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## **GRT** CHANGING LAND USE AND CROPPING PATTERN IN SOLAPUR DISTRICT

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**Abstract:-**The Solapur district can be broadly divided into three natural zones, the Eastern zone comprising Barshi, North Solapur, South Solapur and Akkalkot talukas, which has medium to deep black soil, to some extent get assured rainfall, and in this area jowar, bajra and pulses are grown. The central or the transitional zone comprising Mohol, Mangalwedha, Eastern part of Pandharpur and Madha taluka has uncertain rainfall, light to medium soil and grows kharif and rabi crops. The Western Zone comprises scarcity areas of Karmala, Sangola and Malshiras talukas and Western part of Madha and Pandharpur talukas with lighter soils and uncertain rainfall. In Karmala, Pandharpur and Madha talukas, rabi crops are mainly grown. Moreover, kharif crops such as bajra and groundnut in Sangola taluka are also grown. Large part of Malshiras taluka receives protection from scarcity due to the irrigation provided by Nira Right Bank Canal, so sugarcane is the major crop in this area.

**Keywords:** Changing Land, Cropping Pattern, life and economy.

### **INTRODUCTION :**

There are very little variations in the climate in different parts of the district. The climate is dry and hot in all part of the district, except that portion of Barshi taluka, which lies above the Ghats where it is somewhat coolest than in the rest of the district. The dominant natural factor, which affects the life and economy of the people, is the rainfall. All over the district, the rainfall is uncertain and scanty with an annual average of 989.12 mm; district gets rain from South West as well as North East monsoons. The paucity of total amount of rainfall and large variations both in extent and the distribution in different years makes the agriculture almost a gamble on the rains. The fact finding committee appointed by government in 1960 had reported that the rainfall is not dependable in the area of Karmala, Sangola, Madha, Pandharpur, Malshiras, Mohol, Mangalwedha, Akkalkot, North Solapur and South Solapur and they are likely to be affected by scarcity areas.

### **OBJECTIVES**

Following are the objectives of the present paper...

- 1.To study the Land use pattern in Solapur district.
- 2.To study the cropping pattern of the district.
- 3.To study the production and yield pattern of the district.
- 4.To find the Land holding pattern in Solapur district.

## RESEARCH METHODOLOGY

Keeping in mind the above said objectives, we have used the secondary data for to find out the conclusion. Secondary data collected from Socio-Economic Survey Report of Solapur District and Maharashtra Statistical Abstract Part-II. From these sources after collecting the data, we have calculated Three-year average for the year 1975-78, 1995-98 and 2010-13 and then calculated the percentage change over a period.

### Land Use Pattern

The availability of land and its proper use is important in agriculture for raising output. The land use pattern generally influenced by several factors such as the nature of the soil, topography, climatic condition and man made factors like availability of irrigation facilities and high yield varieties of seeds. The table 1 gives the land use data of the Solapur district as three-year average for 1975-78, 1995-98 and 2010-13. Spatial analysis of land use pattern in 2010-13 indicates that the total geographical area of the Solapur district has decreased by 13200 hectares because of the attachment of the totally nine villages to another districts i. e. Osmanabad district and Sangli district. Of the total reported area of the district 14.87 lakh hectares, the net sown area is 10.06 lakh hectares, which accounted for nearly 68 percent. Thus, the district had relatively higher proportion of the net sown area as compared to the entire Maharashtra State nearly 60 percent.

The dynamics of land use pattern indicates that additional area used for cultivation made available through fallow land or cultivable wasteland only without affecting the ecological balance adversely. Fallow land is of two types (1) Current fallow and (2) Other fallow. The current fallow land is that part of the cropped area, which kept unploughed for a season during the current year. It is kept idle mainly for the following reasons (i) regaining the fertility of the soil, (ii) adverse economic condition of the agricultural producer and (iii) adverse climatic condition, particularly in drought prone period. Other fallow land includes all those areas, which temporarily kept out of cultivation due to one reason or the other as mentioend above for a period of one to five years. In the district under study 19.79 percent, area was under the category of fallow land.

