Arth Ganga Project: District Prayagraj

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EXECUTIVE SUMMARY

Prayagraj is one of the oldest holy cities in the state of Uttar Pradesh. The city situated at the confluence of three major rivers holds historical and religious importance.

The total geographical area of the district is 5482 km^2. Owing to the rivers and adequate amount of precipitation, 64% of total cultivated land (436400 ha) is irrigated with the gross irrigated area is 392142 ha whereas 36% is rainfed. The land under irrigation has shown an increase in 2018-19. The share of cultivable wasteland and barren and uncultivable land decreased from 2.43% to 2.04% and 2.84% to 2.68% respectively, in 2017-18. The district is divided into four Agro-ecological situations namely, Black and Coarse-grey land, Jamuna khaddar, and Alluvial, Ganga Low land, and Sodic and Ganga plain. Permanent pastures account for 1638 ha, the Cultivable wasteland is 13335 ha. The barren and uncultivable land constitutes 16585 ha. Majorly based on the extent of erosion soil types are highly varied, mostly loam. With the net sown area of 314356 ha and gross cropped area of 479600 ha, the Cropping intensity of the district is 158.3%. The net sown area ranges from 54.18% to 63.31%. The area for non-agricultural use increased steadily over the period from 14.34% to 17%. The district's net and gross irrigated areas increased from 77.01% and 78.23% in 2010-11 to 87.77% and 89.04%, respectively in 2017-18. The major crops types are Paddy, Wheat, Rice, pulses, etc. Among the horticulture crops are Potato, Brinjal, Tomato apple, etc. whereas Guava, Melon, Watermelon, etc. are the main horticulture products in different regions. The use of chemical fertilizers has been prominent with the use of nitrogen higher and phosphorus and potassium used in lesser amounts than the prescribed ratio. Over the years the crop yields have been found to show fluctuations. The livestock consists of cattle and goats, buffalos, sheep; along with poultry and fisheries. The livestock grew at an average rate of 3.53% from 2011-12 to 2018-19. The tertiary sector makes up about 50% of the economy of the district with public administration having the highest contribution to the economy (30.11%). The primary sector grew with an annual growth rate of 7.66%. The tertiary sector had a growth rate of 9.05% with a share increase to 57.60% in 2018-19. In 2017-18, the nitrogen share, after declining, became 66.23%, while the phosphorus share increased to 25%, and the potassium share rose to 8.76%. The overall use of chemical fertilizers has reduced in the district from 321.91 kg/ ha GSA in 2010-11 to 220.30 kg/ ha GSA in 2017-18.

The total forest cover of the district is 129.21 km^2. Out of total forest cover, the maximum area is covered by Open Forest (97.21%) followed by Moderately dense forest (26%) and Very Dense Forest (6%). The district has increased forest cover and contribution in GDP up to 2019 with an annual average growth rate of about 20.37%. The share of wooded areas and gardens also declined from 1.48% in 2011-12 to 1.01% in 2017-18. Few places have concentrated rich biodiversity like Company Bagh, Kusrobagh, Balapur pond, etc. First Sanskriti Forest has been proposed. The district comprises 1097 wetlands; most are lakes/tanks/ponds and waterlogged, small or large-sized where the number of natural wetlands is less than man-made. There has not been much significant change observed in the district's tourism except in the year 2019 the change observed

has been 536.45%. The number of foreign visitors was more (698.13% change) than the number of domestic visitors. One of the main reasons was the hosting of Kumbh Mela, an auspicious festivity in the district. There are numerous temples of religious importance along with parks, museum, forts, planetarium, ghats among which Sangam has depicted the confluence of Ganga, Yamuna, and Saraswati and holds high importance.

The main source of lightning is Kerosene (55.37%) closely followed by electricity (43.57%) while only 0.39% is the usage of Solar energy. The main fuel source is cow dung cake (36.70%) and firewood (34.52%) with LPG/PNG usage of about 22.4% only. Solar plant units are installed at different government offices and other places in the district. Many solar rooftops have been installed at various buildings. Biogas potential from animal and agricultural waste was calculated at approximately 3 crore m^3/year and 46 crores m^3/year respectively. This shows high biomass production from animal and agriculture waste. No hydropower project has been assigned to date.

Various measures such as eco-tourism should be taken to improve tourism and enhance the use of renewable energy especially by creating awareness. Use of high-yielding seeds, micro-irrigation, constructing and maintaining harvesting structures, adopting greenhouse farming with organic farming, and encouraging farmers for adapting different crop cultivation and various irrigation methods. Along with focussing on agriculture practices Bee culture, dairy, poultry, fisheries, etc. needs encouragement as they have high economic potential.

1 DISTRICT OVERVIEW

1.1 INTRODUCTION

Figure 1 Map of the district

1.2 DEMOGRAPHIC PROFILE OF PRAYAGRAJ

- Geographical Area: 5,482 Sq Km
- Administrative Divisions:[1]

  District Headquarters: Prayagraj (Allahabad)

  No of Municipalities: 10

[1] http://www.upenvis.nic.in/Database/Allahabad_932.aspx

No. of Nyay Panchayats: 218

No of Tehsil: 8

No of Blocks: 23

No of Gram panchayats: 1710

No. Of Villages: 3178

- Demographic and socio-economic indicators:[2]

  Population: 59,54,391 (Census 2011)

  Population density (Total persons per sq. km): 1086

  Sex ratio: 901

  Literacy: 72.32%

- Occupation/ other Livelihood source:
- Major Rivers: Ganga, Yamuna
- Forest Area: 129.21 Sq. Km.

1.3 AGRO CLIMATIC PROFILE OF THE DISTRICT

1.4 ECONOMIC PROFILE OF PRAYAGRAJ

[2] http://www.upenvis.nic.in/Database/Allahabad_932.aspx

The primary sector does not significantly impact the district economy because it only shares, on average, 13% of the district economy, though, it grew with a remarkable annual growth rate of 7.66%. The share of the secondary sector decreased from 38.44% in 2011-12 to 28.82% in 2018-19. This sector grew with a moderate annual growth rate of 2.29%. The tertiary sector occupies almost 50% of the share in the district economy. It increased with a yearly magnificent growth rate of 9.05%. Consequently, its share went up from 48.91% in 2011-12 to 57.60% in 2018-19. Table1 shows that the primary and tertiary sectors have been the economy's growth engines during the time period from 2011-12 to 2018-19.

Table 1: Trends in Gross District Domestic Product in Allahabad 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	3002.74	9127.46	11612.23	23742.43	-	-	-	-
	(12.65)	(38.44)	(48.91)	(100)				
2012-13	3042.50	8109.05	13804.80	24956.35	1.32	-11.16	18.88	5.11
	(12.19)	(32.49)	(55.32)	(100)				
2013-14	3080.81	7968.26	12980.71	24029.78	1.26	-1.74	-5.97	-3.71
	(12.82)	(33.16)	(54.02)	(100)				
2014-15	3170.67	8247.44	14251.76	25669.88	2.92	3.50	9.79	6.83
	(12.35)	(32.13)	(55.52)	(100)				
2015-16	3345.27	9101.74	15614.76	28061.76	5.51	10.36	9.56	9.32
	(11.92)	(32.43)	(55.64)	(100)				
2016-17	4063.55	10220.45	17772.20	32056.19	21.47	12.29	13.82	14.23
	(12.68)	(31.88)	(55.44)	(100)				
2017-18	4823.29	9900.13	18899.40	33622.82	18.70	-3.13	6.34	4.89
	(14.35)	(29.44)	(56.21)	(100)				
2018-19	4941.96	10487.76	20962.60	36392.32	2.46	5.94	10.92	8.24
	(13.58)	(28.82)	(57.60)	(100)				
Average Growth Rate					7.66	2.29	9.05	6.41

Source: UPDES, Government of Uttar Pradesh
Note: Figures in Parentheses are percentage share in the total GDDP

We further break down the primary sector GDP to determine which subsector is lagging and which one is driving the primary sector growth. Table 2 shows that agriculture, including the horticulture sector, grew at an average annual growth rate of 4.22% from 2011-12 to 2018-19. However, its share reduced from 61.68% in 2011-12 to 57.57% in 2018-19. Likewise, the share of livestock reduced from 31.23% to 29.44% during the same period. The annual growth rate in the livestock sector has been 3.53%. The share of forestry and logging increased significantly during the same period from 4.96% to 10.44%, with an average annual growth rate of 20.37%. The production of this subsector has shown considerable variability over the years. The share of the

fishery & aquaculture increased from 2.12% in 2011-12 to 2.55% in 2018-19, with a positive annual growth of 7.21%. Mines and quarrying also recorded a remarkable annual growth rate of 29.99%, with significant variations over the years. Overall, agriculture and related sectors performed well in the district, with Forestry and Mining sectors performing exceptionally well during the study period.

Table 2: Trends in Gross District Domestic product from Agriculture and allied activities in Allahabad 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	1679.32	850.34	135.12	57.85	2722.64	280.11	3002.74
	(61.68)	(31.23)	(4.96)	(2.12)	(100)		
	-	-	-	-	-	-	-
2012-13	1680.74	914.44	170.12	60.61	2825.92	216.58	3042.50
	(59.48)	(32.36)	(6.02)	(2.14)	(100)		
	[0.08]	[7.54]	[25.90]	[4.79]	[3.79]	[-22.68]	[1.32]
2013-14	1605.31	994.68	165.47	62.49	2827.96	252.85	3080.81
	(56.77)	(35.17)	(5.85)	(2.21)	(100)		
	[-4.49]	[8.77]	[-2.73]	[3.10]	[0.07]	[16.75]	[1.26]
2014-15	1355.77	1025.03	292.25	66.80	2739.85	430.82	3170.67
	(49.48)	(37.41)	(10.67)	(2.44)	(100)		
	[-15.55]	[3.05]	[76.61]	[6.90]	[-3.12]	[70.39]	[2.92]
2015-16	1409.18	1055.01	325.27	68.20	2857.66	487.60	3345.27
	(49.31)	(36.92)	(11.38)	(2.39)	(100)		
	[3.94]	[2.92]	[11.30]	[2.09]	[4.30]	[13.18]	[5.51]
2016-17	1941.16	1001.57	217.46	83.48	3243.67	819.88	4063.55
	(59.84)	(30.88)	(6.70)	(2.57)	(100)		
	[37.75]	[-5.07]	[-33.14]	[22.40]	[13.51]	[68.14]	[21.47]
2017-18	1940.70	1130.01	269.91	83.50	3424.11	1399.18	4823.29
	(56.68)	(33.00)	(7.88)	(2.44)	(100)		
	[-0.02]	[12.82]	[24.12]	[0.02]	[5.56]	[70.66]	[18.70]
2018-19	2092.12	1069.85	379.34	92.82	3634.13	1307.82	4941.96
	(57.57)	(29.44)	(10.44)	(2.55)	(100)		
	[7.80]	[-5.32]	[40.55]	[11.17]	[6.13]	[-6.53]	[2.46]
Average Growth Rate	4.22	3.53	20.37	7.21	4.32	29.99	7.66

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

Table 3 shows the percentage share of subsectors in the secondary and tertiary sectors. Within the secondary sector, the manufacturing sector had a share of approximately 31.54% in 2018-19. The share shows variability from year to year and has decreased by an average of 0.16% in the past years. Construction has more than half of the share of the secondary sector. Its share increased from 52.77% in 2011-12 to 63.48% in 2018-19, with a consistent annual growth rate of 4.83. The share of the electricity, gas and water supplies increased from 3.62% to 4.98% in the same period, with an astonishing annual growth of 6.84%. The electricity, gas and water supply sub-sector, thus, makes the most important contribution to the growth of the secondary sector.

Table 3: Trends in percentage share of non-agriculture sub-sectors in DGDP in Allahabad 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	43.60	3.62	52.77	100	14.14	14.62	6.86	25.54	27.41	11.42	100
2012-13	35.77	4.35	59.88	100	12.96	10.33	6.23	23.21	36.86	10.41	100
2013-14	32.28	4.94	62.78	100	17.17	11.18	7.22	26.01	27.53	10.88	100
2014-15	30.31	5.08	64.61	100	18.68	11.02	7.44	25.31	26.36	11.19	100
2015-16	32.12	4.63	63.25	100	20.85	10.97	7.42	24.59	24.99	11.18	100
2016-17	41.13	4.41	54.46	100	21.54	11.97	6.49	22.55	26.86	10.58	100
2017-18	32.45	5.17	62.37	100	21.43	10.20	5.54	23.07	28.98	10.77	100
2018-19	31.54	4.98	63.48	100	20.64	10.25	6.00	21.91	30.11	11.10	100
Average Growth Rate	-0.16	6.84	4.83	2.29	15.07	4.18	7.12	6.46	13.05	8.47	9.05

Source: Estimated from Statistical Handbooks, UPDES

Within the tertiary sector, public administration made up the highest share (30.11%) in 2018-19, followed by the real estate and professional services (21.91%), transport, storage and communication (20.64%) and other services (11.10%). Average annual growth is observed highest

in Transport, Storage & Communication (15.07%) followed by public administration (13.05%), other services (8.47%) and financial services (7.12%), and lastly lowest in Trade and Hotel (4.18%).

Thus, we can say that the negative average growth in the manufacturing sector (-0.16%) is averaging out the positive growth rate in the construction (4.83%) and the Electricity, gas and water supply (6.83). Thus, the secondary sector grew at a very minimal average growth rate of 2.29%. Transport and Communication and Public Administration sub-sectors are the major contributors to the growth of the Tertiary sector.

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 5570.74 sq. km². The forest area represents 3.86% of the total declared area. The share of cultivable wasteland decreased from 2.43% in 2011-12 to 2.04% in 2017-18. Barren and uncultivable land share decreased from 2.84% in 2011-12 to 2.68% in 2017-18. The share of wooded areas and gardens also declined from 1.48% in 2011-12 to 1.01% in 2017-18. The fallow land also shows a remarkable decline over the period. The net sown area ranges from 54.18% to 63.31%. The area for non-agricultural use increased steadily over the period from 14.34% to 17% (Table 4).

Table 4: Trends in Land-use Pattern in Allahabad (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	Pasturel and	Area under trees and gardens	Net Sown Area
1	2	3	4	5	6	7	8	9	10	11
2009-10	557014	3.85	2.43	13.40	4.58	2.84	14.34	0.29	1.48	56.79
2010-11	557074	3.85	2.60	12.39	5.93	2.89	14.61	0.38	1.66	55.69
2011-12	557074	3.85	2.42	13.46	5.37	2.81	14.71	0.29	1.81	55.28
2012-13	557074	3.85	2.58	11.96	5.92	2.86	16.51	0.38	1.64	54.30
2013-14	557074	3.85	2.25	13.58	5.13	2.71	16.53	0.29	1.48	54.18
2014-15	557074	3.85	2.30	8.62	4.65	2.72	16.67	0.29	1.43	59.47
2015-16	557074	3.86	2.17	5.80	3.53	2.72	16.91	0.29	1.42	63.30
2016-17	557074	3.86	2.04	6.41	3.52	2.68	16.97	0.29	1.01	63.22
2017-18	557074	3.86	2.04	6.09	3.72	2.68	17.00	0.29	1.01	63.31

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

Overall, the land use pattern shows that the area under non-agricultural use has increased significantly, while the focus of the district administration is to reduce the percentage share of current and other fallow land areas.

2.1.2 Trends in Operational Land Holdings

In Allahabad district, the total number of operational farms decreased from 551 thousand in 2010-11 to 549 thousand in 2015-16, a net decrease of 0.36%. While in the state, their numbers increased from 23325 thousand in 2010-11 to 23822 thousand in 2015-16, a net increase of 2.13%. Most

land positions in the district are marginal and small. These categories represented 93% of total operational holdings 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.

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

	Agri, Census	Marginal Holdings (0-1 ha)	Small Holdings (1-2 ha)	Semi-Medium Holdings (2-4 ha)	Medium Holdings (4-10 ha)	Large Holdings (10 & above, ha)	Total Holdings ('000 No.)
Allahabad	2010-11	82.06	10.86	5.40	1.50	0.17	551
	2015-16	82.33	11.03	4.98	1.51	0.15	549
							[-0.36]
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	0.10	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 (43.57%), followed by Rice (27.14%) and Bajra (4.81%). These three crops together constitute around 75.52% of the GSA. The total area devoted to cereals has decreased from 83.52% in 2010-11 to 76.80% in 2017-18. The main pulses produced are Masoor, Gram, and Arhar. The total pulses acreage has gradually decreased over the years, from 10.65% in 2011-12 to 7.14% in 2017-18. Thus, the foodgrains cover a majority (almost 84%) of the GCA. Mustard is the only major oilseed crop produced and the total oilseed acreage ranges from 0.53% to 0.61%. The area under Sugarcane is almost negligible. The acreage of Potato has remained consistent over the years and varies only from 2.66% to 2.18%. In general, there is no significant change in the cultivation pattern during the study period. The cropping intensity increased sharply from 154 in 2011-12 to 162.61 in 2017-18.

