CHAPTER I
INTRODUCTION

Self sufficiently was the guiding forces behind agricultural development in the mid sixties lead to Green Revolution. India soars to incredible heights in terms of food production. Agricultural sufficiently was of utmost importance in third five year plan. The new technology required sound rural infrastructure to thrive thereby leading to regional patterns of agricultural growth.

There were important changes during the various sub-periods in the pattern of agricultural development. During the first phase of Green Revolution, i.e. from 1962 to 1965 and from 1970 to 1973, new technology was only confined to wheat and the main beneficiaries were the irrigated North-Western States of India (Punjab, Haryana and Western U.P.). Reason being, a well laid out rural infrastructure. During the second period, the new technology got consolidated in the Western region and gradually extended to some part of eastern India and to coastal parts of south India. The third period, i.e. from 1980 to 1983 and from 1992 to 1995, marks a turning point in India where agricultural growth accelerated to 3.5 percent per annum and also permeated to all regions in India. There was a significant acceleration in rain fed states of M.P. and Rajasthan primarily as a result of large shifts of areas from coarse cereals to oilseeds. There are no doubts that these shifts are also the function of rural infrastructure that was laid down by the government and which brought changes in agricultural pattern. Areas with a poor base of rural infrastructure took more time in brining about positive changes in the agricultural pattern. But the point of concern is that new technology is available for some remunerative crops though, agricultural research is making breakthrough in many other crops and also the levels of
infrastructure is becoming better, which have already better levels of rural infrastructure from the beginning. Hence, there is more prosperity in areas which are already prosperous.

The dawn of the nineties marked the beginning of a new policy framework for India. India launched its policy of economic liberalization and integration with the world economy. Agriculture failed to show any buoyancy after the introduction of economic reforms. A more serious problem was gradual decline in the yields level of various crops. An important reason has been the sharp deceleration in total investment and more so in public sector investment in agriculture. Another important aspect of rural economy is linking the agriculture of the area with the associated processing industries. Agro-processing is a very crucial sector, which further develops and strengthens the agricultural economy. The backward and forward linkages of agro-processing must be present in the region i.e. the raw material for the industry, labour to work in these factories, market for finished products etc. Infrastructural facilities serve both as a means and an end to the establishment of these industries, in terms of rural development.

Industrialization has been considered as a key to rapid economic development. It offers prospects for growing availability of manufactured goods, greater efficiency and modernization throughout the economy. With liberalization at doorstep it has become important to modernize rural India in terms of agriculture, infrastructure, agro-based industries, so that rural economy is also ready to meet the challenges.

Here we will seek above linkages in the state of Uttar Pradesh. Western Uttar Pradesh had been the part of the initial trio where, new technology was adopted in the fields for enhanced productivity of wheat. It terms of infrastructure availability it was at the similar levels as that of Punjab and Haryana. Since Uttar Pradesh is an agriculturally dominant state, whether the above discussion of agricultural development, infrastructure and agro-
processing industries hold true and what were the changes that has taken place in the agricultural scenario. Whether, other sub-regions of Uttar Pradesh benefit from the early infusion of new technology in western Uttar Pradesh will also be studied. What has been the growth in the agricultural levels of Uttar Pradesh, which crops are associated with good rural infrastructure? We will restrict the study to sugarcane and oilseeds. The related agro-processing industries, i.e. sugar mills and oilseed processing units will form the other part of the study. Here, the focus of the study is also on the various aspects associated with these industries.

1.1 Literature review

The manner in which India transformed itself from a food deficit economy in the 1950s and 1960s to a food self sufficient or surplus economy, is most striking since the introduction of, "Green Revolution", technology in the late sixties. This owed itself to the combination of development efforts arising through a workable state-people partnership. The state played a vital role in building agricultural infrastructure, in providing market support, in priority and concessional lending of institutional finance to agriculture, especially to marginal and smaller farmers. The farmers, on their part, did well in accepting the risk and challenges of the new technology. Original green revolution in the states of Punjab and Haryana maintained their record of fast productivity growth. Also Uttar Pradesh put up a very impressive yield increasing record during the 1980s, the eastern districts in the state started catching up technologically with their western counterparts (Chadha).\(^1\)

G.S. Bhalla\textsuperscript{2} had highlighted the regional variations in the growth pattern of agriculture. The higher growth rate and productivity in north western India is due to the existing infrastructure facilities which aided quick and better adoption of new technology. Another important aspect highlighted by G.S. Bhalla is that none of the late entrants in the technology arena could match the strong infrastructural, institution and commercial network, assiduously cultivated through a sustained process of public investment, as was done in the original green revolution areas. Nevertheless, the lagging areas are now giving up their 'slumbering postures'. The policy administrators in those areas are convinced that there is no escape route to technology upgradation. This was the scenario till late 1980s and early 1990. However now, the situation is different. G.S. Bhalla (2000) had discussed the crisis situation in Indian Agriculture. The growth in Agriculture has decelerated. Because of absence of any technological breakthrough there is stagnation in yield level of various crops. Furthermore, the aspiration to increase exports in a big way would also need growth in agriculture to accelerate for generating an adequate surplus. Secondly, the crisis in agriculture is manifest in lack of diversification and increasing burden for workforce on agriculture. Likewise he has also suggested certain remedies in which agricultural innovation and extension and infrastructural investments are prime.

The original disparities in the country is widening in spite of various governmental measures to develop backward areas. These disparities are present not only in terms of demographic indicators, female literacy but also in state domestic product; poverty; development and non-development expenditure by state

government; shares in plan outlay; investment; banking activities and infrastructure development (Kurian, 2000)\(^3\). Kurian has also brought out theoretically the intra-state disparities and how they are widening.

Fan and Hazell (2000)\(^4\), have suggested that while irrigated areas played a key role in agricultural growth during green revolution era, however the results of their study show that it is now rain fed area, including many less favoured areas that give the most growth for an additional unit of investment. Moreover, investments in rainfed area have a much larger impact on poverty alleviation, making them a win-win strategy.

Shand and Bhinde (2000)\(^5\), while examining the variations in the size, income and structure characteristics of Indian states analysed that reform in agriculture will yield the most benefit as growth in this sector is positively and significantly related to overall growth. Infrastructure and human development are other important determinants.

Desai (2002)\(^6\), has put technical change as a better alternative strategy in giving boost to domestic agriculture than better term of trade on trade liberalization for giving boost to domestic agriculture; he has suggested 2-fold change in Research and Development expenditure. Firstly, it need to be increased from under 1 percent of agricultural GDP at present to over 2 percent in the near future. Secondly, it needs to have explicit budget for

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undertaking field-based location specific Research and Development.

