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CHAPTER - IIIDemand for Oil Engines.

The entrepreneurs used all these facilities mentioned before to manufacture the ' diesel oil engines ' used for - irrigation purposes. There was a demand for these engines. - Now the demand for Oil engines is declining in Kolhapur district. It has reached a saturation point here. If they are keen on - manufacturing oil engines, they will have to strive hard to - capture outside markets. They will get all the advantages of economies of scale through specialization and longer ---- production runs and low cost of production. Outside demand - however depends on many factors.

If a changed market is to be exploited, then they will have to adopt diversification. We will study their choice in other chapters. Before that the factors that have influenced the demand for oil engines and the extent of this influence in Kolhapur district will be studied.

Background of Farmers :-

I) Farmers in Kolhapur are fortunate. They have been blessed by bountiful nature. Water from rivers is plentiful.

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They strived always to harness the water for agricultural purposes. They used mhotas, budkis, and phad system for irrigating water, prior to the use of oil engines or electric pumps. The change in pattern of 'lifting of water' devices was greatly influenced by the 'Kolhapur Sugar mill' which was started in 1933. This mill is situated at Bawada on the Panchaganga river 3 miles to north of Kolhapur city. The larger share of credit for establishing the industry goes to the late Dr. R.R. Shirgaonkar for his hard and enterprising spirit. His highness the late Rajaram Maharaj took keen interest in providing facilities to the concern. The mill used all agricultural implements to grow sugar cane on its farms. This inspired the farmers to use diesel engine and electric pumps to grow sugar cane around the Kolhapur city and in all the talukas. The farmers here have experimental attitude, they are progressive and adapt their agricultural operations according to new changes in them. But many a times we find that farmers who own small sized land holdings are not in a position to purchase oil engines. Hence they are assisted by supply of finance coming from financial institutions. We will study the extent of land holdings in Kolhapur district.

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Size of Holdings :

The information pertaining to the size of holdings gives us the idea about the crops grown, the economic - - condition of the farmers. In Kolhapur districts we find the - average size of the land holding is 2.1 hectares.

Table IDistribution of land holdings in Kolhapur District.³¹

Size group (in acres)	Percentage.
1) Below 2.50	47.26
2) 2.51 to .5	19.49
3) 5.1 to 7.5	10.86
4) 7.6 to 10	6.63
5) 10.1 to 15	7.19
6) 15.1 to 20	3.47
7) 20.1 to 25	1.86
8) 25.1 to 30	1.06
9) 30.1 to 35	0.67
10) 35.1 to 40	0.43

 Ref : 31 : (Source : Census of Agricultural holding in

Maharashtra state 1974 Page 19.

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Size group (in acres)	Percentage.
11) 40.1 to 45	0.28
12) 45.1 to 50	0.17
13) 50.1 to 60	0.21
14) 60.1 to 75	0.16
15) 75.1 to 100	0.06
16) 100.1 to 150	0.10
17) above 150	100.00

We find that the largest number of holdings lie --
 below 5 acres (66.75%). Holdings between 5 acres and 10 --
 acres constitute 17.49% of total number of holdings. The small
 land holders are too poor to provide any capital for the --
 improvement of land by way of digging wells and purchase of --
 oil engines to lift water. Hence the significance of finance --
 -- supplied by various institutions.

" Area irrigated and Irrigation practices."

II) In kolhapur, opening of land on a large scale, is not
 possible. Small dams with short lengths of canals are possible
 and are useful. Weirs have proved useful for storing water. -

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In Kolhapur wells are important and Dharans have enabled the farmers to install oil engines, pumps. Oil engines are used to lift water and for running power-crushers in sugar-cane crushing season. The rivers in Kolhapur are important as sugar cane is extensively grown on the banks of these rivers by lift irrigation. For this ' Oil engines ' are used. But - due to silting of water and continuous use of water on a - large scale, water will fall short of requirements.

" The rainfall in Kolhapur State' through less --- subject to great variations from year to year is nevertheless frequently very unevenly distributed during later months of - monsoon (September and October) which is the critical time for both rice and jowar crops."³² Thus to assure regular - water supply to foodgrains and perennial supply of sugar cane, irrigation is essential Irrigation is the artificial ----- application of water to the land for the purpose of raising crop yields." The percentage of irrigated to total cropped - area in Kolhapur in 1881 and 1893 was 2.73% and 3.3% --- respectively."³³ In the last two decades irrigation facilities -----

Ref : 32 : Raobahadur P.C.Patil Page 46.