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	30.52	30.58	32.14	32.53	30.59	31.42	27.19	27.14
Wheat	44.79	44.85	43.53	44.68	49.12	50.45	43.66	43.57
Bajra	5.96	5.91	5.67	5.07	5.42	5.57	4.82	4.81
Other Cereals	2.25	2.27	2.14	2.01	1.44	1.48	1.28	1.28
Total Cereals	83.52	83.61	83.47	84.28	86.57	88.92	76.95	76.80
Masoor	2.10	1.65	2.12	1.65	1.17	1.20	1.04	1.04
Gram	3.04	3.28	3.21	3.25	2.01	2.06	1.78	1.78
Arhar	3.25	3.25	3.11	2.66	2.88	2.96	2.56	2.55
Other Pulses	2.26	2.28	2.26	2.27	2.00	2.05	1.77	1.77
Total Pulses	10.65	10.47	10.69	9.83	8.05	8.26	7.15	7.14
Total Foodgrains	94.17	94.08	94.17	94.12	94.62	97.18	84.10	83.94
Mustard	0.24	0.23	0.26	0.27	0.33	0.34	0.29	0.29
Other Oilseeds	0.34	0.37	0.30	0.31	0.26	0.27	0.23	0.23
Total Oilseeds	0.59	0.60	0.56	0.58	0.59	0.61	0.53	0.53
Sugarcane	0.14	0.14	0.14	0.14	0.13	0.13	0.12	0.12
Potato	2.66	2.68	2.64	2.65	2.45	2.52	2.18	2.18
Net Sown Area	64.93	64.22	62.47	62.86	65.11	71.18	61.52	61.50
Gross Sown Area (in 1000 Ha)	477.76	479.50	484.20	480.13	508.78	495.36	572.39	573.50
Cropping Intensity	154.00	155.71	160.08	159.08	153.57	140.48	162.54	162.61
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

ii-Trends in Per Hectare Yield of Principal Crops

Table 7 shows that the yield per hectare of most crops varies from year to year. However, the yield for most crops (except oilseeds) has increased in the latter years of the study. This can be due to improved irrigation facilities and better infrastructure. The Wheat yield varies between 13.13 and 31.64 qtls/ha. A similar pattern is also observed in the case of Rice, whose yield was lowest in 2015-16 (17.25 qtls/ha) and highest in 2017-18 (29.46 qtls/ha). The yield of Bajra decreased from (9.69 qtls/ha) in 2011-12 to (4.91 qtls/ha) in 2017-18. Overall, the yield of total cereals has increased significantly over the years, from (22.74 qtls/ha) to (28.94 qtls/ha). The yield of total pulses showed a lot of variation, with the lowest in 2014-15 (4.48 qtls/ha). Similarly, total foodgrains yield was lowest in 2014-15 (14.52 qtls/ha) and highest in 2017-18 (27.68 qtls/ha). The yield of Mustard decreased from (9.61 qtls/ha) in 2011-12 to (6.11 qtls/ha) in 2017-18. The yield of Sugarcane and Potato has increased considerably over the years. Sugarcane's yield went up from 582.77 qtls/ha in 2010-11 to 619.86 qtls/ha in 2017-18 and Potato from 199.63 to 256.83 qtls/ha. The improvement in the yield of Sugarcane and Potato over the years may influence farmers to increase their production by increasing the land area under these crops. It is due to the improved income of the farmers as these are high-value crops. 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 Allahabad (Qtls)								
Crop/Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**
Rice	23.27	25.56	28.21	25.43	21.08	17.25	29.55	29.46
Wheat	24.49	26.28	24.35	23.21	13.13	17.97	26.80	31.64
Bajra	9.69	9.23	9.24	7.00	6.45	9.44	9.46	4.91
Total Cereals	22.74	24.53	24.74	23.07	15.45	16.99	26.66	28.94
Masoor	2.72	8.55	7.33	4.96	3.69	2.50	16.66	11.48
Gram	10.67	10.88	8.46	7.32	2.91	0.65	15.28	16.06
Arhar	8.67	10.78	11.34	6.89	5.80	7.37	13.57	19.45
Total Pulses	8.17	10.30	9.81	6.93	4.48	5.98	14.02	14.10
Total Foodgrains	21.09	22.94	23.04	21.38	14.52	16.06	25.59	27.68
Mustard	9.61	9.52	10.38	8.60	3.95	5.54	6.11	6.11
Total Oilseeds	6.67	5.77	7.23	5.50	4.07	3.60	5.02	4.98
Sugarcane	582.77	561.19	622.88	682.88	658.21	758.89	736.49	619.86
Potato	199.63	182.95	144.59	125.54	156.71	196.71	219.55	256.83
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

2.1.4 Trends in Production of Principal Crops

Table 8 shows the trends in the production of the main crops over the years. Rice, Wheat and Potato dominate the production. Almost 50 percent of the total production of food grains comes only from Wheat (790.67 thousand tons) in 2017-18. Rice also has significant production ranges from 268.47 thousand tons to 459.98 thousand tons. Other cereals, apart from Bajra (13.55 thousand tons), do not have much presence in the district. Coming to pulses, Gram and Arhar occupy the highest production. Productions of Gram and Arhar were 16.38 thousand tons and 28.47 thousand tons, respectively, in 2017-18. Although there has been a significant variation in the production of these pulses over the years, they still represent around 78% of the total pulses. Masoor is another pulse crop that accounted for about 11% of the total pulses production in 2017-18. Pulses production in the district was quite low, suggesting that pulses are not an essential part of the district's agriculture. Mustard production was 1.03 thousand tons, which represented more than 67% of the total oilseed production.

Sugarcane is not an important crop here. Its Production ranges between 38.33 thousand tons and 50.54 thousand tons. Potato production varies from 159.60 thousand tons to 320.42 thousand tons over the years. 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, also fluctuated over the years, partly due to changes in nature and partly due to market conditions. In summary, Wheat, Rice, and Potato dominate the cropping pattern and the district's agriculture production.

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

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	339.33	374.74	438.90	397.10	328.14	268.47	459.98	458.57
Wheat	524.01	565.23	513.12	497.81	328.19	449.09	669.62	790.67
Bajra	27.60	26.17	25.36	17.04	17.79	26.02	26.07	13.55
Other Cereals	16.36	17.18	22.35	21.68	6.45	4.89	18.63	11.99
Total Cereals	907.31	983.32	999.72	933.64	680.57	748.46	1174.30	1274.78
Masoor	2.73	6.75	7.51	3.92	2.20	1.49	9.91	6.83
Gram	15.47	17.13	13.14	11.44	2.97	0.66	15.59	16.38
Arhar	13.47	16.81	17.05	8.82	8.49	10.78	19.87	28.47
Other Pulses	9.93	11.01	13.11	8.55	4.68	11.54	12.05	6.05
Total Pulses	41.60	51.71	50.81	32.73	18.33	24.47	57.42	57.73
Total Foodgrains	948.91	1035.03	1050.53	966.36	698.90	772.92	1231.71	1332.51
Mustard	1.12	1.05	1.31	1.10	0.67	0.93	1.03	1.03
Other Oilseeds	0.76	0.62	0.65	0.42	0.56	0.15	0.48	0.47
Total Oilseeds	1.88	1.67	1.96	1.52	1.23	1.09	1.51	1.50
Sugarcane	39.80	38.33	42.79	47.12	43.84	50.54	49.05	41.28
Potato	253.51	234.93	184.92	159.60	195.51	245.41	273.92	320.42
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

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. Observing the area under different crops, we find the lowest variability in the area in Potato (1.25%), followed by Sugarcane (1.60%) and Rice (2.88%), and the highest in Masoor (24.75 %). The variability in the area under total pulses (11.05%) is higher than the area under total cereals (4.87%). Since Rice and Wheat dominate the production, the variability in the area under total food grains is very low (3.36%).

The variability of production depends on the variability of the cultivated area and the variability of the yield. Therefore, the variability in the production of different crops is greater than in the cultivated area of all crops. The highest variability in production is observed in Masoor (58.11%), followed by Gram (54.61%), Arhar (43.13%), and Wheat (25.72%). High variation in the production of pulses is partly due to variation in the land area under them and partly due to the vulnerability of pulses to pests which are a major hindrance to the adoption of pulses by farmers. The variability is lowest in Sugarcane (10.02%), followed by Mustard (17.75%). Improvement in crop insurance conditions and better market accessibility can lower this variation.

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

Crop/Year	Area (1000 Ha)			Production (1000 tons)			Yield (Qtl. /Ha)		
	Average	SD	COV	Average	SD	COV	Average	SD	COV
Rice	153.35	4.42	2.88	383.15	68.73	17.94	24.98	4.31	17.24
Wheat	231.74	19.46	8.40	542.22	139.45	25.72	23.48	5.67	24.13

Bajra	27.36	1.29	4.70	22.45	5.41	24.10	8.18	1.80	22.04
Total Cereals	421.32	20.53	4.87	962.76	197.62	20.53	22.89	4.58	20.03
Masoor	7.49	1.85	24.75	5.17	3.00	58.11	7.24	4.92	67.93
Gram	12.78	2.78	21.74	11.60	6.33	54.61	9.03	5.42	60.01
Arhar	14.69	0.87	5.91	15.47	6.67	43.13	10.48	4.45	42.45
Total Pulses	45.48	5.03	11.05	41.85	15.17	36.24	9.22	3.54	38.38
Total Foodgrains	466.80	15.69	3.36	1004.61	211.74	21.08	21.54	4.44	20.61
Mustard	1.44	0.26	18.17	1.03	0.18	17.75	7.48	2.34	31.29
Total Oilseeds	2.90	0.13	4.35	1.54	0.30	19.18	5.36	1.22	22.78
Sugarcane	0.68	0.01	1.60	44.09	4.42	10.02	652.90	70.17	10.75
Potato	12.62	0.16	1.25	233.53	52.10	22.31	185.31	42.56	22.96
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

In the case of yield, the highest variability is estimated in Masoor (67.93%), followed by grams (60.01%) and Arhar (42.45%). Yield variability in total cereals (20.03%) and total food grains (20.61) is much lower as compared to that in total pulses (38.38%). Sugar cane remains the most consistent crop of all years. Several factors, such as climate change, market prices, and rainfall patterns influence the variability in agricultural production.

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 Wheat and total oilseeds, on average, have a relatively larger share in GCA than their share in VOP, while Rice, Pulses, Potato, and Sugarcane have, on average, a higher share in VOP than GCA. Allahabad is mainly a food grain production district. Therefore, foodgrains account for more than 94% of the GCA (although this value has decreased in the later years). Similarly, total foodgrains account for nearly 90% of the total value of the agricultural product. Three crops - Wheat, Paddy, and Potato together accounted for, on average, around 78.33% of GCA, while their share of the total VOP was much higher, on average, at around 84.73%. Overall, the total agricultural GCA has increased significantly from (477.76 thousand ha.) in 2011-12 to (573.50 thousand ha.) in 2017-18. And the total value of the product has also risen that it becomes double what it was in 2011-12, that is, (1604.88 in Cr. Rs.) in 2011-12 to (3333.27 in Cr. Rs) in 2017-18.

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

Crop	% Share in	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Wheat	GCA	44.79	44.85	43.53	44.68	49.12	50.45	43.66	43.57
	VOP	37.68	36.25	36.40	37.89	31.29	32.97	39.52	41.51
Paddy	GCA	30.52	30.58	32.14	32.53	30.59	31.42	27.19	27.14
	VOP	34.53	36.25	34.91	37.89	43.63	32.97	39.52	36.59
Total Cereals	GCA	83.52	83.61	83.47	84.28	86.57	88.92	76.95	76.80

	VOP	74.80	70.19	74.31	80.81	77.02	76.55	79.62	79.34
Total Pulses	GCA	10.65	10.47	10.69	9.83	8.05	8.26	7.15	7.14
	VOP	13.24	14.80	11.85	10.98	11.98	11.95	11.07	10.62
Total Food Grains	GCA	94.17	94.08	94.17	94.12	94.62	97.18	84.10	83.94
	VOP	88.04	84.99	86.17	91.79	89.00	88.50	90.69	89.96
Total Oil seeds	GCA	0.59	0.60	0.56	0.58	0.59	0.61	0.53	0.53
	VOP	0.37	0.28	0.29	0.28	0.31	0.27	0.22	0.21
Potato	GCA	2.66	2.68	2.64	2.65	2.45	2.52	2.18	2.18
	VOP	11.06	14.33	13.12	7.07	9.97	10.46	8.57	9.42
Sugarcane	GCA	0.14	0.14	0.14	0.14	0.13	0.13	0.12	0.12
	VOP	0.52	0.40	0.42	0.86	0.71	0.77	0.52	0.41
Paddy + Wheat + Potato	GCA	77.97	78.11	78.30	79.85	82.16	84.39	73.03	72.89
	VOP	83.26	82.12	84.44	85.20	84.89	84.52	85.89	87.53
Total Agriculture	GCA (1000 Ha)	477.76	479.50	484.20	480.13	508.78	495.36	572.39	573.50
	VOP (in Cr Rs)	1604.88	2098.52	2325.70	1917.84	1662.32	1767.13	3082.99	3333.27
Per Worker VOP (Rs.1000 at current pRices) in Bijnor		-	19.30	21.50	20.65	23.96	22.87	33.76	38.85
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 Allahabad district increased from 19.3 thousand rupees in 2011-12 to 38.85 thousand rupees in 2017-18, a net increase of 101.29% 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, but the rate of growth of total value in the district is greater than in the state. The ratio of per worker output of the district to the state average has slightly increased from 0.47 in 2011-12 to 0.55 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 72.71% of the total fertilizers used, while the proportions of phosphorus and potassium were 22.76% and 4.51%, respectively. In 2017-18, however, the nitrogen share had fallen to 66.23%, while the phosphorus share increased to 25%, and the potassium share rose to 8.76%. The use of nitrogen is more than the recommended ratio, while that of the Phosphorous and potassium 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 cultivation patterns, etc. Although the overall use of chemical

fertilizers has reduced in the district from 321.91 kg/ ha GSA in 2010-11 to 220.30 kg/ ha GSA in 2017-18, but still the authorities can take steps to further reduce their consumption as the chemicalization of agriculture degrades soils and water resources and creates non-point sources of pollution in the water bodies. Therefore, use of organic fertilizers and biofertilizers in the agriculture must be incentivized.

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	234.08	191.10	160.40	177.14	103.88	98.47	84.21	145.91
Phosphorous	73.28	57.18	43.15	46.88	30.02	36.91	33.06	55.09
Potassium	14.55	12.19	5.47	7.93	6.15	6.80	6.91	19.30
Total	321.91	260.46	209.03	231.96	140.05	142.17	124.19	220.30
Gross Sown Area (Ha)	477757	479504	484197	480126	508783	495358	572389	573499

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

2.1.6. Irrigation Structure and Status

The types of irrigation systems and the percentage of the net and gross irrigated area to the net and gross cropped area, respectively, are shown in Table 12. The length of the canals (2145 kms) and the number of ground pump-sets (805) have remained almost constant since 2011-12. Government tube-wells decreased from 1169 in 2011-12 to 1107 in 2018-19. The number of wells increased significantly from 2879 in 2011-12 to 3887 in 2018-19, a net increase of 35%. Shallow, medium and deep tube wells increased by 4%, 58%, and 49%, respectively, in 2018-19 compared to 2010-11. The district's the net and gross irrigated areas increased from 77.01% and 78.23% in 2010-11 to 87.77% and 89.04%, respectively in 2017-18.

