

Impact Of Irrigation Facilities On The Production Of Major Crops In Nashik District

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Abstract-

In the present paper an attempt has been made to study the impact of increased irrigation facilities on the crop production of the Nashik district based on the secondary data published by government departments. The irrigation facilities in the study region such as wells with the electric pumps and diesel pumps, area benefitted by dams, borewells with handpump and electric pumps are studied for the period of around 15 years. During the same time the production of major crop which are Wheat, Rice, Jowar, Bajra, Tur and Sugarcane are taken into consideration. The comparative study of availability of irrigation facilities and the production of the crops in hector is studied. The study reveals that the production of crop increases over the period of time due to improve irrigation in the region.

Keywords: Irrigation, Crop production, diesel pumps, electric pumps, borewells.

Introduction-

Agriculture is the major source of income, for roughly 58 percent of India's population. India is the world's second-largest producer of agricultural products. Agriculture employed more than half of the Indian workforce in 2018 and generated 17–18% of the country's GDP. Generally, in the maximum part of India, rainfall is limited to only four months every year, from June to September, when the monsoon arrives. In certain regions of the nation, rainfall occurs throughout the months of December and January. Rainfall is scarce and unreliable in many regions of the nation, even during the monsoon and in agriculture, insufficient, unpredictable, and irregular rain creates uncertainty which is the main cause for the low production, that's why the irrigation facility plays an important role in agriculture production. Irrigation is the science of applying water to land artificially in order to meet the water needs of crops throughout their life cycle in order to provide adequate nutrition. India's irrigation system consists of a network of big and small canals branching from Indian rivers, as well as groundwater well-based systems, tanks, and other rain-gathering facilities. The largest of these is the groundwater system. Agriculture in India, like that of many other developing nations, has grown dramatically in the last four decades as a result of the widespread adoption of high-yielding variety seeds, by the development of irrigation systems.

About Study Area-

Nashik district's location is from 19° 35'18" North latitude to 20° 53'07" North latitude and 73° 16'07" East longitude to 74° 56'27" East longitudes with an area 15530 59.km, It is third largest in Maharashtra. There are 15 Tahsil in the district like Nashik, Paint, Sargana, Trimbakeshwar, Igatpuri, Sinnar, Niphad, Dindori, Kalwan, Satana, Malegaon, Chandwad, Nandgaon, Deolaand Yeola.

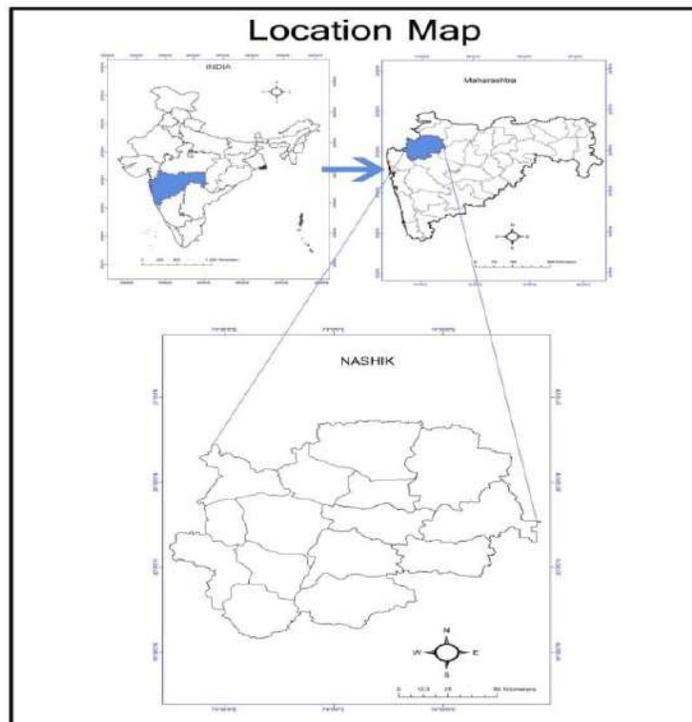


Fig.1 Location Map of the Study Area

Agriculture is the main economic activity of the district and about 70 per cent working population is depends upon it. Nashik district's agriculture related land area and it's classification are as follows:

Table: 1 Classification of Area under landuse

Area Type	Area (Hectors)
Geographical area	15,63,000
Cultivable area	8,64,000
Average kharif Crop area	6,63,200
Average Rabi Crap area	1,36,500
Actual sown area	6,58,763
Forest	3,40,000
Uncultivable area	23,000

Source: Krishi Vigyan Kendra

dependent on agriculture occupation. Nasik district falls under medium rainfall area with normal annual rainfall of 1056 mm. The district has net irrigated area of 245471 ha. There are 13 major, 08 medium and 104 minor irrigation projects in the district. The irrigation potential for 1,03,098 ham is available for long term planning in the district. Since last 20 years the grape has acquired dominance on the agricultural economy of the district. Due to water shortage in kalwan, Deola, Baglan& Malegaon blocks, the farmers have shifted to pomegranate from sugarcane & grape crops. Some progressive farmers are cultivating flowers in green houses. These developments also indicates that the farmers in the district adopt new technologies & methods of cultivation very fast.

Methodology-

In the present paper the comparative studyof irrigation facilities and Crop production of fifteen years' time span i.e., from 2000-01 to 2015-16is studied as per available data. For irrigation facility data of Nashik district, we have used statistical department's annually online published data of wells with electric pump and diesel pump of years 1999-2000, 2008-09 and 2011-12, Borewells with Hand pump and Electric pump of years 2005-06, 2010-11 and 2015-16 andIrrigation Projects (Dams) years of 2005-06, 2010-11 and 2015-16. For crop production data of major crops i.e., Wheat, Rice, Jowar, Bajra, Tur, Sugarcane annual production of year

2001-2002 to 2015-2016 of Nashik district is consider as per availability. The study is based on the information collected from the website of Department of Agriculture, Government of Maharashtra.

