

CROPS AND CROPPING PATTERN

Jyoti Kumari¹ and Radheshyam Ramkrishna Dhole^{2*}

Abstract: -

Cropping patterns in India involve the spatial and temporal arrangement of crops representing the proportion of land dedicated to different crops and their sequence (rotation) on a given area over a specific period, typically a year. The choice of Cropping Pattern in India is largely shaped by factors such as rainfall, temperature, soil characteristics, and overall climatic conditions of the area.

1. Major crops in India can be classified into:

Food crops: Rice, Wheat, Millets, Maize, and Pulses.

Cash crops: Sugarcane, Oilseeds, Horticulture crops, Tea, Coffee, Rubber, Cotton, and Jute.

1.1 Rice

India is an important center of rice cultivation. Rice is cultivated in the largest areas in India.

Climatic Requirements: In India rice is grown under widely varying conditions of altitude and climate.

- ☞ The Rice crop needs a hot and humid climate. It is best suited to regions that have high humidity, prolonged

sunshine and an assured supply of water.

☞ It required around 150-300 cm of rainfall and deep clayey and loamy soil.

☞ The average temperature required throughout the life period of the crop ranges from 21 to 37° C.

The crop of rice is grown with the following methods:

- ☞ Dry or Semi-dry upland cultivation
- ☞ Broadcasting the seed
- ☞ Sowing the seed behind the plow or drilling
- ☞ Wet or lowland cultivation
- ☞ Transplanting in puddled fields.
- ☞ Broadcasting sprouted seeds in puddled

Jyoti Kumari¹ and Radheshyam Ramkrishna Dhole^{2}*

¹M.Sc fruit science, Narayan Institute of Agricultural Sciences,

²Assistant Professor, Department of Entomology, Narayan Institute of Agricultural Sciences, Gopal Narayan singh University, Jamuhar, Sasaram, Rohtas- 821305

fields.

1.2 Wheat

Wheat is the main cereal crop in India. Indian wheat is largely a soft/medium-hard, medium protein, white bread wheat, somewhat similar to U.S. hard white wheat.

Climate requirement

Wheat can tolerate severe cold and snow and resume growth with the setting in of warm weather in spring. The best wheat is produced in areas favored with cool, moist weather during the major portion of the growing period followed by dry, warm weather to enable the grain to ripen properly.

- ☞ The optimum temperature range for the ideal germination of wheat seed is 20-25° C.
- ☞ Rains just after sowing hamper germination and encourage seedling blight.
- ☞ Areas with a warm and damp climate are not suited for wheat growing.

Wheat is grown in a variety of soils in India:

- ☞ Soils with a clay loam or loam texture, good structure, and moderate water holding capacity are ideal for wheat cultivation.
- ☞ Heavy soil with good drainage is suitable for wheat cultivation under dry conditions.
- ☞ These soils absorb and retain rainwater well. Heavy soils with poor structure

and poor drainage are not suitable as wheat is sensitive to waterlogging.

- ☞ Wheat can be successfully grown on lighter soils provided their water and nutrient holding capacity are improved.

1.3 Millets

- ☞ Given the nutritional value of the millets, the Government has notified millets as Nutri-cereals in April 2018. Millets are a rich source of Protein, Fibre, Minerals, Iron, and Calcium and have a low glycemic index. The National Year of Millets was celebrated in 2018.

Climate requirement

- ☞ Millets require a temperature between 27-32°C.
- ☞ Rainfall is around 50-100 cm.
- ☞ Millets can be grown in inferior alluvial or loamy soil because they are less sensitive to soil deficiencies.

Jowar: is a rain-fed crop grown in moist areas with less or no irrigation.

Bajra: grows in sandy soils and shallow black soil.

Ragi: requires red, black, sandy, loamy, and shallow black soils which are found in dry regions mostly.

1.4 Pulses

Pulses are consumed as Dal, which is a cheap source of plant protein. These are

consumed because of bodybuilding properties having the presence of various amino acids.

- ☞ These also have medicinal properties. By-products of pulses like leaves, pod coats, and bran are given to animals in the form of dry fodder.
- ☞ Some pulse crops like Gram, Lobia, Urdbean & Moongbean are fed to animals as green fodder.

Climatic Requirement

Pulse crops are cultivated in the Kharif, Rabi, and Zaid seasons of the Agricultural year.

1.5 Maize

Maize is one of the most versatile emerging crops having wider adaptability under varied agro-climatic conditions. Globally, maize is known as the queen of cereals because it has the highest genetic yield potential among the cereals.

Maize serves as a basic raw material as an ingredient in thousands of industrial products that includes starch, oil, protein, alcoholic beverages, food sweeteners, pharmaceutical, cosmetic, film, textile, gum, package and paper industries, etc.

Climatic conditions

- ☞ Maize can be grown successfully in a variety of soils ranging from loamy sand to clay loam.
- ☞ Soils with good organic matter content having high water holding capacity

with neutral pH are considered good for higher productivity.

