

Diversity and Economics Importance of Major Cultivated Crops in Hapur Uttar Pradesh

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www.jrasb.com || Vol. 5 No. 4 (2026): August Issue

Received: 17-08-2026

Revised: 21-08-2026

Accepted: 25-08-2026

ABSTRACT

Hapur district is located in the highly fertile Indo-Gangetic plains of western Uttar Pradesh. It is mainly an agricultural region. Where farming forms the backbone of the local Economy. This study evaluates the diversity and economic significance of major crops cultivated in the region across different cropping seasons.

The main crops grown here include Wheat (*Triticum aestivum*), sugarcane (*Saccharum officinarum*), Mustard (*Brassica juncea*), Potato (*Solanum tuberosum*), and Pearl millet (*Pennisetum glaucum*). Sugarcane (*Saccharum officinarum*) and potato (*Solanum tuberosum*) is the main cash crop of this area. It supports local agro-industries and jaggery (gur) production. On the other hand wheat, paddy and maize ensure food security for the region.

The good alluvial soil, strong irrigation facilities, and the increasing use of modern farming techniques have improved crop production and increased farmers' income.

However, the rising trend of sugarcane monocropping poses ecological challenges, including groundwater depletion and soil health degradation.

Mono-cropping, especially sugarcane and wheat is very common here to maintain long term economic stability, reduce financial risk, and create more job opportunities for the rural people of Hapur. It is highly important to adopt crop diversification (grow different types of crops) and scientific farming methods.

Keywords- Crop Diversity, Economic importance, Hapur District, Sugarcane Cultivation Agricultural Economics, Cropping Intensity.

I. INTRODUCTION

Agriculture is one of the main sources of income and livelihood in Hapur district and plays an important role in the economic development of the region. Hapur district is located in the western part of Uttar Pradesh and is a part of the fertile agricultural belt of the state. The geographical location, fertile soil, suitable climate, availability of irrigation facilities, and relatively favourable natural conditions make Hapur an important agricultural district. A large section of the population depends directly or indirectly on agriculture for their livelihood. Agriculture not only provides employment to farmers and agricultural labourers but also supports many other activities such as transportation, food processing, storage, trading and agricultural markets.

Hapur has a diversified cropping pattern, and farmers cultivate a wide variety of crops during different seasons of the year. The major crops grown in the district include food grains, cash crops, oilseeds, pulses and vegetables. Among the important crops, wheat, rice and maize are major food grains, while sugarcane and potato are important commercial crops. Farmers select crops according to soil conditions, availability of water, climate, market demand, expected prices and the availability of agricultural resources. The cultivation of different crops during different seasons helps farmers make better use of their land and available resources.

The agricultural year is generally divided into three major crop seasons—Kharif, Rabi and Zaid. Kharif crops are mainly cultivated during the rainy season and include crops such as rice and maize. Rabi crops are

generally sown during the winter season and harvested in spring. Wheat is one of the most important Rabi crops grown in the region. Zaid crops are cultivated between the Rabi and Kharif seasons and include several vegetables and other short-duration crops. This seasonal variation in cultivation allows farmers to grow more than one crop on the same land during a year and increases the overall productivity of agricultural land.

Sugarcane is one of the important cash crops of the region. It is cultivated mainly for commercial purposes and provides an important source of income to farmers. Sugarcane also supports sugar-related industries and other activities connected with its processing and transportation. The crop creates employment opportunities not only at the farm level but also in transportation, processing and trading. Potato is another important commercial crop grown by farmers, particularly because of its demand in local and nearby markets. Vegetables are also cultivated to meet the demand of the growing population and provide farmers with opportunities to earn income from short-duration crops. Food grains such as wheat, rice and maize are equally important for the agricultural economy of Hapur. Wheat is an important Rabi crop and forms a major part of the local food supply. Rice is mainly associated with the Kharif season, while maize is also cultivated as an important food and commercial crop. These crops contribute to food security and are traded through local agricultural markets, commonly known as Mandis. The availability of these crops in local markets helps in meeting the food requirements of the population and supports agricultural trade in the district.