: 33 : Kolhapur Gazetter page 162 and Modaks' report page 187

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have tremendously influenced the crop pattern. Net irrigated area was 9.24% in 1960-1961, 11.16% in 1965-1966, 11.91% in 1970-71, 13.62% in 1973-74 in Kolhapur as compared to --- Maharashtra which was 6.23% in 1960-1961, 7.70 in 1970-1971 and 7.95% in 1972-1973. The percentage of net irrigated area as a percentage of net area sown rose from 9% in 1960-1961 to 20% in 1972-1973.³⁴

Lift irrigation from the rivers is the main source of irrigation and oil engines are used to lift water. It is generally believed that, with extension of net-irrigated area, use of oil engines may rise. We find a sudden rise in area under irrigation in 1972-73 over 1960-1961. The percentage of net irrigated area as a percentage of net area sown also - shows increase 1972-73 over 1960-61 in almost all the talukas of Kolhapur district.

Ref : 34 : Socio-economic review and D.S.A. of
Kolhapur District 71-72 page 31-32
1973-1974 P. 16.

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Table-2

Talukawise net irrigated area as a percentage of net -
area-sown.³⁵

<u>Taluka</u>	<u>1960-61</u>	<u>65-66</u>	<u>71-72</u>	<u>72-73</u>	<u>73-74</u>
Karvir	16.77%	18.17%	22.54%	40%	24%
Panhala	13.76%	15.22%	14.35%	22%	13%
Hatkanangale	14.22%	16.90%	18.51%	18%	14%
Shirol	8.84%	12.32%	21.62%	21.82%	24%
Kagal	7.35%	11.38%	6.24%	6.24%	5%
Gadhinglaj	4.59%	7.07%	7.25%	7.15%	11%
Chandgad	3.43%	3.93%	5.24%	5.39%	9%
Ajara	1.70%	2.71%	2.77%	2.73%	3%
Bhudargad	8.03%	9.15%	7.56%	7.23%	18%
Radhanagari	13.08%	16.36%	13.75%	13.81%	16%
Bavada	4.30%	5.76%	5.71%	5.61%	7%
Shahuwadi	9.73%	7.26%	6.27%	8.26%	11%
District	9.24%	11.16%	11.91%	11.80%	13%

It can be seen that in Karvir, Shirol, Bhudargad, ---
Hatkanangle and Radhanagari the percentage of net irrigated

Ref : 35 : Socio-economic review and District statistical
abstract of Kolhapur District 1973.74 Page 16

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to net area sown is higher. The reason is, lift irrigation -
 from the rivers is the main source of irrigation. Now oil -
 engines and electric pumps are mostly used to lift water -
 under individual or co-operative efforts." Oil engines and -
 pumps were introduced in the state along with the power ---
 crushers by about 1925. They are used to lift water from the
 rivers. There were about 471 pumping sets in 1940. Their -
 number rose to 740 in 1945. Karwir Beta, with a large area
 under sugar cane and better supply of water in the - - - -
 Panchaganga has 357 oil engines and pumps of which 147 belong
 to the Kolhapur sugar mills. Hatkanangle, Radhanagari, - - -
 Bhudargad and Panhala have 94, 82, 31 and 28 pumping plants
 respectively working on water impounded by temporary dams -
 on the rivers. Many of the oil engines from the pumping sets
 are also used for driving power crushers, during cane crushing
 season, when the crop does not require much water"³⁶

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 Ref : 36 : "Regional Survey of Kolhapur " The late

RaoBahadur P.C.Patil page 162-163.

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Increase in the use of oil engines.Table- 3.

<u>Year</u>	<u>Number of oil engines.</u>
1940	471
1945	740
1951	2632
1961	7560
1972	12398

The reason for such a high proportion of rise in the use of oil engines is the extension of land under sugar cane. Sugar cane requires perennial water supply. Sugar cane is a - fond commercial crop in Kolhapur which yields large incomes - and provides employment 10 to 15 times more than employment - in dry crops.

" In the year 1933 the imports of foreign sugar in the state increased to about 2,500 tons conditions have changed since 1934, when a sugar factory was opened at Kolhapur under the patronage of the state. The factory produced all the -- sugar required by the state and exported on an average about 22,619 bags or 2,262 tons of sugar a year in 1944, 1945. --

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Kolhapur has been sending 'Gul' for about 100 years. In the year 1942-43 the state had 2.5% of the gross cropped area under sugar cane."³⁷

Area irrigated under sugar cane crop
in each Tehsil of Kolhapur District (Hect.)

