Arth Ganga Project: District Pratapgarh

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EXECUTIVE SUMMARY

Pratapgarh is an agrarian district, located in the middle of Ganga plain west, in the state of Uttar Pradesh. The district is traversed by the rivers Ganga and Sai. The district has religious and archaeological importance.

The total geographical area of the district is 3717 Km^2, out of this area, the total cultivable land is 182400 ha, the permanent pastures are 600 ha, the Cultivable wasteland is 3700 ha. The barren and uncultivable land constitutes 7500 ha. Major soil types are deep loamy and partial sodic or slightly silty. The district lies in the Central plain zone. With the net sown area of 149000 ha and gross cropped area of 210900 ha, the Cropping intensity of the district is 116%. The net irrigated area is 138900 ha whereas the rainfed area is 10200 ha. The share of cultivable wasteland, Barren and uncultivable land decreased from 2.10% to 1.30% and 2.57% to 2.49% in 2010-11 to 2017-18. The share of area under trees and gardens, the fallow land had declined over the period. The net sown area is around 63% of the total reported area, although inconsistent, has increased slightly over the years. The area for non-agricultural use increased over the period from 11.32% to 19.78%. The major farming system is divided into resource-rich, resource-poor, and landless. The district's percentage net and gross irrigated areas have shown consistency over the years, with an average of 89% and 90%, respectively. The major crops types are wheat, rice, maize, pearl millet, potato, etc. Til, Sunflower, Tobacco, Turmeric are the commercial crops The district is a top producer of Aonla fruit. The use of chemical fertilizer is quite high in the district. The tertiary sector grew with an average annual growth rate of 6.61%, with its share increasing from 62.56% in 2011-12 to 65.87% in 2018-19. The primary sector's average annual growth rate from 2011-12 to 2018-19 is only 4.51% with share decreased from 28.27% to 25.73%. Agriculture grew at an average annual growth rate of 3.8% from 2011-12 to 2018-19 with its share declined to 62.56%. The share of livestock increased from 24.90% to 32.87% with an average annual growth rate of 9.26%. The fishery and aquaculture showed an average annual growth of 10.52% from 2011-12 to 2018-19. Mines and quarrying, although inconsistent, also recorded an annual growth rate of 9.86%.

The total forest cover of the district is 117.82 Km^2. The forest area represents 0.16% of the total declared area. Majorly open forests (86.24%) followed by medium dense forests (31.28%) are present. The share of forestry and logging was around 9.53% in 2017-18 with an average annual growth rate of 9.63%. The fishery and aquaculture subsector share are minimal, around 2.38% in 2018-19, but it also had an impressive average annual growth of 10.52% from 2011-12 to 2018-19. Mines and quarrying also recorded a remarkable annual growth rate of 9.86% Local people and an NGO named Paryavaran Sena took the initiative to Bhimrao Ambedkar Bird Sanctuary, Gangetic areas have varied species thus rich biodiversity. There are many temples such as Behla Devi, Bhakti Dham, Shani Dev, etc. located in the district which have the potential to attract tourists. The district is well connected through roads and railways. The number of tourists had increased by 15.28% in 2019. The district comprises mostly medium-sized 2366 wetlands which

are most are lakes/tanks/ponds and waterlogged. The number of natural wetlands is less than man-made.

The main source of lightning is kerosene (72.85%) followed by electricity (26.31%) closely while only 0.39% is the usage of Solar energy. The main fuel source is firewood (72.67%) followed by cow dung cake (13.21%) whereas the use of LPG/PNG is very low in the district thus, the government should indulge and encourage people to use green resources. Pratapgarh Solar Power Project of 100 MW has been implemented. A 70-kW grid-connected solar rooftop plant along with two solar high mast lighting systems have been installed in the system. The biomass production is high owing to the agricultural waste. Biogas potential from animal and agricultural waste is calculated approximately as 2 crores m^3/year and 27 crores m^3/year respectively. There are no hydropower projects in the district.

The district needs special attention on the maintenance of temples, forts, etc. along with adapting eco-tourism, agro-forestry, promoting sustainable tourism, creating awareness and involving more locals, etc. Adaptions like high-yield seeds, use of advanced mechanized tools, micro-irrigation, Organic farming, Vermicomposting, and green manuring, bee-keeping, expansion of fishery, poultry farming, and dairy units. The monitoring and maintenance of forests, plantations, etc. needs attention.

1 DISTRICT OVERVIEW

1.1 INTRODUCTION

Pratapgarh district lies in the middle of Ganga plain west under the administrative control of Allahabad division. The distict encompasses a geographical area of 3717 sq. km. and in terms of geographical area it occupies the rank of 29th in the state and 325th in India. Administration wise it is divided into 5 tehsils namely Raniganj, Kunda, Lalganj, Patti and Sadar. There is 1 Lok Sabha seat and 5 assembly constituencies in the district. Moreover the district encompasses 5 sub-districts, 9 towns and 2217 villages. In 2019, there was a total 3.17% forest area of the total geographical area. The forests also form the principal grazing ground of the district , the chief species of tree found in these forests are dhak, shesham, neem, babul, bel, peepal, bargad, gular, pakar, mahua, teak, mango and jamun. Grasses like dub,baib and spear grass are found in the district.

In the district 33.24 per cent (10,66,601 persons) pertains to the category of working population. Main workers constitute 17.23 per cent of population. Non-workers contribute about 66.76 per cent of total population. Out of these about 69.6 per cent are from the urban population and 66.7 percent in rural area. Of the total working population in the district 28.7 per cent are cultivators, 36.2 per cent engaged as agricultural labourers, 6.4 per cent in household industry and 28.7 per cent as other workers.

The economy of the district is solely dependent on agriculture. Most of the lands in the district are used for agricultural purposes. Some of its chief agricultural products are wheat, rice, barley, jowar, gram, peas, etc. Crop pattern follows Rabi, Kharif and Zaid. The principal Kharif crops are Rice, Jowar and Bazara, Maize, Arhar & Urad. The principal Rabi crops are wheat, barley, gram peas potato and other pulses like masoor & lahi etc. Wheat was grown in approx 43 percent of total cultivable land while paddy occupied approx 32 percent land. Til, Sunflower, Tobacco , Turmeric are the commercial crops produced in the district More than half of the population is engaged in agriculture since it is scantily industrialized. Only a few industries of automobile and agro are available in the district. The household and small scale industries produce general engineering goods, furniture, saw mills, rice mills, lime soap, leather goods, telephone, bulbs, optical frames and lens, tobacco, bakery and cold storage ,etc.

Figure 1 Map of the district

1.2 DEMOGRAPHIC PROFILE OF PRATAPGARH

- Geographical Area: 3717 Sq. Km.
- Administrative Divisions:[1]

  District Headquarters: Pratapgarh City

  No of Municipalities: 9

  No of Tehsil: 5

  No of Blocks: 17

  No. Of Villages: 2265

- Demographic and socio-economic indicators:[2]

  Population: 32,09,141 (Census 2011)

  Population density (Total persons per sq. km): 863

  Sex ratio: 998

  Literacy: 70.1%

- Occupation/ other Livelihood source: Agriculture
  - Major Rivers: Ganga & Sai
  - Forest Area: 117.82 Sq. Km.

1.3 AGRO CLIMATIC PROFILE OF THE DISTRICT

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

[2] https://www.censusindia.gov.in/2011census/dchb/DCHB_A/09/0942_PART_A_DCHB_PRATAPGARH.pdf

1.4 ECONOMIC PROFILE OF PRATAPGARH

The primary sector significantly impacts the district economy because it contributes around 27% of the district's GDP. However, this sector's average annual growth rate from 2011-12 to 2018-19 is only 4.51%. Its share decreased from 28.27% in 2011-12 to 25.73% in 2018-19. The share of the secondary sector also decreased slightly from 9.17% in 2011-12 to 8.40% in 2018-19. It increases with an unimpressive average annual growth rate of 4.74%. The tertiary sector occupies around 63% of the share in the district economy. The sector grew with the remarkable average annual growth rate of 6.61%, with its share increasing from 62.56% in 2011-12 to 65.87% in 2018-19. Overall, the district economy grew with an average annual growth rate of 5.83%. Steps should be taken to increase the productivity of the primary sector so that it can grow at a higher rate. This will improve the growth rate of the overall district, and the primary sector has a decent (27%) contribution to the district GDP.

Table 1: Trends in Gross District Domestic product in Pratapgarh 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	1582.53	513.04	3502.09	5597.67	-	-	-	-
	(28.27)	(9.17)	(62.56)	(100)				
2012-13	1731.75	468.30	3695.78	5895.83	9.43	-8.72	5.53	5.33
	(29.37)	(7.94)	(62.68)	(100)				
2013-14	1680.28	533.84	3854.88	6069.01	-2.97	14.00	4.31	2.94
	(27.69)	(8.80)	(63.52)	(100)				
2014-15	1835.08	571.08	4185.87	6592.03	9.21	6.98	8.59	8.62
	(27.84)	(8.66)	(63.50)	(100)				
2015-16	2023.65	608.80	4564.16	7196.61	10.28	6.60	9.04	9.17
	(28.12)	(8.46)	(63.42)	(100)				
2016-17	2066.89	666.99	4702.30	7436.19	2.14	9.56	3.03	3.33
	(27.80)	(8.97)	(63.24)	(100)				
2017-18	2007.48	644.64	4886.37	7538.49	-2.87	-3.35	3.91	1.38
	(26.63)	(8.55)	(64.82)	(100)				
2018-19	2135.10	697.18	5465.54	8297.83	6.36	8.15	11.85	10.07
	(25.73)	(8.40)	(65.87)	(100)				
Average Growth Rate					4.51	4.74	6.61	5.83

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

We further break down the primary sector GDP to know the subsectors' contributions to the primary sector growth. Table 2 shows that agriculture, including the horticulture sector, grew at an average annual growth rate of 3.8% from 2011-12 to 2018-19. However, its share fell from 68.20% in 2011-12 to 62.56% in 2018-19. On the other hand, the share of livestock increased from 24.90% to 32.87% in the same period, with a remarkable average annual growth rate of 9.26%.

This shows the importance of livestock in Pratapgarh District and the increased dependency of citizens on livestock products. The share of forestry and logging in the total agriculture and allied sector is small, around 9.53% in 2017-18, but it grew remarkably well with an average annual growth rate of 9.63%. The fishery and aquaculture subsector share is minimal, around 2.38% in 2018-19, but it also had an impressive average annual growth of 10.52% from 2011-12 to 2018-19. Mines and quarrying also recorded a remarkable annual growth rate of 9.86%; however, its growth is not consistent over the years. This high growth in this subsector can have serious environmental issues like deforestation, soil erosion, etc., with long-term effects on the health of local citizens. Overall, the Primary sector performed well during the time period of the study, with all its subsectors doing well. More work can be done on improving the agriculture (including horticulture) sub-sector as it has the most significant impact on the primary sector.