Objectives-

1. To study the irrigation facility available in the Nashik district
2. Comparative study of irrigation facilities and crop production in the Nashik district

Table:2 Irrigation Facilities: - Wells with diesel and electric pumps

Tehsil	Wells with Diesel Pump	Wells with Electric Pump	Wells with Diesel Pump	Wells with Electric Pump	Wells with Diesel Pump	Wells with Electric Pump
	1999-2000		2008-2009		2011-2012	
Surgana	30	71	0	0	0	0
Kalvan	380	6019	21	89271	145	8662
Devala	0	0	0	0	0	0
Baglan	156	7085	427	16625	310	17125
Malegaon	1700	6078	1918	6078	1618	6078
Nandgaon	560	4260	2237	1470	2237	1470
Chandvad	110	7750	92	8331	0	2314
Dindori	1179	2549	394	12981	0	19065
Peth	37	51	35	0	0	35
Trambak	0	0	65	315	82	350
Nashik	0	10087	5	10098	7	100115
Igatpuri	235	42	226	84	220	84
Sinnar	1908	9006	19	195	467	19509
Niphad	390	33442	220	27605	242	30365
Yevla	2174	4882	0	3500	0	3500
Total	8859	91322	5359	96209	5328	230172

Source: Directorate of Economics and Statistics, Government of Maharashtra

Irrigation is the agricultural process of applying controlled amounts of water to land to assist in the production of crops, as well as to grow landscape plants and lawns, where it may be known as watering. Agriculture that does not use irrigation but instead relies only on direct rainfall is referred to as rain-fed. Irrigation has been a central feature of agriculture for over 5,000 years and has been developed independently by many cultures across the globe. Irrigation facilities in the Nashik district consists of wells, canals, wells with electric pump, wells with diesel pump. As per the data collected from Department of Statistics for the year 1999-2000 it shows that there were 8859 wells with diesel pump and 91322 wells with electric pumps. After the period of about ten years i.e. in year 2008-09 wells with diesel pump reduces to 5359 and wells with electric pumps increases to 96209. The trend continues and the number of electric pumps increases tremendously to about 230172 in 2011-12. The growth in the number of wells indicates that the irrigation facilities enhanced such as Baglan, Dindori Sinnar, Niphad and Nashik has shown increase in irrigation leading to crop production throughout the district over the period. Above table represents tehsilwise data of wells over the decade. Tehsils

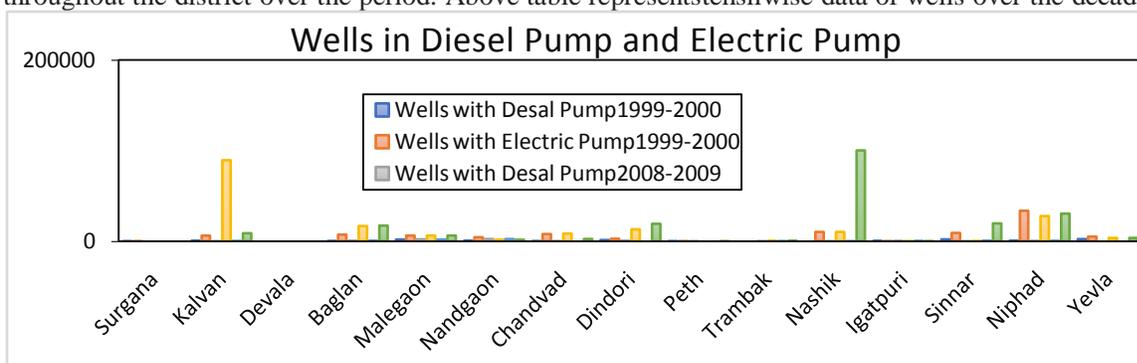


Fig:2 Wells in Diesel Pump and Electric Pump

Table: 3 Irrigation Facilities: - Borewells with Hand pump and Electric pump

Tehsil	Working Hand pump	Working Electric pump	Working Hand pump	Working Electric pump	Working Hand pump	Working Electric pump
	2005-2006		2010-2011		2015-2016	
Surgana	517	66	323	4	378	2
Kalvan	493	34	207	-	590	42
Devala	513	82	315	28	365	23
Baglan	280	46	513	48	746	68
Malegaon	146	9	594	23	767	21
Nandgaon	502	73	310	7	434	3
Chandvad	655	33	437	20	555	20
Dindori	181	23	470	64	640	63
Peth	245	26	111		142	2
Trambak	544	68	136	2	178	5
Nashik	94	2	212	29	278	29
Igatpuri	515	36	187	8	269	7
Sinnar	292	5	415	14	817	15
Niphad	119	5	541	41	665	79
Yevla	522	14	350	2	645	18
Total	5618	522	5121	290	7469	402

Source: Directorate of Economics and Statistics, Government of Maharashtra

The table No.3 represents borewells availability in the region. It shows that numbers of electric pumps has decreased from the 2005 to 2010 and again it increases in 2015. It also reveals that electric pumps numbers are noticeably increased over the period, leading to the improvement in facility of irrigation. Overall the trend of borewells are for the irrigation are becoming escalated.