Bhalla and Tyagi (1989)⁷, have analysed the impact of the Green Revolution at district level during 1962-65 to 1980-83 and are of the opinion that new technology had been replicated only in those areas which had an assured irrigation base and also the areas which have developed irrigation over a period of time through large investments.

To reduce the inter-regional inequalities, large infrastructure investments have to be directed towards neglected areas. Johl (1994)⁸, has put emphasis on the structural adjustments in agricultural sector to enhance growth and productivity in post liberalization phase. He has discussed the determinants of agricultural growth and is of the opinion that agricultural investment plays an important role in agriculturally marginalized areas. Increasing public sector investment is also likely to foster private sector investment since there exists a strong complimentarity between public and private sector investment in agriculture (Bhalla, 2000).

Wanmali and Islam (1997)⁹, have applied the core periphery model of Friedman (1966) to predominantly agricultural regions. The complexity and diversity of this rural service infrastructure vary tremendously according to the sophistication of the regional settlement system. Certainly, along with access to rural infrastructure it will determine whether a region is a core or a

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periphery in term of infrastructure, not withstanding the role the agro-ecological endowments and agricultural production systems have had in its outcome. Viewing the case study of Zimbabwe and Zamibia, they have proved the core-periphery application to rural areas in terms of infrastructure facilities.

Resources constraints faced by the infrastructural sector can be solved by attracting internal private investors in a big way and also to cut unnecessary government expenditure so that more budgetary allocation could go into this crucial sector as suggested by K.S. Narayan (1999). Kurian (2000) established that there are considerable disparities in socio-economic development across Indian states with respect to infrastructure, agriculture, NSDP etc. the accelerated growth since the early 1980s with increased participation by the private sector appears to have aggravated regional disparities. Both the studies, Kurian (2000) and Wanmali and Islam (1997) (in case of Africa), are of the view that recent trends in investment, both public and private, indicate that if left unaltered by effective public intervention inter-state or inter-region (in case of Wanmali and Islam) disparities are likely to aggravate. Bularamulu (2000), have analysed macro level role of infrastructure in urban/rural areas and main reasons or regional imbalance in development, with references to infrastructure.

In the recent past the capital expenditure of the central and state governments in infrastructure are declining. Governments are increasingly depending on the private investors, international agencies, etc, for investment in infrastructure. Their concentration is mostly on the projects which would give them immediate results and profits. This trend will further accentuate the disparities in the

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levels of amenities across the states, between rich and poor localities, urban and rural areas, rich and the poor. So, the need of the hour is that fruits of infrastructure reach the poor and the living in backward areas. If necessary, the government should depend more on the local/internal resources for development of infrastructure, than any external aid.

Mishra and Mishra (2000)\textsuperscript{12}, have mentioned that rural road development had suffered mainly due to piece-meal approach and suggested that connecting all the villages with roads can be achieved through a micro-level participative planning at the village and block level. They put utmost importance to the issue of revamping of delivery system. In order to implement the rural programmes, especially that of rural roads, in an efficient manner, it becomes necessary that the delivery system at the grassroots level for these programmes should be revamped and streamlined. Another suggestion they made was urgent need for providing all rural areas with approach link road to centres of business within a particular time-frame. Ramesh Chand (2001)\textsuperscript{13}, has discussed Public and Private Investments in India Agriculture based on CSO data and had shown that there is a widespread decline across the board in all the states in public sector capital expenditure for agriculture. There are instances when huge investment made in infrastructure in some areas soon ceased to serve its purpose due to lack of maintenance. There is a need to keep the created infrastructure functional so that it serves the intended purpose.


Development of irrigation not only increases the use of yield increasing inputs, cropping intensity and productivity of the crops but also helps to provides additional employment opportunities and push up the wage rates for agricultural labourers (Dhawan, 1991). Narayana Moorthy (2001), has made an attempt to understand the role of irrigation in the reduction of the level of rural poverty in India taking cross-section data of 14 major states at four point of time. The results give clear significant inverse relationship between the incidence of rural poverty and the irrigated area. Rath (1996), while recommending policies for alleviating rural poverty has indicated that "the first and most important task would be to extend irrigation to farming areas that would have the most significant impact on productive employment. In most states where the incidence of poverty is high, irrigation is on the low side, with significant potentiality for its extension."

R.S. Dixit (2001) has analysed the spatial distribution of regulated markets in Uttar Pradesh. Regulated markets have been established by the government to save the farmers from exploitation by middle men with regard to the sale of his agricultural produce in an open market. H.B. Shivamaggi (1997) is of the view that a quantitative approach to rural banking, focusing entirely on the numbers of institutions rather than the quality of services, has given rise to an infrastructure which has not attracted sufficient interest. He had also suggested certain remedies to alter the situation. Srivastava and Ahuja (1960) have worked out the short term credit requirements and testing the soundness of the quantum of credit requirements on the basis of three economic criteria the returns, the replaying capacity, and the


risk bearing ability of the farmers of different size groups in Gannaur block of Badaun district of Uttar Pradesh. It has been well recognized in development literature and among development agencies from the experience of co-operatives in many agri-business sectors in different regions of India, and many other development programmes that outside efforts at local development generally do not succeed unless and until the beneficiaries and stake holders find logic in these efforts. Therefore, the recent initiatives in participatory development are believed to be more successful and sustainable. The situation is much more complex in agri-business sector due to its many peculiarities compared to industries or service sectors. Sukhpal Singh (1995) has discussed cases of locally evolved producer's organisations and groups in the agri-business sector in India to draw lessons. He has recognized that both individual, as collectively oriented initiatives have potential for sustainable performance if they meet 'feel needs' of the individual producers in business terms.

The following literature is, study area specific, which here is agricultural productivity and agro-processing in Uttar Pradesh. Taufique, Ahmad and Munir (2000) in the analysis of agricultural productivity based on composite index that the existence of high productivity areas are scattered mainly in Ganga – Yamuna doab. They also revealed that the concentration of high productivity of cereals in the western Utter Pradesh indicates the impact of various institutional and technological factors operating in the region which helped in converting low productivity areas to medium and even to high productivity areas.

Ahmed and Shamim (2000) have examined the regional imbalances of agricultural productivity in upper Ganga – Yamuna doab of Uttar Pradesh. The farmers are now specializing in a few numbers of crops and devoting most of their arable land to such crops. Traditional agricultural is in the process of transformation from subsistence into market oriented semi-commercialized
agriculture. They also revealed that sugarcane is the most important crop among the all crops grown in upper Ganga – Yamuna doab. The high diversification of crops is based on assumption of perfect certainly. Generally the farmers are interested in cultivation of sugarcane, wheat and rice indicating market orientation of agricultural economy; farmers are going for optimization of their agricultural income. The negative aspects is that mutual cooperation is being vanished consequently large sized farmers are becoming more selfish and have increased their agricultural assets to a significant extent. This trend has widened the gap of income in rural areas and had created many socio-economic problems.

