

## **A REVIEW ON THE MANAGEMENT PRACTICES OF THE CROPS**

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### **Abstract**

Human beings feed on the food to live and this food is grown in fields by agricultural techniques and is made available to the eaters. Now it also depends on how much is the food made available to the eaters so that it can meet the requirements of the local as well as the national demands but it can also be exported to meet the demand of the other nations where that particular kind of food is not available due to unsuitable environment for the production of that environment but sometimes it also depends upon several other factors through which the demands can be fulfilled and various kinds of crops can be produced in the same field without any loss to the fertility of the soil also in further cycles. So in this paper, such management practices for the production of the crops have been discussed and some of such practices are the use of cover crops, crop rotations, intercropping, high-yielding variety of seeds and the use of good quality fertilizers and pesticides. Such management also leads to the sustainable production of crops to continue to meet the demands of future generations while maintaining the high yield production of the crops. Mass production of crops is necessary for the food security of the nation and thus management practices are important to be discussed

**Key words:** Agricultural, Crop rotation, Fertilizers, High yielding seeds, Management Practices, Pesticides.

### **Introduction**

For the sustenance and the food security of the global population there arises the need for the maximization of the production of crops. In the progressing nations, where the survival of the population depends heavily on agricultural production, the best management practices for crops must always be applied at all times [1]. This is essential for the economic status of such communities being created. Globally, it is estimated that the human population will shoot to 9.1 billion by 2050, calling for the mass production of crops to feed on these growing numbers. The continuous supply of food is largely dependent on the efficient and sustainable management of crops. This is important for the avoidance of agricultural crop losses in the general food supply chain.

Any process or technique which is technically and environmentally sound and which, when used in the production of crops, avoids or reduces the common problems associated with general agricultural production is considered to be best management practice. Because of the interconnected and dynamic existence of the agroecosystems, every agricultural crop management activity needs to be carefully weighed in order not to compromise the interactions between crops and their other physical factors. More specifically, management practice must not be related to environmental costs or the interests of throwing off the board, conservation and ecosystem preservation. The short-term and long-term goals must improve the buoyancy of the land and its biodiversity while taking into account its advantages for local communities adjacent to the farmland.

For crops, there are internationally agreed on management methods. Such agricultural crop control activities yield outcomes. They include, among others, the use of cover crops, crop rotation, intercropping, agroforestry, soil testing, record keeping, proper management of water and irrigation, management of pesticides and/or fertilizers, and tillage systems. It will increase crop yield, boost soil quality, ensure biodiversity conservation and minimize overall environmental costs by paying close attention to these main issues in agricultural crop management. Three of the best management practices for crops, which are the use of cover crops, crop rotation and intercropping, as well as pesticide and fertilizer management, are discussed in the following portion.

Cover crops are crops that, often during the off-season period, are grown to remain low on the ground to prepare the field for cash crop planting. White, however, believes that the cover is the second plantation of an

unharvested crop in line with the cash crop may also be a cropping operation. They play an important role in the maintenance of agricultural produce in agricultural areas. They increase soil fertility and soil quality, prevent soil erosion and prevent leaching or runoff of nitrogen while improving water quality and preserving soil microbial biodiversity. They provide necessary nitrogen to help sustain pH levels and decrease soil compaction. Cover crops are 'fraudulent crops' used to distract predators from damaging the farm's agricultural cash crops. The use of cover crops in agricultural crop planting is also recommended as one of the safest and most sustainable management practices for crops by many farmers.

Some of the best agricultural crop management methods that have long been used in organic farming and now in traditional farming are crop rotation and intercropping. Crop rotation is an agricultural method of growing different or dissimilar crops in different seasons on the same farmland. On the other hand, intercropping is a multiple cropping method in which two or more species of crops are concurrently planted in one planting season on the same farmland. These activities of agricultural crop planting help to vary the number of soil nutrients, thus reducing the risk of soil erosion. Ball *et al.* argue that crop rotation ensures the harvesting of high-quality crop yields with less environmental effects on the general agroecosystem. They also make a positive contribution to soil structure stability, reducing the outbreak of pests, weeds and other diseases on agricultural land. The rotation and intercropping of crops decreases dependency on chemical fertilizers, minimizes the hazards of agricultural crop production and increases crop yield compared to monoculture practices. This theory is verified by a 50-year field experiment in the Northern Region of Moldova. Boincean states that, in contrast to monoculture, crop rotation at the study site maximized crop productivity.

