Arth Ganga Project: District Kasganj

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EXECUTIVE SUMMARY

Kanshiram Nagar- Kasganj is one of the holy cities in the state of Uttar Pradesh. The district has many architectural, morphological, and spiritual wonders. The city is situated on the banks of the river Ganges.

The total geographical area of the district is 1993 km^2. The primary sector showed the average annual growth rate from 2011-12 to 2018-19 to be 3.19% with its share decreasing from 47.02% in 2011-12 to 41.41% in 2018-19. The share of the secondary sector increased from 15.24% to 20.24% with a remarkable average annual growth rate of 8.12%. The tertiary sector occupies a 35.16% share of the district economy with yearly growth of about 3.91%. Overall, the district economy grew with an average annual growth rate of 3.97%

In 2017-18, the net sown area and the gross irrigated area represents 143559 ha and 230634 ha. The cropping intensity of the district is 182.76%. The total actual irrigated area is 141833 ha. Major crop types are wheat, rice, maize, barley, millet, pulses like a variety of black pulses, pigeon pea, lahi mustard, etc. along with sugarcane, potato, tobacco, etc. The total food grains along with pulses account for the production of 596874 MT. The livestock consists of cattle (indigenous and crossbred), buffalos (indigenous and crossbred), pigs (indigenous and crossbred), sheep; along with other poultry and fisheries.

Agriculture with the horticulture sector grew at an average annual growth rate of 2.19% from 2011-12 to 2018-19. However, its share increased from 66.85% in 2011-12 to 54.13% in 2018-19. The share of cultivable wasteland increased slightly from 5.22% in 2010-11 to 5.24% in 2017-18 whereas barren and uncultivable land share decreased from 1.75% to 1.30%. The net sown increased from 73.34% in 2010-11 to 73.39% in 2017-18. The area for non-agricultural use increased over the period from 12.79% to 14.0%. The district's percentage of the net and gross irrigated areas have increased over the years with an average of 97.62% and 84.50%, respectively. In 2017-18, the nitrogen share decreased to 68.49%, while the phosphorus share increased to 27.71%, and the potassium share decreased to 3.79%. The use of nitrogen is more than the recommended ratio, while the Phosphorous and potassium ratio is less than the recommended ratio. The overall use of chemical fertilizers has increased in the district from 180.63 kg/ ha GCA in 2010-11 to 224.43 kg/ ha GCA in 2016-17.

The share of the livestock subsector increased from 31.54% to 44% from 2011-12 to 2018-19 with grew with an average annual growth rate of 6.54%. The fishery & aquaculture subsector share is very minimal, around 0.72% in 2018-19 with a remarkable average annual growth rate of 254.30% from 2011-12 to 2018-19. Mines and quarrying also recorded an impressive average annual growth rate of 35.70%.

The total forest cover of the district is 48.8 km^2. The Forest area represents 1.05% of the total reported area. Out of the total forest cover, 84% is open forest and the remaining 16% is medium dense forest. The forest cover has decreased significantly in the district.

The share of forestry and logging in the total agriculture and allied sector is small, around 1.14% in 2018-19 with a significant average annual growth rate of 6.07%. The share of area under trees and gardens slightly reduced from 0.31% in 2010-11 to 0.22% in 2017-18.

Kanshiram Nagar Kasganj is known for its varied religious destinations and ecological attractions. The district is connected well through roads and a railway network. In the year 2019, the number of domestic tourists increased by 3.47%. There are a variety of places to visit in the district such as bridges on Kali River which is a modern civil architectural wonder, and many temples such as Jama Masjid, Manas Mandir, Parshuram Mandir, Barah Bhagwan Mandir, Syam Barah Mandir, Raghunathji Mandir, ancient Raghunathji Mandir of lord Ram, etc along with brass bell Soro.

Electricity consumption in agriculture has increased significantly from 109.76 KWH in 2014-15 to 232.45 KWH in 2019-20, a net increase of approximately 111.78%. The percentage share of the agriculture sector in the total electricity is 34.26%. In the district, 77.42% of households depend on kerosene as the main source of lightning, followed by 21.31% using electricity and only 0.37% using solar. According to Pugazenthi et. al. 2016, the total solar power potential available in the district of Kanshiram Nagar is 0.0643. No substantial data related to installations of solar energy units have been recorded from the available resources. 47% of households use firewood as the main cooking fuel, followed by 29% using cow dung cakes and 12% using crop residue, and the other 12% use LPG/PNG.

The total number of wetlands existing in the district is 674 consisting of both Man-made and Natural. Most of them are small or medium-sized and tanks/pondsraverines and waterlogged. The district's biodiversity data includes various crop production, livestock population, bird species, and forest cover with 331 bird species and 40 threatened/rare species of bird in the district. Biogas potential from animal waste and agricultural waste was calculated approximately as one crore m^3/year and thirty-three crores m^3/year. No data on the biogas plant is given for the Kasganj district. No hydropower present or plans exist.

To promote sustainable development creating awareness, educating people about renewable energies, sanitation, maintaining decorum of the properties by not destroying or keeping them clean, Adopting Public-Private partnerships, upgrading staff and facilities, etc. Along with managing and reducing waste and pollution from all sectors, special checks should be imposed on mining activities. Drip and Sprinkler irrigation, introducing Vermicomposting and Green and Poly house, use of high-yielding seeds, micro-irrigation, constructing and maintaining harvesting structures, adopting greenhouse farming with organic farming, and encouraging farmers for adapting different crop cultivation and various irrigation methods. Proper marketing and insurance system for food grains and other high-value crops Various measures such as eco-tourism should be taken to improve tourism and promote the use of renewable energy especially by creating awareness. Involvement of locals to increase plantations and promote Agroforestry. Along with focusing on agriculture practices Bee culture, dairy, poultry, fisheries, implementation of PM Matsya Yojana, etc. needs encouragement as they have high economic potential. Crop advisory under the drought condition and introducing technology, training, marketing needs, advisory services, ferti-seed drill along with monitoring and inspections in all sectors.

1. DISTRICT OVERVIEW

1.1 INTRODUCTION

Kanshiram Nagar is the 71th district in the Indian state of Uttar Pradesh. The district and particularly the city Kasganj is popularly known as because it was established in a thick forest of "kans". The district is situated in the western part of the state. It lies in the central portion of the Ganga and Yamuna doab and is bounded on the north-east side by the river Ganga, which separates it from the Budaun district. Kanshiram Nagar District, popularly known as Kasganj was newly created (on April 17, 2008 by dividing Etah district) after 2001 Census. District comes under jurisdiction of Aligarh division. Kasganj town is the district headquarters. To provide efficient administration, the district is administratively divided into 03 tahsils namely, Kasganj, Patiyali and Sahawar (newely created after 2001 Census). There are 389 Gram Panchayats and 715 Revenue villages with 650 inhabited villages and 65 uninhabited villages in the district. In urban area there are 10 statutory Towns and 01 Census Town.

It is located in the Doab, the area between the holy rivers Ganges and Yamuna and the alluvium soil makes the land one of the most fertile regions. A large number of surrounding villages depend on agriculture and related economic activities. Gross district domestic productivity in Kasganj district largely depends up on agriculture and animal husbandry, Forestry and logging, transportation, mining and quarrying and manufacturing units.

The total population of the district is 14,36,719 out of which 11,48,512 live in rural and rest 2,88,207 in urban areas. The most populous tahsil is Patiyali with 5,60,320 population followed by Kasganj tahsil whose population is 5,59,044. The least populous tahsil is Sahawar with a population of 3,17,355. In the district 32.91 per cent or 472,765 persons pertain to the category of working population. Average males working population is 49.10 per cent against 14.50 per cent among females. Main workers constitute 24.66 per cent of population while marginal workers account for 8.25 per cent. Non-workers contribute 67.09 per cent of total population. It may be mentioned that the working population in the district is 32.91 per cent as compared to 32.94 per cent in the state.

The district Kasganj (Former Name as Kanshi Ram Nagar) was formed on 17th Apr 2008 by carving out Kasganj, Patiali and Sahawar Tehsils from Etah district. Initially, the district was named after a politician, Kanshi Ram. Sant Tulsidas born in the district and Amir Khusro also belongs to Patiali tehsil of the district. Popular area of the district includes Soron, Patiali, Nadri etc.

The town has got a prominent geographical feature in the shape of Kali River. The river originates in Doon Valley and merges with Hindon River in Ghaziabad which subsequently merges with holy river Yamuna. The Kali River has also got two canals which pass over the river through the two bridges specially made for this purpose. This is a sort of modern civil architectural wonder which attracts some curious onlookers from and around the town to witness and marvel this piece of engineering. There are so many temples and other holy places in this city that it will take a long time to cover all. Some of them

are Someshwar Mahadev, Manas Mandir, Parshuram Mandir, Barah Bhagwan Mandir, Syam Barah Mandir, Raghunathji Mandir, Bhuteshwar Mahadev, Batuknath Mandir, and Shri Ganga Mata Teli Wala Mandir. There is an ancient Raghunathji Mandir of lord Ram. 130 kg brass bell Soron is also a well known pilgrimage spot.

Soron is also known as SHUKAR KSHETRA. Devotees travel to this city to pay respect to the almighty and seek blessings. Soron is believed to be the birth place of great Indian poet TULSI DAS who had composed RAMCHARITMANAS in the praise of lord Ram. Near the kund of soron there is a very famous temple of Lord Hanuman which is popularly known as Shree LADOO WALE BALAJI. Near this temple is shree VARAHA BHAGWAN's temple. According to the mythological stories, it is believed that demon Hiranyaksh stole the earth and hide it in the kund of Soron. God Vishnu then took the incarnation of Varaha, killed the demon and restored the earth to its original place. Thus, this temple was built to commemorate the victory of good over evil. Soron is basically a holy place. Many temples are situated here and the people mainly from Rajasthan, Madhya Pradesh, Gujarat and many parts of India come here to visit the temples.

Also, There is a bridge on river Ganges named Kachhla which is situated 12 km away from Soron in the Budaun district which is a very famous place, people come here to take bath on holy Ganges

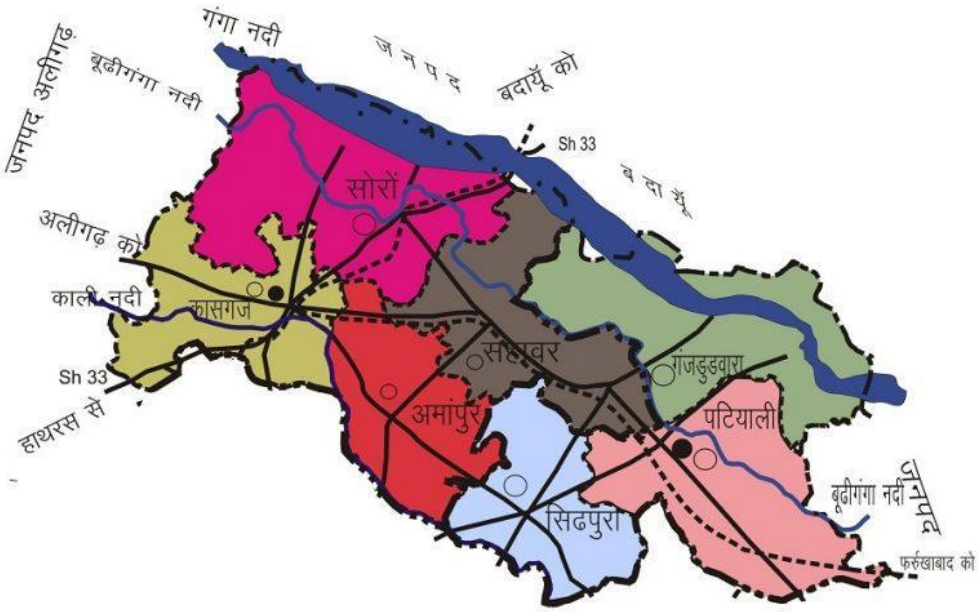


Figure 1 Map of the district

1.2 DEMOGRAPHIC PROFILE OF KASGANJ

1. Economy and Livelihoods

- Geographical Area: 1993 Sq. Km.
- Administrative Divisions:[1]

  District Headquarters: Kasganj

  No of Municipalities: 10

  No of Tehsil: 3

  No of Blocks: 7

  No. Of Villages: 715

- Demographic and socio-economic indicators:[2]

  Population: 14,36,719 (Census 2011)

  Population density (Total persons per sq. km): 735

  Sex ratio: 880

  Literacy: 61.0%

- Occupation/ other Livelihood source: Agriculture and animal husbandry, Forestry and logging, transportation, mining and quarrying and manufacturing units
- Major Rivers: Ganga
- Forest Area: 48.8 Sq. Km.