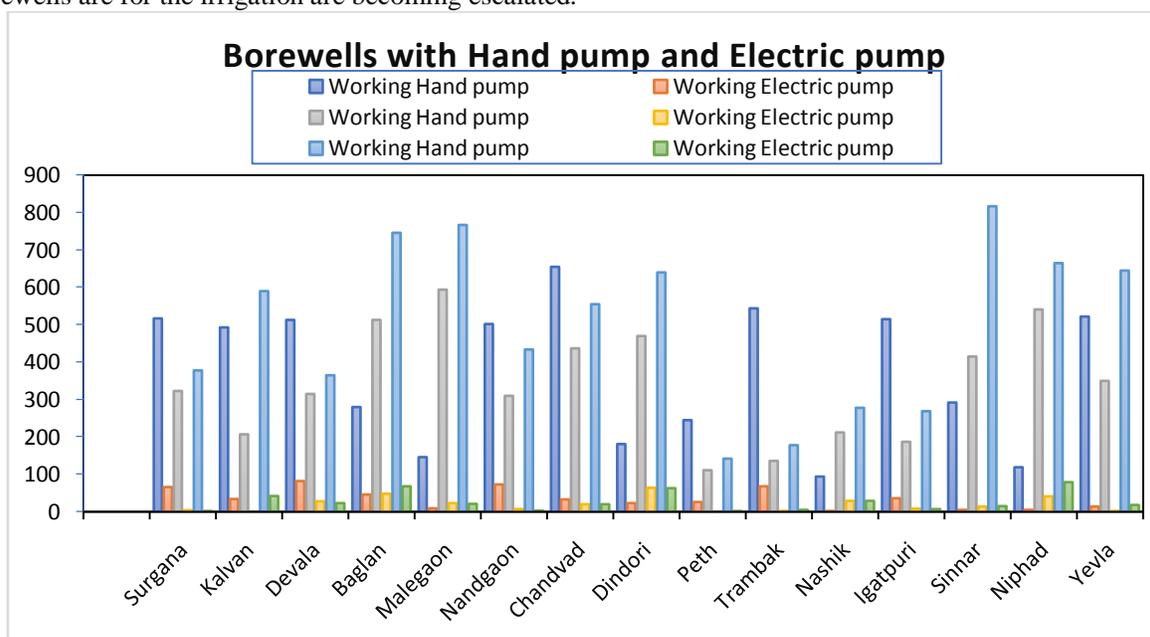


Fig: 3 Borewells with Hand pump and Electric pump

Table:4 Irrigation Projects (Dams) (Area in Hector)

Tehsil	Minor Project	Medium Project	Major Project	Minor Project	Medium Project	Major Project	Minor Project	Medium Project	Major Project
	Benefited area in 2005-2006			Benefited area in 2011-2012			Benefited area in 2015-2016		

Surgana	552	0	0	515	0	0	649	0	0
Kalvan	2093	0	52096	3346	0	36180	3346	0	53539
Devala	1068	0	0	1641	0	3794	1641	0	0
Baglan	2018	23534	0	2588	8885	2322	2588	23534	0
Malegaon	1976	0	0	3400	9529	14171	3400	0	0
Nandgaon	919	8139	26705	2497	1355	105688	2497	7673	106588
Chandvad	2959	0	864	1699	834	715	2655	0	715
Dindori	2951	9034	124057	3315	0	92286	4804	9034	101983
Peth	723	0	0	0	0	0	3149	0	0
Trambak	898	0	0	1808	0	0	2605	0	0
Nashik	1068	12725	38400	1409	12113	38400	2618	12728	30400
Igatpuri	1281	0	113450	1500	3573	113450	2044	0	113450
Sinnar	1953	5260	0	1955	3340	6211	3050	5260	0
Niphad	517	0	0	953	0	16260	1422	0	0
Yeola	914	0	0	827	0	0	953	0	0
Total	21890	58692	355572	27453	39629	429477	37421	58226	406675

Source: Directorate of Economics and Statistics, Government of Maharashtra

A majority of the dams built in the world are multipurpose in nature, but irrigation is the largest user of the waters withdrawn. due to a dam, reducing flood hazard due to inundation of land, crop and property which might result into economic upheavals. It also reduces congestion of runoff in plains and coastal lands. The table no. 4 reveals that the Nashik district has minor, medium and major dam project which leads to the beneficial of irrigation in the region. In the year 2005-2006 it shows that around 355572 hector of the agricultural land was benefitted by the major dams in the district. Kalwan, Nandgaon, Dindori, Nashik and Igatpuri are tehsils in which area under major dams is remarkable. Medium dam project benefitted the areas in Baglan, Nandgaon, Dindori, Nashik and Sinnar. In the year 2011-12 the tehsils almost all the tehsils were benefitted by major dams except Surgana, Peth, Trimbakeshwar and Yeola. Nandgaon and Igatpuri is region which were mostly irrigated by major dams followed by Dindori, KalwananNiphad. All most each and every tehsils are irrigated by minor dams in region. In 2015 the area under dam irrigation is increased compared to previous data obtained in 2005 and 2011. It increases from 436154 hectores in the year 2005 to 496559 hectores in the year 2011 and 502322 hectores in the year 2015.

