Arth Ganga Project: District Kaushambi

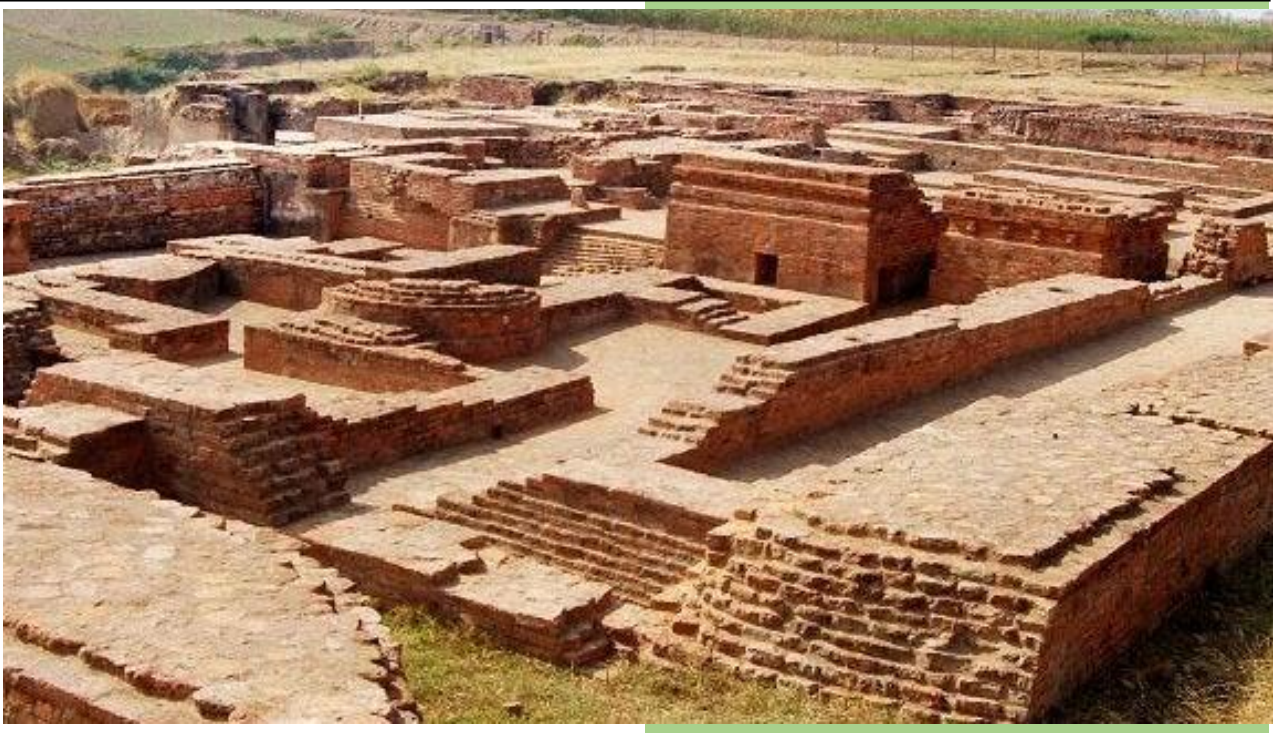

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 26

District Overview 39

Introduction 3

Demographic Profile of Kaushambi 4

Agro Climatic profile of the district 5

Economic Profile of Kaushambi 5

Quantitative Data Analysis 9

Qualitative Data Analysis 28

Agriculture, Allied Activities, 28

Forestry 28

Energy 29

Tourism 30

Wetland 39

Action Plan development 39

Agriculture 39

Forestry 39

Tourism 40

Wetlands 44

Energy 45

Recommendations 46

5.1. Agriculture and allied sectors 46

5.2. Forestry 49

5.3. Tourism 49

5.4. Wetlands 50

5.5. Energy 51

References 53

Appendices 53

EXECUTIVE SUMMARY

Kaushambi, a religious place of historical importance is a district in the state of Uttar Pradesh traversed by rivers Ganga and Yamuna it is an agrarian economy.

The total geographical area of the district is 1780 km^2. The district lies in the Middle Plain (5) agro-climatic zone. The district is divided into three Agro-ecological situations with sandy, sandy loam soils but with varying pH. The major soils are sandy, sandy loam, saline, alkaline, and water-logged soils. Out of the cultivable area of about 153813 ha, the gross irrigated area is 128027 ha. Permanent pastures account for 517 ha, the Cultivable wasteland is 3768 ha. The barren and uncultivable land constitutes 8132 ha. With the net sown area of 314468 ha and gross cropped area of 177839 ha, the Cropping intensity of the district is 132.25%. Cultivable wasteland, of the area under trees and gardens, decreased to 1.84% and 1.98% respectively in 2017-18. The current and other fallow land has increased over the years and also, area for non-agricultural use increased over the period from 12.31% to 13.26%. The net sown area has decreased over time, from 72.62% in 2010-11 to 66.77% in 2017-18. The major crops types are Paddy, Wheat, Jawar, Bajra, Rice, pulses, etc. Among the horticulture crops (fruits and vegetables) are Mango, Gladiolas, Brinjal, Banana, Guava, etc. The livestock consists of indigenous and crossbred cattle, goats and pigs, buffalos, sheep; along with poultry and fisheries. The primary and secondary sectors showed growth of 30.70% and 27.13% respectively, in the year 2018-19. From 2011-12 to 2018-19, agriculture with horticulture and livestock showed an average annual growth rate of 5.44% and 7.0% respectively, with their shares decreasing slightly from 80.06% to 79.37% and increased from 14.53% to 15.43% in the respective sectors. The fishery and aquaculture subsector showed an average annual growth rate of 86.25% from 2011-12 to 2018-19. Mines and quarrying's annual growth rate was 128.66%. In 2017-18, The nitrogen's share in fertilizers decreased to 70.46%, while the phosphorus share increased to 23.47%, and the potassium share decreased to 6.06%.

The total forest cover of the district is 27.83 Km^2, out of this the maximum area is covered by open forest (22.83 Km^2) followed by mid-dense forest (5 Km^2). The share of forestry and logging is around 2.93% in 2018-19, but it grew remarkably well with an average annual growth rate of 30.79%. The forest cover increased by 2.21% in 2019. The total number of species found in the district is 335. The district comprises 1255 wetlands mostly lakes/tanks/ponds and waterlogged. The wetlands generally are small-sized with natural wetlands more than man-made. The district is well connected with roads, railways, and airways. The district has many historical places like Kara along with temples, monastery. The number of tourists has increased in respective years since 2015 with the highest increase in the year 2017.

The major source of lightning is kerosene (83.31%) followed by electricity (15.83%). The use of solar energy is only 0.40%. The source of fuel is firewood (64.10%) followed by crop residue (18.27%). Various capacity solar power plants are being installed for electricity generation from solar energy. Electricity consumption in agriculture has increased significantly from 164.74 kWh

in 2014-15 to 230.49 kWh in 2019-20, a net increase of approximately 39.91%. Biomass production potential is high in the district but the use of that biomass is very less. Biogas potential from animal and agricultural waste is calculated approximately as 1 crore m^3/year and 13 crores m^3/year respectively. A biogas plant was set up in the district. Currently, there are no hydropower plants.

Being an economically weak district measures need to be taken to enhance the economy along with development such as promoting organic agriculture, horticulture Dairy, and agroforestry, eco-tourism, creating awareness, and welcoming the participation of locals, etc. Practices like flood irrigation, beekeeping, adopting Resource Conservation Technologies, vermicomposting, monitoring of natural hazards, etc. must be taken into consideration.

1 DISTRICT OVERVIEW

1.1 INTRODUCTION

Kaushambi is a district of Uttar Pradesh with an area of 1779 sq km. In terms of geographical area it occupies 63rd rank in the state and 517th in India. Administration wise, the district is divided into 3 tehsils namely Manjhanpur, Sirathu and Chail. Moreover the district comprises 3 sub-districts, 9 towns and 868 villages.

According to the 2011 census, the district has a population of 1599596. In the total population of the district of 15,99,596 as much as 39.95 percent are total workers and the rest of 60.05 percent are non-worker. Among workers 25.96 percent are main workers and the rest of 13.99 percent are marginal workers of the total population. In the district among workers about 22.08 percent are cultivators, 50.2 percent agricultural laborers and 22.86 percent other workers.

Agriculture is the backbone of the economy of the district. Most of the lands in the district are used for agricultural purposes. More than half the population is engaged in agriculture to earn their livelihood. The chief agricultural products in the districts are wheat, rice, arhar, etc. The district is scantily industrialized but some agro based industries are available in it. Under the Factories Act 1948, The district of Kaushambi has an agrarian economy

A scattered part of the forest may be seen in the district. From the point of view of increasing population, industrialization and pollution, the forest department and others with numerous institutions are implementing various schemes for plantation throughout the district.

Figure 1 Map of the district

1.2 DEMOGRAPHIC PROFILE OF KAUSHAMBI

- Geographical Area: 1780 Sq. Km.
- Administrative Divisions:[1]

  District Headquarters: Manjhanpur

  No of Tehsil: 3

  No of Blocks: 8

  No of Gram panchayats: 451

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

No. of Nagar Panchayat: 10

No. Of Villages: 869

- Demographic and socio-economic indicators:[2]

  Population: 15,99,596 (Census 2011)

  Population density (Total persons per sq. km): 899

  Sex ratio: 908

  Literacy: 61.3%

- Occupation/ other Livelihood source: Agriculture
  - Major Rivers: Ganga and Yamuna
  - Forest Area: 27.83 Sq. Km. (No major forest)

1.3 AGRO CLIMATIC PROFILE OF THE DISTRICT

1.4 ECONOMIC PROFILE OF KAUSHAMBI

The primary sector has a significant impact on the district economy because it contributes, on average, 25% share in the district GDP. Moreover, the average annual growth rate in this sector from 2011-12 to 2018-19 is 10.27%. Its share increased from 25.24% in 2011-12 to 30.70% in 2018-19. The share of the secondary sector also increased from 19.78% in 2011-12 to 27.13% in 2018-19. It increased with an impressive average annual growth rate of 10.74%. The tertiary sector occupied, on average, 52% share of the district economy. However, the sector grew with a low average annual growth rate of 2.86%, with its share decreasing from 54.98% in 2011-12 to 42.17% in 2018-19. Overall, the district economy grew with an average annual growth rate of 6.27%. Steps

[2] https://www.censusindia.gov.in/2011census/dchb/DCHB_A/09/0943_PART_A_DCHB_KAUSHAMBI.pdf

should be taken to increase the productivity of the tertiary sector so that it can grow at a higher rate. This will improve the growth rate of the overall district, and the tertiary sector has a decent (52%) contribution to the district GDP. The primary and secondary sectors have performed well during the study period.