Singh and Fazal (1996)

Singh and Fazal (1996)\textsuperscript{16}, have concluded that price is the most influencing factor in affecting the area under all crops. Better yield of any crop attracts farmers for its cultivation, thereby, positively influencing wheat and sugarcane in upper Ganga – Yamuna doab.

Smriti Banjerjee (1997)

Smriti Banjerjee (1997)\textsuperscript{17}, have studied eighty-eight blocks of five districts in Uttar Pradesh to indicate inter-district imbalances in development of agriculture. The study reveals that diversity in the sectoral development of different blocks is the factor responsible for disparity in total development. However, land use efficiency and carrying capacity are the main factors controlling the agricultural development of the blocks.


V.R. Singh (1995)\textsuperscript{18}, while examining the level of rurality in Uttar Pradesh concluded that regional disparities and development of rural systems move together with the magnitude and attitude in which these policies are adopted firmly and if there is any lacuna at any state it must be curbed at the entry point.

Yadava and Gupta (1996)\textsuperscript{19}, while concluding study on rural industrialization and eco-development in Hardoi district of Uttar Pradesh concluded that demand based industries and resources based industrial units particularly food processing units may check migration of unemployed person to the urban centres and it may also help farmers in getting better return of their produce. Rice Mills, pulse mills and other by product units may be up at suggested growth centres. Cold storage, units should be increased for improving rural economy.

Mani and Pandey (1997)\textsuperscript{20}, have suggested some policy implications of sale and lease transactions in agricultural land of western Uttar Pradesh. They considered lease market as viable profitable in which marginal farmers attempt to become small operators through leasing in of land.

Panini (1999)\textsuperscript{21}, while commenting on Agribusiness in Karnataka expressed that farmers of Karnataka have been


receptive to agribusiness firms and optimistic about economic liberalization. However, agribusiness has left them dependent on technical exports and scientists hence, they are more vulnerable to changes in market and climatic conditions. To avoid the latter eventuality it is imperative that proper institutional infrastructure is built up so that the farmers can be given strategic support at crucial junctures. It is clear that the success or failure of globalisation depends considerably on the nature of institutions that are built up to harness the process of market liberalization.

Sandip Sarkar (1998)\textsuperscript{22}, is of the opinion that to achieve higher growth in agro-industry of UP, it is required to concentrate on more dynamic sectors of agro-industry. The findings of the study are that whole Uttar Pradesh fared better than all India in terms of growth of agro-industry. It gives the hint that higher growth in Uttar Pradesh is probably due to more favourable inter-sectoral relationship.

1.2 Objectives of the Study

I To analyse the variations in levels of agricultural development in Uttar Pradesh in terms of changes in cropping pattern.

II To study the spatial and temporal variations in the utilization of agricultural infrastructure facilities at district level in Uttar Pradesh and to evaluate the changes in cropping pattern in view of the development of agricultural infrastructure of the area.

III To analyse the rural development in the region with the help of agricultural development and agro-processing activities associated with it.

IV  To study the levels of infrastructure and its role in the development of agro-processing activities in the area.

V  To understand the problems and prospects of existing agricultural situation, infrastructure availability and agro-processing.

1.3 Research questions

I  There exist spatio-temporal variations in the patterns in agricultural growth and changes in cropping pattern, presenting a diversified scenario.

Data Base

• Area, production and productivity of principles crops, Ministry of Agriculture (of above mentioned period).

Methodology

• Percentage of area under various crops will be calculated to understand the cropping pattern and crop associations of the region.
• Growth rates of area production and yield under various crops over the study period will indicate the diversification or specialization of agricultural pattern of the region.
• Chorochromatic maps are made to see the regional variation in the state.

II  Cropping pattern had a positive response to the change in the levels of available rural infrastructure and thus, the crop associations show dynamism and have registered changes over time.

Data Base

Methodology

1. The various agricultural infrastructure facilities included in the study are:
   - Irrigation - Gross Irrigated Area (percent of Gross Cropped Area)
   - Rural electrification - Villages Electrified (percent)
   - Rural Roads - Length of Road (per 00 square kilometres)
   - Credit facilities - Credit to Agriculture (Rs/Capita)

2. Compound growth rates are calculated for infrastructure facilities.

3. The values are standardized so that they can be compared.

4. Co-efficient of variation is calculated to show the variation in distribution of infrastructure facility.

5. Composite index through standardization method is calculated to understand the role of infrastructure in diversification of agriculture.

6. Correlation between infrastructure facility and area under sugarcane and mustard as a percent to the Gross Cropped Area is calculated to see the relationship between the two.

III Agricultural development has led to the development of agro-processing industries and agricultural base and associated agro-processing activities are interlinked leading to areal differentiation in agro-based industries in the study region.

Data Base

- Annual Survey of Industries
- National Sample Survey Organisation
Methodology
All India and Uttar Pradesh State data for Food Processing Industries for number of factories, fixed capital, number of workers, number of employees, net value added and value of output are compared.
Composition of Food Processing Industries in Uttar Pradesh have been analysed.

4. **Well laid infrastructural facilities normally promote agro-processing industries based on locally available raw material and the markets of finished products depending on the nature of raw materials and scale of production.**

Date Base
• Primary Survey

Methodology
From the sample villagers we studied the scale of production in terms of sugarcane processing that is gur making, crushers and sugar factory. Similarly in case of oilseeds, oil production at small scale which is ghani, oil production at large scale. The agency of disposal of agricultural produce is studied. What infrastructure level is available at different scales of production have been studied.

5. **The differentiations in infrastructural and agricultural development have led to disparities in the agro-processing activities.**

Data Base
• Primary Survey

Methodology
The data generated from the Primary Survey has been used to show the levels of differentiation and comparison is made between the two samples. Various statistical techniques have been used to analyse and depict the inter-regional disparities.
1.4 Geographical Personality of the Study Area

The study pertains to the state of Uttar Pradesh with specific purpose of understanding the agro-based industries in two selected districts which is Muzaffarnagar and Agra. What followed is the discussion on the salient geographical features of the two selected districts.

