

STATUS OF AGRICULTURE IN BIHAR

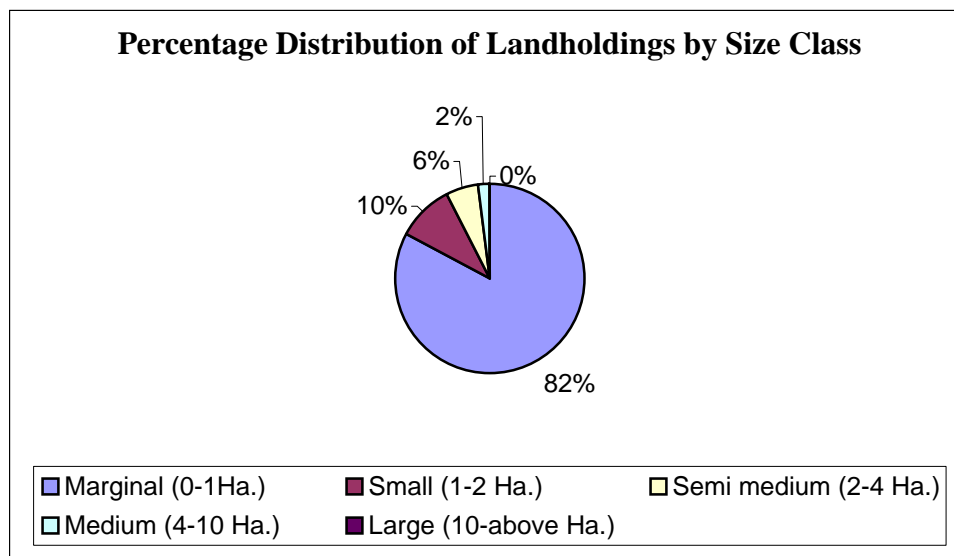
2.1 Introduction

Bihar has a total geographical area of 93.60 lakh hectares on which it houses a population of 82.9 million, thereby generating a population density of 880 persons per sq. km (Census 2001). Gross sown area in the State is 79.46 lakh hectares, while net sown area is 56.03 lakh hectares. There are around 1.04 crore landholdings in the State of which around 83 percent are marginal holdings of size less than 1 hectare (Table 2.1). With around 90 percent of the total population living in rural areas, agriculture as the primary feeder of rural economy continues to operate not only on margins of land but also on the margins of human enterprise, its productivity being among the lowest in the country. Without increasing returns to these margins, not much can be done realistically to develop the agricultural sector. Thus, agriculture continues to define both the potentialities and constraints to development in Bihar.

Table 2.1 : Distribution of Holdings by Size Class

Category of farmers	No. of Holdings	Operational holding (In Ha.)
Marginal (0-1Ha.)	86,45,932 (82.9%)	27,87,789 (40.8%)
Small (1-2 Ha.)	10,05,650 (9.6%)	13,00,667 (19.0%)
Semi medium (2-4 Ha.)	5,90,970 (5.7%)	15,82,279 (23.1%)
Medium (4-10 Ha.)	1,78,295 (1.7%)	9,75,355 (14.3%)
Large (10-above Ha.)	11,570 (0.1%)	1,93,760 (2.8%)
Total	1,04,32,417 (100%)	68,39,850 (100%)

Source : Agricultural Census Division, Ministry of Agriculture, New Delhi



Agriculture in Bihar is crucially dependent on monsoon. Although around 57 percent of its gross cultivated area is irrigated, irrigation itself is crucially dependent on monsoon as it largely depends on the use of surface water. According to the soil quality and climatic conditions of the relevant areas, Bihar has been classified in 3 agro-climatic zones : North-West Alluvial Plane (Zone1), North-East Alluvial Plane (Zone 2), and South Alluvial Plane (Zone 3), the last zone being further classified in two sub-zones 3A and 3B (Table 2.2). Monsoon arrives earliest in the north-eastern Zone2, which also receives the highest rainfall among all three zones. Zone 3 receives monsoon showers last of all three zones and also the least amount. Total irrigated area in the State is 45.67 lakh hectares, of which nearly 30 percent is fed by canal water. This highlights the monsoon dependence of even irrigated lands as catchment areas of nearly all the major rivers in the State are outside the state.

2.2 Agricultural Production in 2006-07

Kharif 2006 started with a probability of a normal rainfall, but the deviation for the first showers of the monsoon was (-)48 percent. Rainfall in the month of June and July was normal, but was again below normal by 57 percent in August. It was again normal in the month of September. Finally, rainfall was 19 per cent below normal for the entire monsoon. This seems to have adversely affected area under cultivation. Area under paddy in the State according to the second advance estimate for kharif 2006 was 31.30 lakh hectares (Table 2.3) against the target of 37.00

lakh hectares (Table 2.4). Similarly, area under wheat for rabi 2006 stood at 20.34 lakh hectares, falling short of a target of 24.00 lakh hectares. Thus, there has been a fall in the area under foodgrains from 65.48 lakh hectares in 2005-06 to 61.55 lakh hectares in 2006-07 (Table 2.5). Under the conditions of deficient rainfall and a fall in acreage, foodgrain output is expected to register a fall over the figures for 2005-06. The second advance estimate of foodgrains for 2006-07 is 82.10 lakh MT. For kharif 2006-07 foodgrain production has been estimated at 40.04 lakh MT over an area at 34.83 lakh hectares. For rabi 2006-07, the estimate of foodgrain production is of 42.06 lakh MT over an area of 26.73 lakh hectares. This is a fall of around 4 lakh MT from previous year's production of around 86 lakh MT. Effect of falling acreage on production of foodgrains has, however, been moderated by an increase in yield from 12.39 qnts/hectare in 2005-06 to 13.34 qnts/hectare in 2006-07 (Table 2.6).

Cereal production is expected to fall by almost 3 lakh MT to 78 lakh MT as compared to previous year's production of 81 lakh MT (Table 2.7). This fall largely comes from a fall in acreage under cereals by almost 9 lakh hectares. Within cereals, fall in production is largely caused by fall in maize output by almost around 4 lakh MT. Other coarse cereals too are estimated to register a marginal fall in, both, acreage and production. While both rice and wheat are estimated to suffer a minor fall in acreage, their production is likely to improve over previous year due to increase in productivity (Table 2.5).

Production of pulses too is expected to fall marginally by 0.75 lakh MT in 2006-07 despite an increase in productivity. This is because of a substantive fall in the area under pulses by around 2 lakh hectares as compared to previous year. Oilseed production is expected to suffer a marginal fall from 1.19 lakh MT in 2005-06 to 1.11 lakh MT in 2006-07 due to marginal fall in both acreage and productivity. Sugarcane has been planted on an area of 1.43 lakh hectares and its output is estimated to be 12.33 lakh MT.

Table 2.2 : Agro-Climatic Zones in Bihar

Agro climatic Zones	Districts	Soil	Ph	Initiation/Ce ssation of rainfall	Total Rainfall (mm)	Temperature (dg. Celcius)		Important Cropping Sequence
						Maximu m	Minimu m	
Zone-1 (North west alluvial plane zone- Pusa)	Saran, Siwan, Gopalganj, E.Champaran, W.Champaran, Sheohar, Sitamarhi, Madhubani, Darbhanga, Muzzafarpur, Vaishali, Samastipur, Begusarai	Sand y loam, loam	6.5 – 8.4	12 th June/ 30 th Sep to 10 th Oct	1040 – 1450 (1245.00)	36.6	7.7	Rice – Wheat, Rice-Rai, Rice-Sweet Poatato, Rice- Maize(Rabi), Maize-Wheat, Maize-Sweet Potato, Maize- Rai, Rice-lentil
Zone-2 (North-East Alluvial Plane zone- Purnea)	Supaul, Khagaria, Saharsa, Madhepura, Purnea, Katihar, Kishanganj, Araria, Naugachia.	Sand y loam, Clay loam	6.5 – 7.8	7 th June/30 th Sep to 10 th Oct	1200 – 1700 (1450.00)	33.8	8.8	Jute-Rice, Jute- Wheat, Jute- Potato, Jute- Kalai, Jute- Mustard, Rice- Wheat-Moong, Rice-Toria
Zone 3		Sand y loam, Clay loam, loam, Clay	6.8 – 8.0		990 – 1240 (1115.00)	37.1	7.8	Rice-Wheat, Rice-Gram, Rice- Lentil, Rice-Rai
Zone-3A (South Alluvial Plane Zone- Sabour)	Sheikhpura, Lakhisarai, Jamui, Banka, Munger and Bhagalpur			15 th June/30 th Sep to 10 th Oct				
Zone-3B (South Alluvial Plane Zone – Sabour)	Bhabhua, Rohtas, Aurangabad, Buxar, Bhojpur, Jehanabad, Gaya, Nalanda, Patna, Nawada			10 th June/ 30 th Sep to 10 th Oct				