Table 2: Trends in Gross District Domestic product from Agriculture and allied activities in Pratapgarh 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	1047.60	382.43	80.62	25.43	1536.08	46.45	1582.53
	(68.20)	(24.90)	(5.25)	(1.66)	(100)		
	-	-	-	-	-	-	-
2012-13	1065.95	428.22	183.20	26.65	1704.01	27.74	1731.75
	(62.56)	(25.13)	(10.75)	(1.56)	(100)		
	[1.75]	[11.97]	[127.24]	[4.79]	[10.93]	[-40.28]	[9.43]
2013-14	985.59	471.07	153.10	27.47	1637.23	43.05	1680.28
	(60.20)	(28.77)	(9.35)	(1.68)	(100)		
	[-7.54]	[10.01]	[-16.43]	[3.10]	[-3.92]	[55.21]	[-2.97]
2014-15	1069.47	489.68	189.25	29.37	1777.76	57.31	1835.08
	(60.16)	(27.54)	(10.65)	(1.65)	(100)		
	[8.51]	[3.95]	[23.61]	[6.90]	[8.58]	[33.13]	[9.21]
2015-16	1185.47	607.53	122.38	29.99	1945.37	78.28	2023.65
	(60.94)	(31.23)	(6.29)	(1.54)	(100)		
	[10.85]	[24.07]	[-35.33]	[2.10]	[9.43]	[36.59]	[10.28]
2016-17	1167.87	643.31	149.79	36.70	1997.67	69.22	2066.89
	(58.46)	(32.20)	(7.50)	(1.84)	(100)		
	[-1.48]	[5.89]	[22.40]	[22.38]	[2.69]	[-11.58]	[2.14]
2017-18	1077.84	591.99	180.07	39.45	1889.35	118.13	2007.48
	(57.05)	(31.33)	(9.53)	(2.09)	(100)		
	[-7.71]	[-7.98]	[20.21]	[7.51]	[-5.42]	[70.66]	[-2.87]
2018-19	1317.01	691.91	46.27	50.06	2105.25	29.85	2135.10
	(62.56)	(32.87)	(2.20)	(2.38)	(100)		
	[22.19]	[16.88]	[-74.30]	[26.88]	[11.43]	[-74.73]	[6.36]

Average Growth Rate	3.80	9.26	9.63	10.52	4.82	9.86	4.51

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

Table 3 shows the percentage share of subsectors in secondary and tertiary sectors. Within the secondary sector, the manufacturing sector has a share of approximately 28.80 in 2018-19. The share has increased by an average growth rate of 7.58% over the years; however, the growth has not been uniform. The share of the electricity, gas, and water supplies subsector has increased from 13.44% in 2011-12 to 15.18% in 2018-19, with a remarkable average annual growth rate of 6.43%. The share of the construction sub-sector decreased slightly from 58.11% to 56.02% in the same period as the average annual growth rate is very less (4.00%). This indicated that the secondary sector in Pratapgarh is heavily dependent on the Construction sub-sector. The Manufacturing subsector made an important contribution to the growth of the secondary sector. Within the tertiary sector, the real estate and professional services made up the highest share of (30.61%) in 2018-19, followed by transport, storage and communication (19.76%), Public administration (14.59%), and trade & hotel (13.61%). Average annual growth is observed highest in Transport, Storage & Communication (17.08%), followed by financial services (7.36), trade & hotels (5.71%) and lowest in Real estate subsector (3.33%). All the subsectors in secondary and tertiary sectors have performed well during the study period. More work needs to be done to improve the construction, real estate, and public administration subsector. Transport and Communication and Financial Services sub-sectors are the major contributors to the growth of the Tertiary sector.

Table 3: Trends in percentage share of non-agriculture sub-sectors in DGDP in Pratapgarh 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	28.45	13.44	58.11	100	10.67	14.63	10.19	38.04	16.79	9.67	100
2012-13	21.25	15.04	63.71	100	12.43	14.16	10.35	38.30	14.83	9.93	100
2013-14	26.47	14.63	58.91	100	13.18	14.69	11.15	38.10	13.44	9.44	100
2014-15	29.24	14.25	56.51	100	14.27	15.46	11.64	36.45	12.49	9.68	100
2015-16	32.01	14.03	53.97	100	18.68	15.30	11.69	33.56	11.20	9.56	100
2016-17	35.66	14.73	49.61	100	18.20	15.19	11.05	32.91	12.59	10.06	100

2017-18	29.03	16.58	54.40	100	18.15	13.48	9.67	33.34	14.30	11.06	100
2018-19	28.80	15.18	56.02	100	19.76	13.61	10.44	30.61	14.59	10.98	100
Average Growth Rate	7.58	6.43	4.00	4.74	17.08	5.71	7.36	3.33	4.91	8.61	6.61
Source: Compiled from District Statistical Handbooks											

2 QUANTITATIVE DATA ANALYSIS

2.1 Agriculture and Allied Activities

2.1.1 Trend in Land Use Pattern

The total declared area of the district is 3616.29 sq. km². The forest area represents 0.16% of the total declared area. The share of cultivable wasteland decreased from 2.10% in 2010-11 to 1.30% in 2017-18, which is a good development indicator. The share of Barren and uncultivable land decreased slightly from 2.57% in 2010-11 to 2.49% in 2017-18; however, the decrease could have been more significant. The share of area under trees and gardens has been consistent over the years (around 4.25%), with a sudden fall observed in 2017-18. The fallow land also shows a remarkable decline over the period. The net sown area (NSA) is around 63% of the total reported area and has increased slightly over the years; however, the growth has not been consistent. The area for non-agricultural use increased over the period from 11.32% to 19.78% (Table 4). Overall, the land use pattern shows that the acreage for non-agricultural use has increased significantly.

Table 4: Trends in Land-use Pattern in Pratapgarh (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	Pastureland	Area under trees and gardens	Net Sown Area
1	2	3	4	5	6	7	8	9	10	11
2010-11	361629	0.16	2.10	15.42	4.02	2.57	11.32	0.17	4.25	60.01
2011-12	361629	0.16	2.08	15.50	3.77	1.94	11.33	0.17	4.25	60.79
2012-13	361629	0.16	2.08	14.88	4.02	2.54	19.38	0.17	4.19	52.58
2013-14	361629	0.16	1.87	16.70	4.08	2.53	19.41	0.14	4.29	50.82
2014-15	361629	0.16	1.86	12.55	1.83	2.53	19.55	0.14	4.26	57.11
2015-16	361629	0.16	1.62	7.49	0.94	2.52	19.66	0.14	4.25	63.21
2016-17	361629	0.16	1.54	7.50	1.05	2.50	19.74	0.14	4.18	63.19
2017-18	361629	0.16	1.30	8.86	1.08	2.49	19.78	0.14	2.88	63.32

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

2.1.2 Trends in Operational Land Holdings

In Pratapgarh district, the total number of operational farms increased from 488 thousand in 2010-11 to 500 thousand in 2015-16, a net increase of 2.46%. While in the state, their numbers increased from 23,325 thousand in 2010-11 to 2,822 thousand in 2015-16, a net increase of 2.13%. Most land positions in the district are marginal and small. These two size categories represented around 97.02% 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 Pratapgarh

	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.)
Pratapgarh	2010-11	88.72	8.10	2.74	0.43	0.01	488
	2015-16	89.02	8.00	2.58	0.39	0.01	500
							[2.46]
Uttar Pradesh	2010-11	79.45	13.01	5.72	1.71	0.11	23325
	2015-16	80.18	12.63	5.51	1.58	0.1	23822
							[2.13]

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

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

i- The Trend in Cropping Patterns

Rice and Wheat dominate the agriculture of the district. Table 6 shows the area devoted to various crops over the last eight years. In 2017-18, wheat made up the highest share of GCA (45.25%), followed by Rice (33.6%) and Urad (2.77%). Together these three crops constitute around 81.62% of the GCA. The area shared by the cereals has increased over the years (90.53% of GCA in 2016-17), but a sudden fall is observed in 2017-18 (82.59%). The main pulses produced are Urad, Arhar, and Peas, while the rest of the pulses are not significantly produced. The total pulses acreage has also remained consistent over the time period of the study (around 7.19%). Thus, the food grains cover a majority (around 97.72% in 2016-17) of the GCA. Mustard is the only oilseeds crop produced, and the total oilseed acreage has decreased over the years. The area under Sugarcane is almost negligible. The acreage of Potato has also decreased over the years (from 1.91% of GCA in 2010-11 to 1.21% of GCA in 2017-18. In general, there is no significant change in the cultivation pattern reported in the district during the study period. The average cropping intensity in the district is 152.97.

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	32.09	32.22	32.30	35.50	36.21	36.82	36.83	33.60
Wheat	48.65	48.56	48.93	46.78	48.77	49.59	49.60	45.25
Bajara	3.44	3.40	3.44	3.29	2.76	2.80	2.80	2.56
Other Cereals	1.81	1.82	1.63	1.55	1.27	1.29	1.29	1.18
Total Cereals	85.99	86.00	86.30	87.11	89.01	90.50	90.53	82.59
Urad	3.32	3.52	3.30	3.38	2.99	3.04	3.04	2.77
Matar	1.35	1.33	1.35	1.18	1.06	1.08	1.08	0.99
Arhar	2.21	2.20	2.27	2.08	1.81	1.84	1.84	1.68
Other Pulses	1.75	1.66	1.59	1.58	1.21	1.23	1.23	1.12
Total Pulses	8.62	8.71	8.51	8.22	7.07	7.19	7.19	6.56
Total Foodgrains	94.61	94.71	94.81	95.34	96.09	97.70	97.72	89.15
Mustard	0.69	0.66	0.66	0.54	0.47	0.48	0.48	0.44
Other Oilseeds	0.20	0.22	0.19	0.19	0.14	0.14	0.14	0.13
Total Oilseeds	0.89	0.88	0.85	0.73	0.62	0.63	0.63	0.57
Sugarcane	0.36	0.33	0.29	0.29	0.24	0.24	0.24	0.22
Potato	1.91	1.85	1.90	1.54	1.30	1.32	1.32	1.21
Net Sown Area	71.46	72.42	63.03	62.49	59.78	67.27	67.27	61.49
Gross Sown Area (in 1000 Ha)	303.67	303.58	301.67	294.09	345.48	339.79	339.71	372.35
Cropping Intensity	139.94	138.08	158.65	160.01	167.27	148.65	148.66	162.62
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

Table 7 shows that the yield per hectare of most crops varies from year to year. However, the yield for most of the major crops has increased in the latter years of the study. This can be due to improved irrigation facilities and better infrastructure. Wheat and Rice are the major crops in the district, and their per hectare yield (27.88 qtls and 18.21 qtls respectively, in 2017-18) are low. Per hectare yield of total cereals decreased a bit from 24.00 qtls in 2010-11 to 23.14 qtls in 2017.18. On the other hand, per hectare yield of total pulses increased from 7.98 qtls in 2010-11 to 8.42 qtls in 2017-18. The yield of total oilseeds has increased from 7.92 qtls in 2010-11 to 11.74 qtls in 2016-17, which is a significant improvement. This can be due to the availability of hybrid seeds in the district. The per hectare yield of Sugarcane is high, particularly 878.43 qtls in 2016-17. Similarly, the yield of Potato is also very high, particularly 293.27 qtls in 2017-18. Since Sugarcane and Potato are high-value crops, but area under these crops were quite low. In summary, all crop yields show year-over-year fluctuations, with the lowest in 2014-15. 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 Pratapgarh District (Qtls)

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	20.10	23.17	24.28	23.91	22.43	17.93	17.35	18.21
Wheat	28.13	29.33	28.15	26.87	13.65	22.04	27.52	27.88
Bajara	7.59	7.61	7.56	8.25	7.81	7.01	8.96	7.76
Total Cereal	24.00	25.81	25.65	24.71	17.06	19.75	22.65	23.14
Urad	5.67	5.80	6.47	6.27	4.44	4.09	5.85	5.76
Matar	9.02	11.39	13.05	11.14	7.41	9.75	13.67	13.52
Arhar	10.26	11.64	11.11	12.88	5.46	8.45	13.39	8.26
Total Pulses	7.98	8.82	9.03	9.18	6.56	6.63	9.67	8.42
Total Food Grains	22.54	24.25	24.15	23.38	16.29	18.78	21.69	22.06
Mustard	9.61	9.52	10.39	8.60	3.95	7.31	14.83	9.99
Total Oilseeds	7.92	7.77	8.56	6.83	3.43	5.88	11.74	7.93
Sugarcane	582.76	561.19	622.88	682.89	658.21	695.02	878.43	374.50
Potato	208.13	149.19	171.17	155.38	155.91	172.36	214.31	293.27
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

ii- Trends in Production of Principal Crops

Table 8 shows the trends in the production of the main crops over the years. Rice and Wheat, dominate the production. In 2017-18, Rice (227.79 thousand tonnes) and Wheat (469.72 thousand tonnes) formed a major part of the total cereal production (711.64 thousand tonnes). Among pulses, Urad, Peas, and Arhar occupied the highest production. Urad had 5.95 thousand tons; Peas had 4.97 thousand tons, and Arhar had 5.18 thousand tons in 2017-18. Although there has been a significant variation in the production of these pulses over the years, they still represent around 78% of the total pulse production. Mustard production was 1.64 thousand tons, which represented around 97% of the total oilseed production in 2017-18. Sugarcane is another important crop whose Production has been significant in the district (71.50 thousand tons in 2016-17). Potato production varies from 70.07 thousand tons to 131.80 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, fluctuated over the years, partly due to changes in nature and partly due to market conditions. Proper insurance arrangements are the need of the hour to get assured income and take more risk and diversify their production.

