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Article : IRRIGATION DEVELOPMENT IN THE NASHIK DISTRICT, MAHARASHTRA : 1970 TO 2005

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Abstract

Irrigation plays an important role in the agriculture development. Crop production increases considerably if irrigation is provided to dry lands. Nashik district is well known for the grapes and onion production as well as export. Area under fruits and other cash crops show increase in recent time. One of the main reasons behind this cropping pattern change is the irrigation development in the district.

In present paper an attempt have been made to understand the irrigation development in the district from 1970. Here it is found that area under irrigation was increased from 12% in 1970 to 28 % in 2004-05.It also found that this growth is not uniform in the district. Tahsils which are located in the western hilly region like Peth, Surgana, Trambak, Igatpury are characterized by very low irrigation ranging from 3 to 5 %.Whereas tahsil which are located in the Major river basins like Girna and Godavari have comparatively large area under irrigation.(eg.Niphad-53%,Nasik-30%,Baglan-26%).Tahsil like Chandwad, Malegaon, Nandgaon are located in the rain shadow region having irrigation in between 10 to 18 percent.

Another interesting thing is that area under well irrigation is increased from 1970 to 2001.Surface irrigation now showing increase because some irrigation project was completed after 1985.

1. Introduction:

"Irrigation is the artificial application of water to promote growth of crops from different sources such as rivers, springs, lakes, wells."

Except in southeastern India, which receives most of its rain from the northeast monsoon in October and November, dry land cultivators place their hopes for a harvest on the southwest monsoon.

Water is the most important input for enhancing agricultural productivity. India has numerous rivers with an estimated total catchment area of 252.8 million ha (m.ha.) out of about 1,869 km3 of surface water resources, about 690 km3 of water is available for different uses. The irrigation potential of India is estimated to be 139.5 m.ha. Out of which 84.9 m.ha. is acquired. The ground water available for irrigation is 360 km3. The annual precipitation including snowfall, the main source of water in India, is estimated to be 4000 km3. Annual potential evapo-transpiration in India is 1775 mm, varying from a minimum of 1239 mm in Jammu and Kashmir to a maximum of 2,052 mm in Andhra Pradesh.

The amount of rainfall in various regions in the country is variable. Hence irrigation in India has been of primary importance. Though there has been a 161 % increase in the land under irrigation in India over the past 4 decades, it is supposed to be only 33 % of the estimated potential.

2. Study Area:- Nasik District, lying between 19.35’ and 20.52’ North latitude and 73.16’ and 74.56’ East longitude, with an area of 15,582 sq.km. (6015 sq.miles) has a population of 49,93,796 with as per the census of 2001.Nasik district is bounded on the north-east by Dang and Surat district of Gujarat state, on the north by the Dhulia district, on the east by the Jalgaon and Aurangabad districts, on the south by the Ahemadnagar district and towards the south-west by the Thane district.

Whole district forms parts of the Great Trap region of the Deccan. It is entirely of volcanic formation. The volcanic portion consists of compact, stratified basalts, and an earthy trap. The basalts are the most conspicuous geological feature. To the west, they lie in flat-topped ranges, separated by valleys, trending from west to east. The eastern slope is gradual and by a series of steps. The total thickness of the trap flows is probably about 5000 feet. (Gazetteer of the Bombay presidency, Nashik District volume No-16, page11-12)

The drainage pattern and trend lines of the ridges depend upon the structure of the underlying basaltic rocks of the districts. The district is drained by two main rivers, Godawari and Girna, on their tributaries, the watershed between these being the Satmala range. Apart from these there are a number of small

Konkan rivers draining westwards in to the Arabian Sea. This district is normally having three drainage systems.

I. Konkan Rivers. II .Godawari & its tributaries. III.Girna & its tributaries.

The district may broadly be divided in to three major geographical regions.

