

# **ARTH GANGA BHAGALPUR DISTRICT**



**Submitted By  
IIM Lucknow  
IIT Roorkee**

## **TABLE OF CONTENT**

<b>Executive Summary</b>	4
<b>District Overview</b>	6
<b>Quantitative Data Analysis</b>	7
1. Agriculture	7
2. Horticulture	8
3. Forestry	10
4. Wetlands and Biodiversity	11
5. Fisheries	13
6. Industries	13
7. Tourism	14
8. Energy	17
<b>Qualitative Data</b>	18
1. Agriculture and Horticulture	19
2. Biodiversity	20
3. Forestry	20
4. Energy	21
4. Wetlands	22
5. Tourism	23
<b>Action Plan Development</b>	25
1. Agriculture	26
2. Wetlands and Biodiversity	27
3. Fisheries	27
4. Industries	29
5. Forestry	30
7. Tourism	33
<b>Recommendations</b>	34
1. Biodiversity	34
2. Energy	35
3. Wetlands	36

4. Tourism	36
5. Forestry	37
<b>Reference</b>	<b>39</b>

## Executive Summary

Bhagalpur is located in the southern region of Bihar. It is one of the oldest districts of Bihar and is situated in the Ganga basin at 141 ft above sea level. Bhagalpur district comprises three Sub-Divisions: Bhagalpur Sadar, Kahalgaon and Naugachia.

The economy of Bhagalpur is predominantly reliant on agriculture and silk. More than 70% of the workforce is involved in agriculture and allied activities. Wheat and Rice is the most abundantly grown crop with the largest gross area sown. The district has a good share of horticulture production. The most common crops grown are Mango, Guava, Banana, Litchi and Citrus; among vegetables are Potato, Tomato, Brinjal, Cauliflower etc. Horticulture farming is prevalent among small and marginal farmers since it is labour intensive and provides high remuneration, substantial employment and better income opportunities. Thus, if practised at a large scale intensively, horticulture farming has the scope of turning small and marginal farmers into commercial cultivators. It is recommended to highlight the importance of boosting green urban areas and provide wildlife corridors and connections between Green Spaces to improve biodiversity. Reducing the use of pesticides and fertilizers in an agricultural field would maintain the health of soil and save it from excessive chemicals.

Bhagalpuri silk is very famous in the country. The handloom silk industry is intrinsic to Bhagalpur and is famous for its superior quality and outstanding craftsmanship. The topography and climate of Bhagalpur are well suited for rearing the Tassar cocoon out of which Tassar silk is made. The finished silk products like home furnishings, dresses, scarves have gained immense popularity in western countries, and there is a significant demand for them. The demand for handloom silk products is much higher in comparison to products of the power loom. This sector has immense potential to transform the district's economy, but at present, it is untapped and buried under the corruption of intermediaries. Effective and stringent policy implementation measures need to be undertaken in order to revive the handloom industry. Bhagalpur has potential to be developed exclusively as a silk market. There is a need to develop standard local markets to attract niche customers. Private companies can be encouraged to import silk from native producers and sell them after refining and brand tag.

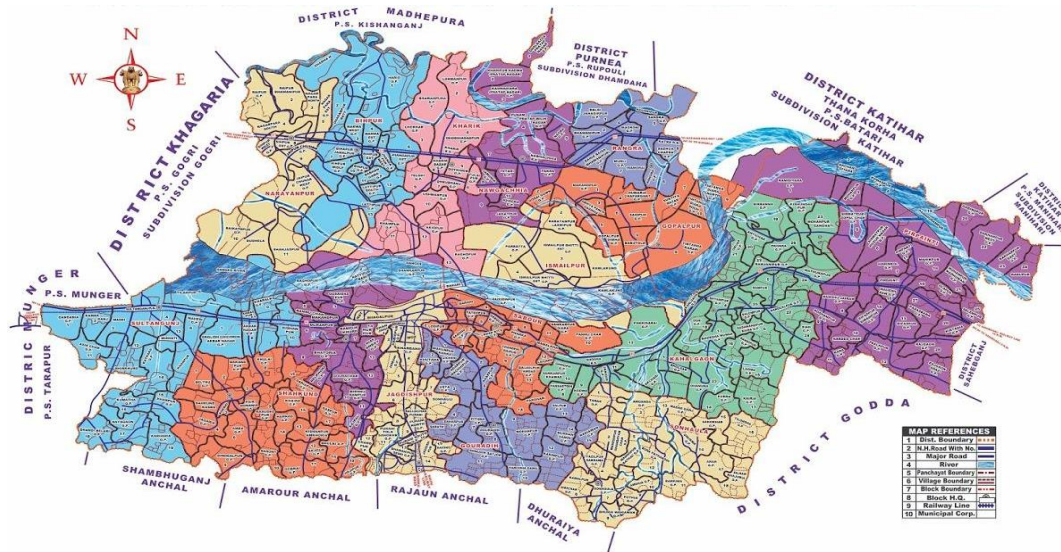
There are a total of 605 wetlands in Bhagalpur, covering a total area of 24171 ha. The wetlands are an ideal natural source to develop community fish farms, and this will promote a sustainable way of earning livelihood among the villagers. 'The Community Fish Farms can be placed under the jurisdiction and monitoring of the gram panchayat. It is recommended to promote organic farming and a

scientific approach near the wetlands to lower the pollution of the wetlands. Also, these practices help attract the market and increase the yield of cotton. Promoting co-tourism is also recommended in the region. The wetlands must be allowed for a limited number of visitors. The Bihar State Tourism Development Corporation should make a targeted action plan to promote and advertise heritage and cultural tourism of Bhagalpur across the country. Regular maintenance of tourist spots along with the different roads connecting it with the center of the city is necessary to provide tourists with an enjoyable experience.

Thermal power is the main source of electricity generation in the district. The district does not follow any well-planned scheme for biomass energy production. But produces large amounts of biomass, especially crop residues from sugarcane, oil seeds, rice, maize, wheat etc. The need is to develop a plan which would include the farmers and the native people of the district who would together help in waste collection. This will lead to employment generation along with sustainable use of resources. The biomass gasification technology is an interesting option for rural development. It promises sustainable conversion of locally available biomass into electricity and a local value chain with income generation for the suppliers of the biomass as fuel. This will generate employment opportunities for the people in the district. With improved electricity supply people would eventually desire to start up cottage industries. This will lead to an overall development in economy and livelihood of the people without harming the environment.

Bhagalpur is a web of three rivers that make this city a tourist destination with numerous historical monuments and cultural activities such as Vikramshila University ruins, Cave sculpture of Ashoka regime, Tomb, Vikramshila Mahotsava, Jal Jivan Hariyali Human Chain etc. However, with so much tourism potential, the tourist's influx is less due to no promotion District level Mahotsavas and fairs and Undeveloped roads to tourist sites outside the centre of the city.

## District Overview



**Fig 1: Bhagalpur Map**

Bhagalpur is the 38<sup>th</sup> district of Bihar. It is the third largest city of Bihar, and is situated in Eastern Bihar. It is situated 220 km east of state capital Patna, and 410 km northwest of Calcutta. It is well connected by road and rail. Bhagalpur is also known as the “silk city” and is the district headquarters. It has 7 subdivisions, Birpur, Gopalpur, Pirpainti, Sultanganj, Nathnagar, Bhagalpur, Kahalgaon<sup>1</sup>.

There are 2536 villages and 243 panchayats in Bhagalpur district. The major rivers flowing through Bhagalpur are Ganga, Badua, Chanan. It is situated on the Southern Bank of the Ganga river. The Vikramshila Gangetic Dolphin Sanctuary is also located in Bhagalpur.

The economy of Bhagalpur is predominantly reliant on agriculture and silk. The NTPC Thermal Power Plant and Tussar Silk Industry are the two major industries. The main agricultural crops of the district are rice, wheat, maize, barley and oilseeds. Bhagalpur is famous for its artisan and handloom industry of Tussar Silk. It occupies the main part in the production of Tussar Oak Silk and its products.

Bhagalpur has many tourist attractions of cultural and historical significance, the ruins of the ancient Vikramshila University, Mandar hill, Ancient Cave Sculptures of Ashoka’s Regime, the Tomb of Aurangzeb’s brother are a few of the famous places.

<sup>1</sup> <https://bhagalpur.nic.in/>

## Quantitative Data Analysis

### 1. Agriculture

Bhagalpur is predominantly an agrarian economy. The fertile and alluvial gangetic plains provide favorable conditions for good crop productivity. Agriculture engages more than 70% of the workforce. The main crops grown are as follows:

- **Major Crops:** Rice, Wheat, Maize, Pulses and Oilseeds.
- **Horticulture:** Mango, Banana, Litchi, Citrus, Guava, Tomato, Potato, Brinjal, Cauliflower, Onion

Bhagalpur can be geographically described as South Bihar Alluvial Plain. The average rainfall is around 1350 mm with sub – dry and sub – humid conditions.