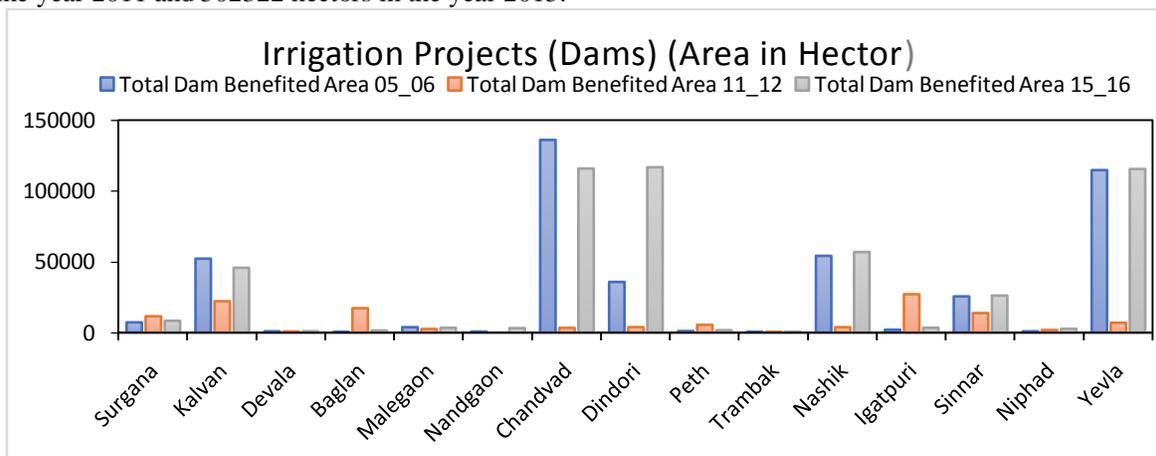


Fig: 4 Nashik District- Talukawise Average Yield Yield:- Kg/ha

Table: 5 Production of Wheat Kg/ha from (2001 -2015)

CROP- Wheat																
Sr.No	Dist /Taluka	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
	Sinnar	136.5	750.5	102.7	119.0	131.0	164.0	213.2	193.0	226.3	306.2	182.5	169.3	226.3	207.6	134.8

2	Nashik	160.9	157.07	138.11	189.80	174.20	213.00	106.60	324.70	201.60	221.68	211.64	277.50	277.42	266.89	249.29
	Yeola	463.5	815.5	758.8	135.10	114.90	150.30	154.70	808.0	197.70	173.15	142.38	103.16	159.03	145.24	893.3
	Niphad	174.57	216.68	166.71	194.70	210.90	192.00	212.70	167.10	193.20	177.83	222.73	130.83	145.50	126.10	147.44
	Chandwad	848.8	105.23	805.8	120.20	259.60	297.50	220.50	251.30	221.50	204.29	175.36	163.17	205.51	144.60	881.5
	Peint	0	0	0	0	121.90	173.40	514.0	151.10	967.0	640.1	185.77	208.25	170.86	465.0	166.84
	Dindori	122.70	992.1	886.8	122.87	137.70	123.90	142.40	164.30	107.60	171.31	168.38	229.66	175.31	179.83	143.11
	Nandgaon	686.1	123.37	149.32	171.10	120.30	117.80	104.50	193.30	168.40	192.57	243.07	170.50	173.16	195.18	133.55
9	Devala	810.6	139.56	144.67	190.50	212.80	171.80	131.70	124.80	183.80	164.44	125.11	122.95	128.64	139.64	183.02
	Surgana	338.1	506.4	893.2	556.2	117.40	461.0	113.10	137.30	141.20	151.22	0	934.8	922.9	984.5	155.57
	Kalwan	131.46	119.51	117.17	128.09	156.10	159.00	233.70	190.00	173.90	216.47	164.09	166.64	156.66	136.44	212.08
	Malegaon	517.0	800.2	972.3	122.70	136.30	146.60	148.80	137.16	142.80	160.73	148.43	139.53	133.60	156.93	117.50
	Baglan	818.7	116.23	101.86	124.20	156.70	197.00	199.80	144.10	156.20	199.53	186.64	133.77	171.30	166.27	134.21
	Trymbak	0	650.8	766.4	977.0	867.0	844.0	176.70	149.50	131.00	106.19	111.27	154.22	165.42	101.07	168.81
	Igatpuri	126.46	174.16	114.97	103.80	131.20	156.70	200.00	111.60	946.0	127.27	300.07	128.64	178.36	133.80	155.42

Source: Department of Agriculture Government of Maharashtra

Fig. 5

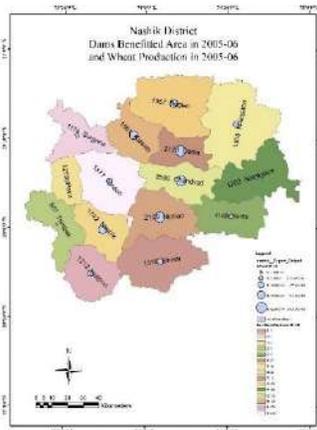


Fig. 6

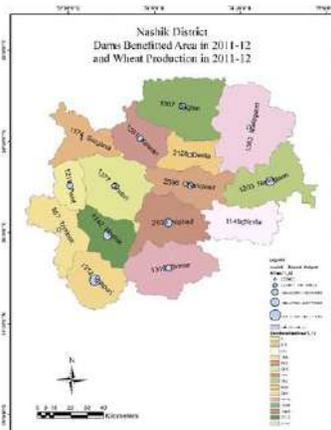
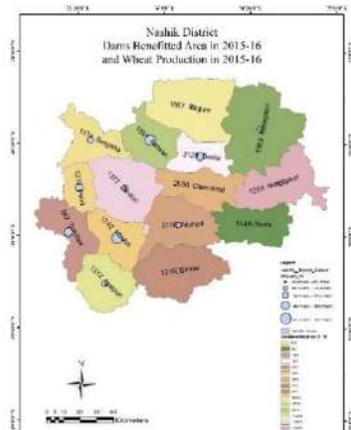