I. The Downghat Basin. II. The Girna Basin .III. The Godawari Basin.

3. Objectives of the Study:-

1. To compare the area under irrigation at the time of 1970-01 and 2004-05.

2. To understand the imbalance of irrigation development in different part of the district.

3. To asses the role of different means of irrigation in the irrigation development mainly wells and canals and understands the tahsil wise distribution of these means.

4. Methodology: - For this study mainly secondary data has been used. Information about study region is taken from Gazetteer of the Bombay presidency, Nashik District volume No-16 .Data related to the tahsilwise area under irrigation and area under different means of irrigation is acquired from socio-economic abstracts of different years of the Nashik district. Simple statistical tools like average, percentile were used. Data is represented by choropleth maps. Tables and charts were prepared by author on the basis of information available from secondary source.

5. Irrigation Development in the Nashik District:- Maharashtra is the leading industrialized state in India, but its current development of only 13 percent of its irrigation potential is far below the national average of about 33 percent. The land developed so far in the state by the large and medium-sized irrigation projects is only about 56 percent of the currently identified ultimate potential of 4.1 million hectares. The state has a rugged terrain, and a large number of rivers originate here, resulting in many comparatively small irrigation projects. However, the total number of dams of more than 15 meters in height built in Maharashtra is about 900, compared to 2 900 countrywide, so the state can claim to be the leading dam builder in the country. Irrigation is a state subject and the state has a force of about 15000 engineers and more than 1,20,000 men working in investigation, planning, design, construction, maintenance and operation of the irrigation systems. The state

spends Rs.10 to 12 billion every year to manage some 3 million hectares of surface irrigation. This gives an indication of the amount of work which is being done here on irrigation development and management. This needs to be done at the cheapest possible rate and refinements will have to come later.

Despite all these efforts, a large percentage of the area will remain rain-fed and subjected to the vagaries of nature .Nashik district is located in North West part of Maharashtra. 57 % area is under cultivation from total geographical area of the district. More than 4.3 lakh agricultural land owner are present in the district. Around 17 % of the district income is contributed by agricultural sector .This means agriculture is one of the major economical activity of the district. Like many of the district of Maharashtra agriculture is mostly depend upon north-west monsoon rain which is concentrated in the 4 months(June to September).Without irrigation facilities we cant think about the development in agriculture. Nashik district have 73major, Medium and miner project (around 8% of the state).After all this efforts area under irrigation is only 17% in case of Maharashtra (28% for Nashik District).

5.1 Growth in Gross Irrigated area & Role of Means of Irrigation:-

Following table describes that how area under irrigation is increases from1970 to 2005.This table also shows the tahsilwise area under irrigation, of the Nashik district.

Role of Means Of irrigation (in %) & Gross area under irrigation (%) in Nashik District :-

Sr. No.	Tahsil		1970-71	1980-81	1990-91	2000-01	2004-05	Avg.	Change from 1970-71 to 2004-05 (%)
1	Surgana	Canal	40	62	36	00	26	33	-14
		Well	60	38	64	100	74	67	14
		AUI	0.13	0.09	4.46	1.18	9.79	3.13	9.66
2	Kalwan	Canal	14	03	05	00	41	13	27