The use of chemical pesticides on farmland to raise agricultural crop yields is common in many countries. However, it is best to use them sparingly. They must be used only when the last choice is to protect farm crops from parasites. Organic fertilization, such as the use of compost and animal manure to nourish soil fertility, must be preferred in the majority of cases over the use of chemical pesticides. Agriculturalists must pay careful attention to the option of a pesticide that has very little or no environmental effect. The chemical solubility, volatility and degeneration characteristics must be objectively considered to find out whether it will not harm the ecosystem easily or leach from the soil. 'The mark is the law' for the use of chemical pesticides. What this usually means is that it is important to observe the application of the chemical as spelt out on the label meticulously to the latter. They must be applied and used properly in their appropriate quantities. Generally, before rainfall, the timing for the application of the pesticide must not be done as it is likely to leach or result in runoff that will ultimately mar the freshwater quality. In dry and well ventilated areas where fire stopping equipment is readily available, chemical fertilizers must be well labelled and stored.

### **Green Revolution Towards The Increase In The Production Of The Crops: Reasons, Methods And The Consequences**

India ranks second in terms of the arable land of the world having at least 20 different types of climates and around 157.35 million hectares of land comes under cultivation. Around 58% of India's rural population participates in agriculture but even the economy of the India is not an agrarian economy. As per a report on agricultural produce there was around 279.51 million tonnes of production in the crop year of 2017-18. But the same agricultural produce ability of the nation was very bad during the period of 1947-1960 and there were complete chances of the famine [2]. Therefore to counter the situation Green revolution was started in 1960 to increase the production of the food, alleviation of the poverty and the malnourishment of the country and to fulfill the demand of the large population. The major crops production during this period was rice, wheat, millets, barley, maize and the sorghum. Thus the other crops which were now consumed less became the fodder crops after the revolution and even the conventional varieties of rice before the revolution became almost extinct and total available varieties are now 7000 and even not all of them are cultivated. There was the loss of the 1 lakh varieties of the rice which were once the indigenous varieties of the rice. It happened all due to the availability of the subsidy for some selected variety of crops due to their high yielding nature and the government pressure on the monoculture. Thus India became self-reliant in the production of such crops. But the production of such crops also led to some adverse effects such the overuse of the fertilizers, pesticides and

the resources of the groundwater for the large production. The overuse of chemical and lack of crop rotation led to the infertility of the soil. These after effects posed a great problem to the farmers to overcome long duration shortcomings.

The above mentioned factors can be well understood in detail. As the Indian farmers land was small in area and well protected by the windbreaks and the tree cover so farmers were habitual to keep the fields fallow for some time, crop rotation and organic farming to fulfill the deficiency of the nutrients of the soil which continue to maintain the equilibrium of the soil. The main cause behind the negligence of the indigenous crops and the use of the HYV's was that the indigenous crops were not able to withstand with the chemical fertilizers and the pesticides although these varieties were also high yielding. The new varieties developed were high yielding in conjunction with the fertilizers and the irrigation. After the revolution the use of the fertilizers was intense and the usage of the fertilizers can be seen in Figure 1.

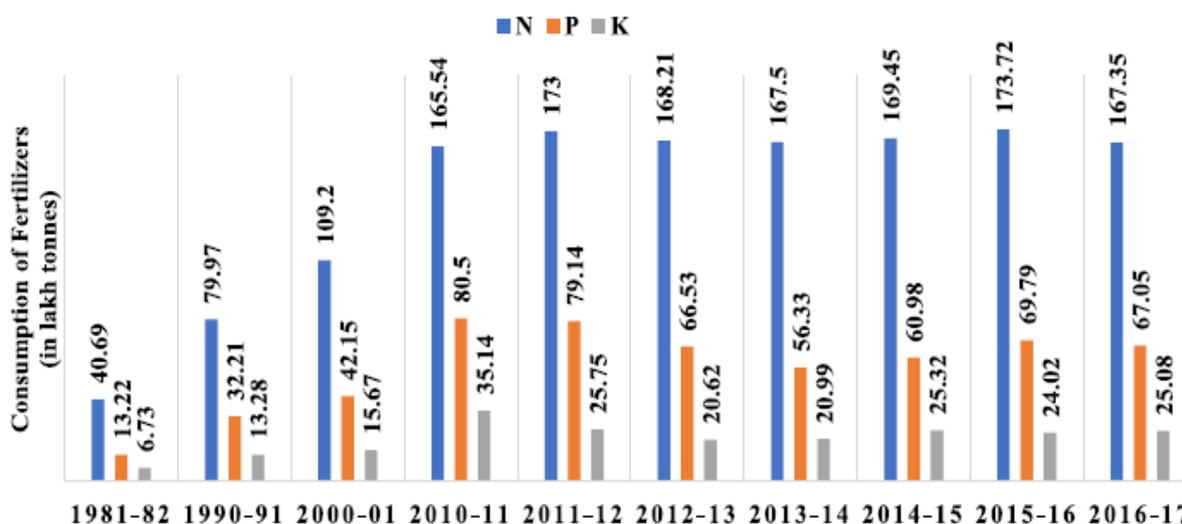


Figure 1: Consumption of fertilizers (N, P, and K) post-Green Revolution period.