Muzaffarnagar – The district may generally be described as an alluvial plain which has a general slope from north to south, with a highest point above seal-level in the central part being 251.55m near the village of Rohana on the Meerut - Sharanpur road close to the northern border of the district. Proceeding southward along the road the elevation remains practically the same as far as the Kali Nadi, south of which it drops to 242.89 mt. near the village of Rampur but rises again to 246.01 mt. about 3 km. North of Muzaffarnagar. AT Muzaffarnagar the elevation drops to 240.79 mt. but south of the town the road again raises to 248.41 mt. at Begharazpur. From this point the surface of the road gradually slopes southward, the elevation declining at every successive kilometre coming down to 243.33 mt. near the southern boundary of the district. In the eastern portion there is a much greater declivity along the Ganga canal. At Berla abotu 15 km. Further south it drops to 252.98 mt. while near the southern border of the district it is not more than 236.32 mt. The levels along the eastern Yamuna canal in the western part of the district are very similar to those of the Meerut-Shahranpur road. Thus, the general slope of the district is from north to south, there is another and greater declivity from the northeast corner towards the centre, the highest point in the district being on the high bank of the Ganga. The chief rivers of the district, the Ganga, the kali, the Hindan, and the Yamuna have plays an important role in fashioning the topography of the district and divide it in four fairly distinct tracts. On the extreme east is the Ganga khaddar, containing the whole of the paragna of Gordhanpur, and portions of paraganas Pur Chhapar,
Bhukarheri, and Bhuma Sambalbera. Subsequently, comes the eastern upland, the kali Nadi (West 0, through which run the Ganga canal. Further west is the doab of the kali Nadi (West) and Hindan rivers. And, finally, there lies the western tract comprising that portion of the district which extends from the Hindan to the Yamuna.

Ganga Khadar – This tract is bounded on the west by the old high bank of the Ganga, a line of cliffs broken by ravines, which at places attains a height of more than 30mt. above the lowland and slopes down from the level of the uplands towards the Ganga itself. The width of the Ganga Kahddar is greatest towards the north, where it covers 20 km. Moving southwards the tract gradually narrows until in the vicinity of Bhukarheri the Ganga again widens and in pargana Bhuma Sambalhera attains a width varying from six to ten kilometres. The chief rivers flowing through the tract are the Saloni and the Banaganga which generally change their course. On the whole the khadar presents variation, but elsewhere bearing nothing more than coarse grass the occasional clumps of tamarisk. In the cold season it is clothed in brown, trees are scarce, and the grass, too, loses its luxuriance. Here and there rivulets occur and beyond all is the silver streak if the Ganga itself.

The Eastern Upland – This tract lies between the high rank of the Ganga and the kali Nadi (West), and is generally known as the Ganga canal tract as it is traversed from north to south-west for its entire extent by the main Ganga canal. It comprised the parganas of Khatauli, Jauli Jansath, and major portions of parganas Pur Chhapar, Muzaffarnagar, Bhukarheri, and Bhuma Sambalhera. All along the high cliff there is a series of ravines worn by the surface drainage and are of little value even for pasturage. Beyond these ravines the upland has a general slope from east to west and close to the high bank from west to east, with a considerably greater slope from north to south as is evident by a excessive gradient of canal channel. To the south-east, between the canal and the
lowlands the headwaters, of the kali Nadi (East) or Nagan collect together but assume a definite shape as a river tract to the kali Nadi (West) in the northern parganas in generally more gradual, but in the south in parganas Khatauli a belt of broken lands separates in most villages the generally level uplands from the valley of the kali Nadi (West). the tract had in the south-western part where much land had been put out of drainage works it has improved and been brought under the plough.

The most prominent physical feature of the tract is the presence of sand, which occurs in belts of hillock with a direction from the north level sandy plain in the south. It commences from north to south, and occasionally transverse ridged in the north and a sandy ridged in pargana Muzafarnagar and extends south-easterwards through parganas Jansath and Bhuma Sambalhera into district Meerut. The chief ridge starts from the ravines of pargana Pur Chhapar and then, bending in a south-westerly direction to within 6 km. of the kali Nadi, turns southern borders of pargana extreme south of the pargana. Offshoots of this main ridge extend in various directions through parganas Khatauli and Jauli Jansath and there are other isolated sandhills in pargana Pur Chhapar. The Anupshahr branch canal, which leaves the main canal near Jauli and traverses through parganas Jauli Jansath and Bhuma Sambalhera, passes through the broad sandy belt along almost the whole of its course. Outside the sandy belt the soil is generally good loam except in the neighbourhood of the Kali Nadi.

**Kali Hindan Doab** – This tract, also known as the Central tract, is high throughout and is naturally of a fertile character. Here the water-table is very low. The Deoband branch of the Ganga canal enters the tract in pargana Charthawal and terminates in the ravine of the Hindan river near Budhana. The eastern and western extremities of the tract, which slope down to the rivers on either side, are marked by broken ground, and the tendency of ravine
formation is noticeable to an increasing degree in the southern portions of the area. Between the ravines and the kali river is often unculturable owing to its swampy character. The northern portion of the lowland of the Hindan is also swampy, but the southern portion contains considerable tract of cultivated land, the soil being much less sandy than that in the Ganga canal tract. However, one well-marked belt of sand runs through its middle, beginning at Charthawal in the north near the Hindan, and passing through Baghra and the east of Shikarpur towards the Kali Nadi.

The Western Tract – This tract, which lies between the Hindan and the Yamuna, comprises the entire tahsil of Kairana, parts of parganas Charthawal, Baghra, Shikarpur, Budhana, and the pargana of Kandhla. It is traversed by the Krisani and the Katha flowing from north to south somewhat parallel to the Yamuna and the Hindan. The land between the Hindan and the Krisani is of a generally uniform character owing to the absence of sand. The soil near the rivers is very poor as usual and liability to floods renders cultivation precarious. The broken ground between the Hindan valley and the upland is of an extremely poor character and is unsuitable for cultivation. Along the Krisani this uneven land is negligible. The stream flows in a well-defined channel and the khaddar is small. The fields, however, in its vicinity are liable to be swept by heavy floods, the severity of which is increased by the discharge into the Krisani of several drainage cuts, which bring down more water than the capacity of the river.

The tract between the Hindan and the Krisani consists of a somewhat elevated upland, sufficiently low, hwoever, to admit of irrigation from a branch of the Yamuna canal. Beyond the Krisani the land is traversed by the main channel of the Eastern Yamuna canal. In the low ground along the canal the soil has suffered considerably from saturation and is affected by reh. The soil in the northern portion is inferior to that in the southern portion.
The north-western portion of the tract, comprising the pargana of Bidauli and parts of parganas Jhinjhana and Kairana, is separated by the Katha river from the rest of the district. It has suffered to a great extent owing to the heavy floods in the Katha and a constant tendency of the Yamuna to change its course towards the east. In the neighbourhood of the Yamuna and the Katha rivers the lands are greatly affected by *reh*. The country is cut by numerous watercourses, of special note being a large lake, which does not dry up till late in the year. The whole of the central portion is also more or less insecure owing to the inundations from the Yamuna and the two streams known as the Khokri and the Sendhi. The former flows from north to south through the centre of pargana Bidauli, while the latter appears to be a backwater of the Yamuna. These streams are merely irregular water channels which have no fixed course. In years of heavy rainfall they overflow their banks and throw extensive tracts out of cultivation. The land to the west of the Katha is also a lowlying swampy tract of inferior soil, constantly open to floods. It has suffered considerably from *reh*. The land in the upper course of the katha, though considerably covered with Dhak forest, is better than that in the lower course, which is marked by several swamps and water coursed. The south-western portion of the tract is a delve plain of good soil, except in the vicinity of the Yamuna.