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

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	195.82	226.62	236.59	249.58	280.66	224.34	217.03	227.79
Wheat	415.69	432.44	415.54	369.68	229.92	371.37	463.73	469.72
Bajara	7.92	7.85	7.84	7.97	7.44	6.68	8.54	7.40
Other Cereals	7.36	6.89	7.80	5.94	6.65	5.00	7.17	6.74

Total Cereals	626.78	673.80	667.76	633.17	524.67	607.38	696.47	711.64
Urad	5.71	6.21	6.44	6.24	4.59	4.23	6.04	5.95
Matar	3.69	4.60	5.33	3.86	2.72	3.58	5.02	4.97
Arhar	6.88	7.76	7.62	7.87	3.42	5.30	8.39	5.18
Other Pulses	4.61	4.75	3.80	4.23	5.29	3.08	4.19	4.49
Total Pulses	20.88	23.32	23.19	22.20	16.02	16.19	23.64	20.58
Total Foodgrains	647.67	697.11	690.65	655.38	540.69	623.57	720.11	732.22
Mustard	2.01	1.90	2.08	1.37	0.65	1.20	2.43	1.64
Other Oilseeds	0.13	0.17	0.12	0.10	0.08	0.05	0.07	0.05
Total Oilseeds	2.14	2.07	2.20	1.46	0.73	1.25	2.50	1.69
Sugarcane	62.88	56.74	54.56	57.36	53.58	56.58	71.50	30.48
Potato	120.82	83.70	97.98	70.40	70.07	77.46	96.31	131.80
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. Among different crops, the lowest variability is observed in Urad (2.44%), followed by Arhar (4.27%) and Bajara (4.34%), and the highest in Potato (12.70%). The variability in the area under total pulses (3.66%) is much less than the variability in the area under total cereals (9.03%). Since Rice and wheat dominate the production, the variability in the area under total food grains is, therefore, very high (8.11%).

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

	Area (1000 Ha)			Production (1000 Ha)			Yield (Qtl./Ha)		
Crop/Year	**Average**	**SD**	**COV**	**Average**	**SD**	**COV**	**Average**	**SD**	**COV**
Rice	112.19	13.99	12.47	232.30	24.89	10.71	20.92	2.86	13.67
Wheat	156.79	12.94	8.25	396.01	76.53	19.33	25.45	5.25	20.62
Bajara	9.86	0.43	4.34	7.70	0.54	7.07	7.82	0.58	7.36
Total Cereal	283.60	25.62	9.03	642.71	59.48	9.25	22.85	3.04	13.30
Urad	10.25	0.25	2.44	5.68	0.82	14.40	5.54	0.84	15.14
Matar	3.80	0.24	6.25	4.22	0.90	21.23	11.12	2.27	20.44
Arhar	6.43	0.27	4.27	6.55	1.74	26.50	10.18	2.66	26.14
Total Pulses	25.03	0.92	3.66	20.75	3.08	14.82	8.29	1.16	14.01
Total Food Grains	308.63	25.03	8.11	663.42	61.86	9.32	21.64	2.77	12.82
Mustard	1.78	0.21	11.74	1.66	0.57	34.33	9.27	3.06	32.96
Total Oilseeds	2.32	0.27	11.45	1.76	0.58	33.26	7.51	2.36	31.50
Sugarcane	0.88	0.10	11.78	55.46	11.63	20.97	631.98	142.33	22.52
Potato	4.96	0.63	12.70	93.57	22.92	24.49	189.96	48.22	25.38

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

The variability of production depends on the variability of the cultivated area and the variability of the yield. Therefore, the variability in the production of different crops is greater than in the cultivated area of all crops. The highest variability in production is observed in Mustard (34.33%), followed by Arhar (26.50%), Potato (24.49%), and sugarcane (20.97%). High variation in the production of oilseeds is partly due to variation in the land area under them and partly due to the high rate of oilseeds and non-availability of hybrid oilseeds. Improvement in crop insurance conditions and better market accessibility can lower this variation. Variability is lowest in bajara (7.07%), followed by Rice (10.71%) and Urad (14.40%)

In the case of yield, the greatest variability is estimated in Mustard (32.96%), Arhar (26.14%), and Potato (25.38%). Yield variability in total cereals (13.30%) and total food grains (12.82) is lower as compared to that in total pulses (14.01%). Bajara, Urad, and Rice are the most consistent crops over the years. Several factors such as climate change, market prices, rainfall patterns, etc., influence the variability in agricultural production.

Table 10 compares the share of the main crops in the total GCA and their share in the total value of agricultural output (VOP). It is significant to note that total cereals and total foodgrains, on average, have a relatively larger share in GCA than their share in VOP, while total pulses, Potato, and sugarcane have, on average, a greater share in VOP than GCA. Pratapgarh is mainly a food grain production district; therefore, food grains account for around 95% of the gross area of the crops. Similarly, total foodgrains account for nearly 92% of the total value of the agricultural product. Three crops - wheat, paddy, and Potato together accounted for, on average, around 84.26% of GCA and 86% of the total VOP. Overall, the total agricultural GCA has increased in the latter years of the study (average, 325 thousand hectares), and the total value of the product has also increased significantly, that is, (1112.16 Cr. Rs.) in 2011-12 to (1574.07 Cr. Rs) in 2017-18.

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

Crop	% Share in	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Wheat	GCA	48.65	48.56	48.93	46.78	48.77	49.59	49.60	45.25
	VOP	46.72	46.87	45.08	42.22	30.69	44.34	52.95	51.77
Paddy	GCA	32.09	32.22	32.30	35.50	36.21	36.82	36.83	33.60
	VOP	28.17	32.42	33.06	36.95	48.41	36.93	32.85	32.39
Total Cereals	GCA	85.99	86.00	86.30	87.11	89.01	90.50	90.53	82.59
	VOP	76.44	80.80	79.71	80.69	80.87	82.72	87.17	85.52
Total Pulses	GCA	8.62	8.71	8.51	8.22	7.07	7.19	7.19	6.56
	VOP	10.55	11.09	10.60	11.66	12.73	10.81	7.31	7.75

Total Food Grains	GCA	94.61	94.71	94.81	95.34	96.09	97.70	97.72	89.15
	VOP	86.99	91.89	90.31	92.36	93.60	93.53	94.48	93.26
Total Oil seeds	GCA	0.89	0.88	0.85	0.73	0.62	0.63	0.63	0.57
	VOP	1.35	1.22	1.28	0.53	0.58	0.43	0.64	0.40
Potato	GCA	1.91	1.85	1.90	1.54	1.30	1.32	1.32	1.21
	VOP	8.69	5.81	7.25	5.84	4.60	4.80	3.47	5.71
Sugarcane	GCA	0.36	0.33	0.29	0.29	0.24	0.24	0.24	0.22
	VOP	2.97	1.08	1.17	1.28	1.21	1.23	1.41	0.63
Paddy + wheat + potato	GCA	82.65	82.63	83.13	83.82	86.28	87.73	87.75	80.06
	VOP	83.58	85.10	85.39	85.01	83.70	86.08	89.28	89.87
Total Agriculture	GCA (1000 Ha)	303.67	303.58	301.67	294.09	345.48	339.79	339.71	372.35
	VOP (in Cr Rs)	1112.16	1153.31	1216.71	1182.09	1217.55	1340.01	1478.37	1574.07
Per Worker VOP (Rs.1000 at current prices) in Pratapgarh		-	16.18	18.40	24.93	22.76	25.86	31.34	37.63
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 Pratapgarh district increased from Rs.16.18 thousand in 2011-12 to Rs.37.63 thousand in 2017-18, a net increase of 132.59% 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 value of the output of the district to the state average increased from 0.3979 in 2011-12 to 0.5399 in 2017-18.

2.1.4. 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 69.18% of the total fertilizers used, while the proportions of phosphorus and potassium were 24.96% and 6%, respectively. In 2017-18, however, the nitrogen share decreased to 64.32%, while the phosphorus share increased to 26.33%, and the potassium share increased to 9.34%. 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, cultivation patterns, etc. Although the overall use of chemical fertilizers has reduced in the district from 194.16 kg/ ha GSA in 2010-11 to 121.04 kg/ ha GSA in 2017-18 but still the authorities can take steps to further reduce their consumption as chemicalization of

agriculture degrades soils and water resources, requiring the use of organic fertilizers and biofertilizers.

Table 11: Trends in Use of Chemical Fertilizers in Agriculture (Kgs/per ha GSA)								
Fertilizer/Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**
Nitrogen	134.32	105.60	121.90	115.45	104.42	99.32	96.83	77.86
Phosphorous	48.18	37.41	39.78	29.20	30.02	37.19	37.70	31.87
Potassium	11.66	6.03	5.22	4.02	6.11	6.76	8.01	11.31
Total	194.16	149.05	166.90	148.67	140.54	143.28	142.54	121.04
Gross Sown Area (Ha)	303673	303576	301672	294088	345481	339788	339710	372354
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

2.1.5. 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 described in Table 12. The length of the canals (1767 km) and the number of wells (168) have remained constant since 2010-11. Shallow, medium, and deep tube wells increased by 1.64%, 95.02%, and 263.63%, respectively, in 2018-19 compared to 2010-11. The district's percentage net and gross irrigated areas have shown consistency over the years, with an average of 89% and 90%, respectively.

Table 12: Types of Irrigation Systems and percentage of the net and gross Irrigated Area									
Name/Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**
Length of Canal (KM)	1767	1759	1767	1767	1767	1767	1767	1767	1767
No. of Govt. Tube wells	95	87	95	107	114	133	133	133	143
No. of Wells	168	168	168	168	168	168	168	168	168
Shallow Tube well	102148	102528	102673	103624	103624	103624	103624	103742	103827
Medium Tube well	221	263	309	359	397	397	397	414	431
Deep Tube well	22	22	22	72	73	73	73	76	80
% Of NIA	89.27	88.93	85.74	86.63	88.67	90.92	90.98	91.02	-
% Of GIA	88.65	88.52	88.91	89.30	91.26	90.51	91.56	91.30	-
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

Canals and groundwater (GW) are the main irrigation sources in the district. The canal's share in the NIA (average, 39.43%) has decreased over the years. The share of wells and tube wells in NIA (average, 60.57%) has increased over the years. This shows the increased dependency of the district on the groundwater for irrigation purposes, and it can have serious environmental issues if such a pattern continues in the long run.