This overuse of the fertilizers led to the cause of the degradation of the soil physically as well as the chemically which altered the microflora nature of the soil and it increased the alkalinity and the salinity of the soil. Secondly the excessive use of the groundwater for the excess production of the crops dropped the water table in many areas of the country. As the HYV's of crops are less and thus it led to the mono types of crops and thus eliminated the other varieties of the indigenous crops too. But there was a negative side of the HYV's of crops that although they yielded good production but at the same time it lead to the degradation of the environment with their cultivation and their yielding capacity also reduced due to the negative effects of the fertilizers on the soil and the environment degradation. For example IR-8 and the ADT-27 were initially the good yielding varieties of the rice but with the passage of time their yield also got reduced. In short the major impacts of the Green Revolution are:

- Loss of the indigenous varieties of the crops due to the introduction of the HYVs.
- Deficiency in the nutrients of the soil
- Excessive use led to the retaining of the pesticides in the soil.
- It led to the unsustainable means adopted by the farmers.

The impact of the green revolution was the increase in the cultivation of the crops from 97.32 million hectares to the 126.04 in 2014. In 2020 the production of the food grains shoots to 301 million tonnes. The arable land for the coarse cereals decreased from the 37.67 million hectares to the 25.67 million hectares in 1950s [3]. For the sorghum it decreased from 15.57 million hectares to the 5.82 million hectares and the area of cultivation of the pearl millet reduced from 9.02 million hectares to the 7.89 million hectares. For the rice, wheat, pulses and the

maize it got increased from 30.81; 9.75; 19.09; 3.18 million hectares to the 43.95; 31.19; 25.23; 9.43 million hectares respectively. These trends also affected the availability of the food grains in the rural and the urban households as can be seen in the Figure 2. It also impacted the availability of the rice from 58 kg/year to the 69.3 kg/year from 1951 to the 2017. The net availability of the rice raised from the 24 to 70.1 kg/year from 1951 to 2017. But in contrast the availability of the millets and the pulses lowered down. This changed the consumption of the population from the minor cereals and the pulses to wheat and the rice as well as the major cereals as can be seen in the Figure 3. The trend of the consumer expenditure can be seen in Table 1 which shows the importance of cereals in the daily consumption in 1987 but with the passage of time it decreased with a dip of 14% and 8% in the rural and the urban households [3]. The consumption of the coarse cereals and the millets was static at the 0.1% in the rural areas and it became zero in the urban population.