<b>Table 1: Trends in Area under Principal Crops in Bhagalpur District (in 1000 Ha)</b>							
<b>Crop/Year</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>
Rice	26.65	35.14	29.52	32.35	32.91	32	33.69
Wheat	41.22	42.91	46.95	46.38	46.23	48.35	47.5
Maize	48.93	44.8	44.64	46.06	44.9	40.7	38.91
Barley	1.29	1.21	1.34	1.24	1.18	1.25	1.21
Chickpea	1.98	4.1	4.49	4.61	4.17	2.29	2.28
Rapeseed and Mustard	1.61	2.15	2.35	2.4	2.46	2.38	1.82
Linseed	0.65	0.51	0.57	0.56	0.45	0.56	0.85
Sunflower	0.44	0.29	0.29	0.26	0.21	0.16	0.16
Sugarcane	0	5.52	5.58	5.93	5.92	5.91	1.77
Source: <a href="http://data.icrisat.org/district-level-data/">http://data.icrisat.org/district-level-data/</a>							
<b>Table 2: Trends in Production of Principal Crops in Bhagalpur District (in 1000 Tons )</b>							
<b>Crop/Year</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>
Rice	81.1	67.3	56.7	95.83	77.53	74.22	115.95
Wheat	128.26	104.07	127.39	52.83	143.02	163.6	156.47
Maize	203.98	273.43	272.84	155.81	233.34	138.49	179.46
Barley	2.07	1.15	2	0.38	1.12	0.95	0.82
Chickpea	2.03	4.32	5.8	3.25	3.26	1.89	1.46
Rapeseed and Mustard	2.06	1.99	3.86	2.81	2.4	2.57	1.45
Linseed	0.56	0.44	0.48	0.49	0.39	0.47	0.72

Sunflower	0.64	0.42	0.42	0.38	0.3	0.24	0.23
Sugarcane	0	37.95	40.07	39.93	33.57	32.8	9.73

Source: <http://data.icrisat.org/district-level-data/>

**Table 3: Variability in Area, Production and Yield of Principal Crops (2010-11 to 2017-18)**

Crop/Year	Area (1000 Ha)			Production (1000 Ha)			Yield (Kg/Ha)		
	Average	SD	COV	Average	SD	COV	Average	SD	COV
Rice	31.75	2.83	8.91	81.23	19.48	23.98	2565.43	591.14	23.04
Wheat	45.65	2.60	5.68	125.09	37.57	30.03	2737.29	779.79	28.49
Maize	44.13	3.34	7.58	208.19	54.03	25.95	4711.43	1148.5	24.38
Barley	1.25	0.05	4.37	1.21	0.62	50.87	962.71	456.22	47.39
Chickpea	3.42	1.17	34.29	3.14	1.53	48.77	903.14	230.58	25.53
Rapeseed and Mustard	2.17	0.33	15.19	2.45	0.76	31.18	1124.57	279.02	24.81
Linseed	0.59	0.13	21.70	0.51	0.11	21.11	856.14	14.81	1.73
Sunflower	0.26	0.10	37.59	0.38	0.14	37.51	1455.57	16.96	1.17
Sugarcane	5.11	1.64	32.20	32.34	11.50	35.57	6253.67	756.67	12.10

Source: <http://data.icrisat.org/district-level-data/>

**Table 4: Trends in Crop-wise Irrigated Area in Bhagalpur (in 1000 Ha)**

Crop/Year	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice	8.75	15.33	14.83	16.29	16.73	15.99	19.95
Wheat	26.27	29.65	32.47	32.15	32.24	33.18	41.08
Maize	25.23	25.79	28.29	28.93	28.08	26.5	26.91
Barley	0.02	0.01	0.01	0.01	0.01	0.01	0.01

Source: <http://data.icrisat.org/district-level-data/>

## 2. Horticulture

The horticultural products form a significant component in achieving food and nutritional security. Horticulture enables farmers to diversify their cropping pattern to include fruit, vegetable, flowers, medicinal and aromatic plants. Horticultural crops vary from season to season, cultivation of these crops helps in boosting the income of farmers. The horticulture crops commonly grown among fruits are Mango, Guava, Banana, Litchi and Citrus; among vegetables are Potato, Tomato, Brinjal, Cauliflower etc. Horticulture farming is prevalent among small and marginal farmers,

Bhagalpur is famous for its mango cultivation, the varieties of mangoes include Jardalu, Gulabkhas, Maldah, Amrapali. The increasing demand for fruits and vegetables has led to the shift in cultivation of horticultural crops.



Table 5

	Aonla / Goosebery		Banana		Guava		Limes and Lemons		Litchi	
District 2017 - 18	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)
Bhagalpur	-	350	1350	54432.28	711	5575.65	945	7065	600	4100

Table 6

Fruits	Mango		Muskmelon		Papaya		Watermelon		Other Citrus	
District 2017 - 18	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)
Bhagalpur	7900	73089.24	0	415	100	1150	100	1200	1100	10300

Table 7

Vegetables	Beans		Bitter gourd		Bottle Gourd		Brinjal		Cabbage	
District 2017 - 18	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)
Bhagalpur	310	2550.75	300	1900	1205	26215.26	1700	34000	1200	22900

Table 8

Vegetables	Carrot		Cauliflower		Cucumber		Elephant Foot		Green Chilly	
District 2017 - 18	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)
Bhagalpur	100	1700	1700	29000	100	1000	-	675	1200	15525.25

Table 9

Vegetables	Kaddu / Pumpkin		Okra / Ladies Finger		Onion		Peas (Green)		Pointed Gourd	
District 2017 - 18	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)
Bhagalpur	15	450	1500	32042.75	1605	40156.15	400	2700	300	2900

Table 9

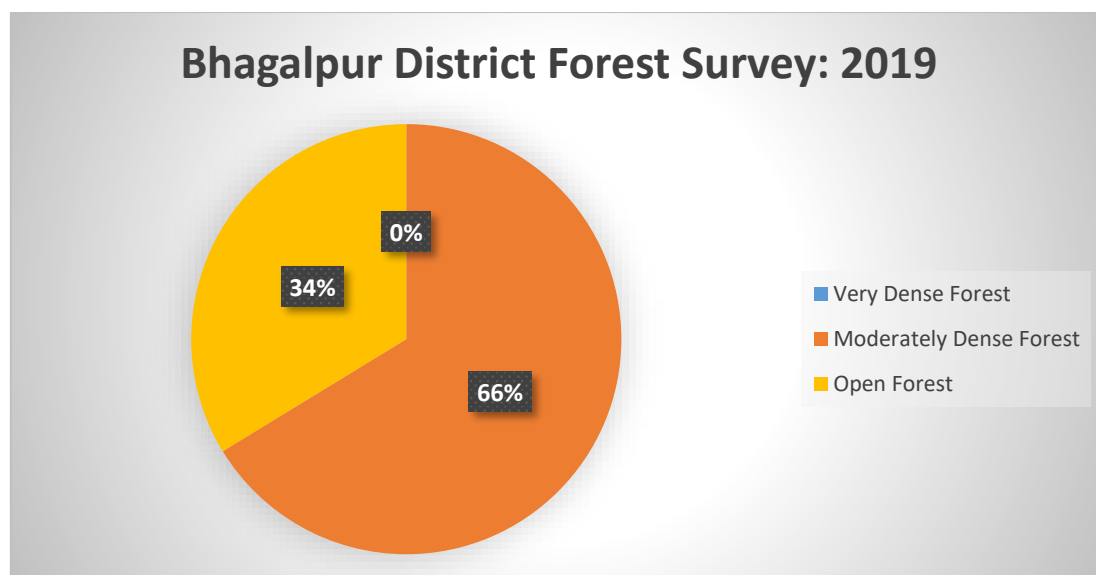
Vegetables	Potato		Radish		Tomato		Other Vegetables	
	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)	Area (in Ha.)	Production (in MT)
District 2017 - 18								
Bhagalpur	9850	262875	400	6900	1605	38125.55	1100	15500

The above tables have been compiled from the Directorate of Horticulture, Govt. of Bihar.  
Area and Production of Fruits, Vegetables, Plantation Crops and Aromatic Plants in Bihar during 2017 – 18

### 3. Forestry

District of Bhagalpur has 2569 Km<sup>2</sup> total geographic area. Forest cover area as per 2019 forest survey assessment is 69.73 Km<sup>2</sup>. This is 2.71% of the total area which makes the district forest deficient. The state has a total 7305.99 Km<sup>2</sup> forest area which is 7.75% of the total geographic area of the state.

Bhagalpur district does not have forest under the category of Very Dense Forest (VDF), 46.21 Km<sup>2</sup> of area comes under the category of Moderately Dense Forest (MDF) and 23.52 Km<sup>2</sup> is open forest (OF) as per 2019 assessment.



Area	Geographical Area	Very Dense Forest	Moderately Dense Forest	Open Forest	Total	% of Geographical Area
Bhagalpur	2569	0	46.21	23.52	69.73	2.91
Bihar	94163	333.13	3280.32	3692.54	7305.99	7.76

Source: Indian State of Forest Reports 2017, 2019

## 4. Wetlands and Biodiversity

### 1. Wetlands

There are many wetlands in the region but some important wetlands are like Ganga Prasad Bill. The region has a large number of ox-bow lakes/cut off meanders. The data in Table 4 represent the number of wetlands and their area representation in the district. There are around 178 wetlands sized greater than 2.25 Ha and 427 less than 2.25 Ha areas. The region consists of small wetlands, generally less than 200 Ha in the area, but there is 1 wetland with an area of more than 200 Ha.

