



ORIGINAL RESEARCH PAPER

Agriculture

IMPORTANCE OF CROPPING PATTERN AND CROP DIVERSIFICATION IN AGRICULTURE – A REVIEW

KEY WORDS: Agriculture, Cropping System, Crop Diversification, Farming System, Sustainability

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ABSTRACT

In India, over the years, the new cropping systems have become most important in view of their higher productivity as well as earnings for farmers. The cropping system refers to the type and sequence of crops cultivated and practiced over space and time based on the available technologies of crop production. It is usually practiced to maximize the crop yield. In recent years cropping system and farming system words are in use to denote a system approach which includes the integrated nutrient management, integrated pest management, sustainability, soil health etc. Agricultural sector of India has undergone a major shift from traditional crops to modern high value crops and got a tremendous potential in the overall growth of the agriculture. Diversified cropping system has got major role in the agriculture in helping farmers to achieve higher income. Crop diversification provides better circumstances for food security and allows farmers to grow surplus products for sale at market.

INTRODUCTION

India, an agriculture dominating country includes traditional as well as modern farming techniques. It is an art and science of cultivating soil and growing crops along with raising livestock. Nasim *et al.*, 2017 studied three hundred and sixteen cropping patterns in their study area. According to them cropping pattern is the major thing to get more productivity from agriculture. The agriculture practices include the preparation of plant and animal products for people to use and their distribution to markets. In India agriculture is a primary activity which helps in producing food grains and raw materials for industries. It also influences the socio – economic factors. These factors affect the intensity of land use, farming system and choice of cropping.

Farmers will select the crops for the purpose of cultivation on the basis of components like physical, social and economic conditions. They cultivate a number of crops and rotate a particular crop combination over a period of time. But it is noteworthy that the best farming practices always followed by certain cropping patterns as well as cropping system for raising their productivity and also for maintaining the fertility of soil. Satnami D and Surendra P., (2019) done a geographical analysis on cropping pattern in Karnataka. According to them cropping pattern is a dynamic concept because any pattern of crops is not an ideal cropping pattern to a particular area. Certain factors influencing the patterns according to farmers' requirements. Mainly it is controlled by physical as well as cultural and technological factors.

Cropping pattern

Cropping pattern is a vigorous concept because it changes over space and time. It is said that no cropping pattern is perfect for all times to a particular region. (Satnami D and Surendra P., 2019). It can be defined as the portion of area under various crops at a point of time. Cropping pattern is different from one region to another depending on the terrain, topography, slope, rainfall, soil type, temperature, climate and technology. In some regions it also depends on the demand in the market. The change of cropping pattern mainly influenced by the agro – climatic, socio – cultural, economic and political factors. Singh and Dhillon, (2005) studied the factors influencing for change of cropping patterns.

Cropping pattern is less diversified in those areas where physical diversities are least. It becomes possible for the farmers to replace less profitable crops with more profitable ones by continuous supply of water and modern inputs like high yielding varieties of seeds and commercial fertilizers. Cropping pattern changes as the agricultural productivity changes. In medium and low productivity areas the cropping

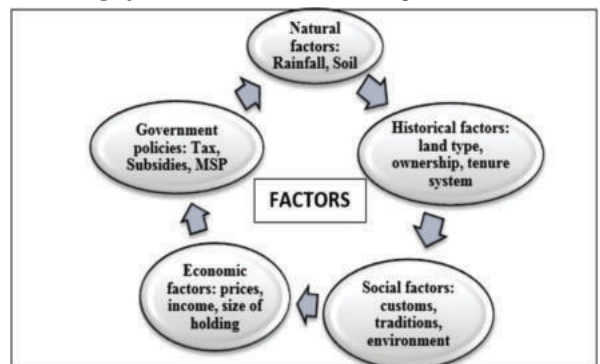
pattern is shifting towards nonagricultural crops. (Singh, 1979)

The cropping pattern is resolved on the basis of biological strength of the individual crops. The relative production of crop leads the suitability of that crop in a given geo – climatic and cultural setting. The selected study area of Lh. Seithang, 2013 revealed that agriculture is the main occupation for the people. Around 52 percent of the population depending on agriculture. They are growing most of the major crops of India.

There has been an evident change in the cropping pattern. During the post – reform period farmers used to grow more of the traditional food grain crops but at present there is a more share of the non – food grain crops such as oil seeds, vegetables, horticultural crops, spices, sugar cane in the cropping area. (Joshi *et al.*, 2004). It was recognized that the change in cropping pattern was initially accredited to comparative changes among various crops and crop diversification. (Sanjeev Kumar and Sakshi Gupta, 2015).