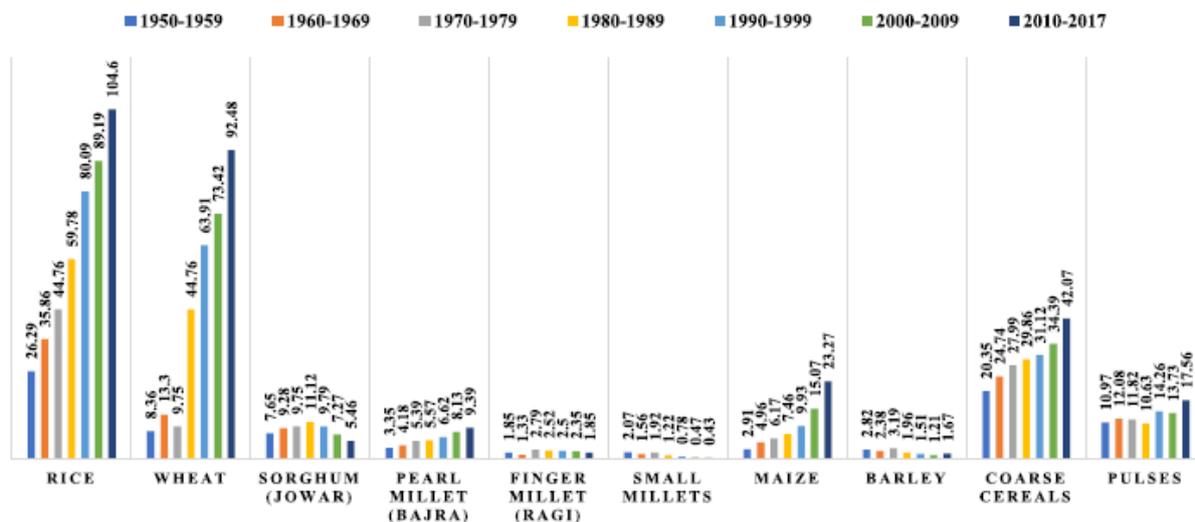


Figure 2: The trend in the production of food crops in India from 1950 to 2017 (in million tonnes).

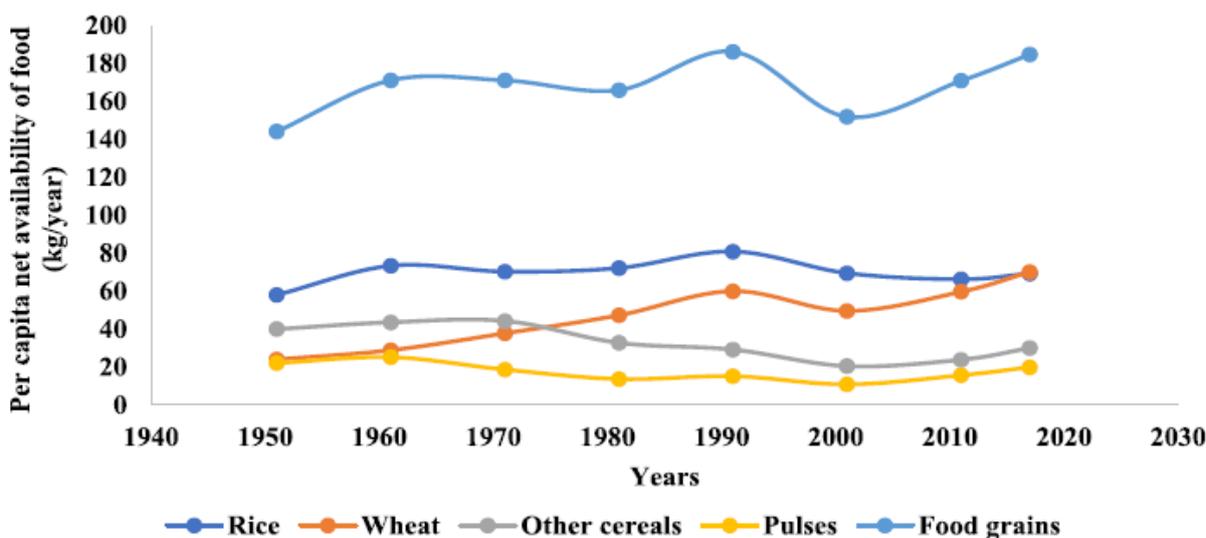


Figure 3: The per capita net availability of food grains in India since 1951.

Table 1: Trends in percentage composition of consumer expenditure since 1987–1988.

Year/group	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010	2011–2012	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010	2011–2012
	Rural						Urban					
Cereals	26.3	24.2	22.2	18.0	15.6	12.0	15.0	14.0	12.4	10.1	9.1	7.3
Gram	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Cereal substitutes	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
Pulses and products	4.0	3.8	3.8	3.1	3.7	3.1	3.4	3.0	2.8	2.1	2.7	2.1
Milk and products	8.6	9.5	8.8	8.5	8.6	9.1	9.5	9.8	8.7	7.9	7.8	7.8
Edible oil	5.0	4.4	3.7	4.6	3.7	3.8	5.3	4.4	3.1	3.5	2.6	2.7
Egg, fish, and meat	3.3	3.3	3.3	3.3	3.5	3.6	3.6	3.4	3.1	2.7	2.7	2.8
Vegetables	5.2	6.0	6.2	6.1	6.2	4.8	5.3	5.5	5.1	4.5	4.3	3.4
Fruits and nuts	1.6	1.7	1.7	1.9	1.6	1.9	2.5	2.7	2.4	2.2	2.1	2.3
Total, food	64.0	63.2	59.4	55.0	53.6	48.6	56.4	54.7	48.1	42.5	40.7	38.5
Total, non-food	36.0	36.8	40.6	45.0	46.4	51.4	43.6	45.3	51.9	57.5	59.3	61.5