**Table 11: Wetland Data of Bhagalpur District**

Wetland Types	Total Number of												Aquatic Vegetation
	Wetlands:			Area (ha)									
Natural Wetlands	NRC D	NWI A	Diff .	<2.5	<5	<10	<20	<50	<100	>100			
Lake/ponds	15	16	1	0	0	7	2	1	5	0	0	0	15
Ox-bow lakes/cut off meanders	63	63	0	0	19	16	16	10	1	1	0	0	62
High altitude Wetlands	0	0	0	0	0	0	0	0	0	0	0	0	0
Riverine Wetlands	23	23	0	0	13	6	2	2	0	0	0	0	18
Waterlogged	19	21	2	0	9	4	2	1	3	0	0	0	14
River/Stream	0	28	28	0	0	0	0	0	0	0	0	0	0
Man-made Wetlands	NRC D	NWI A	Diff .	<2.5	<5	<10	<20	<50	<100	>100		AV	
Reservoirs/Barrages	1	1	0	0	0	1	0	0	0	0	0	0	0
Tanks/ponds	24	26	2	0	21	3	0	0	0	0	0	0	23
Waterlogged	0	0	0	0	0	0	0	0	0	0	0	0	0
Salt pans	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total (605)</b>	<b>145</b>	<b>178</b>	<b>33</b>	<b>427</b>	<b>62</b>	<b>37</b>	<b>22</b>	<b>14</b>	<b>9</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>132</b>

Source: NRC D (National River Conservation Directorate)-NWIA Inventory Data 2007, NWIA Wetland Atlas report

The district comprises 605 wetlands; most of them are Lakes, meanders and tanks. The meander wetland type with a large wetland size of more than 200 Ha is found in the region.

- The wetland size is small in general, but 1 wetland is around 500 Ha
- The number of natural wetlands is more than man-made.
- Many natural wetlands have aquatic vegetation also.

Table 12

District-wise Wetland Area in Bihar (2019)						
District	Geographical Area (Sq. km)	Wetland Area (ha)	% of total Wetland Area	Percent of geographical area	Open water (ha)	
					Post Monsoon	Pre Monsoon
Bhagalpur	2502	24171	5.99	9.66	16237	10273

Source: Department of Environment, Forest, and Climate Change, GoB.

### Vikramshila Gangetic Dolphin Sanctuary

The Vikramshila Gangetic Dolphin Sanctuary is located in the Bhagalpur district of Bihar. It stretches 60 km along the Ganges River from Sultanganj to Kahalgaon. In 1991 it was declared as the only protected area for endangered Gangetic Dolphins in Asia. The numbers of the Gangetic Dolphins are dwindling, they are no longer found in abundance. Stringent measures and key policies have been initiated by the government agencies to repopulate the number of dolphins. The main causes of pollution are agricultural runoff, fishing and transportation, these factors cause major disturbance in the delicate ecosystem. The Gangetic Dolphin is also the National Aquatic Animal.

The Sanctuary is home to a rich variety and diversity of flora and fauna. It is a natural habitat to a number of endangered aquatic species including the Indian smooth coated otter, gharial, a variety of freshwater turtles and 135 species of waterfowl. A number of Avifauna species which are critically endangered, vulnerable and nearly threatened have been also spotted in the sanctuary. As per the IUCN Red List species declared as vulnerable like the Black Kite, Black-winged Kite, Shikra, Crested Serpent Eagle, Eastern Imperial Eagle, Greater Spotted Eagle, Indian Spotted Eagle, Pallas's Fish Eagle have been spotted within the sanctuary.

The availability of fishes in the river is a critical factor for Dolphin presence. The small fishes serve as food for the dolphins. The species of fishes recorded within the sanctuary are Helicopter catfish, Indian River shad, Indian patasi, Gangetic ailia, Bagrid catfish, Coitor croaker, Mrigal, Short-hairfin anchovy and Gangetic Mystus.

## 5. Fisheries

The large number of river streams, low-lying fields, ponds, marshes and wetlands in the region indicate a high potential for pisciculture. The district is abundant in natural fisheries resources in the form of reservoirs and flood plains, they are ecologically most conducive to the development of aquaculture. Certain parts of the Ganga river bed near Bhagalpur are noted for abundance in spawn. Fisheries is a major part of livelihood in Bhagalpur, fish purchased from different parts of the country is sold at the wholesale fish market at Sujaganj. The fish is further sold to retailers on auction basis. A large volume of fish is received every day in Bhagalpur market from the other side of the Ganges mostly from Kathiar and Khagaria. Bhagalpur is famous for exporting freshwater fishes.

Table 13

Production of Fish and Fish Seeds										
District	Fish Production ('000 tonnes)	Fish Seeds (Lakh)	Fish Production ('000 tonnes)	Fish Seeds (Lakh)	Fish Production ('000 tonnes)	Fish Seeds (Lakh)	Fish Production ('000 tonnes)	Fish Seeds (Lakh)	Fish Production ('000 tonnes)	Fish Seeds (Lakh)
Year	2015-16		2016-17		2017-18		2018-19		2019-20	
Bhagalpur	13.6	182	13.61	375.00	14.09	377.25	14.25	373.20	14.93	448.00

Source: Economic Survey Bihar 2015 – 16, 2016 – 17, 2019 – 20, 2020.

## 6. Industries

### 1. Handloom Industry

Bhagalpuri Silk is known as “Queen of all fabrics”, and Bhagalpur is famously known as the “Silk City”. The handloom silk industry is intrinsic to Bhagalpur, it is famous for its superior quality and outstanding craftsmanship. The topography and climate of Bhagalpur is well suited for rearing Tassar cocoon, the final product is called as Tassar silk. The various varieties of silk available include Tassar, Muga, Katia, Ghiccha, Mulberry and Eri.

The Bhagalpur Silk Industry is more than 200 years old, the skill has been passed down from one generation to another. The handloom industry is the main occupation, there are 35,000 handloom weavers and 25,000 looms. The handloom clusters collectively make around 2 million meters of silk per annum, with an annual turnover of 100 crores per annum. There are 1, 00,000 people employed in the production process of silk. The finished silk products like home furnishings, dresses, scarves have gained immense popularity in western

countries and there is a large demand for them. The demand for handloom silk products is much higher in comparison to products of the power loom.

## 2. Large Scale and Medium Scale Industries

The largest industrial belt of the district is Barari industrial area spread across 51.35 acres and Kahalgaon industrial area of 1020.45 acres. The thermal power plant of NTPC is situated in Kahalgaon of Bhagalpur district.

<b>TYPE OF INDUSTRY</b>	<b>NUMBER OF UNITS</b>	<b>INVESTMENT (Lakh Rs.)</b>	<b>EMPLOYMENT</b>
<b>Agro based</b>	146	1566	446
<b>Soda water</b>	26	143	106
<b>Cotton &amp; textile</b>	74	346	258
<b>Woollen, Silk &amp; Artificial Thread based clothes</b>	92	533	318
<b>Jute &amp; Jute based</b>	1	5	1
<b>Ready-made Garments &amp; Embroidery</b>	7	23	16
<b>Wood/Wooden based furniture</b>	37	196	176
<b>Paper &amp; Paper products</b>	19	131	86
<b>Leather based</b>	4	9	10
<b>Chemical/Chemical based</b>	30	1219	95
<b>Rubber, Plastic &amp; Petro based</b>	11	67	28
<b>Mineral based</b>	10	183	68
<b>Metal based (Steel Fab.)</b>	23	127	127
<b>Engineering units</b>	23	399	119
<b>Electrical machinery and transport equipment</b>	9	78	48
<b>Repairing &amp; Servicing</b>	320	2025	1133
<b>Others (Misc.)</b>	144	815	408
<b>TOTAL</b>	<b>976</b>	<b>7865</b>	<b>3443</b>

Source: [www.udyogmitrabihar.in/docs/dp/bhagalpur.pdf](http://www.udyogmitrabihar.in/docs/dp/bhagalpur.pdf)

## 7. Tourism

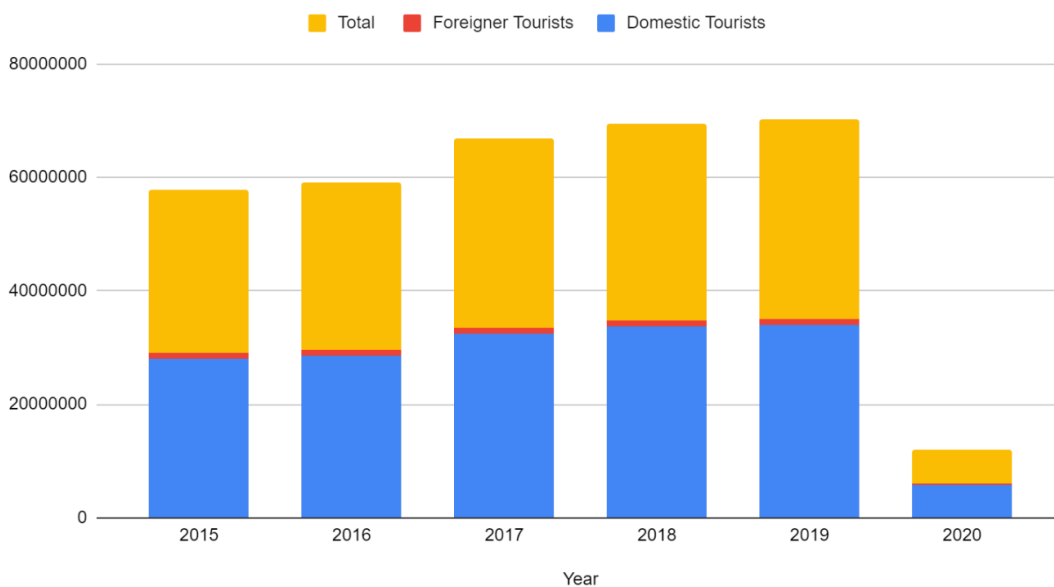
The data given below shows the number of tourists visiting Bihar per year. Data ranges from the year 2015 till 2020. The clear-cut division of data shows the number of Domestic tourists and international tourists and the percentage increase in the number of tourists based on previous year's data.