		Well	86	97	95	100	59	87	-27
		AUI	13.11	6.55	28.11	34.16	22.49	20.88	9.38*
3	Deola	Canal	N.A.	N.A.	N.A.	00	09	05	9
		Well	N.A.	N.A.	N.A.	100	91	95	-9
		AUI	N.A.	N.A.	N.A.	24.41	33.07	28.74	8.66
4	Baglan	Canal	55	50	04	22	00	26	-55
		Well	45	50	96	78	100	76	55
		AUI	22.70	16.45	17.54	30.67	46.32	26.73	23.62
5	Malegaon	Canal	20	50	34	01	19	25	-1
		Well	80	50	66	99	81	75	1
		AUI	15.71	14.36	7.81	20.20	14.31	14.47	- 1.40
6	Nandgaon	Canal	00	00	00	15	00	03	0
		Well	100	100	100	85	100	97	0
		AUI	6.79	6.79	14.62	8.88	12.87	9.99	6.08
7	Chandwad	Canal	00	04	00	00	18	04	18
		Well	100	96	100	100	82	96	-18
		AUI	12.02	13.53	11.76	34.81	19.39	18.30	7.37
8	Dindori	Canal	17	13	00	09	27	13	10
		Well	83	87	100	91	73	87	-10
		AUI	10.07	10.89	17.27	32.41	32.70	20.68	22.63
9	Peth	Canal	00	00	01	93	26	24	26
		Well	100	100	99	07	74	76	-26
		AUI	0.02	0.04	1.05	3.09	14.92	3.82	14.90
10	Trambak	Canal	N.A.	N.A.	N.A.	01	35	18	34
		Well	N.A.	N.A.	N.A.	99	65	82	-34
		AUI	N.A.	N.A.	N.A.	2.91	3.48	3.19	0.57*
11	Nashik	Canal	60	35	08	16	12	26	- 48
		Well	40	65	92	84	88	74	48
		AUI	16.90	17.52	18.87	43.57	56.98	30.76	40.08
12	Igatpuri	Canal	00	04	00	24	34	12	34
		Well	100	96	100	76	66	88	- 34
		AUI	0.54	3.23	1.24	10.32	9.34	4.93	8.80
13	Sinner	Canal	13	21	00	15	34	17	21
		Well	87	79	100	85	66	83	-21
		AUI	8.07	14.35	11.72	21.31	17.69	14.62	9.62
14	Niphad	Canal	19	47	18	26	27	27	8
		Well	81	53	82	74	73	73	-8

		AUI	23.49	48.73	45.94	55.05	92.05	53.04	68.56
15	Yeola	Canal	08	00	04	12	31	11	23
		Well	92	100	96	88	69	89	-23
		AUI	7.81	81.44	10.95	20.84	29.03	30.01	21.22
	Dist. Total	Canal	32	23	06	22	25	22	-7
		Well	68	77	94	78	75	78	7
		AUI	**12.43**	**24.10**	**15.43**	**25.42**	**28.44**	**21.16**	**16.01**

Source – Socio-economic abstract. (District inspector of Land Records, Nashik)

Note:- The figures are slightly different due to rounding has been adjusted. * Change from 2001 to 2005

AUI = Area under Irrigation

This table shows the values in percentage because it is easy to read and understand. If these figures were in thousand hectares or like that then it is difficult to read, understand and compared. For the same purpose percentages also in rounded figures.

Above data shows that except Malegaon tahsil area under irrigation increase in all the other tahsil. This increase in irrigated area is varied from 0.57 % in Trambak to 68.56 % in Niphad.Tahsils like Niphad, Nashik record significant growth in irrigated area of 68 & 40 percent respectively. Tahsils like Baglan, Dindori and Yeola record moderate increase in irrigated area which is around 20 percent. All the other tahsil shows this growth less than 15 %. It is also found that good irrigation development is happened in those tahsil which are located in major river basins and most of the parts of these tahsil are characterized by river bank plane. For e.g. Most of the part of Nashik, Niphad and Dindori tahsil are located in the river bank plains of Godawari, Darna and Kadawa rivers. These rivers deposited lot of sediments at both the banks, which affects the comparatively high water table and by digging wells one can easily get water for agriculture. But this is possible only that area which is very close to the rivers. Another reason is out of 73 irrigation project 29 (40%) were located in these tahsil. It is because western part of Nashik and Dindori tahsil have a topography whish is suitable for such project constructions and another reason is the political leaders of these tahsil always were very strong hold and they have a command on the district politics and affect decision regarding choosing the projects location and benefited area.

