Organic Farming

Basic knowledge/principles of organic farming and its scope

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Let us first know about Green revolution

- The Green Revolution started in 1960s with the first introduction of High Yielding Variety (HYV) seeds in Indian agriculture. This was coupled with better and efficient irrigation and the correct use of fertilizers to boost the crop. The end result of the Green Revolution was to make India self-sufficient
- After 1947 India had to rebuild its economy. Over three-quarters of the population depended on agriculture in some way. But agriculture in India was faced with several problems. Firstly, the productivity of grains was very low. And India was still monsoon dependent because of lack of irrigation and other infrastructure. when it came to food grains.
- So in 1965, the government with the help of Indian geneticists M.S. Swaminathan, known as the father of Green Revolution, launched the Green Revolution. The movement lasted from 1967 to 1978 and was a great success.

Features of the Green Revolution

- The *introduction of the HYV seeds* for the first time in Indian agriculture. These seeds had more success with the wheat crop and were highly effective in regions that had proper irrigation. So the first stage of the Green Revolution was focused on states with better infra – like Punjab and Tamil Nadu.
- During the second phase, the HYV seeds were given to several other states. And other crops than wheat were also included into the plan
- One basic requirement for the HYV seeds is *proper irrigation*. Crops from HYV seeds need alternating amounts of water supply during its growth. So the farms cannot depend on monsoons. The Green Revolution vastly improved the inland irrigation systems around farms in India.
- The *emphasis of the plan was mostly on food grains* such as wheat and rice. Cash crops and commercial crops like cotton, jute, oilseeds etc were not a part of the plan
- Increased availability and use of *fertilizers* to enhance the productivity of the farms
- Use of *pesticides and weedicides* to reduce any loss or damage to the crops
- And finally the introduction of *technology and machinery* like tractors, harvesters, drills etc. This helped immensely to promote commercial farming in the country.

Impact of the Green Revolution

- Increase in Agricultural Production: Foodgrains in India saw a great rise in output. It was a remarkable increase. The biggest beneficiary of the plan was the Wheat Grain. The production of wheat increased to 55 million tonnes in 1990 from just 11 million tonnes in 1960.
- Increase in per Acre Yield: Not only did the Green Revolution increase the total agricultural output, it also increased the per hectare yield. In case of wheat, the per hectare yield increased from 850 kg/hectare to an incredible 2281 kg/hectare by 1990.
- Less Dependence on Imports: After the green revolution, India was finally on its way to self-sufficiency. There was now enough production for the population and to build a stock in case of emergencies. We did not need to import grains or depend on other countries for our food supply. In fact, India was able to start exporting its agricultural produce.
- Employment: It was feared that commercial farming would leave a lot of the labour force jobless. But on the other hand, we saw a rise in rural employment. This is because the supporting industries created employment opportunities. Irrigation, transportation, food processing, marketing all created new jobs for the workforce.
- A Benefit to the Farmers: The Green Revolution majorly benefited the farmers. Their income saw a significant raise. Not only were they surviving, they were prospering. It enabled them to shift to commercial farming from only sustenance farming.

The drawbacks of green revolution in Indian agriculture are

- 1) It deplete the ground water level
- 2) It reduces the soil fertility
- 3) It causes water pollution. for eg when chemical fertiliser or pesticides mixes with the water it pollutes the water

Four decades after Indian farmers began increasing production using pesticides and fertilizers, they are starting to have second thoughts about the change. In 2008, Researchers at Punjabi University discovered DNA damage in 30 percent of Indian farmers who treated plants with herbicides and pesticides. An additional study found heavy metals and pesticide chemicals in drinking water. These substances are harmful and can cause serious health problems. Some of these problems may occur because some farmers may not know how to handle and dispose of toxic chemicals. They may also harm the environment by using too many of those products.

Loss of Genetic Diversity

- In traditional farming, farmers plant a variety of crops that typically have a large supply of unique genotypes. People using Green Revolution farming methods plant fewer crop varieties in favor of those that produce high yields. This type of cultivation causes an undesirable loss in crop genetic diversity. You can witness this problem in India, where about 75 percent of their rice fields contain only 10 varieties of plants. This is a significant drop compared to the 30,000 rice varieties that were planted 50 years ago. Traditional crops have the highest gene diversity and as they dwindle, those genes vanish. These genetic diversity losses can be seen all over the world in locations that implemented Green Revolution farming methods.

Impacts on Rice Production

- Rice fields are a vital source of food for individuals around the world. Because these fields often have mineral-rich soil, they are resilient and people have farmed them successfully for centuries. However, after the Green Revolution changed the way people farm, rice field sustainability declined, even though rice yields increased. Causes for the decline include loss of biodiversity and fish deaths due to toxicity from pesticide use.

Other Side Effects

- Because the Green Revolution required learning new water management skills, some farmers that didn't have these skills could not take full advantage of the new irrigation techniques. The Green Revolution's original mission was to focus on areas with significant rainfall or irrigation. This meant that in drier locations, wheat yield gains often fell below 10 percent, while yields in irrigated areas reached 40 percent. By the mid 80s, locations with high irrigation fully adopted high-yield crop production methods, while areas with little rainfall and a limited water supply experienced low

More inequality among farmers

The new technology requires a huge amount of investment which can be only, afforded by the big farmers. Hence, these farmers are getting the absolute benefits of the green revolution and became comparatively more rich than farmers. This increases inequality in rural India

Mono-Culturing

Among the most prominent shortcomings of Green Evolution is mono-culturing. This practice demands large tracts of land, which are not always available, large volumes of water and intensive amounts of fertilizers. These needs poses difficulties for farmers around the world.