Table 1: Trends in Gross District Domestic product in Kaushambi 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	1030.60	807.54	2244.92	4083.06	-	-	-	-
	(25.24)	(19.78)	(54.98)	(100)				
2012-13	921.13	856.31	2458.22	4235.65	-10.62	6.04	9.50	3.74
	(21.75)	(20.22)	(58.04)	(100)				
2013-14	791.46	913.07	2428.29	4132.82	-14.08	6.63	-1.22	-2.43
	(19.15)	(22.09)	(58.76)	(100)				
2014-15	999.21	997.86	2672.51	4669.59	26.25	9.29	10.06	12.99
	(21.40)	(21.37)	(57.23)	(100)				
2015-16	1272.70	1111.00	2907.72	5291.42	27.37	11.34	8.80	13.32
	(24.05)	(21.00)	(54.95)	(100)				
2016-17	1290.08	1249.23	2100.44	4639.75	1.37	12.44	-27.76	-12.32
	(27.80)	(26.92)	(45.27)	(100)				
2017-18	1374.42	1495.17	2200.82	5070.41	6.54	19.69	4.78	9.28
	(27.11)	(29.49)	(43.41)	(100)				
2018-19	1856.83	1640.91	2550.23	6047.97	35.10	9.75	15.88	19.28
	(30.70)	(27.13)	(42.17)	(100)				
Average Growth Rate					10.27	10.74	2.86	6.27

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

We further break down the primary sector GDP to determine which subsector is lagging and which one is driving the primary sector growth. Table 2 shows that agriculture with the horticulture sector grew at an acceptable average annual growth rate of 5.44% from 2011-12 to 2018-19, and its share decreased slightly from 80.06% in 2011-12 to 79.37% in 2018-19. On the other hand, the share of livestock increased from 14.53% to 15.43% in the same period as it grew, with a remarkable average annual growth rate of 7.0%. The share of forestry and logging in the total agriculture and allied sector is small, around 2.93% in 2018-19, but it grew remarkably well with an average annual growth rate of 30.79%. The fishery and aquaculture subsector share is minimal, around 2.27% in 2018-19, but it also grew with a magnificent average annual growth rate of 86.25% from 2011-12 to 2018-19. Mines and quarrying also recorded a remarkable annual growth rate of 128.66%; 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 study period, 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: Gross District Domestic Product Trends from Agriculture and allied activities in Kaushambi 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	784.30	142.32	50.20	2.81	979.63	50.97	1030.60
	(80.06)	(14.53)	(5.12)	(0.29)	(100)		
	-	-	-	-	-	-	-
2012-13	651.08	167.54	41.22	2.94	862.78	58.34	921.13
	(75.46)	(19.42)	(4.78)	(0.34)	(100)		
	[-16.99]	[17.72]	[-17.89]	[4.74]	[-11.93]	[14.47]	[-10.62]
2013-14	521.86	187.55	34.08	3.03	746.52	44.94	791.46
	(69.91)	(25.12)	(4.57)	(0.41)	(100)		
	[-19.85]	[11.94]	[-17.32]	[3.10]	[-13.48]	[-22.97]	[-14.08]
2014-15	701.51	194.85	34.61	3.24	934.22	64.99	999.21
	(75.09)	(20.86)	(3.71)	(0.35)	(100)		
	[34.43]	[3.89]	[1.57]	[6.82]	[25.14]	[44.61]	[26.25]
2015-16	852.72	272.84	33.57	3.30	1162.44	110.26	1272.70
	(73.36)	(23.47)	(2.89)	(0.28)	(100)		
	[21.56]	[40.02]	[-3.02]	[2.05]	[24.43]	[69.65]	[27.37]
2016-17	1000.00	212.64	35.45	4.04	1252.15	37.93	1290.08
	(79.86)	(16.98)	(2.83)	(0.32)	(100)		
	[17.27]	[-22.06]	[5.61]	[22.36]	[7.72]	[-65.60]	[1.37]
2017-18	991.34	164.49	149.42	4.44	1309.69	64.73	1374.42
	(75.69)	(12.56)	(11.41)	(0.34)	(100)		
	[-0.87]	[-22.65]	[321.47]	[9.72]	[4.60]	[70.66]	[6.54]
2018-19	1016.66	197.63	37.49	29.06	1280.84	575.99	1856.83
	(79.37)	(15.43)	(2.93)	(2.27)	(100)		
	[2.55]	[20.15]	[-74.91]	[554.93]	[-2.20]	[789.82]	[35.10]
Average Growth Rate	5.44	7.00	30.79	86.25	4.90	128.66	10.27

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 share of manufacturing declined from 27% in 2011-12 to 14% in 2018-

19. The share of the electricity, gas, and water supplies subsector has increased from 2.41% in 2011-12 to 3.41% in 2018-19. Moreover, it grew with a remarkable average annual growth rate of 16.6%. The share of the construction increased from 70.35% to 82.57% in the same period, with average annual growth rate of 13.27%). It indicates that the secondary sector is heavily dependent on the construction sub-sector. Manufacturing sector shows a dismal performance during the period.

Within the tertiary sector, Real Estate and professional services made up the highest share (32.30%) in 2018-19, followed by trade & hotel (23.26%), other services (16.51%) transport, storage, and communication (15.68%), and financial services (11.28%). Average annual growth is observed highest in other services (20.69%), followed by transport, storage, and communication (13.54%), financial services (10.10%), by trade & hotels (9.09%), real estate (4.54%) and lowest in public administration (-9.21%).

Table 3: Trends in percentage share of non-agriculture sub-sectors in DGDP in Kaushambi 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	27.25	2.41	70.35	100	7.51	15.25	6.79	26.94	38.44	5.07	100
2012-13	21.04	2.69	76.27	100	8.15	12.43	7.42	26.32	40.12	5.55	100
2013-14	19.62	3.08	77.30	100	9.38	12.23	8.85	27.85	35.08	6.61	100
2014-15	15.68	3.34	80.98	100	9.89	13.86	9.15	26.46	33.50	7.14	100
2015-16	15.50	3.06	81.44	100	11.69	15.16	9.10	24.40	31.90	7.75	100
2016-17	16.48	3.46	80.06	100	15.60	22.02	12.22	34.72	0.94	14.51	100
2017-18	17.28	3.48	79.24	100	15.70	20.81	10.60	35.50	1.01	16.38	100
2018-19	14.02	3.41	82.57	100	15.68	23.26	11.28	32.30	0.97	16.51	100
Average Growth Rate	1.83	16.60	13.27	10.74	13.54	9.09	10.10	4.54	-9.21	20.69	2.86

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 1855.04 sq. km². The forest area represents 0.11% of the total declared area. The share of cultivable wasteland decreased from 2.04% in 2010-11 to 1.84% in 2017-18, which is a good development indicator. The share of Barren and uncultivable land has remained constant over the years (4.38%). The share of area under trees and gardens decreased slightly from 2.09% in 2010-11 to 1.98% in 2017-18. The current and other fallow land has increased over the years, which is not good for the district economy. The net sown area (NSA) has also decreased over time, from 72.62% in 2010-11 to 66.77% in 2017-18. The area for non-agricultural use increased over the period from 12.31% to 13.26% (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 Kaushambi (as % of the total reported area)

Year	Total Reported Area (ha)	Area under forest	Cultivable wasteland	Current Fallow	Other Fallow	Barren and uncultivable land	Land other than agriculture	Pasture land	Area under trees and gardens	Net Sown Area
1	2	3	4	5	6	7	8	9	10	11
2010-11	185504	0.11	2.04	3.52	2.65	4.38	12.31	0.28	2.09	72.62
2011-12	185504	0.11	2.03	4.03	2.28	4.38	12.32	0.28	2.09	72.49
2012-13	185504	0.11	2.02	3.40	2.65	4.34	12.81	0.28	2.06	72.34
2013-14	185504	0.11	2.03	5.78	3.66	4.38	12.86	0.28	2.09	68.82
2014-15	185504	0.11	1.89	5.48	2.20	4.38	12.86	0.28	2.09	70.72
2015-16	185504	0.11	1.88	7.92	3.78	4.38	13.08	0.28	2.08	66.50
2016-17	185504	0.11	1.84	8.47	3.27	4.36	13.20	0.28	1.98	66.51
2017-18	185504	0.11	1.84	7.27	4.17	4.33	13.26	0.29	1.98	66.77

Source: Compiled from http://updes.up.nic.in/spiderreports/intialisePage.action And District-wise Development Indicators file.

2.1.2. Trends in Operational Land Holdings

In Kaushambi district, the total number of operational farms increased from 215 thousand in 2010-11 to 220 thousand in 2015-16, a net increase of 2.33%. 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 94.29% in the district in 2015-16, while the corresponding proportion in the state was 92.81% (Table 5). The two agricultural censes 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 Kaushambi

	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.)
Kaushambi	2010-11	82.68	11.47	4.46	1.31	0.09	215
	2015-16	83.57	10.72	4.39	1.23	0.08	220
							[2.33]
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

Table 6 shows the cropped area under various crops over the last eight years. In 2017-18, Wheat made up the highest share of GCA (39.30%), followed by Rice (26.32%) and Bajra (4.64%). Together these three crops constitute around 70.26% of the GCA. The area shared by the total cereals has remained consistent over the years (77.99% in 2014-15), with a sudden fall observed in latter years (73.20% in 2017-18). The main pulses produced are Chickpeas and Arhar, while the other pulses are not significantly produced. The total pulse acreage has also decreased from 14.81% in 2010-11 to 11.20% in 2017-18. Thus, the food grains cover a majority (average, 88.60%) of the GCA. Mustard and Til are the only major oilseeds crop produced, and the total oilseed acreage has remained consistent over the years (average, 1.86%). The area under Potato has also remained consistent over the years (average, 2.38%); however, the area under sugarcane

is negligible and also decreased over the years. In general, there is no significant change in the cultivation pattern reported in the district during the study period, except that the net sown area has decreased in the district over the years. The average cropping intensity is 145.76.

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

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	24.63	25.26	25.67	25.58	28.04	26.39	26.42	26.32
Wheat	40.53	41.21	41.73	42.28	41.87	39.41	39.45	39.30
Bajara	6.09	5.98	5.62	5.34	4.94	4.65	4.65	4.64
Other Cereals	6.63	6.71	6.42	4.88	3.14	2.95	2.95	2.94
Total Cereals	76.10	77.39	77.65	78.09	77.99	73.41	73.47	73.20
Chana	7.60	6.91	7.48	7.16	5.32	5.00	5.01	4.99
Arhar	5.30	5.05	4.61	4.61	4.73	4.45	4.46	4.44
Other Pulses	1.91	1.80	1.75	1.71	1.88	1.77	1.77	1.77
Total Pulses	14.81	13.76	13.83	13.49	11.93	11.23	11.24	11.20
Total Foodgrains	90.91	91.15	91.48	91.58	89.91	84.64	84.71	84.40
Mustard	1.00	0.89	0.91	1.02	1.05	0.99	0.99	0.99
Til (Net)	0.81	0.80	0.80	0.79	0.78	0.73	0.73	0.73
Other Oilseeds	0.38	0.38	0.01	0.01	0.01	0.01	0.01	0.01
Total Oilseeds	2.20	2.07	1.73	1.82	1.84	1.73	1.73	1.73
Sugarcane	0.84	0.84	0.77	0.73	0.36	0.34	0.34	0.34
Potato	2.30	2.24	2.36	2.24	2.58	2.43	2.43	2.43
Net Sown Area	76.21	75.61	76.44	73.02	69.10	61.16	61.23	61.24
Gross Sown Area (in 1000 Ha)	176.75	177.84	175.55	174.84	189.86	201.69	201.52	202.26
Cropping Intensity	131.21	132.25	130.83	136.95	144.71	163.49	163.33	163.29

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, it 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 (29.08 qtls and 22.05 qtls respectively, in 2017-18) are also low. Per hectare yield of total cereals has increased from 22.55 qtls in 2010-11 to 25.08 qtls in 2017.18. Similarly, per hectare yield of total pulses increased from 9.16 qtls in 2010-11 to 11.10 qtls in 2017-18. The yield of total oilseeds has increased from 6.89 qtls in 2010-11 to 7.48 qtls in 2017-18, which is a significant improvement. This can be due to use of hybrid seeds. However, the improvement in yield of most of the crops is not uniform. The per hectare yield of sugarcane is high, average, 772.53. Similarly, the yield of Potato is also high, average, 173.45. 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 Kaushambi District (Qtls)								
Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	20.18	24.27	21.87	22.31	21.81	18.34	19.83	22.05
Wheat	26.93	29.03	29.07	22.94	15.20	20.33	30.99	29.08
Bajara	10.13	15.58	12.16	9.48	9.81	9.26	10.36	14.44
Total Cereal	22.55	25.56	24.79	21.51	17.07	18.51	25.06	25.08
Chana	10.24	12.82	13.14	2.99	3.03	4.74	12.81	7.86
Arhar	8.10	10.72	12.48	6.01	6.47	7.99	15.67	15.36
Total Pulses	9.16	11.58	12.52	4.72	4.71	6.57	13.13	11.10
Total Food Grains	20.37	23.45	22.93	19.04	15.43	16.93	23.47	23.23
Mustard	9.61	9.49	10.38	8.60	3.95	7.53	8.82	11.93
Till (Net)	2.06	2.49	2.09	1.74	1.67	1.73	1.24	1.44
Total Oilseeds	6.89	6.87	6.53	5.64	3.02	5.08	5.63	7.48
Sugarcane	582.76	561.19	622.88	682.89	658.21	645.02	1501.86	925.40
Potato	204.12	157.31	180.65	140.76	159.98	178.33	229.87	136.59
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 (117.36 thousand tons) and Wheat (231.19 thousand tons) formed a major part of the total cereal production (371.40 thousand tons). In the case of pulses, Chickpeas and Arhar occupied the highest production. Production of Chickpeas and Arhar was 7.93 thousand tons and 13.80 thousand tons, respectively, in 2017-18. Although there has been a significant variation in the production of these pulses over the years, they still represent around 90% of the total pulse production. Mustard production was 2.38 thousand tons, which represented around 91% of the total oilseed production in 2017-18. Potato production has also been significant over the years (67.0 thousand tons in 2017-18). Sugarcane does not show any presence in the district agriculture. Looking at the annual production data of various crops, we find that their production has increased on average during the period, but at the same time, fluctuates 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 Kaushambi District (in 1000 Tons)								
Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	87.83	109.04	98.58	99.78	116.13	97.64	105.59	117.36
Wheat	192.95	212.77	212.95	169.58	120.82	161.63	246.38	231.19
Bajara	10.92	16.57	12.00	8.85	9.20	8.69	9.72	13.54