**Table 15: Number of Tourists Visiting Bihar Per Year**

Year	Domestic Tourists	Foreigner Tourists	Total	% Increase in tourists
2015	28029118	923737	28952855	
2016	28516127	1010531	29526658	1.98
2017	32414063	1082705	33496768	13.45
2018	33621613	1087971	34709584	3.63
2019	33990038	1093141	35083179	1.08
2020	5644524	308080	5952604	-83.04

**Source: Department of Tourism Govt. of Bihar.**

Domestic Tourists, Foreigner Tourists and Total



The data in the above table reveals that from the year 2015 to 2016 there is an increase of 1.9 percent tourist visits in Bihar; in the year 2017 there is an increase of 13.4 percent tourist visits in Bihar; in year 2018 the increase in tourist visit is 3.6 %; in the year 2019 the percent of tourist visits increased by 1 percent; in the year 2020 the data shows there is a loss of 83 percent tourists.

Interpretation of the data reveals that the most successful year for the Bihar tourism sector is 2017, because it receives a drastic increase in tourist visits compared to previous year and other years.

After 2017 the increase in the tourist visits had shrunken to 3.6 percent. This was a time when social distancing and Covid was not restricted. Government should scrutinize the measures that helped them to create impact in 2017 but not in the year 2018.

In the year 2019 the percentage of visits in Bihar was limited to 1 percent. Although the number of tourists continuously increased from 2015 to 2019, the graph is not constant.

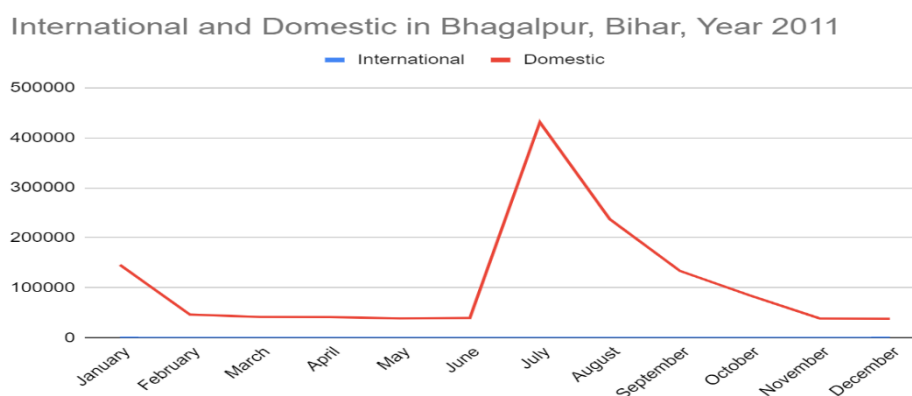
2020 was really a worst year for the tourism and hospitality sector because of COVID-19 pandemic and worldwide lockdown.

2. The data in the below given table is taken from a government report published by the Department of Tourism, Government of Bihar. The data shows numbers of tourists from India and foreign countries in Bhagalpur. The data is divided into month-wise distribution of total tourists in Bhagalpur and in the state Bihar.

**Table 16: Numbers of Tourists from India and Foreign Countries in Bhagalpur.**

Months	Domestic Visitors	Total in Bihar	% in Bhagalour
January	145872	1448567	10.07008996
February	46546	1173372	3.96685791
March	41755	1158791	3.603324499
April	41428	758936	5.458694804
May	38787	640747	6.053403293
June	39767	610620	6.512561004
July	430954	3035306	14.19804132
August	236942	2174451	10.89663552
September	133830	3073254	4.354667724
October	84798	1409264	6.017183438
November	38740	2276934	1.701410757
December	38039	1609735	2.363059758
Total	1317458	19369977	6.801546538

Source: Directorate of Tourism, Bihar, Patna



Source: Directorate of Tourism, Bihar, Patna

The data and chart show the number of footfalls in Bhagalpur for tourism.



The data specifically describes the number of foreign visitors is nil (which may have increased in the later years) hence there is a great need for inspection of shortfalls in tourism. There is a need to develop tourist spots to the international standard to attract more and more international guests.

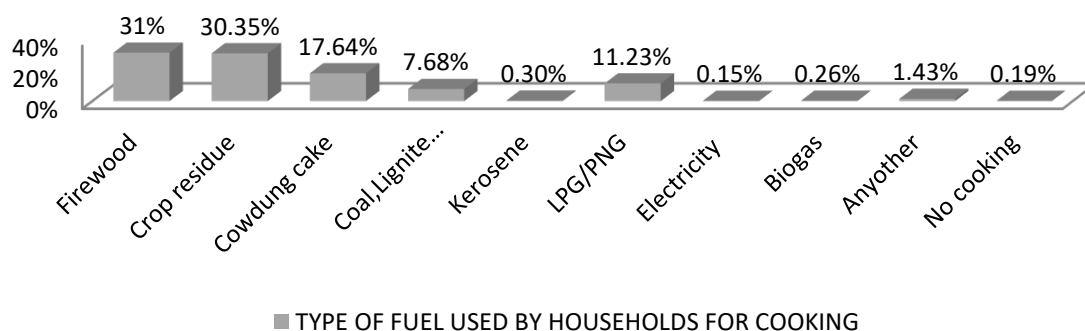
The graph also shows that the number of domestic visitors in Bhagalpur is not homogeneous throughout the year. The graph attains a peak in July and August. The least footfalls are witnessed in the months of March, April, May, June, and November. The department needs to focus on homogeneous attraction of tourists throughout the year to reduce the effect of seasonal unemployment on the sector. This government can organize grand festivals and Mahotsavs in the off season. Various tourist packages can also be offered in off season to invite the maximum number of tourists in off season.

## 8. Energy

### 1. Biomass Energy

The Bihar Renewable Energy Development Agency (BREDA) is the nodal agency which looks after establishing and running biomass energy generation programs. Paddy and wheat are the main food crops in the districts along with sugarcane and oil seeds as non- food crops. The net sown area of the district is 153600 ha with 125% cropping intensity. Maize has the highest productivity of 5450 kg/ha followed by wheat (2500 kg/ha) and rice (2342 kg/ha). Mustard has a total productivity of 700 kg/ha. According to the 2011 census, almost equal numbers of households use firewood and crop residue followed by cow dung cakes for cooking purposes as represented in the graph below. It is required to reduce the consumption of these as their direct combustion harms more to the environment than the compressed forms such as briquettes. The district does not have any well-established biomass power plants.

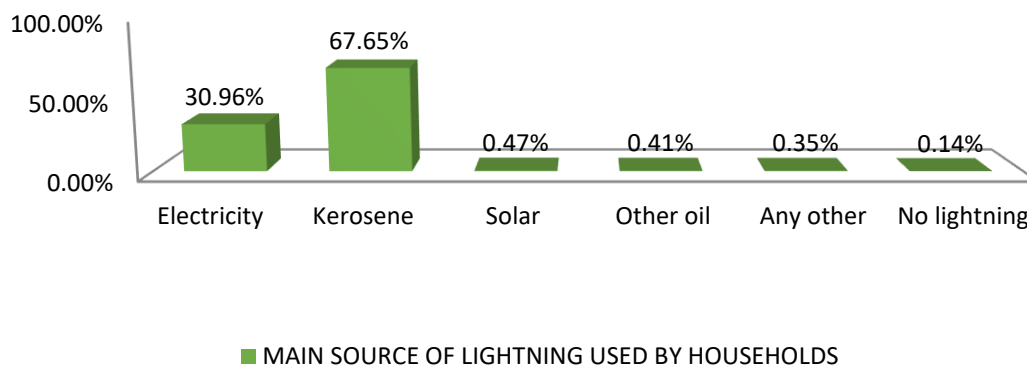
**TYPE OF FUEL USED BY HOUSEHOLDS FOR COOKING**



## 2. Solar Energy

The state Bihar is aiming at producing 2 GW solar power by 2022 and in this line, two power plants are slated to be commissioned by 2022 in Bhagalpur. Each will produce 350MW of electricity using solar energy. Bhagalpur has been selected under the SolarCity Scheme of the Union Ministry of New and Renewable Energy (MNRE). MNRE will provide financial assistance of Rs 50 lakh to each city and technically assist the urban local governments to prepare a master plan to assess the current energy situation, future demand and action plans. Under the Saat Nischay Yojana, solar street lights are to be installed in the villages of Bihar. According to the 2011 census, the majority of households use kerosene for lightning purposes while 0.47% households use solar energy lightning purpose as represented in the graph below.

**MAIN SOURCE OF LIGHTNING USED BY HOUSEHOLDS**



## Qualitative Data

### 1. Agriculture and Horticulture

The main stakeholders at Bhagalpur district level in the agricultural sector are:

**Krishi Vigyan Kendra, Bhagalpur:** The main role of the Krishi Vigyan Kendra is to develop agricultural potential by frontline demonstrations on the farmer's field. The main aim of the Vigyan Kendra is to work as a knowledge and resource center of modern agricultural technology to support the initiative of public, private and voluntary sectors for improving the agricultural economy of the district. The Krishi Vigyan Kendra has set up a stellar model of stakeholder interaction by starting a "*Kisan Chaupal*". The concept of Chaupal helps to solve agriculture related problems of the farmers and also facilitate transfer of knowledge, apart from informing women about the new findings in the field of Home Science. The Kisan Chaupal is organized every Saturday in one village of the district. Scientists of Krishi Vigyan Kendra Bhagalpur reply to the queries of the farmers. Films related to new methods and techniques in the field of Agriculture & Allied areas are also screened through a projector at the village. The objectives of Chaupal are mentioned as below:

- Solving of the farmers' problems through on spot experts' advice
- Active participation of villagers
- Educating farmers about new advances in agriculture and allied areas
- Empowering farm women
- Reviving our tradition
- Feedback of farmers regarding their problems

**Bihar Rajya Beej Nigam Limited, Bhagalpur:** The Nigam has its seed processing center in Bhagalpur. The main functions of the Nigam are to encourage seed production, seed processing and seed distribution. Various other functions of the Nigam also include:

- Production of foundation seed produced from state agricultural sectors;
- Production and storage of certified seeds, produced through foundation seeds obtained from the farms of progressive farmers;
- Processing and tagging of certified seeds in the processing units, after processing and certification.
- Seed distribution through various schemes at subsidized rates operated by the department of agriculture.