### Food Security And The Consequences Of The Food Price Crisis

Food security does not just availability of food to satisfy the hunger of the people but it also means to make right choice of the nutrients to check the malnutrition and the zeroing the health issues [4]. It can arise at the national level as well as at the individual level due to the idiosyncratic shock. At the world conference on food in 1970 the main focus was on the deficiency and the level of production. Now the focus is on the food also because even there is availability of the food in large quantity but poor people are till today are not able to get the sufficient amount of food. Pertaining to the same Amartya Sen focused on the demand side issues than the supply side threats. Even after the availability of the sufficient quantity of the food still 850 million populations is deprived of the food as per report of the world bank in 2007 [5]. So in the developing countries the issue of the food security is not related to the availability but the access of the poor to the food and is also partially affected by the supply of the food. The food crisis was due to the sharp hike in prices of the food and thus it ultimately led to the lack of the access of the poor to the food due to their inability to the access of food [6]. In 2008 there was a complete surge in the prices of the food against the gradual increase in the prices of the food and there is now continuous decrease but even then above a secular trend as can be seen in Figure 4 which shows a graph of the trend of the prices of food [7].

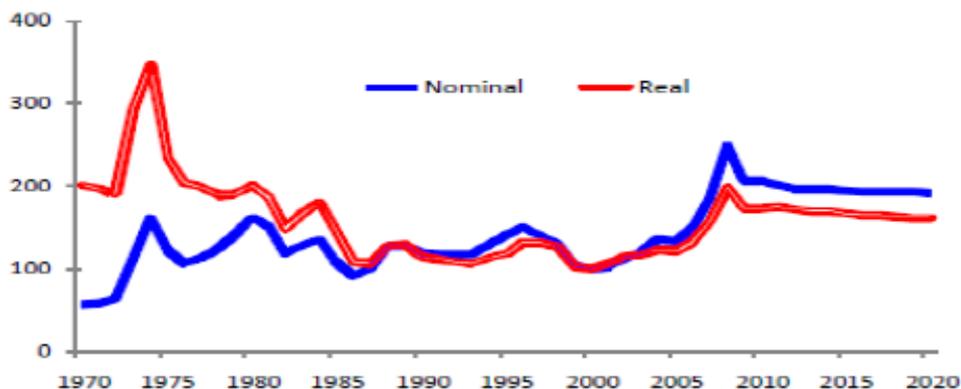


Figure 4: Food price index

As the major portion of the income is spent on the purchase of the food so the prices of the food plays a very important role in the human life and it accounts for the three parts of the income spent on the purchase of the staple food and thus it affects the poor people. As per an estimation by the Ivanic and Martin due to the crisis there was sweeping of the 105 million of people into the poverty which further leads to the efforts to reduction of

poverty of further 7 years [8]. In Sub-Saharan area of the Africa there was an increase of the 2.5% due to the crisis. Now even if we neglect the purchasing capacity then it also impacts the household in long terms for the food security due to the lower calorie intake value [9]. Torlesse *et al.* studied the underweight children of the Bangladesh with correlation to the money spent on the purchase of the rice [10]. It can be understood with a mathematical example like if earlier the price of the rice per kg was 40 rs. Per kg but now it increased to 60 rs. Per kg then there will be almost a 50% reduction in the purchase of rice by keeping the income the same. Now the family will adjust to the same amount of rice. It will also affect the education of the children and the selling of the livestock of the household to meet their demands. Thus temporary raise in the prices of food led to the permanent poverty of the people. It all happened because of several factors involved in increasing the prices of the food like increase in the fuel prices led to the increase in the production cost of the agriculture due to the increase in the cost of the fertilizers and the international market due to the decrease in the value of the rupee in the Indian context and vice versa in the context of the other countries [11]. An increase in the substitutes of the conventional fuels like bio-diesel also decreased the usage of the land available for the food and thus more demand and less supply situation. It may also particularly due to the floods and droughts also.

### **Conclusion**

Careful adoption of sustainable agricultural crop management practices such as those addressed is a wise path to be taken to ensure food security globally in the coming years. Although the overall formation and structure of soil vary from one geographical structure, these management activities for crops, on the other hand, offer profound benefits to the economies of both developing countries and countries in progress. It must be a priority for farmers and extension officers to educate farmers, especially rural farmers, on how to effectively implement these sustainable and essential agricultural crop management practices to maximize the yield of crops while preserving the pristine nature of agricultural ecosystems. The green revolution was targeted towards the increase in the production of the agriculture produce of wheat and rice to meet the demand of the nation but it was so much fruitful that it also led to the export of the same crops.

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