Table 2.3 : Second Advance Estimates of Area and Production of Crops for 2006-07

1	Area (000, hectares)			Production (000, tones)			Yield (kg/hectare)		
	2	3	4	5	6	7	8	9	10
Rice	3130.905		3130.905	3527.822		3527.822	1127		1127
Wheat	-	2034.305	2034.305	-	3238.614	3238.614	-	1592	1592
Jawar	5,870	-	5,870	5,958	-	5,958	1015	-	1015
Bajra	4,039	-	4,039	4,310	-	4,310	1067	-	1067
Maize	268,015	200,124	468,139	411,913	580.76	992.673	1537	2902	2120
Ragi	16.011	-	16.011	11.560	-	11.560	722	-	722
Small Millets	4,246	-	4,246	3,172	-	3,172	747	-	747
Barley	-	18,709	18,709	-	21,066	21,066	1126	-	1126
Coarse Cereals	298.181	218.138	517.014	436.913	601.826	1038.739	1465	2750	2009
Cereals	3429.086	2253.138	5682.204	3964.735	3840.440	7805.175	1156	1704	1374
Tur	-	35.814	35.814	-	46.845	46.845	-	1308	1308
Urad	28.415	-	28.415	21.340	-	21.340	751	-	751
Moong	10.873	-	10.873	6.132	-	6.132	564	-	564
Other Kharif Pulses	14.900	-	14.900	11.86	-	11.860	796	-	796
Gram	-	71.989	71.989	-	65.006	65.006	903	-	903
Other Rabi Pulses	-	311.704	311.704	-	253.834	253.834	-	815	815
Total Pulses	54.188	419.507	473.695	39.332	365.685	405.017	726	871	855
Total food Grains	3483.274	2672.645	6155.919	4004.067	4206.125	8210.192	11.50	15.74	13.34
Ground Nut	0.716	-	0.716	0.354	-	0.354	494	-	494
Castor Seed	-	0.133	0.133	-	0.127	0.127	-	957	957
Sesamum	3.635	-	3.635	2.824	-	2.824	777	-	777
Niger Seed	-	-	-	-	-	-	-	-	-
Sun Flower	2.604	6.047	8.651	3.573	8.871	12.444	1372	1467	1438
Soyabean	-	-	-	-	-	-	-	-	-
Rapeseed and Mustard	-	83.021	83.021	-	68.658	68.658	-	827	827
Lin Seed	-	30.665	30.665	-	25.973	25.973	-	847	847
Safflower	2.604	6.047	8.651	3.573	8.871	12.444	1372	1467	1438
Total oil seeds	6.955	120.073	127.028	6.751	103.795	110.546	971	864	870
Cotton*	-	-	-	-	-	-	-	-	-
Jute*	127.847	-	127.847	1191.963	-	1191.963	1678	-	1678
Mesta	12.990	-	12.990	118.357	-	118.357	1640	-	1640
Jute and Mesta	-	-	-	-	-	-	-	-	-
Sugarcane	103.115	-	103.115	4131.509	-	4131.509	40067	-	40067
Onion	14.863	-	14.863	123.66	-	123.660	8.32	-	8.32
Potato	52.580	90.535	143.115	421.692	811.194	1232.886	8.02	8.96	8.61

Source : Statistics and Evaluation Dept., GOB

Table 2.4 : Target area and Production of crops for 2006-07 (Area-lakh hectares/Production-lakh MT)

Name of Crop	Kharif		Rabi		Total	
	Area	Production	Area	Production	Area	Production
Rice	37.00	68.00	2.50	6.00	39.50	74.00
Wheat	00	00	24.00	58.00	24.00	58.00
Maize	4.00	6.95	6.00	19.00	10.00	25.95
Other Coarse Cereals	0.75	0.75	0.50	0.50	1.25	1.25
Pulses	2.50	2.30	8.50	9.00	11.00	11.30
Total Foodgrains	44.25	78.00	41.50	92.50	85.75	170.50
Oilseeds	0.25	0.18	3.56	2.90	3.81	3.08

Source : Agriculture Dept., GOB

2.3 Longterm Trend In Foodgrains Production

Foodgrain production in Bihar has shown high volatility, but there is a long-term trend of falling production in the State. Cereal production has fallen sharply from 122.29 lakh MT in 2001-02 to 81.12 lakh MT in 2005-06(Table 2.7). This fall in production has been accompanied by an almost secular decline in area under cereal production from 70.19 lakh hectares in 1990-91 to 65.87 lakh hectares in 2006-07. Larger part of the fall in production and area is explained by the fall in production of and area under rice (Table2.5). Though production of wheat too has fallen, but area under it has largely been unchanged around 20 lakh hectares. Fall in production of wheat been due to its falling yield. While it's yield in the later half of nineties hovered around 22 qtls/hect, it has steadily fallen thereafter, reaching 21.46 qtls/hect in 2000-01 and still lower at 13.94 qtls/hect in 2005-06 (Table 2.5). Pulses too have seen a fall in production and acreage, but the fall has been moderate. Their production has fallen from 5.47 lakh MT in 2001-02 to 4.83 lakh MT in 2005-06, with acreage falling in the corresponding period from 6.94 lakh hectares to 6.55 lakh hectares. While there has been a marginal fall in the productivity of pulses, but their yield rates have remained significantly above the national average. Acreage and production of coarse cereals have largely been unchanged over the last few years. For maize, there has been a rise in production from around 12 lakh MT in late nineties to nearly 15 lakh MT in 2005-06, with almost unchanged acreage and rising productivity, from around 20 qtls/hect to 23 qtls/hect over the same period.

Acreage and production of oilseeds has more or less hovered around 1.4 lakh hectares and 1.2 lakh MT in recent years with moderate fluctuations.

The falling trend in production and acreage of cereals has been further aggravated by deficient rainfall in 2006-07. Total cereal production is estimated to be 78.05 lakh MT, which is around 3 lakh MT less than the production figure for 2005-06 (Table 2.5). For kharif 2006-07, cereal production has been estimated at 39.64 lakh MT over an area at 34.29 lakh hectares. For rabi 2006-07, the estimate of cereal production is of 38.40 lakh MT over an area of 22.53 lakh hectares. The fall in production has been largely on account of fall in area from 65.87 lakh hectares in 2005-06 to 56.82 lakh hectares in 2006-07. The second advance estimates for 2006-07 have put the production figures for coarse cereals at 10.38 lakh MT on an area of 5.17 lakh hectares and an yield of 20.09 quintals/hectare. Production of pulses has been estimated at 4.05 lakh MT and that of oilseeds at 1.11 lakh MT. Estimates put the area under sugarcane cultivation at 1.43 lakh hectares with an output of 12.33 lakh MT.

The observed trend of fall in acreage and production of cereals, it might be noted is not incidental. There has been a deliberate effort by the State government during the last five years, to divert land under rice and wheat cultivation towards horticulture. Plan of crop diversion has been given priority in 12 districts of the state. About 30 percent of area under wheat in the districts of Muzaffarpur, Darbhanga, Samastipur and Madhubani (Zone 1 districts) is being considered for diversion towards mango, litchi and makhana. Similarly 20 percent of crop area in the districts of East Champaran, Samastipur, Khagaria, Muzaffarpur and Vaishali is being considered for diversion towards banana. Further, about 20 percent of rice-wheat area in the districts of Buxar, Bhojpur, Sasaram etc. is likewise being considered for diversion towards vegetable production. Finally, about 30 percent total area of the state is being considered for diversion from current crops towards new crops.

