Arth Ganga Project: District Fatehpur

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National Mission for Clean Ganga (NMCG)

Submitted by:

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Fatehpur is an agrarian district located between rivers Ganga and Yamuna in the state of Uttar Pradesh. This holy place holds pride to be the motherland of culture, art, and martyrs. This district with a subtropical semi-humid climate and an adequate amount of precipitation is also part of the Grand Trunk Road (one of Asia's oldest and longest roads).

According to Krishi Vigyan Kendra, this district lying in the Central Plain Zone 'V' of agro-climatic zones has almost 85% of the families are dependent on agriculture and animal husbandry and 74.5% are agriculture workers. Of the total cropped area (382480), 54.38% of the area is irrigated land. The cultivable wasteland (2.65%), the area under trees and gardens (1.63%), net sown area (68.25%), the area for non-agricultural uses (12.92%) increased whereas Barren and uncultivable land (2.37%), and current fallow land has decreased from 2011 to 2019. The major crops grown are paddy, jowar, bajra, etc. along with wheat, barley potato, onion, etc. Tube-wells, pumps, fertilizers, etc. all aid in increasing agricultural production. The district's percentage of the net and gross irrigated areas have increased over the years with an average of 72.60% and 72.89%, respectively. As the district lies between two major rivers of the country there are varied soil types (*Type-1,2A,2B,3,4,5,6A,6B; Type-1 to 4 belongs to Ganga and Type-5 and 6 to the Yamuna*) which are prevalent here with alluvium and sandy loam being most dominant. The district is divided into four main Agro-ecological situations where crop intensive, crop rotation, animal husbandry, etc. are carried out. The use of nitrogen is more, while the phosphorous and potassium ratio is less than the recommended ratio. The overall use of chemical fertilizers has reduced in the district from 191.17 kg/ ha 2010-11 to 171.27 kg/ ha in 2017-18. The livestock contains crossbred and indigenous varieties of cattle, buffalo, sheep along with poultry and fisheries. Female cattle and buffalo, goats have increased but pig, sheep had decreased during 2011-18. There has been a significant increase in the primary sector from 2011 to 2019 although an increase has also been administered in tertiary and secondary sectors. Fishery & aquaculture showed an average annual growth rate of 3.76% from 2011-12 to 2018-19. Mines and quarrying showed an average annual growth rate of 141.33%.

Although there had been a slight increase in the forest cover (0.44% in 2019) yet there is negligible forest (42-53 sq. km) in the area. The main type of forest found here is openly followed by medium dense forest. Many schemes are being worked upon to improve the conditions of forests. A varied variety of species and a large number of wetlands are present. The district comprises 2441 small and medium-sized wetlands; most of them are waterlogged and lake/ponds/tanks. Despite being a historically important place with certain tourist attractions there are negligible tourist visits. The district is surrounded by the main cities of the state with high tourist visits yet lack of maintenance and proper advertisement the district lacks in tourism.

Kerosene (83.13%) is the major source of light whereas firewood (63.03%) followed by crop residue (20.56%) are major sources for cooking fuel both of which are not sustainable power

sources. The electricity consumption in agriculture (45.38% share) has increased significantly from 208.28 kWh in 2014-15 to 341.5 kWh in 2019-20, a net increase of approximately 66.02%. With the high amount of biomass production with appropriate measures, an ample amount of biogas can be produced. Many measures and schemes are in place to enhance the use of Solar energy. No hydropower projects exist to date despite the location of the district between the Ganga and Yamuna rivers. Thus, promoting eco-tourism, agro-forestry, etc. sustainable development and economy can be achieved. Also, high yielding seeds, more horticulture crops production along with salt-tolerant and medicinal plants, promoting vermicomposting, green manuring, polyhouse and greenhouse, beekeeping and dairy management, etc. should be adopted in the district.

1 DISTRICT OVERVIEW

1.1 INTRODUCTION

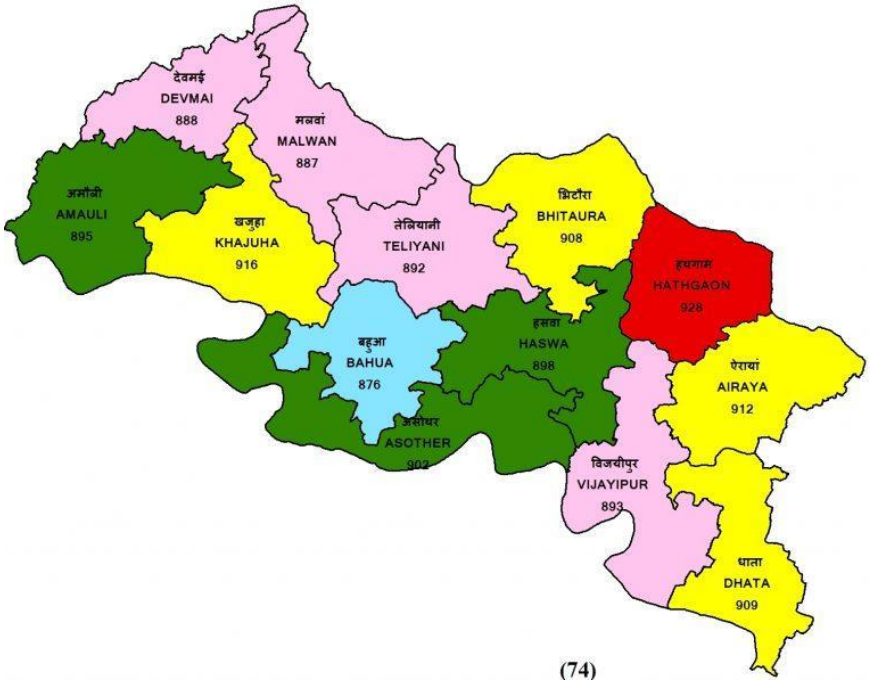


Figure 1 Map of the district

1.2 DEMOGRAPHIC PROFILE OF FATEHPUR

- Demographic and socio-economic indicators:[1]

  Population: 26,32,733 (Census 2011)

  Population density (Total persons per sq. km): 634

  Sex ratio: 901

  Literacy: 67.4%

- Occupation/ other Livelihood source: Agriculture
- Major Rivers: Ganga, Yamuna
- Forest Area: 53.44 Sq. Km. (ISFR 2019)

1.3 AGRO CLIMATIC PROFILE OF THE DISTRICT

1.4 ECONOMIC PROFILE OF FATEHPUR

The primary sector has a significant impact on the district economy because it contributes, on average, 29.19% share in the district GDP. Moreover, the average annual growth rate in this sector from 2011-12 to 2018-19 is 9.86%. Thus, its share increased from 29.40% in 2011-12 to 32.67% in 2018-19. The share of the secondary sector decreased from 21.46% in 2011-12 to 14.55% in 2018-19. The sector grew with a low average annual growth rate of 2.02%. The tertiary sector grew with a remarkable average annual growth rate of 8.68%, with its share increasing from 49.14% in 2011-12 to 52.78% in 2018-19. Overall, the district economy grew with an average annual growth rate of 7.64%. The growth in the secondary sector is less than the other two sectors. Steps should be taken to increase the productivity of the secondary sector so that it can grow at a higher rate. This will improve the growth rate of the overall economy. The primary and tertiary sectors have performed well during the study period.

Table 1: Trends in Gross District Domestic product in Fatehpur 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	2144.45	1565.51	3584.08	7294.03	-	-	-	-

[1] https://www.censusindia.gov.in/2011census/dchb/DCHB_A/09/0941_PART_A_DCHB_FATEHPUR.pdf

	(29.40)	(21.46)	(49.14)	(100)				
2012-13	2308.25	1646.99	3612.04	7567.28	7.64	5.21	0.78	3.75
	(30.50)	(21.76)	(47.73)	(100)				
2013-14	2274.03	1738.66	4030.40	8043.09	-1.48	5.57	11.58	6.29
	(28.27)	(21.62)	(50.11)	(100)				
2014-15	2053.26	1597.50	4368.80	8019.56	-9.71	-8.12	8.40	-0.29
	(25.60)	(19.92)	(54.48)	(100)				
2015-16	2607.59	1720.27	4894.95	9222.81	27.00	7.68	12.04	15.00
	(28.27)	(18.65)	(53.07)	(100)				
2016-17	2934.01	2007.82	5234.68	10176.51	12.52	16.72	6.94	10.34
	(28.83)	(19.73)	(51.44)	(100)				
2017-18	3008.67	1750.36	5271.68	10030.71	2.54	-12.82	0.71	-1.43
	(29.99)	(17.45)	(52.56)	(100)				
2018-19	3926.81	1748.71	6343.80	12019.33	30.52	-0.09	20.34	19.83
	(32.67)	(14.55)	(52.78)	(100)				
Average Growth Rate					9.86	2.02	8.68	7.64
Source: UPDES Note: Figures in Parentheses are percentage share in the total GDDP								

We further break down the primary sector GDP to know which subsector is driving the primary sector growth. Table 2 shows that agriculture, including the horticulture sector, grew at an impressive average annual growth rate of 4.23% from 2011-12 to 2018-19. However, its share in the primary sector decreased from 76.0% in 2011-12 to 66.10% in 2018-19 due to faster growth of livestock, forestry and mining & quarrying. The share of the livestock increased from 15.41% to 23.94% as it grew with a remarkable average annual growth rate of 13.91%. This shows the importance of livestock in Fatehpur District and the increased dependency of citizens on livestock products.

The share of forestry and logging in the total agriculture and allied sector is also significant, around 8.51% in 2018-19, as it yearly grew by 13.0%. The share of the fishery & aquaculture is minimal, around 1.45% in 2018-19. It grew with a low average annual growth rate of 3.76% from 2011-12 to 2018-19. Mines and quarrying also recorded a remarkable average annual growth rate of 141.33%. Its high growth can have serious environmental issues like deforestation, soil erosion, etc., with a long-term effect on the health of local citizens. Overall, the Primary sector performed well 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: Trends in Gross District Domestic product from Agriculture and allied activities in Fatehpur 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	1586.46	321.69	143.54	35.72	2087.40	57.04	2144.45
	(76.00)	(15.41)	(6.88)	(1.71)	(100)		
	-	-	-	-	-	-	-
2012-13	1602.52	361.85	208.92	37.42	2210.71	97.54	2308.25
	(72.49)	(16.37)	(9.45)	(1.69)	(100)		
	[1.01]	[12.48]	[45.55]	[4.77]	[5.91]	[70.99]	[7.64]
2013-14	1548.90	405.14	172.70	38.58	2165.33	108.71	2274.03
	(71.53)	(18.71)	(7.98)	(1.78)	(100)		
	[-3.35]	[11.97]	[-17.34]	[3.09]	[-2.05]	[11.45]	[-1.48]
2014-15	1389.55	410.50	124.13	41.24	1965.42	87.84	[2053.26
	(70.70)	(20.89)	(6.32)	(2.10)	(100)		
	[-10.29]	[1.32]	[-28.12]	[6.89]	[-9.23]	[-19.19]	[-9.71]
2015-16	1667.47	608.71	139.64	42.10	2457.92	149.67	2607.59
	(67.84)	(24.77)	(5.68)	(1.71)	(100)		
	[20.00]	[48.28]	[12.49]	[2.09]	[25.06]	[70.38]	[27.00]
2016-17	1961.77	718.15	151.91	51.53	2883.36	50.66	2934.01
	(68.04)	(24.91)	(5.27)	(1.79)	(100)		
	[17.65]	[17.98]	[8.79]	[22.40]	[17.31]	[-66.15]	[12.52]
2017-18	1985.17	638.37	247.20	51.49	2922.22	86.45	3008.67
	(67.93)	(21.85)	(8.46)	(1.76)	(100)		
	[1.19]	[-11.11]	[62.72]	[-0.09]	[1.35]	[70.66]	[2.54]
2018-19	2052.11	743.25	264.26	44.88	3104.50	822.31	3926.81
	(66.10)	(23.94)	(8.51)	(1.45)	(100)		
	[3.37]	[16.43]	[6.90]	[-12.83]	[6.24]	[851.22]	[30.52]
Average Growth Rate	4.23	13.91	13.00	3.76	6.37	141.33	9.86

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 of secondary and tertiary sectors. Within the secondary sector, the manufacturing sector had a share of approximately 37.6% in 2018-19.