The cultivation of different crops is important because it reduces farmers' dependence on a single crop. If the price or production of one crop decreases due to unfavourable weather, pests, diseases or changes in market demand, farmers can obtain income from other crops. Crop diversification therefore helps in reducing agricultural risks and can contribute to greater income stability. It also improves the use of land and other agricultural resources and provides a variety of food products for local consumption.

Irrigation plays a very important role in the agriculture of Hapur district. Farmers use different sources and methods of irrigation to provide water to their crops, especially when rainfall is insufficient. Modern irrigation equipment and improved methods of water management have made it easier for farmers to maintain regular water supply to their fields. The use of improved seeds, fertilizers, modern agricultural machinery and better irrigation techniques has also contributed to increasing agricultural productivity. Modern equipment reduces the physical effort required by farmers and helps them complete agricultural activities such as sowing, harvesting and transportation more efficiently.

Post-harvest management is another important part of agriculture in the district. Proper storage is necessary to protect harvested crops from moisture, pests,

spoilage and other forms of damage. The development and use of large storage facilities, including silos and warehouses, have improved the storage capacity of agricultural products. Better storage facilities allow farmers and traders to preserve crops for longer periods and reduce post-harvest losses. This is particularly important for crops such as wheat, rice and maize, which are produced in large quantities.

Agriculture also has an important relationship with the local economy of Hapur. Farmers sell their agricultural produce in local markets and Mandis, where traders and other buyers purchase crops for further distribution and processing. The movement of agricultural products creates demand for transportation, labour, storage, packaging and trading services. In this way, agriculture contributes not only to the income of farmers but also to the economic activities of many other people associated with the agricultural supply chain.

The present study focuses on the cropping pattern and agricultural production of Hapur district. It examines the different types of crops cultivated in the region during different seasons of the year and considers their importance to the local economy. The study also looks at the role of major food grains, cash crops, pulses, oilseeds and vegetables in the agricultural system. Along with crop cultivation, the study considers factors such as irrigation, modern agricultural technology, storage facilities, market demand and the income generated from different crops.

Overall, agriculture is an essential part of the social and economic structure of Hapur district. The diversity of crops, fertile agricultural land, irrigation facilities, improving technology and well-developed market connections provide favourable conditions for agricultural development. The cultivation of both food crops and commercial crops helps farmers maintain their livelihoods while also supporting food security, employment and local trade. Therefore, understanding the cropping pattern of Hapur district is important for understanding the agricultural economy of the region and the factors that influence the income and development of its farming community.

II. REVIEW OF LITERATURE

Agriculture is one of the most important activity in hindi and plays a major role in the rural economy. Agarwa (2018) described that India agriculture provides food, employment and raw material for many industries. The diversity of crops grown in different regions depends on soil, climate, water, availability, farming practices and economic conditions.

According to District Census Handbook of Hapur (2011), Agriculture is an important occupation in Hapur District. The fertile alluvial soil and suitable climatic conditions of the District support the cultivation of different crops. Major cultivated crops include wheat, sugarcane, rice, potato, pulses, vegetables, and other

seasonal crops. The diversity of these crops is important for maintaining agricultural productivity and providing food and income farmers.

Chandel and Shukla (2019) explained that the conservation and proper utilisation of agricultural resources are important for sustainable agriculture. Crop diversity can help farmers reduce the risk of crop failure and improve the use of soil and water resources.

The Indian Council of Agricultural Research (ICAR,2023) has provided information on field crops, food grain crop, commercial crops, Horticultural crops and vegetables crops. Wheat and rice are important food crops, while sugarcane is an important commercial crop. Potato, peas, and other vegetables are also economically important because they provide food, employment and income to farmers.

The Directorate of wheat Development (2022) reported the importance of wheat production in india. wheat is one of the major food crops and is an important source of carbohydrates and energy. In areas such as Hapur, wheat is commonly cultivated during the winter season and contributes significantly to the agricultural economy.

Jain (2016),in the study of ethnobotany, discussed the relationship between plants and human society. Cultivated plants are closely associated with human food , medicine, trade, and daily life .This shows that plant diversity has both biological and economic importance.

Kumar (2015) discussed biodiversity and sustainable development and emphasised the importance of conserving biological resources. Agriculture biodiversity is also important because different crop species and varieties provide genetic resources that may help agriculture adapt to changing environmental conditions.