Table 2.5 : Area, Production & Productivity of Foodgrains and Oilseed

	Rice	Wheat	Maize	Other coarse cereal	Pulses	Total cereals	Oilseeds
Year 1996 – 1997							
Area	36.44	20.33	6.80	0.85	7.60	71.92	1.62
Production	58.12	44.70	15.20	0.97	6.35	125.34	1.11
Yield	15.95	22.09	22.35	11.41	8.35	17.43	6.85
National Yield	18.82	26.79	17.20	10.72	6.35	16.14	9.26
Year 1997 – 1998							
Area	36.21	20.09	6.09	0.78	7.52	70.69	1.65
Production	53.95	39.39	12.01	0.75	5.48	111.59	1.21
Yield	14.90	19.61	19.72	9.57	7.29	15.78	7.35
National Yield	19.00	24.85	17.11	9.86	5.67	15.52	8.16
Year 1998 – 1999							
Area	36.39	20.53	6.19	0.68	7.35	71.14	1.77
Production	52.91	42.92	12.09	0.73	6.69	115.34	1.51
Yield	14.54	20.91	19.53	10.74	9.10	16.21	8.53
National Yield	19.21	25.90	17.57	10.68	6.34	16.27	9.44
Year 1999 – 2000							
Area	35.96	20.81	6.38	0.64	7.22	71.01	1.57
Production	55.47	45.84	14.27	0.69	6.20	122.46	1.15
Yield	15.43	22.03	22.37	10.78	8.59	17.24	7.32
National Yield	19.86	27.78	17.92	10.34	6.35	17.04	8.53
Year 2000 – 2001							
Area	36.56	20.68	6.21	0.56	7.17	71.18	1.54
Production	54.44	44.36	14.97	0.58	6.22	120.59	1.31
Yield	14.89	21.46	24.11	10.37	8.67	16.94	8.51
National Yield	19.01	27.08	18.22	10.27	5.44	16.26	8.10
Year 2001 – 2002							
Area	35.52	21.23	5.94	0.53	6.94	70.19	1.39
Production	52.03	43.91	14.88	0.53	5.47	116.82	1.17
Yield	14.65	20.68	25.05	10.00	7.88	16.64	8.41
National Yield	20.79	27.62	20.00	11.31	6.07	17.34	9.13
Year 2002 – 2003							
Area	35.85	21.31	6.04	0.53	6.98	70.69	1.37
Production	50.86	40.41	13.50	0.48	5.61	110.85	1.05
Yield	14.19	18.96	22.35	9.06	8.04	15.68	7.66
National Yield	18.04	26.19	16.42	9.62	5.56	15.62	7.10
Year 2003 – 2004							
Area	35.78	20.77	6.16	0.47	6.80	69.98	1.41
Production	54.48	36.89	14.74	0.43	5.57	112.11	1.24
Yield	15.23	17.61	23.93	9.15	8.19	16.02	8.79
National Yield	20.50	27.07	19.83	12.28	6.23	17.07	10.72
Year 2004 – 2005 (last forecast)							
Area	31.23	20.28	6.14	0.44	6.58	64.67	1.32
Production	24.72	32.63	14.66	0.39	4.67	77.07	1.17
Yield	7.91	16.09	23.88	8.86	7.09	11.92	8.66
Year 2005 – 2006 (4th advance estimate)							
Area	32.22	20.38	6.22	0.51	6.55	65.87	1.36
Production	34.17	28.40	14.25	0.48	4.83	81.12	1.19
Yield	10.60	13.94	22.92	9.41	7.37	12.47	8.73
Year 2006-07 (2nd advance estimates)							
Area	31.31	20.34	4.68	0.49	4.73	56.82	1.27
Production	35.28	32.39	9.93	0.46	4.05	78.05	1.11
yield	11.27	15.92	21.20	9.38	8.55	13.74	8.70

Note : Area in lakh hectare, production in lakh MT and yield rates in qtls/hectare

Source : Statistics and Evaluation Dept., GOB

Table 2.6 : Productivity of Different Crops**(Quintals / hectare)**

Year	Rice		Wheat		Maize		Pulses		Oilseeds	
	State	National	State	National	State	National	State	National	State	National
1992-93	14.15	18.88	21.30	23.80	21.50	16.02	7.09	5.98	7.05	7.99
1993-94	13.52	19.11	21.08	25.59	20.61	15.70	7.38	6.10	7.07	8.43
1994-95	12.18	17.97	20.06	24.83	20.14	15.95	6.15	5.52	6.84	8.51
1995-96	15.95	18.82	22.09	26.79	22.35	17.20	8.35	6.35	6.35	9.26
1996-97	14.90	19.00	19.61	24.85	19.72	17.11	7.29	5.67	7.38	8.16
1997-98	14.54	19.21	20.91	25.90	19.54	17.97	9.10	6.34	8.55	9.44
1998-99	15.43	19.86	22.03	27.78	22.37	17.92	7.96	6.35	7.32	8.53
2000-2001	14.89	19.01	21.73	27.08	24.54	18.22	8.35	5.44	7.44	8.10
2001-02	14.65	20.79	20.65	27.62	25.04	20.10	7.88	6.07	8.41	9.13
2002-03	14.19	18.04	18.96	26.19	22.35	16.42	8.04	5.56	7.66	7.10
2003-04	15.23	20.51	17.61	27.07	23.93	19.83	8.19	6.23	8.79	10.72
2004-05	7.91	-	16.09	-	23.88	-	7.09	-	8.86	-
2005-06	10.6	-	13.94	-	22.92	-	7.37	-	8.7	-
2006-07	11.27	-	15.92	-	21.20	-	8.55	-	8.73	-

Source : Statistics and Evaluation Dept., GOB

Table 2.7 : Trends In Cereal Production

Sl. No.	Year	Area (in lakh hect.)	Production (lakh MT)	Productivity (Qtls/Hect.)
1	1950 – 1951	96.71	44.42	4.53
2	1960 – 1961	93.66	74.19	7.92
3	1970 – 1971	99.08	78.81	7.95
4	1980 – 1981	100.25	99.11	9.89
5	1990 – 1991	94.31	124.00	13.02
6	2001 – 2002	70.19	116.82	16.64
7.	2002 – 2003	70.81	110.88	15.66
8.	2003 – 2004	69.98	112.10	16.02
9.	2004-05 (last estimate)	64.67	76.87	11.92
10.	2005-06 (last estimate)	65.87	81.12	12.47
11.	2006-07 (II nd estimate)	56.82	78.05	13.74

Source : Statistics and Evaluation Directorate, GOB

2.4 Flood Control and Drainage

Every year, Bihar faces the vagaries of flood and waterlogging. After bifurcation of the State, Bihar has become the most flood prone area in the country. Total flood prone area of the State is

68.80 lakh hectares which is 73.06 percent of its total geographical area and 17.2 percent of the total flood prone area in the country. Flood situation is most severe in northern plains of Bihar. This is because almost all the major rivers in the State enter Bihar from Nepal in this region. Bed slope of these rivers is very sharp in the Nepal and they usually enter the State on plain lands. Because of a sudden drop in bed slope, silt brought by the flow of these rivers get deposited at their base to cause recurring floods.

While a long term solution to this problem can be achieved by constructing dams at upper catchment of Kosi, Gandak, Bagmati, Mahananda rivers in Nepal territory, in the short run, Bihar has to depend on construction and maintenance of embankments along the rivers. Till March 2006, 3430.47 km length of embankments have been constructed in the State which protect 29.16 lakh hectares of area, out of a total of 68.80 lakh hectare flood prone area. Thus, 39.64 lakh hectares of land area still stands exposed to the perennial problem of floods. Despite such high exposures to threat of flood, only 29 percent of the total 10th Plan allocation for flood control have been utilized (Table 2.8). A more efficient utilization of the allocated funds would have lessened the damage capacity of floods in the State.

Table 2.8 : 10th Plan Performance on the Outlays for Flood Control (Rs in crore)

Sl.No	Source of Funding		10 th Plan Outlay	
	Flood Control	Agreed Outlay	Actual Outlay	Anticipated Performance
1	Establishment (CSS+State Plan)	114.08	152.52	145.79
2	State Plan (Ongoing & New Schemes)	1576.00	332.92	329.81
3	NABARD	55.00	21.00	16.97
	Sub Total (works)	1631.0	353.92	346.78
	Total Flood Control	1745.08	506.44	492.57

Beside the menace of flood, about 9.41 lakh hectare of land suffer from the problem of water logging in Bihar. It has been found by various Expert Committees that it would not be economically viable to free 2.5 lakh hectares of land from water logging due to excessive depth. Thus, against 6.91 lakh hectares of water logged area from where water can be drained out, only about 1.50 lakh hectare have been freed from water logging. The task ahead is to free the remaining 5.41 lakh hectares of land area. Against a total agreed outlay of around Rs167 crore, on

drainage works in the 10th Plan, there has been an actual utilisation of around 74 percent (Table 2.9).

Table 2.9 : 10th plan performance and 11th plan requirement Rs in Crore

Sl. No.	Source of Funding	10 th Plan Outlay	
		Agreed Outlay	Actual Utilisation
	Drainage		
1	State Plan (Ongoing & New Schemes)	120.94	7.79
2	NABARD	166.77	122.79
	Total Drainage	166.77	122.79

2.5 Irrigation

Bihar is richly endowed with water resources and with a very healthy rainfall average of 1271.9 mms. Ultimate irrigation potential in the State is estimated to be around 102 lakh hectares which is far above total cultivated area in the State (Table 2.10). However, neither rainfall nor the distribution of the water resources is uniform across the State, causing uneven irrigation potential/coverage across the State. While Zone-2 (Table 2) receives earliest showers and highest rainfall (1450 mm) among all three agro-climatic zones in the State, Zone-3 receives an average rainfall of only 1115 mms.

Table 2.10 : Ultimate Irrigation Potential in Bihar (In lakh hectares)

Source	India	Bihar	% Share of Bihar in India
1. Surface Water	737	63.58	8.63
(a) Major + Medium Schemes	585	53.53	9.15
(b) Minor Irrigation	174	10.05	5.78
2. Ground Water	641	39.06	6.09
Total (1 + 2)	1399	102.64	7.34

Source : Central Water Commission, Dept. of Water Resources, Bihar and Central Ground Water Board.

Bihar has 45.67 lakh hectares of irrigated area against its total geographical area of 93.6 lakh hectares. While created irrigation capacity of 45.67 lakh hectare means that around 49 per cent of

total area is irrigated, distribution of irrigation capacity is not even across the State. The percentage of irrigated area varies greatly across different regions/districts, from a low of 16 percent (in Jamui) to around 86 percent (in Sheikhpura). In fact, both irrigation capacity and its source vary greatly across the 3 agro-climatic Zones of the state.