Table 13: Source-wise Area under Irrigation in Pratapgarh (in %)								
Source/Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**
Canal (surface Irri.)	44.19	44.49	42.63	39.88	48.60	31.92	31.84	31.88
Wells And Tube-wells (GW Irri.)	55.81	55.51	57.37	60.12	51.40	68.08	68.16	68.12
NIA (1000 ha)	193.73	195.52	163.04	159.22	183.13	207.84	207.89	208.41
Source: http://updes.up.nic.in/spiderreports/intialisePage.action And District-wise Indicator reports								

Table 14 shows that a majority area under Rice (average, 100%), wheat (average, 100%), Potato (average, 100%), and sugarcane (average, 100%) is irrigated. Percentages of the irrigated area under pulses (average, 39.4%) and oilseeds (average, 69.24%) are relatively less.

Table 14: Trends in Crop-wise Irrigated Area in Pratapgarh (as % of the cropped area)								
Crop/Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**
Rice	100	100	100	100	100	100	100	100
Wheat	100	100	100	99.97	100	100	100	100
Total Cereal	94.26	94.33	94.45	94.66	95.65	95.65	95.65	95.65
Total Pulses	38.45	37.31	38.40	38.02	40.75	40.75	40.75	40.75
Total Foodgrains	89.18	89.08	89.42	89.78	91.61	91.61	91.61	91.61
Total Oilseeds	62.43	61.43	69.65	67.06	73.35	73.35	73.35	73.35
Sugarcane	100	100	100	100	100	100	100	100
Potato	100	100	100	100	100	100	100	100
Source: http://updes.up.nic.in/spiderreports/intialisePage.action								

2.1.6. Electricity Intensity in Agriculture

Electricity is one of the main energy sources used in agriculture. Table 15 shows that per capita electricity consumption in agriculture has increased significantly from 104.55 KWH in 2014-15 to 223.33 KWH in 2019-20, a net increase of approximately 113.61%. It is a cause of concern as it can result in an increased burden on non-renewable resources and create waste disposal problems. The percentage share of agriculture (average, 20.78%) in the total electricity consumption in the district is very minimal. It can be due to high electricity consumption in secondary and tertiary sectors. Since electricity consumption has increased over the years, the authorities need to switch to more sustainable modes of electricity production, such as solar panels.

Table 15: Trends of Electricity consumption in Agriculture						
Division/ Year	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**

Per Capita electricity consumption (KWH)	104.55	104.63	210.32	227.3	220.56	223.33
% of electricity consumed in Agriculture sector to total consumption	21.11	24.58	19.27	19.64	19.38	22.14
Source: District-wise Development Indicators file.						

2.1.7. Status of Agriculture Markets

Table 16 shows the marketing infrastructure in the district. It has one main market and eight sub-markets, which have remained constant over the period. The number of regulated mandis per lakh hectare of Net area sown had decreased from 4.9 in 2013-14 to 0.44 in 2018-19, which is a notable issue as it is very important for farmers to have proper access to mandis for them to be able to sell their produce.

Table 16: Status of Agriculture Markets in Pratapgarh

Category/Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Main Markets (No.)	1	1	1	1	1	1	1
Submarkets (No.)	8	8	8	8	8	8	8
Total Markets (No.)	9	9	9	9	9	9	9
No. of Regulated mandis per lakh Ha. of net area sown	4.9	2.49	-	0.44	0.48	0.44	-
Source: District-wise Development Indicators file and District-wise Statistical Report							

2.1.8. Status of Organic Farming

To promote sustainable agricultural practices and improve the farmers' livelihood, the Government of India launched PKVY and Namami Gange schemes. Under these schemes, farmers are incentivized to form groups to do organic farming and sell their products with PGS certification. Under the programme, the beneficiary farmers get Rs.12000, Rs. 10000, and Rs.9000 per hectare, respectively, in the first, second, and third year of conversion.

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 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 bio-diversity, etc. To sustain the organic farming initiative, a long-term system of payments for ecological services may be evolved to retain the existing farmers and motivate others to move towards this sustainable farming system. There is no assured market for these products, and farmers do not get premium prices. They sell their products at the same prices their conventional counterparts do. Certification and quality check and monitoring mechanisms are yet to be set up.

Table 17 shows the details of the establishment of organic clusters under the Paramparagat Krishi Vikas Yojana in the district. The district has 55 groups in five development blocks. The highest number of groups are in Kunda (43), Shivgarh (7), followed by Kalakankar (2), Gaura (2), and Asper Deosara (1). Significantly high variation can be seen in the number of farmers per group in the Kunda and Shivgarh 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. No organic cluster under the Namami Gange scheme has been reported till now.

Table 17: Status of Organic Farming PGS Groups under PKVY Scheme in Pratapgarh (as on June 30, 2021)

S. No.	Block	Scheme	No. of groups	No. of farmers in groups			
				Total	Average	Median	SD
1	Aspur Deosara	PKVY	1	21	21	21	0
2	Gaura	PKVY	2	46	23	23	0
3	Kalakankar	PKVY	2	62	31	31	1.41
4	Kunda	PKVY	43	1086	25.25	24	3.79
5	Shivgarh	PKVY	7	210	30	31	7.3
6	District Total	PKVY	55	1425	25.9	24	4.62
		Total	55	1425	25.9	24	4.62

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

Since per hectare use of chemical fertilizer is quite high in district agriculture, a gradual shift of farmers from conventional to the organic farming system is likely to positively impact water quality and soil health along with farming sustainability. However, being a knowledge-intensive system of farming, farmers need proper training to know the practical details of the integrated sustainable farming system. Since economies of scale in both production and marketing matter in organic farming, some institutional framework may be needed in the forms of SHGs/ farm cooperative/PFOs/contract farming, etc. Organic farming could be an economically viable option in the district if the government builds strong marketing networks linking farmers, processors, and distributors with the easy certification process and minimizes farmers' risk by

protecting their farm income through payments of ecosystem services. A long-term system of incentive and regulation needs to be evolved to retain the existing farmers and motivate others to move towards the sustainable farming system in the district.

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

- The major problem 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 problem of marketing is even more serious in the case of perishable vegetable crops. Contract farming companies and Farmer Producers' companies can be encouraged.
- Farmers practice 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 allocate a part of their lands to organic farming. They practiced conventional farming in the rest of the area, which may contaminate the organic produce and fail the purpose of the cluster approach in organic farming.
- The knowledge and awareness level regarding practices under organic farming was inadequate among farmers.

2.2. Trends in Livestock

Livestock forms an integrated part of the rural economy. From Table 18, we can infer that indigenous and exotic male cattle decreased considerably from 277692 in 1997 to 21471 in 2019 and from 57753 in 1997 to 5572 in 2019, respectively. On the other hand, the number of indigenous and exotic female cattle has increased considerably from 173617 in 1997 to 459935 in 2019 and from 34933 in 1997 to 117225 in 2019, respectively. Thus, the total number of cattle increased only slightly from 543995 in 1997 to 604203 in 2019, thus, a net increase of 11.06%. 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 210.38% in 2019 as compared to 1997 is observed in the total population of buffalo. A significant reduction in the indigenous sheep population is observed (83.39%) in 2019 compared to that in 1997. During the same period, the population of exotic sheep also decreased significantly, thus, indicating a decrease in the total sheep population by 82.85%. The total population of goats increased from 232836 in 1997 to 340666 in 2019, a net increase of 46.31%. The total pig population decreased considerably from 139119 in 1997 to 13192 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 livestock subsector has around 33% share in the agriculture and allied activities sector and grew at a significant average annual growth rate of 9.26% from 2011-12 to 2018-19.

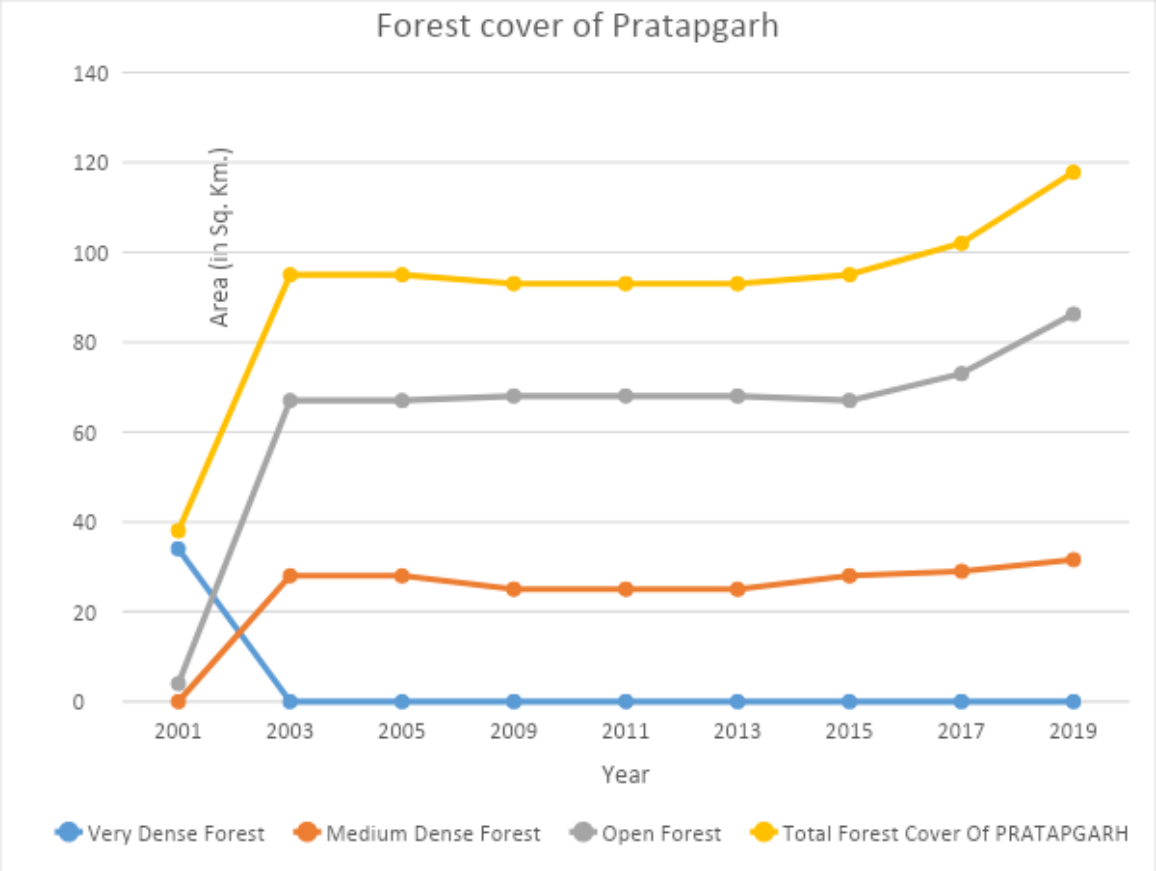
Table 18: Trends in Livestock population (in numbers) in Pratapgarh						
	Category	1997	2003	2007	2012	2019
Indigenous Cattle	Total Male	277692	172934	135205	94529	21471
	Total Female	173617	160583	164743	192833	459935
	Total	451309	333517	299948	287362	481406
Exotic Cattle	Total Male	57753	7670	9511	24399	5572
	Total Female	34933	15634	17719	66366	117225
	Total	92686	23304	27230	90765	122797
Total Cattle		543995	356821	327178	378127	604203
Buffalo	Total Male	48752	84051	101881	88332	26811
	Total Female	143290	220616	258830	267848	569264
	Total	192042	304667	360711	356180	596075
Sheep	Total Indigenous Sheep	53180	32533	33945	16775	8828
	Total Exotic Sheep	1472	896	369	2111	544
	Total Sheep	54652	33429	34314	18886	9372
Goat	Total	232836	235175	239157	263750	340666
Pig	Total Indigenous Pig	124206	91488	92518	34450	12164
	Total Exotic Pig	14913	14467	14380	9488	1028
	Total Pig	139119	105955	106898	43938	13192
Total Livestock		1176985	1043315	1072328	1064678	-
Total Poultry		178246	196059	179742	203609	-
Source: http://updes.up.nic.in/spiderreports/intialisePage.action And http://dahd.nic.in/animal-husbandry-statistics						

Table 19 shows that the Pratapgarh district has an active network of cattle hospitals and development centres, which are necessary for the livestock sub-sector to grow. The number of cattle hospitals has remained constant around 52 over the years. Similarly, cattle development centres increased from 34 in 2010-11 to 104 in 2018-19. The man-made reproduction centre has remained consistent around 44 over the years. There are very few sheep and pig development centres in the district (4 and 6), which might be one reason for the declining sheep and pig population in the district.