[1] https://kasganj.nic.in/

[2] https://censusindia.gov.in/2011census/dchb/0971_PART_B_DCHB_KANSHIRAM%20NAGAR.pdf

1.3 ECONOMIC PROFILE OF KASGANJ

The District Economy

The primary sector has a significant impact on the district economy because it contributed, on average, 49.39% share in the district GDP. However, the average annual growth rate in this sector from 2011-12 to 2018-19 is only 3.19%. Thus, its share decreased from 47.02% in 2011-12 to 41.41% in 2018-19. The share of the secondary sector increased from 15.24% in 2011-12 to 20.24% in 2018-19. The sector grew with a remarkable average annual growth rate of 8.12%. The tertiary sector occupies 35.16% share in the district economy. It grew only by 3.91% yearly. Overall, the district economy grew with an average annual growth rate of 3.97%. The growth in the primary sector is less than in the other two sectors. Steps should be taken to increase the productivity of the primary sector to grow at a higher rate. This will improve the growth rate of the overall district, as well as the primary sector. The secondary sector has performed well during the period of the study.

Table 1: Trends in Gross District Domestic product in Kanshiram at Constant Prices (base 2011-12) in Rs Crore

Year	Sector-wise GDDP (Rs, Crore)				Annual Growth Rates			
	Primary	Secondary	Tertiary	Total GDDP	Primary	Secondary	Tertiary	Total
2011-12	2662.53	863.29	2136.99	5662.81	-	-	-	-
	(47.02)	(15.24)	(37.74)	(100)				
2012-13	3488.56	1000.68	2286.79	6776.02	31.02	15.91	7.01	19.66
	(51.48)	(14.77)	(33.75)	(100)				
2013-14	3725.99	1139.99	2513.69	7379.67	6.81	13.92	9.92	8.91
	(50.49)	(15.45)	(34.06)	(100)				
2014-15	4212.89	1047.56	2838.02	8098.47	13.07	-8.11	12.90	9.74
	(52.02)	(12.94)	(35.04)	(100)				
2015-16	4414.09	1274.63	3125.65	8814.36	4.78	21.68	10.13	8.84
	(50.08)	(14.46)	(35.46)	(100)				
2016-17	4347.39	1239.26	2861.80	8448.45	-1.51	-2.77	-8.44	-4.15
	(51.46)	(14.67)	(33.87)	(100)				
2017-18	4352.15	1342.20	2812.31	8506.66	0.11	8.31	-1.73	0.69
	(51.16)	(15.78)	(33.06)	(100)				
2018-19	2963.19	1448.29	2744.33	7155.81	-31.91	7.90	-2.42	-15.88
	(41.41)	(20.24)	(38.35)	(100)				
Average Growth Rate					3.19	8.12	3.91	3.97

Source: UPDES
Note: Figures in Parentheses are percentage share in the total GDDP

We further break down the primary sector GDP to find which subsector is lagging and which is driving the primary sector growth. Table 2 shows that agriculture with the horticulture sector grew at a low average annual growth rate of 2.19% from 2011-12 to 2018-19. Moreover, its share decreased from 66.85% in 2011-12 to 54.13% in 2018-19. On the other hand, the share of the livestock subsector increased

from 31.54% to 44% in the same period as it grew with a remarkable average annual growth rate of 6.54%. It shows the importance of livestock in Kanshiram District and the increased dependency of citizens on livestock products. The share of forestry and logging in the total agriculture and allied sector is small, around 1.14% in 2018-19, but it also grew with a significant average annual growth rate of 6.07%. The fishery & aquaculture subsector share is very minimal, around 0.72% in 2018-19, but it grew with a remarkable average annual growth rate of 254.30% from 2011-12 to 2018-19. Mines and quarrying also recorded an impressive average annual growth rate of 35.70%. This high growth in this subsector can have serious environmental issues like deforestation, soil erosion, etc., with long-term effects on the health of local citizens. Overall, the Primary sector performed below expectations during the study period. More work can be done on improving the agriculture (including horticulture) sub-sector as it has the most significant impact on the primary sector.

Table 2: Gross District Domestic Product Trends from Agriculture and allied activities in Kanshiram at Constant Prices (base 2011-12) in Rs. Crore

Year	Agriculture	Livestock	Forestry and Logging	Fishery and Aquaculture	Total Agriculture and allied	Mining and Quarrying	PRIMARY SECTOR
2011-12	1766.22	833.37	41.73	0.74	2642.07	20.46	2662.53
	(66.85)	(31.54)	(1.58)	(0.03)	(100)		
	-	-	-	-	-	-	-
2012-13	2571.36	848.31	41.47	0.79	3461.93	26.62	3488.56
	(74.28)	(24.50)	(1.20)	(0.02)	(100)		
	[45.59]	[1.79]	[-0.62]	[5.60]	[31.03]	[30.10]	[31.02]
2013-14	2791.99	873.43	38.53	0.81	3704.77	21.22	3725.99
	(75.36)	(23.58)	(1.04)	(0.02)	(100)		
	[8.58]	[2.96]	[-7.09]	[3.07]	[7.01]	[-20.27]	[6.81]
2014-15	3197.88	895.06	49.32	0.86	4143.13	69.76	4212.89
	(77.19)	(21.60)	(1.19)	(0.02)	(100)		
	[14.54]	[2.48]	[27.99]	[6.77]	[11.83]	[228.69]	[13.07]
2015-16	3251.97	1043.57	40.22	0.88	4336.64	77.45	4414.09
	(74.99)	(24.06)	(0.93)	(0.02)	(100)		
	[1.69]	[16.59]	[-18.45]	[2.33]	[4.67]	[11.02]	[4.78]
2016-17	2986.30	1232.66	80.68	1.08	4300.72	46.67	4347.39
	(69.44)	(28.66)	(1.88)	(0.03)	(100)		
	[-8.17]	[18.12]	[100.60]	[22.57]	[-0.83]	[-39.74]	[-1.51]
2017-18	3009.32	1228.04	34.01	1.14	4272.51	79.64	4352.15
	(70.43)	(28.74)	(0.80)	(0.03)	(100)		
	[0.77]	[-0.37]	[-57.85]	[4.77]	[-0.66]	[70.66]	[0.11]
2018-19	1574.14	1279.60	33.29	20.84	2907.86	55.32	2963.19
	(54.13)	(44.00)	(1.14)	(0.72)	(100)		

	[-47.69]	[4.20]	[-2.12]	[1735.0]	[-31.94]	[-30.54]	[-31.91]
Average Growth Rate	2.19	6.54	6.07	254.30	3.02	35.70	3.19

Source: Compile from UPDES
Note: 1. Figures in () are percentage share in the total agriculture & allied GDDP
2. Figures in [] are annual growth rates.

Table 3 shows the percentage share of subsectors in secondary and tertiary sectors. Within the secondary sector, the manufacturing had a share of approximately 26.39% in 2018-19. The share has increased over the years as the average annual growth in this sector is 24.76%. The share of the electricity, gas, and water supplies subsector has increased from 5.95% in 2011-12 to 7.42% in 2018-19. Moreover, it grew with a remarkable average annual growth rate of 11.53%. The share of the construction decreased from 79.15% to 66.18% in the same period, and the average annual growth rate is low (5.03%). It indicates that the secondary sector in Kanshiram is heavily dependent on the manufacturing and construction sub-sectors, and the electricity subsector is also growing at a faster rate.

Within the tertiary sector, Trade & Hotel made up the highest share (34.90%) in 2018-19, followed by the Real estate (32.22%), transport, storage, and communication (15.63%), and financial services (6.73%). Average annual growth is observed highest in transport, storage, and communication (11.51%), followed by financial services (6.73%), by trade & hotels (5.86%), real estate (4.62%) and lowest in public administration (-1.51%). More work needs to be done to improve Construction and public administration subsectors. Transport and communication, trade and hotels, and financial services are the major contributors to the Tertiary sector's growth.

Table 3: Trends in percentage share of non-agriculture sub-sectors in DGDP in Kanshiram at Constant Prices (base 2011-12) in Rs Crore

Year	Manufacturing	Electricity, Gas, Water Supply	Construction	SECONDARY SECTOR	Transport, Storage & Communication	Trade and Hotel & Restaurant	Financial Services	Real Estate and Professional Services	Public Administration	Other Services	TERTIARY SECTOR	
2011-12	14.90	5.95	79.15	100	9.52	32.33	6.11	30.19	9.64	12.21	100	
2012-13	25.15	5.48	69.37	100	10.40	38.45	6.15	30.06	4.99	9.95	100	
2013-14	32.68	5.60	61.72	100	10.79	40.70	6.41	28.49	3.66	9.95	100	
2014-15	21.54	6.36	72.10	100	11.46	42.94	6.06	26.46	3.34	9.73	100	
2015-16	29.31	6.94	63.75	100	12.19	41.36	5.76	24.56	6.70	9.43	100	
2016-17	27.45	7.51	65.04	100	13.32	44.14	6.59	27.63	1.08	7.24	100	

2017-18	25.30	7.86	66.84	100	13.49	41.51	5.99	30.02	1.15	7.84	100	
2018-19	26.39	7.42	66.18	100	15.63	34.90	7.33	32.22	1.30	8.63	100	
Average Growth Rate	24.76	11.53	5.03	8.12	11.51	5.86	6.73	4.62	-1.51	-0.24	3.91	
Source: Compiled from District Statistical Handbooks												

2. Quantitative Data Analysis

2.1 Agriculture and Allied Activities

2.1.1 Trend in Land Use Pattern

The total declared area of the district is 1956.01 sq. km². Forest area represents 1.05% of the total reported area. The share of cultivable wasteland increased slightly from 5.22% in 2010-11 to 5.24% in 2017-18. Barren and uncultivable land share decreased from 1.75% in 2010-11 to 1.30% in 2017-18. The share of area under trees and gardens decreased from 0.31% in 2010-11 to 0.22% in 2017-18. The current and other fallow land has also decreased over the years, which is good for the district economy. The net sown area (NSA) has increased over the years, from 73.34% in 2010-11 to 73.39% in 2017-18. The area for non-agricultural use increased over the period from 12.79% to 14.0% (Table 4). Overall, the land use pattern shows that the fallow and uncultivable land area has decreased while the NSA has increased over the years.

Table 4: Trends in Land-use Pattern in Kanshiram (as % of total reported area)

Year	Total Reported Area (ha)	Area under forest	Cultivable wasteland	Current Fallow	Other Fallow	Barren and uncultivable land	Land other than agriculture	Pasture land	Area under trees and gardens	Net Sown Area
1	2	3	4	5	6	7	8	9	10	11
2010-11	195601	1.05	5.22	3.07	2.34	1.75	12.79	0.13	0.31	73.34
2011-12	195601	1.05	5.37	3.38	2.65	1.48	13.49	0.11	0.26	72.21
2012-13	195601	1.05	5.18	2.96	2.34	1.73	13.53	0.13	0.30	72.78
2013-14	195601	1.05	5.43	2.55	2.29	1.41	13.68	0.12	0.28	73.18
2014-15	195601	1.05	5.28	2.46	2.35	1.37	13.70	0.12	0.30	73.38
2015-16	195601	1.05	5.22	2.38	2.31	1.36	13.87	0.12	0.26	73.41
2016-17	195601	1.05	5.20	2.39	2.35	1.32	13.95	0.12	0.25	73.36
2017-18	195601	1.05	5.24	2.40	2.26	1.30	14.00	0.12	0.22	73.39
Source: Compiled from http://updes.up.nic.in/spiderreports/intialisePage.action										

2.1.2 Trends in Operational Land Holdings

In Kanshiram district, the total number of operational farms decreased from 185 thousand in 2010-11 to 181 thousand in 2015-16, a net decrease of 2.16%. While in the state, their numbers increased from 23,325 thousand in 2010-11 to 23822 thousand in 2015-16, a net increase of 2.13%. Most land positions in the district are marginal and small. These two size categories represented around 92.76% in the district in 2015-16, while the corresponding proportion in the state was 92.81% (Table 5). The two agricultural censuses of 2010-11 and 2015-16 report no significant change in the percentage share across the various categories of landholdings. Marginal land holdings increased in 2015-16.

Table 5: Distribution of Operational Holdings by Size-categories of farms (in %) in Kanshiram

	Agri, Census	Marginal Holdings (0-1 ha)	Small Holdings (1-2 ha)	Semi-Medium Holdings (2-4 ha)	Medium Holdings (4-10 ha)	Large Holdings (10 & above, ha)	Total Holdings ('000 No.)
Kanshiram	2010-11	76.46	16.18	5.95	1.35	0.06	185
	2015-16	76.54	16.22	5.89	1.30	0.05	181
							[-2.16]
Uttar Pradesh	2010-11	79.45	13.01	5.72	1.71	0.11	23325
	2015-16	80.18	12.63	5.51	1.58	0.1	23822
							[2.13]

Source: Compiled from Statistical Diary 2018-19, UPDES. Figures in [] are percentage increase/decrease in 2015-16 over 2010-11.