Fig. 7



The above fig.5 represents the production of wheat in the year 2005-06. The production of was 1316 kg/ha inSinnar, 1742 kg/ha in Nashik, 1149 kg/ha inYeola, 2109 in Niphad., 2596 in Chandwad, 1219 kg/ha in Peth, 1377 kg/ha in Dindori, 1203 kg/ha in Nandgaon, 2128 kg/ha in Deola, 1174 kg/ha in Surgana, 1561 kg/ha in Kalwan, 1363 kg/ha in Malegaon, 1567 kg/ha in Baglan and 867 kg/ha in Trimbakeshwar tehsil. There is variation in the productions of wheat In the tehsils depending upon its irrigation facilities. Yeola, Niphad, Chandwad has comparatively more production then Trimbakeshwarthesil. From the fig.4 it is clear that the irrigation facility developed in Nandgaon, Chandwad and Yeola has benefitted the production of wheat in the

region. The similar result is observed in the 2011 and 2015, the tehsils with sufficient irrigation the production has increased per hector.

Table: 6 Production of Rice Kg/ha from (2001 -2015)

CROP- RICE																
Sr.No	Dist /Taluka	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
1	Sinnar	944.0	643.1	1346.0	2328.0	1285.0	1082.2	1633.0	1691.0	519.3	487.3	299.1	835.8	2376.6	888.8	1413.6
2	Nashik	771.0	795.5	1001.7	1538.0	1340.0	944.3	1687.0	1960.0	870.3	814.0	1890.7	1420.5	2067.5	1836.6	1869.3
3	Yeola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Niphad	704.0	443.7	717.8	656.0	1293.0	1131.8	992.0	649.0	403.5	1144.7	564.3	1893.9	0	0	0
5	Chandwad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Peint	1186.0	0	1985.5	1238.0	1355.0	418.0	1533.0	1269.0	410.5	175.2	1052.0	1080.4	623.5	307.3	330.7
7	Dindori	1374.0	495.8	889.2	630.0	1161.0	569.4	1046.0	570.0	396.4	507.2	1366.7	928.1	1547.2	1181.0	1160.3
8	Nandgaon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Devala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Surgana	0	555.7	942.4	915.0	945.0	802.5	869.0	0	398.9	405.7	970.5	1360.4	1141.9	470.3	728.9
11	Kalwan	1049.0	387.5	1009.9	1115.0	804.0	645.2	1062.0	496.0	626.3	607.4	1353.4	996.0	1239.1	1469.8	1567.8
12	Malegaon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Baglan	1113.0	657.3	850.5	587.0	680.0	601.8	807.0	791.0	566.5	602.5	716.4	886.9	493.3	793.5	366.6
14	Trymbak	0	294.7	1156.3	812.0	1172.0	1166.7	2147.0	1125.0	297.9	361.9	1158.5	916.5	1376.5	1876.6	1813.3
15	Igatpuri	1299.0	446.7	1274.1	1205.0	1623.0	1223.6	1533.0	1391.0	206.4	333.8	1375.5	1349.7	1296.5	1499.5	1960.6

Source: Department of Agriculture Government of Maharashtra

Fig. 8

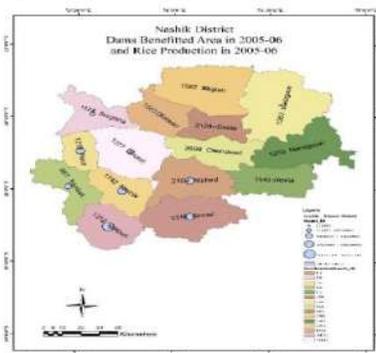


Fig. 9

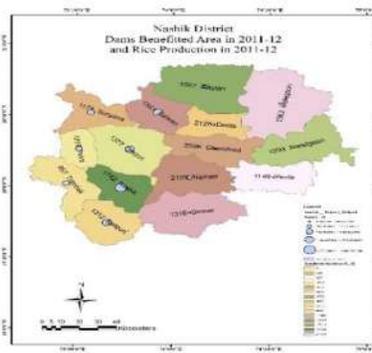
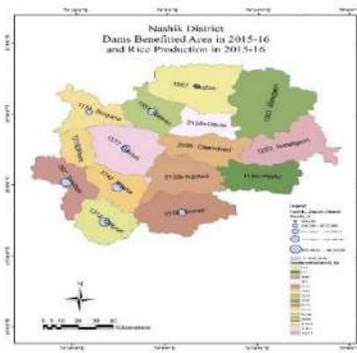


Fig. 10



Rice is not cultivated throughout the tehsils of Nashik district, as it require sufficient water to grow, it is mainly grown in western part of the district where the rainfall is high and some central part where the rainfall is moderate irrigation facilities are adequate. The above fig.8 represents the production of rice in the year 2005-06. The production of was 1285 kg/ha in Sinnar, 1340 kg/ha in Nashik, 1293 in Niphad, 1355 kg/ha in Peth, 1161 kg/ha in Dindori, 945 kg/ha in Sargana, 804 kg/ha in Kalwan, 680 kg/ha in Baglan and 1172 kg/ha in Trimbakeshwar tehsil. The productions noticeably changed in the year 2015, it increases almost double than year 2005 mainly due to increase in the irrigation facilities such as wells with electric pumps and electric borewells.