**River systems and water resources**

The rivers and streams of the district are included in the river systems of the Ganga and the Yamuna. The chief tributaries of the Ganga are the Kali Nadi (East) the Saloni and the Ban Ganga. Among the tributaries of the Yamuna the important ones are the Katha and the Hindan. The latter is joined by the Krisani in district Meerut and the Kali Nadi (West) in this district.

**Ganga** – Rising in district Uttarkashi, the Ganga first touches this district near the village of Balawala in pargana Gordhanpur, and flows south-westward as far as the village of Chandpuri where it is
joined by the Banganga. It then takes a south-easterly course and, running along the eastern boundaries of parganas Bhukarheri and Bhuma Sambalhera, leaves this district near the village of Khera in the latter pargana. All along its course the Ganga forms the eastern boundary of this district which it swap rates from the district of Bijnor.

**Kali Nadi (East)** – This river is called Nagin probably becuase of its serpentine course, and Kali Nadi (East) to distinguish it from the Kali Nadi (West), the tributary of the Hindan.

**Saloni** – This stream which formerly joined the Ganga in district Saharanpur, changed its course about 1852 and flowed into the old bed of the Ganga, linking the line of lakes therein.

**Banganga** – This stream is in reality of backwater of the Ganga and represents an old channel of that river.

**Yamuna** – Rising in district Uttarkashi, the Yamuna first touches the district in the extreme north-west of pargana Bidauli about four km. North-west of Bhari Mustafaabad and runs southward in an irregular course along the western boundaries of parganas Bidauli, Kairana, and Kandahal of Kandhal, separation this district from district Karnal of Haryana State.

**Katha** – This stream, which rises in district Sharanpur, enters this district near Mundait in paragana Jhinjhana.

**Hindan** – Rising in the Shiwalik hills to the north of pargana Muzaffarabad in district Saharanpur, the Hindan enters this district at the village of Badha Khera in pargana Charthawal.

**Krisani** – This river enters the district from the district of Saharanpur, near the village of Chandaina in the extreme north of pargana Thana Bhawana, about 5 km. north of Jalalabad, and runs southward past Jalalabad and Thana Bhawan, entering Shamli at the village of Kairi.

**Kali Nadi (West)** – Rising in district Saharanpur, the Kali, which is also known as the Kali Nadi (West) to distinguish it from the Kali
Nadi (East) or Nagin, enters the district near the village of Rohana in pargana Muzaffarnagar.

**Kankar** – It exists in a very limited quantity. There are only two quarries in tahsil Kairana, one being in Jansath and the other in the valley of the Saloni in tahsil Muzaffarnagar. The distance of main roads from these quarries is so great that the kankar for metalling them is bought from the neighbouring areas of the districts of Meerut and Saharanpur.

**Reh** – This mineral is an impure carbonate of soda and alkaline in nature and pernicious to agriculture. In the last quarter of the 19th century it occurred in considerable quantities along the Yamuna in pargana Bidauli. This was much more marked along the course of the Eastern Yamuna canal and at a place along the Kali Nadi (West) and the Ganga canal. The reh infected area was 10,584 hectares in 1885-86. On completion of the drainage works at the end of the 19th century this area was reduced to was more due to natural reaction than to the artificial drainage. By 1970-71 the reh covered area further diminished to 1,348 hectares, with 907 hectares in tahsil Kairana, 230 hectares in tahsil Muzaffarnagar, 173 hectares in tahsil Budhana, and only 38 hectares in tahsil Jansath. At present this mineral is found in a small quantity along the Yamuna and the west of kali Nadi (West).

**Principal crops**

**Kharif** – Rice is a valuable crop of this season. It is largely grown in the tracts where a sufficient supply of water for irrigation is obtained. Since the opening of the Ganga canal in these areas the cultivation of finer varieties of rice has increased. Among the numerous local varieties of rice the most notable is *munji*.

There are two main harvests of rice, the earlier one known as *kuari*, and late called *jarhan*. The former is sown late in June or in early July and a good September harvest depends on the adequacy of rainfall.
Maize is one the important grains grown in the district. The maize crop is raised without much labour. Its greatest advantage lies in the fact that it is among the first to reach maturity, and consequently is less liable to suffer from early cessation of the rains, while at the same time it leaves the fields free for Rabi preparation earlier than other crops such as jowar and bajra.

In comparatively inferior soils and the narrow strips of sandy land along the river banks jowar and bajra are the main Kharif staples.

Among other Kharif cereals, sawan, mandua, and kodon, and pulses like urd and moong may be mentioned. Sawan and mandua were among the favourite Kharif crops in the past, but price incentives have changed the cropping pattern in recent years. More valuable crops like rice maize and sugar-cane jave replaced cultivation of these cereals.

**Rabi** – Wheat is the most important among the Rabi staples in the district and covers more than 50 percent of the total Rabi area. It has maintained its predominant position in the district during the last seventy years. The wheat crop requires a good soil, carefull tillage, and an assured means of irrigation. In nearly all the parganas it constitutes the chief product of the spring harvest, through crop is often sown in combination with barely or gram or both, forming the mixture locally known as gochai.

Barley was another important Rabi crop in the district in the past, but has gradually yielded place to wheat and other valuable crops.

The remaining Rabi area is taken up for the mot part of gram and pea.

Of the Rabi pulse only arher and masur are important. An interesting feature of arhar is that it is sown with the main Kharif crops and harvested after most of the Rabi crops.
Cash crops

Sugar-cane, cotton, oil-seeds, ground-nut, potato, tubers, vegetables, cucurbits, sunn-hemp, and tobacco are the main cash crops of the district.

Cotton was an important cash crop in the district in the days gone by. Sugar-cane is one of the most important Kharif cash crops of the district. Oil-seeds do not occupy a sizable area in the district. Sunn-hemp is sown both for its fiber and for its use as green manure.

Vegetables, through they occupy a small area in the district, especially around the town and large villages, constitute valuable crops. Potato, which is one of the most important among tubers.

Large-scale industries

There are eight large-scale units in the district manufacturing sugar, condensed mills, liquor, and a special alloy of steel used in the manufacture of auto-leaf spring and watches, etc.