Factors determining cropping pattern in India

B. Shridharan and S. A. Radhakrishnan (1978) studied the factors affecting changes in the cropping pattern in Nilgiri district of Tamil Nadu. They listed the number of factors influencing cropping pattern in any area under study. The selection and allocation of piece of land to different crops were the result of a decision taken by the individual farmers based on physical, economic and sociological factors.



Natural factors:

Under natural factors, rainfall and soil influences the cropping pattern. The type of crop that would be grown using a particular type of soil is decided by the constituents of soil and climatic impact of a region. Temperature also plays a crucial role in regulating the overall relationship between crop production and other factors. Conrad Kyei-Mensah *et al.*, 2019, stated that cropping pattern is also being depending on

the irrigation facilities. Their study concluded that the variability in rainfall leads to major changes in the production of the crop. When plenty of water is available, farmers will cultivate not only different crops but also follow double or triple cropping system.

Historical Factors:

Under historical factors, land type ownership and tenure system decides the cropping pattern. There is a relationship between land holding and cropping pattern. The small farmers initially cultivate the food grains for their requirements then they will cultivate the cash crops. Moin Khan and Ateeque Ahmad, 2019, studied changing cropping pattern in Kheri district of Uttara Pradesh and concluded that the variation in land influences more on the agricultural practices. The farmers of the study area expressed that unavailability of water is the main reason to avoid some of the crops which requires more water to grow. Also they chosen rain fed crops to save underground water table.

Social Factors:

The social factors include peoples' customs, traditions and environment.

Economic Factors:

Economic factors play a stronger role affecting the crop pattern in areas with greater irrigation and infra – structure prospective. Price associated factors covering output and input prices also trade policies and other economic policies affects the cropping pattern of area. Rubeenah Akhter and Rekha Acharya, 2015 suggested farmers to adopt new techniques of farming with the help of government to avoid risk in the loss of the crop due to low capital to invest in the production. They also appreciated the farmers for growing fruits and vegetables to gain more productivity in terms it improves their economic stability.

Government policies:

The government policies like Minimum support price, subsidies for certain agricultural inputs will make farmers to change their cropping pattern in a particular region or in a particular season. Rubeenah Akhter and Rekha Acharya, 2015, concluded that because of some price policies resulted in an increase in area under some high income crops like horticulture crops.

Types of cropping combination

In India, various types of cropping patterns are practiced by the farmers to obtain maximum yield. The major types include the following:

1. Monocropping:

Growing of only one crop in a field season after season is known as monocropping. The main disadvantage of this is it reduces the soil fertility and spoils the structure of the soil.

2. Mixed cropping:

when more than two crops are grown in a piece of land simultaneously then it is said to be mixed cropping. The practice of mixed cropping method helps to avoid the risk of failure of one of the crop. Success of the mixed cropping pattern can be achieved by satisfying certain criteria like the crops should be one tall crop and other should be dwarf, the grown crops should have different maturation time and different water requirements and one crop should have shallow roots and other one should be deep rooted crop.

3. Intercropping:

inter cropping is a superior type of mixed cropping. Here cultivation of two or more crops in the same piece of land simultaneously will be practiced. The entire cropping pattern used in mixed cropping can be used in intercropping also.

The main advantages of inter cropping are optimum utilization of resources, maximum utilization of soil nutrients,

controlling of spreading of pest and diseases, maintenance of soil fertility. (iasri.res.in)

4. Crop rotation:

Crop rotation is an old practice adopted by the farmers to enhance soil fertility, reduce the attack of pests and diseases. It is a technique of cultivating different crops in the same piece of land over different seasons. With a well-planned crop rotation technique, crop health can be maintained and long term sustainability is ensured. (Caio Fernandes *et al*, 2023). During the grazing season when the land is left barren, it also involves the livestock into the technique.

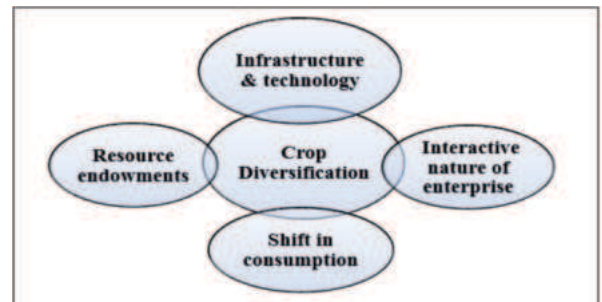
Hence the cropping pattern plays an important role in improving the fertility of soil there by increases the yield of the crops. It also ensures the crop protection and the availability of nutrients to the crops. (cutm.ac.in)

Crop Diversification

Crop diversification refers to a shift from the regional dominance of one crop to regional production of a number of crops, to meet ever increasing demand of cereals, pulses, vegetables, fruits, oilseeds, fibers etc.

