Agriculture and Cropping Pattern in India

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Abstract: Today India is the world’s second or third largest producer of several dry fruits, agricultural based textile raw material, roots and tuber crops, pulses, farmed fish, egg, coconut, sugarcane and different types of vegetables. In the fiscal year ending June 2011, with a normal monsoon season, Indian agriculture accomplished an all time production of 85.9 million tonnes of wheat, a 6.4 percent increase from a year earlier. Meanwhile, rice production hit a new record at 95.3 million tonnes, a seven percent increase from the year earlier. Lentils and many other food staples production also increased during this period. Actually production of various crops depend on various factors such as good monsoon, size of farm, availability of inputs, Govt. policies etc. There are three cropping seasons in the country and likewise there are three crop pattern as Kharif, Rabi and Zaid in India. Kharif season largely coincides with south-west monsoon under which cultivation of tropical crops such as rice, cotton, jute, Jowar, bazra etc. The Rabi seasons begins with the onset of winter in October to November and ends in March to April. Zaid is the shortest season beginning after harvesting of Rabi crops.

Keywords: Agriculture, Crop Season, Crop Pattern, Kharif, Rabi and Zaid.

Introduction: India is the second largest producer of wheat and rice. As per the 2010, Food and Agriculture Report, India is the world’s largest producer of many fresh fruits, vegetables, fibrous crops such as Jute, staples such as millets and costar oil seeds. It is said that India exported $ 39 billion worth of agricultural products at the value of 2013. The improvement in irrigation infrastructure in the last decades have supported India to make an improvement in food security, to reduce dependence on monsoons, to improve agricultural productivity and to create new job opportunity in rural areas. As per census data of 2011, India’s gross irrigated crop area of 82.6 million hectare is the largest throughout the world. Consequently India is among the top 3 global producer of many crops including wheat, rice, pulses, cotton, pea nuts, fruits and vegetables.
**Research Objective:** The present research paper highlights the economic value of agricultural production and helps to find out the some facts about crop pattern and factors affecting it in the recent years.

**Research Methodology:** The present research paper is exploratory in nature. The researcher has used secondary sources of data collection. To collect the data, the researcher has used reference books, journals, News papers and official websites. To pace the study some observational facts have also been used.

**Major Crops and Production:** The table no. 1 shows that India has a large potential for further accomplishment from productivity increase, in increased agricultural output and agricultural income. The data in the table highlight the 20 most important agricultural products in India by the economic value as per 2013.

![Table -1](Largest Agricultural Products by Value as per 2013)

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Rice</td>
<td>42.57</td>
<td>0.27</td>
<td>3.99</td>
</tr>
<tr>
<td>2</td>
<td>Buffalo Milk</td>
<td>27.92</td>
<td>0.4</td>
<td>0.63</td>
</tr>
<tr>
<td>3</td>
<td>Cow Milk</td>
<td>18.91</td>
<td>0.31</td>
<td>1.2</td>
</tr>
<tr>
<td>4</td>
<td>Wheat</td>
<td>13.98</td>
<td>0.15</td>
<td>2.8</td>
</tr>
<tr>
<td>5</td>
<td>Mangoes &amp; Guavas</td>
<td>10.79</td>
<td>0.6</td>
<td>6.3</td>
</tr>
<tr>
<td>6</td>
<td>Sugar Cane</td>
<td>10.42</td>
<td>0.03</td>
<td>66</td>
</tr>
<tr>
<td>7</td>
<td>Cotton</td>
<td>8.65</td>
<td>1.43</td>
<td>1.6</td>
</tr>
<tr>
<td>8</td>
<td>Bananas</td>
<td>7.77</td>
<td>0.28</td>
<td>37.8</td>
</tr>
<tr>
<td>9</td>
<td>Potatoes</td>
<td>7.11</td>
<td>0.15</td>
<td>19.9</td>
</tr>
<tr>
<td>10</td>
<td>Tomatoes</td>
<td>6.74</td>
<td>0.37</td>
<td>19.3</td>
</tr>
<tr>
<td>11</td>
<td>Fresh Vegetables</td>
<td>6.27</td>
<td>0.19</td>
<td>13.4</td>
</tr>
<tr>
<td>12</td>
<td>Buffalo Meat</td>
<td>4.33</td>
<td>2.69</td>
<td>0.138</td>
</tr>
<tr>
<td>13</td>
<td>Ground Nutes</td>
<td>4.11</td>
<td>1.96</td>
<td>1.8</td>
</tr>
<tr>
<td>14</td>
<td>Okra</td>
<td>4.06</td>
<td>0.35</td>
<td>7.6</td>
</tr>
<tr>
<td>15</td>
<td>Onions</td>
<td>4.05</td>
<td>0.21</td>
<td>16.6</td>
</tr>
<tr>
<td>16</td>
<td>Chick Peas</td>
<td>3.43</td>
<td>0.4</td>
<td>0.9</td>
</tr>
</tbody>
</table>
Crop Pattern: The choice of crop cultivation of farmer is decided by various factors and sometimes they cultivate a number of crops at their farms and rotate a particular crop combination over a period. But here it is also 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. Moreover, cropping pattern is a dynamic concept because it changes over space and time. It may be defined as a yearly sequence and spatial arrangement of sowing and fallow on a given area. In India, the cropping pattern determined by rainfall, climate, temperature, types of soil and technology. It is very important to identify crops and their showing agro-climatic condition so that they can be categorized.