Sugar – During the early thirties of the present century, manufacture of refined sugar was started in four units, viz, Sir Shadi Lal Sugar and General Mills (Ltd.), Mansurpur, the Upper Doad Sugar and General Mills (Ltd), Shamli, the Upper India Sugar Mills (Ltd.), Khatauli, and the Amritsar Sugar Mills (Ltd), Bonana Kalan. Bagasse and molasses, the by-products of this industry, are used for the manufacture of paper and alcohol respectively. During 1971-82, the total investment in these units amounted to Rs. 850 lakhs their turn-over was worth Rs. 1,950 lakhs, and they employed 5,000 persons.

Condensed milk – The Indian Milk Products, Ltd. Muzaffarnagar, was established in 1962. This unit manufactured condensed milk and ghee.

Rectified spirit – Two units, one each at Shamali and Mansoorpur are engaged in manufacturing rectified spirit and spirituous drugs.
Molasses, used as a raw material, is procured mainly from the local sugar mills.

**Steel casting** – The Uttar Pradesh Steel Co. (Ltd.), was established in 1962 in technical collaboration with M/s Kobe Steel Ltd., a leading manufacturer of steel casting in Japan. In November 1964, it was converted into a Public Ltd., Company.

**Small-scale industries**

The directorate of industries, U.P. had registered 230 units of small-scale industries in the district in 1971-72. Some of the important industries are described below:

**Agricultural implements** – The district has at present 72 units manufacturing agricultural implements such as threshers, discharrows, ploughs, Persina wheels, and small machines used in irrigation.

**Sugar-cane crushers** – The manufacture of sugar-cane crushers has been taken up by 15 units with an investment of Rs. 53.3 lakhs and a calculated annual production worth Rs. 14.10 lakhs during 1971-72.

**Khandsari** – There are about 500 units, scattered all over the district, manufacturing khandsari. It is an old-time industry which has survived the vicissitudes of time.

**Cottage industries**

There are a number of old and flourishing cottage industries in the district. Some of them have switched over to modern techniques of production. These industries are assisted by various organizations, but mainly by the khadi and village industries board. The following are some important cottage industries in the district.

**Gur** – Gur making is one of the old-time industries of the district. There were 4000 units with production worth Rs. 10 crores in 1971. This district is one of the most important gur mandies of the State and exports a large quantity to other state.
Woolen-Blanket Blanket weaving is almost as old and important a cottage industry in the district as the preceding one concentrated mainly at Mirapur, Shahpur, Gangeru, and Morna.

Handloom cloth – The next old and significant cottage industry is weaving of cloth on hand-loom. It is flourishing still at Muzaffarnagar, Budhana, Charthawal, Shahpur, Kairana, Lisar, Baghra, Bhopa, Khatauli, and Jansath.

Agra

The district may be into four physical divisions that are formed by its major rivers, the Yamuna, the Chambal and the Utangan. The area which lies to the north of the Yamuna forms part of the Ganga-Yamuna doab and includes the tahsil Etmadput. Between the Yamuna and the Utangan lies a uniform stretch of upland country the tahsil of Agra, Kirol, Fatehabad and a considerable portion of tahsil Kheragarh. The region between the Yamuna and the Chambal includes tahsil Bah and that to the south of the Utangan comprises the south-western part of tahsil Kheragarh.

The trans-Yamuna division has a level expense of upland which is dissected by the inconsiderable affluent of the Yamuna, the main being the Jirna, the Sengar and the Sirsa, Small and isolated ridges of sand occur in this tract the characteristics feature of which is a light yellow loam of great natural fertility. In the south its almost level surface is cut of by deep and extensive ravines which render large areas unsuitable for agriculture. Another feature of this region is the occurrence of kankar, beds which are something exposed or are left covered with a thin layer of soil due to active erosion in the vicinity of the ravines. The whole of the ravined belt is dotted with trees and is used as a gazing ground. The khadar or flood plain of the main rivers lies below the ravines and forms narrow belts by the sides of the ravines where tall grass grows in abundance.
The next physical division is a tract laying to the south of the Yamuna which extends as far as the Utangan. It is practically a level stretch of loamy soil, broken only by the Khari river and a drainage channel locally known as the Dahar (or Nahre). A few outcrops occur rising out of the alluvial plain in the west, from Fatehpur Sikri to Kiraoli. Along the course of the Kharo Nadi there are ravines which grow longer and the Agra tahsil the ravines along its course break up the surface only for a short distance from the river line after which they are more marked, the land affected being rendered unculturable for over a mile in breadth. In tahsil Farehabad they almost disappear for some distance (the highlands gradually sloping down to a low bank of alluvial land) but they soon appear again becoming deeper and broader as the river proceeds onwards. The ravines along the Utnagan area similar to those along the Khari.

The third physical division, which is covered by the tahsil of Bah, is an oblong strip of land about forty-two miles long with an average breadth of eight or nine miles. It is bounded by the Utangan and the Yamuna in the north and by the Chambal in the south and is scoured by the deep and extensive ravines of these rivers. The level upland, which ridge flanked on all sides by broken land. The soil in this watershed is a fine loam which becomes sandy as the ravines on the north are approached, whereas to the south the soil is of a clayey nature. The clay is dark in colour in the west and is known as mar. It becomes a genuine stiff clay (termed matiyar) in the eastern portion of the tract becoming somewhat sandy in the extreme east. In this tract the lowlands are more valuable agriculturally than those in the other parts of the districts indeed the kachhar is limited to a narrow, raised strip along the Yamuna, though at some places (for example north of the village of Bateshwar in the north and north of village Khilaoli in the east) there are broad stretches of fine rich soil. The lowlands of the
Chambal are extensive and produce magnificent crops because they are annually enriched with silt brought down by the rivers.

The fourth natural division of the district is that part of the Kheragarh tahsil which lies to the south-west of the Utangan. It is drained by several watercourses and is flanked by a spur of the Vindhayas which runs along its northern boundary. Sandy and clayey soils are generally found in this tract which is dotted with numerous isolated hills. The water-table is near the surface but the nature of the underlying strata renders irrigation difficult. Due to the character of the soil, this tract differs from the rest of the district. Here the loam (*duma*) is not only on inferior in quality but also very limited in extent.

The hilly tract south-west of tahsil Agra, which occupies parts of tahsils Kiraoli and Khareagarh, may well be considered a fifth natural division of the district. The hills belong geologically to the Upper Vindhyan system including their lowest (the Kaimur group) as well as their highest (the Bhandar group) beds. The Bahandrauli and Fatehpur Sikiri spurs are the two parallel but broken ridges of Vindhayan sandstone running south-west to north-east.