The land, which is not available for cultivation, includes (i) barren and unculturable land i. e. rocky or hilly land, which cannot easily brought under cultivation except at a high cost and (ii) land put to non agricultural uses such as roads, railways, canals, infrastructural facilities, industrial establishments, urbanization and for other non agricultural uses. In the district of the geographical area 4.26 percent area was not available for cultivation.

It is an important from ecological point of view that in what extent area occupied by forests, permanent pastures and grazing lands and by miscellaneous trees. In case of forests, the position of the district as a whole was most disappointing. Of the geographical area of the Solapur district, only 2.14 percent area occupied by forests, which was far below that of the State (17.24 percent). For maintaining the ecological balance, expected that atleast 33 percent of the geographical area should be under forest, but in light of this norm, this district was so far below.

**Table 1**  
**Land Use Pattern in Solapur District**  
**(Average for 3 years)**

Sr. No.	Particulars	Period			% change		
		1975-78	1995-98	2010-13	1975-98	1995-13	1975-13
1	Total Geographical Area	15010	14878	14878	-0.87	0	-0.87
2	Area under forest	326 (2.17)	350.33 (2.35)	319.47 (2.14)	7.46	-8.80	-2.00
3	area not available for cultivation	724 (4.82)	684.66 (4.60)	633.91 (4.26)	-5.43	-7.41	-12.44
4	Total other uncultivated land	1055.66 (7.03)	1106 (7.43)	792.17 (5.32)	4.76	-28.37	-24.95
5	Total fallow land	1653 (11.01)	2181.33 (14.66)	2944.55 (19.79)	31.96	34.98	78.13
6	Net area sown	11251.33 (74.95)	10555.66 (70.94)	10064.75 (67.64)	-6.18	-4.65	-10.54
7	Area sown more than once	808.33 (7.18)	727.66 (7.99)	421.21 (2.83)	-9.97	-42.11	-47.89
8	Gross cropped area	12059.66 (80.34)	11403.33 (76.64)	10485.96 (70.47)	-6.71	-8.04	-13.04
9	Cropping intensity	107.18	108.03	104.18	0.79	-3.56	-2.79

Source: 1) Statistical Abstract of Maharashtra Part-II  
 2) Socio-Economic Survey Reports of Solapur District  
 Note: 1) Figures in parenthesis shows percentage to total geographical area and in case of area sown more than once, percentage to net sown area.

Over a period, it is observed from Table 1 that in the district the net sown area did not increase during the period of 1975-78, 1995-98 and also in 2010-13, but it is gradually decreased. In fact it is decreased by 10.54 percent from 1975-78 to 2010-13. Reduction in net sown area in the district can attributed to increase in fallow land. In fact, there is a scope to bring the fallow land under cultivation to increase agricultural production. Moreover, in the district of area sown more than once to net sown area was nearly 2.83 percent. Consequently the low level of multiple cropping in the district has resulted in low cropping intensity. In 1975-78 it was just 107.18 for the district, which was rose with somewhat to 104.18 in 2010-13, showing only 2.79 percent declines. Moreover, it showed that of the geographical area, nearly 68 percent land has already brought under cultivation, which reflects the fact that agriculture products still adopted extensive strategy of cultivation rather than intensive one.