Pandiyam (2014) describe the importance of agricultural botany in understanding crop plants, their characteristics, cultivation and uses. Sharma (2017) also explained the importance of plant Taxonomy in identifying and classifying plants correctly.

Singh(2018) discussed plant Systematics and it's role in understanding plant diversity and relationship. Proper identification of crop plants is important in botanical studies because different species and varieties may have different economic use and Agricultural characteristics.

The ICAR-Central Research Institute for Dryland Agriculture (CRIDA,2014) prepared a District Agriculture Contingency Plan for Hapur District.

Overall, the available literature shows that Hapur District has considerably agricultural importance and supports a variety of food, Commercial, Horticultural and vegetable crops.

The study of crop diversity is important from both botanical and economic point of view. Different

crops contribute to food security, employment, income generation and industrial development.

Therefore ,the present study on the diversity and economic importance of major cultivated crop in hapur district is useful for understanding the major crops resources of the district and their role in the livelihood and economic of the local farming community.

III. MATERIAL AND METHOD

Material: The study focused on the major cultivated crops of Hapur district, namely Wheat (*Triticum aestivum*), paddy (*oryza sativa*), Sugarcane (*Saccharum officinarum*), maize (*Zea mays*), mustard (*Brassicas juncea*), Potato (*Solanum tuberosum*), and pearl millet (*pennisetum glaucum*). Data were collected from field observation, interaction with local farmers, agriculture record, published literature, and government report.

Method: Field surveys were carried out in selected Village of Hapur district during the cropping season. Information on crop diversity, cultivation practices, cropping patterns, and economic importance was collected through direct observation and informal interview with farmers. Secondary data were obtained from the Department of Agriculture, Government of Uttar Pradesh, agriculture statistics, research articles, and relevant literature.

The collected information was compiled and analyzed using a descriptive method. The diversity of cultivated crops was assessed based on their occurrence and distribution, while their economic importance was evaluated considering their contribution to food security, livestock feed, industrial use, market value, and farmers's income.

Study Area: The present study was conducted in Hapur district, Uttar Pradesh, India. Hapur lies in the fertile Indo-Gangetic plains and a subtropical climate with hot summer, a monsoon season and cool winter. The district is characterized by alluvial soil and an extensive irrigation network, making it suitable for cultivation of a variety of crops.

Field Survey: The present study was carried out in Hapur district, Uttar Pradesh, during the Kharif and Rabi season (2025-2026). A detailed field survey was collected in selected Villages representing different agriculture zones of the district. The survey was undertaken at regular intervals to observe the diversity and distribution of cultivated crops under varying environmental and management conditions. During each field visit, observations were made regarding crop type, cropping patterns, sowing and harvesting period, irrigation facilities, fertilizer application, weed management ,pest and disease incidence, information on local agriculture practices and crop utilization was obtained through personal interviews and informal discussions with farmers. GPS location of sampling sites were noted

wherever possible, and photographs of cultivated crops were taken for documentation. The field survey formed the primary source of data for assessing the diversity and economic importance of cultivated crops in the study area.

Collection and Identification of Plant Material:

Representative plant specimens of the major cultivated crops, namely wheat (*Triticum aestivum*), paddy (*Oryza sativa*), sugarcane (*Saccharum officinarum*), maize (*Zea mays*), mustard (*Brassica juncea*), potato (*Solanum tuberosum*), and pearl millet (*Pennisetum glaucum*), were collected from different agricultural fields during their active growth and reproductive stages.

Healthy and disease-free specimens were selected to ensure accurate identification and morphological assessment. In the case of large plants such as sugarcane and maize, representative structures were collected. The collected specimens were carefully labelled with the collection number, local name, scientific name, date of collection, village name, habitat, and collector's name.

Identification of the plant specimens was carried out using standard taxonomic literature, regional floras, identification manuals, and botanical keys. Scientific names and family names were verified using internationally accepted botanical nomenclature to ensure taxonomic accuracy.

Morphological Studies: Morphological studies were carried out on all collected crop specimens using fresh specimens and field observations. Both vegetative and reproductive characters were examined in detail. Vegetative characters included plant habit, plant height, root type, stem characteristics, leaf arrangement, leaf shape, leaf margin, venation pattern, leaf apex, and surface texture. Reproductive characters such as type of inflorescence, flower structure, flowering period, fruit type, seed characteristics, and maturity period were also recorded.