**River system and water resources**

The most prominent physical feature of the district is the river Yamuna with its tributaries, the Chambal and the Utangan, which in their turn have many other minor minor streams as their tributaries. These affluent from a broken chain of pools in summer but assume considerable volume during the rainy season, the velocity depending on the nature of the rainfall. During the monsoon the upper portions of the courses of these streams have low and shelving sides but their banks become more abrupt as they approach the bigger rivers. They flow from north to south in the north of the Yamuna but to the south of the river they move from west to east.

**Yamuna** – The Yamuna, the chief river of the district.
Tributaries of Yamuna

Jhirna – The first tributary of the Yamuna in the district is the Jhirna (also known as the Karwan or the Karon) which it in the north.

Sirsa – Another northern tributary of the Yamuna is the Sirsa which enters the district from district Etah, flows south-east in an ill-defined course and, after traversing some twelve miles, leaves the district near the village of Narki which s on the eastern border of the tahsil of Firozabad.

Sengar – Another northern tributary of the Yamuna which traverses the district is the Sengar.

Utangan – In this district the only southern affluent of the Yamuna is the Utangan or Banganga. It enters the district at the south-western corner of tahsil Kiraoli, near the village of Sarauli.

Khari – This river is the only feeder of the Utangan in the north. it enters the district from the south-west of Fatepur Sikri and proceeds north for a short distance till it meets the Orinia, another stream derived from numerous small channels which carry off the drainage from Bharatpur (in Rajasthan).

Chamal – This river rises in the northern slopes of the Vindyaas. Tasord is the village in the extreme west of tahsil Bah near which the river first touches the district along the boundary of which flows as far as the border of district Etawah.

Tanks – There are thirty-five tanks benefiting an area of 11,263 acres round about Jagner in tahsil Kherabarh and a big reservoir in the Agra tahsil, covering an area of 764 acres and holding 290 million cubic feet of water. These tanks belong to the irrigation department and are the only source of irrigation in those area, the water being released at the time of the rabi sowing. This water helps the soil to become fertilized by inorganic matter coming from the catchments areas and makes it fir for producing good rabi crops without the need of any subsequent irrigation.
**Mineral deposits** – *Kankar*, brick and pottery-clay are the useful materials which are commonly obtainable from the tract occupied by the alluvium while building stone is quarried extensively from the Vindhyan sandstone formations.

**Kankar** – Calcareous concretions (locally known *kankar*) are found throughout the district and occur both in block and in the ravines along the Chambal in tahsil Bah. The place of the raja of Bhadawar, which is at Pinahat, is one of the buildings made of this material. Kankar is also burnt for the production of lime. The bodular form is found throughout the district but the quality varies from place, the more common variety being the bichhua.

**Ground water** – On the whole in the alluvial plain of the district, which lies between the Yamuna and the Chambal, the water-tables is fairly low (approximately eight feet from the surface in an average). Gravel beds have been found near Agra when wells have been sunk at comparatively shallow depth but when they are sunk fairly deep, clay beds between which underground water is stored are reached, making the construction of wells very difficult and costly.

**Soils**

There are six broad categories into which the district and be divided from the point of view of its soils, the categories and the distinguishing characteristics of each being as follows:

**Area Type 1 (recent alluvium)** – The tracts where soils of this category are found are adjacent to the banks of the Yamuna and are mainly in the tahsil of Agra, Fatehabad and Bah and to some extent also in Emadpur and Firozabad. These soils are gray to ash-gray in colour and have a coarse sandy texture occasionally being missed with deposits of silt. The alluviums are calcareous in nature and have practically no features of genetic-soil development. Due to the high water-table they remain moist for a considerable period and are frequently submerged by the flood water of the river. The
main crops are vegetables, chiefly of the cucurbitaceae family. The area under this type of soil is, however, very small and it is periodically inundated by recurring floods in the river and on this account its utilisation for kharif crops is apt to be hazardous.

**Agra Type 2** - This type of soil is found in the uplands in four different parts of the district – (i) the Yamuna uplands - Bordering on the alluvium and arising almost abruptly as the wall of a terrace, the uplands of the Yamuna are characterized by an undulating topography and leas to ravines with which their entire boundary is fringed, the soils being light-textures fresh alluvium which is brownish yellow on the surface. The use of these plots for agricultural purposes is, however, restricted due to the absence of adequate irrigation facilities, the crop of bajra-arhar (mixed) and of juar being the main kharif crops and gram mixed with barley being produced in rabi. The extensive ravines with their heavy run-off and denudation are relatively unproductive. (ii) The western uplands - These uplands occupy the largest area of the district and occur in the tahsils of Fatehabad, Agra and Kiraoli. (iii) The northern uplands - These occupy a major part of the two contiguous tahsils of the Etmedapur and Firozabad (iv) The southern uplands - The southern uplands, which occupy the major portion of tahsil Bah, are characterise by an even topography and a very low water table (ranging from 60 m 100 feet). The soils are deep and have attained a high state of maturity.

**Agra Type 3** - The tracts where soils of this category are located are mainly in the tahsils of Kiraoli, Kheragarh and in parts of Fatehabad and Agra. The areas is an uneven plain, mainly drained by the Khari Nadi and also by an undefined depression passing through the entire length of the lower part of the district, where the soils are slightly different from those generally found in the tract, being sandy on the bank of the depressions. The soils are generally loamy in texture with occasional variations changing to clayey loams in depression and light loams on the elevated sections. The
soils in this region are brownish gray to grayish brown in colour and possess a good granular structure. They are adequately provided with plant nutrients and are fairly fertile. The cropping in this area is jwar or bajra and arhar during kharif and wheat or gram during rabi. These soils are very responsive to management practices (including the use of fertilizers).

Agra Type 4 - Soils of this type are found in depressions in a long narrow strip in tahsil Firozabad and in a long strip as well as in pockets in the northern parts of tahsil Etamadpur.

Agra Type 5 (black clayey soils) - Such parches of soils are found - but to a very limited extent - in the south western corner of tahsil Bah to the north of the ravines of the Chambal. The soil is black in colour and of a very fine texture and closely resembles the mar of Bundelkhand.

Agra Type 6 - These soils are found in the south-western corners of tahsil Kheragarh and some parts of Kiraoli adjoining the chain of hillocks near Fatehpur Sikri. On the whole these soils are poor in inherent fertility and procure indifferent crops of moth (a pulse), gram and wheat or barley.

Important crops

The usual harvests of the districts are rabi (the spring crop), kharif (the autumn crop) and zaid (the extra or hot weather crop), the last being only of little importance. Here, is elsewhere, rabi crops are more expensive to produce than kharif, requiring more ploughing, a greater amount of seed and more irrigation.