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)	2145	2145	2145	2145	2145	2145	2145	2145	2145
No. of Govt. Tube wells	1169	1192	1192	984	991	1081	1081	1059	1107
No. of Wells	2879	2879	2879	3879	3879	3879	3879	3887	3887
No. of Ground level Pump set	809	809	809	805	805	805	805	805	805
Shallow Tube well	39616	39616	39633	39728	41163	41163	41163	41207	41235
Medium Tube well	1919	2228	2530	2669	2734	2734	2734	2887	3035
Deep Tube well	1654	1769	2105	2207	2260	2260	2260	2366	2473
% Of NIA	77.01	78.01	78.82	79.54	80.51	87.71	87.73	87.77	-
% Of GIA	78.23	79.16	78.72	80.13	83.21	87.29	89.01	89.04	-

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

Canals and groundwater (GW) are the main sources of irrigation in the district. The canal's share in the NIA increased from 44.41% in 2010-11 to 48.04% in 2017-18, while the corresponding share of wells and tube-wells decreased from 52.89% to 51.13% over the same period. Table 13 also shows that the development of the GW in the district has been quite high and that only about 30% of the GW has yet to be exploited.

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

Source/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Canal (surface Irri.)	44.41	46.56	46.66	46.55	55.73	48.15	48.13	48.04
Wells And Tube-wells (GW Irri.)	52.89	51.68	51.63	51.68	42.75	50.78	50.87	51.13
Others	2.70	1.76	1.72	1.77	1.52	1.07	1.00	0.83
NIA (1000 ha)	238.91	240.23	238.40	240.05	266.73	309.28	308.94	309.56
% Of Remaining GW to Total GW	19.06	-	24.52	-	19.06	19.06	30.13	-

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

Table 14 shows that a majority area under Rice (average, 93.84%), Wheat (average, 98.11%), Potato (average, 100%), and Sugarcane (average, 100%) is irrigated. Percentages of the irrigated area under pulses (average, 19.24%) and oilseeds (average, 8.65%) are relatively less.

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

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	95.44	95.55	93.33	93.28	93.29	93.29	93.29	93.29
Wheat	95.93	97.53	97.81	97.53	99.02	99.02	99.02	99.02
Total Cereal	86.46	87.39	87.07	87.83	89.25	89.25	89.25	89.25
Total Pulses	15.31	15.60	15.12	16.58	22.84	22.84	22.84	22.84
Total Foodgrains	78.41	79.41	78.90	80.39	83.61	83.61	83.61	83.61
Total Oilseeds	6.26	5.72	7.16	6.22	10.96	10.96	10.96	10.96
Potato	100	100	100	100	100	100	100	100
Sugarcane	100	100	100	100	100	100	100	100

Source: Compiled from Statistical Abstract, Uttar Pradesh

2.1.7. Electricity Intensity in Agriculture

Electricity is one of the primary energy sources used in agriculture. Table 15 shows that per capita electricity consumption in agriculture has increased significantly from 401.1 KWH in 2011-12 to 442.87 KWH in 2019-20, a net increase of approximately 10%. The percentage share of agriculture in the total electricity consumption has also increased from 17.82 in 201-112 to 18.43 in 2019-20, indicating that the intensification of Electricity in agriculture has increased significantly. Since electricity consumption has increased over the years, it is very important for the authorities to switch to more sustainable modes of electricity production, for example, the use of solar energy.

Table 15: Trends of Electricity consumption in Agriculture in Allahabad

Division/ Year	2011-12	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Per Capita electricity consumption (K.W.H)	401.1	388.34	408.11	495.51	516.7	474.52	442.87
% Of Electricity consumed in Agriculture sector to total consumption	17.82	16.81	19.98	21.92	19.87	15.63	18.43

Source: District-wise Development Indicators file.

2.1.8. Status of Agriculture Markets

Table 16 shows the marketing infrastructure in the district. It has four main markets and 16 sub-markets, which have remained constant over the period. The number of regulated mandis per lakh hectare of NSA had decreased from 6.3 in 2013-14 to 1.13 in 2019-20, which is a significant issue as farmers need to have proper access to mandis for them to be able to sell their produce.

Table 16: Status of Agriculture Markets in Allahabad

Category/Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Main Markets (No.)	4	4	4	4	4	4	4
Sub Markets (No.)	15	15	16	16	16	16	16
Total Markets (No.)	19	19	20	20	20	20	20
No. of Regulated mandis per lakh Ha. of net area sown	6.3	3.59	-	1.14	1.21	1.13	-

Source: Compiled from Statistical Abstract, Uttar Pradesh and District-wise Development Indicators file.

2.1.9. Status of Organic Farming

ARTH GANGA PROJECT: DISTRICT PRAYAGRAJ

To promote sustainable agricultural practices and improve the farmers' livelihood, the Government of India launched the PKVY and the 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 to carry on the activity on a sustainable basis. Organic and zero-budget farming will provide ecological services in terms of soil health, human and animal health, saving of water, protection of 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 farming clusters under the Paramparagat Krishi Vikas Yojana in the district. The district has 186 groups in nine development blocks. The highest number of groups are in Bahadurpur (39), closely followed by Kaurihar (33), Saidabad (25), and Uruwan (23). These four blocks together consisted of about 64% of the total groups. Each group has, on average, 35 farmers. Significantly high variation can be seen in the number of farmers per group across the various development blocks. 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.

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

S. No.	Block	Scheme	No. of groups	No. of farmers in groups			
				Total	Average	Median	SD
1	Bahadurpur	PKVY	39	1204	30.87	30	5.03

2	Bahria	PKVY	12	463	38.58	38.5	10.79
3	Handia	PKVY	15	478	31.86	30	9.74
4	Karchhana	PKVY	15	553	36.86	36	11.3
5	Kaurihar	PKVY	33	1249	37.84	35	8.39
6	Manda	PKVY	10	353	35.3	34	11.99
7	Saidabad	PKVY	25	899	35.96	34	13.42
8	Soraon	PKVY	14	447	31.92	31	5.18
9	Uruwan	PKVY	23	854	37.13	39	10.74
10	Allahabad District Total	Total (PKVY)	186	6500	34.94	32	9.77
Source: Compiled from https://pgsindia-ncof.gov.in/							

Since per hectare use of chemical fertilizer is quite high in the district agriculture, a gradual shift of farmers from conventional to organic farming systems is likely to positively impact water quality and soil health, and 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 concern of the farmers was poor marketing of the organic products and not being able to fetch a premium.
- Scaling up organic production is another problem. The marketing problem 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.
- According to the farmers, implementing policies initiated to promote organic farming in the area is not very efficient as the inspection is not conducted regularly, and the farmers did not receive subsidies in time under the scheme.

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

2.2 Trends in Livestock

Livestock forms an integrated part of the rural economy. Table 18 shows that the number of indigenous and exotic male cattle has decreased considerably from 328523 in 1997 to 25662 in 2019 and from 35005 in 1997 to 7786 in 2019, respectively. However, on the other hand, the number of indigenous and exotic female cattle has increased considerably from 243951 in 1997 to 352053 in 2019 and from 35619 in 1997 to 174955 in 2019, respectively. Thus, the total number of cattle decreased only slightly from 643097 in 1997 to 560456 in 2019, thus, a net decrease of 12.85%. 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 109% in 2019 compared to 1997 is observed in the total population of buffalo. A slight reduction in the population of indigenous sheep is observed (8%) in 2019 as compared to that in 1997. Still, during the same period, the population of exotic sheep decreased significantly by 87%, thus, indicating a decrease in the total sheep population by 13%. The total population of goats increased from 234647 in 1997 to 261053 in 2019, a net increase of 11%. The total pig population decreased considerably from 141133 in 1997 to 13871 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 30% share in the agriculture and allied activities sector and grew at an average rate of 3.53% from 2011-12 to 2018-19.

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

	Category	1997	2003	2007	2012	2019
Indigenous Cattle	Total Male	328523	298735	306444	194628	25662
	Total Female	243951	300388	337032	356011	3520 53
	Total	572473	599123	643476	550639	377715
Exotic Cattle	Total Male	35005	26077	34581	55674	7786
	Total Female	35619	53522	57481	93104	174955
	Total	70624	79599	92062	148778	182741
Total Cattle		643097	678722	735538	699417	560456
Buffalo	Total Male	96521	112166	157701	162130	34307
	Total Female	292697	360505	411470	422420	782751
	Total	389217	472671	569171	584550	817058

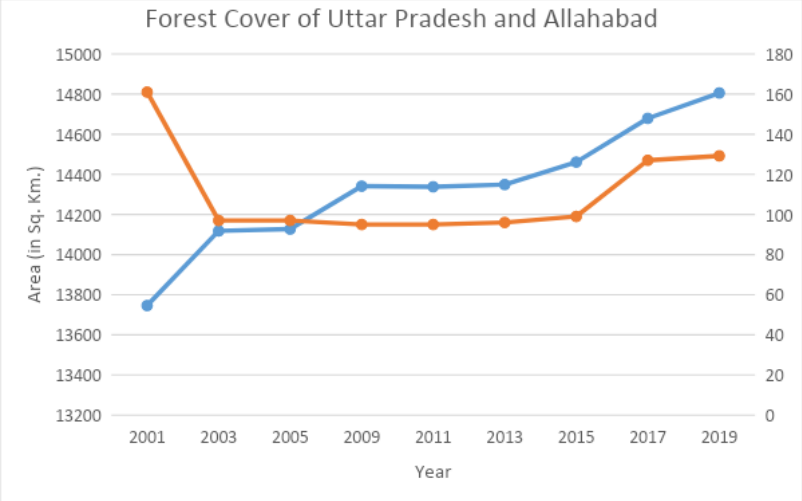
Sheep	Total Indigenous Sheep	130657	111020	98694	120635	120173
	Total Exotic Sheep	9844	5662	4521	7817	1201
	Total Sheep	140501	116682	103215	128452	121374
Goat	Total	234647	246288	268118	299979	261053
Pig	Total Indigenous Pig	123470	118627	98050	42513	12806
	Total Exotic Pig	17663	6171	5347	13372	1065
	Total Pig	141133	124798	103397	55885	13871
Total Livestock		662634	1651411	1783237	1771134	-
Total Poultry		104822	288397	232769	612629	-
Source: http://updes.up.nic.in/spiderreports/intialisePage.action And http://dahd.nic.in/animal-husbandry-statistics						

Table 19 shows that the Allahabad district has an active network of cattle hospitals and development centres, which is necessary for the livestock sub-sector to grow. The number of cattle hospitals has remained consistent around 51 over the years. Similarly, the number of cattle development centre (92), man-made reproduction centre (37) and sheep development centre (32) has also remained consistent over the years. There are very few pig development centres in the district (4), which might be one reason for the declining pig population in the district.

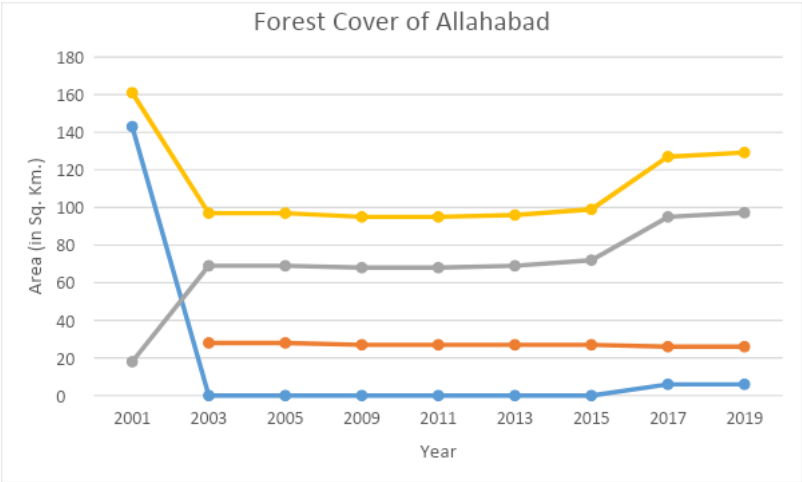
Table 19: Year-wise number of Cattle Hospitals and Development Centers

Category	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Cattle Hospital	50	50	50	50	51	51	51	51	51
D- category Cattle Dispensary	7	7	7	7	7	7	7	7	7
Cattle Development Centre	92	92	92	92	92	92	92	92	92
Man-Made Reproduction Centre	37	37	37	37	37	37	37	37	37
Sheep Development Centre	32	32	32	32	32	32	32	32	32
Pig Development Centre	4	4	4	4	4	4	4	4	4
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

2.3 Forestry



From the plot, the forest cover decreased in 2001 for allahabad, and then till 2015, it ranges from 95 to 99 Sq. Km., and the forest cover of uttar Pradesh has increased over the period 2001-19.



Majorly, Open forest is found in the Allahabad district, followed by moderately dense, then very dense forest. From the last two assessment of the ISFR, the forest cover has increased.

2.3.1. Biodiversity: The district's biodiversity data includes crop production, livestock population, bird species, and forest cover. The crop production trend shows a reduction in the non-

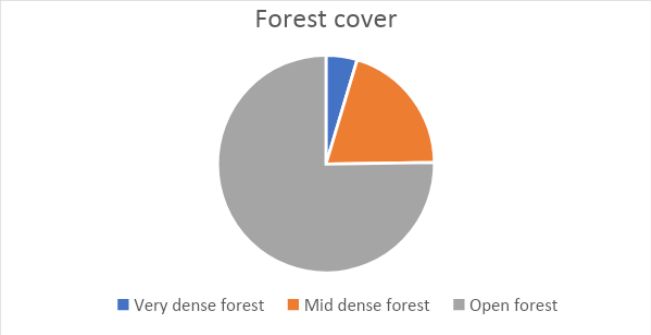
grain crop but increases in all other crops. Forest data shows that forest cover was increased by 2.21% in 2019.

Table 1 Bird species recorded in the district.

Number of species	358
Number of rare/accidental species	3
https://avibase.bsc-eoc.org/checklist.jsp?region=INggupah	

Forest cover (in sq. km.)

Geographical area	Very dense forest	Mid dense forest	Open forest	Total	% of Geographical area `	Change with respect to 2017 assessment	Scrub
5482	6.00	26.00	97.21	129.21	2.36	2.21	36.26



2.4 Tourism

Domestic/foreign visitors in different years in particular city

No. of tourists in Prayagraj in Different Years						
Year	**Domestic**	**% change**	**Foreigner**	**% change**	**Total (Domestic+foriegner)**	**% change**
2013	84717964	-	387719	-	85105683	-
2014	35605966	-57.97%	107141	-72.37%	35713107	-58.04%

2015	40001670	12.35%	109281	2.00%	40110951	12.31%
2016	41146674	2.86%	109571	0.27%	41256245	2.86%
2017	41764987	1.50%	109675	0.09%	41874662	1.50%
2018	44668662	6.95%	146805	33.85%	44815467	7.02%
2019	284057014	535.92%	1171696	698.13%	285228710	536.45%
2020	31867069	-88.78%	66689	-94.31%	31933758	-88.80%

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

Note: 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 during Kumbh- 7,86,65,500) Is Included In Above Figure Of Allahabad.

a. The above-given data table-2 is taken from the Uttar Pradesh tourism website. The data table shows the number of tourists visiting Prayagraj for tourism from 2013 to 2020. The tourist visits are bifurcated into two different groups – Domestic and Foreign tourists. The table also embraces data which show the change in the number of tourists compared to previous years.

b. Year 2013 celebrated Kumbh Mela in Prayagraj. The number of total tourists reached 85105683 in this year.

c. In the Year 2014 the number of total tourists dropped by 58.04% compared to 2013 data. The drop is more visible in international tourists which is a 72.37% drop while the domestic tourists dropped by 57.97% compared to 2013 data. The total number of tourists this year reached 35713107.

d. In the year 2015 the total number of tourists increased 12.31%; the increase is credited to an increase in the number of domestic tourists which is 12.35% whereas the increase in the number of international tourists is 2%. The total number of tourists this year reached 40110951.