Table - 4.

Tehsil	1968-69	1969-70	1970-71	1971-72
Kolhapur Dist.	40,670	42,567	39,895	39,999
Shahuwadi.	1,648	1,863	2,463	1,343
Panhala	4,215	4,457	4,210	4,229
Hatkanangle	5,650	5,198	5,257	5,157
Kagal	2,845	2,880	2,586	2,483
Bhudargad	2,135	2,237	1,774	1,726
Ajara	787	911	752	747
Gadhinglaj	2,856	3,029	2,893	2,865
Chandgad	1,745	1,905	1,670	1,743
Shirol	4,213	5,075	4,962	5,054
Karveer	9,401	9,962	9,700	9,963
Bawada	783	917	732	732
Radhanagari	4,392	4,123	3,836	3,947

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Thus we find the area under sugarcane has increased from 1968-69 to 1971-72 in Karveer, Shirol, Hatkanangle, -
 Panhala, Gadhinglaj, Kagal and Radhanagari Taluka. The --
 extensive area under sugarcane has enabled these regions to
 supply sugar cane to Kolhapur sugar mills and Kumbi-Kasari,
 Kuditre, in Karveer (9963 hect. area under sugar cane). Shri
 Datta sugar Ltd. in Shirol (5054 hect) 'Panchaganga Sugar'
 in Hatkanangle (5157 hect). 'Gadhinglaj Sugar 'in Gadhinglaj
 (2865 hect) 'Shri Shahu Sugar mills in Kagal (2433 hect)
 Bhogavati in Redhanagari taluka (3947 hect) respectively.

These sugar co-operatives have fostered the spirit
 of co-operation in a wider sphere and have become nuclei of
 economic growth. The co-operatives have linked agriculture
 and industry in backward and forward linkages and opened -
 new^w avenues of job and production. The incomes of these -
 areas have created a market for the consumer durables ----
 manufactured in engineering industry. The main reason behind
 extensive sugar cane area lies in the fact that government
 had given subsidy for electric motor, oil engines at the -
 rate of 25% and $33\frac{1}{3}\%$. Hence demand for oil engines was -
 rising simultaneously and mutually determining the crop -

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pattern and area under different crops. Area under Sugarcane rose from 2.5% in 1942-43 to 7.50% in 1960-1961 and from 7.50% in 1960-61 to 10.43% in 1973-1974. Since 1950-1951 to 1974, -- land under sugarcane has increased from 38,300 acres to ----- 1,07,300 acres.³⁸ Amongst the food crops 78.60% area was under sugar cane.³⁹ We find sugar cane cultivation rose from decade to decade. In earlier times Black smiths assisted ' Gul' industry by manufacturing ' iron Kahils ' and other equipments that -- were needed by this industry. These traditional techniques -- have replaced by ' Sugar mills ' and ' Oil engines ' ----- respectively. The increase in demand for oil engines persisted so long as electric pumps could not be used due to absence of extension of electricity to various talukas.

Irrigation Pattern i.e. Area irrigated by different sources.

There are various sources of supplying water to the farms. They are canals, tanks, wells, rivers etc. In Kolhapur due to the peculiar natural situation, wells supply 24%, --

Ref : 38 : Socio-econ. review and Dist.State Abstract of
1973-74 P. 17, Kolhapur

39 : D.C.H. Kolhapur 1961 Page 36

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canals 5% tanks supply 1% and other sources 70% of Water supply.⁴⁰
 With possibility of canals however oil engines may not be needed.

A change in the technique of watering sugarcane plants has been decisively responsible for a shift of acreage from --- foodgrains to sugarcane. Prior to the plan period, the method of watering sugarcane crop was dependent on biological source or energy. The method used in the cultivation of sugar-cane was -- both human and animal, labour intensive mholte and budki. But -- with the improvement in the system of watering crops sugarcane cultivation has become easy on hilly tracts, sloping layouts of land where formerly human and animal power was needed. The --- introduction of lift irrigation and oil engines has made ---- sugarcane cultivation easier. In recent years the system of -- jack-well is spreading everywhere and larger acreage of lands are brought under irrigation. The availability of oil engines have enabled the farmers to put more land under irrigation.