Major cash crops in various parts of the country

1.6 Sugarcane

Sugarcane family is a widely grown crop in India. It employs over a million people directly or indirectly besides contributing significantly to the national exchequer.

- ☞ Sugar cane originated in New Guinea where it has been known for thousands of years.
- ☞ Sugar cane plants spread along human migration routes to Asia and the Indian subcontinent. Here it cross-bred with some wild sugar cane relatives to produce the commercial sugar cane we know today.

Important regions/ zones for sugarcane cultivation in India

Broadly there are two distinct agro-climatic regions of sugarcane cultivation in India, viz., tropical and subtropical.

Tropical Sugarcane region

The tropical sugarcane region consists of sugarcane agro-climatic zone 4 (peninsular zone) and 5(Coastal zone) which includes the states of Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka, Gujarat, Madhya Pradesh, Goa, Pondicherry, and Kerala.

Sub-tropical sugarcane region: Around 55 percent of the total cane

area in the country is in the sub-tropics. U.P, Bihar, Haryana, and Punjab come under this region.

Climatic requirement

- ☞ The optimum temperature for sprouting (germination) of stem cuttings is 32°C to 38°C.
- ☞ It slows down below 25°C and reaches a plateau between 30°-34°C.
- ☞ Temperatures above 38°C reduce the rate of photosynthesis and increase respiration.
- ☞ For ripening, however, relatively low temperatures in the range of 12°C to 14°C are desirable.

Reduction in yield of sugarcane due to rise in temperature

The sugarcane productivity and juice quality are profoundly influenced by weather conditions prevailing during the various crop-growth sub-periods.

- ☞ Sugar recovery is highest when the weather is dry with low humidity; bright sunshine hours, cooler nights with wide diurnal variations, and very little rainfall during the ripening period.
- ☞ These conditions favor high sugar accumulation.
- ☞ The climatic conditions like very high temperatures or very low temperatures

deteriorate the juice quality and thus affecting the sugar quality.

- ☞ Favorable climates like warm and humid climates favor the insect pests and diseases, which cause much damage to the quality and yield of its juice and finally sucrose contents.

1.7 Tea

In colonial India, the British had to import tea from China, which caused huge dents in their treasury, so the East India Company started tea plantations in Assam. As the production of tea increased, India started exporting tea to the rest of the world. This contributed to the nation's economy. By the 1850s, India became one of the biggest tea producers in the world. After independence, local tea brands were introduced as beverages to the masses.

Climatic requirements

- ☞ Requires temperature between 20-30°C.
- ☞ Rainfall is around 150-300 cm.
- ☞ Deep and fertile well-drained soil, rich in humus and organic matter.

1.8 Coffee

India cultivates all of its coffee under a well-defined two-tier mixed shade canopy, comprising evergreen leguminous trees. Nearly 50 different types of shade trees are found in coffee plantations. Shade trees prevent soil erosion on a sloping terrain; they

enrich the soil by recycling nutrients from deeper layers, protect the coffee plant from seasonal fluctuations in temperature, and play host to diverse flora and fauna.

India's coffee-growing regions have diverse climatic conditions, which are well suited for the cultivation of different varieties of coffee.

1.9 Jute

Jute is an important natural fiber crop in India next to cotton. In trade and industry, jute and Mesta crop together known as raw jute as their uses are almost the same. Raw jute plays an important role in the country's economy.

Jute cultivation is mainly concentrated in eastern and northeastern India while mesta cultivation is spread almost throughout the country. The crop can be grown in low, medium, and high land situations, with both moisture stress and water stagnating condition.

Climatic conditions:

- ☞ Temperature: Between 25-35°C
- ☞ Rainfall: Around 150-250 cm
- ☞ Soil Type: Well-drained alluvial soil

1.10 Cotton

Cotton is one of the most important fibers and cash crops of India and plays a dominant role in the industrial and agricultural economy of the country.

In India, there are ten major cotton-growing states which are divided into three

zones, viz. north zone, central zone, and south zone. The North zone consists of Punjab, Haryana, and Rajasthan. The central zone includes Madhya Pradesh, Maharashtra, and Gujarat. The South zone comprises Andhra Pradesh, Telangana, Karnataka, and Tamil Nadu.

Besides these ten States, cotton cultivation has gained momentum in the Eastern State of Orissa. Cotton is also cultivated in small areas of non-traditional States such as Uttar Pradesh, West Bengal & Tripura.

Climatic conditions:

- ☞ Cotton is a tropical or sub-tropical crop grown in semi-arid areas of the country (mainly in the Deccan Plateau).
- ☞ Only light rainfall (50 to 100 cm) is preferred. Cotton can also be cultivated under irrigated conditions.
- ☞ It requires high temperature and bright sunshine for its growth. Cotton requires a clear sky during the flowering stage.