The share has decreased over the years as the average annual growth in this sector is only 2.61%. The share of the electricity, gas and water supplies subsector has increased from 6.01% in 2011-12 to 8.41% in 2018-19. Moreover, this subsector grew with a remarkable average annual growth rate of 7.70%. The share of the construction increased from 52.52% to 54.0% in the same period. However, it grew only by 2.06% per annum. This indicates that the secondary sector in Fatehpur is heavily dependent on the manufacturing and construction sub-sector, though the electricity subsector is growing at a faster rate.

Within the tertiary sector, the Real estate subsector made up the highest share (25.74%) in 2018-19, followed by Trade & Hotel (20.58%), transport, storage and communication (19.35%) and public administration (14.96%). Average annual growth is observed highest in transport, storage and communication (23.47%), followed by Public Administration (11.53%), trade & hotel (8.56%), financial services (7.87%) and lastly lowest in real estate (3.85%). More work needs to be done to improve manufacturing and real estate subsectors. Public Administration and Transport and Communication and Trade & hotel are the major contributors to the growth of the Tertiary sector.

Table 3: Trends in percentage share of non-agriculture sub-sectors in DGDP in Fatehpur 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	41.46	6.01	52.52	100	8.31	21.43	7.53	35.00	15.09	12.64	100
2012-13	43.24	8.08	48.68	100	11.04	22.13	8.34	36.93	9.47	12.09	100
2013-14	47.26	6.76	45.98	100	12.37	21.60	8.96	34.38	13.23	9.46	100
2014-15	41.46	7.18	51.36	100	13.57	19.75	9.13	33.10	12.63	11.83	100
2015-16	44.50	6.82	48.68	100	15.57	20.97	8.48	30.00	12.57	12.41	100
2016-17	52.08	6.89	41.03	100	15.00	22.32	7.67	28.53	13.59	12.89	100
2017-18	40.70	8.49	50.82	100	15.31	19.49	6.99	29.99	15.83	12.39	100
2018-19	37.60	8.41	54.00	100	19.35	20.58	7.01	25.74	14.96	12.37	100
Average Growth Rate	2.61	7.70	2.06	2.02	23.47	8.56	7.87	3.85	11.53	9.26	8.68

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 4221.26 sq. km². Forest area represents 1.8% of the total reported area. The share of cultivable wasteland increased slightly from 2.34% in 2009-10 to 2.65% in 2017-18. The share of Barren and uncultivable land decreased slightly from 2.49% in 2009-10 to 2.37% in 2017-18. The share of area under trees and gardens increased from 1.38% in 2009-10 to 1.63% in 2017-18. The current fallow land decreased over the years, which is good for the district economy. The net sown area (NSA) has increased over the years, from 67.76% in 2009-10 to 68.25% in 2017-18. The area for non-agricultural uses increased over the period from 11.60% to 12.92% (Table 4). Overall, the land use pattern shows that the fallow and uncultivable land area has decreased, while the net sown area has increased over the years.

Table 4: Trends in Land-use Pattern in Fatehpur (as % of the 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
2009-10	422126	1.80	2.34	8.59	3.39	2.49	11.60	0.64	1.38	67.76
2010-11	422126	1.80	2.30	8.26	3.41	2.45	11.63	0.66	1.40	68.09
2011-12	422126	1.80	2.41	7.77	3.42	2.40	11.78	0.66	1.29	68.46

2012-13	422126	1.80	2.28	7.97	3.40	2.42	11.50	0.66	1.38	68.58
2013-14	422126	1.80	2.56	7.18	3.48	2.42	11.88	0.66	1.46	68.56
2014-15	422126	1.80	2.69	7.53	3.04	2.38	11.97	0.66	1.53	68.39
2015-16	422126	1.80	2.81	4.98	4.40	2.37	12.82	0.66	1.78	68.37
2016-17	422126	1.80	2.66	6.04	3.92	2.37	12.90	0.66	1.29	68.34
2017-18	422126	1.80	2.65	4.92	4.74	2.37	12.92	0.71	1.63	68.25
Source: Compiled from http://updes.up.nic.in/spiderreports/intialisePage.action										

2.1.2 Trends in Operational Land Holdings

In Fatehpur district, the total number of operational holdings increased from 402 thousand in 2010-11 to 403 thousand in 2015-16, a net increase of 0.25%. 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 landholdings positions in the district are marginal and small. These two size categories represented around 92.41% 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 Fatehpur

	Agri, Census	Marginal (0-1 ha)	Small (1-2 ha)	Semi-Medium (2-4 ha)	Medium (4-10 ha)	Large (10 & above, ha)	Total ('000 No.)
Fatehpur	2010-11	75.75	16.57	5.75	1.81	0.12	402.00
	2015-16	77.88	14.53	5.77	1.72	0.10	403.00
							[0.25]
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

i- The Trend in Cropping Patterns

Rice and Wheat dominate the agriculture of the district. 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 (42.89%), followed by Rice (21.03%). Together these two crops constitute around 64% of the GCA. The area shared by the total cereals has increased from 64.40% in 2010-11 to 68.08% in 2017-18. The main pulses produced are Chickpeas and Arhar, while the rest are not significantly produced. The total pulse acreage has decreased from 20.33% in 2010-11 to 16.57% in 2017-18. Thus, the food grains cover a majority (average, 84.53%) of the GCA. Mustard and Till are the only major oilseeds crop

produced and the total oilseed acreage has decreased from 6.35% in 2010-11 to 6.25% in 2017-18. The cultivated areas under Potato and Sugarcane in the GCA are minuscule, though their share marginally increased during the period. In general, there is no significant change in the cultivation pattern during the study period, except that the NSA decreased over the years, from 70.93% in 2010-11 to 67.43% in 2017-18. The average cropping intensity is 145.87.

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	17.64	19.37	19.30	20.77	20.89	21.01	21.00	21.03
Wheat	40.81	41.16	40.80	41.61	42.61	42.87	42.85	42.89
Jawar	2.64	2.38	2.29	2.15	1.92	1.93	1.93	1.93
Other Cereals	3.31	2.93	3.07	2.44	2.22	2.23	2.23	2.23
Total Cereals	64.40	65.84	65.46	66.97	67.63	68.04	68.01	68.08
Chana	10.91	10.41	10.39	9.72	9.21	9.27	9.26	9.28
Arhar	5.26	4.83	4.63	4.25	3.93	3.95	3.95	3.96
Other Pulses	4.16	3.70	3.86	3.52	3.32	3.34	3.34	3.34
Total Pulses	20.33	18.94	18.89	17.49	16.46	16.56	16.55	16.57
Total Foodgrains	84.73	84.78	84.34	84.46	84.09	84.60	84.56	84.65
Mustard	3.68	3.57	3.74	3.89	3.85	3.87	3.87	3.87
Till (Net)	2.57	2.35	2.43	2.00	2.31	2.33	2.33	2.33
Other Oilseeds	0.11	0.10	0.10	0.10	0.04	0.04	0.04	0.04
Total Oilseeds	6.35	6.02	6.27	5.99	6.21	6.24	6.24	6.25
Sugarcane	1.47	1.50	1.53	1.71	1.74	1.75	1.75	1.75
Potato	2.00	1.99	2.04	2.14	2.27	2.28	2.28	2.28
Net Sown Area	70.93	70.15	69.34	68.70	67.12	67.51	67.45	67.43
Gross Sown Area (in 1000 Ha)	405.23	411.95	417.48	421.25	430.11	427.50	427.71	427.24
Cropping Intensity	140.99	142.56	144.21	145.56	148.98	148.12	148.26	148.29

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

ii- Trends in per hectare yield of principal crops

Table 7 shows that the per hectare yield of most crops varies across years. However, the yield for of the major crops increased in the study's later years. This can be due to improved irrigation facilities along with the availability of better infrastructure. Wheat and Rice are the major crops in the district and their per hectare yield (32.27 qts and 24.12 qts respectively, in 2017-18) are also high. Per hectare yield of total cereals has increased from 27.65 qtls in 2010-11 to 28.84 qtls in 2017-18. Similarly, per hectare yield of total pulses increased from 10.24 qtls in 2010-11 to 14.22 qtls in 2017-18. However, the yield of Pulses is less than that of cereals, following which the total production of pulses is less. The yield of total oilseeds has increased from 6.51 qtls in 2010-11 to 8.23 qtls in 2017-18. This can be due to the availability of hybrid seeds. However, the rise in the

yield of most crops is not uniform. In some years, it has decreased, but on average, the yield has increased in the latter years of the study. The per hectare yield of Sugarcane, on average, is only 585.42 qtls. The average yield of Potato is 198.18 qtls/ha. 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 Fatehpur District (Qtls)

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	21.07	23.38	24.56	26.09	19.37	18.67	24.01	24.12
Wheat	32.75	32.75	32.90	32.87	19.60	25.14	33.53	32.27
Jawar	14.49	17.74	15.67	14.04	8.14	6.61	9.79	13.19
Total Cereal	27.65	28.53	29.04	29.60	18.90	22.24	29.47	28.84
Chana	11.67	13.13	12.44	4.36	1.78	4.90	14.43	17.14
Arhar	9.68	10.70	9.83	8.94	2.07	5.20	13.10	12.13
Total Pulses	10.24	11.53	10.93	5.83	2.41	5.07	12.75	14.22
Total Food Grains	23.47	24.73	24.99	24.68	15.67	18.88	26.20	25.98
Mustard	9.53	9.66	10.50	7.54	4.34	6.12	11.07	11.29
Till (Net)	2.06	2.66	2.09	1.74	2.02	1.90	0.98	2.92
Total Oilseeds	6.51	6.90	7.22	5.62	3.50	4.51	7.31	8.23
Sugarcane	582.77	561.19	622.88	682.89	658.21	649.81	612.68	312.95
Potato	223.48	201.06	233.73	204.01	154.33	176.08	195.66	197.10

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

iii- Trends in Production of Principal Crops

Table 8 shows the trends in the production of the main crops over the years. Rice and Wheat, dominate the production. In 2017-18, Rice (216.65 thousand tonnes) and Wheat (591.44 thousand tonnes) formed a major part of the total cereal production (838.90 thousand tonnes). Among, pulses, Chickpeas and Arhar occupied the highest production. Chickpeas' production was 67.92 thousand tons, and Arhar had a production of 20.49 thousand tons in 2017-18. Although there has been a significant variation in the production of these pulses crops over the years, they still represent around 87% of the total pulse production.