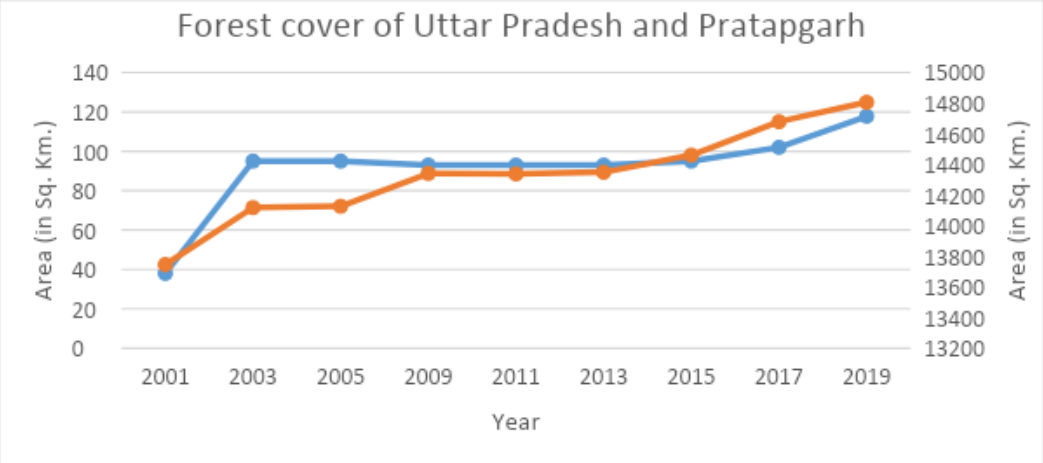
Table 19: Year-wise number of Cattle Hospitals and Development Centers									
Category	2010 -11	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16	2016 -17	2017 -18	2018 -19
Cattle Hospital	53	57	52	52	52	57	57	50	50
D- category Cattle Dispensary	5	5	5	5	5	5	46	46	45
Cattle Development Centre	34	40	45	45	45	46	49	49	104

Man-Made Reproduction Centre	47	43	44	44	44	44	44	44	44
Sheep Development Center	5	5	4	4	4	4	4	5	4
Pig Development Center	6	4	6	6	6	4	6	6	6
Source: http://updes.up.nic.in/spiderreports/intialisePage.action									

2.3 Forestry



According to ISFR reports, the forest cover of Pratapgarh has increased between 2001 and 2019. As per the latest ISFR assessment, the forest cover of Pratapgarh is 117.82 Sq. Km., majorly open followed by medium dense forest are found in the district.



The forest cover of Uttar Pradesh has increased b/w 2001 and 2019 and the forest of the Pratapgarh district has also increased.

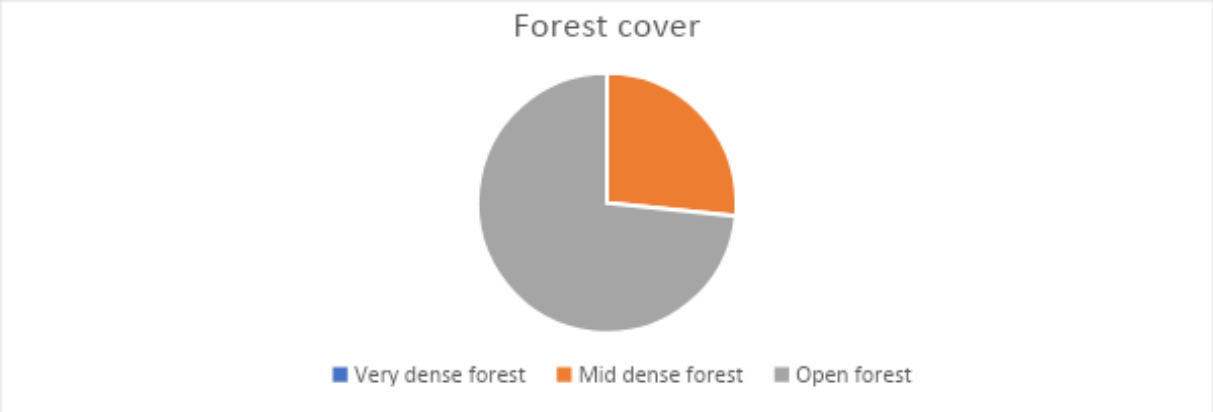
2.3.1. Biodiversity: The district's biodiversity data includes crop production, livestock population, bird species, and forest cover. The crop production trend shows a reduction in the non-grain and sugarcane crops but increases in all other crops. Forest data shows that forest cover was increased by 15.82 % in 2019.

Table 11 Bird species recorded in the district.

Number of species	330
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
3717	0	31.28	86.24	117.82	3.17	15.82	2.00



2.4 Tourism

Image-1;Source; Google maps.

The District Pratapgarh lies in the Allahabad Division (Prayagraj) and is named after its headquarters town Bela Pratapgarh. Pratap Singh was a native king of this place during 1628-1682, he allocated headquarters at Rampur near Aror. In Rampur king built a *Garh* (fort) and named it Pratapgarh. Subsequently the locality around the fort came to be known as Pratapgarh. The district was constituted in the year 1858 and headquarters was recognised at Bela which was known as Bela Pratapgarh. The name Bela is derived from the temple of Bela Bhawani situated on the bank of river Sai in the town.

The district is surrounded by Prayagraj, Raebareli, Sultanpur, and Jaunpur. The river Ganga touches the boundary of the district near Kunda and enters Prayagraj.

Demography of Pratapgarh-

1.	Area	3730 sq.km

2.	Population	3209141
3.	Total villages	2265
4.	Language	Hindi
5.	Economy	Agrarian
6.	Municipal corporation	09
7.	Blocks	17

Table-1; Source- https://pratapgarh.nic.in

Domestic/foreign visitors in different years in particular city

Pratapgarh	Domestic	Foreigner
2013	NA	NA
2014	NA	NA
2015	NA	NA
2016	NA	NA
2017	NA	NA
2018	733490	853
2019	766854	767
2020	415605	93

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

Note- NA= Data not available on the official website.

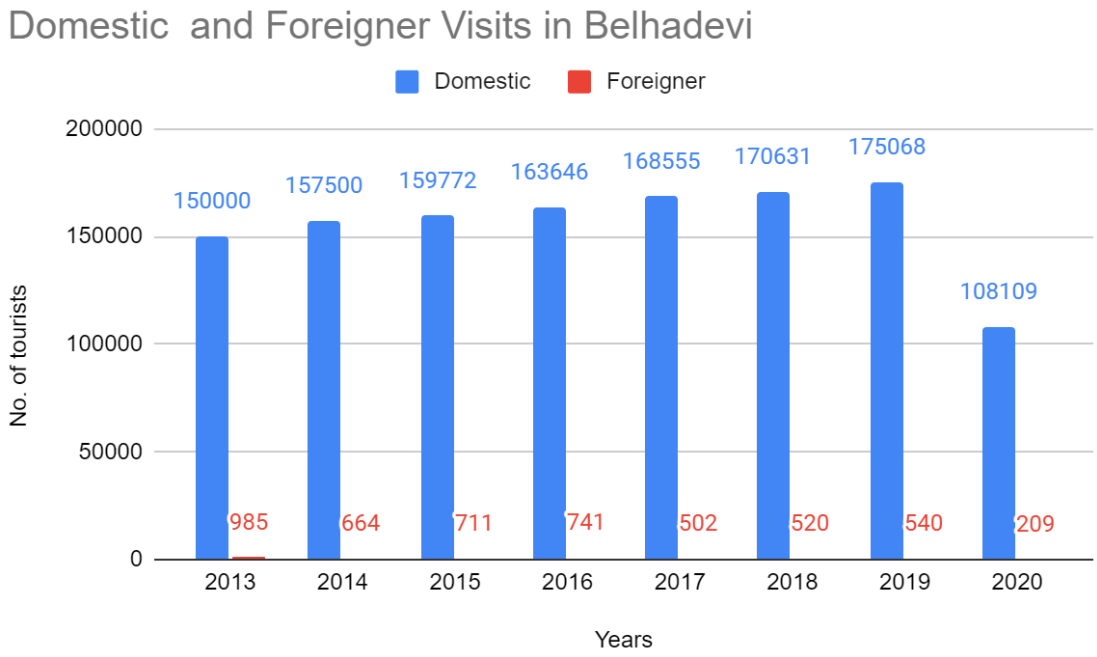
a. The above-given data table is taken from the Uttar Pradesh tourism website. The data table shows the number of tourists visiting Pratapgarh for tourism from 2013 to 2020. The tourist visits are bifurcated into two different groups – Domestic and Foreign tourists.
b. The above give table shows that the number of tourists from 2013 to 2017 were not recorded by the department of tourism Uttar Pradesh.
c. In the year 2018 district received 766854 domestic tourists and 853 foreign tourists.
d. In the year 2019 district received 766854 domestic tourists and 767 foreign tourists.
e. In the year 2020 district received 415605 domestic tourists and 93 foreign tourists.

Belhadevi is a famous Hindu Religious tourist site in the Pratapgarh District, table illustrates the number of tourists in different years-

Belhadevi	Domestic	Foreigner

2013	150000	985
2014	157500	664
2015	159772	711
2016	163646	741
2017	168555	502
2018	170631	520
2019	175068	540
2020	108109	209

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



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

a. The above-given data table-3 and Graph-1 is taken from the Uttar Pradesh tourism official website. The data table shows the number of tourists visiting Balhadevi (Pratapgarh) for tourism from 2013 to 2020. The tourist visits are bifurcated into two different groups – Domestic and Foreign tourists

b. The above data shows the number of tourists visiting Belhadevi -a prime tourist spot in Pratapgarh. The above data shows that the number of domestic tourists increases from 2013(150000) to 2019 (175068).

c. In the year 2020 the number of tourists decrease to 108109.

d. The number of foreign tourists is not consistent throughout these years from 2013 to 2019. The number of foreign tourists decreases in 2014 and 2017 when compared to numbers in the previous years and then gradually grows. In the year 2020 the number of foreign tourists in 2009.

2.5 Wetlands

The district has both small and large wetlands. The area has lakes/ponds such as the Benti Tal (718.89 Ha), Parsahuan Tal (112.02 Ha), Umran Tal (360.86 Ha), which are some of the large lakes in the region. Table 1 shows the number of wetlands and their area representation in the district. There were around 516 wetlands larger than 2.25 Ha and 1850 smaller than 2.25 Ha. Most of the wetlands are smaller than 500 hectares in size.