Other Cereals	11.66	13.47	14.36	15.51	6.52	6.16	9.31	9.31
Total Cereals	303.35	351.85	337.88	293.72	252.66	274.13	370.99	371.40
Chana	13.76	15.75	17.26	3.74	3.06	4.79	12.93	7.93
Arhar	7.58	9.63	10.10	4.85	5.82	7.18	14.08	13.80
Other Pulses	2.64	2.95	3.05	2.53	1.78	2.90	2.72	3.42
Total Pulses	23.98	28.33	30.40	11.12	10.66	14.87	29.72	25.14
Total Foodgrains	327.33	380.18	368.28	304.84	263.32	289.00	400.72	396.54
Mustard	1.71	1.50	1.66	1.54	0.79	1.50	1.76	2.38
Til (Net)	0.30	0.36	0.30	0.24	0.25	0.26	0.18	0.21
Other Oilseeds	0.67	0.68	0.03	0.02	0.02	0.02	0.03	0.02
Total Oilseeds	2.68	2.53	1.98	1.80	1.06	1.78	1.97	2.61
Sugarcane	86.66	83.34	84.71	86.59	45.35	44.44	103.48	63.76
Potato	83.10	62.58	74.92	55.19	78.47	87.47	112.75	67.00
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 all crops, the lowest variability in the area is observed in Til (2.62%), followed by Wheat (4.61%) and Arhar (5.32%), and the highest in Sugarcane (36.99%). The variability in the area under total pulses (5.41%) is more than the area under total cereals (4.48%). Since Rice and wheat dominate the production, the variability in the area under total food grains is, therefore, also relatively low (3.19%).

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	48.90	4.66	9.53	103.99	10.02	9.63	21.33	1.82	8.53
Wheat	76.26	3.51	4.61	193.53	41.12	21.25	25.45	5.47	21.50
Bajara	9.77	0.61	6.20	11.18	2.75	24.62	11.40	2.41	21.16
Total Cereal	142.15	6.37	4.48	319.50	45.01	14.09	22.52	3.26	14.46
Chana	11.47	1.51	13.18	9.90	5.70	57.53	8.45	4.42	52.26
Arhar	8.80	0.47	5.32	9.13	3.44	37.71	10.35	3.83	36.97
Total Pulses	23.64	1.28	5.41	21.78	8.29	38.09	9.18	3.44	37.48
Total Food Grains	165.79	5.29	3.19	341.28	52.32	15.33	20.61	3.20	15.51
Mustard	1.84	0.18	9.84	1.60	0.44	27.19	8.79	2.35	26.72
Til (Net)	1.44	0.04	2.62	0.26	0.05	20.77	1.81	0.40	21.91
Total Oilseeds	3.47	0.26	7.62	2.05	0.55	26.59	5.89	1.41	23.90
Sugarcane	1.04	0.39	36.99	74.79	21.33	28.52	772.53	315.26	40.81

Potato	4.47	0.47	10.58	77.68	17.77	22.88	173.45	31.78	18.32
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 Chickpeas (57.53%), followed by Arhar (37.71%), Sugarcane (28.52%), and Mustard (27.19%). High variation in the production of pulses and oilseeds is partly due to variation in the land area under them and partly due to the high rate of seeds and non-availability of hybrid seeds. Improvement in crop insurance conditions and better market accessibility can lower this variation. Variability is lowest in Rice (9.63%), followed by Til (20.77 %) and Wheat (21.25%).

In the case of yield, the greatest variability is estimated in Chickpeas (52.26%), Sugarcane (40.81%), and Arhar (36.97%). Yield variability in total cereals (14.46%) and total food grains (15.51%) is lower as compared to that in total pulses (37.48%). Rice, Wheat, and Potato are the most consistent crops over the years. Several factors such as climate change, market prices, rainfall patterns, etc., influence the variability in agricultural production.

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 oilseeds, on average, have a relatively larger share in GCA than their share in VOP, while total Foodgrains, Potato, and Sugarcane have, on average, a greater share in VOP than GCA. Kaushambi is mainly a food grain production district; therefore, food grains account for around 88.60% of the gross area of the crops. Similarly, total foodgrains account for nearly 89.10% of the total value of the agricultural product. Three crops - Wheat, Rice, and Potato together accounted for, on average, around 69.14% of GCA and 75.22% of the total VOP. Overall, the total agricultural GCA has increased in the latter years of the study (average, 187.54 thousand hectares). The total value of the product has also increased significantly, that is, Rs. 537.23 Cr. in 2011-12 to Rs.1112.06 Cr. in 2017-18.

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

Crop	% Share in	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Wheat	GCA	40.53	41.21	41.73	42.28	41.87	39.41	39.45	39.30
	VOP	39.51	38.15	42.66	43.11	33.88	37.44	39.07	38.81
Paddy	GCA	24.63	25.26	25.67	25.58	28.04	26.39	26.42	26.32
	VOP	26.16	30.08	24.43	32.13	36.63	27.14	24.67	30.16
Total Cereals	GCA	76.10	77.39	77.65	78.09	77.99	73.41	73.47	73.20
	VOP	69.03	71.99	70.76	79.78	75.03	68.16	67.08	73.28
Total Pulses	GCA	14.81	13.76	13.83	13.49	11.93	11.23	11.24	11.20
	VOP	19.86	20.23	19.84	10.07	14.93	18.87	17.95	16.10

Total Food Grains	GCA	90.91	91.15	91.48	91.58	89.91	84.64	84.71	84.40
	VOP	88.89	92.22	90.60	89.85	89.95	87.03	85.03	89.37
Total Oilseeds	GCA	2.20	2.07	1.73	1.82	1.84	1.73	1.73	1.73
	VOP	2.01	1.63	0.84	0.97	0.77	1.03	0.67	1.00
Potato	GCA	2.30	2.24	2.36	2.24	2.58	2.43	2.43	2.43
	VOP	6.19	3.84	6.10	6.08	6.88	9.97	11.29	7.48
Sugarcane	GCA	0.84	0.84	0.77	0.73	0.36	0.34	0.34	0.34
	VOP	2.74	2.17	2.19	2.94	2.38	1.96	2.85	1.89
Paddy + Wheat + Potato	GCA	65.68	66.94	67.97	70.11	72.49	68.24	68.30	68.05
	VOP	71.85	72.07	73.20	78.18	77.38	74.55	75.03	76.46
Total Agriculture	GCA (1000 Ha)	176.75	177.84	175.55	174.84	189.86	201.69	201.52	202.26
	VOP (in Cr Rs)	537.23	653.43	736.32	590.03	570.63	701.59	1198.22	1112.06
Per Worker VOP (Rs.1000 at current prices) in **Kaushambi**		-	28.11	29.24	39.04	29.32	41.75	42.85	48.09
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 Kaushambi district increased from Rs.28.11 thousand in 2011-12 to Rs.48.09 thousand in 2017-18, a net increase of 71.07% 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 value of agricultural output per worker is much higher in the state than in the district. The rate of growth per worker value of the output in the district is lesser than in the state. The ratio of per worker value of the output of the district to the state average has decreased from 0.6914 in 2011-12 to 0.6900 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 71.91% of the total fertilizers used, while the proportions of phosphorus and potassium were 20.79% and 7.30%, respectively. In 2017-18, however, the nitrogen share decreased to 70.46%, while the phosphorus share increased to 23.47%, and the potassium share decreased to 6.06%. The use of nitrogen is more than the recommended ratio, while the Phosphorous and potassium ratio is less than the recommended ratio. The table also shows that fertilizer consumption varies from year to year, which can be due to several factors, including rainfall patterns, cultivation patterns, etc. Although the overall use of chemical fertilizers has reduced in the district from 270.97 kg/ ha GSA in 2010-11 to 173.38 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	194.86	125.32	111.81	120.56	117.63	104.66	101.03	122.17
Phosphorous	56.34	45.19	37.58	30.04	33.68	39.16	39.07	40.70
Potassium	19.77	12.42	6.41	4.16	6.82	7.04	8.42	10.51
Total	270.97	182.93	155.79	154.76	158.13	150.86	148.52	173.38
Gross Sown Area (Ha)	176752	177839	175553	174839	189855	201690	201518	202262

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 (494 km), number of wells (17), and the number of ground-level pump sets (69) have remained constant since 2010-11. Government tube wells increased from 274 in 2010-11 to 428 in 2018-19. Shallow, medium, and deep tube wells increased by 0.54%, 38.10%, and 36.39%, respectively, in 2018-19 compared to 2010-11. The district's percentage of the net and gross irrigated areas have shown consistency over the years, with an average of 74.79% and 75.06%, 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)	494	494	494	495	495	495	493	493	493
No. of Govt. Tube wells	274	294	305	319	331	331	372	428	428
No. of Wells	17	17	17	17	17	17	17	17	17
No. of Ground-level Pump set	69	69	69	69	69	69	69	69	69
Shallow Tube well	16787	16787	16787	16787	16795	16795	16795	16878	16878
Medium Tube well	1803	2013	2130	2290	2337	2337	2337	2417	2490
Deep Tube well	1492	1616	1841	1928	1960	1960	1960	1993	2035
% Of NIA	71.26	72.25	73.34	72.29	75.48	77.50	77.93	78.28	-
% Of GIA	71.08	71.99	73.15	73.51	75.93	78.04	78.38	78.38	-

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, 14.70%) has decreased over the years. The share of wells and tube wells in NIA (average, 85.28%) has decreased slightly 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 Kaushambi (in %)

Source/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Canal (surface Irri.)	16.59	17.58	17.45	14.63	12.62	13.00	12.91	12.86
Wells And Tube-wells (GW Irri.)	83.33	82.38	82.55	85.36	87.38	87.00	87.09	87.14
Others	0.08	0.04	0.00	0.01	0.00	0.00	0.00	0.00
NIA (1000 ha)	96.00	97.15	98.41	92.29	99.02	95.61	96.15	96.97

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

Table 14 shows that a majority area under Rice (average, 91.09%), wheat (average, 99.78%), Potato (average, 100%), and sugarcane (average, 100%) is irrigated. The percentage of irrigated under pulses (average, 8.80%) and oilseeds (average, 27.02%) is relatively less.

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

Crop/Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	92.76	92.98	93.01	93.47	89.13	89.13	89.13	89.13
Wheat	99.72	99.54	99.69	99.62	99.91	99.91	99.91	99.91
Total Cereal	83.65	83.79	84.79	85.02	85.98	85.98	85.98	85.98
Total Pulses	6.85	6.42	7.10	6.84	10.79	10.79	10.79	10.79
Total Foodgrains	71.14	72.11	73.04	73.50	76.01	76.01	76.01	76.01
Total Oilseeds	25.66	24.84	30.91	31.49	25.81	25.81	25.81	25.81
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 164.74 KWH in 2014-15 to

230.49 KWH in 2019-20, a net increase of approximately 39.91%. This is a cause of concern as this can result in an increased burden on non-renewable resources and create waste disposal problems. The percentage share of the agriculture sector (average, 49.14%) in the total electricity consumption in the district is quite significant. This indicates the heavy usage of electricity by agricultural farmers. Since electricity consumption has increased over the years, the authorities need to switch to more sustainable modes of electricity production, such as solar panels.

Table 15: Trends of Electricity consumption in Agriculture

Division/ Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Per Capita electricity consumption (KWH)	164.74	134.31	225.74	257.94	223.58	230.49
% Of electricity consumed in Agriculture sector to total consumption	32.68	57.09	53.9	56.37	48.51	46.34
Source: District-wise Development Indicators file.						