Mustard production was 18.69 thousand tons, which represented around 85% of the total oilseed production in 2017-18. Sugarcane is another crop whose production was 458.53 thousand tons in 2016-17. Potato production has also been significant over the years (192.09 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 is the need of the hour so that they get assured income and can take more risk and diversify their production.

Table 8: Trends in Production of Principal Crops in Fatehpur District (in 1000 Tons)								
Crop/Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**
Rice	150.61	186.54	197.86	228.27	173.97	167.75	215.67	216.65
Wheat	541.53	555.30	560.35	576.03	359.24	460.64	614.40	591.44
Jawar	15.49	17.36	15.00	12.70	6.72	5.45	8.08	10.88
Other Cereals	13.96	14.50	20.43	18.01	9.82	13.03	19.02	19.93
Total Cereals	721.59	773.69	793.64	835.01	549.75	646.87	857.17	838.90
Chana	51.63	56.31	53.97	17.85	7.07	19.43	57.18	67.92
Arhar	20.61	21.28	19.01	16.00	3.50	8.78	22.15	20.49
Other Pulses	12.10	12.38	13.22	9.11	6.50	7.67	10.99	12.30
Total Pulses	84.34	89.97	86.19	42.95	17.07	35.88	90.31	100.71
Total Foodgrains	805.93	863.66	879.82	877.97	566.82	682.76	947.48	939.61
Mustard	14.21	14.20	16.40	12.36	7.19	10.12	18.32	18.69
Till (Net)	2.14	2.58	2.12	1.46	2.01	1.89	0.97	2.91
Other Oilseeds	0.40	0.34	0.39	0.34	0.14	0.03	0.22	0.38
Total Oilseeds	16.75	17.11	18.90	14.16	9.33	12.04	19.51	21.98
Sugarcane	348.03	346.59	398.52	492.84	492.60	486.32	458.53	234.21
Potato	180.95	164.95	199.37	183.57	150.41	171.61	190.69	192.09
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

iv- 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. In the case of variability in the area under different crops, we observe it the lowest v in wheat (4.24%), followed by chickpeas (4.74%) and mustard (4.98%) and the highest in Jawar (10.32%). The variability in the area under total pulses (6.18%) is more as compared to the variability in the area under total cereals (4.13%). Since Rice and wheat dominate the production, the variability in the area under total food grains is, therefore, also relatively low (1.99%).

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	84.83	6.86	8.09	192.16	27.19	14.15	22.66	2.65	11.68
Wheat	176.70	7.50	4.24	532.36	83.36	15.66	30.22	5.08	16.81
Jawar	9.01	0.93	10.32	11.46	4.40	38.39	12.46	3.88	31.13
Total Cereals	281.38	11.63	4.13	752.08	107.30	14.27	26.78	3.98	14.87
Chana	41.24	1.96	4.74	41.42	22.84	55.15	9.98	5.53	55.44
Arhar	18.25	1.71	9.39	16.48	6.79	41.20	8.96	3.65	40.73
Total Pulses	74.52	4.61	6.18	68.43	31.40	45.88	9.12	4.17	45.74
Total Foodgrains	355.90	7.07	1.99	820.51	132.31	16.12	23.07	3.77	16.36
Mustard	15.98	0.80	4.98	13.94	3.98	28.53	8.76	2.51	28.69

Till (Net)	9.81	0.60	6.11	2.01	0.60	30.05	2.05	0.59	28.69
Total Oilseeds	26.09	0.76	2.91	16.22	4.16	25.67	6.22	1.58	25.40
Sugarcane	6.96	0.66	9.51	407.21	93.12	22.87	585.42	117.06	20.00
Potato	9.10	0.74	8.11	179.21	16.11	8.99	198.18	24.97	12.60
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

The variability of production depends on the cultivated area's variability and the yield's variability. 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 Chickpeas (55.15%), followed by Arhar (41.20%), Jawar (38.39%), Till 30.05%), and mustard (28.53%). High variation in the production of pulses and oilseeds is partly due to variation in the land area under them and partly due to non-availability of hybrid seeds. Improvement in crop insurance conditions and better market accessibility can lower this variation. Variability in production is lowest in Potato (8.99%), followed by Rice (14.15%) and wheat (15.66%).

In the case of yield, the greatest variability is estimated in chickpeas (55.44%), Arhar (40.73%) and Jawar (31.13%). Yield variability in total cereals (14.87%) and total food grains (16.36%) is lower as compared to that in total pulses (45.74%). Rice, Wheat, and Potato 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 Product 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, total Foodgrains, and total oilseeds, on average, have a relatively larger share in GCA than their share in VOP, while total pulses, Potato, and Sugarcane have, on average, a greater share in VOP than GCA. Fatehpur is mainly a food grain production district; therefore, food grains account for around 84.53% of the gross area of the crops. Similarly, total foodgrains account for nearly 82.55% of the total value of the agricultural product. Three crops - wheat, paddy, and Potato together accounted for, on average, around 64.19% of GCA and 69.45% of the total VOP. Overall, the total agricultural GCA has increased in the latter years of the study (average, 421.06 thousand hectares), and the total value of the product has also increased significantly, that is, 1345.98 Cr. Rs. in 2010-11 to 2451.41 Cr. Rs in 2017-18.

Table 10: Share of Principal crops Total GCA and Total Value of agriculture products in Fatehpur

Crop	% Share in	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Wheat	GCA	40.81	41.16	40.80	41.61	42.61	42.87	42.85	42.89
	VOP	44.90	40.47	38.39	40.06	39.28	41.94	41.23	44.32
Paddy	GCA	17.64	19.37	19.30	20.77	20.89	20.91	20.90	20.92

	VOP	15.18	15.14	17.50	21.42	26.53	19.75	19.93	19.05
Total Cereals	GCA	64.40	65.84	65.46	66.97	67.63	68.04	68.01	68.08
	VOP	62.11	57.74	58.00	63.35	67.48	63.22	62.85	65.38
Total Pulses	GCA	20.33	18.94	18.89	17.49	16.46	16.56	16.55	16.57
	VOP	24.70	27.18	20.57	13.83	11.44	18.51	22.54	21.47
Total Food Grains	GCA	84.73	84.78	84.34	84.46	84.09	84.60	84.56	84.65
	VOP	86.81	84.92	78.57	77.18	78.92	81.74	85.39	86.85
Total Oilseeds	GCA	6.35	6.02	6.27	5.99	6.21	6.24	6.24	6.25
	VOP	3.11	4.14	3.42	2.62	3.20	2.87	2.93	3.08
Potato	GCA	2.00	1.99	2.04	2.14	2.27	2.28	2.28	2.28
	VOP	5.75	7.43	13.15	14.19	8.79	7.71	6.39	7.10
Sugarcane	GCA	1.47	1.50	1.53	1.71	1.74	1.75	1.75	1.75
	VOP	4.27	3.43	4.79	5.95	9.06	7.67	5.29	2.97
Paddy + wheat + potato	GCA	60.44	62.52	62.14	64.52	65.76	66.05	66.02	66.09
	VOP	65.84	63.04	69.04	75.67	74.60	69.40	67.54	70.46
Total Agriculture	GCA (1000 Ha)	405.23	411.95	417.48	421.25	430.11	427.50	427.71	427.24
	VOP (in Cr Rs)	1345.98	1819.55	2246.44	2237.40	1446.64	1850.65	2391.84	2451.41
Per Worker VOP (Rs.1000 at current prices) in **Fatehpur**		-	26.02	32.21	44.94	27.42	41.67	47.07	55.50
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 Fatehpur district increased from Rs. 26.02 thousand in 2011-12 to Rs. 55.50 thousand in 2017-18, a net increase of 113.32% 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 total value of agricultural output per agricultural worker is much higher in the state than in the district, and the rate of growth per worker value of output in the district is more than in the state. The ratio of per worker value of the output of the district to the state average has increased from 0.6399 in 2011-12 to 0.7963 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 70.80% of the total fertilizers used, while the proportions of phosphorus and potassium were 24.13% and 5.06%, respectively. In 2017-18, however, the nitrogen share decreased to 67.85%, while the phosphorus share increased to 28.23% and the potassium share decreased to 3.91%. 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 and cropping patterns, etc. Although the overall use of chemical fertilizers has reduced in the district from 191.17 kg/ ha GSA in 2010-11 to 171.27 kg/ ha GSA in 2017-18 but still the authorities can take steps to further reduce their consumption as chemicalization of agriculture degrades soils and water resources, requiring the use of organic fertilizers and biofertilizers.

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	135.36	94.34	116.56	117.18	122.25	114.06	112.11	116.21
Phosphorous	46.14	28.78	38.20	30.02	35.27	42.74	43.89	48.36
Potassium	9.67	5.31	3.83	4.12	7.21	7.84	9.23	6.70
Total	191.17	128.44	158.59	168.19	164.73	164.63	165.23	171.27
Gross Sown Area (Ha)	405228	411952	417479	421249	430111	427496	427708	427239

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

2.1.6. Irrigation Structure and Status

i- 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 (1450 kms) over the years. The number of wells has remained constant (777) over the years. The number of Government tube wells increased from 408 in 2010-11 to 533 in 2018-19. Shallow, medium, and deep tube wells increased by 0.49%, 48.09% and 39.71%, respectively in 2018-19 as compared to that in 2010-11. The district's percentage of the net and gross irrigated areas have increased over the years with an average of 72.60% and 72.89%, 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)	1523	1450	1450	1450	1450	1450	1450	1450	1450
No. of Govt. Tube wells	408	470	477	508	615	617	618	579	533
No of Wells	777	777	777	777	777	777	777	777	777
No. of Ground level Pump set	59	59	59	59	59	59	59	59	59
Shallow Tube wells	41651	41651	41833	41847	41855	41855	41855	41857	41857
Medium Tube wells	2518	3001	3281	3446	3538	3538	3538	3639	3729
Deep Tube wells	1327	1400	1519	1600	1740	1740	1740	1802	1854
% Of NIA	68.53	70.01	71.05	72.24	73.69	74.96	74.99	75.34	-

% Of GIA	68.48	70.88	71.43	73.72	75.01	74.30	74.44	74.84	-
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

ii- 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, 19.24%) has decreased over the years, and the share of wells and tube wells in NIA (average, 80.50%) has increased over the years. This shows the increased dependency of the district on the groundwater for irrigation, and it can have serious environmental issues if such a pattern continues in the long run.

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

Source/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Canal (surface Irri.)	21.53	20.82	19.60	18.94	18.54	18.15	18.15	18.15
Wells And Tube-wells (GW Irri.)	78.11	78.79	79.96	80.74	81.24	81.73	81.77	81.68
Others	0.36	0.39	0.44	0.31	0.21	0.12	0.07	0.17
NIA (1000 ha)	196.98	202.32	205.69	209.07	212.75	216.36	216.32	217.06
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

iii- Crop-wise irrigated area

Table 14 shows that a majority of cultivated areas under Rice (average, 99.89%), Wheat (average, 99.44%), Potato (average, 100%), and Sugarcane (average, 100%) are irrigated. Percentages of the irrigated area under pulses (average, 8.86%) and oilseeds (average, 40.21%) are relatively less.