Table 1: Wetland Data of Pratapgarh 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	43	48	5	0	4	5	7	17	8	1	1	0	35
Ox-bow lakes/cut off meanders	32	45	13	0	0	3	7	7	15	0	0	0	29
High altitude Wetlands	0	0	0	0	0	0	0	0	0	0	0	0	0
Riverine Wetlands	1	3	2	0	1	0	0	0	0	0	0	0	0
Waterlogged	41	53	12	0	19	11	6	2	3	0	0	0	7
River/Stream	0	37	37	0	0	0	0	0	0	0	0	0	0
Man-made Wetlands	NRCD	NWIA	Diff.	<2.25	<5	<10	<20	<50	<200	<500	<1000	>1000	AV
Reservoirs/Barrages	0	0	0	0	0	0	0	0	0	0	0	0	0
Tanks/ponds	35	36	1	0	22	7	4	2	0	0	0	0	12
Waterlogged	238	294	56	0	97	59	45	29	8	0	0	0	43
Salt pans	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (2366)	390	516	126	1850	143	85	69	57	34	1	1	0	126

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

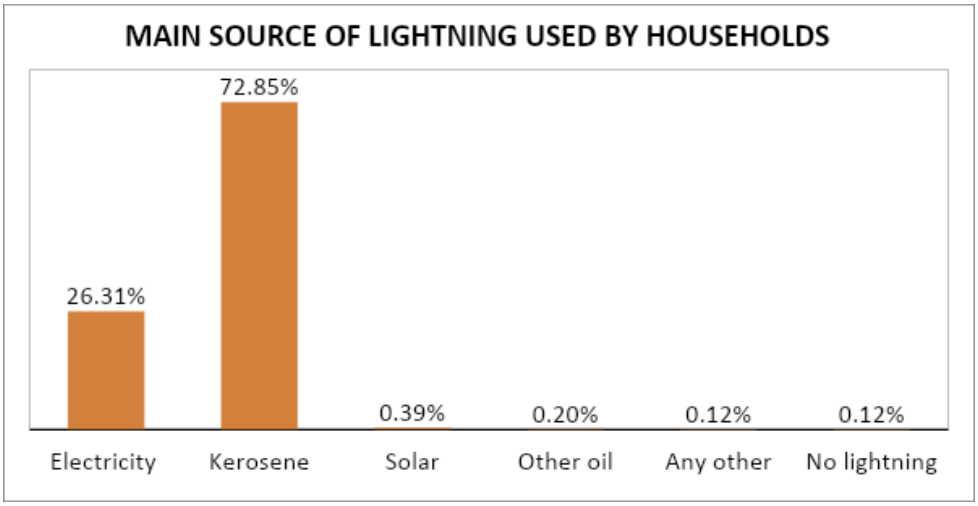
- The district comprises 2366 wetlands; most are lakes/tanks/ponds and waterlogged.
- The wetlands are medium in size in general.
- The number of natural wetlands is less than man-made.
- Many man-made wetlands are waterlogged one's.
- 1/4th of the wetlands (>2.25 Ha) have aquatic vegetation.

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(as depicted in figure) census more than half the population, i.e. 72.85% households use kerosene as the main source of lightning. 26% households use electricity while only 0.39% use solar for the lightning purpose.



Fig

The annual reports on UPNEDA website mention the various solar plant units installed in the district Pratapgarh. A 70 kW grid connected solar rooftop plant has been installed Vikas Bhawan in Pratapgarh. The district has also been installed with 2 solar high mast lightning systems in the year 2018-2019. Also a Solar R.O plant has 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 co-generation in the state sugar mills and rice husk based-electricity generation projects are being encouraged. The district Pratapgarh depends on agriculture to a large extent. The crop production of the district is 322.7 Kt/Yr and the biomass generated is 475.6 kT/Yr (Kumar et.al. 2017). The forests produce a biomass of 142.0 kT/Yr. District's cropping intensity is 116% with 210900 ha of gross sown area. The district encompasses 3700 ha of cultivable waste land and 5100 ha fallow land. The major crops in the district are wheat, rice, sugarcane, etc.

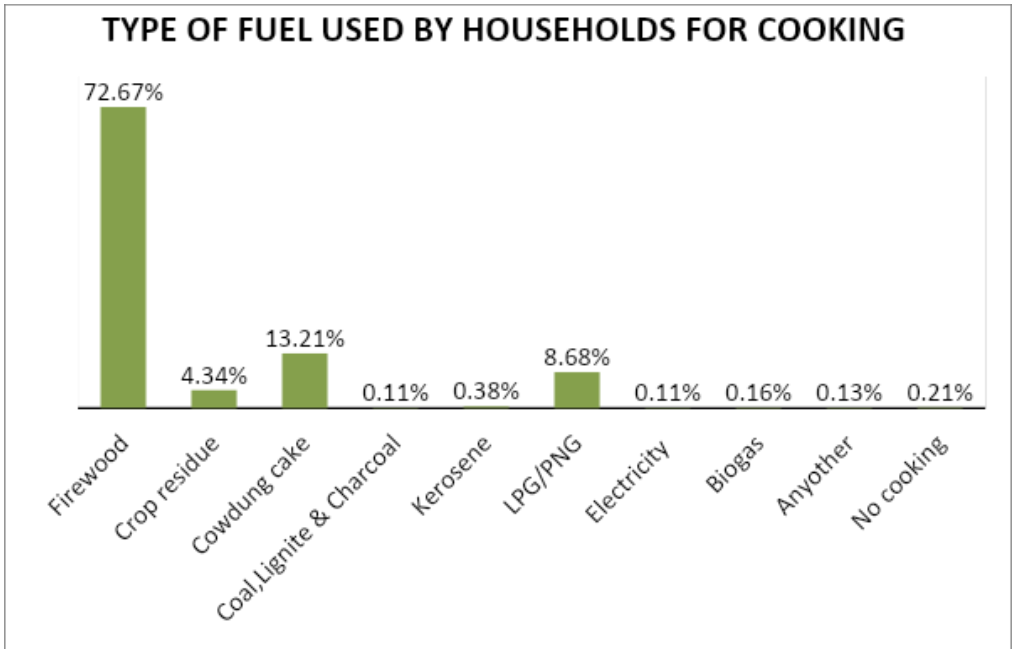


Fig. 1

The data from the 2011(as depicted in figure) census about the type of fuel used by households for cooking depicts that 72% of households use firewood, 4.34% use crop residue and 13.21% cow dung cake. Only 8.68% people use LPG/PNG which is very low.
From the official website of UPNEDA, biomass gasifier plants have been reported in Pratapgarh. M/S Jeetmal Rice Mill and M/S Aditya cold storage.

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 is calculated approximately as two crores m^3/year and twenty-seven 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 Sai. According to the information available, there is no hydroelectric plant in the district, and no location has been studied for future developments.

3 QUALITATIVE DATA ANALYSIS

3.1 AGRICULTURE, ALLIED ACTIVITIES,

3.2 FORESTRY

In June 2021, the divisional commissioner announced to build mini or 'small' forests for environmental protection, on the land of Gram Sabha will be used for the same in every village.[3]
In Pratapgarh district, the local people and an NGO named Paryavaran Sena took the initiative to plant trees, intends on raising awareness about the environment and increasing level of pollution among the locals.[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 : In the Pratapgarh area of Uttar Pradesh, the Dr. Bhimrao Ambedkar Bird Sanctuary is located. It is 13 kilometers from the main town and 13 kilometers south of Kunda, along the Ganga. The Gangetic area is a symbol of aquatic vegetation and animal life and a kind of gene bank that, like the human race, has assimilated many possibilities and generations of variations over time. According to the Wildlife Act of 1972, the region was declared a reserved area by the Uttar Pradesh government. The Act promotes the protection of wild animals and the preservation of their habitat and development. The region is home to various animals, birds, reptiles, fish, amphibians, and invertebrates. Similarly, the Bird Sanctuary region has a diverse range of aquatic and soil-based vegetation that supplies food for the birds and animals and has therapeutic potential.

3.3 ENERGY

As per the data of the year 2013, Prayagraj district energy consumption is around 48 TJ/year and 3.2 GJ/capita/year. GHG emission of 3401 Ton CO_2 equivalent and 0.226 Ton CO_2 equivalent/capita has been evaluated for the district.

[3] https://timesofindia.indiatimes.com/city/allahabad/small-forests-to-be-developed-for-environmental-protection/articleshow/83826189.cms
[4] https://www.timesnownews.com/mirror-now/society/article/locals-in-allahabad-plant-trees-in-100-villages-to-create-oxygen-bank/551874
[5] https://pib.gov.in/newsite/PrintRelease.aspx?relid=148508

5.5.1. Solar

In the district Pratapgarh not much work has been done in the solar energy sector. The district has an ongoing solar energy project 'Pratapgarh Solar Power Project' of 100 MW capacity in the village – Jehanabad, tehsil- Kunda with the annual energy generation of 202.49 MU. The project has been implemented by Bundelkhand Saur Urja Limited- a joint venture of NHPC Limited and UPNEDA.According to an article in Power Today- In Uttar Pradesh, 104 villages of Allababad, Kaushambi, Fatehpur and Pratapgarh are going to be illuminated by solar streetlights. The 104 villages are called as Dr. Ram Manohar Lohia Gram.

5.5.2. Biomass

Pratapgarh is an agrarian district and thus produces biomass in form of agricultural residue in large amounts. Due to which there exists a problem of stubble burning in the district. Parali – a crop residue of rice is banned to be burnt in the district. But quite often it is in news that parali is being burnt. In order to solve this problem and create employment opportunities there needs to be installations of biomass based plants. These plants will reduce the stubble buring problem and bring development in the district.

5.5.3. Biogas

According to a tweet from Gram Vikas Seva Sansthan, a biogas plant has been erected in Uttar Pradesh's Pratapgarh area in conjunction with Sistema.bio (biogas company in Pune). The collaboration's goal is to meet the energy needs of underprivileged communities in order to enhance their living conditions.

5.5.4. Hydropower

In the case of hydropower generation, the state administers national programs such as the small hydropower project program. Uttar Pradesh New and Renewable Energy Development Agency and Uttar Pradesh Jal Vidyut Nigam are in charge of minor hydropower development. Neither sites have been studied, nor do they exist in the district at this time.

3.4 TOURISM

Places of interest

Numerous animal/ human skeletons and a number of a small stones, weapons, belonging probably to the Neolithic, have been found in Archaeological exploration at Sarai Nahar in Kunda-Pratapgarh. It is the only site in the entire Ganga valley where human skeleton of such primitive

age as also the Stone Age implements has been found. On the left bank of Sai River there lies a ruined "Kot" representing a Buddhist Stupa.

Shani Dev Temple

Shani Dev Dham, the temple dedicated to Shani Dev, is located at a distance of about 51 km from Allahabad, 16 km from Pratapgarh, 116 km from Ayodhya, & 3 km from Vishwanathganj in Kushfara village. Hanuman and Manokamana temples are also situated in the same premises. Every Saturday people throng in large numbers & perform special worship here. Navratri is also celebrated here. (Source-pratapgarh.nic.in)

BELA DEVI

The Bela Devi Temple is one of the important temples situated on the banks of River Sai.. This temple is locally known by the name of "Bela Mai" or mother goddess Bela. Several devotees come from all over India to visit this place and seek the blessings of goddess Bela. (Source-pratapgarh.nic.in)

BHAKTI DHAM

Bhakti Mandir is a Hindu Temple located in tehsil Kunda district Pratapgarh. This divine temple was established by the world's fifth original Jagadguru in November 2005. It is maintained by Kripalu Parishat, a non-profit, charitable, educational and spiritual organisation.

Beautiful life sized Divine Deities of Radha Krishna (on the ground floor) and Sita Ram (on the first floor) leave the visitors spell bound. Adjacent to it is a large dome which is another magnificent structure. (Source-pratapgarh.nic.in)

Ghusmeshwar Nath Dham

Ghusmeshwar Nath Dham is believed to be the holiest site of pilgrimage of this region. It is located on the bank of River Sai and enshrines a Shiva Linga, which is popular here by the name of Baba Ghuisarnath Dham. (Source-pratapgarh.nic.in)

Baba Bhayaharan Nath Dham

Baba Bhayaharan Nath Dham is an ancient Shiva temple, situated in the village of Katra Gulab Singh, on the banks of Bakulahi River. The temple enshrines a Shiva Linga and it is believed that this Shiva Linga was set up by the Pandavas at this place. As per legends, the Shiva Linga of Bhayaharan Nath was established by Bhima, after killing the demon Bakasur. Saints Shri Naga Baba and Shri Dandi Baba stayed at this place, worshipped Shiva and served this temple for many years. (Source-pratapgarh.nic.in)

Allahabad is just an hour away from Pratapgarh which is a huge tourist spot. Around 200 kilometres away Varanasi is situated on the bank of Ganga. Around 120 kilometres away Lucknow

another huge tourist spot is located. Tourists who are willing to visit Pratapgarh can visit these famous place and vice versa.