2.1.3 Trends in Area, Production, and Yield of Principal Crops

2.1.3.1 The Trend in Cropping Patterns

Wheat, Bajra, and Maize dominate the district's agriculture. Table 6 shows the area devoted to various crops over the last eight years. In 2017-18, Wheat made up the highest share of GCA (36.17%), followed by Bajra (16.48%), Maize (14.48%), and Rice (6.41%), together these four crops constitute around 74% of the GCA. The area shared by the total cereals has decreased from 76.17% in 2010-11 to 74.72% in 2017-18. The main pulses produced are Masoor and Arhar, while the rest of the pulses are not significantly produced. The total pulse acreage has decreased from 2.24% in 2010-11 to 1.92% in 2017-18. Thus, the food grains cover a majority (average, 77.03%) of the GCA.

Mustard is the only major oilseed crop produced, and the total oilseed acreage has increased from 3.53% in 2010-11 to 3.61% in 2017-18. The area under Sugarcane has decreased over the years, but at the same time, the area under Potato has increased. There has not been any significant change in the cropping pattern during the study period. However, the NSA has decreased over the years, from 58.33% in 2010-11 to 52.98% in 2017-18. The average cropping intensity is 182.76.

Table 6: Trends in Cropping Pattern (as % GSA) and Cropping Intensity

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	6.40	6.50	6.29	6.42	6.48	6.42	6.41	6.41
Wheat	39.11	39.03	37.01	36.16	36.59	36.23	36.20	36.17
Bajara	15.56	14.69	15.83	16.32	16.67	16.51	16.49	16.48
Maize	13.80	13.36	14.01	14.63	14.85	14.71	14.69	14.68
Other Cereals	1.31	1.19	1.16	1.04	0.98	0.97	0.97	0.97
Total Cereals	76.17	74.77	74.30	74.57	75.59	74.84	74.78	74.72
Masoor	0.63	0.61	0.53	0.48	0.47	0.47	0.47	0.47
Arhar	0.58	0.66	0.59	0.62	0.53	0.53	0.53	0.53
Other Pulses	1.02	1.01	1.06	0.99	0.94	0.93	0.93	0.93
Total Pulses	2.24	2.29	2.18	2.10	1.94	1.93	1.92	1.92
Total Foodgrains	78.41	77.06	76.48	76.67	77.53	76.77	76.70	76.64
Mustard	3.23	3.30	3.92	3.71	3.28	3.25	3.25	3.24
Other Oilseeds	0.31	0.32	0.36	0.36	0.37	0.37	0.37	0.37
Total Oilseeds	3.53	3.63	4.28	4.07	3.65	3.62	3.61	3.61
Sugarcane	2.87	2.95	2.83	2.86	2.73	2.70	2.70	2.70
Potato	1.64	1.73	1.68	1.66	1.76	1.74	1.74	1.74
Net Sown Area	58.33	57.55	55.68	54.09	53.59	53.09	53.00	52.98
Gross Sown Area (in 1000 Ha)	245.95	245.40	255.67	264.61	267.84	270.50	270.75	270.96
Cropping Intensity	171.45	173.75	179.61	184.86	186.60	188.37	188.69	188.75

Source: http://updes.up.nic.in/spiderreports/intialisePage.action

2.1.3.2 Trends in per hectare yield of principal crops

Table 7 shows that the yield per hectare of most crops varies from year to year. However, the yield for most of the major crops has increased in the latter years of the study. This can be due to improved irrigation facilities and the availability of better infrastructure. Wheat, Rice, Bajra, and Maize are the major crops in the district, and their per hectare yield (38.29 qtls, 19.91qtls, 20.22 qtls, and 21.0 qtls, respectively, in 2017-18) are also high. Per hectare yield of total cereals has increased from 27.02 qtls in 2010-11 to 29.29 qtls in 2017-18. However, per hectare yield of total pulses decreased from 8.93 qtls in 2010-11 to 7.61 qtls in 2017-18.

The yield of total oilseeds has increased from 14.31 qtls in 2010-11 to 25.68 qtls in 2017-18. This can be due to the availability of hybrid seeds in the district. However, the rise in the yield of most of the

crops is not uniform; in some years, it has decreased as well, but on average, the yield has increased in the latter years of the study. The per hectare average yield of Sugarcane is 584.47. The yield of Potato is high, average, 257.90. In summary, all crop yields show year-over-year fluctuations. The lack of homogeneity of yields makes farmers' income riskier and more unstable, requiring a solid insurance protection measure.

Table 7: Trends in Per Hectare Yield of Principal Crops in Kanshiram District (Qtls)

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	21.11	26.22	27.28	22.35	23.88	19.67	21.70	19.90
Wheat	33.97	35.37	34.00	33.88	23.23	30.49	36.46	38.29
Bajara	19.09	27.63	28.76	31.23	33.28	25.09	21.62	20.22
Maize	18.74	26.39	27.78	27.97	31.20	25.67	24.22	21.00
Total Cereal	27.02	31.52	31.11	31.14	27.09	27.32	29.37	29.29
Masoor	12.55	19.33	14.10	24.04	6.33	7.27	10.30	12.29
Arhar	8.31	8.09	11.59	14.17	10.50	9.35	10.57	7.00
Total Pulses	8.93	11.01	10.53	12.61	7.41	11.47	8.38	7.61
Total Food Grains	26.50	30.91	30.52	30.63	26.60	26.92	28.84	28.74
Mustard	15.39	17.72	19.80	15.56	14.60	18.43	20.92	28.19
Total Oilseeds	14.31	16.41	18.42	14.42	13.43	17.05	19.68	25.68
Sugarcane	488.36	564.12	586.20	620.12	552.28	544.15	614.45	706.05
Potato	269.08	268.28	255.48	251.77	239.34	277.60	236.84	264.83

Source: http://updes.up.nic.in/spiderreports/intialisePage.action

2.1.3.3 Trends in Production of Principal Crops

Table 8 shows the trends in the production of the main crops over the years. Rice, Wheat, Bajra, Maize, and Potato dominate the production. In 2017-18, Rice (34.55 thousand tons), Wheat (375.27 thousand tons), Bajra (90.28 thousand tons), and Maize (83.53 thousand tons) formed a major part of the total cereal production (592.91 thousand tons). Coming to pulses, Masoor and Arhar occupied the highest production. Masoor had a production of 1.56 thousand tons, and Arhar had a production of 1.0 thousand tons in 2017-18. Although there has been a significant variation in the production of these pulses over the years, they still represent around 64% of the total pulse production. Pulses production in the district was quite low, indicating that pulses are not an important part of the district's agriculture.

Mustard production was 24.78 thousand tons, representing around 98% of the total oilseed production in 2017-18. Sugarcane does not have much presence in the district. Its production was only 515.84 thousand tons in 2017-18. Potato production has also been significant over the years (125 thousand tons in 2017-18). Looking at the annual production data of various crops, we find that their production has increased on average during the period, but at the same time fluctuates year to year, partly due to weather changes and partly due to market conditions. Proper insurance arrangements are the need of the hour to get assured income and take more risk and diversify their production.

Table 8: Trends in Production of Principal Crops in Kanshiram District (in 1000 Tons)

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	33.21	41.81	43.86	37.94	41.48	34.16	37.69	34.55
Wheat	326.71	338.73	321.68	324.14	227.70	298.78	357.34	375.27
Bajara	73.04	99.63	116.39	134.90	148.62	112.02	96.52	90.28
Maize	63.60	86.53	99.52	108.27	124.13	102.14	96.36	83.53
Other Cereals	9.53	11.64	9.46	9.17	6.56	5.90	6.65	9.28
Total Cereals	506.09	578.34	590.91	614.42	548.49	553.00	594.57	592.91
Masoor	1.95	2.92	1.91	3.08	0.80	0.92	1.30	1.56
Arhar	1.19	1.31	1.75	2.34	1.50	1.33	1.51	1.00
Other Pulses	1.78	1.96	2.21	1.59	1.56	3.72	1.55	1.41
Total Pulses	4.91	6.19	5.87	7.02	3.86	5.97	4.36	3.96
Total Foodgrains	511.00	584.53	596.79	621.44	552.35	558.98	598.93	596.87
Mustard	12.21	14.37	19.84	15.30	12.83	16.20	18.39	24.78
Other Oilseeds	0.22	0.23	0.31	0.25	0.30	0.48	0.86	0.33
Total Oilseeds	12.43	14.60	20.14	15.54	13.14	16.68	19.25	25.11
Sugarcane	345.22	409.04	423.94	468.50	403.50	397.55	448.92	515.84
Potato	108.55	113.97	109.55	110.35	112.97	131.03	111.79	125.00

Source: http://updes.up.nic.in/spiderreports/intialisePage.action

2.1.3.4 Variability assessment in the area, production, and yield

To understand the variability across the years (Table 9), we calculated the mean, standard deviation (SD), and coefficient of variation (COV) of the area, production, and yield of the main crops. Among different crops, the lowest variability in the area is observed in Wheat (1.43%), followed by Sugarcane (1.83%) and Rice (4.34%), and the highest in Masoor (8.87%). The variability in the area under total pulses (3.6%) is less than the variability in the area under total cereals (4.03%). Since Bajra and Maize dominate the production, the variability in the area under total food grains is influenced by these crops.

Table 9: Variability in Area, Production, and Yield of Principal Crops (2010-11 to 2017-18)

	Area (1000 Ha)			Production (1000 Ha)			Yield (Qtl./Ha)		
Crop/Year	Average	SD	COV	Average	SD	COV	Average	SD	COV
Rice	16.78	0.73	4.34	38.09	3.97	10.43	22.76	2.81	12.37
Wheat	96.79	1.38	1.43	321.29	44.43	13.83	33.21	4.62	13.92
Bajara	42.07	3.41	8.09	108.93	24.47	22.46	25.87	5.24	20.24
Maize	37.55	2.93	7.80	95.51	18.07	18.92	25.37	4.00	15.77

Total Cereal	195.99	7.90	4.03	572.34	34.64	6.05	29.23	1.91	6.54
Masoor	1.35	0.12	8.87	1.81	0.85	46.82	13.28	5.95	44.81
Arhar	1.49	0.10	6.40	1.49	0.41	27.60	9.95	2.28	22.93
Total Pulses	5.39	0.19	3.60	5.27	1.16	21.99	9.74	1.93	19.76
Total Food Grains	201.37	7.73	3.84	577.61	35.02	6.06	28.71	1.87	6.50
Mustard	8.88	0.73	8.22	16.74	4.15	24.82	18.83	4.39	23.31
Total Oilseeds	9.80	0.78	8.00	17.11	4.22	24.65	17.43	3.97	22.76
Sugarcane	7.29	0.13	1.83	426.56	51.45	12.06	584.47	64.66	11.06
Potato	4.48	0.28	6.14	115.40	8.14	7.06	257.90	14.64	5.68
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

The variability of production depends on the variability of the cultivated area and the variability of the yield. Therefore, the variability in the production of different crops is greater than in the cultivated area of all crops. The highest variability in production is observed in masoor (46.82%), followed by Arhar (27.60%), mustard (24.82%), bajara (22.46%), and Maize (18.92%). High variation in the production of pulses and oilseeds is partly due to variation in the land area under them and partly due to the high rate of seeds and non-availability of hybrid seeds. Improvement in crop insurance conditions and better market accessibility can lower this variation. Variability is lowest in Potato (7.06%), followed by Rice (10.43%) and Sugarcane (12.06%).

In the case of yield, the greatest variability is estimated in masoor (44.81%), mustard (23.31%), and Arhar (22.93%). Yield variability in total cereals (6.54%) and total food grains (6.5%) is lower as compared to that in total pulses (19.76%). Potato, Rice, and Sugarcane are the most consistent crops over the years. Several factors such as climate change, market prices, rainfall patterns, etc., influence the variability in agricultural production.

2.1.4 Trends in Value of Production of Major Crops

Table 10 compares the share of the main crops in the total GCA and their share in the total value of agricultural output (VOP). It is significant to note that total cereals and total foodgrains, on average, have a relatively larger share in GCA than their share in VOP, while total oilseeds, Potato, and Sugarcane have, on average, a greater share in VOP than GCA. Kanshiram is mainly a food grain producing district; therefore, food grains account for around 77.03% of the gross area of the crops. Similarly, total foodgrains account for nearly 68.08% of the total value of the agricultural product. Three crops - Wheat, Rice, and Potato together accounted for, on average, around 45.19% of GCA and 53.56% of the total VOP. Overall, the total agricultural GCA has increased in the latter years of the study (average, 261.46 thousand hectares). The total value of the product has also increased significantly, that is, Rs.727.55 Cr. in 2010-11 to Rs. 1332.5 Cr. in 2017-18.