2.1.7. Status of Agriculture Markets

Table 16 shows the marketing infrastructure in the district. It has three main markets and zero sub-markets, which have remained constant over the period. The number of regulated mandis per lakh hectare of Net area sown has remained constant over the years but is a notable issue as it is very important to increase the number of regulated mandis so that farmers are able to sell their products efficiently.

Table 16: Status of Agriculture Markets in Kaushambi

Category/Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Main Markets (No.)	3	3	3	3	3	3	3
Submarkets (No.)	0	0	0	0	0	0	0
Total Markets (No.)	3	3	3	3	3	3	3
No. of Regulated mandis per lakh Ha. of net area sown	2.35	1.62	-	2.43	2.29	2.43	-
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 of the project should be periodically done through MIS, Geo-tagging and monthly physical and financial reports.

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

Table 17 shows the details of the establishment of organic clusters under the Paramparagat Krishi Vikas Yojana in the district. The district has 73 groups in eight development blocks. The highest number of groups are in Kara (34), Mooratganj (22), followed by Sirathu (10). Together, these three blocks constitute around 90% of the total number of organic clusters in the district. Significantly high variation can be seen in the number of farmers per group in the district. It is reported that the maximum limit of land under a cluster per farmer is 2.00 hectares. Hence, the majority of the beneficiary farmers are small and marginal.

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

S. No.	Block	Scheme	No. of groups	No. of farmers in groups			
				Total	Average	Median	SD
1	Chail	PKVY	1	31	31	31	0
2	Kara	PKVY	34	1416	41.64	40.5	11.46
3	Kaushambi	PKVY	1	35	35	35	0
4	Manjhanpur	PKVY	2	67	33.5	33.5	12.02
5	Mooratganj	PKVY	22	904	41.09	39	10.26
6	Nevada	PKVY	1	34	34	34	0
7	Sarsawan	PKVY	2	84	42	42	0
8	Sirathu	PKVY	10	366	36.6	35	14.01

9	District Total	PKVY	73	2937	40.23	39	11.13
		Total	73	2937	40.23	39	11.13
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 farming system, farmers need proper training to know the practical details of the integrated sustainable farming system. Since economies of scale in both production and marketing matter in organic farming, some institutional framework may be needed in the forms of SHGs/ farm cooperative/PFOs/contract farming, etc. Organic farming could be an economically viable option in the district if the government builds strong marketing networks linking farmers, processors, and distributors with the easy certification process and minimizes farmers' risk by protecting their farm income through payments of ecosystem services. A long-term system of incentive and regulation needs to be evolved to retain the existing farmers and motivate others to move towards the sustainable farming system in the district.

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

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

2.2 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 114254 in 1997 to 15706 in 2019 and from 10171 in 1997 to 4927 in 2019, respectively. However, on the other hand, the number of indigenous and exotic female cattle has increased considerably from 78382 in 1997 to 122322 in 2019 and from 9210 in 1997 to 33540 in 2019, respectively. Thus, the total number of cattle decreased only slightly from 212017 in 1997 to 176495 in 2019, thus, a net decrease of 16.75%. 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 104.27% in 2019 compared to 1997 is observed in the total population of buffalo. A significant reduction in the indigenous sheep population is observed (62.26%) 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 64.97%. The total population of goats increased from 124472 in 1997 to 312771 in 2019, a net increase of 151.27%. The total pig population decreased considerably from 71593 in 1997 to 16312 in 2019.

It is significant to note that the number of female cattle and buffaloes has substantially increased over the period, indicating the growth of livestock products, including milk. The substantial decline in the number of male cattle and male buffaloes also shows the rising farm mechanization and declining relevance of animal power, mainly because of the high maintenance cost of livestock. The livestock subsector has around 18% share in the agriculture and allied activities sector and grew at a significant average annual growth rate of 7.0% from 2011-12 to 2018-19.

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

	Category	1997	2003	2007	2012	2019
Indigenous Cattle	Total Male	114254	78233	62090	54860	15706
	Total Female	78382	62831	72833	96188	122322
	Total	192636	141064	134923	151048	138028
Exotic Cattle	Total Male	10171	4791	4759	3566	4927
	Total Female	9210	6006	6741	8772	33540
	Total	19381	10797	11500	12338	38467
Total Cattle		212017	151861	146423	163386	176495
Buffalo	Total Male	64185	53523	57862	60685	31634
	Total Female	114204	115392	149474	160248	332769
	Total	178389	168915	207336	220933	364403
Sheep	Total Indigenous Sheep	52488	38178	28827	31855	19808
	Total Exotic Sheep	6222	47	84	1374	757
	Total Sheep	58710	38225	28911	33229	20565
Goat	Total	124472	122227	125742	211425	312771
Pig	Total Indigenous Pig	65759	46751	36083	39981	16125
	Total Exotic Pig	5834	2568	2453	3686	187
	Total Pig	71593	49319	38536	43667	16312
Total Livestock		658780	542213	552246	677378	-
Total Poultry		119911	91591	74583	87771	-

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

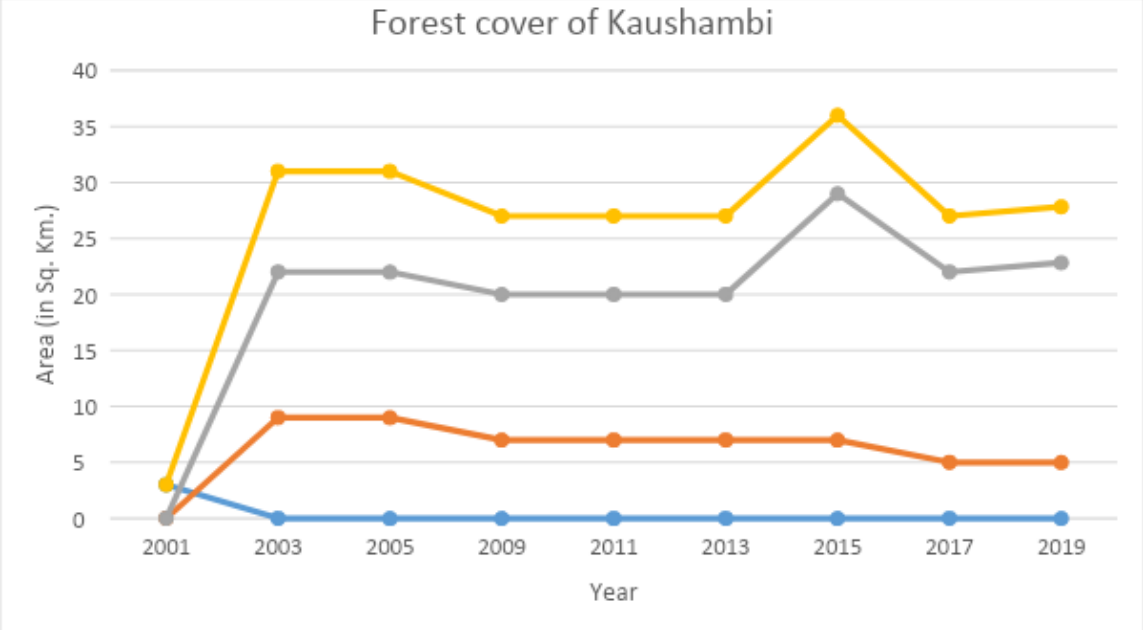
Table 19 shows that the Kaushambi district has an active network of cattle hospitals and development centres, which are very necessary for the livestock sub-sector to grow. The number of cattle hospitals (15), cattle development centres (22) and man-made reproduction centre (15) have remained consistent over the years. There are very few sheep and pig development centres in the district (10 and 5), respectively, which might be one of the reasons for the declining sheep and pig population in the district.

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

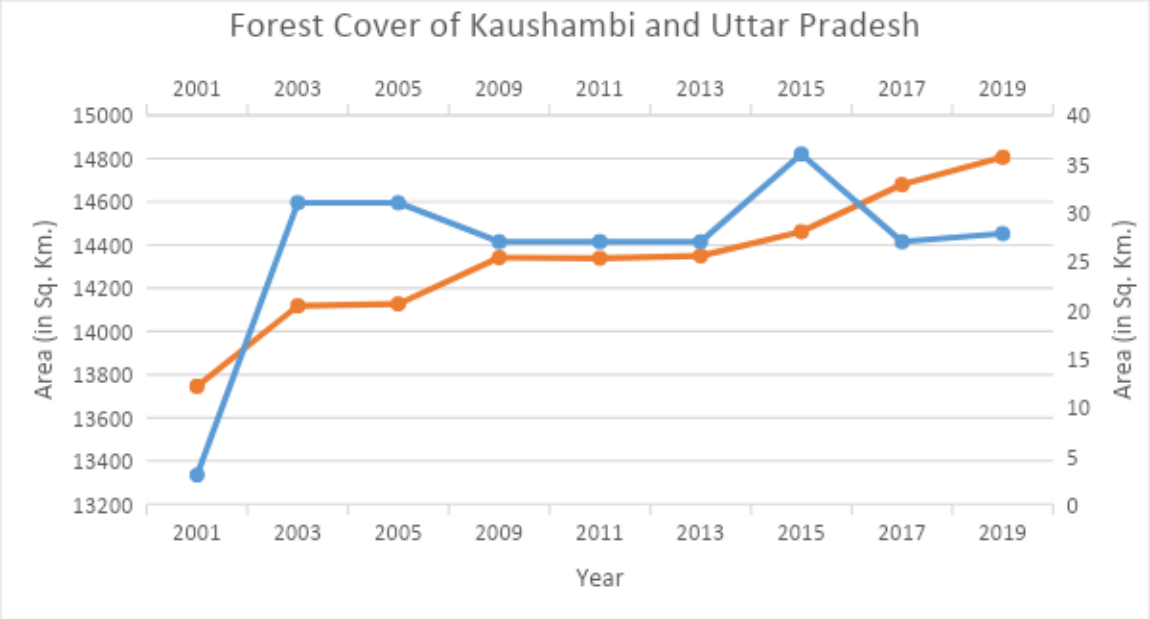
Category	2010 -11	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16	2016 -17	2017 -18	2018 -19
Cattle Hospital	15	15	15	15	15	15	15	15	15
D- category Cattle Dispensary	2	2	2	2	2	2	2	2	2
Cattle Development Centre	22	22	22	22	22	22	22	22	22
Man-Made Reproduction Centre	15	15	15	15	15	15	15	15	15
Sheep Development Center	10	10	10	10	10	10	10	10	10
Pig Development Center	5	5	5	5	5	5	5	5	5

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

2.3 Forestry



According to the FSI assessment, the forest cover of Kaushambi is approx.. 27.83 Sq. Km. Open forest is found followed by medium dense forest in the district.



The forest cover of Uttar Pradesh has increased between 2001 and 2019, and the forest cover of Kaushambi generally fluctuates between 27 – 36 Sq. Km.

2.3.1. Biodiversity: No national park and wildlife sanctuary present in the district. The district's biodiversity data includes crop production, livestock population, bird species, and forest cover. The crop production trend shows a reduction in the non-grain crop but increases in all other crops. Forest data shows that forest cover was increased by 2.21% in 2019. Mahuwa, Mango, Teak, Jamun, Bel, Tandu, Bamboo, Guava, Palas, Amla, and other forest species are among the most important. According to forest department records, total planting in 2015-16 was 77820 acres in 100.30 acres, while total plantation in 2016-17 was 292426 acres in 209.50 acres.

