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Food as people's right

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This is the season to count blessings. India's greatest blessings are its adherence to the democratic system of governance, an independent judiciary, a free and fearless media, and an Election Commission that inspires confidence. I hope that soon India will have an independent and effective Lokpal, which will pave the way for a corruption-free India, a pre-requisite for a hunger-free India.

The other major paradigm shift observed in recent years is the substitution of political patronage with legal rights. Thus, a few years ago, the United Progressive Alliance government, then supported by the Left parties, enacted legislation designed to confer entitlements to information, education and work, in the third case the Mahatma Gandhi National Rural Employment Guarantee Scheme. Tribal families and other forest-dwellers have been conferred the right to land. The brightest jewel in the crown of Indian democracy will be the conferment of the right to food through the National Food Security Act, recently introduced in Parliament. When it is implemented, this country will have taken the essential steps necessary to convert Gandhiji's dream of a hunger-free India into reality.

It is important to realise the significance of the Act in the light of the conditions that prevailed in India during the first 20 years after Independence. During the 1960s, India was the largest importer of food aid, mainly under the PL480 programme of the U.S. In fact, during 1966, over 10 million tonnes of wheat was imported, leading to India being labelled as a nation surviving on a ship-to-mouth basis. Today, India is set to commit over 60 million tonnes of home-grown wheat, rice and nutri-millets to fulfil the legal entitlements under the Food Security Act. When it becomes law, India will operate the largest social protection programme against hunger in human history. How did this transition occur? Here is the historical context in which we should view the Act.

Role of Green Revolution

The Bengal Famine of 1942-43, which claimed over two million lives, provided the backdrop to India's Independence in 1947. The country's population was then a little over 300 million, that is, 25 per cent of the current population. In 1947, not more than 30 persons could be fed at a wedding; today money is the only limit to the number of people who can be entertained on such occasions. Prime Minister Lal Bahadur Shastri even issued an appeal that every Indian should fast one day a week in order to enable the government to balance the food budget.

In 1947, our soils were both thirsty and hungry, and to quote Aristotle, "soil is the stomach of the plant." Hardly 10 per cent of the cultivated area had assured irrigation, and the average consumption of NPK nutrients was less than 1 kg a hectare. The average yield of wheat and rice was about 800 kg per ha. Mineral fertilizers were mostly applied to plantation crops; food crops got whatever organic manure farmers could mobilise. During the first two Five Year Plans (1950-60), emphasis was placed on enlarging the area under irrigation and on fertilizer production. Scientists began extensive experiments in the 1950s to assess the response of rice and wheat varieties to fertilizer application. The varieties cultivated had tall and thin straw and the crop lodged when even small quantities of nutrients were applied. It became clear that varieties with short and stiff straw were needed to get positive response from water and fertilizer.

It is in this background that Dr. K. Ramiah, an eminent rice scientist, suggested in 1950 that we cross the *japonica* varieties of rice obtained from Japan with our *indica* rice varieties. The logic was that the *japonica* varieties were even then yielding over five tonnes a ha, while Indian varieties gave one tonne to two tonnes a ha. Thus began the *indica-japonica* rice hybridisation programme at the Central Rice Research Institute in Cuttack in the early 1950s. The programme lost its priority after genes to develop semi-dwarf varieties of rice became available in the 1960s from Taiwan and the International Rice Research Institute in the Philippines.

After the Second World War, American scientists were examining the significant findings made in Japan both in agriculture and industry. Solomon, a biological scientist, was fascinated by the semi-dwarf wheat varieties developed by Dr. Gonziro Inazuka at the Norin Experiment Station. This variety had short and stiff straw but long panicles, and consequently a high-yield potential. Dr. Solomon gave seeds of the Norin wheat variety to Orville Vogel of Washington State University, who developed the semi-dwarf winter wheat variety Gaines, with a yield potential of over 10 tonnes a ha. Norman Borlaug, working in Mexico, obtained the seeds containing the Norin dwarfing gene

from Dr. Vogel and started the Mexican dwarf wheat breeding programme. Winter wheats like Gaines do not do well under Indian conditions.

On the other hand, Dr. Borlaug's material was suited for the rabi season in India. I therefore approached Dr. Borlaug in 1959 for some of his semi-dwarf wheat breeding material. Dr. Borlaug wanted to see Indian growing conditions before making up a set of breeding lines, and paid a visit in March 1963. We tested the material at locations all over North India during rabi 1963. The multi-location trials revealed that the semi-dwarf wheats of Mexican origin could yield four to five tonne a ha, in contrast to about two tonnes a ha of the tall Indian varieties. It became clear that India had the tools with which to shape its agricultural destiny.

In July 1964, C. Subramanian became Union Minister for Food and Agriculture and he gave his whole-hearted support to spreading high-yielding varieties on a large scale, together with irrigation water and mineral fertilizer. In 1968, Indian farmers harvested about 17 million tonnes of wheat; the earlier highest harvest was about 12 million tonnes in 1964. Such a quantum jump in production and productivity led Indira Gandhi to announce the 'Wheat Revolution' in July 1968.

In addition to the yield breakthrough in wheat and rice, hybrids of maize, jowar and bajra developed by Indian scientists in partnership with the Rockefeller Foundation, opened up opportunities to increase productivity and production of the crops. This led to the introduction by the Government of India in 1967 a High-yielding Varieties Programme in wheat, rice, maize, jowar and bajra. For the first time, yield consciousness was born in farmers' minds and they organised a National Tonnage Club of Farmers. The membership eligibility criterion was the production of an agreed minimum quantity of foodgrains per ha. The term Green Revolution coined by William Gaud of the U.S. in 1968, involved synergy among technology, services, public policies and farmers' enthusiasm. Farmers, particularly those in Punjab, converted a small government programme into a mass movement.

The Green Revolution was criticised by social activists on the ground that the high-yield technology involving the use of mineral fertilizers and chemical pesticides is environmentally harmful. Similarly, some economists felt that the new technologies would bypass small and marginal farmers, for although the technologies are scale-neutral, they are not resource-neutral. This led to my coining the term "ever-green revolution," to emphasise the need to enhance productivity in perpetuity without ecological harm.

Untapped reservoir

Looking ahead, the bright spot in Indian agriculture is the availability of a large untapped production reservoir. For example, the productivity of foodgrains in China is currently 5,332 kg a ha, while it is 1,909 kg a ha in India. A "bridge the yield gap" movement is needed. The dark spots in Indian agriculture relate to ecology and economics. The heartland of the Green Revolution, comprising Punjab, Haryana and Western Uttar Pradesh, is in an ecological crisis, as a result of the over-exploitation of groundwater and the spread of salinity. This region will also suffer most if the mean temperature rises by 1 degree to 2 degrees C as a result of global warming. Conservation and climate-resilient farming will help check ecological hazards. The Food Security Act will confer double benefits – procurement at a remunerative price for the public distribution system will stimulate production, and consumers who need social support to ward off hunger will be able to have economic access to the food needed for a productive life.

One of India's major blessings is the rich store of experience and knowledge available in the rural and tribal areas. The Food and Agriculture Organisation (FAO) recently recognised the Traditional Agriculture System of Koraput, Odisha, as a Globally Important Agricultural Heritage System. This is because the system provides an outstanding contribution to promoting food security, biodiversity, indigenous knowledge and cultural diversity for sustainable and equitable development. The future of food security will depend on a combination of the ecological prudence of the past and the technological advances of today.

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India is on the threshold of a historic transition from a ship-to-mouth existence to implementing the world's largest social protection programme against hunger with home-grown food.



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