Data analysis

- The unavailability of number of tourists data of the district shows negligence of the authority.
- The data in the year 2018 shows that the number of domestic tourists (733490) in the district is not very less; and this can be concluded that department can not exclude these sites. It is necessary to track the number of tourists to scrutinise the policies and packages for better tourism and revenue generation through these activities.
- In the year 2019 the number of domestic tourists increased to 766854, which shows the district is getting attention and number of tourists are increasing.
- The number of foreign tourists in inconsistent throughout the year.
- The number of tourists in Belhadevi is significant. It also attracts international tourists which mean it can be developed to attract booth the domain of tourists.

3.5 WETLAND

Wetlands are the source of numerous ecosystems and habitats for diverse species. Wetlands offer a one-of-a-kind environment that sustains several species simultaneously, including aquatic, terrestrial, and human beings. Local stakeholders rely on the marsh for revenue and small-scale business either directly or indirectly. With the right approach, these businesses may be transformed into a large-scale production centres. Wheat and rice are the main foods in the region. The region is well-known for producer of Aonla fruit. The data gathered and evaluated demonstrates the region's production and potential products produced from the raw product. The following sources and potential products are listed: 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, government of Uttar Pradesh taken the initiative to plant 22 crore saplings. The Forest Department involved the farmers as stakeholders to plant seedlings in their fields. Farmers are expected to sow quality planting material such as clonal plants, which are not available in the UP forest department nurseries. There is also the need to have minimum support price (MSP) for the timber produced by farmers with buy-back arrangement. This in turn will motivate them to plant more trees, which would benefit the economy as well as the environment.[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 : Gangetic dolphins are less in number and should be protected by conserving areas where they are regularly seen. Local organizations should participate and spread awareness in the villages through cultural rallies.

4.3 TOURISM

Ecotourism Projects

Travelling to places where flora, wildlife, and cultural legacy are the main attractions is known as ecotourism. Ecotourism aims to provide visitors with a better understanding of how humans affect the environment and create a greater appreciation for our natural ecosystems. There is a huge opportunity to develop ecotourism projects in the Pratapgarh 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 Pratapgarh a new face in tourism.

Sustainable Tourism

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

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

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

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.

Sustainable practices will not only help in saving the ecosystem in the Ganga but also save ecosystem of the Gangetic fertile land. The sustainable practices will save the agrarian economy and reduce the climate change and its effect.

Projections and Monitoring matrix

Sector	Intervention	Strategy	Total cost	Expected Outcomes
Tourism	**Research**	● Based on various data and matrices, it is possible to predict the reason and motivation for tourism. Through extensive qualitative and quantitative research, it is also possible to determine the variables affecting tourism in Uttar Pradesh. ● Research must be free from all the political pressures and influences. ● The researchers must ensure that the field data and secondary data are correct and not modified while entering the new records. ● Need to involve unbiased researchers.		● A well-researched document as a reference for other processes. ● Factors that affect tourism in Uttar Pradesh. ● Define the determinant of tourism activity.
	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		● Planning to be based on research and previous lessons. ● Realistic planning for

		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. ● 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. ● Social impact evaluation of		successful implementation. ● Impact evaluative study to produce effects of development on tourism to incorporate them in policy making.

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

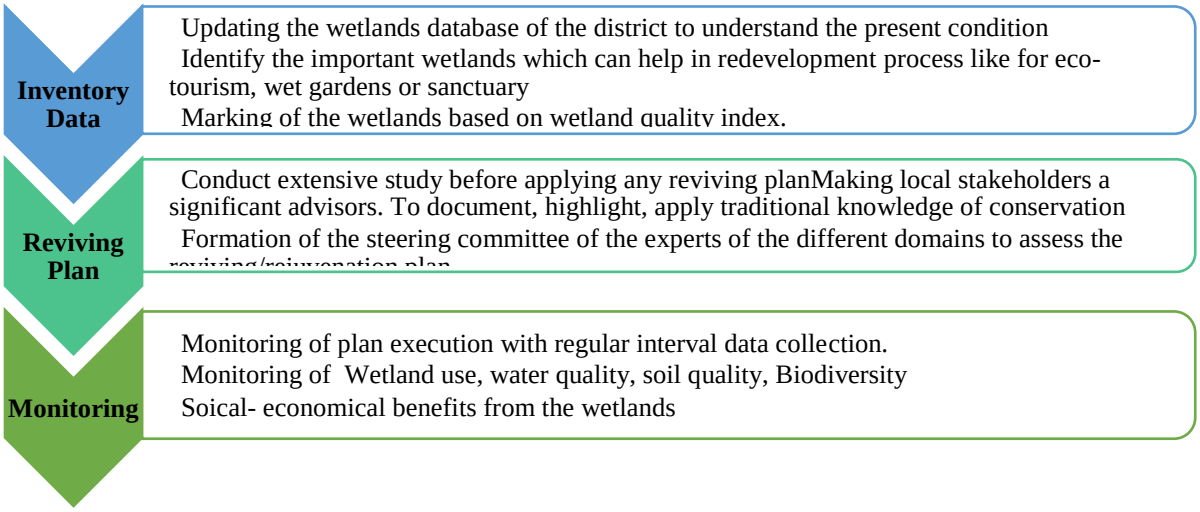
	Impact Assessment of results	● Calculating what the touch points are. ● The reason for failure ● The reason for the success ● Lesson for next planning		● To learn the lesson and find out the root cause of success and failure, to be used further with modification

SWOT analysis of Tourism

S No.	Strength	Weakness	Opportunity	Threat
	● Geographical location- situated between two major tourist spots of Uttar Pradesh: Allahabad and Lucknow. ● Religious tourism of Hinduism, various temples, and pilgrims. ● Known for its high yield of Amla/Avla (Phyllanthus emblica) or Indian Gooseberry. ● Belhadevi Temple.	● Unsupportive infrastructure. ● Lack of tourist spots. ● Lack of cleanliness. ● Unavailability of tourist data in years before 2017.	● Ganga ghats can be developed for cruise shipping and adventure sporting. ● Can be included in Prayagraj Tourist packages. ● Various Hindi poets belong from this city such as Harivansh *Rai Bachchan* and *Sumitranandan Pant*; can be used to attract tourists.	● Rapid development projects can harm the native agrarian economy. ● Pollution in Ganga River. ● Insufficient funds.

4.4 WETLANDS

The area has some of the most productive and diverse wetland ecosystems. They directly or indirectly sustain millions of people and supply goods and services. They provide sustenance for all living forms via enormous food webs. They provide habitat for aquatic vegetation and animals and various bird species, including migratory species. They help to reduce flooding and recharge groundwater. They must be addressed, and action must be made on several fronts. The action plan below provides a glimpse of the actions and activities necessary to maintain, conserve, and revitalise extant and extinct wetlands.



4.5 ENERGY

4.5.1 Solar

The district Pratapgarh has not been very progressive in the solar energy sector. The district requires attention towards inclining people towards solar energy sector and promoting the use of clean and green energy. This could be done by making people aware about the benefits of solar energy and the policies that government has made so that more and more people adopt it. The main economic sector that is agriculture needs to start exploiting solar energy for the agricultural activities requiring power. The central government's Kusum Yojana is best suited for the district. Under this scheme the farmers can take benefit of any of the component of their choice according to their requirement. But this has to be made to understood to the farmers by the responsible authorities. There should be a survey to pick out the fallow lands and use them for establishing solar plants. In areas where the infrastructure is not developed to fulfill the requirement for setting up grid connected solar panels, government should provide subsidy in those areas for the off grid connections. Only a well-planned and well executed development procedure would boost the solar energy sector in the district.

Projection and monitoring

To begin the development of solar energy sector in the district first of all awareness is required among the people of the district not only about the solar energy but also about the various policies the government has made. Followed to this should be promotion of Kusum Yojana in the district among the farmers and helping them choose the component according to their requirement. At places where solar feeder segregation is required, the work should be started without any delay. Next to this should be making plans for providing financial assistance to certain places where on grid connections are not possible. A survey should also be conducted to find out about the fallow land and planning should be done. accordingly All the sections of the society should be considered and made aware and encouraged to use the solar energy would definitely raise the solar energy sector in the district.

4.5.2 Biomass

The district faces the problem of stubble burning, which needs to be solved and the agricultural residue produced should be diverted towards biomass energy production. This can be done when farmers are made aware about the ill effects of burning stubble especially parali and the benefits of bioenergy. The biomass energy plants can supply pellets and briquettes to the farmers. Also the feasible prices should be fixed for the agricultural residue so that neither the sellers nor the buyers are at loss.

To improve the economy of the district and to increase its entrepreneurship district specific plans should be made by the concerned authorities. An environment which is suitable for new local start-ups should be made. In villages, panchayats and the self help groups should be encouraged to take the initiative for setting up biomass based plants. This will create new employment opportunities in the district. . Biomass-based cogeneration in the state sugar mills and rice husk based-electricity generation projects are best suited for the district.

There are rice mills and cold storages in the district, which should be encouraged to install biomass plants. This will reduce the burden on dicoms and these mills and cold storages can also be made centers for power production.

A biomass collecting system needs to be planned for the district which not only collects agro-wastes but also food residues etc. from the urban areas, so that there is a surplus supply of biomass. This is important because when bioenergy plants are set up, then they don't face difficulty in biomass residue collection.

Projection and monitoring

First of all, awareness about bioenergy should be made in the district, especially in the rural areas. The farmers should be made aware of the ill effects of stubble burning. They should be educated about bioenergy. This can be very well done by the village panchayats, self-help groups etc. Followed by this should be setting up of biomass energy plants by the rice mills, cold storages, etc. Obligatory norms should be made for them. At Least 2-3 mills can have one energy production center to reduce the cost per head. Government should provide financial assistance for the new private start-ups, so that they can flourish along with the district.

4.5.3 Biogas

At present, in Pratapgarh city, sewage of 8.95 MLD directly goes to the Sai River. The Sewage treatment plant (STP) in the district is under construction as per the oversight committee's report. The fund should be released to complete this work, and biogas production from the sludge should be estimated for the STP. Kanthal Gaushala in the district has 280 cows, and cow dung from the Gaushala could be used for biogas production.

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

- Share of groundwater irrigation has increased from 55.81 in 2011-12 to 68.28 2017-18 and number of medium and deep tube-wells increased substantially during the study period, indicating the depletion of water table. Therefore, Drip and Sprinkler irrigation systems should be encouraged to increase the water use efficiency and productivity of crops. The district also needs to construct more tanks and ponds under MGNREGA.

- Farmers should be sensitized to the overuse of fertilizer and pesticides application. They should be trained on the uses of fertilizer and chemical pesticides applications.

- Food grains, dominated by Wheat and Rice, constituted about 90% of the GCA. Good quality seeds should be introduced for wheat and paddy to increase productivity in the wheat-paddy cropping system. Moreover, the existing cropping pattern needs to be diversified towards high-value horticulture and livestock activities. The government can promote micro and small units for horticulture products processing.