Area irrigated by different sources in each tahsil of Kolhapur district 1972-1973.

 Ref : 40 : Socio-Econ. review and Dist-State Abstract of

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Table - 5

Taluka	Area irrigated by different sources				Total net irrigated area	Total gross irrigated area
-----	-----				-----	-----
1	Govt.	Tanks.	Wells	others		
1	2	3	4	5	6	7

Karveer		129	2305	15322	17756	17921
Panhala		-	1239	5320	6559	6783
Hatkanangle			3724	4458	8182	8358
Shirol		-	3019	12513	15532	16035
Kagal		160	1052	3931	5143	5295
Gadhinglaj		10	1075	4797	5882	6017
Chandgad		18	480	3464	3962	3999
Ajara		-	145	1452	1598	1642
Bhudargad		113	240	3802	4155	4236
Radhanagari	4563	-	181	3623	8367	8536
Bawada		-	45	1508	1553	1584
Shahuwadi		-	624	4081	4705	5346
Dist:Total	4563	430	14130	64271	83394	65252

(Other sources include lifting water from river)

(Ref: District inspection of land records Kolhapur)

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Population :

Population influences and is influenced by pattern of economic development. We find with rise in population, --- urbanization, density of population non-agricultural ----- occupations gradually rose.

Total population of Kolhapur District was 20,48049 as per 1971 census. The density measured in terms of population per square kilometres was 254 for the district as a whole. --- Table given below reveals the population of the district and its variation over each decade since 1901.

Table - 6

Population of Kolhapur District.

Decade Variation.

Year	Population	Decade Variation	Rate of Variation.
1901	900570	-	-
1911	817976	- 82594	- 9.17
1921	820032	+ 2056	+ 0.25
1931	9373303	+ 117271	+ 14.30
1941	1072444	+1351151	+ 14.42

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1951	1308060	+ 235616	+ 21.97
1961	1596493	+ 288433	+ 11.05
1971	2044332	+ 448339	+ 28.08

Source : 41) Kolhapur District Census Handbook.

1961 Page 11

42) Kolhapur District census handbook 1971

Due to drought and scarcity conditions the district population decreased by 9.17% in the decade 1901-1911. During the period from 1921, there has been a distinct change in the trend of population growth. Population has continued to grow at increasing rate since then. The decade wise growth rate between 1921-1941 is constant around 14% . After 1941 the population has increased at increasing rate. The last decade has marked the highest rate of growth of population at 28.08%.

Rural/Urban Population :

In the rural areas the density of population is 204, whereas in Urban area density is 2295. Among talukas of the district, Karvir has the highest population density of 704. In comparison with 1961 census data the 1971 census data has

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recorded an aggregate increase relating to Kolhapur District of 28.23% . The growth of urban population was of higher -- magnitude at 43.04% as against the lower growth of rural --- population of 24.76% over the same period.

Table - 2

Decade Variation in Population Since 1951

Year	Population Person	Urban	Population Per Sq.Km.	Decade Total	P.C. Rena	Variation Urban
1951	1308060	1084130	158	+ 21.97	+ 14.33	+ 58.23
1961	1596493	1288718	193	+ 22.05	+ 18.87	+ 37.44
1971	2043049	1607804	254	+ 28.23	+ 24.76	+ 43.04

43 Source : Socio-Econ. Review and District Statistical abstract of Kolhapur District
1973-1974.

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It will be seen that among the tehsils of --
 Kolhapur District Karveer, Panhala, Hatkanangle, Shirol --
 tehsils have higher decadal growth percentages than the --
 district average growth percentage of 28.28 in 1961-1971
 decade.

Table - 8

Taluka variation in population in the last two decades
 (percentage variation.)

Taluka	1951-1961	1961-1971
Ajara	+ 15.82	+ 23.23
Bhudargad	+ 19.30	+ 19.82
Chandgad	+ 16.12	+ 19.65
Gadhinglaj	+ 14.61	+ 20.43
Gaganbawada	+ 11.62	+ 8.48
Hatkanangle	+ 33.50	+ 39.70
Kagal	+ 16.48	+ 22.65
Karveer	+ 30.51	+ 35.49
Panhala	+ 18.36	+ 29.72
Radhanagari	+ 15.17	+ 24.40
Shahuwadi	+ 15.91	+ 18.92

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Shirol	+ 24.68	+ 31.42
Kolhapur Dist.	+ 22.05	+ 28.08

In the Kolhapur district Karveer has the highest population density of 704. Talukawise decadal growth rate (1951-71) which were above district average are as follows.