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

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	99.63	99.73	99.91	99.97	99.97	99.97	99.97	99.97
Wheat	99.22	99.25	100	99.30	99.44	99.44	99.44	99.44
Total Cereal	90.29	91.52	91.91	92.82	93.63	93.63	93.63	93.63
Total Pulses	7.47	7.85	8.65	8.81	9.53	9.53	9.53	9.53
Total Foodgrains	70.42	72.83	73.27	75.42	77.17	77.17	77.17	77.17
Total Oilseeds	35.76	38.14	40.18	44.95	40.67	40.67	40.67	40.67
Sugarcane	100	100	100	100	100	100	100	100
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 208.28 KWH in 2014-15 to 341.5 KWH in 2019-20, a net increase of approximately 66.02%. This is a cause of concern as this can result in an increased burden on non-renewable resources and create problems for waste disposal. The percentage share of the agriculture sector (average, 45.38%) in the total electricity consumption in the district is quite significant. This indicates the heavy usage of electricity by farmers. Since electricity consumption has increased over the years, it is very important for the authorities to switch to more sustainable modes of electricity production, such as solar energy.

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)	208.28	213.11	306.95	334.51	340.24	341.5
% Of electricity consumed in Agriculture sector to total consumption	47.45	38.72	51.09	48.52	45.22	43.14
Source: District-wise Development Indicators file						

2.1.8 Status of Agriculture Market

Table 16 shows the marketing infrastructure in the district. It has five main markets and six sub-markets. The number of regulated mandis per lakh hectare of Net area sown has increased from 3.83 in 2013-14 to 4.16 in 2018-19. Still, the increase could have been more significant as 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 Fatehpur

Category/Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Main Markets (No.)	5	5	5	5	5	5	5
Submarkets (No.)	6	6	6	6	6	6	6
Total Markets (No.)	11	11	11	11	11	11	11
No. of Regulated mandis per lakh Ha. of net area sown	3.83	2.61	-	1.73	1.73	4.16	-
Source: District-wise Development Indicators file.							

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 year 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 the beneficiary farmers may revert to conventional farming in the absence of the regulatory framework. 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 so that they may 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 and Namami Gange Schemes in the district. The district has 159 groups in thirteen development blocks. The highest number of groups are in Malwan (33), Bhitaura (25), followed by Telyani (24), Airayan (22) and Hathgaon (17). Together these five blocks represent around 76% of the total organic clusters in the district. 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. More work needs to be done to increase the organic clusters under PKVY Scheme.

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

S. No.	Block	Scheme	No. of groups	No. of farmers in groups			
				Total	Average	Median	SD
1	Airayan	PKVY	2	82	41	41	1.41
		Namami Gange	20	754	37.7	36.5	8.09
2	Amauli	PKVY	5	154	30.8	35	15.05
3	Asothar	PKVY	4	56	14	13.5	3.91
4	Bahua	PKVY	5	112	22.4	27	9.98

5	Bhitaura	PKVY	4	128	32	30	9.41
		Namami Gange	21	915	43.57	48	7.37
6	Devmai	PKVY	4	75	18.75	18.5	5.85
		Namami Gange	6	202	33.66	31	7.86
7	Dhata	PKVY	5	186	37.2	42	10.47
8	Haswa	PKVY	3	107	35.66	41	12.85
9	Hathgaon	PKVY	4	110	27.5	28	12.15
		Namami Gange	13	570	43.84	50	8.88
10	Khajuha	PKVY	2	63	31.5	31.5	6.36
11	Malwan	PKVY	6	127	21.16	21.5	14.19
		Namami Gange	27	1113	41.22	49	10.36
12	Telyani	PKVY	7	272	38.85	38	11.29
		Namami Gange	17	568	33.41	31	12.29
13	Vijayipur	PKVY	4	122	30.5	29.5	14.01
14	District Total	PKVY	55	1594	28.98	28	12.73
		Namami Gange	104	4122	39.63	39.5	10.03
		Total	159	5716	35.94	36	12.12
Source: https://pgsindia-ncof.gov.in/LGList.aspx							

Since per hectare use of chemical fertilizer is quite high in district agriculture, 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 evolve 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:

- The major problem of the farmers was poor marketing of the organic products and not being able to fetch a premium.
- Scaling up of 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.
- Farmers practicing organic farming only on a small part of their land (less than one ha) to get the scheme's benefit.

- 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.
- The knowledge and awareness level regarding practices under organic farming was inadequate among farmers.

2.2. Livestock Sector

i- Trends in Livestock Population

Livestock forms an integrated part of the rural economy. Table 18 indicates that the number of indigenous and exotic male cattle has decreased considerably from 250424 in 1997 to 33400 in 2019 and from 3875 in 1997 to 3141 in 2019, respectively. However, on the other hand, the number of indigenous female cattle decreased from 168766 in 1997 to 96424 in 2019, but the number of exotic female cattle has increased considerably from 4737 in 1997 to 29848 in 2019. Thus, the total number of cattle decreased only slightly from 427802 in 1997 to 162813 in 2019, thus, a net decrease of 61.94%. 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 72.13% 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 (23.79%) in 2019 as compared to that in 1997, and during the same period, the population of exotic sheep increased slightly, thus, indicating a decrease in the total sheep population by 21.10%. The total population of goats increased from 289946 in 1997 to 438167 in 2019, a net increase of 51.12%. The total pig population decreased considerably from 93182 in 1997 to 12249 in 2019.

It is significant to note that the number of female cattle and 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 20.85% share in the agriculture and allied activities sector and grew at a significant average annual growth rate of 13.91% from 2011-12 to 2018-19.

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

	Category	1997	2003	2007	2012	2019
Indigenous Cattle	Total Male	250424	198630	136907	130977	33400
	Total Female	168766	126649	164967	174332	96424
	Total	419190	325279	301874	305309	129824
Exotic Cattle	Total Male	3875	1955	2506	3804	3141
	Total Female	4737	4625	4708	11783	29848
	Total	8612	6580	7214	15587	32989
Total Cattle		427802	331859	309088	320896	162813

Buffalo	Total Male	110464	101145	118827	138921	52961
	Total Female	265688	269819	319961	454735	594542
	Total	376152	370964	438788	593656	647503
Sheep	Total Indigenous Sheep	110132	112993	114045	122915	83926
	Total Exotic Sheep	2267	81	118	1289	4751
	Total Sheep	112399	113074	114163	124204	88677
Goat	Total	289946	312887	348905	397323	438167
Pig	Total Indigenous Pig	84228	73808	74899	49333	11473
	Total Exotic Pig	8954	4376	4281	2593	776
	Total Pig	93182	78184	79180	51926	12249
Total Livestock		1307166	1214064	1295221	1493146	-
Total Poultry		147114	149981	114894	159186	-
Source: http://updes.up.nic.in/spiderreports/intialisePage.action And http://dahd.nic.in/animal-husbandry-statistics						

ii- Cattle Care Centre

Table 19 shows that the Fatehpur 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 (36), cattle development centres (44), man-made reproduction centres (52), sheep development centre (10) and pig development centres (4) have remained constant over the years.

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	36	36	36	36	36	36	36	36	36
D- category Cattle Dispensary	4	4	4	4	4	4	4	4	4
Cattle Development Centre	46	46	44	44	44	44	44	44	44
Man-Made Reproduction Centre	33	33	52	53	52	52	52	52	52
Cattle Reproduction Center	19	19	19	19	19	19	19	19	19
Sheep Development Center	10	10	10	10	10	10	10	10	10
Pig Development Centre	4	4	4	4	4	4	4	4	4
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

2.3 Forestry

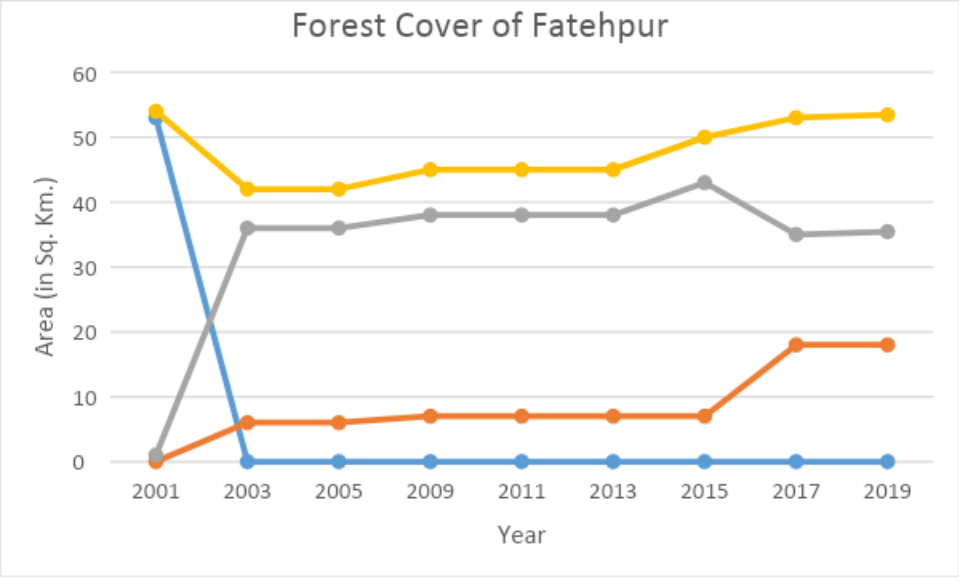


Figure 1 Souce: ISFR (2001-2019)

According to the ISFR report, no major forest area is found in the district. The forest cover has slightly increased as compared to ISFR 2017 to ISFR 2019. Majorly, open forest, followed by medium and dense forest.

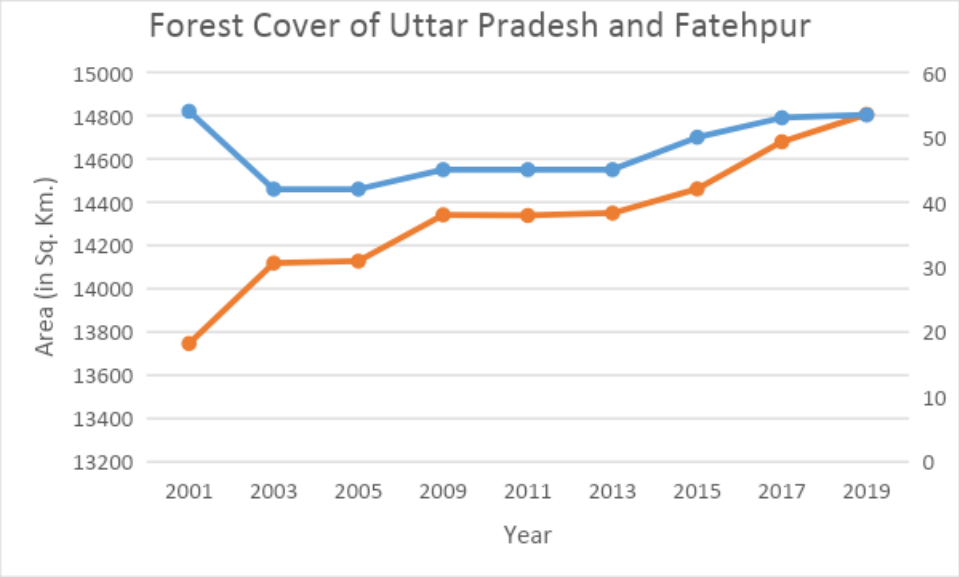


Figure 2 Souce: ISFR (2001-2019)

Over the years the forest cover of Uttar Pradesh has increased significantly. In the case of Fatehpur, the forest ranges between 42 – 53 Sq. Km.