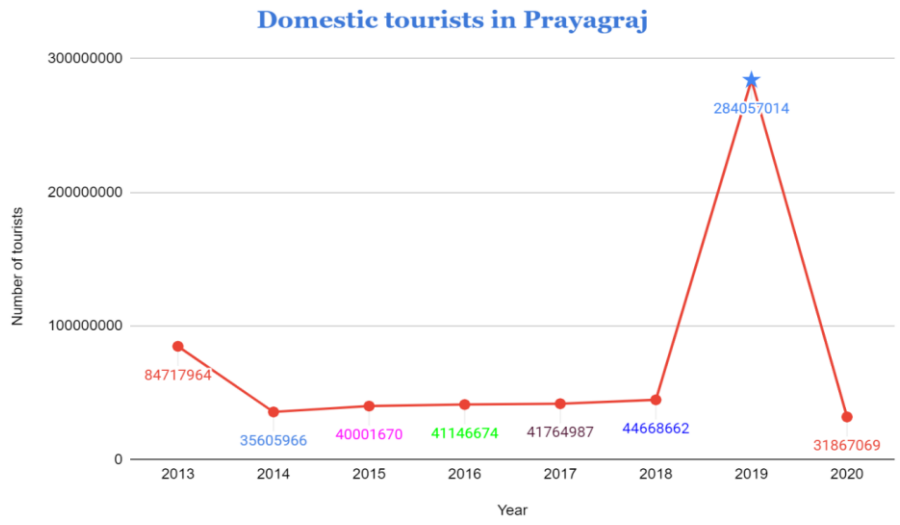
e. In the year 2016 the total number of tourists increased 2.86% compared to 2015 data. The increase in domestic tourists was 2.86% where international tourists grew by 0.27% in this year. The total number of tourists this year reached 41256245.

f. In the year 2017 the total number of tourists increased 1.50% compared to 2016 data. The increase in domestic tourists was 1.50% where international tourists grew by 0.09% in this year. The total number of tourists this year reached 41874662.

g. In the year 2018 the total number of tourists increased 7.02% compared to 2017 data. The increase in domestic tourists was 6.95% where international tourists grew by 33.85% in this year. The total number of tourists this year reached 44815467.

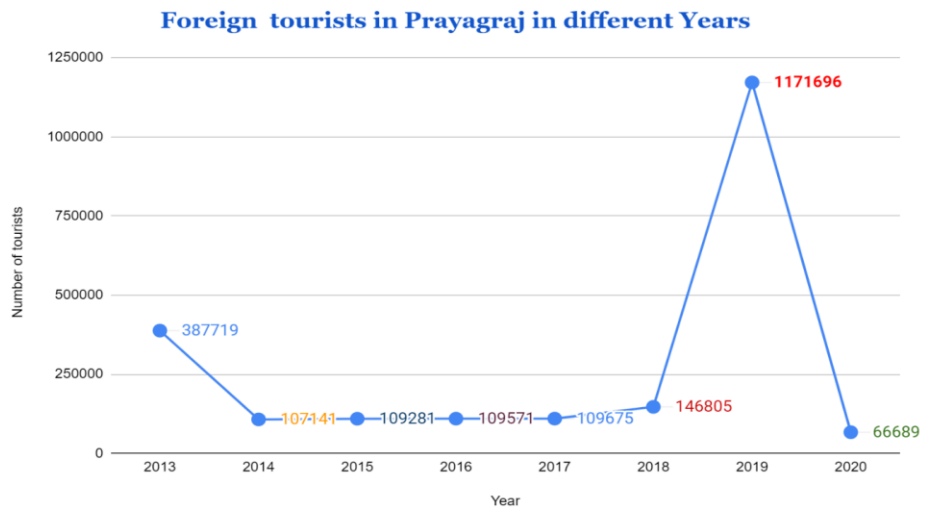
h. In the year 2019 the total number of tourists increased 536.45% compared to 2018 data. The increase in domestic tourists was 535.92% where international tourists grew by 698.13% in this year. The total number of tourists this year reached 285228710.

i. In the year 2020 the total number of tourists decreased by88.80% compared to 2019 data. The decrease in domestic tourists was 88.78% where international tourists shrunken by 94.31% in this year. The total number of tourists this year reached to 31933758.



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

a. The Graph-1 shows the Domestic tourists in Prayagraj from 2013 to 2020. The data is collected from the official site of Uttar Pradesh Tourism Department.



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

a. The Graph-1 shows the Foriegn tourists in Prayagraj from 2013 to 2020. The data is collected from the official site of Uttar Pradesh Tourism Department.

Domestic and foreign visitors in different years in Uttar Pradesh

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

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

a. The above-given graph shows the number of visitors who visited Uttar Pradesh from 2016 to 2020. In 2016 the number of domestic tourists increased to 3.4% compared to 2015, and

foreign tourists increased to 1.69%. In the year 2017, the growth rate increased to 9.56% in domestic tourists and 12.65% in foreign tourists.

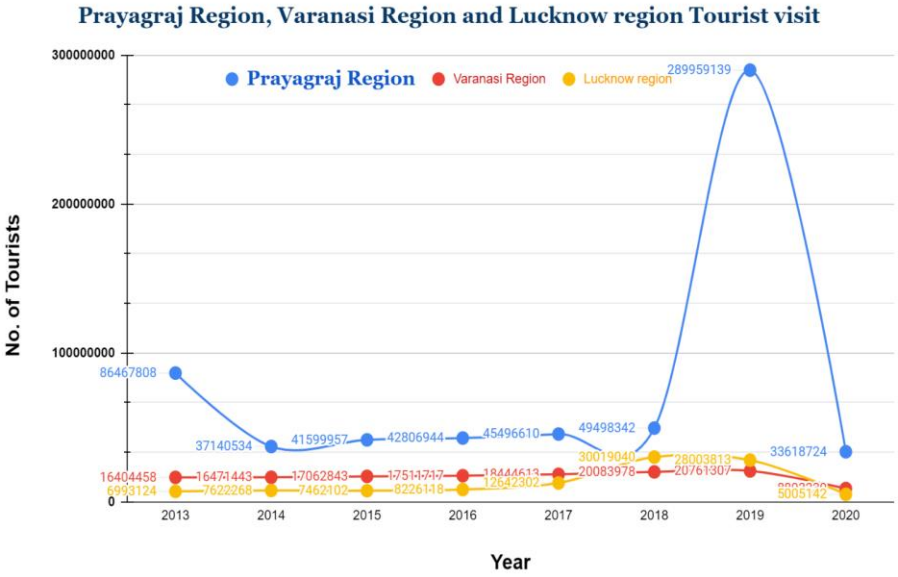
b. Data shows that 2018 has been a fruitful year for Uttar Pradesh tourism. Uttar Pradesh encountered a 21.6% increase in tourist numbers from the previous year, a significant change in numbers. However, the pattern is not similar in Kanpur
c. 2019 was a year when the global event Kumbh Mela 2019 was organized in Prayagraj (a District in Uttar Pradesh). The results are visible in the numbers (given in the data table above), 87.14% increase in the number of tourists compared to 2018. The data also shows foreign visitors increased to 25% in 2019. The enhanced response of tourists shows the consumer behavior, which majorly depends on advertisements. A commodity that has been presented to be associated with the emotions of consumers has a high potential to sustain and perform better than its competitors.
d. The surge in the number of tourists in Kumbh Mela 2019 is attributed to expensive advertisements, extra-standard facilities, and a political campaign. All this together made the event a mega event. Security aspect in such an organization is a significant factor which influences the success and failure. Kumbh Mela 2019 witnessed extra tight security and surveillance to prevent stampedes and violence in the Mela.
e. Such grand organization of events are also a factor on which the number of tourists to other districts (especially domestic tourists) and states (especially foreigner tourists) depend. Although the number of tourists did not significantly increase in Kanpur during Kumbh Mela 2019.
f. The scenario of foreign tourists is worse compared to state data. Even the mega event Kumbh mela could not increase the number of foreign tourists in Kanpur. This signifies the lack of transfer of information.
g. The district witnessed the increased growth in number of domestic tourists but not in foreign tourists. It is necessary to understand the shortfalls before working on upcoming policies and agendas.

Tourist Visits in three different regions-

Tourist visits in Neighbouring regions to Prayagraj			
Year	**Prayagraj Region**	**Varanasi Region**	**Lucknow region**
2013	**86467808**	**16404458**	**6993124**
2014	**37140534**	**16471443**	**7622268**
2015	**41599957**	**17062843**	**7462102**
2016	**42806944**	**17511717**	**8226118**
2017	**45496610**	**18444613**	**12642302**
2018	**49498342**	**20083978**	**30019040**
2019	**289959139**	**20761307**	**28003813**
2020	**33618724**	**8893239**	**5005142**

Table-4; Source: Dept. of Tourism, Uttar Pradesh Government

a. The above given table-4 is taken from the official site of UP Tourism Department. The table shows the total number of tourists visiting in different years from 2013 to 2020 in three different regions – Prayagraj region, Lucknow Region, Varanasi Region.



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

a. The above given graph-3 is taken from the official site of UP Tourism Department. Thegraph shows the total number of tourists visiting in different year from 2013 to 2020 in three regions – Prayagraj region (blue color line in the graph), Lucknow Region(Yellow color line in the graph), Varanasi Region(Red color line in the graph)

b. The Graph shows the maximum number of tourists going to Prayagraj region in all the years in the graph.

c. The second place in number of tourists was received by Varanasi Region from 2013 to 2017. And the third position is acquired by Lucknow region.

d. In the year 2018 Lucknow region moved upward to second position and Varanasi region moved down to third position. Whereas Prayagraj region remained at the top.

e. In the year 2019 the number of tourists in Prayagraj Region increased to 5 times and number reached 289959139. Varanasi region also encountered a narrow growth in number whereas the Lucknow region suffered a drop in the number of tourists in 2019 and the number dropped to **28003813** from **30019040.**

f. In the year 2020 all the three graph curves can be seen coming to meet x-axis, which shows a drastic fall in the number of tourists visiting tourist places in all the three regions.

Budget allotted/ Expenditure in different years by Tourism Department

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

Graph-5; Source: Dept. of Tourism, Uttar Pradesh Government

The above-given table shows the budget sanctioned for the Department of Tourism, Uttar Pradesh, from the Financial Year (FY) 2015-16 to 2021-22. In the initial FYs, which are 2015-16, 2016-17, 2017-18, the amount sanctioned to the department is significantly low. In the FY 2018-19 Department received a 157.21% increased budget. Which followed a 25% increase in the next FY-2019-20. A similar trend is visible in the number of tourists, a skyrocketing of tourists is found in the same years. This directly implies that the money spent is directly proportional to the tourists in particular FY.

Data Analysis

1. 2013 was the year when Kumbh Mela was organized in Prayagraj, and that became a reason the city attracted 85105683 total tourists, in which 387719 were international tourists and 84717964 were domestic travelers.
2. 2014 was a non Kumbh year, that could be the reason Prayagraj, experienced 58.04 percentage drop in the total tourists; under which 72.37% drop were seen in the international tourists. This is significant that international tourists are attracted towards organizations such as Kumbh Mela.
3. 2015 was again a non Kumbh year, although the Prayagraj experienced a 12.31% growth in the number of tourists compared to previous year, however the number of tourists in 2015 is around half compared to 2013 data. The growth is significant in the domestic tourists, which is 12.35%, whereas the growth in the international tourists is 2%. This shows international tourists are not attracted towards Prayagraj in normal or non Kumbh Years.

4. 2016 seems not a very good year from the perspective of tourism. Prayagraj experienced 2.86% growth in the number of tourists. On bifurcating the growth number it is visible that 2.8% growth was received by domestic tourists whereas 0.27% growth was received by international tourists.
5. 2017 seems not a fruitful year for Prayagraj because the growth restricted to 1.5% whereas in the previous year the growth was 2.86%. The growth in the foreign tourists was 0.09% whereas in domestic tourists it can be seen 1.5%. This is the lowest growth rate in the following years, a reason of which is necessary to be researched. 2017 was also the legislative election year in the state, which could have impacted the tourism in the state, although this is just an hypothesis.
6. 2018 seems to receive a significant growth rate in total number of tourists which is 7.02%. The growth can be easily seen in the number of international tourists which is 33.85% compared to previous year data. The domestic tourists received a 6.95% growth rate.
7. 2019 was the Kumbh year in Prayagraj, and the number shows a drastic increase in the tourist footfall. The number shows 535.92% growth in the number of domestic travelers and 698.13% increase in the number of foreign travelers. This is again evident that international tourists are attracted towards Kumbh like massive organizations.
8. 2020 was the year of pandemic and lockdown and the number of footfalls are evident that 88.80% drop in the total number of tourists is because of the closure of all economic activities.

2.5 Wetlands

The district comprises a small and large number of wetlands. The district consists of lakes and reservoirs like the Gawain Tal (608.07 Ha), Ranwai Tal (250.58 Ha), Gularia Bandh (225.75 Ha), which are some of the large size lakes present in the district. Table 1 represents the number of wetlands and their area representation in the district. Around 485 wetlands were sized greater than 2.25 Ha and 612 less than 2.25 Ha areas. The region consists of small and large wetlands, generally less than 500 Ha in area.

Table 1: Wetland Data of Prayagraj District

Wetland Types	Total Number of Wetlands:			Area (ha)									Aquatic Vegetation
Natural Wetlands	**NRCD**	**NWIA**	**Diff.**	**<2.25**	**<5**	**<10**	**<20**	**<50**	**<200**	**<500**	**<1000**	**>1000**	
Lake/ponds	19	22	3	0	0	0	6	7	5	0	1	0	11
Ox-bow lakes/cut off meanders	13	21	8	0	5	0	2	4	2	0	0	0	5
High altitude Wetlands	0	0	0	0	0	0	0	0	0	0	0	0	0
Riverine Wetlands	5	6	1	0	0	0	2	2	0	1	0	0	0
Waterlogged	23	36	13	0	7	4	5	4	3	0	0	0	9
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	17	19	2	0	6	3	3	0	2	3	0	0	3
Tanks/ponds	174	192	18	0	143	23	6	2	0	0	0	0	46

Waterlogged	105	150	45	0	39	26	19	13	7	1	0	0	26
Salt pans	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (1097)	356	485	129	612	200	56	43	32	19	5	1	0	100

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

- The district comprises 1097 wetlands; most are lakes/tanks/ponds and waterlogged.
- The wetland sizes are small and large-sized in general.
- The number of natural wetlands is less than man-made.
- Many wetlands, both man-made and natural, are waterlogged one's.
- Fewer wetlands have aquatic vegetation.

2.6 Energy

2.6.1. Solar Energy

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 as depicted in figure, more than half the households in the district, i.e. 55% use kerosene, followed by 43.57% households using electricity for the purpose of lightning.

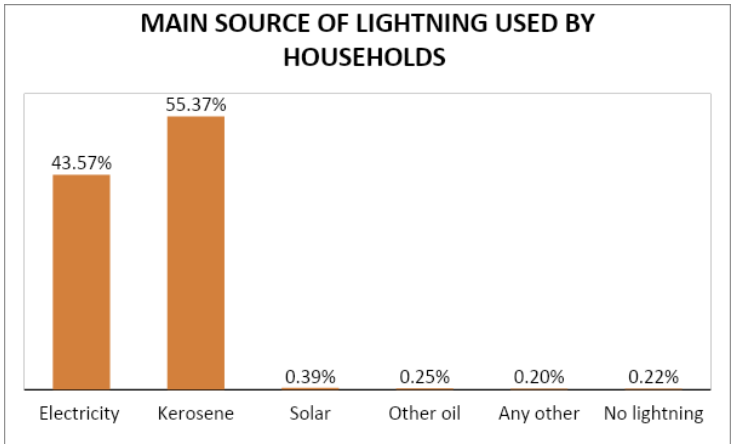


Fig. 1

The annual reports on UPNEDA website mention the various solar plant units installed at different government offices and other places in the district. Solar Rooftop Systems have been installed at various government offices such as at Forest Department of 8 kW, at Allahabad High

Court of 745 kW, CRPF Group Center Phaphamau- 499 kW, Mela Shed-50 kW, Sankar Garh Junction Ald UP-19 kW, Vikas Bhawan-70 kW, Commissioner Office-50 kW, Allahabad University- 1435 kW, Indian Institute of Information Technology-515 kW, Motilal Nehru Medical College-300 kW and Allahabad Division (Northern Central Railways) - 1569 kW. 12 Solar High Mast Lightning System have been installed in the year 2018-2019 in the district Prayagraj. Also, 336 Solar RO Water plants have been installed in the district.

2.6.2.Biomass Energy

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. Agriculture along with fishing and tourism is the main source of income in the district. Wheat and Paddy along with Jowar and Barley are the main crops cultivated in the district. The net sown area in the district is 314356 ha with the cropping intensity of 158.3%. The cropping intensity of the area is good. Also there is usar and uncultivable land available in large amounts. The productivity of various crops in the district is recorded to be 21.57q/ha of paddy, 2.19 q/ha of wheat, 1025 q/ha of barley and 14.09 q/ha of jowar. Sugarcane is also cultivated in the district with the productivity of 451.12 q/ha.

