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Japanese scientist suggests leaf vegetable farming in Bangladesh's urban areas

AKM Moinuddin back from Japan
Thursday, September 19th, 2013

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Dr Toyoki Kozai, Prof Emeritus of Chiba University, leads a group of journalists to a plant factory model at his workplace in Japan

Plant factories with artificial light are becoming increasingly important for commercial production of leaf vegetables and other short-height leaf plants to enhance local production for local consumption in urban areas. When Bangladesh is at high risk of climate change having transportation and storage crisis for perishable foods, the Japanese 'Plant Factory' (PF) model can be one of the best solutions for an uninterrupted commercial production of 'leaf vegetables' in urban areas in the future. The Asian Productivity Organization (APO), as part of its programme – 'Multi-country Observational Study Mission on Best Practices in Promoting Innovation and Productivity in Agriculture for Mass Media Practitioners' arranged an interaction with the Dhaka Courier Correspondent with the innovator of the PF model at his workplace in Japan last week. Dr Toyoki Kozai, Prof Emeritus of Chiba University, Japan shared how Bangladesh can be benefited by using this model in urban area considering Bangladesh's risk for climate change. APO Agriculture Department Director Joselito Cruz Bernardo, APO senior officials including Martini Abdul Aziz, Mutsumi Nojima and Mitsuo Nakamura were also present during the interaction.

Here we have briefly presented the outcome of interaction with Prof Kozai, also President of Japan Plant Factory Organization. According to Kozai, PF aims at solving simultaneously problems of food, environment, energy and resources in the 21st century by developing, demonstrating and expanding a sustainable PF system which enables food production that is resource-saving, environment-friendly, high quality and high-yielding.

"Food production in the field is risky in a changing climate. Since Bangladesh at high risk of climate change, I think Plant Factory can be one of the best solutions to meet the demand of fresh leaf vegetables and other leafy foods in urban areas," Prof Kozai said.

The scientist said the PF will gradually become very important as arable land is shrinking. "It can help resources inflow into urban areas and outflows wastes. Above all it's a water-saving system," he said.

But plants for staple food to intake calories like rice, wheat and potatoes are not suitable for PF.

Asked whether the University will go for collaboration with Bangladeshi agriculturalists, researchers and university students, Prof Kozai, also the Chief Director of the Japan Plant Factory Association said they are willing to take foreign students and researchers; and share the innovative idea with them.

"We want to popularise the idea. And foreign students and researchers, including from Bangladesh, are welcome," he said.

Responding to a question, Prof Kozai said at first the university (from Bangladesh) must have an agreement with them (Chiba University). "Once the agreement is done, we'll accept students or researchers from Bangladesh and in that case, we won't charge any fee for research here."

Responding to another question, he said PF is not a spending but a necessary investment under changing climate and increasing world population. "It's a combination of need and making friendship with environment."

Apart from big Commercial Plant Factory in urban areas, he said, people in urban areas can also have a chance to get fresh vegetables and an opportunity to engage in farming through utilizing this idea in small scale in their residences.

"Residents living in urban areas and having little chance to grow plants in the open field may enjoy using a household Plant Factory. So, this is not only production. It's part of amusement," he said.

The researcher said such Plant Factory can be set up in a wide variety of non-traditional locations, including private residences, various educational institutions, public facilities, commercial premises, hospitals, hotels, restaurants, shopping malls, rehabilitation centers for mentally disorder people, it can be used with TV, refrigerators as green interiors and at convenience stores.

"The small Plant Factory can be installed in a living room, allowing the family to grow fresh and tasty vegetables without the use of pesticides," Prof Kozai said adding that a diversity of plants is amenable to cultivation in these factories.

"For instance, leaf vegetables, herbs, small fruit vegetables like grapes, tomatoes, strawberries, medicinal plants and small flowering plants can successfully be grown in these units. These plants help create a smoothing 'green interior' that benefits people's well-being as they spend time caring for their plants on a daily basis and eating them at the end."

Features of Plant Factory

Plant Factory refers to a plant production facility consisting of six principal components, including nearly airtight warehouse-like opaque structure, 4-20 tiers equipped with hydroponic culture beds and lighting devices, a CO2 and an environment control unit.

Workers generally enter the cultivation room of the Plant factory only after taking a hot water or air shower and wearing clean clothes. Using PF, high quality pesticide-free plants are produced all year round. Leaf vegetables produced in PF are clean and need no further wash before cooking or processing.

The relative annual production capacity and sales volume of leaf vegetables per unit land area of a PF with 10 tiers are estimated to be, respectively, roughly 90-fold and 117-fold, compared with those in open field.

PF as a Model Ecosystem

PFs can therefore be described as a simplified model of an ecosystem; Prof Kozai said adding that as people become familiar with this model, their ability to obtain a maximal production of food while maximizing the benefits in terms of quality and of life will become second nature as they minimize their environmental impact.

Indirect Benefits of Using PF

As these networks are based on a model of collaboration between a community of small growers, they will allow their members to gain an implicit and integrated understanding of the scientific principles at work in the environment, natural resources, food production, and ecosystems through empirical experience, while experiencing the joy of raising living things.
"Using these networks will reinforce people's awareness of the vital importance of food and living things in our environment, of reducing our consumption of natural resources, and of preserving and protecting the environment," Prof Kozai explained.

PF in Japan

Plant Factory with artificial light has been used in Japan for commercial production of leaf vegetables. Prof Kozai thinks PF will play an important role in local production for local consumption of healthy and safe leaf vegetables and other short-height leafy crops in large cities. "Plant factories are becoming increasingly important in Japan for commercial production."