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Precision farming is a game-changer

It has been shown to reduce input costs and enhance yields in the case of rice, wheat, sugarcane, fruit and vegetables

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Is it just ambitious or an outright utopian idea? With the Indian agriculture sector growing at less than four per cent per annum, it would take — at current pace — 25 years for farmers' income to double. But the Modi government's aim to achieve it by 2022, in less than five years, certainly looks ambitious.

It has, of course, backed its claim with some welcome policy measures such as increase in the outlay for agriculture, creation of market linkages (eNAM), ensuring availability of quality seeds, implementing soil health cards and raising minimum support price (MSP) for select crops. But the objective will remain utopian if the government fails to take the bull by the horns and change the way Indians farm.

Indian farmers practice their profession in the most adhoc manner possible using gut feel, intuition or by blindly following legacy practices. If there is something missing in their process, it is data and data-based decision making. In other words, precision.

Reforming farm practices

This pervades their entire operations. The land is prepared without an accurate measure of the depth to which it needs to be tilled for a particular crop. Fertiliser is applied uniformly ignoring possible in-field variability of soil. NPK (Nitrogen Phosphorus and Potassium) content in the soil tend to vary across the field. A uniform spray will either leave a nutrient far in excess or deep in shortage in various sections of the field. The government's soil health card is a step in the right direction but its implementation is patchy.

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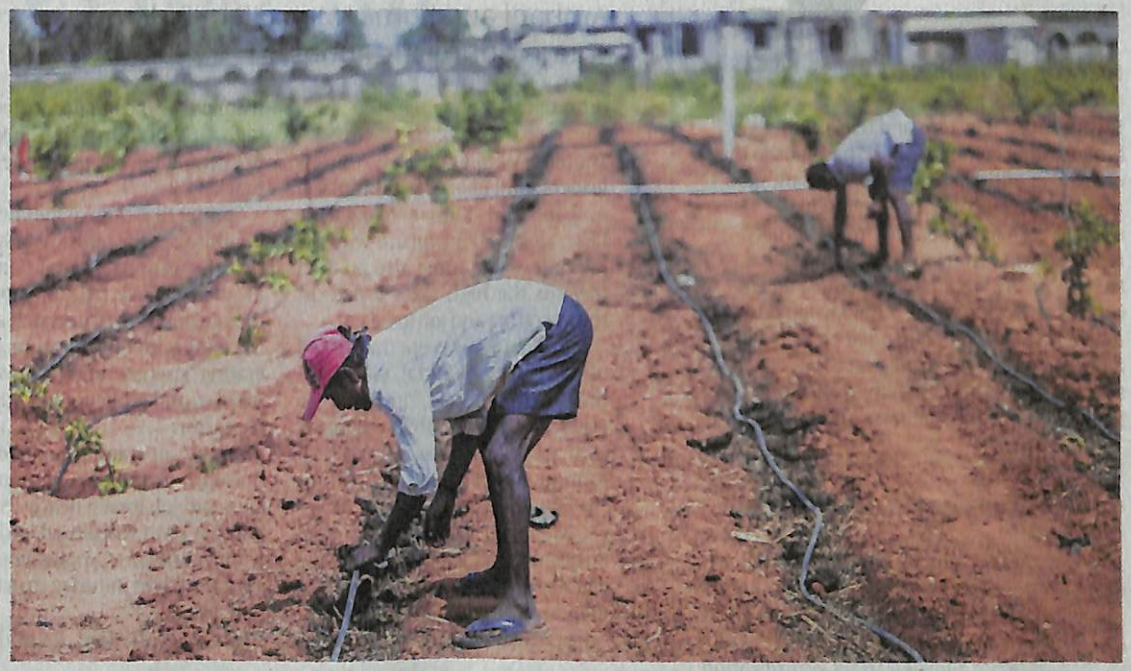
Farmers sow seeds by broadcasting them across the field. They do not follow any particular norm with respect to spatial distance or the right depth for sowing the seed. This prevents the plants from getting optimum nutrients from soil thus hurting yield. When it comes to irrigation, farmers just flood irrigate the field. Only 8.4 million hectares of 100 million hectares of cultivable land in the country are drip-irrigated. Even here farmers water their fields without monitoring weather conditions or after studying soil moisture.

When it comes crop care, farmers decide to spray fertiliser, pesticide or weedicide after a cursory walk through the field. It is neither based on a close scrutiny of the crop nor directed only at those plants or areas that are affected. Also, very few farmers use the drip irrigation system to fertigate the plants. Their call on when to harvest the crop is not scientific either. It is not the maturity of the crop but historical practice and herd mentality that drive the decision.

All these have meant that farmers spend more than what they should when it comes to input cost and end up with lower than potential yield. This coupled with dependence on unpredictable monsoons has made agriculture, as father of Indian Green Revolution MS Swaminathan often says, the riskiest business in India.

But it does not have to be. Precision farming is one where all critical decisions taken on the field by farmers is based on data and technology that interprets the data for them to make a value judgement. Some enterprising farmers have even gone to the extent of deploying Blockchain technology to interpret the volumes of data they have generated from their fields kick-starting what is come to be called 'digital farming'.



Tech farming Drip irrigation can play a crucial role in delivering the right quantum of water BLOOMBERG

By taking up precision farming farmers bring in a measure of accuracy in everything they do. And it is not rocket science. Tractors fitted with sensors are available to help them till the land to the exact depth that the crop needs. They can divide their fields into various quadrants and test them for NPK and other nutrients. Today even satellite imagery can be used to identify nutrient level in the soil. Remedial actions can be taken based on need. Equipment is available to sow crops at prescribed spatial distance and at the right depth.

Also, the crop can be watered by measuring soil moisture using sensors and using drip irrigation to deliver the right quantum of water. Sensors come in handy to spot pest attacks accurately. Satellite images can also be used to determine the density of growth and identify sections of the field where growth is poor. Fertilisers/pesticides can be applied only in those areas using the drip infrastructure. And harvesting can be done after ascertaining the crop maturity.

Benefits of precision farming are significant. It reduces input costs by 18-20 per cent and enhances yield by anywhere between 30 per cent (rice and wheat) and 100 per cent (sugarcane, fruits and vegetables). If such benefits are ignored, the only way to double farmer income is by raising crop prices to unsustainable levels.

The cost factor

Yes, precision farming comes at a cost — ₹2 lakh per hectare. Also, adapting technology for typical small Indian farms and illiterate farmers is a challenge too. But models are already available to deal with these issues. Farmers with small land holdings are already hiring tractors and other farm equipment, instead of buying them, from custom hiring centres in various States or from other private initiatives like Mahindra group's Trringo App or TAFE's J-Farm Services platform to name a few. This network can also be used to offer precision farming related services on a pay per use basis. The government, for its part, should re-orient subsidies away from products to technology-based farming. It must also enhance capacity building, especially among extension workers, to teach precision farming to the farmers. Markets need to be developed to absorb the additional output that will come with special emphasis on value addition through processing of the produce. Otherwise, the benefits of precision farming will be lost due to low prices.

Finally, precision farming makes agriculture less risky and more engaging which will draw youngsters into the profession. It is also a good way to ensure India's food security.