2.3.1. Biodiversity

The district's biodiversity data includes various crop production, livestock population, bird species, and forest cover. The crop production trend shows a reduction in the non-grain crop but increases in all other crops.

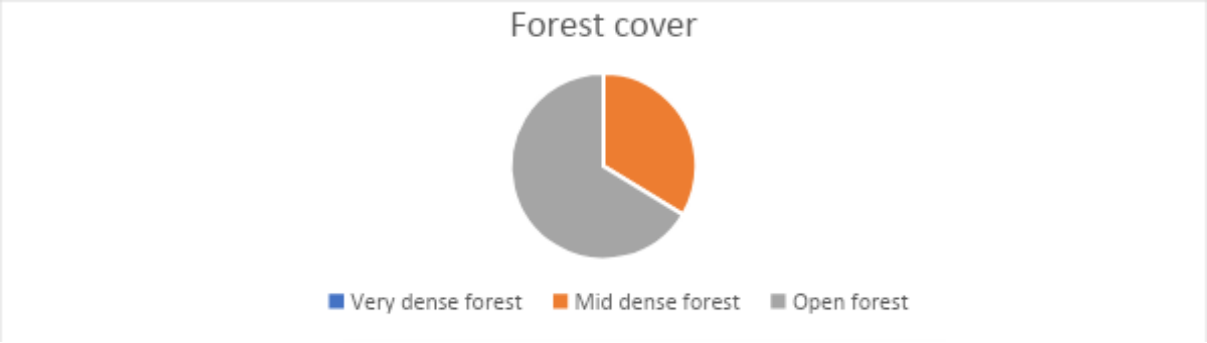
Forest data shows that forest cover was increased by 0.44% in 2019. There are 324 bird species and four rare species of bird in the district.

Table 1 Bird species recorded in the district.

Number of species	324
Number of rare/accidental species	4

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**
4152	0	18.00	35.44	53.44	1.29	0.44	0.00



2.4 Tourism

Total number of tourists visiting Uttar Pradesh- (2005-2006)

Estimating the Number of Visitors for the months of April 2005 to March 2006, the overall number of visitors to Uttar Pradesh (overnight visitors*+day tourists**) was 17799638, including 4494768 domestic overnight visitors, 452386 foreign overnight visitors, and 12852484 day tourists. The following tables detail the number of visitors by location: ACNielsen ORG-MARG Executive Summary - Collection of Tourism Statistics for the State of Uttar Pradesh * Ministry of Tourism ACNielsen ORG-MARG Tourists visiting destinations/locations and remaining overnight is how the word ``overnight visitors'' has been defined. The overnight visitors have been divided into two categories in the report: domestic overnight visitors and overseas overnight visitors. Tourists visiting the destination/location for a single day and without remaining overnight'' is how the word "day tourist" is defined. We collaborate on innovative, cutting-edge tactics and campaigns in a collaborative setting with little hierarchy. Collaborate on innovative, cutting-edge tactics and campaigns in a collaborative setting with little hierarchy. We work in a team environment with less hierarchy.

Why Lucknow, Prayagraj and Kanpur?

It is very important to note here that Fatehpur's current tourist attraction is very low. Total number of tourist sites and locations and considerably low as well. To highlight Fatehpur with reference to other major cities like Lucknow, Prayagraj and Kanpur is one plan that might open tourism related opportunities in the region. Thus, the crux lies in comprehending the total number of tourists visiting Lucknow, Kanpur and Prayagraj as well.

- Uttar Pradesh has a large number of visitors each month.

Tourist Arrival in Kanpur-

Sl. No.	Year	Tourists		Total
		Indian	Foreigner	
1	2001	1,81,922	4,602	1,86,524
2	2002	1,85,678	6,287	1,91,965
3	2003	2,13,647	4,534	2,18,181
4	2004	2,28,411	5,987	2,34,398
5	2005	2,45,524	6,359	2,61,883

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

YEAR WISE TOURIST ARRIVAL IN UTTAR PRADESH

YEAR	DOMESTIC TOURIST	FOREIGN TOURIST	TOTAL	% OF GROWTH(+) / REDUCE(-) IN COMPARISON TO LAST YEAR	
				DOMESTIC TOURIST	FOREIGN TOURIST
2009	13,48,31,852	15,50,309	13,63,82,161	(+) 8.00%	(-) 2.17%

2010	14,47,54,977	17,32,707	14,64,87,684	(+) 7.35%	(+) 11.76%
2011	15,54,30,364	18,87,095	15,73,17,459	(+) 7.37%	(+) 8.91%
2012	16,83,81,276	19,94,495	17,03,75,771	(+) 8.33%	(+) 5.69%
2013	22,65,31,091	20,90,280	22,86,21,371	(+) 34.53%	(+) 4.80%
2014	18,28,20,108	29,09,735	18,57,29,843	(-)19.29%	(-)9.23%
2015	20,65,15,617	31,04,062	20,96,19,679	(+)12.06%	(+)6.67%
2016	20,31,44,204	31,56,812	21,67,01,016	(+)3.04%	(+)1.69%
2017	23,39,77,619	35,56,204	23,75,33,823	(+)9.56%	(+)12.65%

Table 2: Source- UPENVIS

The Tourist Arrival In Maha Kumbh Mela/ Snan, Allahabad In Year-2013 Of Month January 2013 To March 2013 Of Indian Tourist- 7,83,15,500 And Foreign Tourist- 3,50,000 (Total Tourist- 7,86,65,500) Is Included In Above Figure Of Allahabad.

Budget- A provision of Rs. 200 crore made for the Mukhyamantri Paryatan Sthal Vikas Yojana.has is in the pipeline by the UP Government.

2.5 Wetlands

The district is known for huge number of wetlands with some of them renowned one's. The district consists of lakes like Manka Jhil (302.98 Ha), Akhnal Jhil (111.51 Ha), Alaula Jhil (151.89 Ha). The data in Table 4 represent the number of wetlands and their area representation in the district. There are around 455 wetlands sized greater than 2.25 Ha and 1986 less than 2.25 Ha areas. The region consists of small and medium size wetlands only, generally less than 200 Ha in area and there are around 3 wetlands with size for than 200 Ha.

Table 4: Wetland Data of Fatehpur District

Wetland Types	**Total Number of**												
	Wetlands:			**Area (ha)**									**Aquatic**
Natural Wetlands	**NRCD**	**NWIA**	**Diff.**	**<2.25**	**<5**	**<10**	**<20**	**<50**	**<200**	**<500**	**<1000**	**>1000**	**Vegetation**
Lake/ponds	54	59	5	0	19	17	9	5	3	1	0	0	41
Ox-bow lakes/cut off meanders	5	5	0	0	0	1	1	2	1	0	0	0	4
High altitude Wetlands	0	0	0	0	0	0	0	0	0	0	0	0	0
Riverine Wetlands	2	2	0	0	0	0	0	1	0	1	0	0	1
Waterlogged	5	6	1	0	2	0	1	2	0	0	0	0	1
River/Stream	0	39	39	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	72	76	4	0	53	12	5	2	0	0	0	0	48
Waterlogged	233	268	35	0	79	65	49	25	14	1	0	0	153

Salt pans	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (2441)	**371**	**455**	**84**	**1986**	**153**	**95**	**65**	**37**	**18**	**3**	**0**	**0**	**248**

Source: (National River Conservation Directorate, 2008), (Space Application Centre-ISRO, 2007)

- District comprises 2441 wetlands; most of them are waterlogged and lake/ponds/tanks.
- The wetland size is small and medium sized in general.
- The number of natural wetlands is less than man-made.
- Many wetlands both man-made and natural are waterlogged one's and pond type
- Many wetlands have aquatic vegetation.

2.6 Energy

2.6.1. 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. Various capacity solar power plants are being installed for electricity generation from solar energy. According to the 2011 census, 83% households use kerosene, 15.91% use electricity and only 0.53% use solar as the main source of lightning by households (Fig. 1).

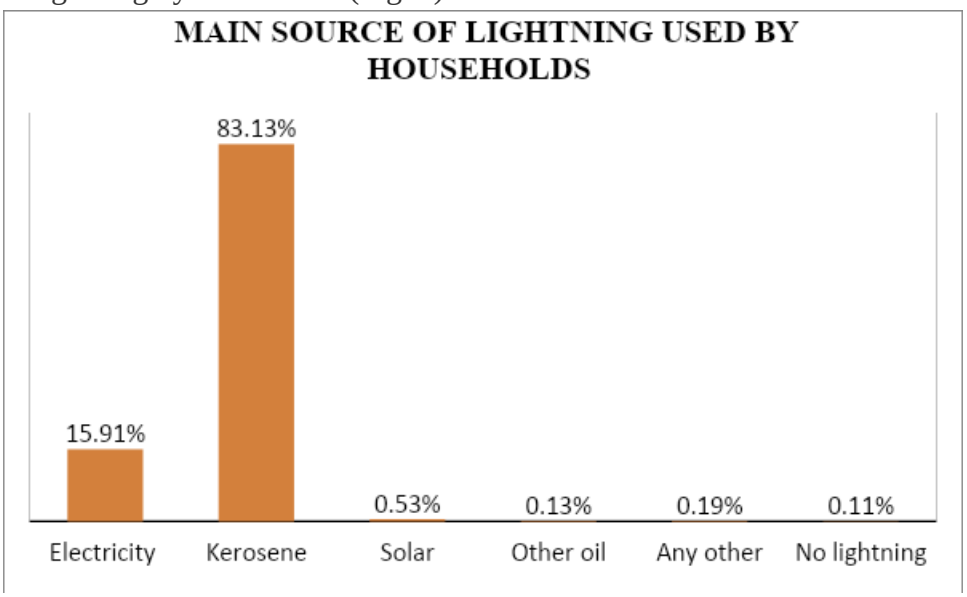


Fig. 1

According to the annual progress reports available on the UPNEDA website, there have been various solar plant units installed in the district Fatehpur. In government buildings like Vikas Bhawan Grid connected rooftop plant of 20 kW has been installed, a 14.8 kW GCRT has been installed at RUB bus station building, a 10.7 kW GCRT has been installed at NWH Station

Building ALD, a 8.8 kW GCRT has been installed at BKO bus station and a 5 kW plant at FTP hospital at Fatehpur. 20 Solar RO water plants have also installed in the district.

The data shows that the concerned authorities have been constantly making efforts to make the district solar powered. A few improvements along with the same pace of development would definitely bring development in the energy sector.

2.6.2. Biomass

Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) is the nodal agency which makes 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. Biomass-based cogeneration in the state sugar mills and rice husk based-electricity generation projects are being encouraged. The district practices agriculture on a large scale and most people derive their income from various agricultural activities. The cropping intensity of the district is 117% with 288971 ha as the net sown area and 411952 ha as the gross cropped area. The district has 10186 ha of land as cultivable waste land and 32819 as current fallow. The productivity of the major crops in the district have been recorded as- rice:2168 kg/ha, wheat: 2968kg/ha and gram: 1153 kg/ha. According to Kumar et. al. (2017)Badaun has fairly good agro residue potential and forest & wasteland potential of 987.7kT/Yr and 84.5 kT/Yr respectively. The data on the official website of UPNEDA mentions some of the biomass based energy plants in the district. A biomass gasifier at M/S Khetan Chemical Fertilizers Limited and a co-generation power plant (Non-bagasse based) at Laxmi cotton mill has been reported.

