.

It is not what creates the problem. If there had not been a drought in Russia, wheat prices would not have soared as they did. It's possible that speculators then added to the problem to some extent. The sort of comparison I always use is saying that speculation is like the foam on a wave. When there is a lot of wind, there are a lot of waves. There's a lot of foam and you can't tell the difference between the water and the foam. But when there's no wind, when the sea is calm, there's no foam. Fundamentally, we need to remember that it's the wave that makes the foam, not the foam that

makes the wave. This is all the more the case insofar as in the agricultural world, we can make comparisons between products for which we have derivatives markets or 'financialised' markets as people say now. These are the big markets in Chicago, for wheat, maize, soya, etc.

But we also have products for which there are no derivatives markets. There are no derivatives markets for rice, for example. There are no future markets for rice. Rice pricing is Bangkok "physic pop"; there are no tools. No-one speculates on rice other than producers, wholesalers and consumers themselves. Rice prices increased even more sharply in 2008 than wheat prices. You may have heard, or at least the Europeans may have done, what has happened in the dairy products market. At the moment there are no derivatives markets worthy of the name for butter or milk powder. Yet the markets have still soared. In reality, rather than blaming speculation, we simply have to tell ourselves that the markets — at least that's my theory (please excuse a theory from a liberal) — that the markets are of some use. Markets send us a message.

When the dogs start barking because the house is on fire, you can kill the dog, but the house will still burn down. The dogs barked in the markets in 2008 and 2010 and said, "Be careful, look at what's happening in front of you. Look at the world's food needs. If you don't make an effort, we're going to force your hand by driving prices up to show you that you're facing a real challenge." So, what does this 21st century food challenge consist of? We talked this morning about the demographic challenge. I couldn't resist asking Jean what his predictions were. I was looking at a world population stabilising at around nine billion human beings by 2070. Perhaps there will only be eight. It doesn't change my argument to any significant extent, because the world population is already 6.5 or 6.7 billion people and 1 billion of these 6.7 billion are already suffering from food poverty. Not hunger. It lies somewhere between hunger and malnutrition: people who have poor diets as a result of poverty.

There are around 150 millions in India if I remember correctly. There are 6.5 billion of us, and 1 billion are suffering from food poverty. If we imagine that in two generations, there will be around 9 billion of us and we think we will have eradicated poverty completely, that everyone will have enough to eat, which would be fantastic, roughly speaking, taking into account the change in diets towards rather more animal proteins — and don't forget that to produce 1 unit of animal proteins, to produce 1 chicken, it takes 3 units of plant protein, to produce 1 unit of beef, you need 7 units of plant protein, so the processing by the animal is significant — so, roughly speaking, we can estimate that the food challenge the world faces is the ability to double our agricultural production in two generations to satisfy our food needs alone.

I haven't taken any energy requirements into account, as I'm not entirely sure of the reasoning for that to within a few plants. I think that the energy balance of producing ethanol from maize, if you include everything, barely evens out. I'm not even sure if it isn't negative. So let's forget the energy side and focus on the food challenge we face in the 21st century: doubling the world's agricultural production simply in order to be able to respond to the growth in the demand for food. How does one go about doubling world agricultural production? One's first, naive reaction is a simple one: increase the area of land under cultivation. The problem is that there is no or at least only very little land that can be developed. There is the Cerrado in Brazil, the great plateau currently devoted to extensive livestock farming, which could be turned over to agriculture. The problem is avoiding extensive livestock farming going further up and into the Amazon region. But there are still around 100 million hectares that could be recovered.

There is probably potential in sub-Saharan Africa, but the quality of the soil is somewhat doubtful. Elsewhere there is very little and conversely, we need to think about urban growth. In countries such as China, urban growth consumes between 500,000 and 1 million hectares every year. Simply because cities are growing and in general, cities are in historic locations. They sit at the heart of good agricultural regions. What we lose along the way are good agricultural regions. When you arrive at Charles de Gaulle airport in Paris, you touch down on some of the best land in France, which is thus no longer available for cultivation of any kind. Let's move on. We don't want to waste time, so let's work simply on the basis of a constant area of usable agricultural land in the 21st century. That may be somewhat pessimistic. I have to say in all honesty that the FAO thinks there is some potential.