**Bihar Agricultural Management and Extension Training Institute, Patna: BAMETI** is an autonomous state level training institute. The main purpose of the institute is to promote modern technologies in agricultural extension management of the state by establishing coordination of reputed institutions at regional and national levels. The institute aims to resolve the issues related to agriculture through modern techniques for better management of human and natural resources.

## 2. Biodiversity

46.27% of the total reported area in district Bhagalpur is net sown, and only 0.03 % is forest land. Bhagalpur has a solid agricultural base to set up industries based on agriculture, and food processing. For the conservation of wildlife, various acts and rules have been implemented. This involves Gangetic dolphin conservation, Bihar sawmill regulation act 1990, Bihar sawmill regulation rules 1993, Bihar sawmill regulation amendment act 2002, biological diversity act 2002, Indian forest act 1992, Environment protection act 1986, wildlife protection act 1972, and wildlife protection amendment act 1991. Bihar shares the national vision of sustainable forest management to meet the needs of current and future generations. The state-specific vision includes the following goals.

- ✓ Increasing vegetation (forest and tree) cover 17% of the state's total geographical area by 2022 through afforestation and land-use diversification.
- ✓ Natural forest management and the construction of rainwater harvesting structures
- ✓ Natural forest rehabilitation with a focus on local species.

The Vikramshila Gangetic Dolphin Sanctuary is located in the Bhagalpur district of Bihar. It stretches 60 km along the Ganges River from Sultanganj to Kahalgaon. The sanctuary is home to a wide variety and diversity of flora and fauna. It is a natural habitat for a number of endangered aquatic species, including the Indian smooth-coated otter, gharial, a variety of freshwater turtles, and 135 species of waterfowl. Several Avifauna species which are critically endangered, vulnerable, and nearly threatened have also been spotted in the sanctuary.

## 3. Forestry

Forest Survey 2019 assessment reported a variety of native trees in rural and urban areas across the state. These common species are *Mangifera indica*, *Bombax ceiba*, *Psidium guyava*, *Dalbergia sissoo* (FSI, 2019). Currently, the State government forest department runs 'Krishi Vaniki Yojana', a scheme which primarily focuses on motivating farmers to plant trees and other crops on a large scale along with traditional crops on their land. This scheme is aimed to improve the income of farmers in the event of crop loss and to contribute towards

agricultural produce by growing poplar trees such as Heesham, Guava, Gambhar, Amla, Mahogany, Teak, Peepal, Jamun, Kachnar, Gulmohar, Mango, Eucalyptus, Neem, Kadam, Bahera, Palas, etc. Farmers are provided seedlings of the trees in government nurseries at the rate of Rs 10 / seedling. If farmers maintain 50 percent of the plants purchased from the forest department in their lands for 3 years, then for this, the farmers will be given an incentive of Rs 60 per plant. Moreover, the Rs 10 they spent for purchasing the seedling is also given back to the farmers (Krishi Yojana).

The department of environment, forest and climate change of Bihar has undertaken various measures to protect the environment of the state. The following are the major schemes of the Bihar government to conserve forests.

### **Krishi Vaniki- other species Yojana**

This scheme has been implemented since 2012-13 in Bihar to encourage plantation of other species. For instance, Teak, Mahogany, Beechwood, Rosewood and Khair. Under this scheme, free samplings are being provided to the farmers during the rainy season. During 2018-19, about 57.78 lakh saplings of the other species have been planted in Bihar.

### **Krishi Vaniki- Poplar Yojana (ETP)**

Under this scheme, the farmers of Bihar are being motivated to plant commercial Poplar plants to increase tree cover for environmental protection. Also, the farmers get cash incentives towards the maintenance of the plants.

### **Mukhya Mantri Niji Paudhshala-Poplar ETP yojana**

This scheme aims to set up nurseries with quality plants belonging to different species through entrepreneurs and farmers. The farmers get subsidies at the rate of Rs 10000 for cutting per acre. Also, this scheme is implemented in all the districts of Bihar.

### **Har Parisar Hara Parisar Yojana**

Due to the shortage of forest land in Bihar, this scheme was launched to increase both the purity and greenery in the environment. Also, the vacant lands on the premises of government and non-government institutions are being planted with suitable species.

### **Greening of Urban spaces**

The prime objective of this scheme is to promote projects related to landscaping of urban parks and green spaces in the urban areas.

## **4. Energy**

## **Biomass Energy**

The district Bhagalpur has forest cover of only 780 ha while the current fallow land covers an area of 7200 ha. This fallow land stands unutilized serving no purpose. The people of the district mainly cultivate rice, maize, wheat, sugarcane etc. These crops produce residues in large amounts. The district is not much developed in the biomass renewable energy sector but is potentially capable of utilizing the resources available for producing energy from biomass. At least the energy produced from the biomass of the district can add to renewable energy sources and reduce use of conventional sources of energy which add to pollution.

Examples should be taken from other districts and start-ups like Husk Power System which utilizes rice husk mainly to produce electricity and makes it available to the people. This if encouraged in the district will increase entrepreneurship, hence opening ways to employment.

## **Solar Energy**

The recent development in Bhagalpur in the solar energy sector, as published in The New Indian Express, is the state government's decision to use the land available in Lakhisarai and Bhagalpur district to construct solar energy plants of 500 MW. The project will be started in 2023. A recent article in Jagran read- 'Electric power outage in Bhagalpur'. The urban as well as rural areas both were affected severely. To protect the district from such electricity outages, use of solar energy at individual level should be encouraged. The government is paying a lot of attention in solarizing the street lights, households etc, which is appreciable. The need is also to solarize the agricultural and industrial sectors to improve the economy and livelihood of the people in a sustainable manner.

## **4. Wetlands**

The wetlands are habitats for a variety of species. The wetlands create a unique ecosystem that supports many species simultaneously like aquatic, terrestrial, and human beings. The district has many potential sources and opportunities to harness valuable products using the scheme and start the pilot project. Local stakeholders directly or indirectly depend on the wetland for their income and small-scale business. These businesses can be a great opportunity to be turned into a large-scale production hub using the right approach. The region has a good amount of production of dairy products and silk products. The region is also known for tussar silk. The data collected and analyzed shows the region's

production and possible product that can be derived from the raw product. The list of sources and the possible products are mentioned below:

- Mango, litchi, banana production is recommended in the region, leading to products like Juice, Jam, Pickle.
- The district stats show a good amount of rice, blackgram, wheat, and maize in the region, which can be turned into products like flour.
- India Govt. has proposed a mission like India's Millet Mission, which creates an opportunity for the district to become a production hub. The district stats show a good amount of barley, jowar production, which can be promoted in the schemes
- The district is famous for its tussar silk which can turn into finished silk saree and other products; Bhagalpur city is also known as silk city.
- The region has a large production of dairy products, which lead to an increase in animal husbandry. Wetlands can support the growth of fodder for animals in the region.

## 5. Tourism

**Heritage of Bhagalpur refers primarily to Architectural, Natural, Living and Traditional sites.**

**1. Mandar Hill:** A diminutive 300 metre high hill at a distance of 30 km from Bhagalpur is one of the most favorite picnic spots in the region.. Apart from its location and charming beauty it is famous for an incredibly large fair held every year on 14 January on the event of Makar Sankranti. According to mythological tales the mountain hill was used for churning the ocean to extract the nectar from its bosom (Samudra Manthan). A fight between Gods and Demons to have a nectar which makes immortal One can witness the marks of the snake roughly around the hill used for mathan. It is also noted that while Lord Vishnu was taking three steps to cover the entire universe, Lord Vishnu put one step on this hill. Two Jain temples nearby also attract Jain pilgrims.

**2. Ruins of Vikramshila University:** The main attraction here is the Buddhist University of Vikramashila. Situated at Antichak in Kahalgaon around 45 kilometers (2 hours by road) from Bhagalpur city railway station near to the confluence of the Kosi and Ganga. The university was founded by king Dharmapala, in late 8th century AD. Vikramashila ruins exhibit terracotta (flourished during Pala period around 8th century A.D) articles, including a large number of plaques characterizing Buddhist and Brahmanical deities, animal and bird figurines and some symbolic representations of culture and performance. Bronze sculptures of Buddhist deities like the Buddha, Maitreya, Vajrapani, Avalokitesvara and Manjusri are exhibited here. Disciplines such as theology,



philosophy, grammar, metaphysics, logic etc. were taught here but the supremely important branches were tantrism and Vedic science. It is also believed that the Lamaism, in Tibet today originated at this place by a scholar Atisa Dipankara

**3. Vikramshila Gangetic Dolphin Sanctuary:** The dolphin sanctuary is spread over a 50 km stretch that covers the area from Sultanganj to Kahalgaon. Situated around 15 kilometres away from the Bhagalpur railway station that can be accessed via road. It is aimed at saving the endangered Gangetic dolphins in India. This is the single protected spot for the vulnerable Gangetic Dolphins in Asia which were once found in abundance in the area. But now the numbers are the main concern. With only a few hundreds alive, it becomes an urgent necessity to save this beautiful species. The local people here call these dolphins with the name '*Soons*' – right from the ancient times. The sanctuary is a safe haven to a diverse range of other endangered flora and fauna, it is a major biodiversity hotspot. Bihar's Dolphin Sanctuary is home to around half of the estimated 2,500-3,000 Gangetic dolphins in India.