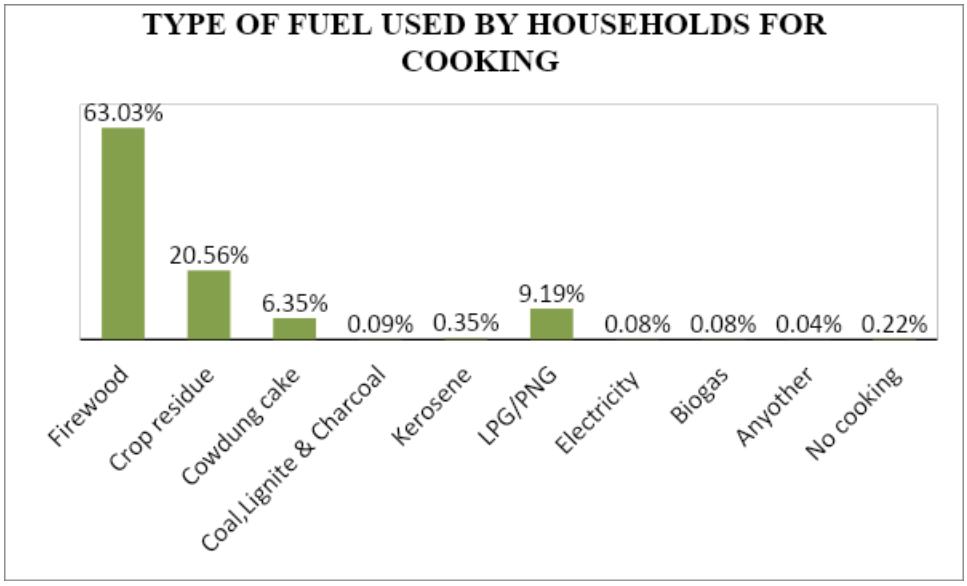


Fig. 1

According to the 2011 census, 63.03% households use firewood, 20.56% use crop residue, 6.35% use cowdung cake and 9.19% use LPG/PNG as the type of fuel for cooking.

The data collected from the possibly available sources indicates that still a lot of people depend on firewood, crop residue etc. for cooking. Not only this, the district is agrarian and still is not utilizing biomass produced in form of crop residue for energy production.

2.6.3. Biogas

No biogas plant exists in the district as per the data. Biogas potential from animal waste was calculated as two crores m^3/year and thirty-five crores m^3/year. This amount of biogas generation can efficiently complete the energy demand of the district.

2.6.4. Hydro Power

No hydropower plant exists in the district. As the district is situated on the banks of rivers Ganga and Yamuna, these rivers can generate electricity by constructing the hydropower plant. However, a survey or identification of the site must be required for the construction of hydropower plants.

3 QUALITATIVE DATA ANALYSIS

3.1 AGRICULTURE, ALLIED ACTIVITIES,

3.2 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.[2]

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).[3]

[2] State Action on Climate Change, Uttar Pradesh

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

3.2.1. Biodiversity

As per the report by The Times of India 2012, Panchdev Yamuna Nadi Mitra Society, Ekdala in Fatehpur (a local organization of Nadi Mitra Mandali) has launched a Dolphin Darshan Kendra' (Dolphin Watch Centre) to protect Gangetic dolphins and give a rare experience of viewing the national aquatic mammal frolicking in the river. No bird sanctuary or biodiversity park exists in the district.

3.3 ENERGY

As per the data of the year 2013, Fatehpur district energy consumption is around 708 TJ/year and 3.7 GJ/capita/year. GHG emission of 48,697 Ton CO_2 equivalent and 0.252 Ton CO_2 equivalent/capita has been evaluated for the district.

3.3.1. Solar

The concerned authorities in the district Fatehpur for the solar energy have been taking steps in making the solar energy sector better in the district. A news article in Jagran is testimony to this according to which 100 schools of the district have received the gift of solar power plant from the government. In this, 90 councils and 10 Kasturba Gandhi residential girls schools will be connected to it. An article in Amar Ujala mentions that -the Agriculture Department has increased the amount of grant to promote solar pumps for irrigation. Now farmers will be able to install solar pumps at low cost. The prices of solar pumps of two, three and five horsepower have been reduced. The target of installing 48 solar pumps is left in the district.

3.3.2. Biomass

Fatehpur seems to lack awareness and knowledge about biomass energy production. An article in Times of India mentions that the district Fatehpur comes under the orange zone, as there have been 200-500 incidents of stubble burning in the last 4 years. This means that farmers probably do not have an alternative option of getting rid-off from the crop residue hence they have to burn it. Hence if biomass plants are being set up then this problem of stubble burning could be avoided.This can be done if biomass produced is utilized at smaller scales by setting up small biomass plants by the local entrepreneurs etc.

3.3.3. Biogas:

The district has a high potential to generate biogas from agricultural, animal, and human waste. A national program such as the New national Biogas and organic manure program (NNBOMP) and

Biogas power generation and thermal energy application program (BPGTP) are running by the State and should be applied to this district generation decentralized energy source.

3.3.4. 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. The district is near the upper Ganges or Ganga canal and can generate electricity from it.

3.4 TOURISM

3.5

How to Reach

Roadways Bus Route

The Fatehpur district is well connected to other Uttar Pradesh cities by road. Fatehpur district, which is located on Grant Truck Road, has direct access to practically all major cities. The Uttar Pradesh State Road Transport Corporation's bus stop is also located here. Bus services are offered on a regular basis for cities like Delhi, Kanpur, Lucknow, Allahabad, Banda, Chitrakoot, Jhansi, and Bareilly.

Indian Railway Route:

Fatehpur station is located on the Indian train route connecting Howrah and Amritsar. New Delhi, Jammu, Howrah, Jodhpur, Farrukhabad, Kanpur, Allahabad, and Varanasi, among other cities, have mail and express trains.

Airway Route:

The nearest airport in Kanpur's Chakeri Airport, which is 78 kilometres distant from Fatehpur; the next closest airport is Lucknow's Amausi Airport, which is 111 kilometres away. In both airports, daily flights to Delhi are available.

Cities Near Fatehpur-

This is a list of the largest cities in India that are nearest to Fatehpur. A huge city has a population of at least 200,000 people, and you can usually fly into one of the main airports. Find the nearest airport to Fatehpur, India if you need to book a flight. You can also check for cities 4 hours (or 3 hours, 2 hours, or 1 hour) away from Fatehpur, India, or just search for cities near Fatehpur, India in general.

Major cities in Uttar Pradesh are approximately around 100 km from Fatehpur. This includes Kanpur which is 74 74 kilometres away and Allahabad which is 118 kilometres away. River Ganga flows through these two major cities as well. The capital city of Uttar Pradesh, Lucknow is 103 kilometres away.

Places to see in Fatehpur-

Om Ghat, Bhitaura

This is a block headquarter situated at the bank of holy river Ganga . This is the place where renowned saint Bhrigu worshiped for a long time . Here, the flow of river Ganga is towards the north direction, which is very important from the religious point of view .

Imali Bawani

This memorial honours the sacrifices made by liberation warriors. The British army hanged fifty-two freedom fighters on a "Imali" tree on April 28, 1858. People say that the "Imali" tree still lives, but that its development has slowed since the tragedy. This location is close to the town of Khajuha in the district's Bindki Subdivision.

Nearby places-

- Bithoor, on the banks of the Ganges, is a significant religious and historical village located 22 kilometres upstream from Kanpur on the Ganges. Bithoor is a peaceful location with historical and religious significance. Legends and stories surround Bithoor's illustrious past. According to Hindu legend, Lord Brahma, the Creator, chose Bithoor as his home after the Universe was destroyed. Valmiki Ashram is the most important location in Bithoor. Inside Valmiki Ashram, there is a tiny pool known as Sita-Kund. The 'Rasoi' Sita is still standing beside the 'Swarga Naseinee' or Deep Malika Stambha, which is studded with niches for illumination all around. The tower has around 48 steps to its top, which is topped with a cupola from which one may have a panoramic view of the entire area- attractions for Visitors Ganges Ghat and a lovely picturesque location.
- Kanpur and Allahabad can become base locations for visitors who intend to travel and explore Fatehpur. Local tourist spots of these two cities can further be enhanced and eventually clubbed together to propose an engaging “weekend” trip to Fatehpur.
- Lucknow being the state capital and not being very far away can also be one opportunity to look ahead in making Fatehpur a go place not only for outsiders from different parts of the country and world but also local people travelling within the state can have a go-to place to have an interesting time.

Data analysis

- According to Table 1, Tourists since 2001, the total number of visitors to Kanpur has climbed year after year. In the year 2005, Kanpur attracted 2.6 lakh visitors. In 2005, around 94 percent of all tourists were Indians, while only 6% were foreigners. Kanpur has seen a 40% increase in total visitor arrivals from 2001 to 2005.

- Table 2 shows us the total number of tourists visiting Uttar Pradesh in the years 2009 and 2017 with some growth. We need to not only understand but also study multiple factors that are gently helping in attracting more tourists in these years. There has been an increase in the total number of tourists between the years 2009-2013 (in fact 34% rise in the year 2013) Whereas there is a decline in the year 2014, both in Indian tourists and foreign

tourists as well (-19% and -9% respectively). Then again there is a rise in the total number of tourists in the following years 2015-2017.

SWOT Analysis

S. No	Strength	Weakness	Opportunities	Threat
•	• Geographically located between two very important cities of Uttar Pradesh that is Kanpur and Allahabad. • Tourist spots at these two cities can be clubbed together to propose a weekend plan.	• Doesn't have many tourist spots, heritage sites or local craft that can be promoted, • Long-term ower can have a negative impact on tourists and other facilities are inter-dependant.	• Much local research needs to be done to identify more and more opportunities that can further be utilized in bringing more tourists both local and foreign.	• Lack of a good budget by the government can be a big barrier. .

3.6 WETLAND

The wetlands are the source of many ecosystems and habitats for a variety of species. The wetlands create a unique ecosystem that supports many species simultaneously like aquatic, terrestrial, and human beings. The district has many potential sources and opportunities to harness valuable products using the scheme and start the pilot project. Local stakeholders directly or indirectly depend on the wetland for their income and small-scale business. These businesses can be a great opportunity can be turned into a large-scale production hub using the right approach. The region has a good amount of production of wheat and rice. The region is known for the large kund and tourist places. 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:

- Pulses and wheat production is recommended as commercial crops in the region, leading to products like product related like flour and pluses.
- Introduction of improved cultivars and production technologies of pulses and oilseeds.
- India Govt. has proposed a mission like India's Millet Mission, which creates an opportunity for the district to become a production hub. The district stats show a good amount of finger millet, pearl millet, bajara in the region, which can be promoted in the scheme.
- Also, products like oil, finished pulses can be derived from the crops and millets grown in the region.
- Also, this region is a belt of large varieties of oil production in the region like mustard, linseed, castor seeds which can turn into valuable market for oil production in the region.
- The district is famous for its man-made ponds and historical values.
- The region has a large production of dairy products, which lead to an increase in animal husbandry. Wetlands can support the growth of fodder for the animals in the region.