Agricultural crop diversification is a shifting of line of products from a low value commodity mix to high value commodity mix. Here commodity mix includes the crops as well as livestock. The sectors like dairy, fishery, poultry, horticulture along with agricultural crops are more involved here. The final products from these sectors may be perishable in nature but they yield high and these are regular allowances to farmers. (Joshi *et al.*, 2002)

Factors determining crop diversification



Anamika *et al.*, 2022 explained the factors determining the crop diversification in agriculture. It is influenced by infrastructure and technology, interactive nature of enterprise, shift in consumption and resource endowments.

Infrastructure and technology:

Agricultural infrastructures like ware houses, cold storage, using high yielding varieties influences more on the change of crop and its pattern in the farming system. Indirectly it will effect on the crop diversification also.

Interactive nature of enterprise:

The increase of processing units and transformation industries in rural areas influencing more on diversification of the crops in agriculture. These help farmers to add value to the products by adopting packaging, processing, regional branding, to improve the market value.

Shift in consumption:

The major factor influencing crop diversification is change in consumers' interest towards diet based nutrient rich food from traditional staple food.

Resource endowments:

Farmers used to select the crop based on the availability of resources in order to get maximum profit out of minimum resource usage

The researchers revealed that there are some factors also influence the crop diversification in a particular region. They are namely, per capita income, portion of area under high yielding varieties (HYV) of cereals and pulses, portion of gross irrigated area to gross cropped area, rainfall, average size of holding, fertilizer consumption etc. (Poudel Acharya et al., 2011)

Mainly there two types of agricultural crop diversification in India. They are horizontal diversification and vertical diversification. (Raj Paroda, 2022)

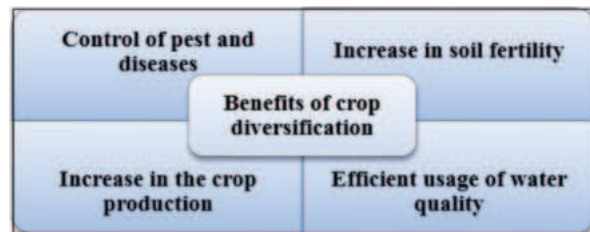
1. Horizontal crop diversification:

Horizontal diversification especially convenient for small farmers who hold on to a small piece of land. This helps them to receive increased amount by increasing cropping intensity. This type of diversification is related to cultivating of two or more or multiple crops instead of a single crop in a particular season in the piece of land.

2. Vertical crop diversification:

In vertical diversification, along with the mix cropping farmers will also include the mechanization. Here farmers get into an advance pace and put money into occupation like livestock rearing, agroforestry, horticulture, culture of different species plants etc. (Raj Padora, 2022).

Agricultural or crop diversification strongly authorised by technological development, infrastructure development, government subsidies and industrialization. (Joshi et al., 2003). Crop diversification brings viability and flexibility in agriculture. In the present scenario crop diversification has become notable element for farmers to secure highest farm profit, to ease the poverty, for increasing the employment, optimum use of the natural resources and so on. (Kumar S. and Gupta S., 2015).



Beillouin D. et al., 2021 studied some advantages of the crop diversification. Agricultural crop diversification has several advantages. It helps in decreasing risk factors as it makes sure that the farmers need not lose all their resources if the weather does not favour the crop production. Because of cultivating multiple crops in a small piece of land, the crop production is increasing which ensures the considerable increase of income to the farmers.

CONCLUSION

Agriculture plays a principal role in the financial system of a country. To have a good financial status, following the different cropping patterns is important, and the farming is affected by various components. Even though the Indian farmers are impoverished, the cropping system can be substituted by their motivation.

So far the analysis reveals that, there is no theoretically well – founded concept of crop diversification. The term crop diversification based very much on the country, regional current problems caused by agriculture, the focus of the scientific discipline, the particular scientific school and local expert knowledge and it is restricted to relatively few baselines and agro ecological situations. If crop diversification is to be developed as a tool for enhancing cropping systems, developing novel value-chains and providing other socio-economic benefits, it is necessary to expand a shared conceptual understanding.

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