Morphological variations observed among different crop species were carefully documented and compared. Measurements were taken using a measuring scale to support morphological assessment. These observations helped in confirming species identification and understanding the distinguishing features of each cultivated crop.

Assessment of Crop Diversity: The diversity of cultivated crops was assessed through extensive field observations conducted across selected villages of Hapur district. Crop diversity was evaluated based on species composition, cropping pattern, seasonal occurrence, cultivation frequency, and spatial distribution.

Each cultivated crop was recorded according to its occurrence during the Kharif and Rabi seasons. Information regarding monocropping, mixed cropping, and crop rotation practices was also documented. The relative abundance and dominance of each crop species

were assessed by comparing the number of fields under cultivation and their geographical distribution.

Secondary information obtained from the department of agriculture, government of Uttar Pradesh, agriculture census report, and published literature was also used to support field observation. The collected data provided an overall understanding of the diversity and distribution of cultivated crops within the study area.

Assessment of economic importance: The economic importance of each cultivated crops was assessed based on its contribution to agriculture food security, industrial utilization, livestock feeding and farmers income's formation regarding average productivity, cultivation area, production cost market demand, selling price and commercial value was collected through field survey farmers interviews, government agriculture reports and publish literature. The importance of wheat and paddy as staple food crops, sugarcane as an industrial crop for sugar production, mustard as an important oil seeds, crop maize and pearl millets as food and fodder crops and potato as a major vegetable crops was evaluated. Additional information regarding employment generation, value-added product, storage potential and contribution to the local economy was also considered while assessing the economic significance of each crop. Economy was also considered while assessing the economic significance of each crop.

Data Analysis: All field observation and secondary information were compiled systematically in Microsoft Excel. The collected data were organized into tables according to crop species, Season cultivated area, frequency of occurrence, and economic uses. Descriptive statistical methods such as frequency, percentage and relative abundance were used to summarize the collected data, comparatively tables and graphical representation including bar graph and pie chart, were prepared to illustrate crop diversity and economic importance. The analyzed data were interpreted to identify the dominant cultivated crops and their contribution to the agricultural economy of Hapur district.

Herbarium preparation: voucher specimens of all cultivated crop species were prepared following standards herbarium techniques. Fresh specimens were collected from the field and immediately placed between blotting paper and newspaper.

The specimens were pressed using a wooden plant press and dried by changing the blotting paper regularly until complete dehydration was achieved. After drying, the specimens were mounted on standard herbarium sheets using an adhesive and linen tape. Each herbarium sheet was labelled with essential information including scientific name, family, local name, collection number, locality, habitat, date of collection, collector's and remark. The prepared herbarium specimen were preserved in the department herbarium for future taxonomic reference, teaching and research purposes.

IV. OBSERVATION TABLE

S. No.	Common Name	Scientific Name	Family	Crop Type	Season	Sowing Time	Harvesting Time	Major Cultivation Area in Hapur	Economic Importance	Remarks
1	Wheat	<i>Triticum aestivum</i>	Poaceae	Cereal	Rabi	Nov–Dec	Mar–Apr	Widely cultivated throughout Hapur district	Staple food crop; major source of farmers' income	High productivity under irrigated conditions
2	Paddy	<i>Oryza sativa</i>	Poaceae	Cereal	Kharif	Jun–Jul	Oct–Nov	Low-lying irrigated fields	Main food crop; sold in local and state markets	Requires abundant water
3	Sugarcane	<i>Saccharum officinarum</i>	Poaceae	Cash Crop	Annual	Feb–Mar	Dec–Mar	Highly cultivated in fertile areas	Raw material for sugar, jaggery and ethanol industry	One of the most profitable crops
4	Maize	<i>Zea mays</i>	Poaceae	Cereal	Kharif	Jun–Jul	Sep–Oct	Moderate cultivation	Food, poultry feed and industrial raw material	Also used as green fodder
5	Mustard	<i>Brassica juncea</i>	Brassicaceae	Oilseed	Rabi	Oct–Nov	Feb–Mar	Common in agricultural fields	Source of edible oil and oil cake	Good market value
6	Potato	<i>Solanum tuberosum</i>	Solanaceae	Vegetable	Rabi	Oct–Nov	Jan–Feb	Cultivated in irrigated fields	High commercial value	Short-duration crop
7	Pearl Millet	<i>Pennisetum glaucum</i>	Poaceae	Cereal	Kharif	Jun–Jul	Sep–Oct	Sandy and less fertile soils	Nutritious food grain and fodder	Drought tolerant crop