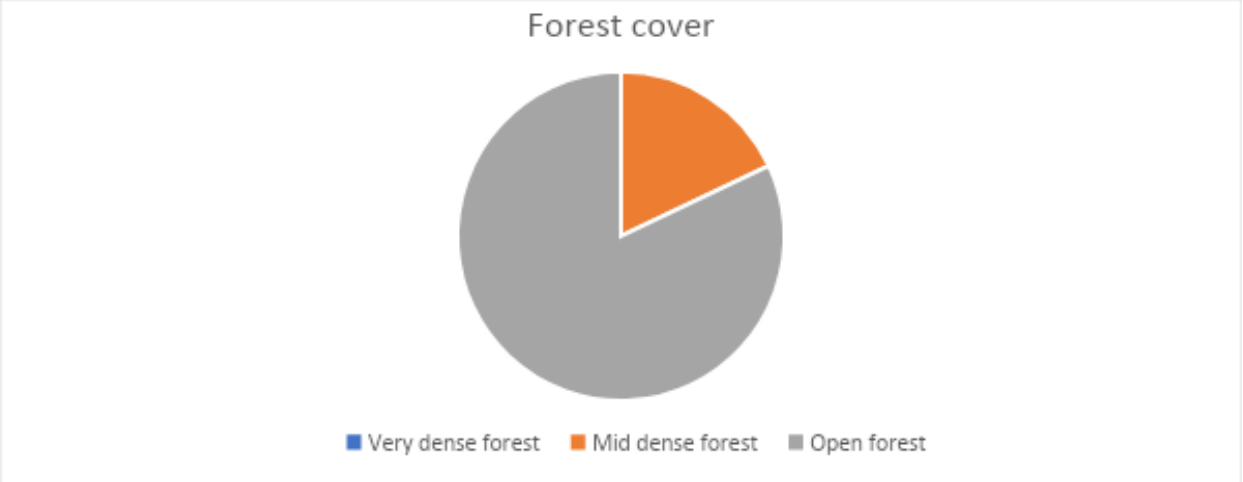
Table 6 Bird species recorded in the district.

Number of species	335
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	Scrub

						2017 assessment	
1779	0	5.00	22.83	27.83	1.56	0.83	0.00



2.4 Tourism

Total number of tourists visiting Kaushambi-(2015-2019)

	Indian	Foreign	Total	% Change
2015	193385	14229	207614	
2016	207807	15390	223197	0.07505755874
2017	2156033	15621	2171654	8.729763393
2018	2160629	15659	2176288	0.002133857419
2019	2161082	15677	2176759	0.0002164235616

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

. The above-given data table-1 is taken from the Uttar Pradesh tourism website. The data table shows the number of tourists visiting Kaushambi for tourism from 2015 to 2019. The tourist visits are bifurcated into two different groups – Domestic and Foreign tourists.

a. In the year 2015 Kaushambi received a total 207614 tourists out of which 9.82% were international visitors. Total number of Domestic travelers were 193385 and total international travelers were 14229.

b. In the year 2016 Kaushambi received a total **223197** tourists out of which 9.92% were international visitors. Total number of Domestic travelers were 207807 and total international travelers were 15390. The district experienced a total growth of 0.07% in total number of tourists compared to the previous year.

c. In the year 2017 Kaushambi received a total **2171654** tourists out of which 9.89% were international visitors. Total number of Domestic travelers were 2156033 and total international travelers were 15621. The district experienced a total growth of 8.72% in total number of tourists compared to the previous year.

d. In the year 2018 Kaushambi received a total **2176288** tourists out of which 9.87% were international visitors. Total number of Domestic travelers were 2160629 and total international travelers were15659. The district experienced a total growth of 0.0021% in total number of tourists compared to the previous year.

e. In the year 2019 Kaushambi received a total **2176759** tourists out of which 8.30% were international visitors. Total number of Domestic travelers were 2161082 and total international travelers were 15677. The district experienced a total growth of 0.00021% in total number of tourists compared to the previous year.

2.5 Wetlands

The district has both small and large wetlands. The area has lakes such as the Alwara Tal (207.26 Ha), Kumhiawan Tal (55.11 Ha), and Tewa Tal (69.04 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 187 wetlands larger than 2.25 Ha and 1068 smaller than 2.25 Ha. Most of the wetlands are smaller than 500 hectares in size.

Table 1: Wetland Data of Kaushambi 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	22	28	6	0	9	7	1	3	1	1	0	0	15
Ox-bow lakes/cut off meanders	1	2	1	0	1	0	0	0	0	0	0	0	1
High altitude Wetlands	0	0	0	0	0	0	0	0	0	0	0	0	0
Riverine Wetlands	1	1	0	0	0	0	0	1	0	0	0	0	0
Waterlogged	2	4	2	0	1	1	0	0	0	0	0	0	0
River/Stream	0	9	9	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	2	2	0	0	0	0	0	0	0	0	0	0
Tanks/ponds	69	72	3	0	64	3	1	0	1	0	0	0	42
Waterlogged	53	69	16	0	26	10	14	2	1	0	0	0	34
Salt pans	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (1255)	148	187	39	1068	101	21	16	6	3	1	0	0	92

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

- The district comprises 1255 wetlands; most are lakes/tanks/ponds and waterlogged.
- The wetlands are small in size in general.
- The number of natural wetlands is more than man-made.
- Many man-made wetlands are waterlogged.
- Half 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 census, 83.31% households use kerosene, 15% use electricity and only 0.40% use solar as the main source of lightning (Fig. 1)

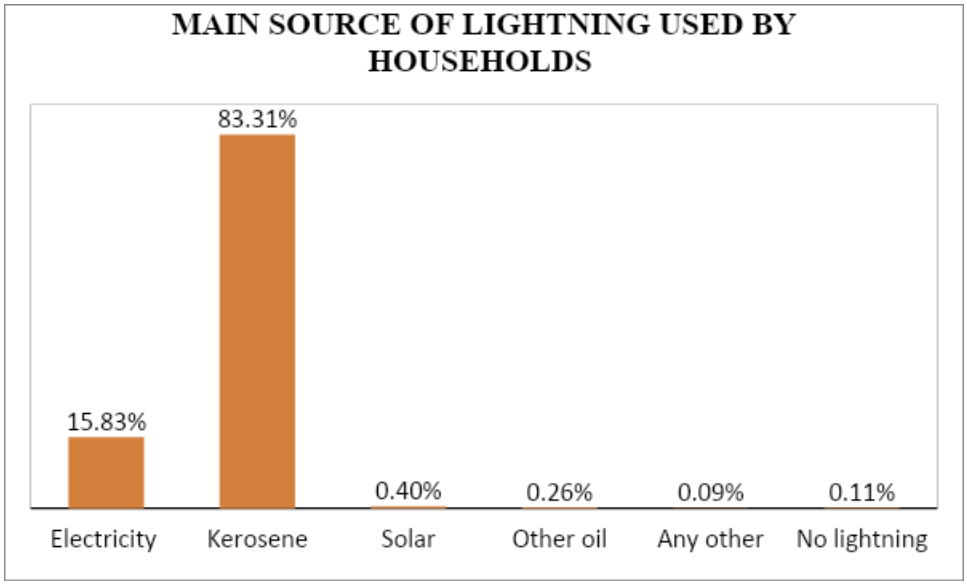


Fig. 1

The annual reports on UPNEDA website mention the various solar plant units installed in the district Kaushambi. A 70 kW grid connected solar plant has been installed at the district magistrate office, Kaushambi.

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.

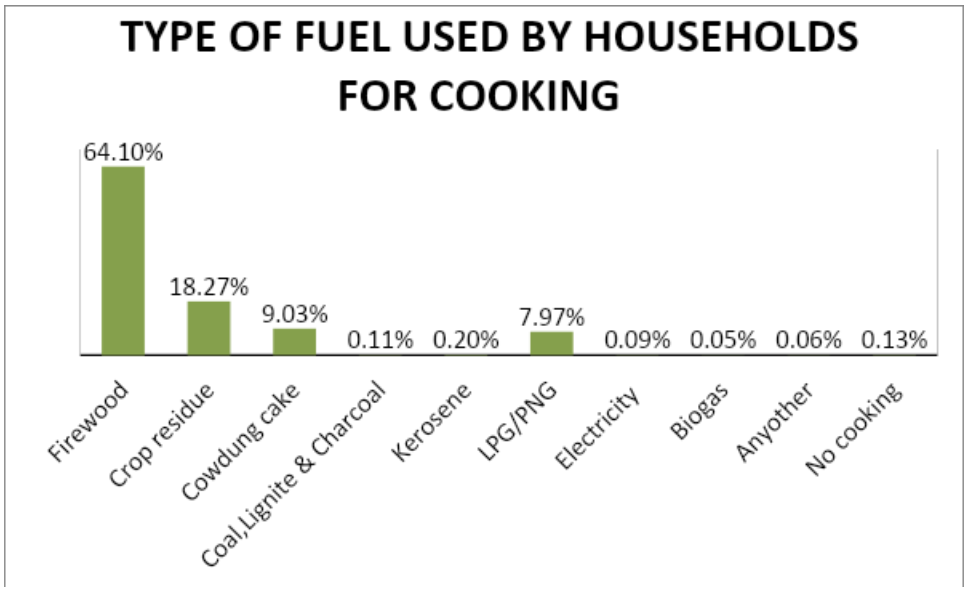


Fig 1

Biomass-based cogeneration in the state sugar mills and rice husk based-electricity generation projects are being encouraged. Kaushambi's main source of biomass is from the agricultural residues and forest residues. The net sown area of the district is 1340 sq. km. and the area under forest cover is 195 ha. The major crops cultivated in the district are rice, wheat, pearl millet and gram with the productivity as 2004 kg/ha, 2538kg/ha, 1222kg/ha and 1151 kg/ha respectively. The cropping intensity of the district is 132.25%.

According to the 2011 census, most households depend on firewood for cooking as depicted in fig. 1. There have been no records found of any biomass plants in the district. The district has the potential of producing energy from the biomass but probably due to lack of awareness the development in this sector has not been done.

2.6.3.Biogas Energy

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

2.6.4.Hydropower Energy

The district's two major rivers are the Ganga and the Yamuna. The Ganga River system, which includes the Yamuna, Kilhahi Nadi, and Sasur Khadai as tributaries, flows through the Kaushambi district. The Ganga enters the district through Kara block, but the Yamuna enters the district through Sarsawan block in the far west and runs for 80 kilometers before joining the Ganga. Available data shows no hydropower plant exists in the district, and no site has been investigated for future projects.

3 QUALITATIVE DATA ANALYSIS

3.1 AGRICULTURE, ALLIED ACTIVITIES,

3.2 FORESTRY

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

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

In order to promote afforestation, the forest department in **Kaushambi**, Uttar Pradesh, is putting up information boards on trees. The boards mention the tree's variety, identifying one as a medicinal tree with healing properties, urging people to save the environment by protecting it. Special attention has been given to trees in densely populated areas of the city.[5]

3.2.1. Biodiversity : Biodiversity assessment in Khanwari village by Ashok Kumar Verma in 2017 concluded that the village has rich high chordate biodiversity. This vertebrate diversity includes

[3] State Action on Climate Change, Uttar Pradesh

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

[5] https://www.hindustantimes.com/cities/up-info-boards-put-up-on-trees-to-help-save-them-in-kaushambi/story-q2sdBxQyzbsYr56BNEthnK.html

19 genera of fishes, two genera of amphibians, four genera of reptiles, twelve genera of birds, and thirteen genera of mammals.

Alwara Lake is part of the village Alwara of Uttar Pradesh's Kaushambi district. The lake has a high level of biodiversity, with a diverse range of flora and animals, including fish and the endangered Sarus crane. A study by Shri Prakash and Ashok Kumar Verma for a preliminary survey of this lake suggests that the lake has forty-five genera of fish.

3.3 ENERGY

5.5.1. Solar

The district Kaushambi can develop itself into a hub of solar energy; this is possible only when planning is done for the sector in a channelized way. There have been efforts by the authorities to use solar energy for not only economic activity but also for the social cause. This is understood from an article in Amar Ujala with the heading 'Thirst will now be quenched by solar energy'. According to this news article- In about 15 villages of Sadar block, efforts have been started to overcome the shortage of drinking water through solar energy. In these villages, water will be supplied by running submersible pumps from solar energy. The solar powered pump will supply 35,000 liters of water throughout the day. Good news for the people of Manjhanpur block. Efforts are being made to solve their drinking water problem by running pumps without electricity and diesel. The blueprint for water supply has been prepared by running submersible pumps from solar energy from Backward Classes Grant Fund (BRGF) and Kshetra Panchayat Fund.

The district Kaushambi can do well in the solar energy sector if efforts are made by the authorities and the residents, because at present nothing much is being done in the district for solar energy.

5.5.2. Biomass

For the district Kaushambi no records of biomass energy plants have been found from the available sources. Hence it can be inferred that the district lacks awareness about the biomass energy or most people could not afford biomass plants due their high costs. Stubble (mainly parali) burning has been a common problem in Kaushambi, and this has been in the news quite frequently. Burning parali not only causes harm to the environment but also affects the fertility of the soil. There have been restrictions from the government for burning parali, but are mostly overseen by the farmers. This problem also gives an idea that farmers probably don't have an alternate option other than burning it. So if biomass plants are installed in the district then this problem could be dealt with sustainably.