Actually, cropping pattern is a spatial and temporal arrangement of crops to be raised in a parcel of land. The term cropping pattern is used to denote the spatial and temporal contribution of crops on a plot management used to produce them. Cropping pattern refers to the relative arrangements of crops on a farm, region, province or country with due consideration to natural features such as soil and climate, crop production, land capability, infrastructure and the nation’s agricultural policy. A change in cropping pattern would mean a change in the proportionate area under different crops.

Crop pattern in India is keenly associated with the crop seasons and on the basis of it there are three crop patterns as – Kharif, Rabi and Zaid. Among the kharif crops, rice, jowar, bajra, maize, groundnut and cotton are the prominent crops to be considered the base crops for describing the kharif cropping patterns. Likewise, among the rabi crops, wheat, gram and sorghum or jowar are considered the base crops for explaining the rabi cropping pattern. There are three distinct crop seasons in the northern and interior parts of country, namely kharif, rabi, and zaid. The kharif season largely coincides with Southwest Monsoon under which the cultivation of tropical crops such as rice, cotton, jute, jowar, bajra and tur is possible. The rabi season begins with the onset of winter in October-November and ends in March-April. The low temperature conditions during this season facilitate the cultivation of temperate and subtropical crops such as wheat, gram and mustard. Zaid is a short duration summer cropping season.
beginning after harvesting of rabi crops, the cultivation of watermelons, cucumbers, vegetables and fodder crops during this season is done on irrigated lands. However, this type of distinction in the cropping season does not exist in southern parts of the country.

Table – 2

Cropping Season and Crop Pattern

<table>
<thead>
<tr>
<th>Cropping Seasons</th>
<th>Major Crops Cultivated</th>
<th>Northern States</th>
<th>Southern States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kharif (June-September)</td>
<td>Rice, Cotton, Bajra, Maize, Jowar, Tur</td>
<td>Rice, Maize, Ragi, Jowar, Groundnut</td>
<td></td>
</tr>
<tr>
<td>Rabi (October-March)</td>
<td>Wheat, Gram, Rapeseeds and Mustard, Barley</td>
<td>Rice, Maize, Ragi, Groundnut, Jowar</td>
<td></td>
</tr>
</tbody>
</table>

On the basis of above table crop pattern may be categorized in three types as Kharif, Rabi and Zaid. These crops are grown sole or mixed, or in a definite sequence (rotational cropping). The land may be occupied by one crop during one season, or by two crops (double-cropping) which may be grown in a year in sequence. Of late, the trend is even more than two crops in a year. These intensive cropping may be done either in sequence or even there may be relay-cropping - one crop under-sown in a standing crop. With wide-rowed slow growing cropping patterns, companion crops may be grown.

Commercial Crops: These Crops include sugarcane, tobacco, potato, jute, tea, coffee, coconut, rubber and other crops, such as spices and condiments. Some of them are seasonal, some annual and some perennial. Generally, the areas occupied by them are very limited as compared with food and other crops. Nevertheless, they are important commercially. Most of them require specific environmental conditions and from the point of view of cropping patterns, they are concentrated in some particular regions. Besides, certain horticultural crops, such as apple, mango and citrus, are important. In several sugarcane-growing areas, mono-cropping is practised, and during the interval between the crops, short duration seasonal crops are grown. In U.P., Bihar, Punjab and Haryana, wheat and maize are the rotation crops, rice is also grown in some areas. In the southern states, namely Tamil Nadu, Karnataka and Andhra Pradesh, ragi, rice and pulses are grown along with sugarcane. In Maharashtra, pulses, jowar and cotton are grown. In the potato-growing region, maize, pulses, wheat are the alternative crops. In the tobacco growing
areas, depending on the season and the type of tobacco, jowar, oilseeds and maize are grown in rotation. In the jute-growing areas, rice is the usual alternative crop.

**Plantation Crops:** In the case of plantation-crops, intercropping with pulses and fodder crops is common. Spices and condiments are generally grown on fertile soils. Chillies are rotated with jowar, whereas onion, coriander, turmeric and ginger are grown as mixed crops with other seasonal crops.