### Cropping Pattern

Crop pattern means the proportion of area under different crops at a particular period. Changes in cropping pattern in any region anywhere is a continuous process and affected by various factors. Technological changes play a vital role in this connection. The trends in the cropping pattern in Solapur district with three-year average for the year 1975-78, 1995-98 and 2010-13 shown in Table 2. With reference to 2010-13, it is seen that jowar, wheat and bajra are the important cereals crops in the district. Largest area of the gross cropped area occupied by jowar in the district, whose share was 55.08 percent in 2010-13. Among cereals, wheat has occupied next rank with 3.60 percent. Whereas the bajra occupied a 2.19 percent area of the gross cropped area. Moreover, about the area under total cereals crops of the gross cropped area, it was 63.21 percent and it was very high in the district compared to pulses, oil seeds, fibres and miscellaneous. Area under total pulses was 6.99 percent of the gross cropped area. With taking first rank among pulses, area under gram is nearly 2.82 percent and then ranking the tur and other pulses. Total food grains occupied the largest area, which accounted for 70.20 percent to the gross cropped area in the district. Thus, the cropping pattern in the district showed that foodgrain crops are main crops being produced. Among foodgrain crops, jowar occupied lion share in the cropping pattern.

In case of non foodgrain crops the position of total oil seed crops showed that, of the total gross cropped areas 4 percent area was brought under these crops. Moreover, among oilseeds, safflower occupied major share with 2.49 percent followed by groundnut (0.45 percent). Among the cash crops, the sugarcane has occupied largest area (6.12 percent), whereas the cotton occupied a very small area (0.30 percent) of the gross cropped area in the district.

**Table 2**  
**Cropping Pattern in Solapur District**  
**(Average for 3 years)**

Area in '00' hectare

Sr. No	Crops	Period			% change		
		1975-78	1995-98	2010-13	1975-98	1995-13	1975-13
1	Rice	68.66 (0.56)	21.33 (0.18)	3.54 (0.03)	-68.93	-83.40	-94.84
2	Wheat	546 (4.52)	439 (3.84)	377.97 (3.60)	-19.59	-13.90	-30.77
3	Jowar	6980 (57.87)	7244 (63.52)	5776 (55.08)	3.78	-20.26	-17.24
4	Bajra	727.33 (6.03)	252.33 (2.21)	230.44 (2.19)	-65.30	-8.67	-68.31
5	Other Cereals	193.66 (1.60)	212.33 (1.86)	3.93 (0.03)	9.64	-98.14	-97.97
6	Total Cereals	8509.66 (70.56)	8169 (71.63)	6629.05 (63.21)	-4.00	-18.85	-22.09
7	Gram	357.66 (2.96)	335 (2.93)	296.63 (2.82)	-6.33	-11.45	-17.06
8	Tur	673.66 (5.58)	277.66 (2.43)	190.76 (1.81)	-58.78	-31.29	-71.68

9	Other Pulses	926.66 (7.68)	227 (1.99)	56.06 (0.53)	-75.50	-75.30	-93.95
10	Total Pulses	1963 (16.27)	839.66 (7.36)	733.04 (6.99)	-57.22	-12.69	-62.65
11	Total Food grains	10469 (86.81)	9008.66 (79.00)	7362.10 (70.20)	-13.95	-18.27	-29.67
12	Sugarcane	188.33 (1.56)	501 (4.39)	642.39 (6.12)	166.02	28.22	241.09
13	Cotton	96.33 (0.79)	39.33 (0.34)	31.86 (0.30)	-59.17	-18.99	-66.92
14	Groundnut	317 (2.62)	210.33 (1.84)	47.72 (0.45)	-33.64	-77.31	-84.94
15	Safflower	543 (4.50)	324 (2.84)	261.65 (2.49)	-40.33	-19.24	-51.81
16	Total Oil seeds	949.66 (7.87)	1178 (10.33)	420.19 (4.00)	24.04	-64.33	-55.75
	Gross Cropped Area	12059	11403.33	10485.96	-5.44	-8.074	-13.04

Source: 1) Statistical Abstract of Maharashtra Part-II for the relevant years.  
2) Socio-Economic Survey Report of Solapur District for the relevant years.  
Note : 1) Figures in parenthesis shows percentage to gross cropped area.  
2) Area under sugarcane shows actual harvested area.