Table 10: Share of Principal Crops Total GCA and Total Value of Agriculture Products in Kanshiram

Crop	% Share in	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Wheat	GCA	39.11	39.03	37.01	36.16	36.59	36.23	36.20	36.17
	VOP	50.79	41.34	31.99	34.07	26.36	30.42	46.77	47.31
Paddy	GCA	6.40	6.50	6.29	6.42	6.48	6.42	6.41	6.41
	VOP	7.10	8.25	6.82	5.11	7.85	5.61	6.68	5.70
Total Cereals	GCA	76.17	74.77	74.30	74.57	75.59	74.84	74.78	74.72
	VOP	75.22	70.63	58.50	61.82	60.45	54.84	70.78	69.02
Total Pulses	GCA	2.24	2.29	2.18	2.10	1.94	1.93	1.92	1.92
	VOP	2.75	4.02	1.84	4.89	2.50	2.76	2.44	2.17
Total Food Grains	GCA	78.41	77.06	76.48	76.67	77.53	76.77	76.70	76.64
	VOP	77.97	74.65	60.34	66.72	62.95	57.60	73.22	71.19
Total Oilseeds	GCA	3.53	3.63	4.28	4.07	3.65	3.62	3.61	3.61
	VOP	4.09	4.72	5.07	3.32	4.04	3.42	4.87	5.90
Potato	GCA	1.64	1.73	1.68	1.66	1.76	1.74	1.74	1.74
	VOP	5.98	9.21	13.53	6.60	9.31	10.63	4.50	6.57
Sugarcane	GCA	2.87	2.95	2.83	2.86	2.73	2.70	2.70	2.70
	VOP	6.74	6.78	6.59	10.02	11.88	6.97	11.39	12.19
Paddy + wheat + potato	GCA	47.14	47.26	44.97	44.23	44.84	44.40	44.36	44.32
	VOP	63.87	58.80	52.35	45.77	43.52	46.66	57.95	59.58
Total Agriculture	GCA (1000 Ha)	245.95	245.40	255.67	264.61	267.84	270.50	270.75	270.96
	VOP (in Cr Rs)	727.55	875.06	1158.41	1402.55	1274.00	1653.22	1241.66	1332.50
Per Worker VOP (Rs.1000 at current prices) in **Kanshiram**		-	60.51	99.80	146.19	156.44	151.68	134.07	83.64
Per Worker VOP (Rs.1000 at current prices) in **UP**		-	40.66	48.69	52.50	52.11	56.48	61.97	69.69

Source: http://updes.up.nic.in/spiderreports/intialisePage.action
And District-wise Indicator reports

Table 10 shows that the total value of agricultural produce per agricultural worker in Kanshiram district increased from Rs. 60.51 thousand in 2011-12 to Rs. 83.64 thousand rupees in 2017-18, a net increase of 38.24% at current prices, while in UP it increases from Rs. 40.66 thousand to Rs.69.69 thousand, a net increase of 71.40%. Thus, the per worker value of agricultural output is much higher in the district than in the state. The rate of growth per worker value of output in the district is less than in the state. The ratio of per worker value of the output of the district to the state average has decreased from 1.4882 in 2011-12 to 1.2002 in 2017-18.

2.1.5 Consumption of Chemical Fertilizers

Table 11 shows the trends in the use of chemical fertilizers in agriculture. The recommended nitrogen to phosphorus and potassium ratio is 4:2:1, which is not maintained in the district. For example, in 2010-11, nitrogen represented 70.52% of the total fertilizers used, while the proportions of phosphorus and potassium were 23.82% and 5.67%, respectively. In 2017-18, however, the nitrogen share decreased to 68.49%, while the phosphorus share increased to 27.71%, and the potassium share decreased to 3.79%. The use of nitrogen is more than the recommended ratio, while the Phosphorous and potassium ratio is less than the recommended ratio. The table also shows that fertilizer consumption varies from year to year, which can be due to several factors, including rainfall patterns, cultivation patterns, etc. The overall use of chemical fertilizers has increased in the district from 180.63 kg/ ha GCA in 2010-11 to 224.43 kg/ ha GCA in 2016-17, which is not a good sign. The authorities need to take steps to reduce their consumption as the chemicalization of agriculture degrades soils and water resources and increase non-point sources of pollution in the waterbodies. There is a need to increase the use of organic fertilizers and biofertilizers in agriculture.

Table 11: Trends in Use of Chemical Fertilizers in Agriculture (Kgs/per ha GSA)

Fertilizer/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Nitrogen	127.37	115.22	101.74	166.53	171.02	170.83	154.07	80.06
Phosphorous	43.02	42.16	47.77	37.43	47.64	63.66	56.99	32.39
Potassium	10.23	5.97	3.44	5.37	9.28	10.70	13.36	4.43
Total	180.63	163.35	152.95	209.33	227.93	245.18	224.43	116.88
Gross Sown Area (Ha)	245948	245396	255672	264608	267838	270499	270745	270962

Source: http://updes.up.nic.in/spiderreports/intialisePage.action

2.1.6 Irrigation Structure and Status

2.1.6.1 Types of Irrigation systems

The types of irrigation systems and the percentage of the net and gross irrigated area to the net and gross cropped area, respectively, are described in table 12. The length of the canal has remained constant (489 kms) over the years. Government tube wells increased from 339 in 2010-11 to 390 in 2018-19. Medium tube wells increased by 642.42% in 2018-19 compared to 2010-11. The district's percentage of the net and gross irrigated areas have increased over the years with an average of 97.62% and 84.50%, respectively.

Table 12: Types of Irrigation Systems and percentage of the net and gross Irrigated Area

Name/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Length of Canal (KM)	489	489	489	489	489	489	489	489	489
No. of Govt. Tube wells	339	339	339	339	369	377	390	390	390
Medium Tube well	33	33	91	125	161	174	200	223	245
% Of NIA	88.51	98.63	99.04	98.98	99.05	99.01	98.92	98.80	-

% Of GIA	84.96	84.73	83.45	82.75	84.52	85.29	85.14	85.12	-
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

2.1.6.2 Source-wise area under irrigation

Canals and groundwater (GW) are the main irrigation sources in the district. The canal's share in the NIA (average, 8.99%) has increased over the years, and the share of wells and tube wells in NIA (average, 72.06%) has increased over the years. It shows the increased dependency of the district on the groundwater for irrigation purposes, and it can have serious environmental issues if such a pattern continues in the long run.

Table 13: Source-wise Area under Irrigation in Kanshiram (in %)

Source/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Canal (surface Irri.)	8.04	7.99	8.89	9.06	9.28	9.52	9.57	9.57
Wells And Tube-wells (GW Irri.)	65.64	68.72	54.83	55.97	61.18	90.13	90.09	89.93
Others	26.31	23.29	36.28	34.97	29.54	0.34	0.34	0.50
NIA (1000 ha)	126.97	139.30	140.98	141.68	142.17	142.18	141.94	141.83
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

2.1.6.3 Crop-wise Irrigated Area

Table 14 shows that majority areas under Rice (average, 98.95%), Wheat (average, 100%), Potato (average, 100%), and Sugarcane (average, 98.13%) are irrigated. Percentages of the irrigated area under pulses (average, 84.55%) and oilseeds (average, 95.29%) are relatively less.

Table 14: Trends in Crop-wise Irrigated Area in Kanshiram (as % of the cropped area)

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	94.67	98.33	99.28	99.31	100	100	100	100
Wheat	100	100	100	100	100	100	100	100
Total Cereal	81.75	81.38	79.38	78.54	80.96	80.96	80.96	80.96
Total Pulses	87.26	89.28	81.93	82.39	83.89	83.89	83.89	83.89
Total Foodgrains	81.91	81.62	79.45	78.64	81.03	81.03	81.03	81.03
Total Oilseeds	95.72	93.40	95.15	95.95	95.52	95.52	95.52	95.52
Sugarcane	97.30	93.55	98.71	98.74	99.18	99.18	99.18	99.18
Potato	100	100	100	100	100	100	100	100
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

2.1.7 Electricity consumption in Agriculture

Electricity is one of the main energy sources used in agriculture. Table 15 shows that per capita electricity consumption in agriculture has increased significantly from 109.76 KWH in 2014-15 to 232.45 KWH in 2019-20, a net increase of approximately 111.78%. It is a cause of concern that results in an increased burden on non-renewable resources and creates waste disposal problems. The percentage share of the agriculture sector (average, 34.26%) in the total electricity consumption in the district is quite significant. It indicates the heavy usage of electricity by agricultural farmers. Since electricity consumption has increased over the years, the authorities need to switch to more sustainable modes of electricity production, such as solar panels.

Table 15: Trends of Electricity consumption in Agriculture

Division/ Year	2014 -15	2015 -16	2016 -17	2017 -18	2018 -19	2019 -20
Per Capita electricity consumption (KWH)	109.76	113.45	162.41	184.41	199.25	232.45
% Of electricity consumed in Agriculture sector to total consumption	40.83	39.8	31.88	30.7	30.7	31.7

Source: District-wise Development Indicators file.

2.1.8 Status of Agriculture Market

Table 16 shows the marketing infrastructure in the district. It has two main markets and seven sub-markets. The number of regulated mandis per lakh hectare of NSA has increased from 6.29 in 2013-14 to 6.96 in 2018-19, which is good, but the increase in the number of regulated mandis is not uniform. It is very important to increase the number of regulated mandis so that farmers are able to sell their products efficiently.

Table 16: Status of Agriculture Markets in Kanshiram

Category/Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Main Markets (No.)	2	2	2	2	2	2	2
Submarkets (No.)	7	7	7	7	7	7	7
Total Markets (No.)	9	9	9	9	9	9	9
No. of Regulated mandis per lakh Ha. of net area sown	6.29	4.6	-	1.39	1.39	6.96	-

Source: District-wise Development Indicators file and District-wise Statistical Report

2.1.9 Status of Organic Farming

To promote sustainable agricultural practices and improve the farmers' livelihood, the Government of India launched PKVY and Namami Gange schemes. Under these schemes, farmers are incentivized to form groups to do organic farming and sell their products with PGS certification. Under the programme,

the beneficiary farmers get Rs.12000, Rs. 10000 and Rs.9000 per hectare, respectively, in the first, second and third years of the conversion period.

The transition period for the full conversion from conventional to organic is considered three years. During this period, crop yield, on average, is expected to decline by 10—15 percent. But after three years, it may reach its original level. Financial assistance received by the beneficiary farmers seems to be adequate to compensate for the yield losses and motivate them to do organic farming. There is a need to set up an integrated processing unit for organic products. Monitoring of the project should be periodically done through MIS, Geo-tagging, and monthly physical and financial reports.

However, the policy-related issue is what would be after the three years? Will the government protect their income? There may be a possibility that in the absence of the regulatory framework, the beneficiary farmers may revert to conventional farming. In this context, two things need to be thought of—a well-designed regulatory and monitoring framework and introduction of payments for ecosystem services for the organic farmers after the transition period to carry on the activity on a sustainable basis. Organic and zero-budget farming will provide ecological services in terms of soil health, human and animal health, saving of water, protection bio-diversity, etc. To sustain the organic farming initiative, a long-term system of payments for ecological services may be evolved to retain the existing farmers and motivate others to move towards this sustainable farming system. There is no assured market for these products, and farmers do not get premium prices. They sell their products at the same prices their conventional counterparts do. Certification and quality check and monitoring mechanisms are yet to be set up.

Table 17 shows the details of the establishment of organic clusters under the Paramparagat Krishi Vikas Yojana in the district. The district has 82 groups in three development blocks. The highest number of groups are in Ganj Dundwara (55) followed by Soron (19) and Sahawar (8). Significantly high variation can be seen in the number of farmers per group in the district. It is reported that the maximum limit of land under a cluster per farmer is 2.00 hectares. Hence, the majority of the beneficiary farmers are small and marginal. No organic cluster under the Namami Gange scheme is reported till date.

Table 17: Status of Organic Farming PGS Groups under PKVY and Namami Gange Schemes in Kanshiram (as on June 30, 2021)

S. No.	Block	Scheme	No. of groups	No. of farmers in groups			
				Total	Average	Median	SD
1	Ganj Dundwara	PKVY	55	1482	26.94	26	5.49
2	Sahawar	PKVY	8	243	30.37	31.5	3.73
3	Soron	PKVY	19	700	36.84	37	6.62
4	District Total	PKVY	82	2425	29.57	29.5	6.94
		Total	82	2425	29.57	29.5	6.94

Source: https://pgsindia-ncof.gov.in/LGList.aspx

A gradual shift of farmers from conventional to the organic farming system is likely to positively impact water quality and soil health along with farming sustainability. However, being a knowledge-

intensive system of farming, farmers need proper training to know the practical details of the integrated sustainable farming system. Since economies of scale in both production and marketing matter in organic farming, some institutional framework may be needed in the forms of SHGs/ farm cooperative/PFOs/contract farming, etc. Organic farming could be an economically viable option in the district if the government builds strong marketing networks linking farmers, processors, and distributors with the easy certification process and minimizes farmers' risk by protecting their farm income through payments of ecosystem services. A long-term system of incentive and regulation needs to be evolved to retain the existing farmers and motivate others to move towards the sustainable farming system in the district.