Double cropping

The foregoing statement shows that a considerable area bears more than one crop in a year but the practice of double cropping is not followed to the same extent in Agra as in other and more fertile districts although now it is being adopted increasingly.

The main crops of the district are wheat, gram, barely, peas, millet (bajra), guineacorn (arhar), black gram (urd), cotton, maize and sugar-cane, the first four being sown in rabi and rest in kharif.
In addition, mustard and taramira (an oilseed) are also grown in rabi while paddy, green gram (moong), sesamum, castor and ground-nut are the subsidiary crops for kharif.

**Rabi crops – wheat** – This is one of the most important crops of the district, the area covered by it being smaller only than that covered by millet and gram. It is sown in loam and light clay which comprise the greater part of the soil of the district and is accordingly cultivated in all the parganas but Kiraoli and Kheragrah are particularly suitable for its cultivation and produce about 40 percent of the total yield of the district. It is sown alone as well as mixed with barely and gram, the wheat-barely mixture being known as gujai and the wheat – gram mixture are gehunchaha.

**Gram** – Gram has always occupied the largest area among all the rabi crops of the district but its cultivation has increased considerably during the last forty years.

**Barley** – Barley occupied a larger area in the past than it does at present.

**Oils-seeds** – The oil-seeds sown in rabi produce edible as well as un-edible oil. Rape-seed and mustard belong to the first category and the area covered by them has increased considerably during the ten years ending 1958-59. In 1948-49 both kinds occupied only 4,807 acres but in 1958-59 rape-seed along was sown in 15,182 acres and mustard in 7,691 acres, Kheragharh being the largest producer. Linseed, which in 1948-49 covered only 66 acres, was sown in 269 acres in 1958-59 in which year tramira occupied 4,599 acres.

**Kharif crops – millet** – This is the most important kharif crop, the area covered by it as was also the case a decade ago being larger than that covered by any other crop if the district. The is sown mostly on poor and sandy soil and is generally mixed with arhar. Bajara mixed with arhar is also sown in all the parganas, those of Bah, Etmadput, and Fatehabad being the largest producers.
Guinea-corn – *Juar* Juar is next in importance only to *bajra* and is sown both by itself and mixed with the later.

Maize – Another cereal sown in *kharif* is *maize*.

**Pigeon pea (Arhar)** – Almost all the *arhar* in this district is sown mixed with either *bajara juar* or cotton and ground-nuts and these mixed crops are produced in all the parghans, *Kiraoli* leading in the production of *juar* and *arhar* (mixed) and cotton and *arhar* (mixed) and Bah in *bajra* and *arhar* (mixed).

**Black gram (Urd)** – This is the other important pulse which is sown in *kharif* but the area covered by it has never been significant.

**Cotton** – Cotton, which was one of the most valuable cash crops of the district and occupied a considerably large area.

**Sugar-Cane** – This is an important commercial crop if the district and has always been cultivated in all the paragnas though the area under cultivation has fluctuated from time to time.

**Paddy** – Though sown in all the paragnas, except Bah, paddy is only a subsidiary crop of the district.

**Oil-Seeds** – Sesamum, ground-nuts and *raindi* (**Ricinus communis**) are the only oil-seeds sown in *kharif* but the area under them, particularly under *raindi*, is very small.

**Large-scale industries**

Oils mills – There are three large-scale oil-mills in Agra city- Madan Mohan Damamal Oil and lee Factory, Ltd. Chittar Mal Ram Dayal Oil Mills Ltd., and the Gangadhar Ramachandra Oil Mill Ltd., which were established in 1941, 1946 and 1948 respectively. The capital (inverted) in all three amounted to Rs. 55,00,000 and 255 persons were employed in them in 1961. Oil seeds valued at about Rs. 1,54,00,000 were consumed to produce oil worth about Rs. 2,00,00,00. Generally mustard oil is produced and exported to Bihar, West Bengal, Assam, Orissa and other states, about 10 percent being consumed in Uttar Pradesh.
Small-scale industries

Small-scale industries dominate the industrial horizon of the district. As many as 10,275 persons are employed in 290 units. The glass and leather industries are the most prominent, the former employing 10,000 persons and the latter about 2,000.

- Iron Foundries
- Iron and Steel Engineering Works
- Metal Works
- Printing Press Industry
- Tin Printing
- Glass Blowing, etc.
- Niwar Making
- Textile Industry
- Hosiery
- Embroidery and Lace Industries
- Tent Industry
- Flour Mills
- Rice Industry
- Flour Mills
- Sugar Mills

Oil production – Oil is produced in fourteen units in which Rs. 21,97,390 was invested in 1960. The industry provided employment to 373 persons and oil worth Rs. 1,16,16,706 was produce in that year. Tilhan (oil-seeds) from which oil is expressed is obtained locally. In a year, on the average, oil-seeds worth about Rs. 8,80,000 are pressed in these units.

- Ice Industry
- Liquid Gold Industry
- Tanneries and Shoe Making
- Sanitary Fittings
- Soap Making
- Cardboard Boxes
Cottage and village industries

In this district, as elsewhere, village and cottage industries are concerned in the main with the processing of raw materials by the adoption of simple techniques. These industries are located near the homes of the villages, thus providing a decentralized base for the economy of the district.

Durrie making, cloth weaving, soinning, of cotton and silk yarn on handlooms, embroidering in gold, silver thread, oil pressing, furniture making, making of footwear, millstones and the production of glass (such as a bangles and crockery), and the main cottage industries of the district.

Special mention

Oil Pressing – Oil is extracted in 343 units which employ 709 persons. The capital investment amount to Rs.48,32,000 and oil products worth Rs. 21,83,000 are sold annually. Tilhan (soil-seeds) worth Rs. 14,64,5000 is consumed every year.

1.6 Chapterization

Chapter Two deals with the percentage change and growth in the area of crops over four periods of time, immediately after the Green Revolution. This would help to understand the changes in the area of various crops over four decades.

Rural Infrastructure facilities available at the district level is analysed in the Third Chapter over three periods of time, i.e. 1980, 1990 and 2000. Growth rates are analysed and a composite index is done to see the overall levels of infrastructure available.

Agro-processing industries form the third and important aspect of the study. This is analysed in the Fourth Chapter.
All India with UP state comparisons are done for understanding the involvement of agro-processing industries at the state level with special reference to the share of sugarcane and oil processing units in Uttar Pradesh.

The Fifth Chapter deals with the village and household level analysis of the two areas under study. Their agricultural patterns, infrastructural facilities are seen along with the Agro-processing units of the concerned regions.

The Sixth Chapter analyses the inter-linkages between the three aspects of rural economy, i.e. Agriculture, Infrastructure and Agro-processing.

The Summary and conclusion is the last chapter of the study.