5.5.3. Biogas

A Biogas plant is being put up in the village after the area was declared ODF under the Prime Minister's dream project Swachh Bharat Mission in Kaushambi District of Uttar Pradesh. The Indian government is also providing a large subsidy for the construction of a biogas plant.

The cost per plant under the UP National Biogas Fertilizer Management program is Rs 53 thousand, with each beneficiary receiving a grant of Rs fourty t. A biogas plant with a capacity of 2 cubic meters can cook for five people and light a lamp for four to five hours per day, resulting in six tonnes of high-quality organic manure each year.

5.5.4. Hydropower

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

3.4 TOURISM

How to Reach Kaushambi - Allahabad Airport (45 kilometers) is the closest airport to the district headquarters in Kaushambi. Bharwari (15 kilometres) is the nearest railway station to the district headquarters in Kaushambi. Buses run from Allahabad (52 km), Chitrakoot (75 km), Fatehpur (80 km), and Kanpur to the district headquarters (160 km). Manjhanpur, the district headquarters, is around 55 kilometres from Allahabad. From Allahabad, travel the G.T.Route towards Kanpur to Mooratganj, then turn left to Bharwari and then right to Manjhanpur on the Mooratganj Mahewa Ghaat road. If you're travelling from Kanpur, take a right at Saini, continue to Sirathu, and then to Manjhanpur on the Sirathu Sarai Akil route. Sirathu and Bharwari are the other railway stations in the district, in addition to Allahabad and Kanpur.

Cities Near Kaushambi- Prayagraj is the closest city near Kausambi.

Places to see in Kaushambi- Historical sites abound in Kaushambi's district. The district's prominence has been demonised over history. The important historic centres are Kara, Prabhasgiri, and Kaushambi.

Kara – It has long been revered for its historical and religious significance. About 69 kilometres north of Allahabad, this location may be found. Sheetla Mata temple, Chhetrapal Bhairav temple, Hanuman temple, and Kaleshwar Mahadev temple are some of the most well-known temples in Kara. It is also the birthplace of Malookdas (1631 – 1739 A.D.), a notable saint. There is a saint's ashram and Samadhi. He, too, was a devotee of Goddess Kara. Teg Bahadur, a well-known Sikh guru, had travelled to Kara to speak with Saint Malookdas about a variety of themes. Kara is also the birthplace of Malookdas (1631 – 1739 A.D.), a notable saint. There is a saint's ashram and

Samadhi. He, too, was a devotee of Goddess Kara. Teg Bahadur, a well-known Sikh guru, had travelled to Kara to speak with Saint Malookdas about a variety of themes.

Sri Ram Temple Bajha is one of the most popular temples in the destination, located 35 kilometres from Allahabad city on the main trunk route (Allahabad-Kanpur Road-NH-2) in the district Allahabad, Uttar Pradesh, India. This temple is thought to have been built some 40 years ago. This temple is dedicated to Lord Shri Ram and is located in the Chayal tehsil area.Because of its ancient legacy, it is a popular tourist attraction. The Mahabharata mentions the town as the city that was given to Kush's son, dubbed 'Kusamba.' During the Buddha's reign, Kaushambi was one of the most important commerce centres and a major transit route. The ruins of the Ashoka Pillar and the remains of a fort coupled with the Ghositaram Monastery comprise a prominent attraction here, with the Vindhyan range as a backdrop. The Allahabad Museum, which is located here, houses a collection of rare coins, sculptures, discoveries, and artefacts uncovered during excavations. The temple is accessible by road, with taxis available at Allahabad Airport and throughout the city, where connection is good. Allahabad is the sole major airport, located 37 kilometres away, with flights connecting important cities such as Delhi and Kanpur. Allahabad, which is roughly 47 kilometres away, also has a train station. Between the months of October and November, just after the monsoon, is the finest time to visit. Ramnavami is a significant deal in this town.

Ma Sheetla's shrine is located on the Ganga river's bank. From all of Goddess's 51 shaktipeeths, it is known as the primary shaktipeeth. Sheetla Devi is seated on gardhabha in the idol. This temple is a place of worship for people of all faiths. They are claimed to be free of bad influences if they worship Goddess Sheetla on the ashtami of Krishnapaksha in the month of Chetra. Since at least 1000 A.D., this location has been a religious pilgrimage. Kara was also a significant municipality in the kingdoms of northern Indian mediaeval monarchs. The remnants of King Jaichand's fort, Kannauj's last hindu king, may still be seen today.

Maa sheetla temple
Source: https://holyvoyages.com/

Prabhasgiri, also known as Prabhosa, is a religious historical site located on the Yamuna River in the **Manjhanpur** Tehsil, some 50 kilometres north of Allahabad. Shri Krishna is also supposed to have been killed here by Jaratkumar's arrow in the suspicion of a deer.There used to be a large Jain temple on a very large hill. In 1824 A.D., another Jain temple was built after it was demolished.

Kamasin Devi Temple Goddess Shakthi is honoured at the Kamasin Devi Temple. It's in Kaushambi, Uttar Pradesh, in the village of Gambheera Purab. The temple is located 10 kilometres west of Manjhanpur, by a pond. Throughout the year, a large number of worshippers visit this shrine.

Digambar Jain Temple- Another well-known Jain pilgrimage site is the Digamabar Jain Temple. It is dedicated to Lord Padma Prabhu, the 6th Tirthankara. The Digambar Sect of Jain Religion is honoured at the Digambar Jain Temple. 'Under Sky' is how Digambar is translated. It refers to Mahavir Jain's non-clad disciples in general. The Jain Temple was constructed in 1834. The footprints of Lord Padma Prabhu, the Jain religion's sixth Tirthankara, are housed in the temple. Many idols of the 6th Tirthankara can be found there. Thousands of devotees flock to the temple during Jain festivals.

Digamabar Jain Temple
Source: https://holyvoyages.com/

Ghositarama monastery- The defences near the Eastern Gateway, and the tower at the north-eastern corner, the Stone Fortress Palace, have all been excavated.This temple is around a kilometre south-west of Manjhanpur's town area. There is a black stone idol of Goddess Durga and Lord Shiva in this temple. These idols are thought to be from the period of Buddha. A vast crowd gathers to worship Goddess Durga on the occasion of Navaratri.This temple is located in the village of Gambheerapurab, about 10 kilometres west of Manjhanpur, on the bank of a pond. Kamasin Devi, according to local legend, grants all of her devotees' wishes. The locals have a strong belief in the temple's divine abilities.This location is roughly 30 kilometres from Allahabad on the Allahabad-Kanpur highway. This location is located in the Chayal tehsil. At this location, there is a large temple dedicated to Lord Shri Ram. This temple was built roughly 20 years ago.The **Buddhist** pilgrimage at Kaushambi Ghositaram Monastery, also known as Ghosita Ram Vihara, is well-known for its connection to Buddha's time. According to local legend, Ghoshita Ram, a wealthy businessman, was a devout devotee of Lord Buddha. In Buddhist Literature, Ghoshita Ram Vihara is mentioned. In the 6th Rainy Season, he built Vihara to accommodate Lord Buddha and his students.

Manjhanpur's Durga Devi Temple: This temple is located approximately 1 kilometer south of Manjhanpur town. There is a black stone idol of Goddess Durga and Lord Shiva in this temple. These idols are thought to date from the period of Lord Buddha. A huge number of devotees converge here during the Navratri festival.

Data analysis

- From table-1 it is evident that the number of total tourists in Kaushambi increased from 2015 to 2019.
- Kaushambi tourism experienced the highest percentage change in tourists in the year 2017, which was an 8.7% increase compared to previous year.
- The growth in the number of total tourists in Budaun is not constant in these years, although the range lies between 0-8%

SWOT Analysis

S.No	Strength	Weakness	Opportunities	Threat
● 1.	● Geographically located next to Prayagraj in Uttar Pradesh. ● Religious tourist plans can be clubbed together to propose a	● Poor promotion of existing temples and monasteries. ● No maintenance of existing heritage sites in the district.	● Proper maintenance of existing heritage sites to attract more tourists both local and foreign. ● By utilizing cutting-edge	● Covid 19 can be a big threat with unpredictable arrival. ● Lack of a good budget by the government can be a big barrier.

	spiritual travel plan. ● The district is densely fortified with temples like Kara Dham Sheetla temple and the Prabhosa Jain temple. ● Archaeologists from Allahabad University, IIT-K excavating Ghositarama monastery		technology, such as laser induced for excavation of Ghositarama monastery. ● Creating museums, artistic spaces and collaborative ventures to bring all useful collected heritage and art under one roof.	.

- **'Travel Uttar Pradesh' plan-** Kaushambi has a plethora of spiritual heritage attractions including many temples and a monastery. To provide visitors a better awareness of how humans affect the environment and to instill a greater respect for ecosystems it can be clubbed with a major city like Prayagraj . In the Kaushambi district, there is a big chance to establish events around river ganga not only on religious grounds but also cultural grounds as well. The project will reduce the detrimental effects of traditional tourism on the environment while also enhancing local people's cultural integrity. This initiative will also increase visitor traffic in the area.
- **Sports Tourism-** The Khelo India Center, an indoor stadium of international standards, will be erected in Kaushambi. Anurag Thakur, Union Minister, presented a gift to the winners of the MP Trophy competition. Manjhanpur. In the district,plans to construct the Khelo India Center, a gymnasium, and an international-level indoor stadium are already being worked upon. P sports tournament.
- **Sustainable tourism-**
  Many places in India have been transformed into significant holy sites due to spirituality. As a result, many travel aficionados have begun to flock to these hubs, in addition to the vast number of pilgrims who visit time and again with goals of sustainability in mind and its overall development. The impact of these religious locations is huge not only around the local surroundings but also among the travelers. To grow sustainably at various touch

points like temples and monasteries must be considered with respect to developing the local trade and involving the local folks.

Different tourists share an equal sense of responsibility for the development of sustainable tourism. Every person is responsible for the factors including many elements. For example, using organic biodegradable stuff is so important for tourists across multiple places in Kaushambi to keep it presentable for next tourists to join in.

Projections and Monitoring matrix

Sector	Intervention	Strategy	Total cost	Expected Outcomes
Tourism	**Research**	● The cause and motive for tourism can be predicted using various data and matrices which are available on various government official websites as well as private organizations have done their bit too. It is also feasible to discover the elements affecting tourism in Uttar Pradesh through significant qualitative and quantitative research. ● All political pressures and influences must be removed from research to bring as much transparency as one can. ● When adding new records, the researchers must ensure that the field data and secondary data are correct and unaltered. This would be specific prizes to the competition's winners. Hundreds of players competed in numerous international competitions, including the Olympics and Paralympics. The players have returned to		As a reference for other processes, a well-researched document. Tourism in Uttar Pradesh is influenced by a number of factors. Understand multiple factors that influence tourism activity. To be able to understand and work upon all the listed factors and create a need for travel for people within and outside the country! Research and prior lessons will be used to inform the planning process. For a successful implementation, realistic planning is required.