1) Hatkanangle	39.77%
2) Karvir	35.85%
3) Shirol	31.40%
4) Panhala	29.99%

Low growth rates are found in

Radhanagari	24.52%
Ajara	23.51%
Kagal	23.11%
Gadhinglaj	20.69%
Bhudargad	19.82%
Chandgad	19.67%
Shahuwadi	19.14%
Bavada	8.51%

It is found that talukas in Eastern part have -
shown high decadal growth rate in population. From the ---

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occupational pattern 1971, we find the following position.

Table - 9

Occupational Pattern 1971 (in'oo)

Taluka	Cultivators	Agricultural Labour	Other workers	Total workers
Karvir	446 (32.4)	173 (12.4)	773 (55.6)	1392
Panhala	328 (64.2)	93 (12.2)	88 (13.2)	514
Hatkanangle	343 (35.2)	168 (17.2)	451 (43.3)	972
Shirol	281 (47.2)	163 (27.5)	153 (25.8)	592
Kagal	383 (64.8)	105 (17.8)	102 (17.2)	590
Gadhinglaj	314 (62.2)	106 (19.8)	83 (16.4)	504
Chandgad	317 (67.3)	61 (12.9)	39 (8.3)	471
Ajara	236 (73.5)	40 (12.4)	45 (14.0)	321
Bhudargad	273 (73.3)	58 (15.4)	35 (9.36)	375

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Radhanagari	394	72	56	523
	(73.4)	(13.7)	(10.7)	
Bawada	223	21	19	263
	(84.7)	(7.9)	(7.2)	
Shahuwadi	333	61	47	441
	(75.5)	(14.0)	(10.6)	
Kolhapur District	3933	115	1915	6963
	(56.7)	(16.0)	(27.4)	

44 Source : Latest available data Socio-economic review and
District Statistical Abstract of Kolhapur - -
District 1973-74 Page 15-16.

(figures in brackets are p.c. to total workers)

In Karvir 55.6% belong to non-agricultural - - -
workers. The reason may be ascribed to the fact of location
of a large number of small and medium scale industries in
and around Kolhapur city, and out of the total working --
population in Kolhapur, nearly 44% are employed in - - - -
engineering industries which specialize mainly in oil --
engines and spare parts.

Ref :45 : D.C.H.Kolhapur 1961

:46 : Census of India-1971 General Population.

:47 : Table: Series II-Maharashtra Part II A

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There are generally four indicators of knowing the levels of economic development of a region. They are - -

- 1) Percentage of workers in manufacturing other than household.
- 2) Literacy 3) Urbanization 4) Density of population.

Table - 10

Levels of economic development.

Name of the Taluka	P.C. of workers in manufacturing other than household		Literacy		Urbanization		Density of Population.	
	1961	1971	1961	1971	1961	1971	1961	1971
Karveer	11.26	14.37	37.92	45.95	55.58	56.66	511	704
Hatkanangle	17.91	25.92	30.04	40.76	26.31	31.16	372	520
Shirol	3.07	7.39	32.70	42.22	4.48	15.99	286	391

Out of 12 talukas in the district three talukas - - - mentioned above have shown somewhat higher levels of economic development. Densely populated talukas in the eastern part -- have shown higher rates. This is due to the flourishing - - - agriculture, caused by deep black soil of varying depth found in Krishna, Panchaganga basin to which these areas belong, - availability of irrigation facilities and use of oil engines/ electric motor to lift water. Prosperous agriculture has -

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sustained manufacturing activity and this in turn has led to greater urbanization and high rates of literacy.

Consumption of Electricity.

Electricity is useful in agriculture as well as in industrial development. It transforms the backward economy -- and traditional farming in developed economy and modern farming. The use of electric power is an important indicator of economic progress. This can be assessed by working out per capita --- consumption of electricity. The per capita consumption was 12.37 KWH-in 1960-1961. It was 37.37 KWH in 1965-1966, 93.84 KWH. in 1970-71 and 89.63 KWH. in 1972-1973, 168.35 KWH in -- 1974-75. The use of electricity is rising day by day.

The total electricity used in the district is -- 3,44,780 thousand KWH in 1974-1975. The following table gives the idea of consumption of electricity in Kolhapur district.

Table 11 (in lakh KWH)

Consumption of Electricity.