2. Cropping patterns in India

Cropping Pattern in India refers to the distribution and arrangement of crops in a region, including the sequence in which they are grown and the share of land allotted to each crop during different seasons. The cropping pattern in India is determined mainly by rainfall, climate, temperature, and soil type. Cropping Pattern describes the proportion of

area under cultivation of different crops at a point of time, changes in this distribution over time, and factors determining these changes.

Based on homogeneity and commonness, major crop regions in India may be divided as follows:

- ☛ Rice Region
- ☛ Wheat Region
- ☛ Jowar-Bajra Region
- ☛ Cotton Region
- ☛ Millet and Maize Region
- ☛ Fruit and Spice Region

3. Types of cropping pattern in India:

Monocropping: Monocropping is when the field is used to grow only one crop season after season. This is harmful to soil health.

Crop Rotation: Crop Rotation means changing the type of crops grown in the field each season or each year (or changing from crops to fallow). Crop rotation improves the soil structure and fertility, and because it helps control weeds, pests, and diseases.

Sequential Cropping: Sequential Cropping involves growing two crops in the same field, one after the other in the same year.

Intercropping: Intercropping means growing two or more crops in the same field at the same time.

Mixed Intercropping: Planting the main crop in rows and then spreading the

seeds of the intercrop (such as a cover crop) in between is called mixed intercropping.

Row Intercropping: Planting both the main crop and the intercrop in rows. The rows make weeding and harvesting easier than with mixed intercropping.

Stir Cropping: Stir Cropping involves planting broad strips of several crops in the field.

4. Factors affecting cropping pattern in India

The Cropping Pattern in India is a mix of geographical, economic, political, and historical factors which are discussed in brief below:

Geographical Factors

Relief: The landscape directly influences what can be grown. For example, rice thrives on irrigated hill terraces, while tea and coffee need well-drained slopes with ample rainfall. In irrigated plains with warm climates, crops like rice and sugarcane dominate, while wheat prefers regions with moderate temperatures and rainfall.

Rainfall: The amount and distribution of rain create distinct cropping zones:

Heavy rainfall areas (150+ cm annually): East India and the West Coast plains grow rice, tea, coffee, jute, and sugarcane. Livestock is also common due to abundant fodder.

Medium rainfall areas (75-150 cm):

Eastern UP, Bihar, Odisha, Madhya Pradesh (east), and Vidarbha in Maharashtra support rice (higher rainfall), wheat (lower rainfall), maize, soybeans, and cotton.

Low rainfall areas (25-75 cm): Semi-arid stretches cultivate millets, jowar, bajra, ragi, and oilseeds. Wheat is grown in irrigated tracts, and mixed cropping with pulses is common to reduce risk.

Soil: Each soil type has its own crop preference. Clayey soils favour rice, loamy soils suit wheat, and black regur soils of the Deccan are perfect for cotton. Coarse grains thrive in lighter soils, while delta soils of Bengal, renewed by annual floods, make jute cultivation ideal. In Darjeeling, the humus-rich soils nurture tea plantations.

Economic Factors

Irrigation: Areas with strong irrigation support multiple crops annually—rice in southern belts, wheat in the north, while coarse grains receive less attention.

Risk and Insurance: Access to crop insurance influences patterns. Plantation crops in southern states, for example, expanded because insurance schemes made them less risky.

Inputs and Infrastructure: Seeds, fertilisers, water storage, transport, and market access play a big role in deciding what farmers grow.

Value and Demand: High-value crops like apples are replacing millets in Himachal and Uttarakhand. Similarly, rice dominates in densely populated regions because of high demand and assured markets.

Political Factors

Government policies often Cropping Patterns in India. Legislation like Food Crops Acts, subsidies, or land reforms can push farmers toward certain crops. The Minimum Support Price (MSP) system has made rice and wheat dominant, leading to monocultures in many regions. In times of drought or inflation, policies shift again, encouraging or discouraging specific crops.

5. Changing cropping patterns in India

A cropping pattern is a dynamic concept as it changes over space and time which occurs due to an increase in the prices of crops.

- Green Revolution also led to changes in the cropping patterns. Rice was introduced to Punjab, Haryana, and Uttar Pradesh.
- New technologies in Indian agriculture play a vital role in determining the cultivation of crops.
- Farmers have changed their crop patterns to reap the benefits of economic expansion due to which they are intensively moving towards the

cultivation of cash crops from traditional crops.

- ⇒ Population explosion and urbanization have led to land conversion, boosting intensive farming, and have brought changes in cropping patterns.

Conclusion

- ⇒ Indian agriculture has been seeing a deceleration in growth compared to the growth of the larger economy which has been widening disparities between the incomes of workers in non-agricultural and agricultural sectors.
- ⇒ Indian farmers are very much poverty-stricken and conservative still their cropping pattern can be changed through appropriate changes in economic motives.
- ⇒ There is a need to shift to sustainable agriculture. The policies should consider the environmental cost as well. The planning should be done with the fact that the next generation also needs to have food security.