While Zone 1 accounts for nearly 37 per cent of total geographical area of the State, its share in total created irrigation capacity of the State is about 31 per cent (Table 2.11). On the other hand, Zone 3B which also accounts for 31 per cent of geographical area has about 41 per cent of total irrigated land in the State. Zone 3A having 13 per cent of geographical area of the State has only around 8 per cent of total irrigated area of the. Finally, while around 64 per cent of Zone 3B area is irrigated, Zone 3A has only around 32 per cent of its area irrigated.

This variation in irrigation capacity across the regions also extends to the sources of irrigation. Nearly 63 per cent of total created irrigation capacity in the State has tubewells as its source (Table 2.12). Canal irrigation accounts for nearly 30 per cent of total irrigated area. Thus major and medium sources of irrigation together account for 93 per cent of total created irrigation capacity in the State, with other sources (minor and micro irrigation) accounting for only about 7 percent of total irrigation. A very high dependence of irrigation on tubewells, and operation of diesel tubewell due to lack of power infrastructure in the rural areas means a high cost and inefficient irrigation.

The variation in irrigation source has a very clear pattern across the agro-climatic zones of the State. While nearly 50 per cent of irrigation in Zone 3B has canal as its source, only 13 per cent of the irrigated area in Zone 2 receives canal irrigation. Reliance on tubewells is very high in Zones 1 and 2 (source of 85 percent of Zone 1's irrigated area). On the other hand, canals have a greater role to play in Zones 3A and 3B and there is a greater balance between tubewell and canal irrigation in these regions. Incidentally, the latter two zones are also the zones with lowest rainfall among all the regions of the state. Thus, while importance of canal irrigation is much greater in southern parts of Bihar (Zone 3), there is an almost exclusive reliance on tubewell irrigation in the northern parts, especially in Zone 2. This is rather peculiar as most of the rivers in Bihar flow through its northern plains, which therefore should have had a better canal irrigation capacity.

Minor and micro irrigation have only a limited coverage in the overall irrigation scenario of the State, accounting for only 7.53 per cent of the irrigated area. Here too, there is a great deal of variation in its use across the State. While only 2 per cent of irrigated area of Zone 2 has minor irrigation as its source, its contribution to irrigated area in Zone 3 is around 17 per cent.

Ground water resources have remained largely unutilized in the State. To tap the huge potential of ground water irrigation, Million Shallow Tubewell Programme has been prepared which would imply additional irrigation capacity of 20 lakh hectares. About 6.97 lakh diesel tubewells and pumpsets are to be distributed by March 2007 under this programme. Farmers are given a grant of 30 per cent and a loan of 50 per cent of total costs under this Programme and no discrimination is made between different categories of beneficiary farmers. Against the distribution target of 5.37 lakh pumpsets by March 2006, 3.80 lakh pumpsets were distributed by November, 2005.

On-farm water management programme is being run in all the 38 districts of the State under which shallow pumpsets, normal pumpsets, and other micro irrigation sources are being arranged. Watershed development programme is being run under which water generating ponds, and other devices of ground water regeneration are being constructed to develop and improve water utilization capacity in the State. In this direction, 5 lakh trees have been planted in 8 districts of the State under agro-forestry programme towards developing water utilization capacity. Sprinkler sets and HDPIP pipes are being distributed in the State under the Centrally sponsored ISOPOM plan for production of pulses, oilseeds and maize. By March 2006, additional irrigation capacity of 18000 hectares of land was created under this programme. Against the target to create additional irrigation capacity of 2.39 lakh hectares in 2006-07, an additional irrigation capacity of 1.76 lakh hectares was created by September 2006. In the 10th Plan, actual outlay on irrigation was Rs1980 crore which was only about 60 percent of total agreed outlay on irrigation (Table 2.13). A substantial portion of this outlay was on major and medium irrigation.

Table 2.11 : Zonal Land Usage, and Percentage of Irrigated Land

Districts	Land Area (in hectares)	Net Sown Area (in hect.)	Total Crop Area (in hect.)	Multi Cropped Area (in hect.)	total irrigated area	% irrigated area
Zone 1						
Saran	265,000	192938	233024	40086	117706	44.42
Siwan	224,000	162889	238635	75746	107262	47.88
Gopalganj	204,000	150524	232775	82251	107689	52.79
Muzafarpur	315,000	207145	339364	132219	130164	41.32
E Champaran	432,000	288804	323302	34498	155655	36.03
W Champaran	484,000	279758	366712	86954	176683	36.50
Sitamarhi	222,000	121048	188399	67351	71682	32.29
Sheohar	44,000	26483	43567	17084	12652	28.75
Vaishali	201,000	126660	190331	63671	77546	38.58
Darbhanga	254,000	172716	209949	37233	102087	40.19
Madhubani	354,000	225113	317083	91970	138551	39.14
Samastipur	262,000	184718	252196	67478	112387	42.90
Begusarai	188,000	117193	174313	57120	91089	48.45
total	3,449,000	2255989	3109650	853661	1401153	40.62
% of total land area	36.85					
%of land area		65.41	90.16	24.75		
Zone 2						
Saharsa	165,000	109633	194022	84389	94983	57.57
supaul	239,000	155251	268820	113569	142114	59.46
madhepura	180,000	131531	205481	73950	133124	73.96
Purnia	314,000	221166	307003	85837	170504	54.30
Kishanganj	189,000	131105	195648	64543	50535	26.74
Araria	271,000	180983	282645	101662	110962	40.95
Katihar	291,000	167217	278835	111618	129408	44.47
Khagaria	149,000	84684	133902	49218	83393	55.97
	1,798,000	1,181,570	1,866,356	684,786	915023	50.89
	19	65.71579533	103.8017798			
Zone 3A						
Munger	140,000	48029	69030	21001	37015	26.44
Sheikhpura	62,000	44217	62737	18520	53423	86.17
Lakhisarai	129,000	68044	78098	10054	41934	32.51
Jamui	305,000	81117	88723	7606	50780	16.65
Bhagalpur	254,000	145667	177576	31909	78364	30.85
Banka	306,000	153818	161325	7507	115698	37.81
	1,196,000	540,892	637,489	96,597	377214	31.54
% of total land area	13					
% of land area		45.23	53.30	8.08		

Zone 3B						
Patna	317,000	206294	253848	47554	179595	56.65
Nalanda	232,000	180872	228353	47481	193288	83.31
Bhojpur	237,000	185364	227536	42172	188094	79.36
Buxar	167,000	138277	144944	6667	113910	68.21
Rohtas	391,000	254360	363159	108799	330834	84.61
Kaimur	342,000	154226	204719	50493	166537	48.70
Gaya	494,000	200333	277364	77031	235090	47.59
Jehanabad	94,000	63650	80024	16374	67206	71.50
Arwal	63,000	41784	58263	16479	48131	76.40
Nawada	249,000	110565	149046	38481	126558	50.83
Aurangabad	330,000	197912	281626	83714	224201	67.94
	2,916,000	1,733,637	2,268,882	535,245	1873444	64.25
% of total land area	31					
% of land area		59.45	77.81	18.36		
Bihar	9,360,000	5712088	7882377	2170209	4566,834	48.79

Source : Central Water Commission Dept. of Water Resources, Bihar and Central Ground Water Board.

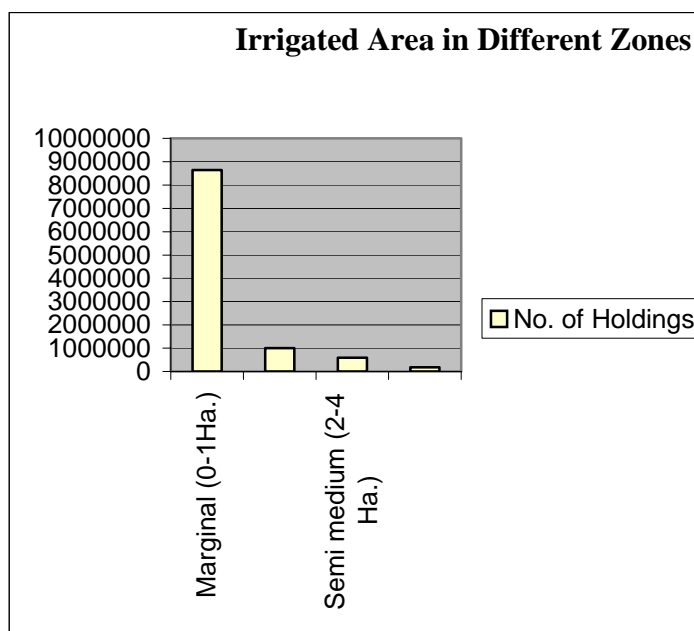
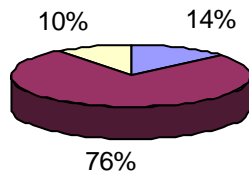


Table 2.12 : Zonal Classification of Total Irrigated Area through Different Sources