Purpose	1950-51	1955-56	1960-61	1970-71	1973-74	1974-75
Domestic Consumption	12.44	3.66	17.73	154.94	157.03	183.30
Industrial Purpose.	7.52	4.78	61.74	941.86	856.18	1346.38

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Agricultural Purpose	-	-	-	-	647.38	898.97
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(Ref : 48 : Socio-Econ.review and D.S.A. of --

Kolhapur 1961-62, 1962-63, 1970-71, 1973-74, 1974-75)

Out of 1033 inhabited villages in the district - only 94 villages were electrified upto 31.3.1961 and 754 villages were electrified by the end of March 1972. By the end of March 1972, 302 villages were electrified in all since - beginning. All the eleven towns have been electrified. The P.C. of these villages to total inhabited villages in the district is 74.05 at the end of the year 1972-73. On 31.3.1975, 835 villages have been covered by supply of electricity in the district. All the villages in the district are expected to be electrified by 1982. Villages in Shirol, Hatkanangle, Kagal, Gadhinglaj, Karveer and Panhala have been electrified cent - percent and the percentage in other talukas is 60% to 80%.

The greater use of electricity has been changing the - - - composition of capital formation in agriculture.

Agricultural implements:

Farmers in Kolhapur have adopted modern implements along with irrigation facilities to raise the per acre ---

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productivity. There seems to be a transformation in - - -
traditional farming.

Table -12

Major agricultural implements used in Kolhapur --

District.

Sr.No.	Particulars.	1956	1961	1966	1972
1	Plough-Wooden	88109	94846	96137	94575
2	Plough-Iron	7238	7741	7874	9581
3	Improved harrows and cultivators.	-	-	2329	-
4	Improved seed drills-	-	-	324	-
5	Improved threshers -	-	-	161	-
6	Rotary chaff cutters	-	-	77	-
7	Sprayers and Dusters	-	-	188	-
8	Carts.	34184	39469	45955	49018
9	Sugarcane Crushers worked by Power.	1450	1618	1587	1373
10.	Sugarcane crushers Worked by bullock	579	319	290	41

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11	Oil engines with Pumps for irrigation purpose	4136	7560	11244	13388
12	Electric pumps for irrigation purpose	33	203	2565	6412
13	Persian wheel or rabat	-	525	350	-
14	Tractors-Govt.	0	5	27	0
15	Tractors-Pvt.	0	37	98	415
16	Power tillers			39	
17	Ghanis-5 Kgrms and over	128	233	49	13
18	Ghanis-less than 5 Kgrms.	172	80	38	2

(Source: 49 : District Census Handbook 1961

: 50 : Socio-economic review and District statistical
abstract of Kolhapur District 1971-72, -
1972-73, 1973-74)

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The use of oil engines with pumps for irrigation -- purposes has increased by 299.75% from 1956 to 1972. The use of electric pumps for irrigation purpose in the same period has gone from 33 in 1956 to 6412 in 1972 i.e. by 19430.30%. This shows that oil engines are being replaced by electric motors. Similar is the case with the use of tractors, power tillers, iron ploughs etc

The use of electric motors is made on a larger scale even in some of the developed taluka.

The table below gives us the idea of the change in some important agricultural implements in 1972 over 1951.

Table- 13.

<u>Panhala</u>	<u>1951</u>	<u>1961</u>	<u>1972</u>	<u>P.C.change</u>
Wooden plough	6476	7926	7529	1.16%
Iron Plough	367	431	788	2.14%
Oil engines		809	1510	1.86%
Electric Pump	-	3	527	175%
Tractor	-	4	84	80%
<u>Hatkanangle</u>				
Wooden plough	1055	951	1375	1.30%
Iron Plough	1970	1991	2330	1.18%

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Oil engines	1606	1261	0.785%
Electric Pumps	59	2454	41.59%
Tractor	23	196	8.52%

Shirol.

Wooden plough	946	652	929	0.982%
Iron Plough	1599	1894	2650	1.65%
Oil Engines	-	848	710	0.837%
Electric Pump	-	38	1802	47.42%
Tractor	-	11	87	7.90%

Karveer.