**Mixed Cropping:** It is the largest experienced crops pattern in many part of India. Mixed cropping was considered by researchers a primitive practice, but now many researchers regard mixed cropping as the most efficient way of using land. Several new mixtures have recently been suggested. They ensure an efficient utilization of sunshine and land. Breeders are developing plant types in pulses and oilseeds, with good compatibility with row crops. Crops mixtures are widely grown, especially during the kharif season. Pulses and some oilseeds are grown with maize, jowar and bajra. Lowland rice is invariably grown unmixed, but in the case of upland rice, several mixtures are prevalent in eastern Uttar Pradesh, with Chotanagpur division of Bihar and in the Chhatisgarh division of Madhya Pradesh. During the rabi season, especially in the unirrigated area of the north, wheat and barley and wheat and gram or wheat + barley + gram are the mixtures of grain crops. Brassica and safflower are grown mixed with gram or even with wheat.

**Crop Combinations:** Crops are generally grown in combinations and it is rarely that a particular crop occupies a position of total isolation. The distribution maps of and their concentration are interesting and helps in knowing the density and concentration of individual crops, but it is even more important to view the integrated assemblage of the various crops in a region. On the basis of some homogeneity and commonness, major crop regions in India may be divides as Rice Region, Wheat Region, Jowar-Bajra Region, Cotton Region, Millet and Maize Region, Fruit and Spice Region.

**The Rice Region:** It is the first-ranking crop in the vast region stretching from lower Gangetic Plain to Brahmaputra Valley in the east and the circum-coastal alluvial tracts of the peninsula region. Rice cultivation is done around Bay of Bengal, barring isolated pockets bordering the Arabian Sea. Though rice displays overall dominance, considering the secondary importance of other crops, this region may be sub-divided into following zones:
• **Rice-Millet**s: It comprises the entire Andhra Pradesh, south Orissa and some parts of Tamil Nadu.

• **Rice-Coffee-Spices**: It comprises is found in the southern extremity of Kerala and Tamil Nadu.

• **Rice-Pulses-Millet**: This combination occurs in the western section of the former zone, covering central Bihar, eastern Madhya Pradesh and eastern Uttar Pradesh.

• **Rice-Jute-Tea**: This combination of crops occurs in farthest east, near Assam Valley northern West Bengal and lower Gangetic plains.

**The Wheat Region**: This region covers the entire north-western India including the state of Punjab, Haryana, Uttar Pradesh and Rajasthan. The major sub-regions are:

• Wheat-Jowar-Bajra in Vindhyan scarp land and Malwa Bundelkhand plateau.

• Wheat-Maize-Sugar Cane covers West Uttar Pradesh, Himachal Pradesh and Jammu.

• Wheat-Jowar-Bajra in Indus Plain covering Punjab and Haryana.

**The Cotton Region**: Cotton is grown in the black soil. Therefore it is grown in the North West India, cotton cultivation predominates. The cotton cultivation covers the Deccan trap region and Gujarat Plain. The Narmada, Tapti, Purna, Sabarmati River Valleys are basically heartlands of cotton cultivation. As a cash-crop, cotton cultivation is always associated with one food grain cultivation, preferably Jowar, Bajra or oil seeds. The different sub-regions are:

• Cotton-Oilseeds-Combination developed in Gujarat.

• Cotton-Pulses-Rice-Region developed in Narmada banks and eastern Gujarat.

• Cotton-Jowar-Bajra grows in close association with one another in the Maharashtra and Western Madhya Pradesh.

**The Jowar-Bajra Region**: It occurs relatively in less rainfall region of 50-100 cm in red soil region. As the region is drought prone, Jowar-Bajra is more popular.

• Jowar-Wheat in entire Rajasthan, Haryana and some parts of Uttar Pradesh.

• Bajra-Jowar-Pulses in Rajasthan desert and semi-desert areas.

• Jowar-Cotton in Maharashtra.

• Jowar-Cotton-Oilseeds-Millet in Karnataka and Maharashtra.
The Millet-Maize Region: The cultivation of millet, maize and ragi are found in close association with other major cereals like bajra, wheat, rice etc. Maize cultivation dominates in Rajasthan, Gujarat, and Madhya Pradesh. In Himachal Pradesh, Maize-Barley-wheat combination has developed, particularly in the foothills of the Himalayas. Some parts of the Aravalli have the peculiar crop combination of Maize-Cotton-Oilseeds-Millets-Wheat. Ragi cultivation predominates in South of Karnataka.

The Fruit & Spice Region: It is the smallest region among the different crop regions. High-altitude hilly areas come under the territory of this region. The ‘Duns’ and valleys in Himalayas, foothills of Nilgiri, Annamalai, Palni and Cardamom hills in Tamil Nadu and Kerala may be classified as fruit and spice region. Here, the dominant agricultural activity is fruit orchards and plantations.