4 ACTION PLAN DEVELOPMENT

4.1 AGRICULTURE

4.2 FORESTRY

In July 2019, the government of Uttar Pradesh took 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 a 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.[4]

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

4.2.1. Biodiversity

- Dolphin watch center has been developed to protect Dolphins by the local organization.
- For conserving biodiversity, sustainability, and climate change, various initiatives such as Mission on the sustainable Himalayan ecosystem, Green UP mission, and sustainable habitat mission have been implemented in the district.
- Control of pollution from industries identified under the Ganga action plan.
- In urban areas, rooftop rainwater harvesting should be made mandatory for all government buildings and schools due to the occurrence of deep water conditions to limit the decline of water levels.
- Farmers in the Fatehpur district are receiving specific training in organic farming as part of the Namami Gange initiative. The Ganges dolphin is also found in the area; therefore, conservation efforts are underway through a specific initiative.

4.3 TOURISM

- **Attracting tourists by clubbing a 'Travel Uttar Pradesh' plan-** As discussed earlier Fatehpur has fewer environment and cultural heritage attractions. To provide visitors a better awareness of how humans affect the environment and to instill a greater respect for ecosystems it can be clubbed with other major cities like Kanpur, Prayagraj or even state capital Lucknow. In the Fatehpur district, there is a big chance to establish events around river ganga not only on religious grounds but also cultural grounds as well. The project will reduce the detrimental effects of traditional tourism on the environment while also enhancing local people's cultural integrity. This initiative will also increase visitor traffic in the area.
- **Sustainable tourism-**
  Sustainable Development Goals Sustainable tourism is also related with goals when keeping in mind sustainable tourism and its development. If the tourism destination is a water body or a forest region, human activities have an impact on life below water and on land; thus, it is our collective responsibility to ensure that tourism is sustainable. Locals/natives can be included in trade and business activities to ensure their long-term sustainability.
  Different tourists share an equal sense of responsibility for the development of sustainable tourism. Every person is responsible for the factors including many elements. For example, lowering the carbon footprint per visitor by employing environmentally friendly practices

Projections and Monitoring matrix

Sector	Intervention	Strategy	Total cost	Expected Outcomes
Tourism	**Research**	● The cause and motive for tourism can be predicted using various data and matrices which are available on various government official websites as well as private organizations have done their bit too. It is also feasible to discover the elements affecting tourism in Uttar Pradesh through significant qualitative and quantitative research. ● All political pressures and influences must be removed from research to bring as much transparency as one can. ● When adding new records, the researchers must ensure that the field data and secondary data are correct and unaltered. This would allow us to articulate a precise conclusion in the long run for the upcoming projects. ● It is necessary to enlist the help of unbiased researchers.		As a reference for other processes, a well-researched document. Tourism in Uttar Pradesh is influenced by a number of factors. Define the factor that influences tourism activity. To be able to understand and work upon all the listed factors and create a need for travel for people within and outside the country! Research and prior lessons will be used to inform the planning process. For a successful implementation, realistic planning is required.

	Planning	● Research and analysis of various data and reports can be used to generate action plans for intervention. ● Developing an active action plan is critical because the results are dependent on how it is prepared and later implemented as well. ● Planning must take into account the state's social position as well as the impression that tourists have of the country. ● Non-practical forecasts should be avoided at all costs. ● Making plans for Mahotsavs, festivals, and fairs to boost the local economy by also employing the local campaigns like #VocalForLocal or #HandloomDay or #WhoMadeMyClothes have worked in the past. ● Separate comfort and leisure trip planning for diverse tourist demographics. It is critical to consider the demographics of travellers while creating tour packages and fares,		

		for example. Foreign tourists expect a lot of hygiene, whereas local tourists expect a lot of deals. As a result, these problems must be addressed and also considered for improvement. ● Sites must be developed according to a set of requirements in order to attract a diverse variety of tourists. Brand Manufacturing to increase tourism activity throughout the state. ● Organizations of grand events like poetry event and local art fairs which hold meaning and significance. ● Complete use of allocated budget.		
	Implementations	● To attract more tourists, various schemes such as tourist packages, tariff plans, and so on can be devised. ● Mahotsavs and fairs will be held to boost the local economy and attract visitors. ● Creating tourism circuits ● Creating dining establishments		To increase the number of tourists and increase tourism earnings from all possible tangents. To boost the state's image while ensuring that no other social issue has an impact on tourism earnings. Create a flowchart to constantly maintain the set standards of

		• Establishing a link between tourist and local culture and cuisine. • Advertorial promotion that has an over-all extensive approach to capture the right audience. • A well-known figure serves as a brand ambassador. • A significant amount of branding and marketing. • The development of tourist attractions and historical sites. • Information and travel packages are available on government websites. • Conducting thorough market research in order to build strategies • Ganga arti culture • Eco-tourism activities boosted by Ganga Festivals		tourism and consider feedback of tourists.
	Impact Assessment of results	• Figuring out where the touchpoints are and to keep a track of pattern of tourists who travel frequently. • The understand the cause of failure and work upon it. • The reason behind the achievement • Planning for future considering all over aspects of that can be covered.		• To learn the lesson and establish the root cause of success and failure, which will be applied in the future with modifications.

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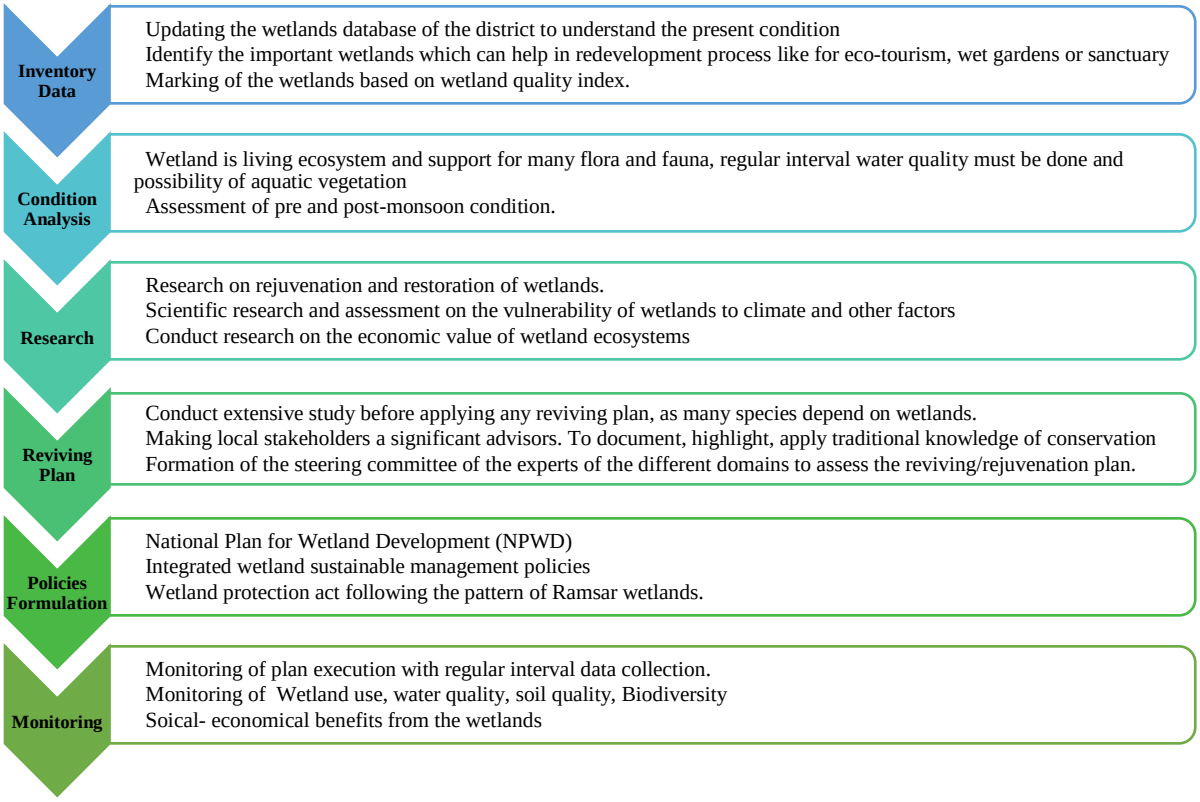
4.4 WETLANDS

The district is comprising of some of the healthy and wealthy wetland ecosystems. They directly or indirectly support millions of people and provide goods and services to them. They support all life forms through extensive food webs. They are a habitat to aquatic flora and fauna and numerous species of birds, including migratory species. They mitigate floods and recharge the groundwater. They need to be taken care and action on different fronts needs to be taken. The action plan below gives a glimpse of the action and development required to protect, conserve, rejuvenate the wetlands existing and extinct.



4.5 ENERGY

4.5.1. Solar

A lot of solar panels have been installed at the government buildings including the offices, schools, and bus stations in the district. Attention needs to be paid to the economic sectors in the district, such that they are powered by solar energy and when the solar energy sector will expand it will

also increase the employment opportunities in the district. The industries, especially the small scale ones, should be provided with the subsidy and the net metering facility. This will give them returns quickly and they will not have to wait for longer durations to earn profit. Not only industries but the agriculture sector also needs attention because it is the main source of income for the majority of people. The people of the district Fatehpur should be educated about the Kusum Yojana. Gram Panchayats would be the best medium since they are directly connected to the people. The fallow land near the village areas should be utilized for this purpose.

Other than this the government should install solar plants in government schools, colleges, hospitals and other public buildings. The remote areas where there is lack of proper infrastructure the concerned authorities should encourage people to install off-grid plants and the users should be provided the solar power units at the minimal possible rates.

Projection and monitoring

The very first thing which is required is that people should be made aware about solar energy through different campaigns and awareness programs. Village panchayats and other local governments along with other self-help groups could play a major role in spreading awareness about solar energy. Next step could be providing some financial help for the off grid solar panels in the remote areas or in the areas where utility supply has not yet reached. Also, the small industries and the MSME's could be allowed for net metering so that they get early returns. The other thing which can be done is establishing solar feeder segregation technology under National Solar Mission in those villages where the majority of farmers could not easily afford individual solar pumps. For the better establishment of solar energy in the district a contribution in research is also required which would ultimately lead to its development.

4.5.2. Biomass

The district requires development of power plants which utilize biomass to produce electricity, 2G ethanol etc. This will help the district to fulfill the electricity demands and also the stubble burning could be stopped. Government should encourage community based biomass plants in the villages especially, and these should be provided with the wastes available from other urban and industrial sources as well. The fallow land available in the district can be used to set up the biomass plants.

The municipalities and panchayats could come forward and set up these biomass plants in the urban and rural areas respectively. Entrepreneurs should be provided with easy facilities for setting up biomass energy plants. All this requires a well-planned system dedicated solely to bioenergy production.

Projection and monitoring

In the initial steps it is important to make people aware of bioenergy so that they develop their belief in it. This can be done by conducting seminars in schools and colleges, campaigning, etc. After this the farmers in the district should be encouraged to sell the agricultural residues. This can

be done by fixing feasible rates of crop residues, so that neither the buyer nor the seller is at loss. There should be regulatory norms for rice mill owners, etc. to have their own biomass plants. If it is not affordable, then maybe a group of them can come together and set up biomass plants. This way construction costs could be divided among a few of them. The municipalities and the panchayats can collaborate with the private entrepreneurs and start the biomass plants. This will increase employment opportunities in the district. Lastly a well-connected and well-knitted system for transportation should be set up to maintain the supply of biomass from different parts of the district.