PICTURES OF CROPS

S. No.	Crop Name	Picture
1	Wheat	
2.	Paddy	

3.	Sugarcane	
4.	Maize	
5.	Mustard	
6.	Potato	
7.	Pearl millet	

V. RESULT

The study on the diversity and economic importance of major cultivated crops in Hapur District, Uttar Pradesh, revealed that agriculture is the backbone of the district's economy and an important source of livelihood for the rural population. Seven major crops—Wheat, Paddy, Sugarcane, Maize, Mustard, Potato, and Pearl Millet—were identified. These crops represent cereals, cash crops, oilseeds, and vegetables, showing a diverse and well-developed cropping system in the district. The study found that wheat is the most extensively cultivated Rabi crop and serves as the main staple food crop. Its high productivity, adaptability, and market demand make it important for farmers' income. Fertile soil, irrigation facilities, improved seed varieties, balanced fertilizer use, and modern cultivation practices contribute to better wheat production. Sugarcane emerged as the most important commercial crop of Hapur district. It occupies a substantial cultivated area and provides a stable source of income to farmers. Sugarcane supplies raw material to sugar mills and is also used for producing jaggery, ethanol, molasses, and other by-products. It also generates employment in farming, transportation, processing, and agro-based industries. The study also highlighted the importance of paddy, maize, and pearl millet, mainly cultivated during the Kharif season. Paddy is an important food crop and is generally grown in areas with adequate irrigation. Maize is used for human consumption, poultry feed, livestock fodder, and industrial purposes. Pearl millet (Bajra) is suitable for relatively dry and less fertile areas due to its drought tolerance and is also an important source of nutritious food and livestock fodder.

Overall, the findings confirm that crop diversity plays a significant role in food security, improving farmers' income, generating employment, promoting agro-based industries, and strengthening the agricultural economy of Hapur district. Cultivation of multiple crops reduces economic risk, improves resource utilization, and provides stability against market fluctuations and climate variability.

Sustainable farming practices, scientific cultivation methods, improved irrigation systems, and modern technologies can further increase crop productivity and ensure the long-term development of agriculture in Hapur district.

VI. CONCLUSION

The present study on the diversity and economic importance of major cultivated crops in Hapur District, Uttar Pradesh, revealed that agriculture is the primary occupation and an important part of the local economy. The study of seven major crops—Wheat, Paddy, Sugarcane, Maize, Mustard, Potato, and Pearl Millet—showed considerable crop diversity based on seasonal

conditions, soil type, irrigation facilities, and market demand.

Among these crops, wheat and sugarcane were found to be the most extensively cultivated. Wheat is the principal staple food crop, while sugarcane is an important commercial crop that contributes significantly to farmers' income and supports the sugar industry.

Paddy, maize, and pearl millet play an important role in food security and animal fodder, while mustard is an important oilseed crop. Potato is a high-value vegetable crop that contributes to both local consumption and commercial trade. The fertile alluvial soils, favourable climatic conditions, and availability of canal and tube-well irrigation make Hapur district highly suitable for diversified agriculture.

Farmers generally follow a Rabi-Kharif cropping pattern, which helps in efficient utilization of land and increases overall agricultural productivity. The cultivation of cereals, oilseeds, vegetables, and cash crops also enhances agricultural sustainability and reduces economic risk.

Overall, crop diversity strengthens the agricultural economy of Hapur district and plays a vital role in ensuring food security, generating employment opportunities, supplying raw materials to agro-based industries, and improving the socio-economic condition of farming communities.

The adoption of improved crop varieties, modern agricultural practices, efficient irrigation systems, balanced fertilizer use, integrated pest management, and sustainable farming techniques can further enhance crop productivity, farmers' income, and long-term agricultural development in the district.

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