Over a period, it was observed from the Table 2 that in the district the area under sugarcane increased by 241.09 percent during the period of 1975-78 to 2010-13. The total oil seed crops also declined remarkably (55.75 percent) during the same period. About the jowar, it has declined by 17.24 percent, whereas the area under other cereals has come down by 97.97 percent. The area under wheat has declined by 30.77 percent, but about the bajra it is decreased very fast (68.31 percent). Overall it was found that foodgrains crops has reduced by 29.67 percent while area under cash crops particularly sugarcane has increased during the same period in the district. Moreover, area under pulses cultivation has diminished (62.65 percent) in the same period.

#### Production Pattern

The climatic conditions of the district contribute to inferior output pattern. Table 3 gives the output pattern of the district for the year 1975-78, 1995-98 and 2010-13 (3 year average). Food grains production was predominant in the district, cereals contributing the major chunk. Of the total cereals, output of jowar (71.15 percent) was commanding next came wheat (17.90 percent). These two crops together comprised 89.05 percent of food grains production of the district. Besides jowar and wheat, bajra also produced and it shared 1.40 percent of the foodgrain production. Pulses were relatively less important, sharing only 9.49 percent of total food grains production of the district. Gram and tur are the dominant among the pulses output. Among nonfood crops sugarcane, cotton, groundnut and the oil seeds were conspicuous.

**Table 3**  
**Output of Principal Crops in Solapur District**  
**(Average for 3 years)**

in '00' tonnes

Sr. No	Crops	Period			% change		
		1975-78	1995-98	2010-13	1975-98	1995-13	1975-13
1	Rice	50.66 (1.27)	25 (0.51)	1.24 (0.04)	-50.65	-95.04	-97.55
2	Wheat	419.33 (10.51)	513.33 (10.47)	493.36 (17.90)	22.41	-3.89	17.65
3	Jowar	2476.67 (62.09)	3624.66 (73.95)	1961.05 (71.15)	46.35	-45.89	-20.81
4	Bajra	125 (3.13)	118 (2.40)	38.70 (1.40)	-5.6	-67.20	-69.04
5	Other Cereals	337.66 (8.46)	276.33 (5.63)	0 (0)	-18.16	-	-

6	Total Cereals	3501 (87.78)	4557.33 (92.98)	2494.35 (90.50)	30.17	-45.26	-28.75
7	Gram	97.33 (2.44)	175.33 (3.57)	187.71 (6.81)	80.13	7.06	92.85
8	Tur	129.66 (3.25)	77.66 (1.58)	73.87 (2.68)	-40.10	-4.88	-43.02
9	Other Pulses	260.33 (6.52)	90.66 (1.84)	0 (0)	-65.17	-	-
10	Total Pulses	487.33 (12.21)	343.66 (7.01)	261.58 (9.49)	-29.48	-23.88	-46.32
11	Total Food grains	3988.33	4901	2755.93	22.88	-43.76	-30.90
12	Sugarcane	1749	42681.33	125910.45	2340.32	195	7098.99
13	Cotton	155.66	64.33	13.29	-58.67	-79.34	-91.46
14	Groundnut	210.66	216.66	15.07	2.84	-93.04	-92.84
15	Total Oil Seeds	267	741	42.32	177.52	-94.28	-84.14

Source : 1) Statistical Abstract of Maharashtra Part - II  
2) Socio-Economic Survey Report of Solapur District  
Note : 1) Figures in parenthesis shows percentage to total food grains output.  
2) The output of cotton is in '00' bales of 180 kg. each.

Perusal of trends in output changes in 2010-13 over 1975-78 that have taken place in the district reveals the most outstanding performance of sugarcane (7098.99 percent) and then the gram (92.85 percent) and wheat (17.65 percent) over the above period.

For the district, output of main crops like sugarcane, wheat and gram revealed an uptrend in more or less proportions, whereas the other crops like jowar, cotton, rice, tur and bajra revealed a downtrend in more or less proportion. A positive feature treated of the agricultural development of the district because of an upward trend in main crops.