Probability of Weeds and Pests to Develop Hazards

Green Revolution is speculated to develop poisonous and super weeds and pests that are difficult to control. There is also the concern of cross pollination from genetically modified organisms (GMOs) to other plants in the environment, which could result in invasive species.

Compromise to Crop Health

There have been some cases with this modern farming method, where unknown ailments have plagued the health of various crop species. It is always thought of that some new breeds of weed and pests can develop, and they may resist pesticides that are used right now.

Sterile Seeds

In most cases, GMOs will generate sterile seeds every year

Shortage of Supply

There is a sterner focus on cash crops with this modern method, and innumerable farmers are trying to grow them, which is leading to a shortage of staple food crops.

Environmental Harm

All the equipment used in Green Revolution requires burning of fossil fuels that contributes to pollution and global warming. Also, if you make use of petrochemical fertilizers, it requires fossil fuels that tend to be patently and unsustainable.

Varied Soil Type by Location

Green Revolution does not take into consideration the type of soil or its suitability for certain types of crop; it just considers the land area and does what is needed for the cultivation of crops each year. The following year requires fresh procurement of seeds, but nothing is done to ensure that the fertility of the soil is retained or replenished.

High Cost

The price of the industrial farming and its equipment under Green Revolution may not be affordable for small

Green Revolution Technologies

(High yielding varieties, chemical fertilizers, synthetic pesticides, mechanization, irrigation)

High Production

(Overcoming food crisis, self-sufficiency in food grain, buffer stock of food grain)

Not Sustainable

(Stagnation or fall in Productivity, decline in soil fertility, salinity problem, lowering of water table, environmental pollution)

Organic Farming

"It is a Production system that avoids (or largely excludes) the use of synthetically produced fertilizers, pesticides, growth regulators and livestock feed additives"

Organic agriculture relies on

- Organic seeds
- Crop rotations
- Crop residues
- Manures
- Composts/vermicompost
- Biofertilizers
- Legumes
- Green manures
- On & Off-farm organic wastes (Weeds, tree leaves)
- Biological pest/disease control
- ITKs (Panchagavya,Amrit pani etc.)

Debated issues on organic agriculture

- Can organic farming produce enough food for everybody?
- Is it possible to meet the nutrient requirement of crops entirely from organic sources?
- Are there any significant environmental benefits from organic farming?
- Is the food produced by organic farming superior in quality?
- Is ecological farming economically feasible
- Is it possible to manage pest and disease in organic farming

Why Organic Farming?

- To help conservation of soil.
- To promote healthy use and proper care of water, water resources and all life therein.
- To encourage and enhance biological cycles within farming system involving micro organism, soil flora and fauna.
- Increasing cost of agricultural chemicals
- Resources contamination/ Natural resources degradation
- Ill effect on the health on the living beings
- Extinction of useful avian birds
- To encourage bio diversity
- To produce food of high nutritional quality in sufficient quality
- High export potential
- Eco conservation
- To preserve and enhance traditional and indigenous knowledge, seed varieties, animal breeds.
- To create employment avenues
- To minimize all sorts of pollution that may result from agricultural practice.
- Provides nitrogen supply by using nitrogen fixing plants as cover crops and green manure crops.

How Organic Farming is Useful ?

- Conserve natural resources
- Reduce pollution
- Appropriate use of by-products of livestock and crops
- Encourage export potential
- Provide employment opportunities
- Regenerate the original ecosystem
- Less cost of production
- Make production system eco-friendly
- Biomass as renewable energy source

For the success of organic agriculture, the principal elements need to be considered are

- Maintaining a living soil
- Making available all the essential nutrients in the required quantity
- Organic mulching for conservation
- Attaining sustainable high yield

Scope in NE India

- Climatic variation
- Rich biodiversity (one of the mega- biodiversity)
- Very low use of fertilizer (12 kg/ha)
- Negligible use of pesticides
- Availability of about 46 mt of manure including crop residues
- Huge availability of biomass, forest litters, weeds etc.
- Soil is rich in organic carbon (1.5 to 3.5 %)
- About 16.72 lakh ha under shifting cultivation
- Time tested indigenous farming systems.
- A number of niche crops to the region (Joha, ginger, turmeric, pineapple, passionfruit, caradamom)
- Can be classified as "Organic by default" ?

Advantages of organic farming over conventional farming

- Organic farming is a sustainable production system depends on recycling of farm resources. It involves less input cost than conventional.
- Totally excludes synthetic chemicals, fertilizer growth hormones, where as in conventional farming these are used.
- Organic farming emphasizes the conservation of natural resources but in conventional farming these is no conservation of natural resources.
- In organic farming output is clean and safe, but in conventional farming how far the produce is safe is questionable.
- Organic farming reduces the entry of toxicants in the food chain, reduces water, air and soil pollution, but in conventional farming increases all these.
- Organically produced products are intentionally accepted with premium price tax than conventionally produced products.

Thank You