The major problem for the growth of organic farming observed are:

1. The major problem of the farmers was poor marketing of the organic products and not being able to fetch a premium.
2. Scaling up organic production is another problem. The problem of marketing is even more serious in the case of perishable vegetable crops. Contract farming companies and Farmer Producers' companies can be encouraged.
3. Farmers generall practice organic farming only on a small part of their land (less than one ha) to get the scheme's benefit.
4. Although organic farming clusters are formed, the farmers allocated a part of their lands to organic farming and practiced conventional farming in the rest of the area, which may contaminate the organic produce and fail the purpose of the cluster approach in organic farming.
5. The knowledge and awareness level regarding practices under organic farming was inadequate among farmers.

2.1.10 Livestock Sector

2.1.10.1 Trends in Livestock Population

Livestock forms an integrated part of the rural economy. From Table 18, we can infer that the number of indigenous male and female cattle has decreased considerably from 150212 in 1997 to 17341 in 2019 and from 64612 in 1997 to 45572 in 2019, respectively. Similarly, the number of exotic male cattle has decreased considerably from 3655 in 1997 to 2330 in 2019, but the number of exotic female cattle has increased from 4005 in 1997 to 14423 in 2019. Thus, the total number of cattle decreased from 222484 in 1997 to 79666 in 2019, thus, a net decrease of 64.19%. Similar inferences can be drawn from the buffalo data as the number of male buffalo decreased, but the number of female buffalo increased; thus, a net increase of 22.87% in 2019 as compared to that in 1997 is observed in the total population of buffalo. A significant reduction in the population of indigenous sheep is observed (57.99%) in 2019 as compared to that in 1997, and during the same period, the population of exotic sheep also decreased, thus, indicating a decrease in the total sheep population by 57.62%. The total population of goats decreased from 205028 in 1997 to 84550 in 2019, a net decrease of 58.76%. The total pig population decreased considerably from 40811 in 1997 to 2045 in 2019.

It is significant to note that the number of female buffaloes has substantially increased over the period, indicating the growth of livestock products, including milk. The substantial decline in the number of male cattle and male buffaloes also shows the rising farm mechanization and declining relevance of animal power, mainly because of the high maintenance cost of livestock. The livestock subsector has around 28.33% share in the agriculture and allied activities sector and grew at a significant average annual growth rate of 6.54% from 2011-12 to 2018-19.

Table 18: Trends in Livestock population (in numbers) in Kanshiram

	Category	1997	2003	2007	2012	2019
Indigenous Cattle	Total Male	150212	100831	37636	36778	17341
	Total Female	64612	66724	42417	50990	45572
	Total	214824	167555	80053	87768	62913
Exotic Cattle	Total Male	3655	5393	589	5816	2330
	Total Female	4005	8506	1025	4265	14423
	Total	7660	13899	1614	10081	16753
Total Cattle		222484	181454	81667	97849	79666
Buffalo	Total Male	121657	173377	76441	201736	24629
	Total Female	307824	509924	198411	590954	503080
	Total	429481	683301	274852	792690	527709
Sheep	Total Indigenous Sheep	13087	7591	12318	6969	5497
	Total Exotic Sheep	198	752	33	472	132
	Total Sheep	13285	8343	12351	7441	5629
Goat	Total	205028	274942	182723	184495	84550
Pig	Total Indigenous Pig	32388	27875	8523	9744	1913
	Total Exotic Pig	8423	4243	528	544	132
	Total Pig	40811	32118	9051	10288	2045
Total Livestock		926792	1191494	561893	1096844	-
Total Poultry		102156	77629	58516	78301	-

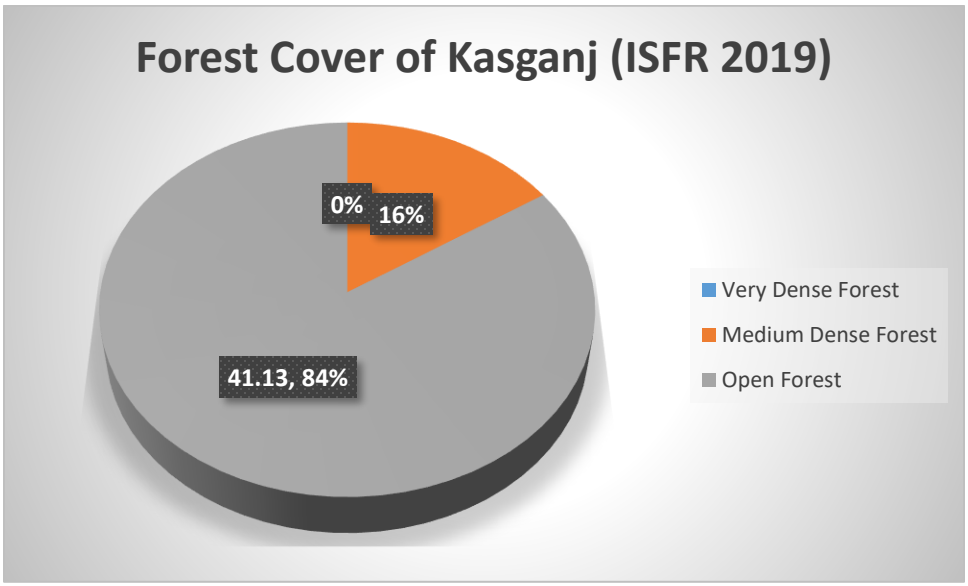
Source: http://updes.up.nic.in/spiderreports/intialisePage.action
And http://dahd.nic.in/animal-husbandry-statistics

2.1.10.2 Cattle Care Centre

Table 19 shows that the Kanshiram district has an active network of cattle hospitals and development centres which are very necessary for the livestock sub-sector to grow. The number of cattle hospitals has increased from 10 in 2010-11 to 16 in 2018-19. The number of cattle development centres has increased from 22 in 2010-11 to 24 in 2018-19. The number of man-made reproduction centres increased from 16 in 2010-11 to 39 in 2018-19. There are very few sheep and pig development centres which might be one reason for the declining sheep and pig population in the district.

Table 19: Year-wise number of Cattle Hospitals and Development Centers									
Category	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Cattle Hospital	10	10	10	10	16	16	16	16	16
D- category Cattle Dispensary	1	1	1	1	1	1	1	1	1
Cattle Development Centre	22	22	22	22	24	24	24	24	24
Man-Made Reproduction Centre	16	16	16	16	16	16	39	39	39
Pig Development Center	8	8	8	8	6	6	6	6	6
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

2.2 FORESTRY



According to FSI report 2019, Kasganj has 48.8 Sq. Km. of forest, of which 84% is open forest and the remaining 16 % is medium dense forest. The forest cover has decreased significantly from the previous assessment.

2.2.1 Biodiversity

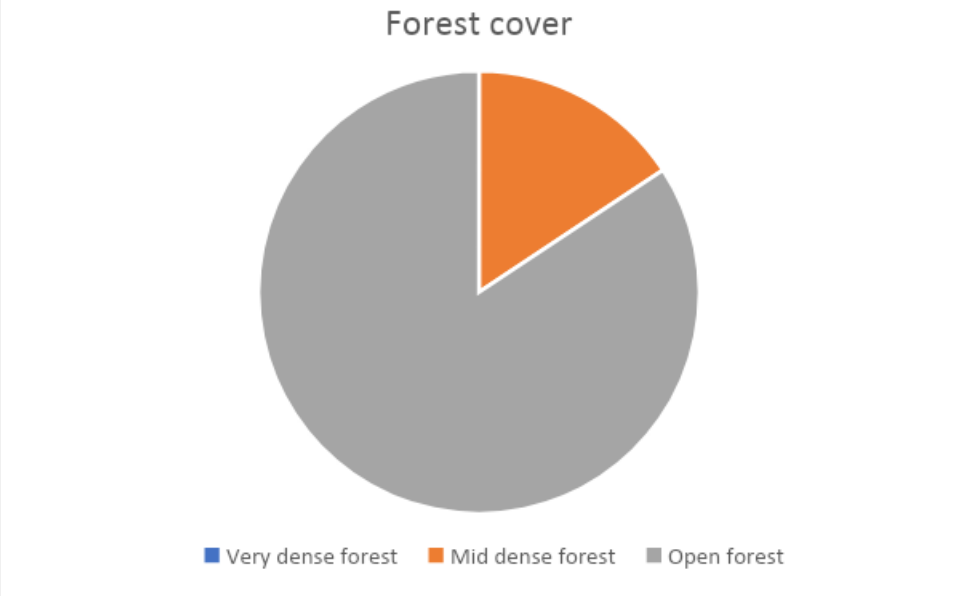
The district's biodiversity data includes various crop production, livestock population, bird species, and forest cover. The crop production trend shows an increase in crop production. Forest data shows that forest cover was decreased by 19.20 % in 2019. There are 331 bird species and forty threatened/rare species of bird in the district.

Table 1 Bird species recorded in the district.

Number of species	331
Number of rare/accidental species	40

Table 2 Forest cover in a square kilometer.

Geographical area	Very dense forest	Mid dense forest	Open forest	Total	% of Geographical area `	Change with respect to 2017 assessment	Scrub
1955	0	7.67	41.13	48.80	2.50	-19.20	0



2.3 TOURISM

Baseline data/Quantitative Data
Total number of tourists visiting Ghazipur -(2015-2019)

1. **Domestic/foreign visitors in different years in Kanshiram/Kasganj.**

Kanshiram/Kasganj			
	Domestic tourist	**International tourist**	**% change in domestic tourists**
2013	no data	no data	
2014	no data	no data	
2015	no data	no data	

2016	5250000	12580	
2017	5040000	13500	-4.00%
2018	5080265	13620	0.80%
2019	5256730	15266	3.47%
2020	1470611	0	-72.02%

Table-1; Source: Dept. of Tourism, Uttar Pradesh Government

a. The above given data has been taken from the official website of UP tourism.
b. The data shows the tourist visits in different years from 2016 to 2020, and the data is bifurcated in domestic and international tourists.
c. The number of tourists in the 2016 is significant in domestic tourist section as well as international tourist section
d. In the year 2017 the district experiences a drop of 4% in the number of domestic tourists.
e. In the year 2018 number of tourists rises to 0.8% compared to previous year data.
f. In the year 2019 the number of domestic tourists increased 3.47%.
g. In the year 2020, dur to the pandemic the number of domestic tourists decreased by 72.02%, when compared to previous year data.

2. Domestic and foreign visitors in different years in Uttar Pradesh

The Indian and Foreign Tourist visits in Uttar Pradesh from 2016 to 2020						
Year	**Indian**	**Foreigner**	**Total**	**Percentage increase/ reduce in comparison to previous year**		
				Indian (%)	**Foreigner (%)**	**Total**
2016	**213544204**	**3156812**	**216701016**	**3.4**	**1.69**	**3.37**
2017	**233977619**	**3556204**	**237533823**	**9.56**	**12.65**	**9.61**
2018	**285079848**	**3780752**	**288860600**	**21.84**	**6.31**	**21.6**
2019	**535855162**	**4745181**	**540600343**	**87.96**	**25.5**	**87.14**
2020	**86122293**	**890931**	**87013224**	**-83.92**	**81.92**	**-83.9**

Table-2; Source: Dept. of Tourism, Uttar Pradesh Government

a. The above-given graph shows the number of visitors who visited Uttar Pradesh from 2016 to 2020. In the year 2016 number of domestic tourists increased to 3.4% compared to 2015, and foreign tourists increased to 1.69%. In the year 2017, the growth rate increased to 9.56% in domestic tourists and 12.65% in foreign tourists.

b. Data shows that 2018 had been a fruitful year for Uttar Pradesh tourism. Uttar Pradesh encountered a 21.6% increase in tourist numbers from the previous year, a significant change in numbers. However, the patten is not similar in Kanpur

c. 2019 was a year when the global event Kumbh Mela 2019 was organized in Prayagraj (a District in Uttar Pradesh). The results are visible in the numbers (given in the data table above), 87.14% increase in the number of tourists compared to 2018. The data also shows foreign visitors increased to 25% in 2019. The enhanced response of tourists shows the consumer behaviour, which majorly depends on advertisements. A commodity that has been presented to be associate with the emotions of consumers has a high potential to sustain and perform better than its competitors.

d. The surge in the number of tourists in Kumbh Mela 2019 is attributed to expensive advertisements, extra-standard facilities, and a political campaign. All this together made the event a mega event. Security aspect in such organization is a significant factor which influences the success and failure. Kumbh Mela 2019 witnessed extra tight security and surveillance to prevent stampedes and violence in the Mela.

e. Such grand organization of events are also a factor on which the number of tourists to other districts (especially domestic tourists) and states (especially foreigner tourists) depend.

f. The scenario of foreign tourists is worse compared to state data. Even the mega event Kumbh mela could not increase the number of foreign tourists in Kanpur. This signifies the lack of transfer of information.

g. The district witnessed the increased growth in number of domestic tourists but not in foreign tourists. It is necessary to understand the shortfalls before working on upcoming policies and agendas.