Igatpuri, Surgana, Peth and Trambak are the tahsil which have very similar physiographical setup, characterized mainly by Sahyadries hill ranges and very undulating topography. Because of this construction of canals is very difficult, time and money consuming task. Though they have considerable number (22)of irrigation project (30%),the use of this is not for them but for the area located to the east because the general slope of the region is to the east (except few part of the western Sahyadries).This again give benefit to Nashik, Niphad and Yeola tahsil. In these 35 years span (1970 to 2005) Total irrigated area of the district increase from 12.43% to 28.44 %.(In case of Maharashtra it is increase from 8.4% in 1970 to 17.5 in 2007) this means Nashik District make significant growth as compare to the state.

Canals and the wells are the two major source of irrigation in this district. The proportion of tube wells is very negligible and so is included in the well category. Area under canal irrigation is decreases in the study period from 32% to 25 % and area under well irrigation is increases from 68% TO 75%.Well irrigation is dominated in Kalwan , Deola, Nandgoan, Chandwad, Dindori, Igatpuri, Sinner and Yeola tahsil where it is more than 80% of the total irrigated area. Significant canal irrigation is found in Surgana, Baglan, Nashik and Niphad Tahsil which is more than 25% of the gross irrigated area of the tahsil. Since 1970 percentage area under canal irrigation is increases in Kalwan, Deola, Chandwad, Dindori, Peth , Trambak, Igatpuri, Sinner and Niphad. This Increase is maximum in Trambak and Igatpuri. Area under well irrigation is increases in Surgana, Baglan and Nashik. In remaining tahsil the picture is more or less same. Following table will put more focus on the above mention facts.

Table No. 2. Level of irrigation Development in Nashik District.

Group	Criteria (area under irrigation))	1970-71	2004-05	Avg.
Good Irrigated	More than 40%	Nil	Baglan , Nashik, Niphad,	Niphad
Medium Irrigated	20 % to 40%	Baglan, Malegaon, Niphad	Kalwan, Deola, Dindori	Kalwan, Deola, Baglan, Dindori, Nashik,

			Yeola (Nashik Dist.)	Yeola (Nashik Dist.)
Less Irrigated	10% to 20%	Kalwan, Nandgoan Chandwad ,Dindori, Nashik,(Nashik Dist)	Surgana, Peth,, Malegaon, Chandwad, Sinnar	Malegaon, Chandwad, Sinnar,
Very less Irrigated	Less than 10%	Surgana, Peth, Igatpuri, Sinnar, Yeola	Trambak, Nandgaon, Igatpuri	Surgana, Nandgaon, Peth, Trambak, Igatpuri,

(Source: - By Author)

This table shows that –

1. There are 5 tahsil (out of 13) in very less irrigated category in 1970, this number decreases to 3 (out of 15) in 2005.

2. There is not a single tahsil in good irrigated group in 1970 but in 2004 Baglan, Nashik and Niphad are included in this group.

3. Area under irrigation is changes every year. For avoiding the effect of extremes average of irrigated area of 1970-71, 80-81.90-91, 2000-01 and 2004-05 is taken in to consideration in the last column .According to that Niphad is the only tahsil which is came under the good irrigated category and Surgana, Nandgaon, Peth, Trambak, Igatpuri are included in very less category. Out of these 5 tahsil 4 are located in the western hilly region.