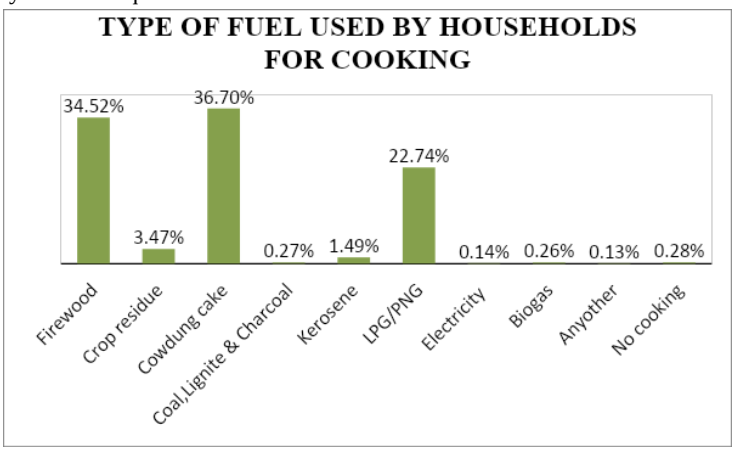


Fig. 1

Fig. 1 is a bar graph depicting data from census 2011, about the percentage of households using the type of fuel for cooking. It can be clearly seen that most of the people are dependent on firewood and cow dung cakes for cooking followed by LPG/CNG. The UPNEDA website mentions the installation of gasifiers in the district of different capacities at Soroy cold storage, Shriti rice mill, Teerathraj rice mill, Singh rice mill and Shiv flour mill. Although there is cultivation of sugarcane in the district, no bagasse based biomass plant has been reported from the district.

2.6.3.Biogas Energy

As existing biogas plant data is unavailable for the district, biogas potential has been evaluated by average livestock and agricultural waste production. Biogas potential from animal and agricultural waste calculated approximately as three crore m^3/year and forty six crore m^3/year respectively. This amount of biogas generation can efficiently complete the energy demand of the district.

2.6.4.Hydropower Energy

The district's two major rivers are the Ganga and the Yamuna. Because the district's plain region is situated between the Ganga and the Yamuna, these rivers are significant to the district's agriculture. Available data shows that no hydropower plant exists in the district, and no site has been investigated for future projects.

3 QUALITATIVE DATA ANALYSIS

3.1 AGRICULTURE, ALLIED ACTIVITIES,

3.2 FORESTRY

For the protection of environment protection, mini or small forests will be developed on the both banks of Ganga.[3] Another initiative was taken to create 'Sanskritik Forest', on the banks of Ganga and Yamuna, for restoring the eco-system with the effort of Forest Research Centre for Eco-Rehabilitation (FRCER), Prayagraj.[4]

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).[5]

3.2.1. Biodiversity : Biodiversity assessment of Balapur pond in the district by Ashok Kumar Verma concluded that the pond's rich and thriving biodiversity, including 40 chordate species and

[3] https://timesofindia.indiatimes.com/city/allahabad/small-forests-to-be-developed-for-environmental-protection/articleshow/83826189.cms

[4] https://timesofindia.indiatimes.com/city/allahabad/sanskritik-forest-to-be-developed-at-chatnag/articleshow/84419481.cms

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

38 angiosperm species. Twelve species of fish, two amphibians, seven species of reptiles, 11 species of birds, and eight species of mammals make up the chordate variety. Another study on butterfly diversity in the district was carried out by Mohammed Abdullahi et al. and concluded a total of 316 individuals and 21 species of butterfly were recorded in the study area (Company bagh, Shuats campus, Kushrobagh). As per the news article of The Times Of India, the first Sanskritik forest will be created in the district near the river Ganga and Yamuna.

3.3 ENERGY

As per the data of the year 2013, Prayagraj district energy consumption is around 4403 TJ/year and 3.7 GJ/capita/year. GHG emission of 299,916 Ton CO_2 equivalent and 0.251 Ton CO_2 equivalent/capita has been evaluated for the district.

5.5.1. Solar

In the district Prayagraj much work has been done in the solar energy sector. A lot of solar rooftop panels have been installed at the various government buildings. The work in the solar energy sector has been quite progressive. According to an article in The Times of India with the heading 'Solar electric power system emerges as go-to option during covid in UP's Prayagraj'- Worried about the over mounting utility bill on account of the use of electric appliances, citizens of including owners of big showrooms, farmhouses, community halls and marriage pandals are quickly switching toward electric power systems in an attempt to reduce electricity charges. Agencies taking up the installation of solar power systems in Sangam city claimed that the absence of business during the first and second lockdown and business fraternity particularly owners of big showrooms, community halls, and marriages. Rahul Khare , director of a firm installing solar power energy systems, told TOI that there has been a rise of 40 per cent in customers seeking installation of the solar power system to help reduce their electricity bills soon after the first lockdown.

An article in Hindustan Times reads 'Allahabad set to become UP's solar power hub'. According to this article Allahabad is all set to become a major solar power generation hub in Uttar Pradesh. The project to set up a solar energy park on Gujarat model at trans-Yamuna region of Meja in Allahabad has picked up speed. This park is coming up on a 100 hectare land near Kosda village of Meja tehsil and already 80 percent of the work is complete.

5.5.2. Biomass

The district Prayagraj has a good agricultural produce and hence the biomass produced is also very rich. There are rice mills and sugar mills in Prayagraj which can make use of biomass in bio-energy production. Since the district has only a few biomass plants, which means that the residue produced is either dumped or burnt directly. This of course has its own repercussions of pollution in different forms. The thermal plants in the district should be encouraged to produce power by using the co-firing method. Presently no initiative is being taken by the concerned authorities about utilization of biomass in the district.

5.5.3. Biogas

As per the report by Danik Jagran, in Mundera Mandi (Prayagraj Nagar Nigam), the Municipal Corporation has chosen Biofix private limited agency to build a biogas plant. Mundera Mandi produces around three tonnes of wet trash every day from vegetables and fruits. The corporation will own the compost manure generated by the agency, which it will subsequently sell to the agency for Rs. 2.5/- per kilogram.

5.5.4. Hydropower

For hydropower generation, the National level program, such as the small hydropower project program, runs in the state. The implementation of small hydropower in the state is carried out by Uttar Pradesh New and Renewable Energy Development Agency and Uttar Pradesh Jal Vidyut Nigam. Neither sites have been investigated so far nor exist at present in the district.

3.4 TOURISM

Temples of Prayagraj

Prayag is famous for Madho temples also. Twelve Madho temples are situated at different locations as given below (**Source-prayagraj.nic.in**):-

- Shareb Madho:- In the east of Triveni it is situated in the garden of "Chatanaga" which had been the place of "Vyas ji'. Shiv Puran was written here.
- Adveni Madho:- Near the kothi of Ram Charan Agarwal at Daraganj, in the temple The idol of lakshmi Narain ji is there.
- Manohar Madho:- In the temple of Darveshwar Nath, there is an idol of lord Vishnu, which is called Manohar Madho
- Chara Madho:- Situated in Agnikor-Arail.
- Gada Madho:- Situated near Chheoki Railway station.
- Adam Madho:- Situated in village Deoria.
- Anant Madho:- Approx Two miles away from Khuldabad.
- Bindu Madho:- Situated in the vicinity of Draupadi Ghat.
- Ashi Madho:- Situated in the neighbourhood of Nagbasuki.
- Sankat Haran Madho:- Situated below Sandhya Vat.
- Vishnu or Adh Madho:- Situated in Arail.
- Vat Madho:- Situated near Akshyavat.

The Sangam - The Confluence

This is the point where the Ganga meets the Yamuna, along with the mythical Saraswati, which remains unseen. It is located about 7 km from the railway station.

Broad floodplains and muddy banks protrude towards the holy Sangam. A dip in the Sangam water is supposed to be the holiest pilgrimage for Hinduism. Boats to the Sangam can be rented by

pilgrims and tourists alike at the ghat near the fort. It is during the Maha Kumbh/Kumbh that the Sangam truly comes alive, attracting the devout from all across the country.

Kumbh Mela
Mentioned in detail below.

Allahabad Fort
Mentioned in detail below

Minto Park
Minto Park is located near Saraswati Ghat. It has a stone monument with a four-lion symbol on the peak, the base of which was laid by Lord Minto in the year 1910. In the year 1858, the EIC (East India Company) officially signed India to the British Government at Minto Park.

Shringverpur
Shringverpur is a must to go excursion tourist destination near Prayagraj. It is located 45 km from Prayagraj on Lucknow highway. According to local mythology, it was at this place that Lord Ram crossed the Ganges river on his way to exile with Sita and Lakshman. Though, the place has been mentioned in the epic Ramayana. Shringverpur is cited as the capital of the renowned kingdom of Nishadraj or the 'King of Fishermen'.

All Saint's Cathedral
All Saints Cathedral was built in the late 19th century and these days stands amazingly as a colonial structure. The Gothic architecture and intricate work and designs on the marble altar and the stained glass panel with the grand pulpit along with its arches in pale sandstone makes the building more attractive. It is also referred to as "Patthar Girja" (Stone Church). This landmark was designed by the British architect Sir William Emerson, in the year 1870. The church is located at the Sarojini Naidu Marg, Civil Lines, Prayagraj, and is open only on Sundays.

Khusro Bagh
A high walled garden that comprises four important Mughal tombs built in the 17th century. This emerald green garden complex has a rich history. One of the tombs belongs to King Ameer Khusro who was the eldest son of Jahangir. Another one belongs to Khusro's mother Shah Begum. The third tomb was constructed by Khusro's sister Nesa Begum is beautiful to look at with multiple artistic carvings over it but remains empty. The last one which is smaller is known as Tamerlan's tomb and remains a secret. The artistic beauty of the place leaves the visitors awestruck. The beautiful arches, domes and chhatris are worth the time and admiration. It is located in Lukarganj, Prayagraj which is one of the main areas in the city, close to the Allahabad junction station.

Allahabad Museum
Mentioned in detail below

Ulta Qila

Ulta Kila is located in Jhunsi 14 kms away from Prayagraj. The Name Ulta Kila was derived from a narrative about a King named King Haribong who ruled Jhunsi. The King was said to be a man without a virtue and his decisions always resulted in a loss to the people of his kingdom . One day he gave something wrong to a saint to eat, the saint cursed him that a star would fall on his fort, which would turn it upside down. Thus, by the orders of Saint Ali Murtaza, the Mirrikh star fell on this fort and since then the fort is upside down.

ISKCON Prayagraj

The ISKCON temple is situated near the banks of river Yamuna. The temple has a small complex with a Dharmashala for the devotees along with a goshala. There has been a massive growth in the number of devotees over the past years. The Sri Radha Veni Madhava deities were installed in the year 2003. The temple is a peaceful place and has a calm environment. This beautiful temple is open to everyone. The devotees can also meditate here.

Shree Akhileshwar Mahadev

The temple is located near Rasulabad Ghat road under Chinmaya Mission. The foundation stones were laid on 30th October, 2004 by Swami Tejomayanandaji and Swami Subodhanandaji of Chinmaya Mission. (Source: prayagraj.nic.in)

Akshay Vat

Mentioned in detail below

Mankameshwar Temple

It is situated near Minto park along the Yamuna river. It has a black stone lingam and statuettes of Ganesh and Nandi. There is a majestic statue of Hanuman and an ancient peepal tree near the temple.

Nag Vasuki Temple

This temple is located on the north of Sangam in the northern corner of Daraganj on the Ganga bank. It has statues of Nag Raj, Ganesh, Parvati and a reclining statue of Bhishma Pitamah. There is a Shiv temple in the premises. A big fair is held on Nag Panchami day.

Padila Mahadev

The temple is located 3 km north-east of Phaphamau in Soraon tehsil of Prayagraj. It is made completely of stone and has several statues. A big fair is held here on Shivratri and in the month of Phalguna.

Lalita Devi Temple

It is located in Mirapur locality and the statue of deity is 108 feet high. There are numerous statues inside the temple and an ancient papal tree in its compound. It is counted among the 51 Siddha Shaktipeeth in the country.

Lakshagriha

It is believed that the Duryodhan had made to trap the Pandavas and eliminate them. However, Vidur alerted the Pandavas who escaped from a secret door while it was set on fire. It is located 6 kilometers south of Handia on the bank of the Ganga. (Source: prayagraj.nic.in)

Alopi Devi Temple

This ancient temple is located in Alopibagh locality in Prayagraj. Devotees pay obeisance here. It is said to be one of the Shaktipeeth and a big fair is held during the Navratri. There is an idol of Lord Shiv and Shivling.

Takshakeshwar Nath

This is a temple of Lord Shankar located in Dariyabad locality on the bank of the Yamuna in Prayagraj.

Samudra Koop

Samudra Koop is situated on a big, high mound on the bank of the river Ganga. It is about 15 feet in diameter and is built of big stones. It is thought that it was built by the king Samudragupta. It is also said that the water level below the well is equal to the sea level, hence the name.

Someshwar Temple

It is built below the ground level inside the fort on the bank of the Yamuna. There is a long corridor and there are 44 idols in here with a Shivling in the center. It was renovated by Bajirao Peshwa in 1735, and some idols date back to the 17th or 18th century. Legend has it that Lord Rama had come during his exile.

Sheetla Temple at Kada

It is located about 69 km north-west of Prayagraj. The great sage Sant Maluk Das was born in 1631 at Kada, where his samadhi and ashram are located. There is a temple of goddess Shitla Devi and a pond.

Kalyani Devi

There is an entire locality by this name on the bank of the Yamuna and a temple of goddess Kalyani Devi. There are idols of the goddess and that of Lord Shankar, said to be dating back to the 20th century.

Prabhas Giri

It is located about 50 km north of Prayagraj city in Manjhanpur tehsil of present day Kaushambi district. This region, 10 km from Kaushambi, was once the capital of the Vatsa empire. Legend has it that Lord Krishna left this earthly world here after being shot by an arrow. There used to be a big Jain temple here and the place is a pilgrimage for the Jain community. The Archeological Survey of India has declared the entire region as protected.

Shivkuti

On the northern end of Prayagraj city on the bank of the Ganga is Shivkuti temple and ashram. There is the ashram of Shri 1008 Shri Narayan Prabhu established by him in 1948. The grand Lakshmi Narayan temple with marble idols and a Durga temple attracts a big fair in the month of Shravan.

Kamauri Nath Mahadev

It is located in the railway colony near the Surajkund locality. In 1859 the railway track had to be diverted because of this temple. It has an idol of five-faced Mahadev. It is said that Lord Shankar had destroyed the cupid god Kamdev here.

Hatkeshwar Nath Temple

It is situated in the heart of the Prayagraj city on the Zero road. There are many idols in it, including that of god Hatkeshwar Shiv.

The Kumbh Mela 2019

The most prominent and notable confluence of three rivers Ganga, Yamuna and Saraswati (mythical) at Prayagraj, is famous worldwide. The Sangam has been a significant tourist attraction and pilgrimage since ancient times. The water of both the rivers Ganga and Yamuna can be seen merging here at Sangam. Although the Muddy water of Ganga and Bluewater of Yamuna do not mix and remain undissolved. The point where these two different colours are visible in the water stream is known as Sangam. Mega events such as Kumbh and Maha Kumbh are celebrated on the bank of Sangam.

The World's most immense holy assemblage, the Kumbh Mela, is attended by millions of followers, and the number keeps increasing every time. The annual Magh Mela (Jan-Feb); then Kumbh Mela (every 6th year), and the Mahakumbh Mela (every 12th year) are organized here. It is said that in prehistoric times, the gods had once lost their strength. To recover it, they were required to churn the Kshir Sagar for extracting Amrit (ambrosia of immortality). Since the task required more people, the gods decided to take help from their enemies, the demons, bribing them with half of the Amrit that came out.

Although once the Kumbh (pot) of Amrit was obtained, the demons triggered a fight. Lord Vishnu along with the Kumbh set forth, when some drops of Amrit spilled in four different locations;

Allahabad, Haridwar, Ujjain and Nashik. The battle went on for twelve days, which were counted as equivalent to 12 human years.