		India with medals, setting new records. Developing the Khelo India Centre and an international class indoor gymnastics stadium in the area. It is necessary to enlist the help of unbiased researchers.		
	Planning	● Research and analysis of various data and reports can be used to generate action plans for intervention. ● Developing an active action plan is critical because the results are dependent on how it is prepared and later implemented as well. ● Planning must take into account the state's social position as well as the impression that tourists have of the country. ● Non-practical forecasts should be avoided at all costs. ● Making plans for all major festivals and occasions like Ramnavmi. Finding out various elements of the temples that can be utilized to weave stories in and around Kaushambi.. ● Hindu temples can be commercialized. Other involved things like flower vendors, incense sticks, and other worshiping things can be standardized across the state under the umbrella of UP Tourism. Every retailer in the vicinity of the temple does		

		their hardest to make as much money as possible from the pilgrims and guests who come to pay their respects. ● This standardization should be incorporated under Brand Manufacturing to increase tourism activity throughout the state. ● Organizing various spiritual and religious events which hold meaning and significance. ● Complete use of allocated budget.		
	Implementations	● To attract more tourists, various schemes such as tourist packages, sustainable collaborations, and so on can be devised at ground level. ● Mahotsavs and fairs will be held to boost the local economy and attract visitors. ● Creating spiritual tourism circuits and to implement existing circuits like the Buddhism circuit. ● Establishing a link between tourist and local culture and cuisine. ● Advertorial promotion that has an overall extensive approach to capture the right audience. ● A well-known figure serves as a sports brand ambassador. Kaushambi's sports persons have faced a resource scarcity for years, but by making		To increase the total number of tourists and increase tourism earnings from all possible tangents and at every touch point. To boost the state's image while ensuring that no other social issue has an impact on tourism earnings. Create a flowchart to constantly maintain the set standards of tourism and consider feedback of tourists. This must include major points of sanitation and clean drinking water.

		names in Olympics and Paralympics they have not only made the state proud but also our country. ● A significant amount of branding and marketing which can be clubbed with other cities like Prayagraj. ● The development of tourist attractions and maintenance of temples in and around Kaushambi. ● Information about travel packages should be available on government websites and various other touch points like social media channels. ● Conducting thorough market research in order to build strong strategies that will work on ground. ● Ganga arti culture • Eco-tourism activities boosted by Ganga Festivals which happen. Along with these proper sanitisation, maintaining hygiene on the banks of river Ganga is very important.		
	Impact Assessment of results	● Figuring out where all touchpoints are. ● They understand the cause of failure and work upon it. ● Reasoning to comprehend all the aspects. ● Planning for the future considering all aspects of that can be covered.		• To learn the lesson and establish the root cause of success and failure, which will be applied in the future with modifications.

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 large-scale production centers. Wheat and rice are the main foods in the region. The region is well-known for its ancient history. 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 products like flour, finished pulse products.
- The primary sources of irrigation are canals and tubewells
- The district is famous as the holy place
- The region is also known for its connection with ayurvedic and medicinal plants

4 ACTION PLAN DEVELOPMENT

4.1 AGRICULTURE

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4.2 FORESTRY

In July 2019, the government of Uttar Pradesh took the initiative to plant 22 crore saplings. The Forest Department involved the farmers as stakeholders to plant seedlings in their fields. Farmers are expected to sow quality planting material such as clonal plants, which are not available in the UP forest department nurseries. There is also the need to have a minimum support price (MSP) for the timber produced by farmers with a buy-back arrangement. This in turn will motivate them to plant more trees, which would benefit the economy as well as the environment.[6]

Projections & Monitoring Matrix

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

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

4.2.1. Biodiversity : As per the news article by 'Danik Jagran,' the central government has approved the establishment of a biodiversity park in an area of around 404.86 hectares near Alwara lake in the Kaushambi district under the Namami Gange plan. The project, which would cost about nine crore rupees, will be finished by 2024. The Biodiversity Park will be separated into two zones for the most part.

4.3 TOURISM

'Travel Uttar Pradesh' plan- Kaushambi has a plethora of spiritual heritage attractions including many temples and a monastery. To provide visitors a better awareness of how humans affect the environment and to instill a greater respect for ecosystems it can be clubbed with a major city like Prayagraj . In the Kaushambi district, there is a big chance to establish events around river ganga not only on religious grounds but also cultural grounds as well. The project will reduce the detrimental effects of traditional tourism on the environment while also enhancing local people's cultural integrity. This initiative will also increase visitor traffic in the area.

Sports Tourism- The Khelo India Center, an indoor stadium of international standards, will be erected in Kaushambi. Anurag Thakur, Union Minister, presented a gift to the winners of the MP Trophy competition. Manjhanpur. In the district,plans to construct the Khelo India Center, a gymnasium, and an international-level indoor stadium are already being worked upon. P sports tournament.

Sustainable tourism-

Many places in India have been transformed into significant holy sites due to spirituality. As a result, many travel aficionados have begun to flock to these hubs, in addition to the vast number of pilgrims who visit time and again with goals of sustainability in mind and its overall development. The impact of these religious locations is huge not only around the local surroundings but also among the travelers. To grow sustainably at various touch points like temples and monasteries must be considered with respect to developing the local trade and involving the local folks.

Different tourists share an equal sense of responsibility for the development of sustainable tourism. Every person is responsible for the factors including many elements. For example, using organic biodegradable stuff is so important for tourists across multiple places in Kaushambi to keep it presentable for next tourists to join in.

Projections and Monitoring matrix

Sector	Intervention	Strategy	Total cost	Expected Outcomes
Tourism	**Research**	● The cause and motive for tourism can be predicted using various data and matrices which available on various government official websites as well as private organizations have done their bit too. It is also feasible to discover the elements affecting tourism in Uttar Pradesh through significant qualitative and quantitative research. ● All political pressures and influences must be removed from research to bring as much transparency as one can. ● When adding new records, the researchers must ensure that the field data and secondary data are correct and unaltered. This would be specific prizes to the competition's winners. Hundreds of players competed in numerous international competitions, including the Olympics and Para Olympics. The players have returned to India with medals, setting new records. Developing the Khelo India Centre and an international class indoor gymnastics stadium in the area. It is necessary to enlist the help of unbiased researchers.		As a reference for other processes, a well-researched document. Tourism in Uttar Pradesh is influenced by a number of factors. Understand multiple factors that influence tourism activity. To be able to understand and work upon all the listed factors and create a need for travel for people within and outside the country! Research and prior lessons will be used to inform the planning process. For a successful implementation, realistic planning is required.
	Planning	● Research and analysis of various data and reports can be used to generate action plans for intervention.		

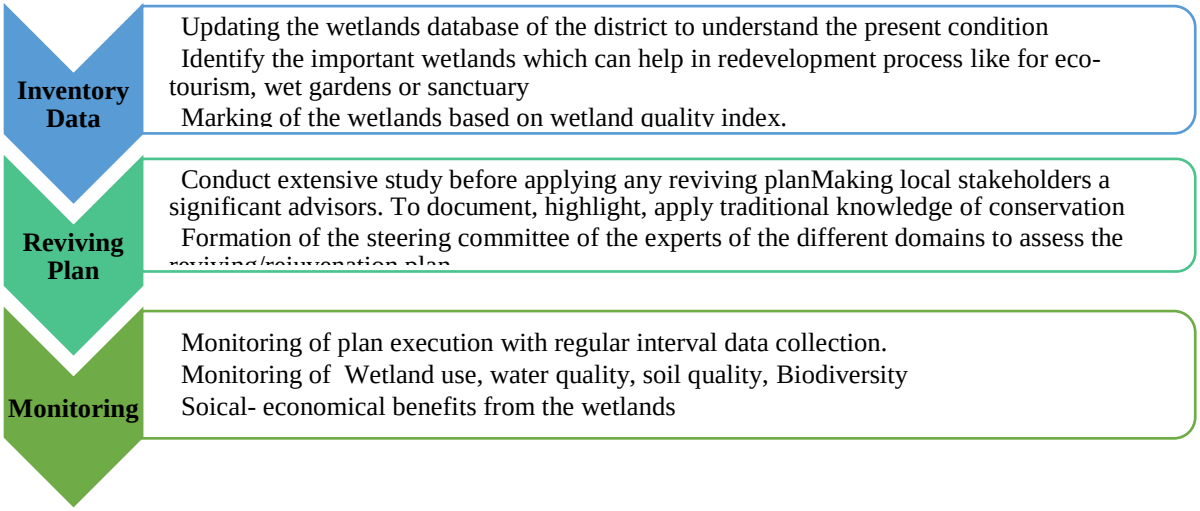
		• Developing an active action plan is critical because the results are dependent on how it is prepared and later implemented as well. • Planning must take into account the state's social position as well as the impression that tourists have of the country. • Non-practical forecasts should be avoided at all costs. • Making plans for all major festivals and occasions like Ramnavmi. Finding out carious elements of the temples that can be utilized to weave stories in and around Kaushambi.. • Hindu temples can be commercialised. Other involved things like flower vendors, incense sticks, and other worshipping things can be standardized across the state under the umbrella of UP Tourism. Every retailer in the vicinity of the temple does their hardest to make as much money as possible from the pilgrims and guests who come to pay their respects. • This standardization should be incorporated under Brand Manufacturing to increase tourism activity throughout the state. • Organizing various spiritual and religious events which hold meaning and significance. • Complete use of allocated budget.		

	Implementations	• To attract more tourists, various schemes such as tourist packages, sustainable collaborations, and so on can be devised at ground level. • Mahotsavs and fairs will be held to boost the local economy and attract visitors. • Creating spiritual tourism circuits and to implement existing circuits like Buddhism circuit. • Establishing a link between tourist and local culture and cuisine. • Advertorial promotion that has an over-all extensive approach to capture the right audience. • A well-known figure serves as a sports brand ambassador. Kaushambi's sportspersons have faced a resource scarcity for years, but by making names in Olympics and Paralympics they have not only made the state proud but also our country. • A significant amount of branding and marketing which can be clubbed with other cities like Prayagraj. • The development of tourist attractions and maintenance of temples in and around Kaushambi. • Information about travel packages should be available on government websites and various other touch points like social media channels. • Conducting thorough market research in order to build strong		To increase total number of tourists and increase tourism earnings from all possible tangents and at every touch point. To boost the state's image while ensuring that no other social issue has an impact on tourism earnings. Create a flowchart to constantly maintain the set standards of tourism and consider feedback of tourists. This must include major points of sanitation and clean drinking water.

		strategies that will work on ground. ● Ganga arti culture • Eco-tourism activities boosted by Ganga Festivals which happen. Along with these proper sanitisation, maintaining hygiene on the banks of river Ganga is very important.		
	Impact Assessment of results	● Figuring out where all touchpoints. ● The understand the cause of failure and work upon it. ● Reasoning to comprehend all the aspects. ● Planning for future considering all over aspects of that can be covered.		• To learn the lesson and establish the root cause of success and failure, which will be applied in the future with modifications.

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 has not witnessed much development in the solar energy sector. A proper planning is required in this sector in such a way that the people in the district get inclined towards it. This can be done by making the people aware about solar energy. Awareness programs can be conducted by the help of local government representatives. People should be educated thoroughly about the three components of the Kusum Yojana and should be helped to accordingly choose the best suited to them. The village panchayats and the self- help groups can play a major role in this process. Development of infrastructure so that on-grid solar panel connections are easily done would also be an important step in the solar energy progress in the district.

Projection and monitoring

The very first thing that should be done in the district is to conduct awareness campaigns and make people aware about the policies which they can take benefit of. This should strengthen the infrastructure of the district so that the grid connected solar rooftop panels are easily installed under the National Solar Mission. Also the farmers should be given special attention under the Kusum Yojana. People should be educated thoroughly about the three components of the Kusum Yojana and should be helped accordingly to choose the suitable one for themselves. The village panchayats and the self-help groups should be allotted the duty of doing this. A district based survey would help to figure out the fallow lands available and their suitability to establish solar plants. The business groups should be urged to set up solar plants in the district. All these steps would definitely help the district flourish in a sustainable manner.

4.5.2 Biomass

The action plan for the development of biomass energy in the district requires to begin from the beginning by making people aware of bioenergy. Because the district has enough resources but probably due to lack of knowledge there is no record of any biomass plants in the district. Along with awareness, it is also required that these biomass plants are set up on a local scale, so that the understanding of biomass plants is reached to the people and they can feel connected to the process. Kaushambi cultivates wheat and rice on a large scale, which produce agricultural residues, especially ‘parali’ from rice which is prohibited from burning in the district. Utilizing it for biomass energy (biofuel) production is a good way to avoid burning it. The government should encourage panchayats, small start-ups for setting up biomass plants in the district by providing them with required resources at reasonable prices. The rice mills and the other small industries which produce biomass should be encouraged to have their own biomass plants. This can be encouraged by providing electricity at low prices to the ones having biomass plants. A well connected system for transportation should be set up which not only collects agricultural residues, but also the other types of biomass from the urban areas. These biomass plants if are grid connected

then they can decrease the burden of discoms in their area. The fallow land available in the district should be used up for biomass energy plants. All these steps if taken will also increase employment opportunities in the district.

Projection and monitoring

The very first thing required in the district is to make people aware of the biomass energy and demonstrate to them the process of bioenergy production. Along with this they should also be made aware about the type of biomass plant which is appropriate according to the requirements. Since the district mainly produces rice and wheat, biomass based gasifier plants are suggested to be established.