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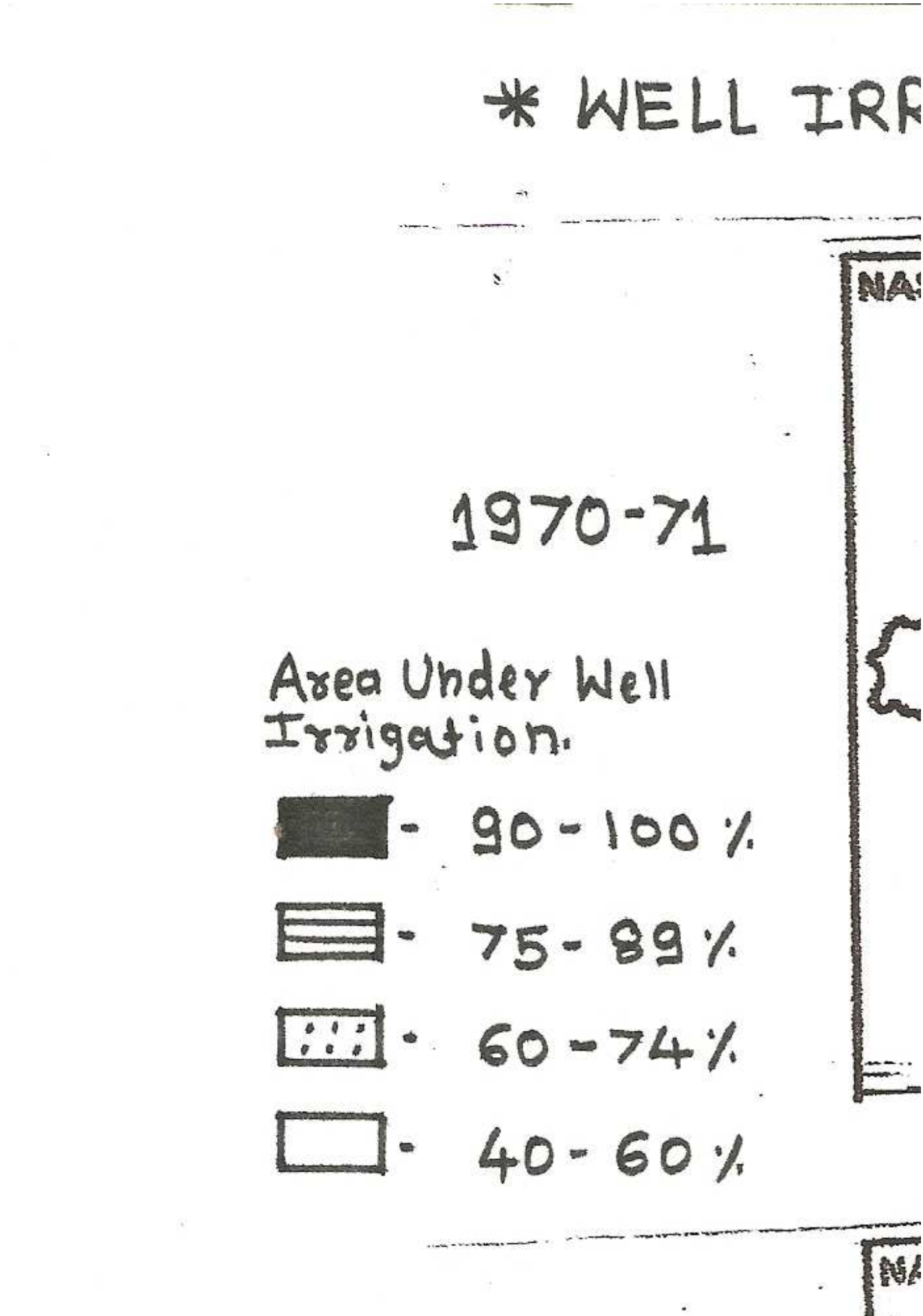

