

Addressing Agricultural Issues with Technology

If the crisis in financial markets around the world is not worrying enough, scientists are now saying that the world must urgently increase its food production as 'it has consumed more than it has produced'.

Current population growth is already straining the earth's resources. According to one estimate, 800 million people – one sixth of the developing world's population – suffer from hunger and the fear of starvation.

However, the solution to this problem is not that simple. The agriculture industry in many parts of the world is struggling to keep up despite being badly affected by climate change and the fluctuating price of raw materials, among others. To reduce the burden on the food import bill, the Malaysian government has taken steps to increase crop production in the country. JURUTERA speaks to Mr. Ng Soo Shin, Engineering Manager of Autoflo Technology Sdn Bhd, to seek his views on the agricultural system in Malaysia.

How extensive is the application of fertigation and chemigation in Malaysia?

Fertigation is extensively applied throughout the country especially in horticultural. Crops like tomato, chilli, rock melon, strawberry, capsicum, cucumber, egg plant, corn, ladies' finger, *etc.* The concept is also gradually being applied in plantations, nurseries and landscapes because of its many advantages. However, although fertigation is widely applied, it is still very much manually operated. To ease their burden, there are several advancements which can help farmers to improve their productivity and efficiency.

What are the advantages of fertigation over traditional broadcast or drop fertilising methods?

The extensive application of fertigation is one proof of its many advantages. Other advantages include:

- i) The most important aspect of fertigation is the savings on labour, time and money
- ii) Even distribution of fertiliser to every plant. The nutrient is placed uniformly around the root for rapid intake of nutrient.
- iii) Centralised fertiliser solution preparation for easy management and monitoring of the concentration of the solution.
- iv) Increased nutrient absorption by plants
- v) Optimised consumption of nutrient
- vi) Reduction in water usage due to the plant's resulting increased root mass being able to trap and hold water

What are some of the concerns or issues related to the application of fertigation and chemigation in the country?

There are actually several issues of concern. The biggest concern of all in agriculture is the heavy usage of chemicals such as pesticide, insecticide, fungicide or fomicide for the control

of pest and disease causing fungus. Health is a real concern for the workers who spray the chemicals as well as the consumers who eat the produce.

The environment is another issue of concern as fertigation and chemigation, if not done properly, can cause soil damage and render it infertile. Furthermore, chemicals leaching into the underground water table or rivers will cause pollution.

Although it is widely known and documented, little has been done to study the effects of these chemicals on human health and to reduce its usage. Farmers are still dependent on these chemicals to fight pest and diseases that can destroy their livelihood. Are there any alternatives?

Fortunately for farmers as well as consumers, there are many alternatives available which are both non-toxic and biodegradable. For example, there is a liquid fertiliser supplement in the market called BioGreen 988, which is well known and has been proven for over 15 years for the effective control of pest and fungus in all types of crops from vegetables to flowers, padi, plantation crops and horticulture crops.

Among its properties are repelling insects or even killing it, preventing disease caused by airborne fungus by strengthening the internal immune system of the plant, increasing yield, extending the production life of the plant and conditioning the soil to release the



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nutrient already available in the soil for intake by the root system. The result is that plants look healthier and more robust, minus the harmful chemicals.

Other areas of concern can be summarised as follows.

- i) Skill level of workers. Advanced technology requires skilled workers. Training or technical education should be provided to enhance the knowledge of technology for farmers.
- ii) Financial constraints. Smallholders have financial constraint.
- iii) Attitude of farmers. There is a need for a change of mindset. There seem to be a reluctance to move away from traditional methods to embrace modern technology. Upgrading the farms with advanced technology will definitely improve their income, living standards and achieving a higher quality of life.

What are the latest advancements in fertigation and chemigation in the agriculture and horticulture industry?

Although the fertigation system offers many advantages over the drop fertilising method, there is still room for improvement, specifically in the areas of nutrient preparation, distribution network and measurement

instrumentation integrated with a computer system. Improvement in these areas will help modernise the fertigation system, especially in Malaysia.

i) Nutrient Preparation

The current method of nutrient preparation is still very much a manual process. Two stock solution of fertilisers A and B in pre-determined amount are poured into a large 2700 litre holding tank and is then hand mixed. Another disadvantage is that the 2700 litre nutrient tank must be completely consumed within three days. After that period, any remaining residue would be drained away. The manual mixing process may be subjected to human error which can result in wastage or, if fed to the plant, can cause unhealthy growth.

ii) Water Operated Liquid Fertiliser Dispenser

The Water Operated Liquid Fertiliser Dispenser from Dosatron International, France, is a technology that replaces the manual pouring and mixing method. It has proven to save on labour and time. Farming is made easier. Besides these benefits, it also offers other advantages such as:

- a) No electricity is required to operate it. Just connect to the piping system and turn on the

water. The flow and pressure of the water operates it.

- b) It gives a more precise dose of nutrient in consistent concentration and homogenous distribution to every plant.
- c) The nutrient injection program can be changed easily according to the growth stages of the crop.
- d) The dispenser occupies a small space. On a large scale farm, it will reduce the need for many large nutrient tanks.
- e) The plant gets freshly prepared nutrient as and when required.

iii) Automatic Control of Distribution

A simple controller-like timer plus several electric operated valves to automatically channel the nutrient to different plots at different times can further make the farming task easier and, at the same time, save a lot on time and laborious work. With proper planning, farmers can setup a farm to function efficiently and productively.

iv) Computerised Monitoring and Control with Instrumentation

A basic computerised monitoring and control system would consist of a computer, pH meter, EC meter, humidity meter, moisture meter, temperature sensor and the necessary software and hardware required for the interface and incorporating nutrient preparation and the Water Operated Liquid Fertiliser Dispenser. This is the trend for modern farming.

A farm can be better managed and controlled to produce a better harvest, better utilisation of water and fertiliser, and at the same time, controlling and protecting the environment and cutting down on wastage.

What is the standard of agriculture technology in Malaysia compared to other countries?

It is a difficult question for me to answer because I have not visited other countries (like Taiwan) to study their agriculture technology. So, I am unable to compare the different standards. ■



A fully automatic fertigation system using timer, electric operated valves and the liquid fertiliser water powered dispenser