Table: 7 Production of Jowar Kg/ha from (2001 -2015)

CROP- Kh. Jowar																
Sr. No	Dist /Taluka	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
<u>1</u>	Sinnar	0	532.4	538.3	0	799.2	517.0	315.0	0	0	1022.5	1417.4	0	0	0	0
<u>2</u>	Nashik	0	2985.1	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>3</u>	Yeola	647.3	2095.5	470.5	1347.0	676.2	774.0	1403.0	678.0	742.7	880.7	0	0	0	0	0
<u>4</u>	Niphad	1260.5	1424.7	218.6	1303.0	0	0	0	0	479.5	0	0	0	0	0	0
<u>5</u>	Chandwad	654.9	1178.2	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>6</u>	Peint	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>7</u>	Dindori	0	689.0	0	0	1109.4	0	0	0	0	0	0	0	0	0	0
<u>8</u>	Nandgaon	844.7	2082.5	0	1633.6	916.7	1206.0	0	2209.0	0	1217.6	1328.0	0	0	0	0
<u>9</u>	Devala	0	758.0	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>10</u>	Surgana	1402.1	669.5	0	0	0	0	0	0	0	0	0	0	0	0	925.3
<u>11</u>	Kalwan	819.6	1428.6	589.2	794.5	798.0	0	0	921.0	726.5	0	0	0	0	0	0
<u>12</u>	Malegaon	296.8	703.6	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>13</u>	Baglan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>14</u>	Trymbak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>15</u>	Igatpuri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Department of Agriculture Government of Maharashtra

Fig. 11

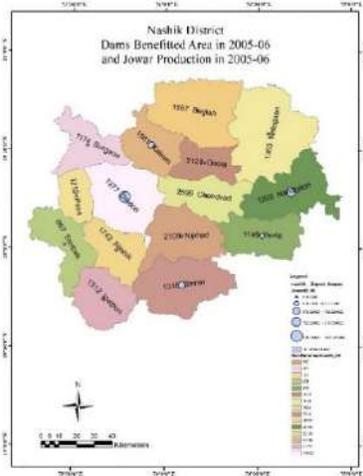


Fig. 12

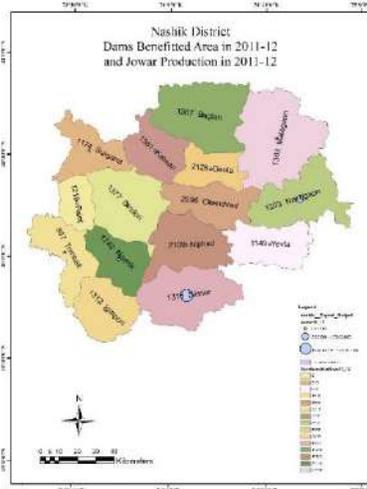
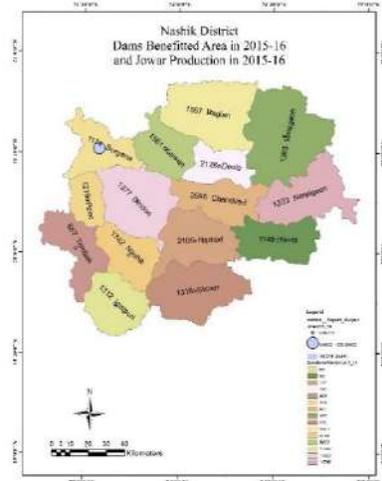


Fig. 13



The Jowar is not sown throughout the district, it is only limited to the area where the rainfall is comparatively low. As it is difficult to practice other crops due to water scarcity. The crop like Jowar which required less amount of water are sown here. Due to low rainfall and low groundwater level the Jowar is preferred in tehsils of Sinnar, Yeola, Nandgaon and kalwan.

Table: 8 Production of Bajra Kg/ha from (2001 -2015)

CROP- Bajra																
Sr. No	Dist /Taluka	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
<u>1</u>	Sinnar	964.0	577.0	891.8	894.0	800.0	682.8	1028.0	622.0	655.8	1415.3	798.4	488.3	706.5	735.3	647.6
<u>2</u>	Nashik	957.0	869.1	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>3</u>	Yeola	483.0	935.9	659.2	968.0	718.0	552.0	1482.0	749.0	791.3	1628.9	1753.3	1230.0	1570.3	1173.7	253.0
<u>4</u>	Niphaad	891.0	1092.7	1055.5	1103.0	821.0	779.0	1001.0	809.0	543.5	954.1	784.1	714.6	598.1	977.3	482.2
<u>5</u>	Chandwad	652.0	941.2	620.3	828.0	1032.0	819.6	2267.0	1925.0	1204.2	1906.5	2137.5	1916.7	1943.8	765.7	764.4
<u>6</u>	Peint	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>7</u>	Dindori	881.0	718.2	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>8</u>	Nandgaon	565.0	632.6	415.0	622.0	817.0	864.4	846.0	811.0	936.0	1634.7	1501.1	639.1	1014.2	549.4	320.1
<u>9</u>	Devala	0	970.5	655.6	1165.0	1142.0	953.5	1701.0	829.0	717.8	1031.3	558.8	1098.4	1171.4	751.4	483.0
<u>10</u>	Surgana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>11</u>	Kalwan	675.0	959.5	1156.8	693.0	945.0	360.5	868.0	676.0	825.1	1100.6	931.4	976.1	988.8	1406.7	398.8
<u>12</u>	Malegaon	342.0	1194.1	670.8	767.0	746.0	911.3	882.0	1353.0	759.2	972.9	650.2	815.3	1097.9	425.7	493.4
<u>13</u>	Baglan	385.0	529.6	456.0	820.0	688.0	702.0	932.0	1174.0	656.1	930.9	722.1	602.8	1500.0	1039.2	884.6
<u>14</u>	Trymbak	0	677.2	0	0	0	0	0	0	0	0	0	0	0	0	0