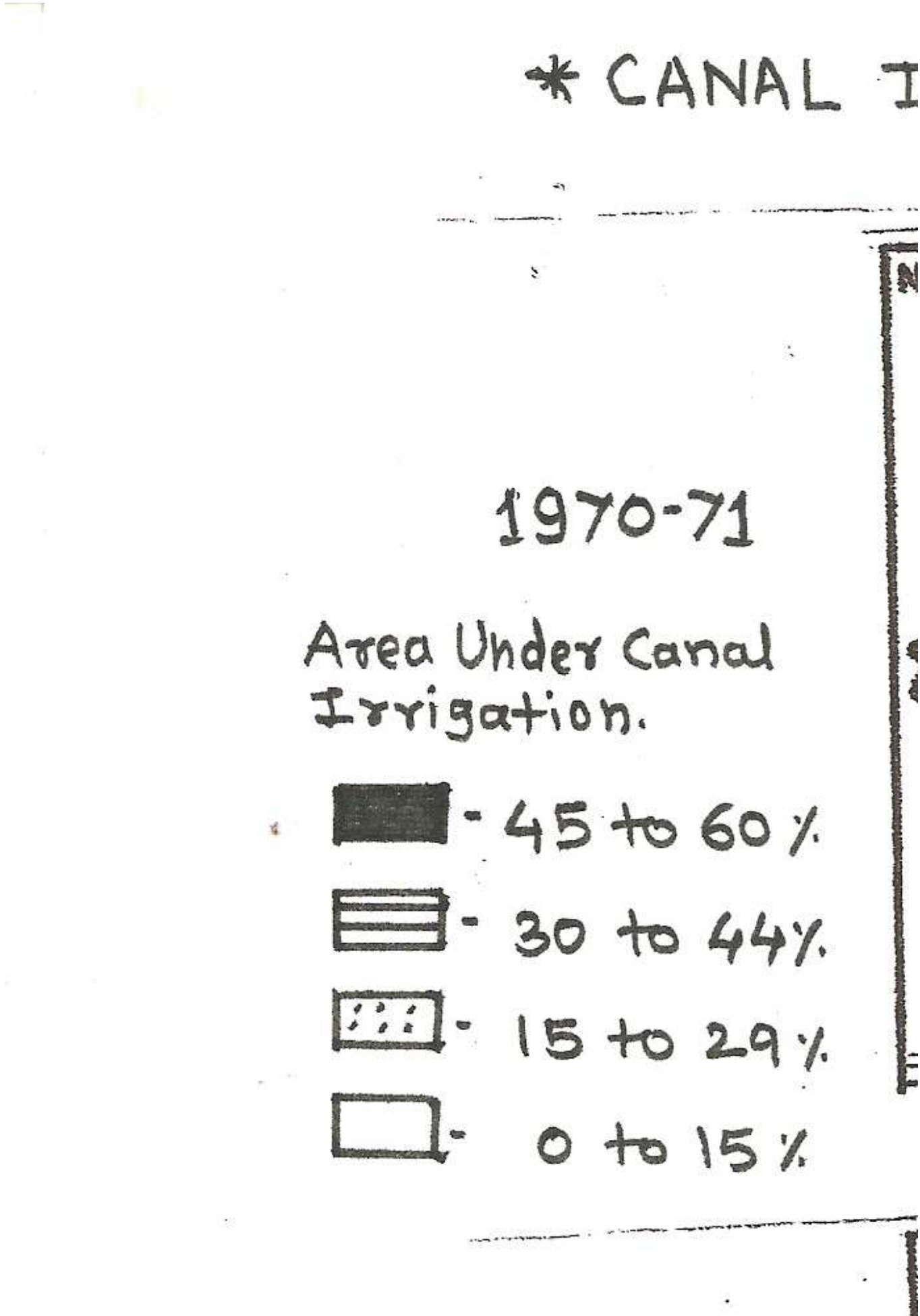
* CANAL I
1970-71
Area Under Canal Irrigation.
- 45 to 60 %
- 30 to 44%
- 15 to 29 %
- 0 to 15 %

5.2 Number of Pump Sets for Irrigation: Another criterion can be used to find out the irrigation development of the region is the number of pump set used for irrigation purpose. Following table is showing the tahsil wise number of pump sets in the district.