#### Yield Rates of Main Crops

Table 4 gives the yield rates of the principal crops for the years 1975-78, 1995-98 and 2010-13 as a three-year average. With taking the reference year 2010-13 crops having higher yields were sugarcane, cotton, rice, wheat, jowar, other cereals and groundnut. Among them, the sugarcane has occupied first rank in the district with yield of 90430 kg. per hectares and then come the groundnut and wheat. Among the pulses gram given more yields in the district. The low-level yield crops such as rice, jowar, bajra and tur, had observed in the district. Variations in the yield rates of various crops were caused by mainly the bio-chemical technology. It was observed, crops having higher yields, also had higher coverage under high yielding varieties.

**Table 4**  
**Yield of Main Crops in Solapur District**  
**(Average for 3 year)**

in Kg. per hectare

Sr. No	Crops	Period			% Change		
		1975-78	1995-98	2010-13	1975-98	1995-13	1975-13
1	Rice	2205.3	1164.33	332.76	-47.20	-71.42	-84.91
2	Wheat	766	1186.66	1200.05	54.91	1.12	56.66
3	Jowar	1737.33	1661.66	384	-4.35	-76.89	-77.89
4	Bajra	172	469.66	384.85	173.05	-18.05	123.75
5	Other Cereals	1755.66	1295	0	-26.23	-	-



Changing Land Use And Cropping Patter In Solapur District

6	Total Cereals	412	558.66	4449	35.59	696.36	979.85
7	Gram	264.33	449	577.21	69.86	28.55	118.36
8	Tur	197	276	377.98	40.10	36.94	91.86
9	Other Pulses	279.33	403.33	0	44.39	-	-
10	Total Pulses	249.33	407	2296	63.23	464.12	820.86
11	Total Food grains	381	545	538*	43.04	-1.28	41.20
12	Sugarcane	39070	85327	90430	118.04	6.15	131.45
13	Cotton	275	277.66	859.87	0.96	209.68	212.68
14	Groundnut	708	1745.66	1232.9	146.56	-29.37	74.138
15	Total Oil Seeds	358.33	616.33	1675.54	72.00	171.85	367.59

Source : 1) Statistical Abstract of Maharashtra Part - II  
2) Socio-Economic Survey Report of Solapur District  
Note: \* 2005-08 average data

Moreover, it was observe that over a period during 1975-78 to 2010-13 rice, and jowar has shown negative change and remain all the crops showed the positive change in the district. In case of cotton, it has registered higher growth (212.68 percent) among all the crops, followed by bajra (173.05 percent). The growth in yield of oil seed crops was higher (367.59 percent) followed by total food grain crops (41.20 percent). Moreover, the yield of total pulses increased by 820.86 percent. While yield of sugarcane increased by 131.45 percent during the same period in the district. Moreover, the yield of groundnut was increase by 74.13 percent. The most disappointing fact was observed in case of jowar, whose yield has reduced by 77.89 percent during the same period.

### Land Distribution

The important part of any agricultural economy is the land distribution among the various size classes. The operational holding defined as all land, which used wholly or partly for agricultural production and operated as one technical unit by one person along or with others without regard to the title, legal form, size or location. Data provided in Table 5 shows that the number and area of operations holding related to size class holding in Solapur district. Table 5 reveal that the number of holdings increased from 3500 in 1970-71 to 6679.1 in 2012-13 with an increase of 90.83 percent, even though the area operated decreased marginally (2.80 percent) from 12969 hectares to 12604.58 hectares.