3. Budget allotted/ Expenditure in different years by tourism dept.

Budget -Department of Tourism, in Different Years		
Year	**Budget in Rupees**	**Percent increase or decrease**
2015-16	**2,245,098,000.00**	
2016-17	**1,992,912,000.00**	**-11.23%**
2017-18	**2,671,016,000.00**	**34.03%**
2018-19	**6,870,209,000.00**	**157.21%**
2019-20	**8,596,205,000.00**	**25.12%**
2020-21	**10,382,037,000.00**	**20.77%**
2021-22	**10,759,153,000.00**	**3.63%**

Table-3; Source: Dept. of Tourism, Uttar Pradesh Government

The above-given table shows the budget sanctioned for the Department of Tourism, Uttar Pradesh, from the Financial Year (FY) 2015-16 to 2021-22. In the initial FYs, which are 2015-16, 2016-17, 2017-18, the amount sanctioned to the department is significantly low. In the FY 2018-19 Department received a

157.21% increased budget. Which followed a 25% increase in the next FY-2019-20. A similar trend is visible in the number of tourists, skyrocketing of tourists is found in the same years. This directly implies that the money spent is directly proportional to the tourists in particular FY.

2.4 WETLANDS

The district has a vast number of small wetlands; most of them are riverine and waterlogged. Table 1 represents the number of wetlands and their area representation in the district.

Table 1: Wetland Data of Kanshiram nagar district

Wetland Types	Total Number of Wetlands:			Area (ha)									Aquatic Vegetation
Natural Wetlands	**NRCD**	**NWIA**	**Diff.**	**<2.25**	**<5**	**<10**	**<20**	**<50**	**<200**	**<500**	**<1000**	**>1000**	
Lake/ponds	0	6	6	0	0	0	0	0	0	0	0	0	0
Ox-bow lakes/cut off meanders	0	15	15	0	0	0	0	0	0	0	0	0	0
High altitude Wetlands	0	0	0	0	0	0	0	0	0	0	0	0	0
Riverine Wetlands	0	68	68	0	0	0	0	0	0	0	0	0	0
Waterlogged	0	31	31	0	0	0	0	0	0	0	0	0	0
River/Stream	0	65	65	0	0	0	0	0	0	0	0	0	0
Man-made Wetlands	**NRCD**	**NWIA**	**Diff.**	**<2.25**	**<5**	**<10**	**<20**	**<50**	**<200**	**<500**	**<1000**	**>1000**	**AV**
Reservoirs/Barrages	0	0	0	0	0	0	0	0	0	0	0	0	0
Tanks/ponds	0	20	20	0	0	0	0	0	0	0	0	0	0
Waterlogged	0	10	10	0	0	0	0	0	0	0	0	0	0
Salt pans	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (674)	**0**	**215**	**215**	**459**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: National River Conservation Directorate (NRCD), National Wetland Inventory and Assessment (NWIA) Atlas

2.5 ENERGY

2.5.1. Solar

The Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) is the nodal agency which looks after the growth and expansion of renewable energy in the state. UPNEDA takes efforts to develop the capacity in renewable energy sources such as solar energy, small-scale hydro-electricity and biomass-based electricity production in the state.

According to the 2011 census, 77.42% households in the district depend on kerosene for the main source of lightning, followed by 21.31% using electricity and only 0.37% using solar.

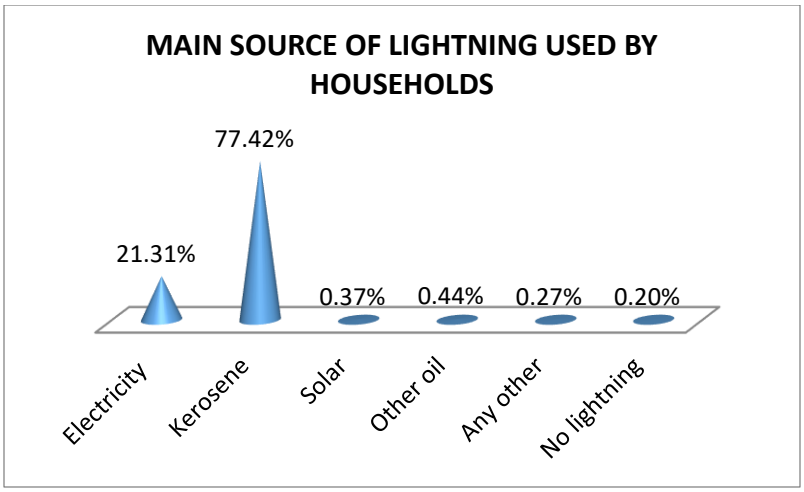


Fig. 1

No substantial data related to installations of solar energy units has been recorded from the available resources.

2.5.2. Biomass

The Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) is the nodal agency which looks after the growth and expansion of renewable energy in the state. UPNEDA takes efforts to develop the capacity in renewable energy sources such as solar energy, small-scale hydro-electricity and biomass-based electricity production in the state.

According to the 2011 census, 47% households use firewood as the main cooking fuel, followed by 29% using cow dung cakes and 12% using crop residue and the other 12%using LPG/PNG as depicted in Fig. 1. Majority of population in the district is mainly dependent on agriculture as their primary occupation. Rice, wheat, sugarcane maize, etc. are some of the major crops and enterprises engaged in agriculture.

The net sown area of the district is 141200 ha with the cropping intensity of 149%. The area sown more than once a year covers 104200 ha land. The district has a 2057 ha of forest land. A total of 10506 ha of cultivable wasteland is there in the district, with 6609 ha of current fallows.

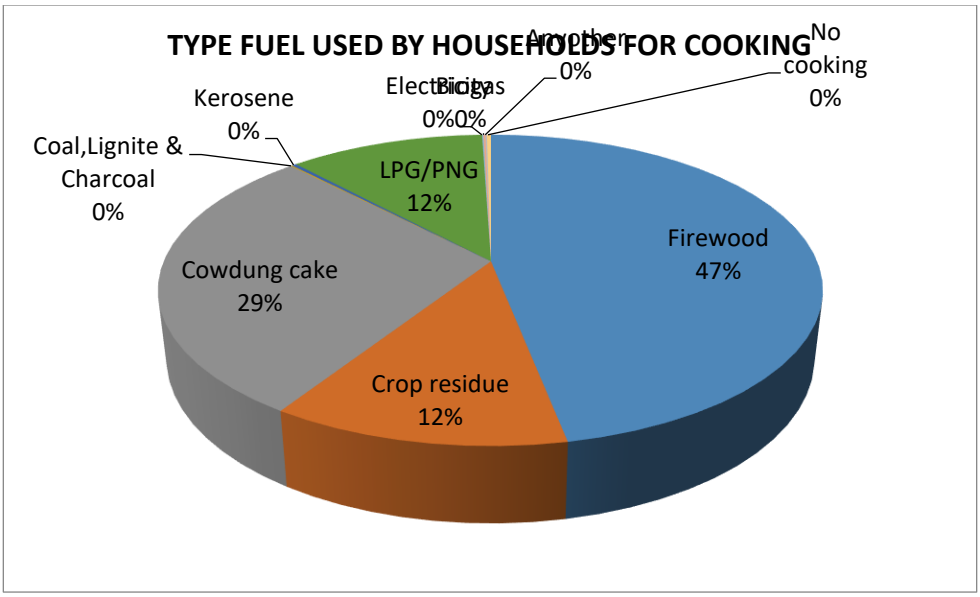


Fig. 1

Table.1 gives an account of productivity of some of the major crops in the district. The productivity of the crops appears to be good consequently a good amount of crop residue would be produced.

CROP	PRODUCTIVITY (kg/ha)
Rice	2243
Wheat	3304
Maize	2168
Bajra	2114
Rapeseed mustard	1608
Sugarcane	51374

Table 1

2.5.3. Biogas

Biogas data is not available for the district. Based on the livestock population and agricultural waste biogas potential calculated. Biogas potential from animal waste and agricultural waste was calculated approximately as one crore m^3/year and thirty-three crores m^3/year. This amount of biogas generation can efficiently complete the energy demand of the district.

2.5.4. Hydro Power

No hydropower plant exists, nor the site has been identified in the district. The Ganges River lowlands, which define the district's southern boundary, are home to this district. The primary rivers are the Ganges, Varuna, and Morva. A survey or identification of the site must require for the construction of hydropower plants.

3 QUALITATIVE DATA ANALYSIS

3.1 FORESTRY

The use of timber in house construction, furniture and agricultural implements etc. is around 61.38 million cum. By using alternatives we can reduce this which in turn will result in reduction in tree felling. In the context of State of Uttar Pradesh 10.495 million people are using fuel wood from forests. Taking an average family size of 5 persons per family it can be concluded that 2.1 million families are directly dependent on forests for fuel wood. By giving them alternative sources of energy it will be possible to reduce Carbon dioxide to the tune of 2.1 million tonnes annually.[3]

To increase forest resources in the country, Ministry of Environment, Forest and Climate Change is implementing a number of Schemes under which financial assistance is provided to State/UT Governments. Some of major schemes of the Ministry are National Afforestation Programme (NAP) and Green India Mission (GIM), Integrated Development of Wildlife Habitat (IDWH), Intensification of Forest Management Scheme (IFMS), Project Tiger and Project Elephant including funds under Compensatory Afforestation Fund Management and Planning Authority (CAMPA).[4]

3.1.1. Biodiversity

Kasganj lost 61ha of tree cover and 21.5kt of CO_2e emissions between 2001 and 2021, a 22 percent decline in tree cover since 2000. Kasganj added 2 ha of tree cover in the region from 2001 to 2012, accounting for 0.1 percent of the tree cover growth in Uttar Pradesh. The main fire season in Kasganj usually starts in early January and lasts for around 23 weeks. There were no VIIRS fire alarms recorded between June 14th and June 6th, 2022, when only high confidence alerts were considered. When compared to recent years, dating back to 2012, this is typical. Kasganj received a total of 116 VIIRS Alarms fire alerts between June 10th and June 6th, 2022.

3.2 ENERGY:

As per the data of the year 2013, Kasganj district energy consumption is around 275 TJ/year and 2.9 GJ/capita/year. GHG emission of 19,905 Ton CO_2 equivalent and 0.210 Ton CO_2 equivalent/capita has been evaluated for the district.

3.2.1. Solar

The district has witnessed not much development in the solar energy sector. There are no substantial records giving information about the solar energy sector in the district. The district is mainly dependent on agriculture for its income along with other farm activities for its income. So to improve the livelihood of the people of the district it becomes important to provide them with uninterrupted power supply at low

[3] State Action on Climate Change, Uttar Pradesh

[4] https://pib.gov.in/newsite/PrintRelease.aspx?relid=148508

costs. According to Pugazenthi et. al. 2016, total solar power potential available in the district Kanshiram Nagar is 0.0643. If the solar energy potential in the district is utilized wisely, then the district can flourish.

3.2.2. Biomass

The district largely depends on agriculture for its income. Along with the useful agricultural products, there is also production of agricultural waste in large amounts. This stubble produced is mostly burnt which causes pollution especially 'parali' from the rice. There have been several articles stating the problem of stubble burning in the district. A national daily mentions- The state government has issued notices to the superintendents of police (SP) of 26 districts over their failure to check the burning of stubble in the respective districts. The districts include Shamli, Meerut, Bulandshahr, Gautam Buddha Nagar, Baghpat, Hapur, Agra, Firozabad, Hathras, Kanshi Ram Nagar, Badaun, Moradabad, Jyotiba Phule Nagar, Sambhal, Kanpur Dehat, Farrukhabad, Kannauj, Lalitpur, Banda, Hamirpur, Mahoba, Chitrakoot, Bhadohi, Amethi, Jalaun and Rampur.
To overcome the problem of biomass burning and to increase the job opportunities for the people in the district biomass energy plants can be one if the solutions.

3.2.3 Biogas:

Livestock and agricultural data show a great potential of biogas in the district. However as per the authors knowledge, no data of biogas plant is given for Kasganj district.

3.2.4. Hydropower:

The State's national-level program runs for hydropower generation, such as the small hydropower project program. The implementation of small hydropower in the State is carried out by Uttar Pradesh New and Renewable Energy Development Agency. There is no information on the district's hydropower future.