IMPORTANCE & SIGNIFICANCE OF KUMBH

Maha Kumbh has a mesmerizing influence over the people as it witnesses the largest human gathering NOR common cause, on a single day irrespective of caste, creed, colour and religion. It is once he experiences seeing millions of pilgrims and tourists.fr p the world comes together. This spectacle of faith is truly e This festival is held in highest regard as the ritual bathed water on this day saturated with flower & incense frag chanting of vedic hymns and mantras liberates one fruit sufferings and miseries of life. The Kumbh Mela is consD most sacred and greatest of Indian festivals. It is believed to making the ceremonial dip in the holy river on this auspicious day ne attains moksha (meaning liberation from the cycle of life, death and rebirth)

Presence of sadhus and ascetics who represent different orders (Akharas), sadhus like Vaishnav (followers of Vishnu) and Shaiva (followers of Shiva) makes it one of its kind festival. The most interesting feature is the presence of Naga sadhus (known as preservers of faith). A particular sect of sadhus initiates the ritual bath and leaves after the dip in the holy water to make way for another order. Many pilgrims gather to take blessings from these sadhus.

Rig Veda has mentioned about the significance of convergence of divine Ganga, Yamuna and Saraswati rivers at Sangam. References can be found about the significance of this ritual in Varaha Purana and Matsya Purana as well. There is a belief that the ashram of the Maharshi Bhardwaj, where Lord Ram, Laxman and Sita visited at the time of their exile (vanvas), was situated at the Sangam.

Once every few years, Jupiter enters the Taurus constellation at the same time when the Sun and the Moon enter Capricorn. This affects the entire atmosphere in such a way that by simply being at Kumbh and taking a dip in the river Ganga can be very conducive to spiritual growth, as well as physical and emotional well-being.

Various tourist walks were created during Kumbh mela for tourism purposes in the city. The heritage walk consists of all the heritage buildings in the city and is mentioned in the image-3. Second walk was The Sangam walk consists of all the temples and ganga Arti at the Sangam area and is mentioned in the image 4. The Prayagraj Dharmik Parikrama consists of all the Important shrines and religious places in the Prayagraj, details are shown in the image-5. Next one is The Kumbh walk which consists of a 1.5 hour tour of the entire Mela campus along various sectors to witness various Akhadas and is shown in Image 6 and Image 7.

The Heritage Walk in Prayagraj

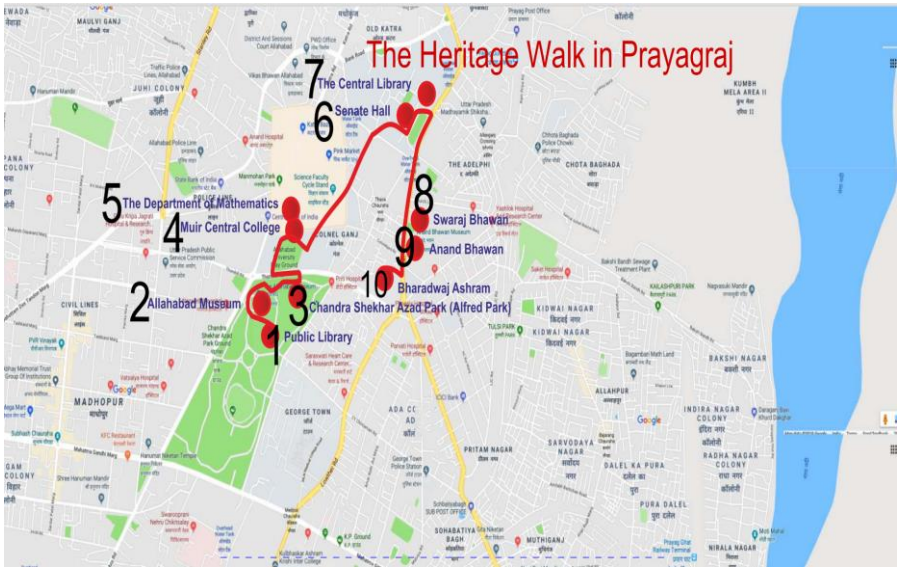


Image3; Source: kumbh.gov.in

The Public Library

The Public Library at Allahabad/Prayagraj was constructed by Govt. of North Western Frontier Provinces during British Raj. The present Library - Rajkiya Public Library is situated in the Thornhill Mayne Memorial Building. It was constructed in the memory of C.B. Thornhill and Mayne.

Library was made in Gothic architecture and provides a range of books, magazines, and newspapers in all Indian Languages. It is believed that the library houses around a lakh of books excluding newspapers and magazines.

Allahabad Museum

The museum is situated at Kamla Nehru Road, inside Chandrashekhar Azad Park in Allahabad. The chain shaker at our park is also known as Company Bag or Company Garden. It is situated.2.5 kilometers from Allahabad Railway station. The park was inaugurated by the first Prime Minister of India, Pandit Jawahar Lal Nehru in 1954 in the memory of freedom fighter Chandrashekhar Azad. Inside the museum, there are around 16 plus galleries that exhibit SpankedArchaeological Gallery, Gandhi Gallery, Nehru Gallery, decorative art gallery, arms gallery, armor and bronze gallery, textile gallery, Modern India painting gallery and Freedom struggle gallery. All the galleries in the museum have remarkable antiques and articles. A large variety of Terra cotta from very important archeological sites such as Kaushambi and others are also displayed in the museum. The museum also houses manuscripts in Sanskrit, Persian Arabic and Pali Language.

Chandra Shekhar Azad Park (Previously Alfred Park)

The son of Chandra Shekhar Azad was Chandra Shekhar Tiwari and was born on 23 july 1906 in Bhavra. He completed his education from the Mahatma Gandhi Kashi Vidyapeeth. Chandra Shekhar Azad Park or Alfred park is spread over 133 acres in Prayagraj. It is also known as Company Bagh. Chandra Shekhar sacrificed his life in the Indian Freedom struggle on 27 Feb, 1931 in Prayagraj. Alfred Park also has a huge Victoria statue.

Muir Central College

The Muir Central college started operating in the year 1872. The college building was constructed by William Emerson and exhibits Indo-saracenic architecture. The college building can be seen from far away places because of the 200 feet yellow sandstone tower. It was later renamed to Allahabad Central University. There was a time when Allahabad University was known as the IAS factory.

The Dept. of Mathematics, University of Allahabad

The Dept. of Mathematics was established in 1872 for advanced mathematics and later became a prominent space for learning. The gothic architecture makes the building an attractive space and the lush green campus provides aesthetic meaning to it. The architecture makes it claim that it is the Oxford of the East.

Senate Hall

The Senate hall building houses the academic and official work of the University Administration. Sir Swinton Jacobs constructed this building in 1910-1915. The building is made of sandstone and a unique architecture style which exhibits typical local arches.

The Central Library

The Central Library was initially a part of Muir college and was established in the year 1872. The present building of the library was erected in 1973.

Swaraj Bhawan

Swaraj Bhawan was the property of Motilal Nehru and was gifted to National congress in 1930, it was initially the original house of Pt. J.L. Nehru. They later shifted to their new house known as Anand Bhawan. At the current date both of the houses are museum and under state's control. The museum exhibits the chronological life of Pt J.L Nehru, childhood of Indira Gandhi and other freedom struggles and congress meetings.

Anand Bhawan

Anand Bhawan is located 4 kilometers away from the railway station. It was the home for India's first Prime Minister Pt. Jawahar Lal Nehru. It was constructed by his father Pt. Motilal Nehru. It was donated to the government in 1970 which is now a museum and open 10am to 5pm with Monday as a weekly holiday.

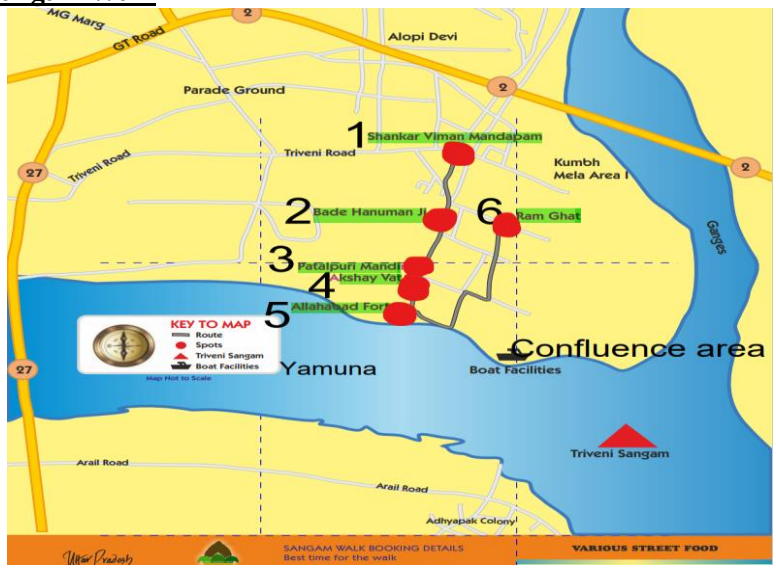
It also houses Jawahar Planetarium which is very famous for its scientific shows and educational series on astronomy.

Bharadwaj Park

The Bharadwaj Ashram is located in Colonelganj, Prayagraj. The sage Bhardwaj founded a shivling of Bhardwajeshwar Mahadev in Bharadwaj Ashram along with hundreds of other statues eg Ram Lakshman, Mahishasur Mardini, Surya, Sheshnag, and Nar Varah are notable among them.

Ayurveda's first benefactor was Maharishi Bhardwaj. Lord Rama had gone to the ashram of the sage Bhardwaj to seek his blessings. It is currently located near the Anand Bhawan. There is a Shiv temple also on the premises and water continuously washes it. Few other statues of Bhardwaj, Yagyavalkya, and other sages, gods, and goddesses are also established here. The sage Bhardwaj was great rishi Valmiki's disciple.

The Sangam Walk



Source: kumbh.gov.in

Shankar Viman Mandapam

Shankar Viman Mandapam was built by Sri Kanchi Kamakoti Peeth in 1986, in a characteristically Dravidian architectural style. The three storeyed temple- ground floor comprises the sculptures and idols of Adi Shankaracharya, the first floor has the sculptures of Devi Kamakshi and 51 Shakti Peeths(symbol of power), dedicated to the goddess (Shakti). The second Floor offers Venkateswara (Balaji) idols from Tirupati and 108 Vishnu-peeths. The third floor has a Sahasra

Yoga linga which is surrounded by 108 Shiva Lingas. The temple is a fusion of northern and southern temple architectural fashions as well as the three traditions (ideology) of Hinduism- 1. Shaivism (Followers of Shiva), 2. Vaishnavism (Followers of Vishnu) and 3. Shaktism (followers of the Goddess or Devi). The temple walls are carved and consecrated with illustrations of gods and goddesses and wall paintings from the Ramayana. A section in the basement is dedicated to the teaching of Sanskrit. The temple is open 7 days a week, from 6:00 AM to 1:00 PM in the morning shift and from 4:00 PM to 8:00 P.M in the evening.

Akshyavat & Patalpuri Temple

Akshayavat (*Akshay* meaning that can not be destructed or immortal and *vat* is a Sanskrit term for Banyan Tree) "the indestructible Banyan tree" is a sacred tree mentioned in Hindu mythology, and in Hindu manuscripts. The Akshaya Vat tree is mentioned in great detail by historians and travelers such as the Buddhist Pilgrim Hieun-tsang and the archeologist, Alexander Cunningham. The tree is significant, for it is where Rama, Lakshman and Sita - the protagonists of the Ramayana are said to have rested during their exile from Ayodhya. There are many controversial stories associated with this tree- one such is that Mughals tried to root it out but failed to do so and from this instance it was named *Akshayvat*.

Patalpuri Temple : Patalpuri Temple is one of the firstborn shrines in Hindu land dating back to the vedic era. This gorgeously carved underground temple is built within the Allahabad fort campus close to the Akshayavat.

Bade Hanuman Ji

Hanuman was the messenger of lord Ram in the Ramayans tale. He is deemed to be the origin of incomparable strength, intelligence and one who unshackles a person from dangers (Sankat mochan) . The idol in the temple is in the supine position (lying horizontally with the face and torso facing up), or veer-mudra. The story associated with this . It is said that a wealthy but childless businessman from Kannauj, made an idol of Hanuman from stones found in the Vindhyachal hills. He decided to bathe the idol at several pilgrimage spots or teeth-stains. When he arrived at Sangam, he had a dream that if the idol was left here, all his wishes would be fulfilled. He did so, and returned to Kannauj and his wife bore him a son. Soon the idol was submerged in the sand. It was discovered by a revered holy man, Mahatma Balagiri. The idol was installed where it was discovered and the temple became famous. It is said that the divine will of Hanuman prevailed, and this prevented the idol from being made erect or being transferred inside the fort. Ever since, it has been worshiped as lete (lying down) Hanuman.

Triveni Sangam

The playwright Kalidasa described the confluence of the white waters of the Ganga and the blue waters of the Yamuna, as if they were a string of pearls and sapphires combined, or a garland of white and blue lotuses intertwined. The Triveni Sangam in Allahabad is a confluence of three rivers, the Ganges, Yamuna, and Saraswati. Of these three, the river Saraswati is invisible and is

said to flow underground and join the other two rivers from below. The muddy, pale- yellow and mica-laden and languid waters of the Ganges merge with the vibrant, blue waters of Yamuna. The Ganges is only 4 feet deep and the Yamuna is 40 feet deep here During the annual flood, one can clearly see the point of confluence. The Sangam or confluence is a pilgrimage spot or teerth-sthan. A dip here, not only expiates sins, but frees one from the cycle of birth and death. A teerth is a ford; the teerth-sthal allows the faithful to cross, ford, the river of consciousness, from the earthly realm to that of divinity and immortality. In fact, it is known as the King of Confluences or Prayag-raj.

Allahabad Fort

Allahabad fort – or the allahabad ("blessed by God") fort, as it was then known, was built in 1583 by the Mughal Emperor Akbar and was home to one of his greatest military garrisons. Abul Fazl in his Akbarnama explains that the fort grew out of [Akbar's] desire to found a great city in the town of Piyag [Prayag] where the rivers Ganges and Jamuna merge. The fort occupies a great vantage point even today, where it not only overlooks the Sangam, but also allows visitors to look down upon the modern city of Allahabad. The fort houses a 10 meter high Ashokan Pillar, dating to the 3rd Century BCE, and believed to have been moved to the premises from the ancient town of Kosam (now Koshambi). The complex also boasts of three other unconventional attractions, the underground Patalpuri temple, the Akshaya Vat, or the immortal banyan tree and the Saraswati Koop, which is widely revered as being the source of the mythical river Saraswati.

Ram Ghat Ganga Aarti

The Ganga Aarti is one of the most beautiful experiences in India. The spiritually uplifting ceremony is performed daily to pay homage to the river Goddess Ganga. Every evening as dusk descends, it's time for the Ganga Aarti to be performed at the Ram Ghat. It's a very powerful and uplifting spiritual ritual. The Ganga Aarti takes place at the Ram Ghat, facing the river. Lamps are lit and circled around by pandits (priests) in a clockwise manner accompanied by chanting of songs in praise of Ganga. It is believed that the lamps acquire the power of the deity. The word 'aarti' is derived from the Sanskrit aaratrik, which means a form of worship, in which light from lamps, with ghee (purified butter) or camphor is offered to one or more deities. The aarti symbolises the five elements ether (akash), air (vayu) , fire (Agni), water (jal) and earth (Prithvi). After the ceremony is complete, devotees cup their hands over the flame and raise their palms to their forehead in order to acquire the goddess blessings. You need to witness the event to actually comprehend its grandiose

.