Unit in hectares					
	Name of District	Canal	Tube well	Other sources	Total irrigated Area
Zone 1					
	Saran	2414	115231	61	117706
	Siwan	6314	93353	7595	107262
	Gopalganj	50672	54027	2990	107689
	Muzaffarpur	-	130164	-	130164
	E. Champaran	794	154450	411	155655
	W. Champaran	128686	42971	5026	176683
	Sitamarhi	1491	63661	6530	71682
	Sheohar	-	12652	-	12652
	Vaishali	-	65655	11891	77546
	Darbhanga	-	95736	6351	102087
	Madhubani	-	41113	97438	138551
	Samastipur	-	112387	-	112387
	Begusarai	-	89416	1673	91089
Zone 1 total		1,90,371 (13.59% of total irrigated area)	10,70,816 (76.42% of total irrigated area)	1,39,966 (9.99% of total irrigated area)	14,01,153 (30.68% of total irrigated area)
Zone 2					
	Saharsa	5527	84562	4894	94983
	Supaul	67352	73678	1084	142114
	Madhepura	32795	92954	7375	133124
	Purnea	11729	158775	-	170504
	Kishanganj	-	50535	-	50535
	Araria	-	110962	-	110962
	Katihar	-	129408	-	129408
	Khagaria	-	76748	6645	83393
Zone 2 total		117,403 (12.84% of total irrigated area)	777,622 (84.98% of total irrigated area)	19,998 (2.18% of total irrigated area)	9,15,023 (20.04% of total irrigated area)
Zone 3A					
	Jamui	1040	30439	5536	37015
	Sheikhpura	23951	525	28947	53423
	Munger	13314	24550	4070	41934
	Lakhisarai	2185	41107	7488	50780
	Bhagalpur	4297	57797	16270	78364
	Banka	90062	23893	1743	115698
Zone 3A total		1,34,849 (35.75% of total zonal irrigated area)	1,78,311 (47.27% of total zonal irrigated area)	64,054 (16.98% of total zonal irrigated area)	3,77,214 (8.26% of total irrigated area)
Zone 3B					
	Patna	51115	121049	7431	179595
	Nalanda	9442	164270	19576	193288
	Bhojpur	40781	135775	11538	188094
	Buxar	44421	66410	3079	113910
	Rohtas	262570	36037	32227	330834
	Kaimur	98493	54414	13630	166537
	Gaya	232303	-	2787	235090
	Jehanabad	596	57839	8771	67206
	Arwal	28712	18034	1385	48131
	Nawada	13944	108831	3783	126558
	Aurangabad	142664	65794	15743	224201
Zone 3B total		9,25,041 (49.38% of total zonal irrigated area)	8,28,453 (44.22% of total zonal irrigated area)	1,19,950 (6.4% of total zonal irrigated area)	18,73,444 (41.02% of total irrigated area)
TOTAL		1367664 (29.95 of total irrigated area)	2855202 (62.52% of total irrigated area)	343968 (7.53% of total irrigated area)	4566834

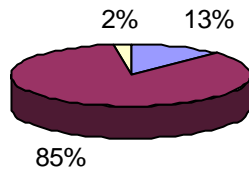
Source : Central Water Commission, Dept. of Water Resources, Bihar and Central Ground Water Board.

Irrigated Area by Source in Zone 1



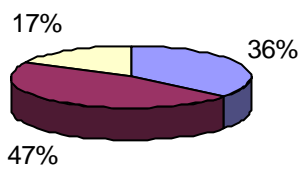
Canal Tubewell Other sources

Irrigated Area by Source in Zone 2



Canal Tubewell Other sources

Irrigated Area by Source in Zone 3A



Canal Tubewell Other sources

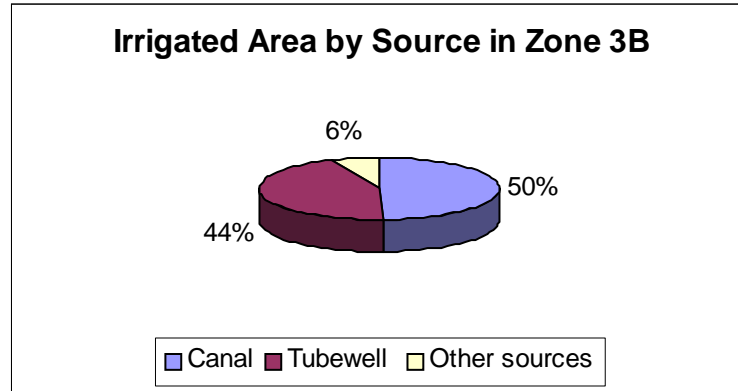


Table 2.13 : The total outlay required including establishment as per source of funding is as follows : (Rs in crore)

Sl. No.	Source of funding	10 th plan outlay		Proposed outlay for 11 th plan	
		Agreed Outlay	Actual Outlay	Anticipated Performance	
	Major & Medium Irrigation				
1	Establishment (CSS + State Plan)	468.00	508.35	482.58	625.00
2	State Plan (Ongoing & New Schemes)	1106.00	124.57	121.89	2006.90
3	RSVY	0.00	165.00	17.14	1500.00
4	AIBP	1257.63	995.00	980.85	2962.91
5	NABARD	441.56	188.0	144.87	1500.00
	Sub Total (Works)	2805.19	1472.58	1264.75	7969.81
	Total Irrigation	3273.19	1980.93	1747.33	8594.81

2.6 Agricultural Inputs

Seeds

Agriculture in Bihar has been bedeviled by a trend of falling productivity over the last few years. Major crops, particularly rice and wheat which together account for 77.26 percent of total cropped area have seen a substantive fall in their productivity in recent years.

Falling productivity of agricultural sector in Bihar , inspite of its rich soil endowment, can be partly explained by the limited availability of good quality seed and a very poor seed replacement rate. Seed replacement rate for cereals is about 10-12 percent, for gram it is 7.5 percent and for rapeseed and mustard, it is 30 percent(Table 2.14). The seed replacement ratio for paddy has increased from 6.8 percent in 2003-04 to 10 percent in 2004-05 to 12 percent in 2005-06. This ratio for wheat was 10 percent in 2004-05 and 11 percent in 2005-06. These rates are much below the desirable 30-35 percent for self-pollinated crops and 50 percent for cross-pollinated crops. In other states, the seed replacement for paddy is at 50 percent in Andhra Pradesh, the rate for wheat is 41 percent in Maharashtra, for gram it is 30 percent in Orissa and for rapeseed and mustard it is 100 percent in Gujarat. However, the seed replacement ratios for oilseeds and maize in the State meet the desired norms, standing at 30 percent for rapeseeds and mustard, and 40 percent for rabi maize which is reflected in their yield being above the national average.

Table 2.14 : Seed Replacement Rates of Different Crops

Sl. No	Name of the crops	2003-04		2004-05		2005-06		2006-07	
		Target	achievement	Target	achievement	Target	achievement	Target	achievement
Kharif crops									
1	Paddy	8%	6.8%	10%	10%	11%	12%	15%	
2	Maize	40%	30%	50%	40%	50%	50%	60%	
3	Pulses	10%	6%	10%	7.5%	10%	8%	14%	
4	Oilseeds	5%	2%	5%	3%	5%	5%		
Rabi Crops									
1	Wheat	10%	8.1%	10%	9%	15%	11%	15%	
2	Maize	-	-	-	-	50%	-	80%	
3	pulses	5%	1.2%	10%	7.5%	15%	-	10%	
4	Oilseeds	25%	20%	30%	25%	30%	-	30%	
5	Vegetables	25%	20%	60%	50%	60%	-	60%	

Table 2.15 : Seed Consumption of Crops in Bihar (in 000 quintals)

	Paddy	Wheat	Maize	Paddu
1997-98		34.77	26.43	1.67
1998-99		68.65	102.34	2.45
1999-2000		77.71	130.43	14.02
2000-01		82.23	128.36	41.40
2001-02		72.26	190.64	24.34
2002-03		90.02	164.09	26.65
2003-04		104.40	181.50	45.95
2004-05		144.99	242.52	36.80
2005-06		194.25	237.85	33.26
2006-07		222	300	35

Table 2.16: HYV Area as Percentage of Total Cropped Area in Bihar

Crop	Year	Bihar
Rice	TE 1982	24.7
	TE 1990	38.3
	TE 1999	67.9
	TE 2005	73.9
Wheat	TE 1982	70.4
	TE 1990	76.9
	TE 1999	90.6
	TE 2005	92.0
Maize	TE 1982	56.9
	TE 1990	62.4
	TE 1999	75.4
	TE 2005	77.1

Source : Directorate of Statistics and Evaluation, Government of Bihar

The target seed replacement rate for pulses in 2006 was 14 and 10 percent in kharif and rabi seasons respectively. Seed replacement target for oilseeds and vegetables was 30 percent and 60 percent respectively. There has been an increase in seed consumption of paddy and wheat in the State in the recent years; while seed consumption for paddy has increased sharply from 72.26 thousand quintals in 2001-02 to 194.25 thousand quintals in 2005-06, the same for wheat has increased moderately form 190.64 thousand quintals to 237.85 thousand quintals over the same period (Table 2.15). This increase in seed consumption in the backdrop of their falling acreage is explained by increase in seed replacement ratio and increasing use of HYVs for these crops. The acreage of paddy under HYVs has increased by almost 4 percent over the period 1999-2005, and that of wheat under HYV has increased by around 2 percent over the same period (Table 2.16). Arrangements have been made to supply 48,000 quintals of maize seeds, 3500 quintals of arhar, 1400 quintals of urad, and 420 quintals of moong for kharif 2006. Seed requirement for rabi-2006 has been estimated at 300 thousand quintals. The estimate for maize seeds in rabi-2006 was of 60 thousand quintals (Table 2.17).