3.3 TOURISM

Kasganj is the 71th district in the Indian state of Uttar Pradesh. The district and particularly the city Kasganj is popularly known as because it was established in a thick forest of "kans". Kasganj was also known as "Tanay" or "Khasganj" during Mughal and British period. Kasganj comes in the Aligarh division jurisdiction. The district was created on April 17, 2008 by dividing Etah district and is renamed as Kanshiram Nagar. Popular area of the district includes Nadrai, Soron, Patiyali. Kasganj the newly created district is among the four districts of Aligarh Division. Kasganj includes three Tehsils Kasganj, Sahawar and Patiyali.
Situated on the banks of river Kali, the town is in proximity of the Himalayan foothills. It is located in the Doab, the area between the holy rivers Ganges and Yamuna and the alluvium soil makes the land one of the most fertile regions. A large number of surrounding villages depend on agriculture and related economic activities. Area of Kasganj district is 1993.08 sq km and is at 68th place in Uttar Pradesh in terms of area of the district. The rural area covers 1918.2 sq km and urban recorded 75.6 sq km. There are 715 villages. The district is devided into three tehsil namely Kasganj, Sahawar and Patiyali and

seven blocks including Sahawar, Kasganj, Amanpur, Soron, Sidhpura, Ganj Dundwara, Patiyali. The district head quarter is located at Kasganj.
The district headquarters Kasganj is very well connected by Grand Trunk (G.T.) road and also connected by rail broad gauge line of Northern Eastern Railway with Tundla junction (on Delhi – Howrah main line). Kasganj district is surrounded by Farukkhabad in east, Aligarh in west, Etah district in north and south is surrounded by Badaun.
Gross district domestic productivity in Kasganj district largely depends up on agriculture and animal husbandry, Forestry and logging, transportation, mining and quarrying and manufacturing units.
The district is situated in the western part of the state. It lies in the central portion of the Ganga and Yamuna doab and is bounded on the north-east side by the river Ganga, which separates it from the Budaun district. The drainage system of the district is controlled by the river Ganga and its tributaries, namely river Kali and Burhi Ganga. The river Kali is perennial and the remaining tributaries are ephemeral.

Places of Interest

Murlidhar Ghanta Ghar

It was constructedby Lala Dau Dayal ji in the memory of his father Shri Murlidhar Aggrawal. It is situated in the heart of the Kasganj city. It divides four gates namely- Eastern Sahawar, Western Bilram, Northern Soron, Southern Nadrai.

Laxmi Gate

It is situated on the way of Kasganj Railway Junction to Roadwasy Bus Stand. It is the live example of craft and architecture. The security guard rooms also constructed inside it and a library also situated on the top. It was inaugurated by then District Magistrate. This place is also known as Laxmi Ganj and Collector Ganj.

Nadrai Bridge

It is also known as Jhaal Bridge. It is constructed on Ganga Canal and Kali River. It is constructed from 1885 to 1889. Its length is 346 m and its discharge capacity is 7095 cusec. It is the historical and brilliant example of Irrigation Department. The students of Aligarh, Agra universities etc come to study the architecture.

Harpadi Ganga

It is situated in the heart of the town Sookerkshetra Soron. It is also known as Hari ki Pauri. This place belongs to the Varah Incarnation of Vishnu God.

Chamunda Temple

It is established by Late Thakur Viri Singh in 19th century. Annual Fair is organized on the occasion of Nav Durga Festival.

Bhimsen Ghanta

It is situated in the Bhimsen Temple at Nadrai Village. An annual fair is organized which is called Bhimsen Fair.

Jama Masjid

It is situated in Nabab Mohalla. Nabab Yakut Khan belongs to this place.

Chishti Peer Baba Mazar

It is situated in the Bhargain. His full name was Hazrat Chishti Rahamtullah Ailaih who came from Iran.

CNI Sadar Church

This church is very old and the Christian community pray here.

Data analysis

1. Based on arrival of tourists- increase or decrease in percent in different years
2. Effect on budget change /strategy change on numbers.
3. Reason of increase or decrease in number of tourists in different year

3.4. WELANDS:

The wetlands create a unique ecosystem that supports many species simultaneously like aquatic, terrestrial, and human beings. Local stakeholders directly or indirectly depend on the wetland for their income and small-scale business. The data collected and analyzed shows the region's production and possible product that can be derived from the raw product. The list of sources and the possible products are mentioned below:

Wheat production is high in the region.
Production of oils like mustard, linseed and castor seeds are reasonably high

4 ACTION PLAN DEVELOPMENT

4.1 FORESTRY

In July 2019, government of Uttar Pradesh taken the initiative to plant 22 crore saplings. The Forest Department involved the farmers as stakeholders to plant seedlings in their fields. Farmers are expected to sow quality planting material such as clonal plants, which are not available in the UP forest department nurseries. There is also the need to have minimum support price (MSP) for the

timber produced by farmers with buy-back arrangement. This in turn will motivate them to plant more trees, which would benefit the economy as well as the environment.[5]

1. **Projections & Monitoring Matrix**

Outcome indicators can be forest produce, buyback of products by the state, annual gross income generated by these outputs, contribution of the forest output in the district domestic product.

4.1.1 Biodiversity –

- The Bhagirathi Van is a critical development for the region since it will increase religious tourism, boost ecotourism, conserve wildlife, and provide opportunity for locals. The revenue generated by forest-related activities would be used to improve the community and expand the forest zone.
- According to a government statement, the Uttar Pradesh government is supporting organic farming and afforestation along the Ganga's banks to make the sacred river cleaner, free of pollution produced by artificial fertilizers and hazardous pesticides, and to preserve its uninterrupted flow.

4.2 TOURISM

- **Ecotourism Projects**

Travelling to places where flora, wildlife, and cultural legacy are the main attractions is known as ecotourism. Ecotourism aims to provide visitors with a better understanding of how humans affect the environment and create a greater appreciation for our natural ecosystems. There is a huge opportunity to develop ecotourism projects in the Mirzapur district. The project will minimize the negative aspects of conventional tourism on the environment and enhance the cultural integrity of local people. Also, this project will boost the tourist inflow in the district. Lakes, Ponds, forests, and protected ranges can be protected to give Prayagraj a new face in tourism.

- **Sustainable Tourism**

It is a type of tourism in which all the needs and desires of a tourist/ and other stakeholders of the tourism industry is fulfilled without compromising the ability of the future generation to utilize the tourism. Several goals of Sustainable Developments Goals are also seen associated with sustainable tourism. Such as life below water and life on land are impacted by human activities if the tourism place is a water body of forest area; hence it is the duty of all of us to take care of sustainability aspect in the tourism. Sustainability for locals/natives can be provided by including them in trade and business activities.

There is a sense of responsibility of different stakeholders associated with tourism to develop sustainable tourism. In which each stakeholder takes care of other stakeholders and biotic and abiotic factors. For

[5] https://www.teriin.org/article/special-drive-tree-plantations-uttar-pradesh-faces-several-challenges

example, reducing the Carbon footprint per visitor, using eco-friendly vehicles to roam around, supporting local businesses.

One example of sustainable tourism is promoting tourists to travel off-season. It will reduce the impact of seasonal unemployment on the marginal traders and other workers in the tourism sector.

Offering eco-friendly services is another example of sustainable tourism. Providing tourists with a cycle to roam around nearby places with help in reducing carbon footprint and it economical. It is aimed at the minimum negative impact on the environment created by tourism activities.

Projections and Monitoring matrix

Sector	Intervention	Strategy	Total cost	Expected Outcomes
Tourism	**Research**	• Based on various data and matrices, it is possible to predict the reason and motivation for tourism. Through extensive qualitative and quantitative research, it is also possible to determine the variables affecting tourism in Uttar Pradesh. • Research must be free from all the political pressures and influences. • The researchers must ensure that the field data		A well-researched document as a reference for other processes. Factors that affect tourism in Uttar Pradesh. Define the determinant of tourism activity.

		and secondary data are correct and not modified while entering the new records. ● Need to involve unbiased researchers.		
	Planning	● Action plans can be developed for intervention based on the research and analysis of different data and reports. ● Developing an Action plan is vital because results depend on how it is planned. ● Planning must consider the social status of the State and the image in the tourists' minds. ● No place should be given to non-practical projections. ● Planning about when to organized Mahotsav/		Planning to be based on research and previous lessons. Realistic planning for successful implementation. .

		festivals/ fairs to pump the local economy. • Separate planning for different demographics of tourists for comfort and leisure tours. For example, while planning the tour packages and tariffs, it is crucial to consider the demography of tourists. Foreign tourists ask much for hygiene while local tourists ask much for discounts. Hence these concerns must be included. • Need to develop the sites as per a set of standards to attract a wide range of tourists. • Brand Manufacturing to increase tourism activity.		

		• Organizations of grand events. • Use of allocated budget.		
	Implementations	• Various schemes can be developed, such as tourist packages, tariff plans etc., to attract more and more tourists. • Mahotsav and Fairs to be organized to rejuvenate the local economy and attract tourists. • Developing tourist circuits. • Developing eateries • Connecting tourism with local culture and food. • Extensive marketing for advertisement. • Famous face as brand ambassador. • Extensive branding and marketing.		To attract a greater number of tourists and maximize the revenue from tourism. To improve the image of the State and not let the other social factor affect the revenue of tourism.

		• Development of tourism spots and heritage sites. • Availability of information on government websites along with tour packages. • An extensive market research for the development of strategies		
	Impact Assessment of results	• Calculating what the touch points are. • The reason for failure • The reason for the success • Lesson for next planning		To learn the lesson and find out the root cause of success and failure, to be used further with modification

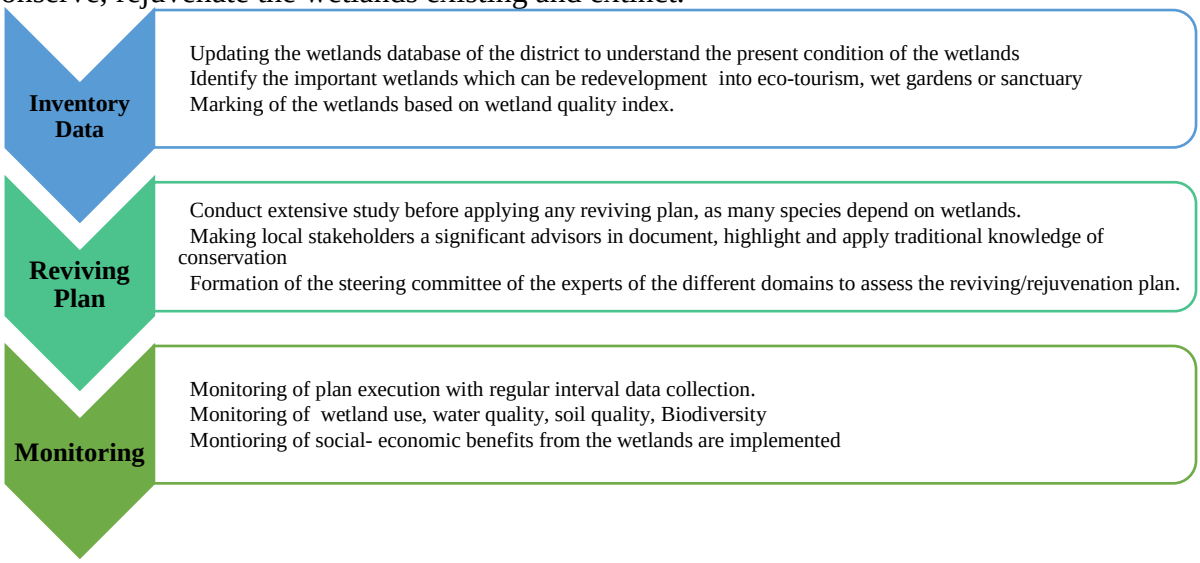
SWOT analysis of Tourism

S No.	Strength	Weakness	Opportunity	Threat
	• Temples • Rich History	• Not located in the tourism zone of the state. • District in dispute	• Get benefitted with ecotourism spot near the district.	• Pollution • Overlooked district. • Crime rate • Under funding to develop tourism in the district.

		• No availability of ghats. • No availability of tourist data.	• Resorts can be made.	

4.3 WETLANDS

Some of the known wetlands in the district need to be taken care and action on different fronts must be taken. The action plan below gives a glimpse of the action and development required to protect, conserve, rejuvenate the wetlands existing and extinct.



4.4 ENERGY

4.4.1. Solar

The people of the district should be made aware of the solar energy as there are not many solar installations witnessed in the district. This can be done by organizing awareness camps etc. at smaller levels so that people are able to get knowledge at personal levels. Also the schemes of the government related to solar energy should be popularized. Farmers should be made acquainted with the Kusum Yojana. The DISCOMs should work towards developing infrastructure required for solar segregation. This would help

the DISCOMs in providing uninterrupted power supply to the farmers at low costs without facing any losses. The administration can also develop a system taking example from Mukhyamantri Saur Swarozgar Yojana, Uttarakhand which can provide employment opportunities to farmers at local level, unemployed entrepreneurs, migrants small and marginal farmers and develop a means of income by installing solar power plants on such land which is becoming barren.

The district also earns its livelihood from different farm activities, the concerned administration should make provision on providing financial aid for the installation of solar plants in these small scale commercial units.

Attention should also be paid on encouraging more and more people for installing solar roof panels under the National Solar Mission, Phase II.