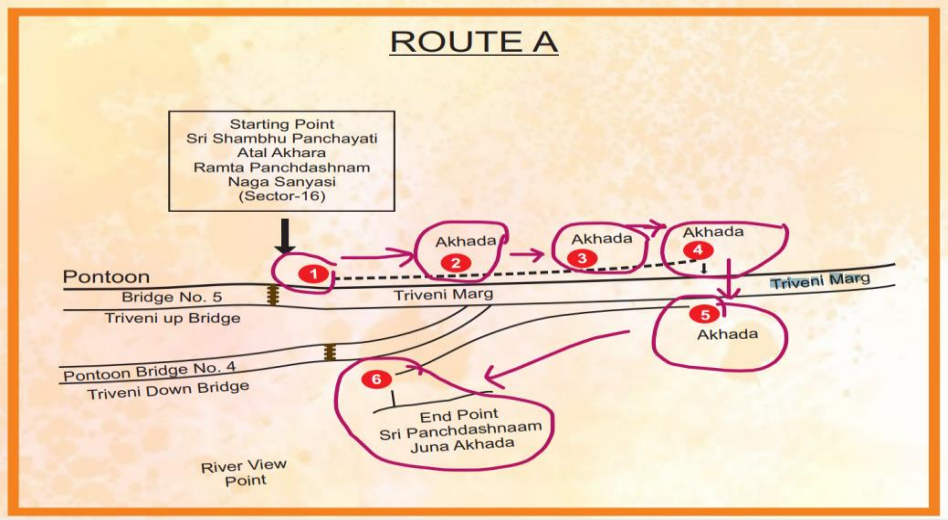
Prayagraj Dharmik Parikrama-

ARTH GANGA PROJECT: DISTRICT PRAYAGRAJ

Source: kumbh.gov.in

Alopshankari Devi Mandir
Aadi Ganesh Mandir
Dashashwamegh Mandir
Nrisingh Mandir
Veni Madhav
Bheeshma Pitamah Mandir
Nag Vasuki Mandir
Asi- Madhav Mandir

Kumbh Walk



Source: kumbh.gov.in

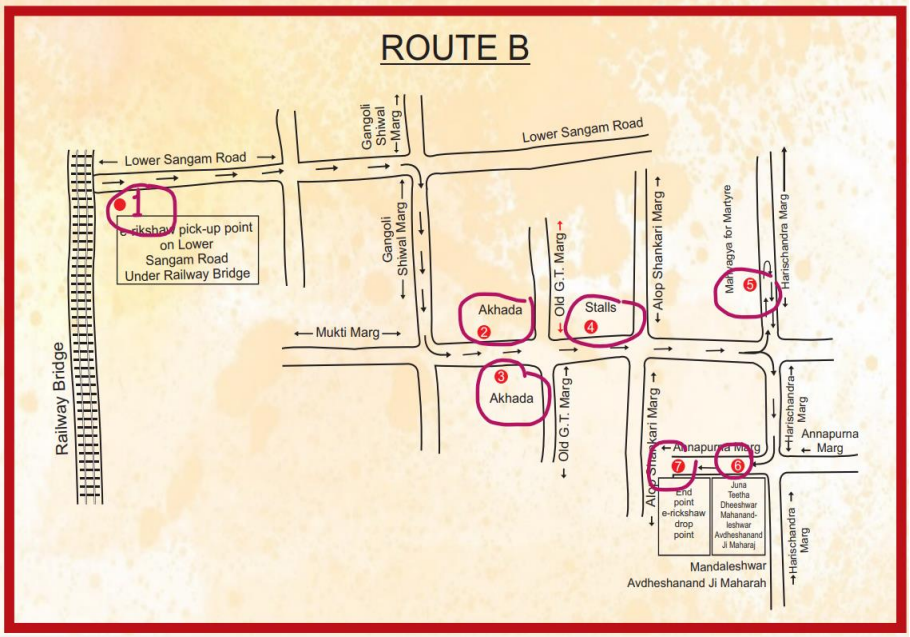
The Kumbh Mela is a gathering of devotees who follow Sanatan Dharma and have faith in Hindu Ideology . The congregation share ideas on faith, spirituality, sacrifice and tradition. The spiritual energy that permeates the air is magnetic and mesmerizing.

An integral part of Kumbh Mela, Akharas were formed in the 8th century by Hindu seer Adi Shankaracharya with the aim to unite organizations of the sadhus and saints to protect the sanatan way of life.

Each Akhara has followers of varying religious customs, views and ideologies. These Akharas have a special historical and religious significance and come from far away places to be represented at the Kumbh.

As you walk down the Triveni Marg, having witnessed the Sangam, the Naga Sadhus are present all along this route. They play a significant role in the Kumbh Mela and many people flock to spend time with them and learn from their wisdom. Their rituals and traditions are specific and clearly defined. Spend a moment with them to experience spirituality. Earlier there were13 akharas, but this year, one more has been included. The shops and stalls enroute give one a glimpse of the interesting memoirs available at the mela. From daily necessities to rare experiences the Kumbh in India gives one a glimpse of it all and much more.

E- Rickshaw Route



Source: kumbh.gov.in

This route is traveled on an e-rickshaw, as the Kumbh mela is a very large area and difficult to cover on foot. Several gates such as this Dhanush gate (dwar), have been erected within the Kumbh area. These prove to be great landmarks, are beautifully designed and aesthetically punctuate the mythological significance of the Kumbh.

Traveling through this part of the Mela, the Akharas are scattered. Visit all on the route, as each Akhara is a journey into a divine, diverse and spiritual space. The significance of the Kumbh goes back in time to the legend of the Samudra Manthan,or ocean churning by the Gods, and demons, to get the nectar of immortality. At one of the prominent Akharas along this route, you will witness a Yagya being performed by over a hundred Seers. As they chant vedic hymns in unison, the energy is palpable and uplifting. These centuries-old rituals are performed by saints and sadhus in the most magnetic way and transit us to a spiritual realm. The chants will be explained to you by a Sadhu at the Ashram. The Yagya can be witnessed from 11am to 1pm and again from 3pm to 5pm. We will also find Akharas where prayers are being constantly offered for those who lost their life in battle. Who became martyrs for the country. This is most definitely a visit to remember as it strengthens the thread of brotherhood and unity, which is central to the Kumbh. Lastly, you visit one of the most beautiful Akharas where one can sit and listen to the ongoing Pravachan and relax in the peaceful ambience and majestic spaces. You can also sip a refreshing drink and eat a wholesome healthy meal.

Important pilgrimage destinations are:

ARTH GANGA PROJECT: DISTRICT PRAYAGRAJ

Prayagraj (Prayag Kumbh Mela, Magh Mela)
Varanasi (Ganga, Kashi Vishwanath temple) 120kms from Prayagraj
Vindhyachal (Vindhyavasini Devi temple) 90kms from Prayagraj
Ayodhya (Ramkot, Hanuman Garhi, Saryu) 170kms from Prayagraj

Things that made Kumbh 2019 – A successful event.

- Arrangement for special trains dedicated to Kumbh Mela 2019, for easy arrival of tourists. This was possible because of collaboration with the Ministry Of Railway and Ministry Of Tourism.
- Special Kumbh Shuttle buses for easy transport. Information of buses widely available on apps and websites such as yatra.com, makemytrip, redbus, cleartrip, paytm etc. Private public partnership helped Kumbh to become a successful event. More than 500 shuttle buses in the city and 500 e-rickshaws in the Mela area were supplied for easy transportation.
- Accomodation- TENT COLONY- a temporary but beautiful accommodation provided by both state and private players for safe and happy stay at Kumbh 2019. UP tourists made tent colonies in the name -KALPA VRIKSHA, KUMBH CANVAS, VEDIC TENT CITY, INDRAPRASTHAM CITY. A 20,000 bed public accommodation was also provided by the state for economical stay. Various private hotels also provided accommodation and Kumbh tariff.
- Mobility is very important in such a huge congress to avoid jamming and crowding. 22 Pontoon Bridges and around 250 km of checkered plate roads were constructed for Kumbh journey to be hassle-free.
- GHATS- Around 8 kms of Ghats had been developed, with changing rooms, river barricading and jetties to offer a mesmeric spiritual Snan/bathing experience at Kumbh.
- Parking- More than 90 Parking Lots with a capacity of around 5,00,000 vehicles were constructed to avoid jams and stuck conditions.
- Health Care Services- 22 hospitals with more than 450 beds, about 150 ambulances and around 2,000 medical staff were deployed in the Kumbh Mela 2019 and had the ability to attend all the medical needs and healthcare emergencies during Kumbh Mela 2019.
- Sanitation – More than 1.22 lakh toilets had been installed within the Mela area. 20,000 dustbins with liner bags had also been placed in every sector to ensure a Swachh Kumbh. Over 20,000 sanitation workers and Swachhagrahis to ensure cleanliness in Kumbh Mela were applied.
- Security- To ensure your safety and security, police stations and outposts have been constructed within the Mela area to ensure a Surakshit Kumbh. A dedicated helpline number **1920** was ready to serve 24 hours, in order to provide assistance to everyone within the Mela area.
- Well-Equipped Lost And Found Centers- to ensure zero lost cases report in modern day Kumbh Mela 2019.
- MEDIA CENTER- A space for national and international media persons to cover the event.

- TELECOM SERVICES- mobile tower and free Wi-Fi zone were made installed for best mobile networks.
- BANKING SERVICES- ATMs were installed in every sector for cash supply in the Kumbh. Multiple bank branches were also made in the Mela campus for foreign money exchange.
- LIGHTING- More than 40,700 LED lights has been installed to make the river banks look attractive and pleasant to the eyes
- DRINKING WATER- 24x7 free drinking water supply for all pilgrims will be ensured during the Mela period.
- Political interest and enough funding.

3.5 WETLAND

The wetlands are the source of many ecosystems and habitats for various 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 to be turned into a large-scale production hub using the right approach. The region has a good amount of production of wheat and rice as a part of the staple diet. The region is known for its ancient history and Ganga-Yamuna confluence. The data collected and analyzed shows the region's production and possible product derived from the raw product. The list of sources and the possible products are mentioned below:

- Rice, wheat production is recommended as commercial crops in the region, leading to products like flour products.
- Production of pulses like Arhar, Urad and Chana are reasonably high, which can turn into the products like flour, finished pulse products.
- The primary sources of irrigation are canals and tubewells
- The district is famous as the holy place
- The region is also known for its connection with ayurvedic and medicinal plants

4 ACTION PLAN DEVELOPMENT

4.1 AGRICULTURE

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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 a buy-back arrangement. This in turn will motivate them to plant more trees, which would benefit the economy as well as the environment.[6]

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.

4.2.1. Biodiversity : As per the report from Hindustan Times, members of the Euphorial Youth Society, a group dedicated to environmental conservation, are distributing indoor plants to Prayagraj inhabitants and raising ecological awareness. This group consists of students from various colleges and institutions around the country who have settled in Prayagraj. Over 1000 healthy indoor plants have been provided to inhabitants of Prayagraj's multiple areas in the last two months, and environmental awareness has been disseminated. Government should appreciate these works and support them financially.

4.3 TOURISM

- **Ecotourism Projects**

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

- **Sustainable Tourism**

It is a type of tourism in which all the needs and desires of a tourist/ and other stakeholders of the tourism industry are fulfilled without compromising the ability of the future generation to utilize the tourism. Several goals of Sustainable Developments Goals are also seen associated with

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

sustainable tourism. Life below water and life on land are impacted by human activities if the tourism place is a water body or forest area; hence it is the duty of all of us to take care of the sustainability aspect in tourism. Sustainability for locals/natives can be provided by including them in trade and business activities.

There is a sense of responsibility of different stakeholders associated with tourism to develop sustainable tourism. In which each stakeholder takes care of other stakeholders and biotic and abiotic factors. For example, reducing the Carbon footprint per visitor, using eco-friendly vehicles to roam around, supporting local businesses.

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

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

NOTE: Kumbh mela 2019 attracted around 6 crore devotees in a single day on a auspicious bathing date. This is very good from the perspectives of tourism and economy because it would have generated huge revenue. However the huge population at a single place at a time can be dangerous for ecological balance. This could have a negative impact on natural resources and other biotic and abiotic factors near Ganga River. Number of tourists could be monitored and controlled for sustainable tourism.

Projections and Monitoring matrix

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

		pressures and influences. ● The researchers must ensure that the field data and secondary data are correct and not modified while entering the new records. ● Need to involve unbiased researchers.		
	Planning	● Action plans can be developed for intervention based on the research and analysis of different data and reports. ● Developing an Action plan is vital because results depend on how it is planned. ● Planning must consider the social status of the State and the image in the tourists' minds. ● No place should be given to non-practical projections. ● Planning about when to organized Mahotsav/ festivals/ fairs to pump the local economy. Eg Shilp Mela in Prayagraj should be expanded to international level to attract		Planning to be based on research and previous lessons. Realistic planning for successful implementation . .

		internation trading. ● Separate planning for different demographics of tourists for comfort and leisure tours. For example, while planning the tour packages and tariffs, it is crucial to consider the demography of tourists. Foreign tourists ask much for hygiene while local tourists ask much for discounts. Hence these concerns must be included. ● Need to develop the sites as per a set of standards to attract a wide range of tourists. ● Brand Manufacturing to increase tourism activity. ● Organizations of grand events. ● Use of allocated budget.		
	Implementations	● Various schemes can be developed, such as tourist packages, tariff plans etc., to attract more and more tourists. ● Mahotsav and Fairs to be		To attract more number of tourists and maximize the revenue from tourism. To improve the image of the State and not let the other

		organized to rejuvenate the local economy and attract tourists. ● Developing tourist circuits. ● Developing eateries ● Connecting tourism with local culture and food. ● Extensive marketing for advertisement. ● Famous face as brand ambassador. Amitabh Bachchan belongs to the city can be a face. ● Extensive branding and marketing. ● Development of tourism spots and heritage sites. ● Availability of information on government websites along with tour packages. ● An extensive market research for the development of strategies		social factor affect the revenue of tourism.
	Impact Assessment of results	● Calculating what the touch points are. ● The reason for failure ● The reason for the success ● Lesson for next planning		To learn the lesson and find out the root cause of success and failure, to be used further with modification

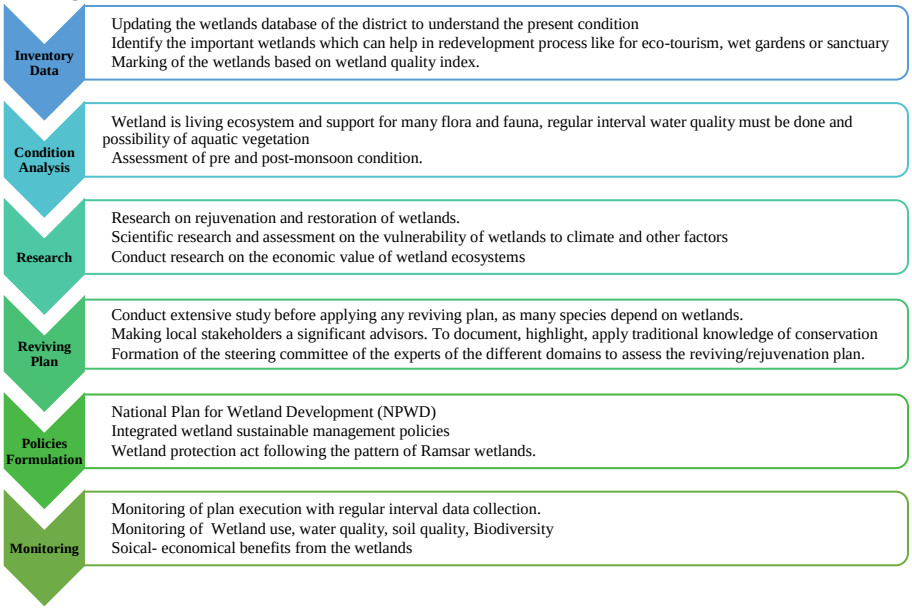
SWOT analysis of Tourism

S No.	Strength	Weakness	Opportunity	Threat
	1. Presence of Sangam Ghat 2. Presence of two rivers. 3. UNESCO recognised Kumbh as heritage site. 4. Allahabad University which is also known as Oxford of the East. 5. City as a hub of freedom fight struggle, eg site where Chandrashekar Azad shot himself. 6. Birth place of 1st Prime Minister of India; Pt. J.L. Nehru. 7. Numerous Heritage sites such as poet's	1. City failed to recognised its tourism potential in the past. 2. Department of tourism failed to upgrade the amenities. 3. Did not focus on benefitting neighboring districts during Kumbh Mela. 4. Post Kumbh pollution mismanagement.	1. Kumbh/Magh mela is a huge opportunity to generate huge revenue from tourism activities. 2. Off-season promotion to attract tourists for heritage walk etc. 3. Generate huge employment opportunities for youth from tourism in Prayagraj. 4. City is known as education hub- can be used to attract international scholars.	5. Sudden increase in population can be dangerous for ecological balance. 6. Pollution after huge organizations such as Kumbh Mela, Magh Mela etc. 7. Pollution in river water. 8. Huge number of students stay here for competitive coachings and education. Massive organizations such as Kumbh Mela

	Ameer Khusro Dargah etc. 8. Hindu pilgim site due to its mentioned in holy religious books.			can disturb the education industry.