Table 2.17 : Certified Seed Requirement of Different Crops in Bihar (2006-07)

Name of crop	Certified seed requirement (In Qtls.)
Kharif	
Paddy	2,22,000
Maize	48,000
Arhar	3500
Urad	1400
Moong	420
Rabi	
Wheat	3,00,000
Maize	60,000
Gram	11,600
Lentil	5300
Pea	2400
Rai /Tori	1440

For last several years, Bihar State Seed Corporation had become non-functional and agricultural farms of the State government were lying barren. In the current financial year, the State government has given approval for restarting seed production by Bihar State Seed Corporation for the next five years at an outlay of Rs. 27.12 crore. Seed production for paddy has started on 45 agricultural farms in the last kharif season, and 10,000 quintals of HYV paddy seeds have been produced. In the current rabi season, programme of production of wheat seeds is being carried out. This would facilitate timely and economical availability of modern crop breeds to the farmers.

Fertilisers

Fertiliser consumption in the State has steadily increased over the years. The consumption of fertilizers has increased from 85 kgs/hectare to 110 kgs/hectare in 2005-06 (Table 2.18). The estimated consumption for 2006-07 is 125 kgs/hectare. For 2006, the State government has estimated the fertilizer consumption to be 9 lakh MT of urea, 3 lakh MT of DAP, 90000 MT of MOP, 1.5 lakh MT of NPK, and 60000 MT of SSP, 90 percent of which has been allocated by the Central government. Despite an increase over the years, fertilizer consumption per hectare in the State is lower than the national average. Besides the low level, an important problem is the distorted consumption pattern of fertilizers in the State. While the ideal ratio of NPK consumption

should be 4:2:1, the consumption pattern in Bihar has become increasingly distorted over the years (Table 2.19). The NPK ratio has worsened from around 12:3:1 in 2000-01 to 24:2:1 in 2003-04, but fortunately improved to 7:1:1 in 2005-06. This problem, along with others, is being addressed by the extension initiatives of the State government, such as establishment of soil testing laboratories and Krishi Vikas Kendras (KVK) in each block.

Table 2.18 : NPK Consumption pattern from 1994 – 1995 onwards

Year	N:P:K Ratio
1995 – 1996	8.4:2.7:1.8
1996 – 1997	12.4:1.7:2.1
1997 – 1998	11.5:2.8:1
1998 – 1999	13.5:3.3:1
1999 – 2000	11.1:3.2:1
2000 – 2001	12.1:2.9:1
2001 – 2002	12.1:2.3:1
2002 – 2003	23:4.2:1
2003 – 2004	24.3:1.7:1
2004 – 2005	14.7:1.7:1
2005 – 2006	6.8:1.3:1
2006-07	4.3:1.8:1 (tentative)

Table 2.19 : Consumption of nutrient per hectare

Year	Nutrient consumption(in Kgs/hect.)
1993&1994	61–20
1994&1995	62–50
1995&1996	65–00
1996&1997	68–00
1997&1998	69–00
1998&1999	72–00
1999&2000	78–50
2000&2001	85–00
2001&2002	94–00
2002&2003	96–00
2003&2004	87–50
2004&2005	92–15
2005&2006	110–00

2005&2006	125-00
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Credit

From an already low level, agriculture's share in total bank credit has fallen over the last 5 years. While its share was at 24 percent in 2000-01, it fell to 20 percent in 2003-04. Though it has registered an increase to 23 percent in 2004-05, it is still lower than the share in 2000-01. The entire rural credit delivery system is not in a good shape in Bihar. In terms of access of cultivators to the banking institutions, average population per bank branch in Bihar, as on end of June 2006, was 25,000, as against the national average of 16,000 (RBI 2006). While the number of commercial bank branches in the State is 2082, only 60.37 percent of these branches operate in rural areas. There are 5 Regional Rural Banks in the State, with 1486 branches, of which around 86 percent are located in the rural areas. The credit-deposit ratio (CDR) of RRBs at 44.77 percent is much higher than those of commercial banks.

Taking the entire banking sector, a total of 4015 branches of 72 banks cater to the 82.9 million strong population of the State (Table 2.20). Even this sparse banking infrastructure is disproportionately oriented towards the urban economy of the State, with only 72 per cent of total branches catering to the rural areas which is home to nearly 90 percent of population . Total allocation of credit to agriculture in Bihar has been increasing over the last few years, but has remained way behind the target credit mark.

Table 2.20 : Institutional Arrangements (Branch Position)

Agency	No. of Banks	No. of Branches	Rural Branches	Semi urban	Urban
CBS	30	2082	1257(60.3%)	443	386
RRR's	16	1486	1287(86.60%)	165	34
SCB	1	14	-	-	14
DCCB's	22	280	240(85.71%)	13	27
LDB	1	151	80(52.98%)	16	55
UCB	2	2	-	-	2
Total	72	4015	2880(71.73%)	637	578

Table 2.21 : Target and Achievement of Agricultural Credit by Different Banks.**(Rs. in crore)**

Year	Commercial Bank				Regional Rural bank				Cooperative Bank				Total Target
	Target	Achievement	% of total target credit for the year	% of total achievement in credit allocation for the year	Target	Achievement	% of total target credit for the year	% of total achievement in credit allocation for the year	Target	Achievement	% of total target credit for the year	% of total achievement in credit allocation for the year	
2002-03	1050.33	604.73	57.20	70.30	391.62	153.84	21.33	17.88	394.14	101.6	21.47	11.81	1836.09
2003-2004	1220.15	792.44	64.21	50.85	376.98	204.87	19.84	13.15	303.21	561.11	15.96	36.01	1900.34
2004-2005	1386.29	1325.06	59.25	65.27	550.86	431.3	23.54	21.25	402.71	273.75	17.21	13.48	2339.86
2005-2006	1645.57	1489.33	61.00	68.51	644.26	450.09	23.88	20.70	407.65	234.61	15.11	10.79	2697.48

Commercial banks account for the largest share of the total credit disbursed to agriculture in the State, though this share has fallen moderately in recent years, from 70.30 percent in 2002-03 to 68.51 percent in 2005-06 (Table 2.21). Total outstanding credit as on March 2005 of all scheduled commercial banks to agriculture stood at Rs. 2973.52 crore, out of which direct credit was Rs.2634.49 crore and indirect credit was Rs.339.03 crore. The share of regional rural banks in total agricultural credit has fluctuated around 20 per cent, although it registered a sharp fall in 2003-04 to 13 percent. Similarly, the share of cooperative banks in total agricultural credit is found to be about 12 percent, although it was suddenly high at 36 percent in 2003-04.

The agricultural credit need was estimated to be Rs. 11341.22 crore for Bihar in 2006-07. An amount of Rs. 10042 crore for crop loans, Rs. 78.22 crore for the Macromode / ISOPAM plan, Rs. 60 crore for micro-irrigation, Rs. 18.50 crore for agri-clinics and Rs. 1142 crore for horticulture mission etc. would be needed as loan from the banking sector. However, the credit target or agriculture set by banks for 2006-07 was only Rs 3732 crore which was much lower than the requirement.

Kisan Credit Card (KCC) is an important medium for increasing agricultural credit. At present, there are 1.04 crore land holdings in the State, but till 2005-06, only 1450779 KCCs have been distributed against the target of 3047536. To meet the target of crop loans of Rs.10042 crore in 2006-07, KCCs have to play a very important role. Although total disbursement under KCC has

increased almost 2.5 times, from Rs. 342 crore in 2002- 03 to Rs. 815 crore in 2005-06 (Table 2.22), it still channels only a miniscule proportion of the total credit volume for crop loans. A target of 6 lakh more KCCs has been fixed by the banks for 2006-07. But even this target is grossly inadequate to measure up to the total credit demand in the current year. In the area of micro-finance, more than 17,000 Self-Help Groups had been financed by banks upto 2005 through their priority lending schemes in 38 districts. The target for 2006-07 is to raise the number to 24,000 SHGs and advance Rs. 48 crore through the scheme.

