

PARK YONG-JOO

Chief Marketing Officer and Head of Global Business Operations at PlanTFarm

Jean-Michel Severino, President of Investisseurs & Partenaires

I suspect we are going to continue digging into this issue with Mr. Park.

Park Yong-Joo, Chief Marketing officer and Head of global Business Operations at PlanTFarm

My background is marketing and I use to prefer a show and tell but because of some technical difficulties I cannot show some images so I will focus on telling you the story. The question is whether controlled environment agriculture, CEA, technology can be the solution to food crises or shortages. I was really glad to hear the UAE Minister of Climate Change mention that she is a strong supporter of CEA technology because the Middle East is the area that many CEA companies are actually focusing on to really deploy their technologies.

When you really think about food shortages there are many different dimensions. First is whether you can have enough food for the human race on earth, while in some countries they really worry about food sufficiency and self-sustainability. This self-sufficiency issue came out a lot after the pandemic. When trade is disrupted and also regional conflict like the Ukraine war, those events can actually cause issues with self-sufficiency.

If you really think about different countries and regions, they all have different needs for controlled environment agriculture. One example would be if you think about Antarctica, the coldest climate on earth where there are no plants but Korean researchers at the Sejong research center there are growing watermelons, cucumbers, peppers, tomatoes, all kinds of different fruit and vegetables in container farms. The researchers are not really farmers and they do not know how to grow these things but the whole system is monitored from a central location in Korea and an expert in the monitoring provides them with instructions. As a result, they can really enjoy fresh fruit and vegetable which improves their wellbeing but cultivating those greens in cold places like Antarctica is also good for mental health.

Mongolia is another good example and I know that a lot of controlled environment agriculture companies are really focusing on hot weather, but Mongolia has been importing nearly 40% of its vegetables and almost 95% of fruits from other countries. When I visited Mongolia the quality of leafy greens is really poor, even in premium supermarkets, and they are so bad that I would not really want to buy them. When I ask Mongolian consumers if they eat vegetables they say yes and when I ask what, they say sweet potatoes and root vegetables, they have never enjoyed eating leafy greens. One of the projects being carried out in Mongolia with support from local Mongolian companies and the city of Ulan Bator, is building an indoor vertical farm close to the city and then producing 70 tons of leafy greens every month. We strongly believe that this will improve the health of Mongolian consumers.

Northern Canada is another example and one city there has a very high rate of obesity and diabetes among young kids. Again, this is because they do not have the opportunity to eat

leafy greens and fresh vegetables. The local city actually called on KIST, the Korea Institute of Science and Technology and they have actually developed the vegetable called pak choi in an indoor vertical farm. We call that super pak choi because it has some special ingredients that help to reduce body fat and obesity and KIST was able to develop pak choi with 2.4 times these ingredients and to produce it twice as fast as traditional farming.

Those are some examples in cold countries and in a hot country like Dubai, as the Minister of UAE said, they are already using controlled environment agriculture here to produce tomatoes, black berries and leafy greens. Another project that is currently taking place in the UAE is actually producing animal feed in indoor vertical farms. I found a statistic saying that Abu Dhabi is the second largest importer of alfalfa from the US and China, and it has grown 35% in the past 10 years. If you think about producing in the US, then you have to dry it so it can be transported to the UAE and once it has arrived water has to be added and then mixed into the animal feed to give to the cows. I hoped we could produce alfalfa from indoor vertical farms but it is not possible but we can actually produce bean sprouts very easily and they have very good nutrients for cattle and it is also much cheaper than alfalfa. There is also a lot of research done on mixing bean sprouts with TMR, the animal feed and it can improve productivity. One research paper says that the weight growth of the beef can be more than times quicker and the quality of meat can improve, while milk production in dairy cows can improve by 20% also with a better protein content. We are actually working with a local company in Abu Dhabi to develop the bean sprout indoor vertical farm and then we want to carry out research with the cattle companies as well.

Today, the UAE minister actually mentioned that agricultural consumes the most resources and I think that is really true. I heard that 70% of fresh water is wasted or used in agriculture and it is very simple, if you give water to plants 95% of it just disappears and less than 5% is actually used by the plants. However, controlled environment agriculture uses less than 5% of the water used by traditional agriculture and we can also recycle water, so the water consumption is very low. There is another statistic showing that 30% of agricultural land has disappeared in I think the past 30 years. In controlled environment agriculture we do not damage the land, we can actually increase the productivity of agriculture by six, eight or 10 times by stacking up layers for increased production. Another good side of controlled environment agriculture is that no pesticides are used in contrast to what I think is 6 billion tons of pesticides used in agriculture. In terms of food waste, only 67% of crops harvested in traditional agriculture are edible so almost a third cannot be eaten, this compares to 97% for crops from indoor vertical farms, so we do not waste anything. 45% of fresh vegetables are wasted during transportation and about 50% are wasted because of supply chain issues. You are not going to have this kind of waste when you are producing crops locally and reducing food miles. In addition to saving on waste, we can also produce vegetables throughout the year, 365 days a year and the productivity rate is at least two times faster than traditional agriculture.

If you look at countries like Singapore, they also want to have self-sufficient supply but they have very limited land. One of the benefits of indoor vertical farms is that we can actually do agriculture anywhere in a city. One example is the Metro farm in Seoul where we actually converted unused space in a Seoul metro station into a smart farm. When we thought about changing the use of this area it was completely empty, dead space but we revived it and turned it into an indoor vertical farm with a cellar café, as well as developing the Agriculture Academy for kindergarten kids. We have been in discussions with the Singapore Food Agency about using the land below the underpasses because there is no sunlight so the area is completely wasted but we can use it for indoor vertical farms. Another project currently being discussed is developing indoor vertical farms in Manhattan, where the price of vegetables is typically 2.5 to three times higher than in New Jersey because of the



transportation costs. There is only one route that can be used to transport vegetable to Manhattan, which is the George Washington bridge. After the pandemic there were a lot of empty spaces in Manhattan building and we want to make self-sustaining farms connected to restaurants.

CEA also has many issues because we are being criticized for using lots of energy but I believe we can solve that problem because one of the things we are currently focusing on is energy consumption in our LED lights. For example, we were able to reduce the power consumption by 10% every year.

Jean-Michel Severino

Thank you very much. I think the list of examples you have given is incredible and highlights how much productivity can be increased as well as all the extreme or frontier conditions in which food can be produced efficiently with viable economic models. All the examples you have given also lead me to go back to one term mentioned by Mr. Abdallah, alternative proteins. Alternative proteins are meat without cows including things like 3D printing, etc. I know there is a lot of curiosity about this issue and I would like all of you to say in two minutes whether you think this is a possible solution for the future of food, not only as a tiny niche area but something that could really be a full scale solution.