Wooden plough	6833	7591	8601	1.25%
Iron Plough	820	884	400	0.487%
Oil engines	-	1330	906	0.681%
Electric Pumps		54	378	7%
Tractor		40	476	11.9%

From the table we find that in all these talukas the demand for oil engines have declined and the -- demand for electric motors is positively increasing though the use of both has started since 1961. The rate of the use

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of oil engines shows fall as compared to rising rate of the use of electric motor. This shows that electricity is preferred to oil engines in these developed talukas . In these talukas - the regional concentration in the case of electric pumpset is greater. When all the villages will be electrified, the demand for oil engines may not have prospects.

Villages :

There are 1086 villages in Kolhapur district.

The number of villages in each of the 12 talukas is given --- below :-

1)	Shahuwadi Taluka	130 Villages.
2)	Panhala Mahal	102 Villages.
3)	Hatkanangle Taluka	52 Villages.
4)	Shirol Taluka	46 Villages.
5)	Karveer Taluka	103 Villages.
6)	Bawada Taluka	77 Villages.
7)	Radhanagari Taluka	101 Villages.
8)	Kagal Taluka	80 Villages.
9)	Bhudargad Taluka	95 Villages.
10)	Ajara Mahal	81 Villages.

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11)	Gadhinglaj Taluka	89 Villages.
12)	Chandgad Taluka	130 Villages.
	Kolhapur District	1086 Villages.

With the availability of electricity the talukas will prefer electric pumps. The demand for electric motor - will depend on the availability of electricity during the period. In many a talukas, the use of electric pumps has been commenced since 1972. That was the period of electrification in that taluka. There are still many taluka in which the -- demand for oil engines in still increasing, the reason is -- non-availability of electricity.

Table - 14

Taluka-wise use of Oil engines/ electric pumps.

<u>Name</u>	<u>1951</u>	<u>1956</u>	<u>1961</u>	<u>1972</u>
<u>Shahuwadi.</u>				
Oil Engines.	N.A.	162	425	1403
Electric Pumps	-	2	-	47

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Hatkanangle

Oil engines.	-	773	1606	1261
Electric Pumps		7	59	2454

Panhala.

Oil engines.	-	468	809	1510
Electric Pumps	-	-	3	527

Shirol.

Oil engines.	-	330	843	710
Electric Pumps.		6	38	1802

Karveer .

Oil engines.		1043	1330	906
Electric Pump		11	54	378

G. Bawada.

Oil engines	-	56	106	1174
Electric Pumps		-	-	4

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Radhanagari.

Oil Engines.	-	422	627	1129
Electric motor.	-	-	-	223

Kagal.

Oil Engines.	-	401	812	1843
Electric motor.	-	3	-	301

Bhudargad.

Oil Engines.	-	137	242	499
Electric motor.	-	-	-	30

Ajara.

Oil engines.	-	28	80	134
Electric Motor.	-	-	1	5

Gadhinglaj.

Oil engines.	-	137	366	1569
Electri Pumps.	-	4	-	635

Chandgad.

Oil engines.	-	179	309	1250
Electric pumps.	-	-	48	6

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Total.

Oil engines.	-	4136	7560	13388
Electric pumps	-	33	203	6412

- 1) Oil engines use rose by 3.23% in 1972 over 1956.
- 2) Electric pumps rose by 194.33% in 1972 over 1956.

Numerically the number of oil engines used was 13388 in 1972 and 4136 in 1956, showing an increase of 9252 engines.

The electric pumps were 6412 in 1972 and 33 in 1956 showing an increase of 6379 electric pumps, but the rates of increase in use of electric pumps exceed the rate of oil engine use.

Thus in aggregate or in partial, the electric -- pumps are exceeding the oil engines.

In the areas in which electricity is not -----
available the 'oil engines ' are still in use. At the same ---
time when scarcity arise-s, droughts occur as found in 1972-
1973, there was a difficult period for agriculture. In rabbi
season of 1972-1973, demand for diesel oil engines increased

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but demand for electric pumps declined. There were electricity cuts, due to scarcity conditions, and so demand for electric pumps declined as compared to demand for oil engines.

Thus we find that the zones which get less than 650 mm rains have been transformed into the densely populated, economically more active regions. In these talukas, the number of non-agricultural labourer is more, the percentage of net - irrigated to net area sown is greater, there is concentration of engineering industry, the percentage of electricity, the use of electric pumps Sugar cane acreage is higher. The techniques of agricultural production and industrial production is now. Green revolution and industrial revolution has benefitted the region. This has taken place due to the revolution that took place in the minds of farmers and manufacturers, who have always strived hard to adapt, Solve and overcome the problems by their imagination, experimentation, initiative and innovating ---- ability.

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