Followed by this should be the efforts made by the government to make the whole process of setting up biomass plants comfortable and easy for panchayats and small start-ups as well. If this effort proves to be successful, then more and more employment opportunities would be created. Also, norms for the rice and other mills should be made of setting up their own biomass plants. Lastly, the government needs to develop a systematic transportation system for the district to maintain the supply of biomass.

4.5.3 Biogas

Asthai Gaushala was built at Manjhanpur (the district headquarters of Kaushambi) and has fifty-five cows. This Gaushala is not in good condition and has only one employee caring for the cows. This Gaushala should be reconstructed for more space and utilized for biogas production by constructing an anaerobic digestion plant near it.

4.5.4 Hydropower

The lower Ramganga command canal present in the district has not enough water for hydropower or irrigation purposes. An action plan should be prepared for water availability in the canal throughout the year.

5 RECOMMENDATIONS

5.1. Agriculture and allied sectors

- Groundwater shares over 87% of NIA in the district and number of medium and deep tube-wells increased substantially during the study period, indicating the depletion of water table. Therefore, Drip and Sprinkler irrigation systems should be encouraged, especially

for vegetable and fruits cultivations. It will help to increase the water use efficiency and productivity of crops. To reduce groundwater exploration, the district needs to construct more tanks and ponds under MGNREGA.

- Food grains constituted about 89% of the GCA in 2017-18 dominated by Wheat and Rice. This indicates that diversification of agriculture from food grains to other high-value crops, including horticulture can significantly increase the farm income if proper marketing and insurance system is established.

- Over 94% 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 if institutional support is provided.

- Pradhan Mantri Matsya Sampada Yojana should be expedited. Fisheries can be boosted by rejuvenating traditional ponds under the MNREGA scheme.
- There is a huge scope for organic farming. But due to lack of proper market access and lower productivity, farmers are unwilling to go for organic farming. Therefore, there is a need for branding effort under the National Organic Foods Market (Jaivikkheti. in) and a need for more training and involvement of farmers in organic farming.
- There is a huge scope for improving the livelihood of local people and regeneration of natural capital through the promotion of organic agriculture, horticulture, Dairy, and agroforestry.
- Mentha, it is also known as Pudina, has been widely cultivated in different parts of the district as a medicinal plant. Therefore, there is huge scope for accelerating the production of the plant and abreast, there is a requirement to develop the Mentha-based processing units.
- Farmers commonly adopt flood irrigation; there is a need to adopt drip and sprinkler irrigations, particularly for horticultural plants and vegetables.
- Mushrooms cultivation and processing could become another source of livelihood to the farmers under well training.
- Recently, Papaya cultivation has been rising in the district. Therefore, there is a need to develop market access for the Papaya fruits by developing some storage and processing units.
- There is a need for Resource Conservation Technologies in the rice-wheat system, particularly direct seeding of Rice, zero tillage in wheat, and bio-fertilizers in agriculture.
- Drought and heatwave are the main natural hazards in this district, so it is advisable to follow the KVKs instruction about the cropping system and agronomic measures.
- There is a need for proper training in Beekeeping, which also could be profitable for the farmers.
- Vermicompost is produced by the farmers using the animal excreta and Rs. 5000 per hectare is provided to the farmers for this, which is not enough. Also, training should be provided to the farmers to efficiently making of vermicompost.

- Uncontrolled way of fertilizer application should be stopped, which reduces soil fertility. There is a need for fertilizer application based on soil analysis.
- There is also a need for breed improvement of animals and the development of small-scale enterprises by animal farming to generate more profit from the animal husbandry sectors.
- The share of agriculture in the total electricity consumption increased from 32.68% in 2014-15 to over 46% in 2019-20. The rising energy intensification of agriculture has some environmental implications. It calls for promoting 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.
- Pradhan Mantri Matsya Sampada Yojana should be expedited. Fisheries can be boosted by rejuvenating traditional ponds under the MNREGA scheme.
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- Uncontrolled fertilizer application should be stopped, which reduces soil fertility. There is a need for fertilizer application based on soil analysis.
- There is also a need for breed improvement of animals and the development of small-scale enterprises by animal farming to generate more profit from the animal husbandry sectors.

5.2. Forestry

Kaushambi is located on the bank of river Ganga and Yamuna. According to ISFR 2019, 27.83 Sq. Km. the area of Kaushambi is covered with forest. As discussed above, the forest cover of Kaushambi has decreased slightly as compared to the previous assessment of ISFR 2017. No major forest was found in the district. There is a wide scope of Afforestation on waste land, trees outside forest (on the sides of the roads, banks of rivers etc.). Government can promote the afforestation, agroforestry activities by providing output based incentives.

5.2.1. Biodiversity

- It is recommended to increase plantation in the district as a very low percentage of area is under forest.
- Wood mafias are present in many villages of the Pinsa area, Anetha, Bhairampur, and cutting green trees illegally; strict laws should be implemented to remove such groups from the district.

5.3. Tourism

- Connect with ASI- Sir Leonard Wooley proposed Kaushambi as one of two major sites in the Ganga valley in his famous study, claiming that excavation of the site would reveal the Indian people's early history. When Sir Mortimer approved the University of Allahabad to excavate Kaushambi with G.R.Sharma as Director on March 1, 1948, it was a watershed moment in the history of Indian archaeology. If such projects are connected to a central organization like ASI and a premier institute like IIT Kanpur it can lead to some interesting discoveries.
- Weekend trips can be planned at many destinations in the major city Prayagraj of Uttar Pradesh. A round trip over the weekend to Kaushambi can be a perfect getaway. This would also allow tourists to cover a new destination covering Prayagraj.
- **Buddhism circuit-**
  Kaushambi already is of significance on Uttar Pradesh’s travel map for plethora of reasons but this place also has a strong presence on UP Tourism website under Buddhist circuit to travel. This needs to be highlighted and considered of great importance and must be executed with proper guidelines on the travel map of travellers.

- **Hygiene and Sanitation**- Many may appear to be conflicted about cleanliness, urinating in public and washing their hands excessively before each meal. Thousands of people have been warned about India's open defecation problem. In India, hygiene can be an issue, but rest assured that new tourist destinations need extremely hygienic and well-kept restrooms and safe drinking water.

Recommended Projects-

- Archaeological Ruins of Kaushambi- Kaushambi is also an excavation site. You may simply search for historic habitations and excavated areas here. There are numerous strata of unearthed findings that demonstrate the level of development at various stages of human settlement. This is where you may get a peek of how Aryans lived throughout the Later Vedic period. Coins, sculptures, and other items discovered here depict various elements of life, as well as ancient Indian beliefs and lifestyles. Fortifications and moats demonstrate the Mahajanapada period's and administration's safety efforts. History and culture buffs will enjoy this location. A group of archaeologists from Allahabad University's (AU) department of ancient history, IIT-(IIT-K) Kanpur's department of civil engineering, and the ASI (Archeological Survey of India) have collaborated to show how Kaushambi was a major manufacturing hub, with copper articles being traded from Rome to China and Southeast Asia. Ghositarama monastery, which is mentioned extensively in early Buddhist literature, should be discovered completely and must be considered for tourism.

- **Spiritual tourism-** To expose oneself to various tangents of spirituality. Temples on the sides of roads, in banks, and even in underground parking garages, small temples and shrines have been very prominent. Every day, it appears as though there is some sort of religious event but to connect it to spirituality can be one move to attract global tourists. In India, people openly practise their religions and value their spiritual beliefs.

5.4. Wetlands

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

- Rice, wheat producing farmers need to switch to organic and water-efficient irrigation systems.
- It is recommended to promote animal husbandry, pulses production in the area. This provides a boost to the economic growth of the local people.
- 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

That district has potential of performing better in the solar energy sector. Nothing significant has been done in the solar energy sector in the district. If the district's main economic activity is backed by solar energy then there would definitely be development in the district to a greater extent. So Kusum Yojana if run rigorously then it can prove very beneficial to the district. Hence green energy would aid the progress of the district in a sustainable manner.

5.5.2. Biomass

The district requires awareness about bioenergy, then only fruitful results can be expected from the policies made by the government. Biomass based gasifier plants are best suited for the district. If small private start-ups are encouraged in the district then it can lead to an increase in employment opportunities. This will lead to an overall development in a sustainable manner. As power produced will be clean and green, it will provide power for various purposes in the district by keeping the environment clean.

5.5.3. Biogas

- Increased cattle shelter capacity, maintaining cow shelter in Manjhanpur, and setting up a biogas plant is recommended.

5.5.4. Hydropower

- It is recommended to build a new multipurpose canal or renovate the Ramganga canal so that water would remain throughout the year in the district.

6. Discussion during the Report Presentation

- The report has been shared again and the discussions will be taken up regarding the same.
- 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.

7 REFERENCES

https://www.censusindia.gov.in/2011census/dchb/DCHB_A/09/0943_PART_A_DCHB_KAUSHAMBI.pdf

https://censusindia.gov.in/2011census/dchb/0943_PART_B_DCHB_KAUSHAMBI.pdf

http://www.nicra-icar.in/nicrarevised/images/statewiseplans/Uttar%20Pradesh/Up60-Kaushambi-28.07.14.pdf

https://www.abplive.com/tv-show/abp-ganga-prime/fir-against-22-farmers-in-kaushambi-for-burning-stubble-ganga-prime-1642409

https://timesofindia.indiatimes.com/city/allahabad/monastery-dig-to-show-kaushambi-in-new-light/articleshow/51705803.cms

https://kaushambi.nic.in/places-of-interest/

https://www.indianetzone.com/48/tourism_kaushambi_district.htm

https://www.amarujala.com/uttar-pradesh/kaushambi/khelo-india-center-to-be-built-in-kaushambi-an-indoor-stadium-of-international-standard-kaushambi-news-ald3219410105

https://www.tripadvisor.in/Attractions-g4168836-Activities-Kaushambi_Kaushambi_District_Uttar_Pradesh.html

https://www.ishtadevata.com/temple/kamasin-devi-temple-gambheera-purab-kaushambi/

http://www.rammandirbajaha.com/about.html

http://www.uptourism.gov.in/pages/top/explore/tourism-circuits

https://holyvoyages.com/kaushambi/best-tourist-places-kaushambi-india.asp

https://www.censusindia.gov.in/2011census/dchb/DCHB_A/09/0943_PART_A_DCHB_KAUSHAMBI.pdf

https://censusindia.gov.in/2011census/dchb/0943_PART_B_DCHB_KAUSHAMBI.pdf

https://www.amarujala.com/uttar-pradesh/kaushambi/Kaushambi-29218-9

8 APPENDICES

Table 7 Crop production in the district.

Crop/Year	2015-16	2016-17	2017-18

Non-grain crops (Metric Tonne)	16647	31692	27753
Grain crops (Metric Tonne)	274125	370994	371399
Sugarcane (Metric Tonne)	44442	103478	63760
Potato (Metric Tonne)	87473	112752	66998

Table 8 Livestock population in the district.

Livestock	2003	2007	2012
Cattle (Cow)	1541861	146423	163386
Buffalos	168915	207336	220933
Sheep	38225	28911	33229
Goat	122227	125742	211425
Pigs	49319	38536	43667
Chicken	91591	74583	87771
Other Poultry	6351	21983	6008
Horses and Ponies	3567	1829	2427

Table 9 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	163386	10	59,63,58,900	447269175	89453835	25	3578153.4
Buffalo	Manure	220933	15	1,20,96,08,175	907206131.3	181441226.3	25	7257649.05
Sheep	Manure	33229	1	1,21,28,585	9096438.75	1819287.75	25	72771.51
Goat	Manure	211425	1	7,71,70,125	57877593.75	11575518.75	25	463020.75
Pig	Manure	43667	2.5	3,98,46,138	29884603.13	5976920.625	25	239076.825
Poultry	manure	93,779	0.1	34,22,934	2567200.125	513440.025	25	20537.601
Total		**7,66,419**						**11631209.14**

Table 10 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	Biogas potential [m3/(tons of dry matter)]	Overall biogas potential (m3)

							moisture (tons)		
Maize	straw	581	1.5	871.5	610.05	15	518.5425	800	414834
Wheat	straw	231194	1.5	346791	242753.7	30	169927.59	800	135942072
Sugarcane	Bagasse	63760	0.33	21040.8	14728.56	80	2945.712	750	2209284
Total		**295535**							**138566190**