Factors Affecting Crop Pattern: Cropping pattern in India is determined mainly by rainfall, climate, Temperature and soil type. Technology also plays a pivotal role in determining crop pattern. These factors may be studied as under:

Physical and Technical Factors: Crop pattern of any area depends upon physical characteristics as the soil, climate, rainfall, etc. In a dry area where the rainfall is scanty and where there is high uncertainty of rainfall, there will be a greater dependence on jawar and bajra, as these crops can be managed with scanty rainfall. This is so in most parts of the country. But then it is possible
that, technologically, rotation of crops can be altered. But physical compulsion may become
decisive in certain circumstances. Water-logging in certain parts of Ludhiana and Sangrur
districts in the Punjab have led to an increase in area under rice; because rice can stand the extra
water better than other crops. In the newly reclaimed lands of M.P. millets are grown for a few
years before they are shifted to rice. Besides soil and climatic conditions, the crop pattern of an
area depends on the nature and availability of irrigation facilities. Whereas water is available, not
only can a different crop be grown, but even a double or treble crop will be possible. When new
irrigation facilities are provided, the whole method of cultivation also may alter. As superior crop
can be grown; a new rotation of crops, where there was none or a better rotation over what
prevailed may be possible. One of the important factors responsible for increase in the
cultivation of sugarcane tobacco etc., is the extension of irrigation facilities.

**Prices and Income Maximization:** Most of the studies have shown clearly the relation between
price movements and crop pattern. A study of Inter-crop price parities undertaken by the
Ministry of Food and Agriculture shows how price variations influence acreage shifts, it seems
that prices exert influence on the acreage under the crops in two ways. One is that the variations
in the inter-crop price parities lead to shifts in acreage as between the crops. Another is that the
maintenance of a stable level of prices for a crop provides a better incentive to the producer to
increase the output that what a very higher level of price does, if there is no uncertainty of this
level being maintain over a number of years. According to some experts income maximization
mainly influences in altering the crop pattern i.e., the farmer would choose that combination of
crops which would give him maximum of income.

**Size of Farm:** There is a close relation between farm size and the crop pattern. Small farmers
devote a smaller relative acreage to cash crops than large farmers. This may be because the small
farmers are first interested in producing food grains for their needs. They would produce cash
crops only after they have met their needs of food grains. In fact, in recent years, the small
farmers have been increasing their sugarcane area more than large farms. It is a fact that the need
for subsistence has traditionally dominated the crop pattern of the small farmers. But his
marginal requirement for money income cannot be less than that of the large farmer.

**Availability of Inputs:** Crop pattern depends on the availability of such inputs as fertilisers,
seed, water, storage and marketing, transport, etc. On the additional facilities, the most rewarding
would be irrigation. The availability of groundnut seed was one of the important factors which induced many farmers to increase the area under this crop in M.P.

**Government Policies:** The polices of state may attach the provision of some service or facility with a particular crop pattern. The provision of irrigational facilities or the supply of seed and fertilisers, etc., may be related to the adoption of a given crop pattern by the farmers. Food crops Acts, Land-use Acts, intensive schemes for paddy, for cotton, for oilseeds, etc., the use of excise duties, export duties etc., all these bring sharply into focus the possibility that while each individual measure may push the crop pattern in the direction intended in that measure the overall effect of all the measures taken together on the entire crop pattern may not be in accordance with national needs.

Besides the personal prejudices and inadequate financial and other resources of the farmers, there may be factors like recurrent droughts or pest infestation that prevent them from opting for a more remunerative set of crops. In these situations if more of irrigation, fertilisers or pesticides are made available, it would be possible for them to change the crop, structure and so earn larger returns from their land. To the extent it is not possible for a farmer to get all these by himself, the Government could come to his help and procure these for him. **Conclusion:** Thus, in conclusion, it can be said that economic factors are playing a dominant role in determining the cropping pattern in India. Although Indian farmers are very much poverty stricken and conservative still their cropping pattern can be changed through appropriate changes in economic motive. Whenever farmers in India see a better cropping pattern they try to adjust with it. To adopt a better cropping pattern farmer should possess requisite volume of capital and know-how just for changing the cropping pattern in India. The above discussion makes it clear that economic factors are most important factors affecting cropping patterns and every farmer would like to move to the combination of crops that maximize his income, which in turn would reflect on the agricultural economy of the country. Sadly, adopting a better cropping pattern is not possible for all farmers mainly due to absence of required facilities; and that is where role of governments becomes very important. However, average size of land holding in India is very small and in adequate use of technology has hampered the growth of agriculture. Likewise poor irrigation facility and natural calamity in monsoon season also adversely impacted the crop pattern in the recent years.

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