4.4 WETLANDS

The district comprises some of the healthy and wealthy wetland ecosystems. They directly or indirectly support millions of people and provide goods and services. They support all life forms through extensive food webs. They are 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 of, and action must be taken on different fronts. 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

The district Prayagraj has been quite progressive in the solar energy sector but needs to pay attention to the farmers by making them aware of the policies of the central and the state government. Because they probably know about solar energy but they are unaware of the proper channel and the policies suitable for them. The next is the industrial sector which needs attention. They should either be provided with net metering benefit when opting for the on grid connections or if not possible then they should be provided with the financial assistance for the off grid connections.

So that they are easily inclined towards solar energy and they don't have to invest a huge sum of capital and wait for longer durations. More and more people should be encouraged towards going for on grid connections under the National Solar Mission. For this mission to gain boost the procedure required should be made easy for the customers and the customers should be entertained well when approaching the concerned authority.

Projection and monitoring

The first thing which is required is to make farmers aware about the Kusum Yojana so that they could take benefit out of it. If required then a selected bunch of villages should be included under the component C of Kusum Yojana initially followed by the other villages. Under this an infrastructural development for solar feeder segregation should be done in the district. Other than this the commercial sector should be provided with the financial assistance for setting up off grid solar panels. Also people should be encouraged for setting up on grid connections and for this to pace up the services that are to be provided by the electricity board should be done smoothly.

4.5.2 Biomass

The district does not have any systematically developed biomass energy production plant even after having a good agricultural produce. The rice and the sugar mills should be encouraged to have their own biomass energy production plants. They cannot only produce electricity but also biofuels. The electricity produced can be grid supplied to the utility which can add to the electricity produced in the district. This electricity can be supplied to the agricultural fields for agricultural use. These mills should also make use of residue available on the fields, so that they are not being burnt unnecessary. If the village is financially capable then it can set up biomass energy plants in its village itself.

Projection and monitoring

Since the district practices agriculture mainly, the need is to first develop an understanding among people about the biomass and its proper utilization. They should be made aware of the

harmful effects of burning the biomass. The next step should be establishment of biomass plants at the community based level. This initiative can be taken by the gram panchayats or a group of people capable of setting up biomass plants in the villages. Private firms should be encouraged in setting up biomass gasifiers which can consume all types of biomass produced in the rural as well as the urban areas. This will creae employment opportunities in the district. Then followed by this should be the special norms made for the rice and sugarcane mills for establishing biomass plants. If the individual mills find it difficult to afford biomass plants singly then a group of three to four or as per the availability and requirement can come together and set up biomass plants.

Other than setting up biomass plants, a well-connected transportation system should be developed for the uninterrupted supply of biomass.

4.5.3 Biogas

Cow shelters in the village Kadi is an initiative taken by CM Yogi Adityanath to protect cows. These shelters should be connected to the biogas plant to generate cooking fuel or electricity to illuminate Gaushalas.

4.5.4 Hydropower

As the district comes in a plain region, the potential to construct a hydropower plant is shallow or could be expensive. The district, on the other hand, can conduct a site investigation for a hydroelectric project.

5 RECOMMENDATIONS

5.1. Agriculture and allied sectors

- In the Wheat-Paddy cropping system, good-quality seeds should be introduced to increase productivity.
- The farmers should adopt Micro-irrigation for vegetables and fruits to increase water use efficiency and productivity of crops.
- There is a need to construct some water harvesting structures (ponds) to facilitate irrigation in the areas where the canal network is not available.
- The district has a huge scope for mushroom cultivation, which should be encouraged.
- There is a vast scope for lemongrass cultivation as a medicinal plant and corresponding oil extraction units, which should be encouraged.

- Flowers cultivation like Marigold (*Tagetes*), rose (*Rosa*), and Gerbera (*Gerbera jamesonii*) have a large scope, which should be cultivated by the farmers.
- Training to prepare the Vermicomposting and Green manuring should be organized for the farmers.
- Farmers should shift towards spices cultivation like onion, garlic, and turmeric for higher returns.
- Commercial Poly house and greenhouse farming should be encouraged for the high revenue crops like capsicum, vegetables, and flowers.
- Beekeeping has a scope for livelihood and income generation, which should be incentivized.
- There is a need for infrastructure for guava processing units and markets, and also needs to encourage banana, Jujube (ber), amla (aonla) cultivation.
- Farmers should inform and encouraged to follow the crop advisory of the extension staff.
- Farmers should adopt organic farming to boost soil health and reduce non-point sources of water bodies' pollution. The government's schemes should be implemented to promote organic farming.
- The district has scope for fishery and poultry farming. It should be encouraged among the farmers by providing training.
- There is a scope for dairy. It should be encouraged among the farmers by providing them training and market access.

- Good quality seeds or high-yield seeds should be introduced for wheat in the wheat-paddy cropping system to increase productivity.
- Micro-irrigation should be adopted by the farmers for vegetables and fruits to increase water use efficiency and productivity of crops.
- Need to construct some water harvesting structures (ponds) to facilitate irrigation in the areas where the canal network is not available.
- The district has a huge scope for mushroom cultivation, which should be encouraged.
- There is a huge amount for lemongrass (*Cymbopogon citratus*) cultivation as a medicinal plant and corresponding oil extraction units, which should be encouraged.
- Flowers cultivation like Marigold (*Tagetes*), rose (*Rosa*) and Gerbera (*Gerbera jamesonii*) have a large scope, which should be cultivated by the farmers.

- Training to prepare the Vermicomposting and Green manuring should be organized for the farmers.
- Farmers should shift towards spices cultivation like onion, garlic, and turmeric for much return to the farmers.
- Commercial Poly house and greenhouse farming should be encouraged for the high revenue crops like capsicum, vegetables, and flowers for much return to the farmers.
- Beekeeping has a large scope, which should be encouraged.
- There is a need for infrastructure for guava processing units and markets, and also needs to encourage banana, Jujube (ber), amla (aonla) cultivation.
- Farmers should be informed and encouraged to follow the crop advisory.
- Organic farming should be adopted by farmers to boost soil health. The government's schemes should be implemented to promote organic farming.
- The district has scope for fishery and poultry farming. It should be encouraged among the farmers by providing training.
- There is a scope for dairy. It should be encouraged among the farmers by providing them training and market access.

5.2. Forestry

Allahabad located on the banks of two major rivers, i.e. Ganga & Yamuna. 129.21 Sq. Km. The area of Allahabad is covered with forest. 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.

- Implementing ideas such as mini-forest formation in each village and conducting Ganga yatra to spread awareness regarding clean Ganga is recommended.

5.3. Tourism

Maintaining heritage buildings- There are several heritage buildings in the city such as Anand Bhawan, Swaraj Bhawan, Bharadwaj Park etc, which are very old monuments and a proper care and inspection is necessary to maintain its beauty throughout the years.

Accessibility - There is an immediate need to improve road infrastructure. The traffic flow will be boosted by good highways and approach points to a specific tourist site.

Safety and security- The system should undoubtedly make provisions that the policies and procedures designed to ensure the safety and security of tourists are implemented effectively. For all travelers, Uttar Pradesh's image must be promoted as a safe and secure tourism destination.

Promotion and selling- Cross-selling tourism hotspots in neighboring states can assist boost tourist inflows. Package deals should be devised and implemented for the benefit of both tourists

and the government. Discounts and special offers on group travel are one way to encourage visitors to bring their families along on business trips.

Appointing brand ambassador - Appointing a brand ambassador can help promote Prayagraj tourism even more. It is critical to capitalize on their celebrity and fan base for UP tourism to get traction and warmly receive visitors.

Upgrading the skills - The hospitality business should be appropriately groomed and capable of offering the best service possible to tourists. Investing in training schools will assist the young generation in concentrating on their work and acquiring the necessary skills to make the experience worthwhile. Also, training sessions for guides can benefit individual guides and help them earn livelihood and the tourism sector to embrace more tourism. These training sessions can also help know the actual number of available tourist guides in the city. And the same information can be uploaded on the website for customer support.

- Tourists are a source of income for the natives; developing local marketplaces such as specialized malls for locally made handicrafts can give a place to sellers and buyers simultaneously. Usually, local markets (selling original articles) are scattered throughout the city; a specialized marketplace will help the sellers showcase their product at excellent places, and buyers can find a wide variety of ranges at the same site.
- Letting tourists know about community-based initiatives such as women-led Self Help Groups and Social Enterprises will support tourism and such industries. As it can bring business to enterprises.
- Development of COVID 19 protocol friendly tourism packages to boost the tourism sector economy after the pandemic.
- Ghats can be developed on the verge of international standards to attract more and more foreign tourists.
- Supporting tourism can also help flourish other sectors such as local handicrafts, restaurants and eateries, travel agencies, local vendors and many more as all of these are in a symbiotic relationship.
- Sangam walk, Heritage walk and Dharmik walk can be continued by the dept. of tourism U.P. even after the Kumbh mela.

Recommended Projects-

- Shilpotsava was celebrated in Noida in 2014, in which SAARC nations participated in an economic-cultural festival. Similar organizations can be held at Prayagraj for cultural exchange and boosting local economy and bringing harmony among nations.
- Prayagraj is a perfect holiday destination because it has Sangam walk, heritage walk, cultural tourism, religious tourism. Regular upgradation of amenities and facilities will encourage

tourism activities for this Dept. of tourism can continuously work on upgrading skills of people. For example tourist guides, boat-man and better tourist cab-drivers can be trained to provide tourists with safe and efficient tourist packages. Tourists guides should be developed for specific tourism such as heritage walk, Sangam walk, 12 Madhav Parikrama etc.

- During Kumbh mela 2019, the Department of Tourism trained a number of Tourist guides, Cab- Drivers and Boatmans under ***Earn While You Learn*** programs. A large number of people were skilled for the organization of the huge Kumbh mela 2019. Such programs can be continued in the non Kumbh Years so that a reservoir of skilled people is always ready to serve the tourism sector. The programs can be scaled to state level and other districts which receive a significant number of tourists. Reason why people took part enthusiastically in the program could be its short duration, no-fee, certificate/license from government body to work freely during the Kumbh, some money during the program etc. Such programs always attract a number of people hence the same model could be replicated.

Key Observations – Prayagraj Tourism

- The presence of numerous tourist spots makes Prayagraj a tourist spot in Uttar Pradesh. The districts embrace the highest number of tourists in the state Uttar Pradesh. During the Kumbh Mela the number of tourists increases around ten fold. In the non-Kumbh years the number takes a dip. From the tourist numbers report it is significant that international tourists visit the city during Kumbh Mela, additionally the number of domestic tourists also decreases to around half in the non-Kumbh Years.
- Prayagraj is a religious tourist spot, tourists usually come to take holy dip in the river ganga for salvation. The city has enough potential to combine heritage tourism with religious tourism to make less visited places outshine. E.g. Khushro Bagh (Tomb of poet Amir Khushro), Bharadwaj Park etc.
- According to several newspapers the number of tourists on Religious Occasions during Kumbh-19 went around 6 crores in a single day. This can be an ecological hazardous situation and can damage the ecosystem. There is a need to develop policies which support sustainable tourism activity and conserve the ecosystem.

SNo.	**Broad objectives / recommendations**	**Key activities / interventions to be planned**			**Monitoring & Evaluation**	**Impact**
		2022	**2023**	**2024**		
	Making non-Kumbh years as successful as Kumbh Years. Encourage tourism related	**R**esearch to figure out the factors impacting the tourism	**I**mplementation of strategies. **T**raining and Incubation Centre	**S**ampling for analysis. Evaluation of interventions.	**I**ntervention impact- RCTs, regression analysis, propensity	**P**erformance of interventions. **W**orking model and

	startups and ideas. **I**ncubation centers to develop prototype and working model with the assistance of industry leaders (tourism industry). **T**raining of skilled man-power to work in tourism sector(through earn while you learn programs). **U**pgradation of UP state tourism corporation policies, the hotels and integration of PPP.	in the district. **D**evelopment of strategies to address the issues. **D**evelopment of policies to protect the ecosystem. **A**dopting PPP (Public Private Partnership) model in the tourism sector to reduce the burden on government spendings Structural developments.	support to innovative ideas **S**tructural developments	**R**edesigning of strategies based on Impact analysis	scores, econometrics, structural equation modelling, Contribution analysis, process tracing, Bradford Hill criteria. **T**hrough Participatory approaches and impact evaluations use the standard OECD-DAC criteria. **B**ased on satisfaction of pre decided key questions.	scalability of ideas from incubation Centre. **M**ore tourist footfall in non-Kumbh year. **T**rained youth to be a part of Tourism industry. **U**pgraded staff and facilities associated with UP State Tourism Corporation

5.4. Wetlands

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.

- Rice, wheat producing farmers need to switch to organic and water-efficient irrigation systems.
- It is recommended to promote animal husbandry, pulses production in the area. This provides a boost to the economic growth of the local people. Sustainable development of industries will lead to minor exploitation of the wetlands as these are water-intensive industries.
- It is recommended to promote wetland in connection with the mythological connection it will improve the health of water body and create tourism hotspot also

- It is recommended to develop the outer periphery of the wetlands with shrubs, flower gardens or medicinal plants to decrease direct contact with human and water bodies.

5.5. Energy

5.5.1. Solar

The district Prayagraj is doing quite well in the solar energy sector which is appreciable. The district needs to focus on Kusum Yojana so that the farmers could take the direct benefit of solar energy and bring advancement in the agricultural techniques. Hence earning more profit and also adding to their income. Under the National Solar Mission more and more people should be encouraged to install solar rooftop plants in the district. This would hence lead to an overall development of the district in a sustainable manner.

5.5.2. Biomass

Biomass energy in Prayagraj is still in the developmental phase. People are required to be made aware regarding the biomass energy and especially the proper use of biomass. A proper collection system for agricultural waste and other wastes should be developed, which would ease the availability of waste for energy generation. The state's Biomass Based gasifier Power Project and Bagasse based energy generation is best suited for the district. The rice mills and the sugar mills should be provided with subsidies for setting up biomass energy plants. This will enable an overall development of the district in a sustainable manner.

5.5.3. Biogas

- Maintenance of a cow shelter in village Kandi and setting up a biogas plant is recommended.

5.5.4. Hydropower

- It is recommended to investigate the hydropower potential in the district as it comes to the plain region.

6. Discussion during the Report Presentation

ARTH GANGA PROJECT: DISTRICT PRAYAGRAJ

- The district is known for Kumbh Mela. The Haats at the Kumbh Mela will be utilized for the Jalaj Produce.
- NYKS volunteers are active in the districts.
- It is well known for Bamboo produce and it can be associated Delhi Haat and Jlaj Model
- Further actions will be taken as per the report submitted by IIM-IIT Consortium.
- 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.

~~6~~ 7 REFERENCES

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76 APPENDICES

Table 2 Crop production in the district.

Crop/Year	2015-16	2016-17	2017-18
Non-grain crops (Metric Tonne)	25550	58926	59231
Grain crops (Metric Tonne)	748457	1174298	1274783
Sugarcane (Metric Tonne)	50542	49050	41283
Potato (Metric Tonne)	245410	273916	320421

Table 3 Livestock population in the district.

Livestock	2003	2007	2012
Cattle (Cow)	678722	735538	699417
Buffalos	472671	569171	584550
Sheep	116682	103215	128452
Goat	246288	268118	299979
Pigs	124798	103397	55885

Chicken	288397	232769	612629
Other Poultry	58308	322763	21252
Horses and Ponies	4955	1615	1844

Table 4 Biogas potential from animal waste.

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	699417	10	2,55,28,72,050	1914654038	382930807.5	25	15317232.3
Buffalo	Manure	584550	15	3,20,04,11,250	2400308438	480061687.5	25	19202467.5
Sheep	Manure	128452	1	4,68,84,980	35163735	7032747	25	281309.88
Goat	Manure	299979	1	10,94,92,335	82119251.25	16423850.25	25	656954.01
Pig	Manure	55885	2.5	5,09,95,063	38246296.88	7649259.375	25	305970.375
Poultry	Manure	6,33,881	0.1	2,31,36,657	17352492.38	3470498.475	25	138819.939
Total		**24,02,164**						**35902754**

Table 5 Biogas potential from agricultural waste.

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	778	1.5	1167	816.9	15	694.365	800	555492
Wheat	straw	790673	1.5	1186009.5	830206.65	30	581144.655	800	464915724
Sugarcane	Bagasse	41283	0.33	13623.39	9536.373	80	1907.2746	750	1430455.95
Total		832734							466901672