

Modernization of agriculture – A boon or bane?

Food is the one need of humanity, which has no compromise. Availability of sufficient food alone can make room for the developmental leaps in any other field. In the pursuit of feeding the fast-growing human population and guarding the erosion of natural resources, technically innovative measures were launched. Due to these efforts, food production per capita could keep pace with the population boom. But for these innovative measures many people might have starved to death. While appreciating the remarkable success, it is also important to understand some of its external costs, in order to assess the true benefits of agriculture modernization. The subject has been discussed elaborately by Jules¹.

The main objective of modernization of agriculture is the need for increased food production for which, traditional agriculture is transformed by adoption of modern varieties of crop and livestock, and external inputs (such as fertilizers, pesticides, antibiotics, credit machinery, etc.) necessary to make these productive. Infrastructure such as irrigation schemes, roads and markets, guaranteed prices and markets for agricultural produce as well as range of other policies has supported this also.

Modern varieties of staple cereals mature quickly, permitting two or three crops to be grown each year. As a result, average yield of cereals has roughly doubled in 30 years. This average does, however, hide significant regional differences. In south-east Asia, food production per capita has increased by about 30 per cent, but in Africa it has fallen by 20 per cent. This apart, genetic erosion, the reduction of diversity within a species is a global threat to agriculture. Secondly, traditional varieties and breeds are displaced. During the twentieth century, varieties about 75 per cent of the genetic diversity of agriculture crops have been lost. In India where once more than 30,000 rice varieties were grown, now just 10 varieties cover 75 per cent of the entire rice area.

Mixtures of traditional varieties did give some insurance against pest and disease attack. Outbreaks and resurgence are more likely to occur when the landscape is simplified to contain just a single crop. Application of pesticides in an

attempt to prevent pest damage, can cause outbreaks and resurgence, since natural enemies that control pests are killed. Pesticides at very high doses may be lethal to both laboratory animals and human beings, causing severe illness at sublethal levels.

Modern varieties are highly responsive to fertilizers. This has led to indiscriminate use of fertilizers. These inputs never used entirely or efficiently by the receiving crops or livestock, are lost to the environment, contaminating water, food and fodder, and the atmosphere. Water is often wasted or used inefficiently, leading to ground water depletion, water logging and salinity problems.

Previously, under the traditional agriculture system farmers maintained cattle and poultry, and included planting green manure crops in rotation. The green leaf manure, trees and hedges bind the soil and provide valuable fodder, fuel wood and habitats for predators of pests. These sources of nutrition are often cheaper, more efficient than inorganic fertilizers and focus on recycling of nutrients. There was little distinction between products and byproducts. In modern agriculture, factors have sidelined livestock, likewise fossil fertilizers have belittled organic manners. This in turn altered the C : N ratio of soil creating physiological hunger in plants, which means no linear increase in yield together with wastage of applied fertilizers involving huge costs.

Earlier farmers enjoyed self-sufficiency altogether. They cultivated traditional varieties that were often resistant to pest, diseases and drought. Phenotypically superior seeds were hand-picked from the field, processed and protected from pests and diseases during storage, using locally available pest-repellent plants. Farm yard manure, green and green leaf manure were used for fertilization, which were usually low or no cost strategies. They also maintained the fertility, in terms of C : N ratio and soil structure. Though the yield could not match those of modern varieties, the risk was low because any of the natural disasters like drought or pest breakdown would mean much more loss in modern agriculture, unlike the traditional one.

The second main objective of modernizing agriculture is to minimize soil ero-

sion. Ironically, many programmes have actually increased the amount of soil eroding from farms. This is because achievements have mostly been short-lived. The lack of consultation and participation of the local people whose lands are being rehabilitated, find themselves participating for no other reason than to receive food or cash. Seldom are the structures maintained, so construction work rapidly deteriorates, accelerating erosion.

The assumption of universality of technologies has led to greater standardization and homogenization. The world so created is inevitably monotonous. Modernization has isolated a type called 'forgotten agriculture'. These are low external input systems and are located in dry land, swamps, upland, fragile and problem soils. Farming system in these areas is complex and diverse. Agricultural yields are low and these areas are less likely to be visited by agricultural scientists and extension workers. The poorest countries tend to have higher proportion of these agricultural systems. Most of the food production in Africa comes from these low external input systems of agriculture, yet these people are currently excluded from agricultural policies that focus on the high potential lands. Hence we have been losers as well as winners, due to agricultural modernization. Therefore new processes are needed, as most modern external packages are financially costly for developing countries and their farmers and cannot do anything to rejuvenate the forgotten agriculture. Only low-cost technology and practices can be applied on a scale wide enough to improve the livelihood of some 2 billion people. This will require the adoption of an entirely different approach to agricultural development.

1. Jules, N. P., *Regenerating Agriculture*, Vikas Publishing, and references therein, 1995.

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