Tahsil		1970-71					2004-05		
	Diesel Pumps	Electric Pumps	Total pumps	% to District Total		Diesel Pumps	Electric Pumps	Total pumps	% to District Total
Surgana	20	-	20	0.10		30	71	101	0.10
Kalwan	1882	-	1882	10.07		380	6019	6399	6.38
Deola	N.A.	N.A.	N.A.	-		N.A.	N.A.	N.A.	-
Baglan	3286	-	3286	17.59		156	7085	7241	7.22
Malegaon	4128	7	4135	22.13		1700	6078	7778	7.76
Nandgaon	760	46	806	4.31		560	4260	4820	4.81
Chandwad	1346	256	1602	8.57		110	7750	7860	7.84
Dindori	683	171	854	4.57		1179	2549	3728	3.72
Peth	32	-	32	0.17		37	51	88	0.08
Trambak	N.A.	N.A.	N.A.	-		N.A.	N.A.	N.A.	-
Nasik	769	93	862	4.61		-	10087	10087	10.06
Igatpuri	41	-	41	0.21		235	42	277	0.27
Sinnar	808	373	1181	6.32		1908	9006	10914	10.89
Niphad	738	1781	2519	13.48		390	33442	33832	33.77
Yeola	1400	58	1458	7.80		2174	4882	7056	7.04
Total	15,893	2,785	18,678	100		8,859	91,322	1,00,181	100

Source – Socio-economic abstract.

This table again highlighted the fact that Niphad is having the maximum number of pump set. In 1970, because of less availability of electricity; proportion of electric pump sets is only 15 % of total number of pump sets. Malegaon is having maximum number of pump sets but as we see in earlier discussion that Malegaon is the only tahsil where the area under irrigation is decreased, the

proportion of pump set also get reduced considerably. Nashik and Sinner are other two tahsil which shows the considerable increase in the number of pump set. In other tahsil the proportion of pump set is more or less same.

5.3 Irrigation Projects of the Nashik District: The table given below describes that how irrigation project are distributed in the district. Maximum numbers of these projects are concentrated in the western part of the district. This part is having undulating topography and so have suitable sites for the construction of the projects. Though these projects are located in the western part but because of the general slope towards east, area located to the east of these project lines get maximum benefit.

Tahsil	No. Of Major Project	No. of Medium Project	No. of Minor Project	Total No. of Project
Surgana	-	-	1	1
Kalwan	2	-	-	2
Deola	-	-	-	-
Baglan	-	2	-	2
Malegaon	1	-	-	1
Nandgaon	-	2	-	2
Chandwad	1	-	3	4
Dindori	6	1	10	17
Peth	-	-	7	7
Trambak	-	1	4	5
Nasik	1	1	5	7
Igatpuri	2	-	7	9
Sinnar	-	1	7	8
Niphad	-	-	5	5
Yeola	-	-	3	3
Total	13	8	52	73

Source – Research Work of Prof. Sanjay Pagar.

6. Conclusions:

1. Area under irrigation in the Nashik district is increases rapidly in compare with state, Maharashtra.

2. Good Irrigation development is taken place in those tahsil which are located in river bank plains. e.g. Nashik and Niphad.

3. Western mountainous part of the district (Peth, Igatpuri, Surgana & Trambak) is characterized by less irrigation development because of undulating topography.

4. Well irrigation plays important role in irrigation in the district. (75% of total irrigation)

5. Area under canal irrigation increase more rapidly (57.36%) than area under well irrigation (36.34%) during study period but percentage of canal irrigation in net irrigation is decreases marginally (-7%) in th period.

6. Niphad, Sinnar and Nashik are showing good increase in number of pump set, showing that Niphad and Nashik are having good irrigation development.

7. Recommendations.

1. Because of the hilly region in most of the western and central part of the district there are limitations on canal construction, so well irrigation remains major source of irrigation in near future. Measures like C.C.T., soil & water conservation should be taken on a large scale.

2. Western part of the district having more than 200 c.m. annual rainfall. Whereas eastern part have about 40 to 50 c.m. rainfall. Project should be completed which can use the excess of water of west and turn it towards east.

3. Government should take care about power supply. (Load shading is about 12 to 18 hours per day in some part).

4. Micro irrigation Facilities and subsidies should be provided to farmers. And also supervise the actual use of these facilities.

5. Excess irrigation reduces the land productivity. Farmers should be made aware of that and encourage them to reduce over pumping of well water.

8. References:

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