**4. Ajgaivinath Temple:** The Ajgaivinath temple is situated in Sultanganj, Bhagalpur around 26 kilometers from the railway station. It is famous for the sanctity of the idol of Lord Shiva. Though the origins and deity of the temple is still under research it is believed that the idol is of Lord Swayambhu. The Indian legend has it that Lord Shiva was presented with his bow, Ajgav, here and the place was named as Ajgaivinath. The celebration of the temple and Lord Shiva, takes place in Shravani Mela(fair).

**5. Shri Champapur Digamber Jain Siddha Kshetra:** Shri Champapur Digamber Jain Siddha Kshetra is a Siddha Kshetra (Place of Salvation). It is situated 3.5 kilometres away from the Bhagalpur railway station. It is quite an ancient and historic Teerth Kshetra. Shri Champapur Digamber Jain Siddha Kshetra is located at village Nathnagar in Bhagalpur.. Champapur is the only '*Panch Kalyanaka Kshetra*' in the world which is related to Panch Kalyanaka: – Garbha, Janma, Tapa, Gyan and Moksha of 12th Tirthankara Bhagwan Vasupujya (The first ascetic saint).

**6. Tilka Manjhi:** Tilka Majhi was the first Paharia leader who took up arms against the British in the 1780s even before the first revolt against the British Govt in 1857. It is situated around 4 kilometers from nearest Bhagalpur railway station. The British surrounded the Tilapore forest from which he operated but he and his men held them at bay for several weeks. When he was finally caught in 1784, he was tied to the tail of a horse and dragged all the way to the collector's residence at Bhagalpur, Bihar.



**7. Maharshi Mehi Ashram, Kuppaghat:** Kuppā Ghat which signifies "A large number of Tunnels" is a place located on the banks of the holy river Ganges at Bhagalpur, Bihar, India. This place is not more than 5.5 kilometers away from the railway station. According to legends and mythology the Maharshi Mehi Paramhans spent nearly ten years in the caves. The beautiful garden located near the bank of the Ganga is known for its reference in Ramayana.

### **Events of Significance promoting Tourism in Bihar.**

**1. Shravani Mela:** Shravani Mela is a month-long festival that is celebrated in July - August of every year by devotees of Lord Shiva. Devotees from all over the world come to this holy place and start their 100+ KM journey to another shrine city of Deoghar in Jharkhand on foot.

**2. Vikramashila Mahotsav:** The Vikramashila site is the place for Vikramashila Mahotsav, which is held annually during the month of February. The Mahotsav aims at promoting tourism and spreading awareness about the ancient Vikramshila Mahavihara. Vikramshila Mahavihara was one of the significantly important centres of Buddhist Studies during the Pala period around the 8th A.D century. It is a great place to witness the different locally produced articles such as Madhubani painting etc.

**3. Jal Jivan Hariyali Human Chain:** The human chain third of its kind in the state, was formed by the state government under its '*Jal Jivan Hariyali*' campaign. Over 5.16 crore people formed an 18,034 km long human chain in Bihar to create awareness about conservation of water and increasing green cover, prohibition and the adverse impact of social evils like dowry and child marriage. **The second radii of the human chain spread to embrace the entire Gangetic belt from Buxar, near UP, to Bhagalpur on the border with Jharkhand.**

## Action Plan Development

### 1. Agriculture

1. In Bhagalpur District, the crops being cultivated are Paddy, Wheat, Maize, Pulses, and Oilseeds, and horticulture crops are Mango, Banana, Litchi, Citrus, Guava, Tomato, Potato, Brinjal, Cauliflower, Onion, and pointed gourd (Parwal).
2. All Farmers should follow KVK Bhagalpur for the latest technological information about crops, horticulture, animal husbandry, and plant protection.
3. Farmers are mainly dependent on rainfall for cultivation and due to minimal irrigation facilities. Therefore, irrigation facilities should be increased, and drip and sprinkler irrigation should be introduced to increase the yield and promote water saving.
4. In the monsoon season, due to severe flood problems, at least 30-40% of the district faces a massive monetary loss.
5. Rabi and Zaid farmers did not get enough water due to poor irrigation facilities.
6. In Bhagalpur, Jardealu mangoes, lichi, and Parwal are famous; their marketability should be improved.
7. Maize is produced as a cash crop in the area, but due to insufficient processing units, it goes to other states and is again imported as poultry feed, affecting the economy of this area.
8. Establishment of Ideal Organic Village – under the pilot project for the establishment of ideal organic village one village will be selected in every district and all the interested people will be encouraged to set up units for the production of vermicompost and Gobar Gas.
9. The storage facility, especially for potatoes, should be improved.
10. There is little to no medicinal and ayurvedic crop farming in this area that should be introduced.
11. The Government's Kishan Chaupal is proving to be a very successful program. In this program, farmers are trained every Saturday in villages. More such programs shall be introduced.
12. Farmers should be trained for the production of vermicompost.
13. Roof farming should be introduced in this area which needs more expansion.
14. In recent years Green Gram (Moong) production has rapidly increased. Its marketability should be improved.
15. The road transport system is poor. Sometimes farmers have to wait for more than 1 day to transport the crop. Thus farmers suffered a massive loss for this.

16. Crop rotation and precision farming should be introduced.
17. Floating farming can be introduced in the Jiara area (Low land near the river).
18. Due to the destruction of saplings by flood, crores of saplings are purchased from the nearest State, West Bengal. Therefore, sapling production facilities should be promoted in this area.

## 2. Wetlands and Biodiversity

### 1. Afforestation

The Ministry of Environment, Forest and Climate Change (MoEFCC) implements plantation/afforestation schemes in the forest areas with a participatory approach. The plantation species under the schemes is selected by the implementing agencies/the members of Joint Forest Management Committees (JFMC) based on their needs, ecological conditions, and other local factors in consultation with the Forest Department. The native forest species are encouraged for plantation in the forest areas giving importance to trees with multiple uses.

The conservation and development of forests primarily involve three strategies – afforestation through natural/artificial regeneration, protection, and management. The ministry is implementing three major schemes for the development of forest areas, *i.e.*, the National Afforestation Programme (NAP) scheme, the National Mission for a Green India (GIM), and the Forest Fire Prevention & Management Scheme (FFPM). While NAP is being implemented for afforestation of degraded forest lands, GIM aims to improve the quality of the forest and increase forest cover besides cross-sectoral activities on a landscape basis.

**Pollution control:** The significant sources of air pollution in Bhagalpur are road dust, vehicular emission, domestic fuel burning, open waste burning, construction activities, industrial emissions etc. Bihar State Pollution Control regularly monitors the ambient air quality at Bhagalpur through Continuous Ambient Air Quality Monitoring Station (CAAQMS) installed at Indira Gandhi Science Complex, Planetarium premises, and Beltron Bhawan, Shastrinagar & Gandhi Maidan, Bankipur Bus Depot under NAMP. A multifaceted awareness campaign is scheduled to create sensitization and create some agents of change among all sections of society. According to the Hindustan Times newspaper, the Bihar government is gearing up to prepare a comprehensive action plan to mitigate the impact of the climate crisis on different sectors.

## 3. Fisheries

Fisheries is an intrinsic source of livelihood for the rural population within the district, the district administration can take up the following measures to promote sustainable pisciculture:

- To facilitate the development and management of fisheries and hydrological agriculture with the aim of reducing poverty, increasing food and nutrition security and accelerating inclusive economic development.
- Extension of water agriculture by using modern technology and to bring about a qualitative improvement in fishery and fish seed production through favorable intensification.
- To increase the productivity of fisheries production by utilizing open water fishery resources, reservoirs and wetlands which are being utilized less efficiently and also by using appropriate technology.
- To empower the fish farmers and agriculturists by creating awareness, organizing them, enhancing their skills so that they can effectively participate in managing and minimizing the impact of natural calamities and climate change. To develop adaptation capacity of fishermen and small farmers and to minimize the impact of natural disasters.
- To provide a suitable environment for the development of the fisheries sector.
- To increase water agriculture production and productivity.
- Growth of Fisheries production in reservoirs and drought plains.

### **Vikramshila Gangetic Sanctuary**

- Establishing an effective wildlife sanctuary is a challenging task. This is especially true in a dynamic environment such as the Ganges River, where flood cycles cause massive changes in the landscape, both seasonally and annually.
- Bio monitoring results indicate that the Vikramshila Gangetic Dolphin Sanctuary supports a relatively high density of dolphins and a rich diversity of other fauna, and that if protective measures were effectively implemented it could contribute substantially towards conserving a number of key biodiversity elements of the Ganges system
- Resources within the sanctuary also support people living on the banks of the 60 km stretch. Therefore, it is inadvisable to cut them off from their source of livelihood by barring them from it. Alienating them from the sanctuary might be counterproductive because conserving river biodiversity in a protected area is a long process and it is only possible by involving stakeholders.

