

## The Shifting of Natural Farming to Chemical Farming in Indian Agriculture

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### **Ancient Indian Agriculture**

India the land of geographical diversity and cultural diversity is the second largest populous country and the seventh largest country by area. It has been assumed that the inhabitants of Indian subcontinent came from Africa about 55,000 years ago (Dyson, 2018). According to Dyson, (2018) the migrants from Africa settled to Indian subcontinent started their initial occupation as hunter gatherers; while it has also been claimed that with the evolve of Indus valley civilization in the western basin of river Indus during 9000 years ago made a tremendous shift of habituation and occupation pattern among the inhabitants and thus the farming begins with domestication of crops and animals. Wheat, barley and jujube were cultivated and domestication of goat and sheep soon pursued at 8000-6000 BCE at Mehrgarh. Agro-pastoralism like threshing, planting crops in rows, storing, use of implements, double monsoon led to two harvests in single crop calendar along with trading networks made breakthrough in Indian farming. According to Murphy, (2007) the wild rice appeared in 4530 BCE and 5440 BCE respectively in the Belan and Ganges valley regions northern India. While cultivation of rice was documented during the 2<sup>nd</sup> millennium in Kashmir and Harappan province. During the 5<sup>th</sup> millennium BCE cotton cultivation was reported by Baber, (1996) along with some other important crops like hemp, sesame, dates, moong beans, horse and black grams, and pigeon pea started with domestication of tropical fruits of Indian origin like mango, mask melon etc. The Indus valley civilization started irrigation based farming systems by around 4500 BCE, the great artificial reservoirs at Girnar dated to 3000 BCE, canal irrigation system from circa 2600 BC and evidence of animal drawn plough at 2500 BCE is the best example of modern farming.

The Vedic scriptures (1000-500 BCE) explained about the pattern of agricultural practices and technologies used like use of iron in agriculture, domestication of trees, kharif plantation, broadcasting of seeds etc. The wide range of various types of cereals, vegetables



and fruits along with animal husbandry, extraction of milk and use of meats were also described there. The Vedic texts also narrates that farmers used to plough soil repeatedly, sowed seeds and typically followed a specific cropping and fallowing sequence. Use of cow dung considered as fertilizer is also documented (Gupta, 2004).

In the early common era cultivation of wide range of crops like rice, sugarcane, millets, black pepper, various grains, coconuts, beans, cotton, plantain, tamarind and sandalwood. Jackfruit, coconut, palm, areca and plantation trees were noticed. Regular ploughing, organic manuring and inter culture operation like weeding, irrigation, crop protection of organic origin were practiced. During late middle ages or early modern era diffusion of Indian and Persian irrigation technologies documented with tremendous breakthrough in water technology gave rise to an irrigation system which brought about economic growth and growth of material culture. Division of Agricultural 'zones' were broadly documented in respect of producing rice, wheat or millets like rice production in central India and wheat and millets in northern part (Roy, 2006). Cultivation of so many foreign crops like tobacco, coffee, tea, pineapple, papaya, and cashew nut were introduced in Indian agriculture. Land management is one of the milestones of this era. In the colonial British era in the second half of the 19th century evidenced scale up in land coverage under agriculture and agricultural production expanded at an average rate of about 1 per cent per year (Roy, 2006).

The Grow More Food Campaign in 1940s and Integrated Production Programme in 1950s along with Five years plan of India oriented towards agricultural development focusing food crops and cash crop supply followed by land reclamation, land development, mechanization in agriculture, electrification, use of HYVs, chemical fertilizers initiated with Green Revolution in 1960s gave tremendous breakthrough in Indian agriculture led to many production revolution like Yellow Revolution, White revolution, Pink revolution, Grey revolution, Blue Revolution etc (Dev, 2006).

### **Green revolution in India (from starving nation to large exporter):**

The much awaited historical events in world agriculture happened in between 1950 and the late 1960s termed as “Green Revolution” coined by William S. Gaud the USAID administrator which was set of research in technology transfer to meet the food shortage or problem of world hunger (Hazel, 2009) under the leadership of Norman Borlaug. Under the



British Empire, India's grain economy faced with unilateral relation of exploitation and subsequently India faced so many famines, low productivity of agricultural produce, economical shakiness makes green revolution as rationale developmental strategy. Under the leadership of Prof. M.S. Swaminathan the introduction of green revolution in India was pursued in Punjab in the late 1960s (Dutta, 2012) with introduction of rust resistant high yielding dwarf varieties of wheat along with so many other objectives to make Indian Agriculture as self sufficient, those are modern irrigation system, mechanization, use of agro-chemicals, land reforms, consolidation of land holdings, agriculture credit etc.

As a result of green revolution Indian agriculture experienced a tremendous growth especially in food grain production like wheat and rice, per capita net availability leaped to 144 kg per year in 1951 to 171 kg in 1971; a paradigm shift of food grains jumped from 83 MT during 1960-61 to 291.95 MT during 2019-20. Application of chemical fertilizer and pesticides showed continuous upward trend. According to Department of Agricultural Research and Education report 50 per cent increase in agricultural production in the post green revolution era is attributed by the use of agro-chemicals. Today, India has attained self-reliance in food-grain production and able to feed the 130 crores of population by itself not only these it has become the world's second largest producer of wheat and rice respectively; while largest exporter of rice during 2019-20 (USDA, 2019). No other country in the world that attempted the "Green Revolution" recorded such a level of success. The history of transformation from net importer to net exporter by the end of the 1970s is the milestone achievement of Indian agriculture. By 2025, India will require about 300 MT of food grains. This would necessitate use of about 45 MT of nutrients. While about 6-8 MT of nutrients could be supplied through existing organic sources, the rest has to come from chemical fertilizers. During 1950-51, Nitrogen consumption in India was 55 thousand tonnes which increased to 16.95 million tonnes in 2017-18. Phosphate and Potash fertilizer consumption also saw a spike in period. P consumption increased from 8.8 thousand tonnes to 6.85 million tonnes, whereas K consumption expanded from 6 thousand tonnes to 2.77 million tonnes. The total fertilizer consumption thus saw a phenomenal jump from the minimal 69.8 thousand tonnes in 1950-51 to 26.59 million tonnes in 2017-18 (Anonymous, 2019). Thus it is sign of aspiration that we are now just close to the desired food grain production by 2025 grappling

with the existing facts like high monsoon dependency, decreasing size of cultivable land. So in this context none can deny the role of agro-chemicals boosting the Indian agriculture.

Despite of several achievements led by Green Revolution several issues have also come out with time and there is a controversy about the impact of green revolution in India. Apart from ecological impact some researchers also cited the social conflict due to growing socio-economic divide (Fujita, 2010). Thus the line “More than five decades after India launched the Green Revolution, its war on hunger is far from won” is still practical and rationale, as Norman Borlaug, the “father” of the Green Revolution, summed up in a speech given thirty years after receiving a Nobel Peace Prize for his work in 1970: “. Increased food production, while necessary, is not sufficient alone to achieve food security”.

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