**Table 5**  
**Number and Area of Operational Holding by Size Class of Holding in Solapur District**  
**(in '00')**

Year		Marginal (up to 1 hect.)	Small (1 to 4 hect.)	Medium (4 to 10 hect.)	Large (10 & above)	Total holding
1970-71	Number	1613 (46.08)	799 (22.82)	702 (20.05)	386 (11.02)	3500
	Area	144 (1.11)	1888 (14.55)	4492 (34.63)	6445 (49.69)	12969
1990-91	Number	827 (21.12)	2168 (55.39)	755 (19.28)	164 (4.19)	3914
	Area	468 (3.85)	4658 (38.35)	4541 (37.39)	2477 (20.39)	12144
2012-13	Number	2368.19 (35.45)	3938.64 (58.96)	311.3 (4.66)	60.97 (0.91)	6679.1
	Area	1296.15 (10.28)	8336.8 (66.14)	2070.59 (16.42)	901.03 (7.14)	12604.58
% Change						
1970-91	Number	-48.72	171.33	7.54	-57.51	11.82
	Area	225	146.71	1.09	-61.56	-6.36
1991-2013	Number	186.35	81.67	-58.76	-62.82	70.64
	Area	176.95	341.56	-54.40	-63.62	3.79
1970-2013	Number	46.81	392.94	-55.65	-84.20	90.83
	Area	800.10	78.97	-53.90	-86.01	-2.80



Source: 1) Government of Maharashtra, Epitome of Agriculture in Maharashtra Part II  
2) Socio-Economic Survey Report of Solapur District  
Note: Figures in parenthesis shows percentage to total.

As per 1970-71 figures out of 3500, 1613 were belonged to the size category of less than one hectare accounted for 46.08 percent. The share of marginal holdings accounted only 1.11 percent of the total operated area. In 2012-13, the number in this category increased to 2368.19 and area operated by them increased to 1296.15 hundred hectares (i. e. 10.28 percent) of the total operated area. In short, the number has in this category increased by 46.81 percent. However, the area operated by them increased very highly by 800.10 percent during the period of 1970-71 to 2012-13. In case of small holding, number of farmers increased from 799 to 3938.64 in the above period. Similarly, operated area too has increased from 1888 hundred hectares to 8336.8 hundred hectares during 1970-2013. Medium size of holdings consists of holdings in the range of 4 to 10 hectares. In 1970-71, there is 702 numbers of holdings in this category accounting for 20.05 percent and these holdings covered 4492 hundred hectares i. e. 34.63 percent of the total operated area. In 2012-13, the number of medium sized holdings declined up to 311.3 (4.66 % to total operated area). The total area operated by medium size holdings also declined highly to 2070.59 hundred hectares i. e. 16.42 percent of the total operational area. With taking the period 1970-71 to 2012-13, it showed from the table that there is declining trend in the number of holdings by 55.65 percent as well as in the operational area (i.e. 53.90 percent) in this category. However, it was very small change in the Solapur district. In case of large size holdings, it comprises holdings of the size of 10 hectares and above. There is nearly 386 numbers of holdings in this category in 1970-71 accounting for only 11.02 percent of the total operational holdings but they covered 6445 hundred hectares of operational area, i. e. 49.69 percent of the total operational area. In 2012-13 the number of large sized holding declined to 60.97 (i.e. 0.91 percent to total) with their operated area 901.03 hundred hectares (i.e. only 7.14 percent). In short, over a period during the 43 years the there was declined in the number of holdings by 84.20 percent, whereas during the same period operated area was highly down up (i.e. 86.01 percent) in the Solapur district. In fact, this category suffered the largest decline in the area operating as well as number of holdings during the 43 years period in the Solapur district.

## CONCLUSION

It was observed that, the land use pattern in solapur district over a period was changed. The only area under follow land was increased. While the gross cropped area of the district was declined. At the same time the area not available for cultivation, total other uncultivated land, Net area sown, Area sown more than once etc. was also declined. Moreover, the cropping pattern of the district was drastically changed. The area under food grain crops was comedown and at the other hand the area under sugarcane crops was raised. It was also found that, the yield of the food grain crops as well as commercial crops in district was increased, while among the food grain crops the yield of rice and jowar crops was declined. The number of landholders in district was increased while the area with the landholders was found declined. Among the farmers the medium and big size number of farmers as well as area with them was declined very highly.

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