4.5.3. Biogas:

Principal secretary sports and rural engineering department instructed a built biogas plant in the village Bahrauli. The energy production using biomass can be done using crop residue, animal waste, etc. The important thing is the easy availability of any of these resources, which depends on the geographical location of the area. The livestock population in the district is enough to generate biogas for individual families present in the district. So, the best-suited technology for the district is the anaerobic digestion plant that can be set up on the household level to utilize crop residues and animal waste.

4.5.4. Hydropower:

No hydropower potential seems in the district, as canals in the district were dry in the month of December 2020.

5 RECOMMENDATIONS

5.1 AGRICULTURE AND ALLIED SECTORS

- Groundwater shares over 80.5% of NIA in the district and number of medium and deep 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 bring more areas under the tank or pond irrigation.

- 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.

- Food grains constituted about 84.53% of the GCA in the district, while their share in the total value of agricultural output is about 82.55%. In contrast, Potato comprised only 2.22 percent share in GCA, but it contributed 7.10% to the total value of agricultural output. This calls for diversification towards high-value horticulture and livestock activities. The government can promote micro and small units for horticulture products processing. There is a needs to introduce more horticultural crops, mainly vegetables like cauliflower, cabbage, brinjal, tomato, etc., for more profits.

- It is significant to note that the number of female cattle and 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, on average, contributed 20.85% to the value of output of agriculture and allied activities and it grew at a significant average annual growth rate of 13.91% from 2011-12 to 2018-19. This indicates that livestock is the key driver of agriculture growth in the district, which need to be promoted through creating an efficient marketing network and setting up dairy and dairy-based processing units. There is also a need to upgradation of local breeds for cattle and buffaloes.

- 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.

- About 92% 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.

- There is a huge scope for mushroom cultivation for the rural youth and farm women to enhance the farmer’s income. 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, mango, guava, and banana should also be promoted by establishing local market, processing units and cold storage.

- The district has scope for beekeeping and Sericulture. It should be encouraged among the farmers.

- Farmers should encourage aonla or amla and ber orchards in sodic soil and engage in intercropping such as turmeric in orchards.

- Per capita electricity consumption in the district agriculture increased from 208.28 KWH in 2014-15 to 341.5 KWH in 2019-20, a net increase of approximately 66.02%. Since electricity consumption has increased over the years and more than 45% of total electricity consumption is in agriculture, there is a need to promote the use of solar energy use 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.

- 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.

Recommendation to Developed Agriculture Activities and Allied Activities

- High-yield seeds should be used by the farmers to increase productivity, especially in paddy and wheat.
- There is a need to introduce more horticultural crops, mainly vegetables like cauliflower, cabbage, brinjal, tomato, etc. for more profits.
- The district needs to bring more areas under the tank or pond irrigation to reduce groundwater exploration.
- salt-tolerant crops varieties and gypsum application should be promoted in the salt-affected areas.
- More schemes and training should be provided to increase organic farming to boost soil health.
- Vermicomposting and green manuring should be adopted by the farmers to maintain soil health.
- Farmers should be trained on the uses of fertilizer and chemical pesticides applications.
- There is a scope for introducing medicinal crops like tulsi, mentha, lemongrass etc.
- There is a large scope for fruit cultivation like papaya, mango, guava, and banana, which should be encouraged.

- There are needs for establishing local market food processing units and cold storage.
- The district has scope for vegetable cultivation like chili, onion, garlic, capsicum, which should be encouraged for much return to the farmers.
- Flower cultivation like cut flower rose, marigold should be encouraged for much return to farmers.
- The district has a scope to introduce mushroom cultivation.
- Greenhouse and poly house cultivation should be promoted for horticultural high revenue crops.
- Farmers should encourage aonla or amla and ber orchards in sodic soil and engage in intercropping such as turmeric in orchards.
- Farmers should follow the crop advisory under the drought condition and need to adopt techniques like drought resistance variety and maintaining moisture of soil by covering the soil.
- There is scope for introducing beekeeping for local farmers, which could be encouraged through proper training.
- There is scope for dairy and dairy-based processing units and needs to upgradation of local breeds for cattle and buffaloes

5.2 FORESTRY

Fatehpur is located on the bank of river Ganga, and Yamuna river. According to ISFR 2019, 53.44 Sq. Km. The area of Fatehpur is covered with forest. As discussed above, the forest cover of Fatehpur has increased slightly as compared to previous assessment of ISFR 2017. No major forest was 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 rivers etc.). Government can promote the afforestation, agroforestry activities by providing output based incentives.

5.2.1 Biodiversity

It is recommended to promote the local organization (Panchdev Yamuna Nadi Mitra Society) that works to protect Dolphins in the Ganga river.

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 indirectly relieving of stress from 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 recommendations

and interventions are required to get valuable products and solve the issues/ challenges faced by the local people of that region.

- Sugarcane producing farmers need to learn about crop rotation as sugarcane is water intensive and draws lots of nutrients from soil too.
- Diversification through introducing vegetable, mushroom, bee keeping, fruits, medicinal plants, dairy, poultry etc. for nutritional security
- It is recommended to rejuvenate and restore the water bodies of the district.
- A scheme like millet mission will give a boost to crops like millets, oats, and pulses.
- Awareness about the water utilities needs to be promoted between the local people to lower the water crisis. Production enhancement and conservation of green fodder for livestock.
- It is recommended to promote production of medicinal plants in the region to promote ayurvedic medicine and wetland can support the water supply for the cultivation.
- It is recommended to promote eco-tourism in the region. As the region can be developed with flower gardens around the wetlands area and biodiversity's.

5.4 TOURISM

- Weekend trips can be planned at many destinations in major cities of Uttar Pradesh. The maximum distance to such weekend destinations is about 200 km. A round trip over the weekend to these places can be a perfect getaway.
- **Ecotourism** is a whole new type of tourism. Ecotourism is the preservation of travel to natural regions in order to appreciate the cultural and natural history of the environment while also offering economic opportunities that make conservation and protection of natural resources beneficial to local people.
  In a nutshell, ecotourism is defined as a tourist programme that is "nature-based, ecologically sustainable, with a large component of teaching and interpretation, and benefits local people.The concept arose after a handful of popular eco-tourism packages drew a big number of visitors, prompting the government to support lesser-known sanctuaries, waterfalls, wildlife, and forest regions like Bithoor(Near Kanpur)
- **National Poetry Sohan Lal Dwivedi Event-**
  Pt. Sohan Lal Dwivedi was born on March 4, 1906, in Bindki, Fatehpur, to a wealthy landlord (Zamindar) and business family. He had his primary and secondary education in Fatehpur, and his higher education in Prayag (Allahabad) and Varanasi. Pt. Sohan Lal Dwivedi, after becoming acquainted with and closer to Pt. Madan Mohan Malviya, the founder of Banaras Hidnu University, played a crucial role in the 'independence fight' through his patriotic compositions. His lyrical temperament made him completely devoted to his nation, and he wrote a number of exhilarating patriotic lyrics, most of which were sung. He was the editor of the 'Adhikar' newspaper as well as the 'Bal Sakha' monthly issue. In 1970, the Government of India gave the title of 'Padma Shri,' while Kanpur University conferred the degree of D.Lit in 1974, and in 1976, the U.P. Government named a Govt. Girls Inter College in Bindki after him, as well as a library at Gandhi Park Ram Leela Ground. Pt. Sohan Lal Dwivedi, a national poet, died on March 1, 1988.

Monitoring, Evaluation & Impact

	Broad objectives / recommendations	Key activities / interventions to be planned			Monitoring & Evaluation	Impact
		2022	2023	2024		
1. 2.	National Poetry Sohan Lal Dwivedi Event- Attracting tourist by clubbing a 'Travel Uttar Pradesh' plan	Rajiv Gandhi Mahila Vikas Pariyojana (RGMVP) mobilises Young Women's Self Help Groups (YWSHGs) 2,70,000 young women are part of RGMVP's network in the country. To find and organise them into specific locations,	Track various groups and their performances.	Reevaluate their functionality.	Intervention impact- RCTs, regression analysis, propensity scores, econometrics, structural equation modelling	Upgraded staff and facilities associated with UP State Tourism Corporation. Clean Ganga and more tourists.

5.5 ENERGY

5.5.1. Solar

It can be conluded that in the district Fatehpur awareness about solar energy and its benefits should be done. Kusum Yojana should be promoted among the farmers, this would bring advancement in the agricultural activities, which would definitely lead the district to flourish in a sustainable manner. Infrastructural development is also important so that easy installation of grid vconnected solar panels is done and more and more people get inclined towards solar energy.

5.5.2. Biomass

It can be said that the district Fatehpur requires awareness about bioenergy. Biomass based gasifier plants are best suited for the district. The rice mills should be encouraged to set up biomass plants. State Government's Biomass Based gasifier Power Project is best suited for the district. The local

governments should also come forward to develop this sector. These initiatives will altogether lead to development of the district's economy and livelihood in a sustainable manner.

5.5.3. Biogas

It is recommended to construct a high capacity cowshed in the village Thiryanv and use it for biogas production.

5.5.4. Hydropower

It is recommended to investigate the sites and check hydropower potential for the district.

6. Discussion during the Report Presentation

- In Fatehpur, there is a social attachment of the Locals with Ganga specially in Bhitaura Ghat.
- Ganga Aaarti are conducted on Bhitaura Ghat by the locals.
- There is a requirement of pucca ghaat in Bhitaura
- Recently in a discussion with Tourist department development of an aquasafari, dolphin sightseeing was suggested for Fatehpur. A small check dam is required to gauge the water level and lay down a proper plan. There is a need of technical expertise and guidance which was requested from Namami Gange.
- 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

Table 6 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)
Cattle	Manure	3,20,896	10	1,17,12,70,400	878452800	175690560	25	7027622.4
Buffalo	Manure	5,93,656	15	3,25,02,66,600	2437699950	487539990	25	19501599.6
Sheep	Manure	1,24,204	1	4,53,34,460	34000845	6800169	25	272006.76
Goat	Manure	3,97,323	1	14,50,22,895	108767171.3	21753434.25	25	870137.37
Pig	Manure	51,926	2.5	4,73,82,475	35536856.25	7107371.25	25	284294.85
Poultry	manure	1,63,119	0.1	59,53,844	4465382.625	893076.525	25	35723.061
TOTAL		1651124						27,991,384.04

Table 7 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	671	1.5	1006.5	704.55	15	598.8675	800	479094
Wheat	straw	591435	1.5	887152.5	621006.75	30	434704.725	800	347763780
Sugarcane	Bagasse	234214	0.33	77290.62	54103.434	80	10820.6868	750	8115515.1
TOTAL		826320							35635838 9.1

Table 8 Trends in Crop Production

Crop/Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Non-grain crops (Metric Tonne)	19247	22171	19659	19542	15406	8650	12139	12139	14646
Grain crops (Metric Tonne)	346458	406214	460193	471678	480473	275708	397502	397502	597398
Sugarcane (Metric Tonne)	9314	10898	11480	10861	8939	7729	8906	8906	12551
Potato (Metric Tonne)	1020989	1011908	876836	1489626	978151	851310	869605	869605	1563879

Table 9 Livestock trend in district.

Livestock	2003	2007	2012
Cattle (Cow)	331859	309088	320896
Buffalos	370964	438788	593656
Sheep	113074	114163	124204
Goat	312887	348905	397323
Pigs	78184	79180	51926
Chicken	149981	114894	159186
Other Poultry	6406	44819	3933
Horses and Ponies	2996	2501	3834
Others	4100	2596	1307