Table 2.22 : Details of KCC in Bihar

(Amount in Rs. Lakh)

Year	Physical Target	Sanction		Disbursement	
		No. of application	Amount	No. of application	Amount
2002-2003	759098	311731	91119	214564	34242
2003-2004	595904	594152	76302	355502	49636
2004-2005	795700	465744	87390	463519	86051
2005-2006	566751	318603	85963	317294	81495

Insurance

Agricultural production in Bihar has shown great fluctuation over the years. At one hand, this fluctuation can be devastating for a small-marginal farmer who operates on limits of subsistence, and, on the other hand, it is a disincentive for enterprising farmers who have the potential for investment. In this perspective, crops in the State are being insured since kharif 2000 to provide economic help to the insured farmers whose crops are damaged by natural disaster. Kharif crops such as paddy, maize, jute and chillies, and among rabi crops, wheat, gram, arhar, masoor, maize, rapeseed and mustard, potato, sugarcane and onion are covered under National Agricultural Insurance Plan. While participation of indebted farmers is compulsory in the plan, that of non-indebted farmers is voluntary.

Under this plan, grants are given in the premium to be paid by the small and marginal farmers, with equal shares of State and Central government. The number of beneficiary farmers for 2004-05 was 411532, 293442 in kharif and 118090 in rabi season .There has been a drop in coverage of

farmers under crop insurance in 2005-06 as compared to 2004-05. Crop insurance policy was taken by 409,946 farmers in 2005-06, out of which 221985 took cover for kharif season and 187961 took cover for rabi season. The spread of insurance cover, however, is grossly inadequate keeping in mind that there are around 104 lakh landholdings in the State , nearly 93 percent of which are small and marginal holdings which are specially required to be protected through the agriculture insurance plan. Its coverage would have to be significantly expanded over the years in order to stabilize income from agriculture and create conducive environment for productive investment in agriculture.

Extension Services

In a sector which is based on enterprise of nearly 77 percent of total workforce on around 1.04 crore landholdings (92.5 percent of them being small and marginal holdings), importance of agricultural research to create/upgrade agricultural technology and extension of this technology and other support services to the farmers, cannot be overemphasized. In Bihar, there is a huge breach between the technology available in the agricultural universities/institutions and those on the field. Efforts have to be made to transfer the available technology to the farmers in the field. The public sector agricultural research and extension system consists of the Rajendra Agricultural University for agricultural research and education; seven research centers/ stations of the Indian Council of Agricultural Research for commodity and location-specific research; and various Departments of the State government that provide agricultural extension and regulatory services. The agricultural research and extension system has not been fully effective in developing and disseminating appropriate technologies to the farmers in the State. While 0.4 percent of agricultural GDP is spent on agricultural research and education at the national level, the average for Bihar is 0.2 percent. Further, 95 percent of this spending is used for salaries and 5 percent for establishment expenses, thereby leaving no funds for operational expenses needed to carry out relevant research. NSSO 2003 figures point out that the performance of the extension system in the State has been such that a mere 0.5 percent of farmers access information on modern technology from extension workers.

Steps to reform the above situation have been in the recent years and, in particular, in the current year. The State government has universalized Agricultural Technology Management Agencies (ATMAs) to cover all districts of the State. The ATMAs are designed to decentralize decision-

making through 'bottom-up' planning procedures that would directly involve farmers and the private sector in planning and implementing extension programmes at the block and district levels. Similarly, a decision has been taken in 2006 to universalize Krishi Vigyan Kendras to all districts of the State. In addition, 31 new seed testing laboratories have been sanctioned in the current financial year to give each district its own seed testing laboratory.

The State has a very distorted pattern of nutrient consumption regarding NPK ratio, which not only leads to a waste of resources but also mars the soil quality of the fields. A major reason for this imbalanced use of fertilizers is lack of knowledge among the farmers about the soil quality of their fields. In the current year, 16 soil-testing laboratories have been sanctioned, adding to the earlier strength of 23, thereby allowing for a complete coverage of all the districts. In fact, a mega-project with an outlay of Rs 309 crore has been sanctioned in this year to establish soil testing laboratories in all the 534 blocks of the state over next 4 years.

Management of seed supply is an important component of any programme of agricultural development. In the current year, Bihar State Seed Corporation has been revived and production of seeds is being undertaken by it on 45 state managed farm which remained inoperative for some years. More than 1100 agriculture graduates have been trained as agriclinics in the State. The utilization of technical expertise of these trained youths is necessary for agricultural development. A decision was taken in the current year to use the seeds produced by agriclinic for public sector programmes. In the current year, the Kisan Samman Yojna was also launched to identify and acknowledge enterprising farmers in the State and using them as extension agents. This plan is unique and innovative programme of extension reforms.

2.7 Horticulture

Bihar is one of the major producers of vegetables and fruits in India with 9.8 and 6.7 percent of national production respectively. It ranks third and sixth among other States in the production of vegetables and fruits respectively. Fruit area in the State is 2.91 lakh hectares which is around 7.8 percent of the total fruit area in the country (Table 2.23). In general, yield rates of fruits and vegetables are lower in Bihar than those of other States. However they are among the highest for okra and litchis. The annual production of fresh fruits in Bihar is about 29.20 lakh MT. In

addition, vegetables are grown in an area of 4.87 lakh hectares from which around 72.58 lakh MT of vegetables is produced (Table 2.24). Besides this, potato cultivation takes place in an area of 3.05 lakh hectares from which 53.07 lakh MT of potato are produced.

Makhana cultivation is done in about 5000 hectares in the entire country, 90 percent of which falls in Bihar. Projects for production of makhana, litchi and mangoes are currently being promoted by NABARD under RSVY in the districts of Muzaffarpur, Darbhanga, Samastipur and Madhubani. About 30 per cent of the total area in the State is planned to be diverted from other crops towards horticulture. During last two years, 2005-06 and 2006-07, plans for horticulture development are being run in the State with 100 percent grant from the Central government under National Horticulture Mission (NHM). The districts left out by the NHM are being covered under the Chief Minister's Horticulture Mission. This plan consists of expansion of area under fruit orchards, commercial flower cultivation, cultivation of medicinal plants, bee-keeping, integrated pest management, training of cultivators and officers, post-harvest management etc. This plan is to be implemented in the public as well as private areas.

Approximately, 25-40 percent of the vegetables and fruits are lost due to lack of proper transport and storage facilities. Because of these handicaps, fruits and vegetables produced in the State are mainly sold fresh in the market, often implying distress sale by the farmers. While mandi markets are the mandated sales outlet for fruits and vegetable products, yet just 6 percent of vegetable production and 4.2 percent of fruit production get shelf space in APMCs.

State has been plagued by substantive losses of fruit and vegetable output effected by lack of adequate cold storage and godown capacity. Bihar has only 160 rural godowns (0.12 percent of the country's godowns) with an approximate capacity of 17,000 tons, which compares very poorly with the figure of 3,015 rural godowns for Punjab, which is around 24 percent of country's capacity. Similarly, although Bihar produces about 10 percent of all vegetables and nearly 7 percent of all fruits, it has only 5 percent of the total storage capacity in India. Of the 238 cold storage units available, 187 are used for potatoes. Thus 77 percent of the capacity of these cold storage units are used to store potatoes alone, leaving only 23 percent for other purposes. The majority (92 percent) of the State's cold storage facilities is owned by the private sector and the

rest by the cooperatives (8 percent). State has been adding to its storage and preservation capacities over last few years. Under the Plan of cold storage construction, capacity expansion and modernization in the State (with financial assistance from Central government), permission has been given for construction of 42 new cold storages since 2000, out of which 22 cold storages have started functioning and the remaining ones are under construction

2.8 Forestry

Out of total geographical area of 94,163 sq. kms. of the State, only 6473 sq. kms is under natural forests, which comprises only 6.87 per cent of the total geographical area. Out of 38 districts, these forests are located in only 10 districts. According to the Forest Survey Institute, Dehradun, there are only 13.6 trees/hectare in the areas outside the forest regions of the State.

According to the Indian Forest Policy 1988, 33 per cent of the geographical area should be under forests for environmental balance. In a densely populated region like Bihar, it is difficult to increase the area under forests. But it can be compensated by making alternative arrangements and using all the empty lands of the State. Under already launched *Kishore Chetna Vriksh Yojna*, awareness about environment, especially about trees, is sought to be created among the school students and their participation is being ensured in the afforestation programmes.