- To promote the development of community-based fishing cooperatives, management responsibilities given to local stakeholders at the community level fosters accountability and increases motivation for conservation.
- The use of nylon monofilament fishing gillnets in stretches of rivers having dolphin populations should be banned, as this net injures dolphins. Use of fishing nets made up of mosquito netting material should also be banned as it collects small fish which serve as food for dolphins, and fetch very little or no income to fishermen
- Ownership rights to certain river segments should be conferred on the cooperatives, on the condition that they only employ sustainable fishing techniques that are less injurious to aquatic wildlife.
- A monitoring program would be needed to ensure that fishing cooperatives were managing their segment responsibly and according to agreed guidelines.

## 4. Industries

### Handloom Industry

The craftsmen are average people, with a large number of them living below the poverty line. Though the glories of their fabric are famous worldwide, their own lives are in darkness due to the minimal wage they get. The weaver's families work for 18 hours on a sari and receive only a meagre sum of Rs. 150 for it. Therefore effective measures need to be undertaken in order to preserve the handloom industries.

### Schemes and grants for farmers and weavers involved in the Handloom Silk industry

- **Incentives on planting of mulberry under cluster plantation**  
An incentive of Rs 11.66 per plant in one installment is provided out of which Rs. 3 per plant is recovered (as cost of planting material & beneficiary contribution of 10%).
- **Rearing kit**  
A Rearing kit of Rs 20,000/- (Rupees twenty thousand only) is provided which includes beneficiary contribution of 10%.
- **Construction of rearing shed**  
Rearers are provided CGI sheets worth Rs. 17,000/- (Rupees seventeen thousand only) which includes beneficiary contribution of 10%.

- **Construction of rearing house**  
Rs. 50,000/- (Rupees fifty thousand only) is provided for construction of a rearing house which includes a beneficiary contribution of 10%.
- **Supply of disinfectants**  
Disinfectants like Vijetha, bleaching powder, Sanitech, lime etc. are provided free of cost.
- **Health insurance scheme for women rearer**  
Health insurance premium of Rs. 781.60/- per person per year is contributed by Central Silk Board (Rs. 642.47/-), Sericulture department of Jammu & Kashmir (Rs. 83.47/-) and the beneficiary (Rs. 55.66/-).
- **Special program for development of sericulture**  
80% from Central Silk Board, 10% from Department of Sericulture, Govt. of Jammu & Kashmir and rest 10% contribution from the beneficiary.
- **Urban Haat at Bhagalpur**  
Bhagalpur is the second most important district, therefore a Haat can be proposed. There will be provision of stalls showcasing various arts, crafts and textile, traditional art and culture. The stalls will be from all the districts of Bihar, as well as handicraft of neighboring states. This will provide the Bhagalpur Silk Industry recognition as well as a boost to the district economy. Bhagalpur has the potential to be developed into a silk market.

## 5. Forestry

Bhagalpur district is a forest deficient area. The major occupation in the district is agriculture and small-scale businesses. That is why the Government of Bihar had drafted an Agroforestry policy in 2018. The district lies under the agriculture category III. This categorisation had been developed on the basis of climatic condition, the geography of the region, soil condition and water availability. Major crops in the district are Rice, Wheat, Lentils, and Gram pulse. The study has suggested a variety of trees in this zone. Eucalyptus, Arjun, Jamun, Kadam, Semal etc are the suggested tree species in the flood-prone zone; whereas Shisham, Gamhar, Melia, Teak etc for the non-flood zone. Litchi, Mango, Jamun, Kathal, Guava can be the most profitable money yielding trees as part of agro-horticulture. Medicinal plants like Kalmegh, Aswagandha, Sarpagandh, Satawar, Lemongrass, Safedmusli etc are viable options in agroforestry (Govt of Bihar, 2018). Below are the important species which can be included under agroforestry:

Fruits	Vegetables	Spices	Flowers	Aromatic Plants
Mango, Guava, Litchi, Banana, Pineapple	Solanaceous, Cucurbits, Onion, Okra, Beans	Turmeric, Ginger, Garlic, Coriander	Marigold, Rose, Tuberose, Gladiolus, Jasmin	Japanese Mint, Lemongrass, Pamaroja, Citronella

Afforestation on the riverbanks and open public spaces is another option that suits the Bhagalpur district. The Miyawaki afforestation method has been adopted by many urban authorities in the world. This technique helps to build dense, native forests. This method ensures that plant growth is 10 times faster and the resulting plantation is 30 times denser than usual. It involves planting native species in the available area and becomes maintenance-free after the first three years. The most important aspect of this method is it requires as minimum as 20 square feet of area. This can enable the native citizens of Bhagalpur to grow profitable fruit plants in the community. The combination of a small forest and home garden is known as homestead forest. With the combination of the Miyawaki method of afforestation and trading platform for these products, this combination can be beneficial for the local economy (Miyawaki Afforestation, 2019). Some of the major Indian cities like Mumbai, Chennai have also adopted this technique for afforestation (Indian Express, 2021). Afforestt is the firm that works in the development of Miyawaki Forest.

### **Biogas for energy**

- ✓ Installation of biogas based projects in the district with sustainable manner.
- ✓ The policy like Biomass and Bagasse based cogeneration projects should be implemented in the district.
- ✓ Mini-grid projects with a capacity size of up to 500 kW powered by biomass should be installed.

### **Hydropower for energy:**

- ✓ Bihar has considerable potential for New and Renewable Energy sources, which is yet to be harnessed; the Government of Bihar resolved to issue a revised policy for the promotion of power generation from various sources of New and Renewable Energy.
- ✓ This policy should be applicable to all New and Renewable Energy projects for industry, urban local bodies etc.
- ✓ District officers should help in identification of hydropower project sites.
- ✓ The electricity generated from the New and Renewable Energy projects should be exempted from tax and electricity duty.

- ✓ In case of power generation from mini/micro/small hydel schemes, the project developer should allow the use of canal waterfall or river water flow for other purposes like irrigation or water supply.

### **Biomass Energy**

Agriculture is the main economic activity of the district along with other small to medium industries which are oil mills, sugar mills, etc. The district does not follow any well planned scheme for biomass energy production. But produces large amounts of biomass, especially crop residues from sugarcane, oil seeds, rice, maize, wheat etc. The need is to develop a plan which would include the farmers and the native people of the district who would together help in waste collection. This will lead to employment generation along with sustainable use of resources.

The district has fallow land in large amounts which can be improved and made cultivable; if not possible then the land can be used to set up bioenergy producing plants. It should be made available at low prices to people who are willing to utilize it for biomass energy production. Loans at low interest rates should be provided to people who are willing to establish start-ups which would produce biomass energy. Utilization of sugarcane, wheat, rice in preparing bio-fuel should be given importance along with briquette manufacturing. Briquettes are better fuel than firewood or crop residue.

Educating people about renewable energy and its benefits is the foremost thing which should be done. Bhagalpur is known for silk production, hence attention needs to be paid on utilizing the residues left during the process.

### **Solar Energy**

The government of the state is doing remarkable work in establishing solar energy plants in the district. Bhagalpur is an agrarian district and special focus is required in making the power requiring agricultural operations more efficient. The best scheme which suits the district is the Kusum Yojana which provides farmers with solar water pumps at subsidized rates. The water levels in Bhagalpur are good enough for the solar water pumps to work. Other than this solarisation of industries is also important so they work efficiently. Hybrid types of solar panels should be encouraged which support both grid connected and off-grid connections.



## 7. Tourism

Tourism plays an important role in promoting economic growth and has potential to generate large scale employment opportunities within the state. Bhagalpur has a rich heritage and ancient history; the district administration can initiate guided city tours for the tourists visiting the district.

**Eco-Tourism:** Eco-tourism includes programs that minimize the adverse effects of traditional tourism on the natural environment, and enhance the cultural integrity of local people. Responsibility of both travelers and service providers is the genuine meaning for eco-tourism.

*Vikramshila Gangetic Dolphin Sanctuary* is a biodiversity hotspot and a major attraction to promote eco-tourism in a sustainable manner.

**Cruise Tourism:** Bihar State Tourism Development Corporation signed a Memorandum of Understanding (MoU) with UK-based Pandaw Cruise India Pvt. Limited in Patna, in order to promote River Cruise Tourism in Bihar. The cruise will have 30 double bed (A/C) rooms, an open deck, dining hall, bar, restaurant, massage centre, big hall and emergency medical facilities. The cruise has six-day stoppages in Bihar which will include Kahalgaon, Munger, Barh, Patna and Buxar. In the first stoppage at Kahalgaon, visitors will be taken for sightseeing of ancient Vikramshila by luxury vehicle. Visitors can also enjoy the betel leaf (Paan) plantation and toddy palm tapping at Oriup near Vikramshila.

**Sustainable Tourism** – It is a type of tourism in which all the needs and desires of a tourist/ and other stakeholders of the tourism industry is fulfilled without compromising the ability of the future generation to utilize the tourism. Several goals of Sustainable Developments Goals are also seen associated with sustainable tourism. Life below water and life on land are impacted by human activities if the tourism place is a water body or forest area, hence it is the duty of all of us to take care of the sustainability aspect in tourism.

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

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

Offering eco-friendly services is another example of sustainable tourism. Providing tourists with cycles to roam around nearby places with help in reducing

carbon footprint and it economical. It is aimed at minimizing the negative impact on the environment created by tourism activities.

### **Integrated Model Framework**

1. The handloom silk industry is intrinsic to Bhagalpur. It is famous for its superior quality and outstanding craftsmanship. The topography and climate of Bhagalpur are well suited for rearing the Tassar cocoon. The final product is called Tassar silk.

The challenge in this sector is the negative environmental externalities. Thus, to counter the negative externality, proper water treatment plants should be set up along with strict monitoring.