15	Igatpuri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Source: Department of Agriculture Government of Maharashtra

Fig. 14

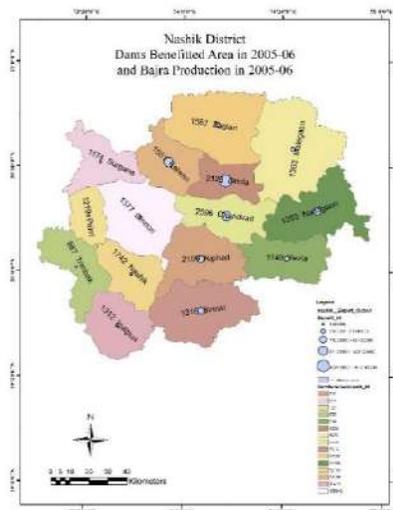


Fig. 15

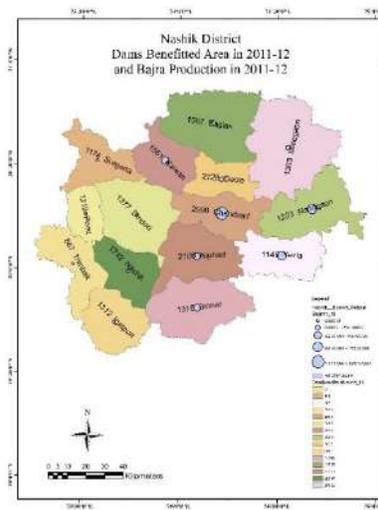
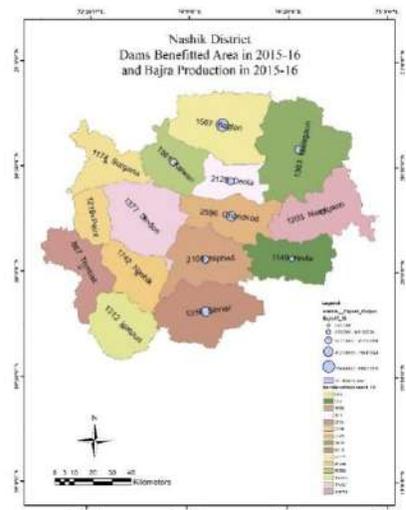


Fig. 16



As per the table no.8 bajra crop is mainly grown in the district in compared to jawar. It is observed that it is not sown in the tribal region of Nashik district. It includes the Surgana, Trimbakeshwar and Igatpuri district. The production of Bajra is high in Baglan, Niphad and Chandwad tehsils of Nashik district. Due to the development of irrigation facilities is major part the cash crops as well as crops with high market potential is grown in the district.

Table: 9 Production of Tur Kg/ha from (2001 -2015)

CROP- Tur																
Sr. No	Dist /Taluka	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
1	Sinнар	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Nashik	0	1014.4	0	1106.0	0	0	0	0	0	0	0	0	0	0	0
3	Yeola	0	1577.5	473.1	293.0	656.2	0	649.0	266.0	328.1	1017.5	835.0	797.5	1143.8	527.5	258.8
4	Niphad	0	1135.0	158.6	474.0	951.2	985.0	1179.0	832.0	537.5	852.5	1275.0	753.8	791.3	680.0	907.5
5	Chandwad	416.3	281.3	248.7	571.0	0	0	0	401.0	425.0	451.9	545.0	457.5	516.3	289.0	378.8
6	Peint	0	191.9	0	1363.0	607.5	300.0	486.0	515.0	327.1	139.4	431.3	735.0	407.5	70.0	96.4
7	Dindori	0	1275.0	0	0	0	0	0	599.0	186.2	582.5	921.3	533.1	460.0	691.3	0
8	Nandgaon	0	792.5	211.3	818.0	663.7	0	0	695.0	628.1	728.8	1221.3	225.6	836.3	511.3	87.5
9	Devala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Surgana	425.0	381.9	262.5	675.0	370.0	634.0	308.0	301.0	148.4	588.8	209.0	351.3	296.3	78.8	275.0
11	Kalw	0	856	0	0	0	0	0	0	0	0	0	0	0	0	0

	an		.9													
12	Malegaon	40 3.1	847 .5	60 7.5	750 .0	147 5.0	133 3.0	126 8.0	132 1.0	135 5.0	124 7.5	106 2.5	105 6.3	175 6.3	36 8.8	52 6.3
13	Baglan	44 1.3	958 .8	76 2.5	284 .0	708 .7	663 .1	738 .0	162 .0	501 .9	462 .5	830 .0	548 .8	412 .5	65 9.4	0
14	Trymbak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Igatpuri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Department of Agriculture Government of Maharashtra