Table 2.23 : Fruits in Bihar : Area (in hectares), productivity (qutls/hect), production (in tones), and estimated coverage for 2005-06 (in hect)

Sl. No.	Name of the Fruits	Area (in hectares)	Production (in tones)	Productivity (in Qntls / hect)	Estimated coverage for 2005-06 (in hectares)
1	Mango	140106	865619	6.18	149500
2	Guava	27660	256057	9.26	27800
3	<i>Litchi</i>	28383	204897	7.22	28500
4	lemon	16808	122875	7.31	17000
5	Banana	27988	920044	32.87	28300
6	Pineapple	4214	122534	29.08	4300
7	Coconut	15150	150778	9.95	15180
7	Others	30930	277450	8.97	31300
	Total	291239	2920254	10.03	292880

Source : Agriculture Dept., GOB

Table 2.24 : Area under vegetables - Area (in hectares), production (in tones), productivity (qutls/hect), and estimated coverage for 2005-06 (in hect)

Sl. No.	Name of the vegetable	Area (in hect)	Production (in tones)	Productivity (quintals/hect)	Estimated area for 2005-06
1	Cauliflower	59701	955216	16.0	60000
2	Cabbage	36513	598813	16.4	36700
3	Onion	48759	975180	20.0	49000
4	Tomato	42987	601818	14.0	43100
5	Chilly	38070	456840	12.0	38300
6	Brinjal	53651	1073020	20.0	53800
7	Ladyfinger	56173	674076	12.0	56300
8	<i>Kaddu</i>	25143	402288	16.0	25300
9	<i>Nenua</i>	33606	470484	14.0	33800
10	<i>Jhiguni</i>	8078	48468	6.0	8300
11	<i>Karela</i>	8424	50544	6.0	8600
12	<i>Parwal</i>	4594	45940	10.0	4700
13	<i>Wodi</i>	11582	69492	6.0	11700
14	Others	99685	835590	14.0	59800
	Total	486966	7257769	14.9	489400

Source : Agriculture Dept., GOB

2.9 Animal Husbandry

Bihar's livestock sector is crucial not only in terms of its contribution to rural income, but also for the section of the population to which this income goes. Bihar's livestock sector accounted for approximately one-quarter of the total value of agricultural output in TE 2002-03. Livestock activity is concentrated among landless households and those with marginal holdings of less than 1 hectare of land. Approximately 35 percent of rural households in Bihar report owning cattle, 20 percent buffalo, and 15 percent sheep and goats (NSSO 2003). Of all rural households owning cattle and/or buffalo in Bihar, more than three-quarters are either landless or have less than 1 hectare of land. Sheep and goats tend to be even more concentrated among landless and marginal rural households

Milk is the most important livestock product, accounting for approximately 50 percent of the total livestock output, followed by meat (24 percent) and other livestock products. Milk production in

Bihar has grown by around 92 percent over the period 2001-2006, while meat production has grown by only 12 percent over the same period. Similarly, egg production has increased by 35 percent over this period, that of wool has fallen by almost 50 percent (Table 2.25). According to the 2003 livestock census, there were approximately 10 million heads of cattle in Bihar, only 10 percent of which were cross-bred, which explains the low productivity and growth of livestock output in the State. The fact that the number of institutions providing extension services to the livestock sector have remained stagnant over the years has certainly not helped its productivity scenario (Table 2.26).

Table 2.25 : Growth rates of Major Livestock Products in Bihar (2001-2006)

Sl. No	Item	Based on 1982 Livestock census		Based on census 2003		Growth over the period (in %)	
		2001-02	2002-03	2003-04	2004-05	2005-06	
1	Total milk (in 000, litres)	2632	2869	3175	4743	5060	92.25
2	Eggs (in crores)	74	74	78	79	100	35.14
3	Meat (in 000, tonnes)	156	173	173	176	175	12.18
4	Wool (in lakh kg.)	4.24	3.62	3.94	3.78	2.2	-48.11

Source : Animal Husbandry and Fisheries Dept., GOB

Table 2.26 : Number of Institutions in Animal Husbandry Dept.

Sl. No	Item	based on 1982 livestock census	based on 1982 livestock census	based on 1982 livestock census	based on census 2003	based on livestock census 2003	growth over the period (in %)
		2001-02	2002-03	2003-04	2004-05	2005-06	
2	no. of Artificial Insemination Institutions	1401	1401	1401	1401	1401	0.00
3	No. of Veterinary hospitals	39	39	39	39	39	0.00
4	No. of Veterinary Dispensaries	814	814	814	814	814	0.00

Source : Animal Husbandry and Fisheries Dept., GOB

2.10 Fisheries and Poultry

There has been a steady increase in fish production in the State over the period 2001-02 to 2005-06 and its share in total agricultural GDP has nearly doubled in last 10 years. However, its production is estimated to fall to 160 thousand MT in 2006-07 (Table 2.27) because seed has substantially fallen this year. Fishermen in the State are being trained to increase productivity of fisheries sector, loans are being granted for maintenance and renovation of privately owned ponds in the State.

Table 2.27 : Trends in fish production, income from Jalkars, and other initiatives of fisheries dept

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Fish production from all sources (,000 MT)	240.00	261.00	266.49	267.51	279.00	160.50
Seed Production (in lakhs)	3299.57	3679.90	3471.14	3182.11	3449.49	2866.55
Income from Jalkar settlements (in lakh Rs)	296.39	321.61	371.14	382.95	448.44	309.83
Number of Private fish farmers who have been given training in pisciculture	861	1192	5063	1475	134	400 (in process)
Loans accepted for mainetenance/renovation of privately owned ponds (in lakhs)	4.00	14.70	35.08	32.84	73.98	14.55
Free housing plan for fishermen (at the rate of 1 per family)	117	56	243	244	205	405

Source : Fisheries Directorate, Bihar

2.11 Agricultural Mechanisation

Current level of mechanization of agriculture in the State is very low. While there are only 17 tractors per hectare in the State, the figure for Punjab is 68 tractors per hectare. At present, Bihar has 111672 tractors, 4000 power tillers, 2.5 lakh stonery engines, 66128 mould bold ploughs, 50000 cultivators, 15000 seed drills, 290000 sprayers, and 300000 threshers. While recommended electricity consumption for farming is 2 KW/hect, it is only 0.8 KW/ hect in Bihar due to limited availability of electricity. The Government is accordingly promoting agricultural mechanization on a large scale through provision of grants for small tractors, power tillers, threshers and GISE tillage machines.

2.12 Land and Agricultural Reforms

The available data for landholdings demonstrate the extent of inequality in the agrarian structure. For example, more than 80 percent of operational holdings in Bihar are marginal (below one hectare), and they account for only 36 percent of total operational land area. At the other end, medium and large operational holdings of more than four hectares comprise less than 2.5 percent of all holdings, but constitute over 20 percent of operational land area. In Bihar, incidence of landlessness has increased in the decade of nineties from 9 percent to 10 percent of the rural households and the proportion of households in the marginal segment has also increased significantly in the same time period (Table 2.28).

Apart from widening of disparity in land distribution, it can also be observed that while incidence of poverty has declined for all landowning classes during the nineties it has actually increased for the landless from 51 percent to 56 percent, strongly suggesting that land ownership is clearly associated with poverty. At the end of the nineties, therefore, the share of land poor households in the total poor population has increased – from 12 to 14 percent for landless households and from 55 to 61 percent for marginal landholding households.

It is in this backdrop that the State government has constituted the Land Reforms Commission in June, 2006 to look into the issues of land ceiling, land consolidation and occupancy/tenancy rights. It also has been mandated to analyse the rural turmoil in the backdrop of land related disputes and recommend remedial measures accordingly. The Commission is to look into feasibility and impact of co-operative farming, giving due importance to the rights and concerns of the small and marginal farmers.

Table 2.28 : Rural Poverty Incidence and Shares by Land Ownership
50th round **55th round**

Land owned (ha)	50 th round			55 th round		
	% of rural population	Poverty incidence %	% Share of the poor	% of rural population	Poverty incidence	% share of the poor
No land	9	51	12	10	56	14
0 < * <= 0.4ha	43	51	55	53	46	61
0.4 < * <= 1ha	24	34	20	20	29	15
1 < * <= 2ha	15	28	10	10	30	7
2 < * <= 4ha	7	18	3	4	16	2
>4ha	3	6	0	2	18	1
Overall	100	40	100	100	40	100

Source : NSSO 50th and 55th Rounds

Policy Initiatives

New Agricultural Policy was made by the State government in 2006, to build upon the natural advantages that State has in agriculture. Its fertile land, huge water resources and conducive climatic conditions imply tremendous potential to the agricultural sector. Despite this, productivity of crops in Bihar compare poorly with other states. Thus, at the core of the new agricultural policy for Bihar is the focus on increasing productivity of crops, not merely in comparison with the national average but in comparison with the best productivity standards achieved in any State in India. Following major initiatives have been taken by the State government in last one year:

- Food security, Increase in farmer's income, Increase in crop productivity and Environmental conservation have been fixed as the four targets of new agricultural policy regime.
- ATMAs have been constituted in 23 districts of the State which did not have its ATMA coverage under the centrally sponsored programme. Thus all the districts of the State now have ATMA coverage.
- A megaproject for establishment of soil testing laboratories in all 534 blocks of the State has been sanctioned, to take soil testing facilities right to the door of the farmers.
- 31 new seed testing laboratories are to be established in the State to give each district its own seed testing laboratory.
- Chief Minister Horticulture Mission has been started in 19 districts of the State which were not covered under National Horticulture Mission, thereby universalizing the programme in the State.
- Micro-nutrient testing laboratories have been established in 3 districts of the State.
- Research and Educational infrastructure of Rajendra Agricultural University, which happens to be the only agricultural university of the State, has been strengthened.
- Agricultural Produce Marketing Board has been abolished
- Bihar State Seed Corporation has been revived, and seed production has been started on 45 state agricultural farms which were lying inoperative.
- Agricultural Produce Marketing Board has been abolished.
- Farmers' Commission has been established..
- Land Reform Commission has been established