2. In the district, high livelihoods are still dependent on agriculture. Most of the them are marginal farmers. Enhancement and strengthening their life quality must be one of the key. The challenges in this sector are high water consumption, soil degradation, Fisheries has issues related to aquatic ecosystem and water quality.

Thus, the solution could be:

- promotion of organic farming,
- Promotion of Horticulture and commercial plantations
- Revamping up micro irrigation techniques.
- crop diversification particularly high value low water usage crops, appropriate breeds of fishes and regular cleaning of wetlands.

3. Renewable energy, clean and diverse biodiversity and dense forestry have a very high positive environmental impact. So, it becomes the most critical category for conservation and long-term sustainability. The investment in this category should not be measured for return in short-term. This must also be taken up to balance some negative externalities for promoting livelihood and cleaning the nearby atmosphere.

## **Recommendations**

### **1. Biodiversity**

- Provide Wildlife Corridors and Connections Between Green Spaces.
- Planting or seeding with native trees, flowers, fruits, vegetables and shrub species.
- Reduce the use of pesticides and fertilizers in an agricultural field.
- Reduce, reuse, and recycle to minimize our demand for resources.

- Use environmentally friendly products for cleaning, clothing, packaging.
- Aim for energy conservation in home, office, university, everywhere.
- Reduce single-person and short-distance car use.
- Incorporate renewable energy and/or energy efficiency into your home.
- Demand and encourage sustainable products

## 2. Energy

### Biogas

- Implementation of various biogas generation schemes such as National biogas fertilizer management program, biogas-based power generation program, bagasse-based cogeneration projects in sugar mills power projects based on other biomass, biomass-based gasifier power projects, Industrial waste-based power projects, biomass-based cogeneration power projects for increase generation of biogas and solid waste management.
- Increasing awareness to the farmers and local citizens about the environment and indoor pollution, its effect on the human body, biogas potential, the necessity of solid waste management, efficient use of agriculture, and animal waste to produce biogas and fertilizer.
- Providing subsidies or incentives for promoting biogas plants (high upfront cost) for village and industrial level.
- Strict policy measures are required to increase biogas production from municipal and industrial wastes.

### Hydropower

- Implementation of a small hydro project in the district.
- Use existing infrastructure like a canal for hydro projects.
- Use of local people or laborers.
- Educate local citizens about renewable energy, its necessity, employment, and energy from hydro projects.

### Biomass

The people of district Bhagalpur first need to get aware of biomass energy and its benefits. The biomass gasification technology is an interesting option for rural development. It promises sustainable conversion of locally available biomass into electricity and a local value chain with income generation for the suppliers of the biomass as fuel. This will generate employment opportunities for the people in the district. With improved electricity supply people would eventually desire to

start up cottage industries. This will lead to an overall development in economy and livelihood of the people without harming the environment.

### **3. 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.

- It is recommended to rejuvenate and restore the water bodies of the district. This can be done by recharging old ponds, aquifers and lakes present and preserving them. This leads to the solution of water scarcity, water quality in the region.
- It is recommended to promote organic farming and a scientific approach near the wetlands to lower the pollution of the wetlands. Also, these practices help attract the market and increase the yield of cotton.
- It is recommended to promote animal husbandry, the silk industry in the area. This provides a boost to the economic growth of the local people.
- It is recommended to promote eco-tourism in the region. The wetlands must be allowed for a limited number of visitors.
- It is recommended to increase waste management practices in the region by promoting plastic waste management, sewage disposal management, encouragement of the use of toilets by local stakeholders and increasing the number of bio-toilets in the region for public use..

### **4. Tourism**

- The Bihar State Tourism Development Corporation should make a targeted action plan to promote and advertise heritage and cultural tourism of Bhagalpur across the country.
- There should be frequent Trade Fairs and Mahotsav across the district to boost the local economy and bring in new business.
- Bhagalpur is known for world famous silk. Silk shopping can be promoted at markets in major tourist centers in Bihar. Bhagalpur has potential to be

developed exclusively as a silk market. There is a need to develop standard local markets to attract niche customers.

- Private companies can be encouraged to import silk from native producers and sell them after refining and brand tag.
- Tourists are a source of income for the natives; developing local marketplaces such as specialized malls for locally made handicrafts can give a place to sellers and buyers simultaneously.
- Local producers can be trained to market their product using the internet and social media. Lessons of Digital marketing can be helpful to the native producers of various articles such as metal crafts, tukuli painting, manjush painting.
- Terra cotta has been in the history of Bihar since 8<sup>th</sup> A.D.; the form of art is used to make a variety of articles. Terra cotta is still relevant and can be upgraded and standardized to fit the modern use.
- Madhubani or Mithila painting of Bihar is very famous, however there is still scope for scalability. Other similar forms of paintings such as Tikuli Painting, Sikki Craft, Manjush Painting, Sujani Craft are limited to very small demographics and artisans related to these art forms are precarious laborers.
- Regular maintenance of tourist spots along with the different roads connecting it with the center of the city is necessary to provide tourists with an enjoyable experience.
- Also training sessions for guides can be beneficial for individual guides and help them earn livelihood and the tourism sector to embrace more tourism. These training sessions can also be helpful in knowing the actual number of functional guides in the city. And the same information can be uploaded on the website for customer support.

## 5. Forestry

- Bhagalpur is a mixed economy with agriculture and small-scale industries. Silk production is the predominant industry.
- White Mulberry trees can solve two important problems: afforestation and mulberry cultivation.

- The Agroforestry and homestead forest are suitable options to increase forest cover. This way the citizens can earn extra income through these forest products such as fruits, flowers, and beekeeping.
- Agroforestry information centres and forest product processing clusters can be established. The government scheme 'Krishi Kalyan Yojana' should not be only limited to the farmers but to the citizens who can grow mini forests in their space.
- Bhagalpur district can have Miyawaki Forests with native plants at every open space possible and these forests can be utilised as heritage and ecotourism places. These forests can be tourist attractions.
- Native Fruit bearing trees can be planted in these forests and the processing can be done on a public-private partnership basis. This can provide aesthetics to the geography and income to the locals.

## Discussion during the Report Presentation

- The Tussar silk and Bhagalpuri silk is famous and can be associated with Jalaj Model.
- Jalaj team is very active and has a production unit.
- Namami Gange has provided Vikramshila Gangetic Sanctuary which attracts a good footfall of tourists.
- There is a Turtle-Rehab centre in Bhagalpur.
- Officials ensured that the submitted report will be reviewed and will taken up for suggestions for implementation of interventions in the districts.
- 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.

## Reference

[http://www.bihar.com/dist\\_bhagalpur.aspx](http://www.bihar.com/dist_bhagalpur.aspx)

<https://bhagalpur.kvk4.in/>

*AGRICULTURE AND THE ECONOMY OF BIHAR: AN ANALYSIS* Md. Abdus Salam, Md. Ejaz Anwer and Md. Safdar Alam; *International Journal of Scientific and Research Publications*, Volume 3, Issue 11, November 2013 1 ISSN 2250-3153.

<https://www.adb.org/sites/default/files/project-document/78599/41603-023-ind-iee-01.pdf>

**Wetland Report for Ganga River Basin Environment Management Plan: Report Code: 031\_GBP\_IIT\_ENB\_DAT\_09\_Ver 1\_Jun 2012**

Chaudhary, s. (2020). *Economics of Mulberry Leaves Production in Parbhani District*. *International Journal of Current Microbiology and Applied Sciences*.

FSI. (2019). *Forest Survey India*: <http://fsi.nic.in/isfr19/vol2/isfr-2019-vol-ii-bihar.pdf>.

Govt of Bihar. (2018). *Agroforestry Policy* : <http://www.indiaatcop24.org/images/material-reports/bihar-cop-24/afforestation-and-increasing-green-cover/Agroforestry-Policy-of-Bihar-State-Draft.pdf>.

Indian Express. (2021). <https://indianexpress.com/article/cities/mumbai/urban-forests-miyawaki-technique-helps-create-dense-green-patches-in-one-year-7218624/#:~:text=These%20urban%20forests%20are%20created,turning%20them%20into%20tiny%20forests>.

Krishi Yojana. (n.d.). <https://vikaspedia.in/schemesall/state-specific-schemes/welfare-schemes-of-bihar/krishi-vaniki-yojana>.

Miyawaki Afforestation. (2019). *Better India*: <https://www.thebetterindia.com/206740/how-to-grow-forest-miyawaki-method-backyard-home-garden-steps-home-india/>.

<https://studylib.net/doc/7493821/bhagalpur---indian-handloom-cluster>

<https://studylib.net/doc/25377213/report-on-bhagalpur-silk-industry-april-2019>

<http://silks.csb.gov.in/bhagalpur/schemes-grants-for-farmers/>

<https://www.udyogmitrabihar.in/docs/dp/bhagalpur.pdf>

<https://bhagalpur.nic.in/places-of-interest/>

<file:///D:/Profile/Downloads/conservation-and-biomonitoring-in-the-vikramshila-gangetic-dolphin-sanctuary-bihar-india-.pdf>

[https://nmcg.nic.in/writereaddata/fileupload/34\\_GangeticReport.pdf](https://nmcg.nic.in/writereaddata/fileupload/34_GangeticReport.pdf)



<https://www.newindianexpress.com/nation/2021/mar/30/bihar-first-state-to-have-two-green-towns-2283421.html>

<https://www.jagran.com/bihar/bhagalpur-bhagalpur-electric-power-outage-update-electricity-crisis-lightning-cut-off-for-the-whole-city-21681786.html>