- The number of female cattle and buffaloes has substantially increased over the period, indicating the growth of livestock products, including milk. The livestock contributed 33% to the value of output of agriculture and allied activities in 2017-18. It indicates that it is the key driver of agriculture growth in the district, which need to be promoted through creating an efficient marketing network and setting up dairy and dairy-based processing units. There is also a need to upgradation of local breeds for cattle and buffaloes. There is a need for Milk Collection Centre to facilitate marketing opportunities to the trained milk producers who have started their dairy.

- Although, the fishery & aquaculture has only 2.38% share in the value of agriculture and allied sectors in 2018-19, but it grew with a significant average annual growth rate of 10.52% from 2011-12 to 2018-19. It indicates that there is a huge scope for raining income and livelihood through effective implementation of PM Matsya Yojana.

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

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

- Farmers should follow the crop advisory under the drought condition and adopt techniques like drought resistance variety and maintaining moisture of soil by covering the soil.

- About 97% of farmers in the district are small and marginal with landholdings less than two hectares. They can contribute substantial to livestock, vegetables and other labour-intensive allied farm activities.

- Per capita electricity consumption in the district agriculture increased from161.60 KWH in 2014-15 to 282.99 KWH in 2019-20, a net increase of approximately 75.11%. Since electricity consumption has increased over the years and more than 45% of total electricity consumption is in agriculture, there is a need to promote the use of solar energy in agriculture.

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

- 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.

- The farmers should use salt-tolerant varieties in the wheat-rice cropping system in the sodic soil to boost productivity. Farmers should also adopt amla or aonla (*Phyllanthus Emblica*) farming in salt-effected soil.

- Farmers should use advanced mechanized tools for farming to increase their yield and income.

- The district has a lot of scope for bee-keeping and Poultry, which should be encouraged by providing training to local youth.

- Good quality seeds or high-yield seeds should be introduced for wheat in the wheat-paddy cropping system to increase productivity.
- The farmers should use salt-tolerant varieties in the wheat-rice cropping system in the sodic soil to boost productivity.
- Farmers should use advanced mechanized tools for farming to increase the yield and income.
- The district has the opportunity to bring more area under the micro-irrigation like drip and sprinkler systems to increase the water use efficiency and crop yield.
- Organic farming should be adopted by farmers to boost soil health.
- Training to prepare the Vermicomposting and Green manuring should be organized to the farmers.
- Farmers should be sensitized on the overuse of fertilizer and pesticides application.
- Farmers should adopt amla or aonla (*Phyllanthus emblica*) farming in salt-effected soil.
- The district has a lot of scope for bee-keeping, which should be encouraged by providing training to local youth.
- The district has good scope for expansion of fishery in an existing good number of ponds and water bodies, which should be encouraged.
- The district has a huge scope for poultry farming and dairy units.
- There is a need for Milk Collection Centre to facilitate marketing opportunities to the trained milk producers who has started their dairy.

5.2. Forestry

Pratapgarh, located on the bank of river Ganga. According to ISFR 2019, 117.82 Sq. Km. area of Pratapgarh is covered with forest. As discussed above, the forest cover of Pratapgarh has increased significantly as compared to previous assessment of ISFR 2017. Majorly open and moderately dense forest are found in the district. There is a wide scope of Afforestation on waste land, trees outside forest (on the sides of the roads, banks of river etc.) and scrub area. Government can promote the afforestation, agroforestry activities by providing output based incentives.

5.2.1. Biodiversity.

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

5.3. Tourism

Maintaining heritage buildings: Regular maintenance of tourist spots and the different roads connecting it with the city's centre is necessary to provide tourists with an enjoyable experience. Information and contact details of authentic tourist guides on the government tourism website may be helpful for tourists and encourage them to visit more places and eventually more business. Acquiring a license by local tourist guides from government bodies is generally a complex process that discourages genuine candidates from getting the license. Easy to apply and get the license can benefit tourism

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 travellers, Uttar Pradesh's image must be promoted as a safe and secure tourism destination.

Promotion and selling: Cross-selling tourism hotspots in neighbouring 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 Pratapgarh tourism even more. It is critical to capitalize on their celebrity and fan base for UP tourism to get traction and warmly receive visitors. There are several Bollywood celebrities form Pratapgarh those can be appointed as brand ambassador such as Sweta Tiwari.

Hindi Literature poets such as Harivansh Rai Bachchan is associated with this place, that can be capitalised to attract more tourists.

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 tourists 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.

Recommended Project

Pratapgarh is famous for its Amla Production and its export in Indian states and other nations. There are several cuisines that are prepared from amla such as Murabba, Amla Pickle, Amla Oil, Amla Candy etc.

Tourism of this district can be promoted though Alma production and distribution. The Alma production can boost the local economy if the local get some training to upgrade their skills and use the Amla production to generate revenue.

Amal candy factories which are a small-scale industry and that can be setup in a home or cottage can help local women and girls to be associated in income generation and dignity earning.

Amla is rich in vitamin C, it can be consumed raw, in the spicy pickled form, dried powder, or as sweet berry concoctions that are very beneficial for health. It can be eaten as a raw drink/juice, along with jaggery, as Murabba (in the sugar syrup), or in the form of dips, candies, and pickles. It is also a seasonal juicy fruit produced during winters.

Micro industries can be erected in this region to support local farmers who are growing Indian Gooseberry. Industries which can convert raw Amla into long lasting dishes can be established here to support local economy.

To set micro industries here there are some pre-requisites that can accelerate the setting up process-

- Upgradation in the skill of local producers, which will enable them to produce superior quality of amla.
- Enabling skills in the localities to utilise the amla production as capital. For example, youth can be trained in making candies, pickle, amla powder etc. This will not only help them in getting permanent employment but also a support and motivation to farmers who are producing amla.
- Entrepreneurial skills in the youth to see this opportunity and bring business models. For this short-term entrepreneurship curses though Skill Development Mission can be offered to literate youth.
- Easy bank loans to setup micro industries. Although after easy of doing business campaign it has become relatively easier to get loan sanctioned for MSME industry and self-

employment. However, one should know the process and mandates for getting a loan; all this can be taught, or youth can be trained in short duration course about getting a loan.

- Digital marketing skills in the age to e-commerce shopping era is must to have skill. Through digital marketing producer will be able to sell their product locally and internationally. Producer should know how to sell their product using digital platforms such as Amazon, Flipkart etc. This will broaden the outreach of the product and producers.
- Infrastructure support and supportive government policies to support business.

Key Observations – Pratagarh Tourism

- Few religious spots are present which attract tourists every year. Belha Devi is one of the famous tourist spot which attract domestic as well as international tourists every year. Average number of tourists visiting Belha Devi is 157269.125, which us a significant number, although the number of international visitors is less than 0.05% of the total tourist visits.
- Pratapgarh is famous for amla production hence can be seen as cuisine tourism.

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 recommendation 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.
- It is recommended to promote wetland in connection with the mythological connection to create an eco-tourism hotspot.
- 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 Badaun is presently in the developmental phase of setting solar energy sector. Farmers should be made acquainted with the Kusum Yojana and its various components Once they start using the solar power for agricultural activities, they could easily incorporate advanced techniques which would eventually benefit them. Thus will lead to an overall development of the district and improve the livelihood of the people.

5.5.2. Biomass

The district is facing a stubble burning problem, to overcome this problem biomass plants should be installed in the district to utilize not only agro wastes but wastes from urban areas as well. For this, panchayats and self help groups in the rural areas should come forward and encourage and make people aware about biomass energy. Biomass-based cogeneration in the state sugar mills and rice husk based-electricity generation projects should be encouraged. This will generate employment in the district. Hence there will be improvement in the economy, ecology and livelihood of the district.

5.5.3. Biogas

- Increased cattle shelter capacity, maintaining Kanthala gaushala, and setting up a biogas plant is recommended.

5.5.4. Hydropower

- It is recommended to investigate the small hydroelectric potential in the Ganga and Sai rivers.

6. Discussion during the Report Presentation

- Pratapgarh is famous for mango belt
- Self-help groups identified for bamboo mission
- Training of making bamboo products

- Regular Ganga aartis at 2 Ghats
- Export of amla products (training & marketing)
- The IIML Report for Arth Ganga should be a regular Agenda item for next 6-8 DGC meetings.
- Hon'ble PM during the post-Budget webinar on Tourism had spoken about market potential of destination weddings. It was suggested that suitable Ashrams in Ganga Basin may be identified for such purpose to promote blissful experience, cost reduction, livelihood opportunities and better upkeep.
- Allocate separate space for Namami Gange Awareness and Jalaj Marketing kiosk in Melas/Congregatios/Fairs for providing better marketing opportunities to the Jalaj products.
- As Dilli Haat Centre – Namami Gange Awareness and Marketing Centre – is being launched soon, it was requested that every district to identify niche products with a creative story and link it with Jalaj in their area.
- To identify Arth Ganga Tourist Trails and organize Ganga Guide training
- Promotion of Natural Farming in Ganga Basin and training workshops should be organized on a regular basis. NMCG is supporting this initiative in coordination with MoA& FW and NCOF.
- Make plans for reuse of treated waste water for agriculture, industrial etc. purpose and also the sludge.
- Training of volunteers for Ganga awareness & Aarti workshops to promote regular aartis on Ghats.

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8 APPENDICES

Table 12 Crop production in the district.

Crop/Year	2015-16	2016-17	2017-18
Non-grain crops (Metric Tonne)	16241	26140	22270
Grain crops (Metric Tonne)	607378	696468	711644
Sugarcane (Metric Tonne)	56575	71504	30484
Potato (Metric Tonne)	77459	96310	131796

Table 13 Livestock population in the district.

Livestock	2003	2007	2012
Cattle (Cow)	356821	327178	378127
Buffalos	304667	360711	356180
Sheep	33429	34134	18886
Goat	235175	239157	263750
Pigs	105955	106898	43938
Chicken	196059	179742	203609
Other Poultry	4382	50696	3934
Horses and Ponies	3163	1911	3268

Table 14 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	378187	10	1,38,03,82,550	1035286913	207057382.5	25	8282295.3
Buffalo	Manure	356180	15	1,95,00,85,500	1462564125	292512825	25	11700513
Sheep	Manure	18886	1	68,93,390	5170042.5	1034008.5	25	41360.34
Goat	Manure	263750	1	9,62,68,750	72201562.5	14440312.5	25	577612.5
Pig	Manure	43938	2.5	4,00,93,425	30070068.75	6014013.75	25	240560.55
Poultry	Manure	2,07,543	0.1	75,75,320	5681489.625	1136297.925	25	45451.917
Total		**12,68,484**						**20887793.61**

Table 15 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	1353	1.5	2029.5	1420.65	15	1207.5525	800	966042
Wheat	straw	469720	1.5	704580	493206	30	345244.2	800	276195360
Sugarcane	Bagasse	30484	0.33	10059.72	7041.804	80	1408.3608	750	1056270.6
Total		501557							2782176726

S.No	Broad objectives / recommendations	Key activities / interventions to be planned			Monitoring & Evaluation	Impact
		2022	2023	2024		
	Training of skilled man-power to work in tourism sector(through earn while you learn programs). Upgradation of UP state tourism corporation policies, the hotels and integration of PPP. Cuisine tourism Development of Ghat	Research to figure out the factors impacting the tourism in the district. Training of manpower. Intensive Marketing Development of strategies to address the issue. Structural developments	Implementation of strategies and programs Structural developments Infrastructure support to local amla cuisine producers, Documentation of cuisines and type of amla.	Sampling for analysis. Evaluation of interventions. Redesigning of strategies based on Impact analysis	Intervention impact-RCTs, regression analysis, propensity scores, econometrics, structural equation modelling, Contribution analysis, process tracing, Bradford Hill criteria.	Trained youth to be a part of Tourism industry. Less impact due to NTPC Upgraded staff and facilities associated with UP State Tourism Corporation. More number of tourist footfalls