Fig. 17

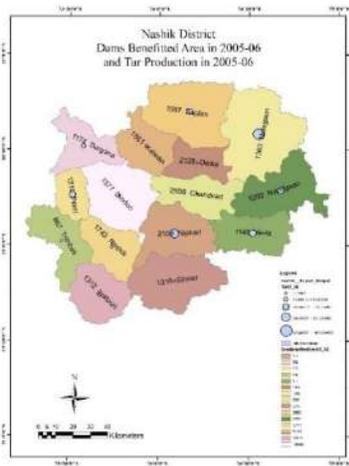


Fig. 18

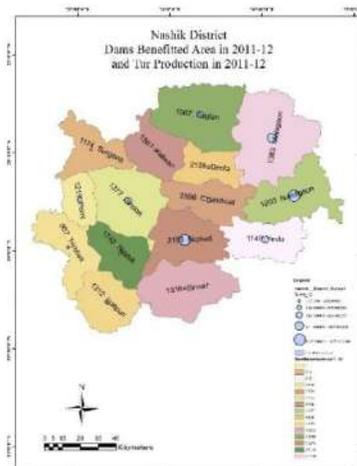
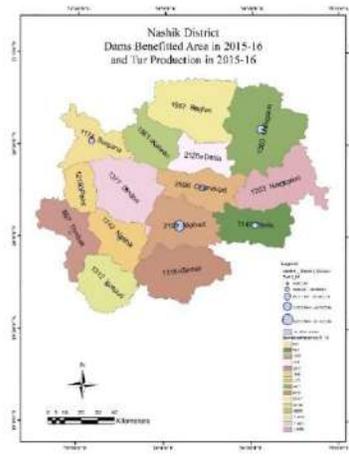


Fig. 19



From the above table it is seen that Sinnar, Nashik, Kalwan, Igatpuri and Trimakeshwar tehsils are not involved in the production of tur. It is mainly sown in the remaining part of the district. Yeola and Malegaon tehsils gives more production of tur, other tehsils are producing it in moderate quantity. Due to irrigation and changing crop pattern there is a shift in cropping pattern in the region. The cultivated area is decreasing for the tur crop and practicing of cash crops is increasing.

Table: 10 Production of Sugarcane tones/ha from (2001 -2015)

CROP- Sugarcane																
Sr. No	Dist /Taluka	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
1	Sinnar	64.3	129.3	97.9	60.3	80.0	63.0	88.0	66.0	63.9	79.7	70.3	71.3	88.0	73.5	96.4
2	Nashik	10.1	11.7	52.8	48.0	49.0	55.0	87.0	52.0	73.1	77.3	71.0	80.5	83.7	84.6	88.2
3	Yeola	46.9	70.1	52.9	53.3	43.0	61.0	58.0	56.0	77.9	80.5	68.8	78.6	71.8	73.0	63.2
4	Niphad	10.4	74.6	49.4	56.3	53.0	72.0	94.0	70.0	69.2	77.7	85.7	83.9	85.2	83.7	94.2
5	Chandwad	59.3	40.8	63.0	0	0	71.0	80.0	65.0	60.0	70.2	61.0	64.6	63.0	0	0
6	Peint	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Dindori	69.2	27.8	42.2	54.9	44.1	52.0	73.0	64.0	63.8	61.1	67.3	80.2	81.5	83.8	89.1
8	Nandgaon	89.5	68.7	25.5	62.8	40.0	83.0	73.0	69.0	84.3	91.7	91.5	59.7	79.4	12.6	58.8
9	Devala	0	69.	54.	0	0	57.	65.	58.	74.	93.	95.	84.	69.	78.	81.

			1	7			0	0	0	7	4	4	0	7	6	1
10	Surgana	0	73. 5	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Kalwan	90. 9	83. 0	88. 2	62. 6	71. 0	80. 0	78. 0	78. 0	73. 9	77. 0	75. 5	85. 7	74. 6	69. 0	63. 1
12	Malegaon	58. 3	60. 2	61. 6	54. 2	59. 0	60. 0	68. 0	63. 0	68. 3	74. 6	76. 2	70. 5	78. 7	53. 3	63. 7
13	Baglan	51. 2	77. 5	60. 7	49. 1	29. 5	66. 0	88. 0	81. 0	78. 7	75. 6	73. 0	62. 4	97. 4	70. 2	66. 4
14	Trymbake shwar	0	73. 5	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Igatpuri	15 5.0	88. 3	39. 5	62. 5	57. 5	52. 0	66. 0	68. 0	84. 7	69. 4	55. 7	87. 5	62. 3	66. 6	71. 1

Source: Department of Agriculture Government of Maharashtra

Fig. 20



Fig. 21

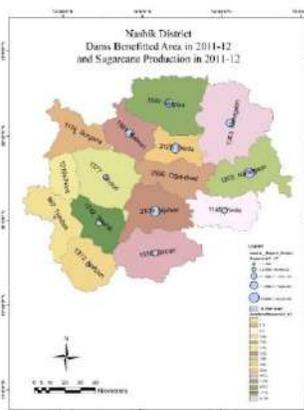
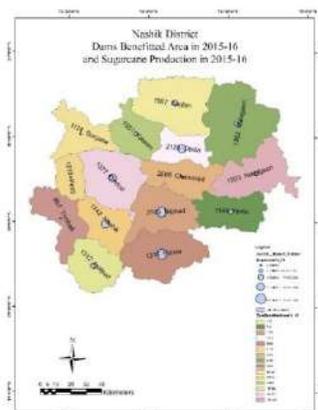


Fig. 22



Sugarcane is planted in the major part of the tehsil except the tribal belt i.e. Surgana, Peth, Trimbakeshwar tehsils of the district. Compared with production in the 2001 to 2015 it is observed that the production has increased. This is only possible due to the availability of water in the region. As sugarcane required huge amount of water, improved irrigation system, increased in the numbers of electric pumps, dam projects has contributed in the production of sugarcane in the region.

Conclusion From the present study it can be concluded that there is remarkable increase in the numbers of irrigation facilities such as wells with electric and diesel pumps, borewells and area under dam irrigation over the period of fifteen years. This has lead in the remarkable growth in the production of crops in the region. Apart from this improved irrigation facilities have created the option for cash crops and commercial farming in the region. The production per hector of the sown crops has also increased in the region.

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