Personally I am rather sceptical as to its reasoning insofar as our ancestors were intelligent people and the land that remains would be difficult to work, produce low yields and be subject to erosion. Perhaps our colleague here will talk to us about the virgin lands of Kazakhstan in the great era of Khrushchev. I would be curious to know what has become

of it today. Be careful: growing more as a way out of the situation is probably not the right solution, particularly given that we need to take into account climate change in some areas, which are going to find themselves susceptible to worse droughts. Others run the risk of getting warm enough to thaw, but I think it will be some time before we can start ploughing up the Siberian or Canadian permafrost.

So, if I cannot increase the amount of land available, the challenge becomes a very simple one. It is about being able to double yields. So, how can we double the world's average yields? One's immediate reaction is to think about technological innovation. It certainly has its place and we should say something about it and take stock of the development of biotechnologies and GMOs, which are now covering increasingly large areas of the world and prompting extremely violent reactions from "civil society or at least its representatives". There will certainly be technical progress. There will be new green revolutions. How will they occur?

It will be interesting to see and examine the way the green revolution was managed in a country like India, which is the best example. Fundamentally, however, we can tell ourselves that we can improve things enormously with equivalent technologies at a more or less constant level. Improve things in terms of managing inputs more effectively. Better management of the use of fertilisers, plant protection products, etc. We also need to ask ourselves whether such fertilisers will always be available. There has even been talk of Peak Phosphate, on the same model as Peak Oil. I'm talking about phosphates because we are sitting here on top of almost half the world's phosphate reserves. We know that for the moment, phosphates are not renewable. As a matter of principle, they may never be, even in our technological dreams.

Finally, and it's another interesting question to discuss, there is the whole area of agricultural policy. Isn't the best way of increasing production to guarantee prices that acts as an incentive to producers? This is how Europe, which, let's not forget, was in deficit in agricultural terms in 1958, has now become one of the world's leading exporters. It is clear that, from this point of view, managing agricultural policies in emerging countries but above all in developing countries, especially Africa, because of its demographics, is our most important challenge. What, then, will the most important challenge be from an agricultural point of view? It's a real question. How should we manage agricultural policies? How should we manage price guarantee systems? It's a subject that generated a significant level of interest in the 20th century and one that perhaps we felt had been resolved, but which has re-emerged as a major problem in the 21st.

Let me stop there. I must apologise for having gone on for such an atrociously long time, but to put it simply, pressing home one's point is one of the privileges of chairing a workshop session. It is now much more fashionable to speak of the climate challenge, energy challenges, and so on. It's certainly very important. Paradoxically, I believe that the major challenge for the 21st century is that same as it was in the 18th. Let's not forget that the French Revolution began with a hunger riot, when the people of Paris went to Versailles to find the baker, the baker's wife and the baker's boy. It was a hunger riot. The great revolutions of the 19th century (1830-1848) were hunger riots. The last great famine the world has known was during the Cultural Revolution under Mao. The world thought it had moved on from that situation, except in a few extreme cases. Fundamentally, the food challenge is now the major challenge humanity faces in the 21st century.

Those, in brief, are the general ideas. What I suggest, in addition to this very general outline, and then answering some questions, is that we get to work quickly on the two case studies and that we look at India first. India, after all, is home to the world's second-largest population. It has 1.3 or 1.4 billion inhabitants and yet we have not talked about hunger riots in India in 2008. In recent times India has caused a stir in some markets and poor harvests in the country have prompted a sharp increase in sugar prices. But that's a secondary issue. Practically since the time of the raj, India has maintained an agricultural policy that has focused on protecting small farmers. If I remember correctly, India introduced one of the fairest of almost all agrarian reforms in the world when it first gained independence. I think the Indian situation is an interesting one to understand in the same way that India is now also asking us a number of questions. Organisations that oppose GMOs, for example, have made a lot of use of the suicides of Indian farmers to protest against the development of GMOs in the cotton industry.

So, Mr. Thorat, where does India currently stand? What is its current situation and where do you see it going in the future? I'm conscious of the fact that you are a central banker rather than an agronomist, but am keen to ask how one develops an agricultural policy and in particular how one finds the money to support agriculture.