4.4.2. Biomass

The district Kanshiram Nagar depends on agriculture to a great extent and by powering the farmers with biomass energy, the economy of the district can be uplifted. Unfortunately, not much has been done in the biomass energy sector in the district. The first thing which should be done is to make people aware of the biomass energy and its benefits. Farmers should be educated about the importance of the bio-waste produced in their fields. To ensure the growth of farmers production of biomass energy is important, which will not only help to keep the environment clean but also add to the farmers' income. Moreover it will also solve the problem of stubble burning in the district. The district mainly cultivates rice and wheat, so the best suited projects for the district can be husk based biomass gasifiers. The husk based biomass plants can be developed on the lines of the Husk Power Systems from Champaran, Bihar. Community based biomass plants should be encouraged in the district, so that the investment is divided among the group of people. The authorities responsible should make an easy business environment in the district, so that more and more people are attracted to it and the new entrepreneurs are given a chance. The authorities responsible should also keep a check on the price of the biomass waste so that neither the farmer nor the plant owner is at loss. A proper system of transportation of the biomass wastes should also be developed. There should be provision for the rice mill owners to set up biomass plants in the district. These could also be opened in a group of two to three, so the infrastructural cost would get reduced. The biomass plants should be established at such places which are on the mid way to urban and rural areas. Sugarcane is also cultivated in the district, sugar mills should also pay attention on producing bagasse based biomass energy. 2G ethanol production can be given a thought with the help of private public partnerships.

4.4.4. Biogas:

- The government is pushing businesses to build biogas facilities. The federal government is also providing financial incentives. The state government will supply all the required infrastructure for the biogas plant to be built.

4.4.5 Hydropower:

The state government of Uttar Pradesh has also set rules for private engagement in the development of micro/mini/small hydropower projects in power evacuation facilities.

4 RECOMMENDATIONS

5.1 AGRICULTURE AND ALLIED SECTORS

- Groundwater shares over 90% of NIA in the district and number of medium tube-wells increased substantially during the study period, indicating the depletion of water table. Therefore, Drip and Sprinkler irrigation systems should be encouraged, especially for vegetable and fruits cultivations. It will help to increase the water use efficiency and productivity of crops. To reduce groundwater exploration, the district needs to construct more tanks and ponds under MGNREGA.
- Farmers should be sensitized to the overuse of fertilizer and pesticides application. They should be trained on the uses of fertilizer and chemical pesticides applications.

- The number of female cattle and buffaloes has increased over the period, indicating the growth of livestock products, including milk. The share of livestock in the total value of agriculture and allied activities increased from 31.54% in 2011-12 to 44% in 2018-19, with a remarkable average annual growth rate of 6.54% (three times that of crop sector). Dairy farming need to be promoted through creating an efficient marketing network, adoption of cross-breed and setting up dairy and dairy-based processing units. Goats and poultry farming can be promoted to improve local livelihood.

- The fishery & aquaculture and agro-forestry are the emerging sub-sector. Fishery & aquaculture has a huge scope for raising income and livelihood through effective implementation of PM Matsya Yojana. The fishery cultivation should be promoted by providing proper training and institutional support.

- Food grains constituted about 77% of the GCA in 2017-18, while their share in the total value of agricultural output was 68%. In contrast, Sugarcane and Potato, respectively comprised 11.74% and 2.70% share in the GCA, while their shares in VOP were 12.19% and 2.70%, respectively. These statistics indicate that diversification of agriculture from food grains to other high-value crops can significantly increase the farm income if proper marketing and insurance system is established.

- Organic farming should be encouraged to boost soil health, reduce water-use and ensure ecological, economic and social sustainability of agriculture. It could be an economically viable option if the government builds strong marketing networks linking farmers, processors, and distributors with the easy certification process and minimizes farmers' risk by protecting their farm income through payments of ecosystem services. A long-term system of incentive and regulation needs to be evolved to retain the existing farmers and motivate others to move towards the sustainable farming system.

- Training to prepare the Vermicomposting and Green manuring should be organized for the farmers. Moreover, salt-tolerant crops varieties and gypsum application should be promoted in the salt-affected areas.

- Farmers should follow the crop advisory under the drought condition and adopt techniques like drought resistance variety and maintaining moisture of soil by covering the soil. More farmers should join the Agromet Advisory Services provided by the K.V.K. for crop production

- About 93% of farmers in the district are small and marginal with landholdings less than two hectares. They can contribute substantial to livestock, vegetables and other labour-intensive allied farm activities.

- Poly house and greenhouse could be commercially used for the high revenue crops, like capsicum, chili, onion, garlic, and strawberry, flower like rose and marigold for much returns to the farmers. Medicinal crops like tulsi, mentha, lemongrass, etc. and fruits like papaya, guava, and banana should also be promoted by establishing local market, processing units and cold storage.

- Since electricity consumption in agriculture has increased from 109.76 KWH in 2014-15 to 232.45 KWH in 2019-20, a net increase of 111.78%, there is a need to promote the use of solar energy in agriculture.

- Agriculture production is vulnerable to natural and market risks. A compulsory and subsidized crop insurance system must be adopted to protect farmers' livelihood and income.

- A new institutional framework needs to be set up at the district level where the concerned line departments' technical, human and financial resources may be pooled or converged together to provide customized solutions to the farmers related to technology, training, marketing needs and advisory services.

- The use of a ferti-seed drill needs to be enhanced for wheat to achieve proper fertilizer use efficiency. Resource conservation technologies like zero tillage and lase land levelling can be extensively applied to reduce the cost of production and sowing time.

- The district has scope for introducing beekeeping for local youth by providing proper training and knowledge.

5.2 FORESTRY

Recommendations for key Projects

Kasganj located on the bank of river Ganga. According to ISFR 2019, 48.8 Sq. Km. area of Kasganj is covered with forest. As discussed above, the forest cover of Fatehpur has decreased significantly as compared to previous assessment of ISFR 2017. No major forest found in the district. There is a wide scope of Afforestation on waste land, trees outside forest (on the sides of

the roads, banks of river etc.). Government can promote the afforestation, agroforestry activities by providing output based incentives.

5.2.1 Biodiversity

- Forest areas need to be protected, treated, and regenerated.
- Government should support/ promote local people to build communities and NGOs for afforestation programs.
- To successfully organize, implement, and monitor operations, provide trainings, meetings, and exposure visits to communities, village volunteers, and employees.

5.3 WETLAND

The wetlands need to be intact, but at the same time, they need to be planned wisely to support the district economically, socially and environmentally, which will lead to indirect relief to the Ganga river to a large extent. It will also lower the local people's dependence on the Ganga river for their small-scale industry or basic daily needs. The following recommendation and interventions are required to get valuable products and solve the issues/ challenges faced by the local people of that region.

- It is recommended to support fishing production
- It is recommended to rejuvenate and restore the wetlands under MNREGA schemes.
- It is recommended to develop the outer periphery of the wetlands with shrubs, flower gardens or medicinal plants. These wetlands can be turned into an eco-tourism site.

5.4 ENERGY

5.4.1. Solar

- People should be made aware about the solar energy and the related schemes.
- Kusum Yojana and National Solar Mission should be popularized among the people of the district.
- Provisions should be made for those involved in the various farm activities to provide them with financial assistance for the solar energy units installations.

5.4.2. Biomass

- People should be made aware of the biomass energy and the harmful effects of stubble burning.

- ❖ Since the district mainly cultivates rice and wheat, husk based biomass gasifiers should be encouraged in the district. Sugarcane is also cultivated in the district, attention should be given on production of 2G ethanol as well.
- ❖ Provisions for easy transportation and a reasonable price of the biomass waste should be regulated by the administration.

5.4.3. Biogas

- It is recommended to connect existing gaushala such as Kanha gaushala to biogas plant.
- Promotion of household biogas plant and different incentive scheme should be spread through posters, or slogans. Tourist attraction places should be targeted to conduct this activity.

5.4.4. Hydropower

- It is recommended to build Ganga canal and investigate hydropower potential near villages Lehra, Datlana, Sehwajpur, Bamanpura, and Ajitnagar.

5.5. TOURISM

S. No.	Broad objectives / recommendations	Key activities / interventions to be planned			Monitoring & Evaluation	Impact
		2022	2023	2024		
	Encourage tourism related startups and ideas. Incubation centers to develop prototype and working model with the assistance of industry leaders	Research to figure out the factors impacting the tourism in the district. Development of strategies to address the issues. Development of policies to	Implementation of strategies. Training and Incubation Centre support to innovative ideas Structural developments	Sampling for analysis. Evaluation of interventions. Redesigning of strategies based on Impact analysis	Intervention impact-RCTs, regression analysis, propensity scores, econometrics, structural equation modelling, Contribution analysis, process tracing,	Performance of interventions. Working model and scalability of ideas from incubation Centre. More tourist footfall.

	(tourism industry). Training of skilled manpower to work in tourism sector (through earn while you learn programs). Upgradation of UP state tourism corporation policies, the hotels and integration of PPP. Dam impacting the ecosystem. Focussing on international tourists	protect the ecosystem. Adopting PPP (Public Private Partnership) model in the tourism sector to reduce the burden on government spendings Structural developments .			Bradford Hill criteria. Through Participatory approaches and impact evaluations use the standard OECD-DAC criteria. Based on satisfaction of pre decided key questions.	Trained youth to be a part of Tourism industry. Upgraded staff and facilities associated with UP State Tourism Corporation

6 Discussion during the Report Presentation

- Over 400-hectare land, that was encroached upon in Kasganj's Nardauli village along the Ganga, was reclaimed and taken up for plantation under the Vriksharopan Jan Andolan.
- The forest department has planted around 1.25 lakh saplings on 120 hectare of the total 456 hectare reclaimed land so far.
- Ganga Van was raised on around 100 hectare in 2019 and Bhagirathi van, another green belt, was set up in 2020 on approximately 300 hectare.
- Gaukhur wetland is a famous attraction for the tourists.
- The Uttar Pradesh Forest Department enabled a 3-day event at Kasganj aimed at both school education and capacity building where interactive activities and workshops were conducted for over 260 students and farmers.
- The IIML Report for Arth Ganga should be a regular Agenda item for next 6-8 DGC meetings.
- Hon'ble PM during the post-Budget webinar on Tourism had spoken about market potential of destination weddings. It was suggested that suitable Ashrams in Ganga Basin may be identified for such purpose to promote blissful experience, cost reduction, livelihood opportunities and better upkeep.
- Allocate separate space for Namami Gange Awareness and Jalaj Marketing kiosk in Melas/Congregatios/Fairs for providing better marketing opportunities to the Jalaj products.
- As Dilli Haat Centre – Namami Gange Awareness and Marketing Centre – is being launched soon, it was requested that every district to identify niche products with a creative story and link it with Jalaj in their area.
- To identify Arth Ganga Tourist Trails and organize Ganga Guide training
- Promotion of Natural Farming in Ganga Basin and training workshops should be organized on a regular basis. NMCG is supporting this initiative in coordination with MoA& FW and NCOF.
- Make plans for reuse of treated waste water for agriculture, industrial etc. purpose and also the sludge.
- Training of volunteers for Ganga awareness & Aarti workshops to promote regular aartis on Ghats.

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6 APPENDICES

AUXILLLARY DATA

Table 3 Biogas potential from animal waste in the district.

Livestock	Residue type	Total population as of 2012	Manure yield* (kg/day)	Total manure generation annually (kg)	Average collection (75%)	Dry manure after removing Moisture content	Manure required for biogas* (kg/m^3)	Biogas potential (m^3/yr)	m3/day	Dry matter per day
Cattle	Manure	97849	10	35,71,48,850	26786167.5	53572327.5	25	2142893.1	5870.94	146774
Buffalo	Manure	792690	15	4,33,99,77,750	3254983313	650996662.5	25	26039866.5	71342.1	2E+06
Sheep	Manure	7441	1	27,15,965	2036973.75	407394.75	25	16295.79	44.646	1116.2
Goat	Manure	184495	1	6,73,40,675	50505506.25	10101101.25	25	404044.05	1106.97	27674

Pig	Manure	10288	2.5	93,87,800	7040850	1408170	25	56326.8	154.32	3858
Poultry	manure	78,474	0.1	28,64,301	2148225.75	429645.15	25	17185.806	47.0844	1177.1
Total		**11,71,237**						**28676612.05**		

Table 4 Biogas potential from agricultural waste in the district.

Crop	**residue type**	**Total crop production (tons) (2017-18)**	**Residue production ratio**	**Residue amount (tons)**	**Average collection (70%)**	**Moisture content**	**Residue amount after removing moisture (tons)**	**Biogas potential [m3/(tons of dry matter)]**	**Overall biogas potential (m3)**
Maize	straw	104415	1.5	156622.5	109635.75	15	93190.3875	800	74552310
Wheat	straw	415053	1.5	622579.5	435805.65	30	305063.955	800	244051164
sugarcane	bagasse	568588	0.33	187634.04	131343.828	80	26268.7656	750	19701574.2
Total		**1088056**							**338305048.2**