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ANALYSIS OF THE CROPPING PATTERN IN SHIRUR TAHSIL OF PUNE DISTRICT IN WESTERN MAHARASHTRA

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Abstract

Agriculture is one of the oldest economic activities of the man; generally it is understood to mean both, cultivation of food and fibre crops and rising of live stocks. It has been remained an importance source of livelihood even today over the years in spite of growing industrialization and urbanization in India. Agriculture in India contributes to national income and gives direct employment mostly to the population of the rural area.

The Shirur tahsil of the Pune district is selected for the present study. The agriculture is the main activity in the tahsil. However, the tahsil lies in the drought prone zone of western Maharashtra. Therefore, the rainfall controls the agricultural development and hence the overall economy of the study area. Therefore it is important to study the cropping pattern in the tahsil. The present study based on the distribution of the various crop production in the three consecutive period.

Keywords: drought prone zone, Crop, Irrigation ,Vegetables ,Plantation, optimum cropping pattern.

1.Introduction:

Agricultural productivity in dry farming areas is as low as one tenth of that in irrigated areas. (Datye 1983, Saptarshi 1993, Kadam 2000, Bhagat 2002, More 2008). Therefore improvement in irrigation facilities is useful programme to improve agricultural productivity and thereby achieving rural development.

The state government of Maharashtra has adopted a policy to extend irrigation facilities to larger areas limited to two cropping seasons. The government decision making process has always been socially biased to provide irrigation facilities to drought prone area. However, it is observed that about 33% NSA is under irrigation in the state. This means that large part (67%) of NSA has been dry farming area. The drought prone areas have 33% probability of drought every year. This has made such regions underdeveloped because of very low agricultural output. There can be two options for setting better agricultural activities. The first one is to provide water by bringing extra regional water. This option has been already exhausted and hence cannot be suggested for future strategy. The second option is to use available water resource within the region in efficient way so as to improve agricultural productivity. This may be achieved by technological intervention and by adopting strategic cropping pattern which would reduce the water requirement of agriculture without comprising agricultural output. There are some geographical studies exhibiting feasibility of such cropping pattern (Bhagat, 2002 and More, 2009). This type of agricultural model can be more sustainable if it includes a financial component. With this view in mind, the present study observed that here are 20 critical crops to be considered.

2. Location of the study area:

The area selected for the present research is Shirur tahsil of Pune district. The area selected for this research is Shirur tahsil of the Pune District. This tahsil extends from 18°49' N to 19°14' N latitude and from 74°22' E to 75°3' E longitude, lying in the northeast section of the Pune district of western Maharashtra. The tahsil extends from northwest to southeast with elongated shape. The tahsil headquarter is at Shirur, which is located at a distance of 65 km from the district headquarter Pune. It is located on the western bank of the river Ghod.

The tahsil is bounded by Khed tahsil to the north, Ambegaon tahsil to the north-east, Parner and Shrigonda tahsils of Ahmadnagar district to the east & south-east respectively, Daund tahsil to the

south, Haveli tahsil to the south-west, Ambegaon tahsil to the north-west.

The tahsil lies in the drainage basin of the river Bhima. The river Ghod forms the north-eastern & eastern boundary of the tahsil. The river Kukdi forms the eastern boundary of the tahsil. The river Bhima forms the southern south-western boundary of the tahsil.

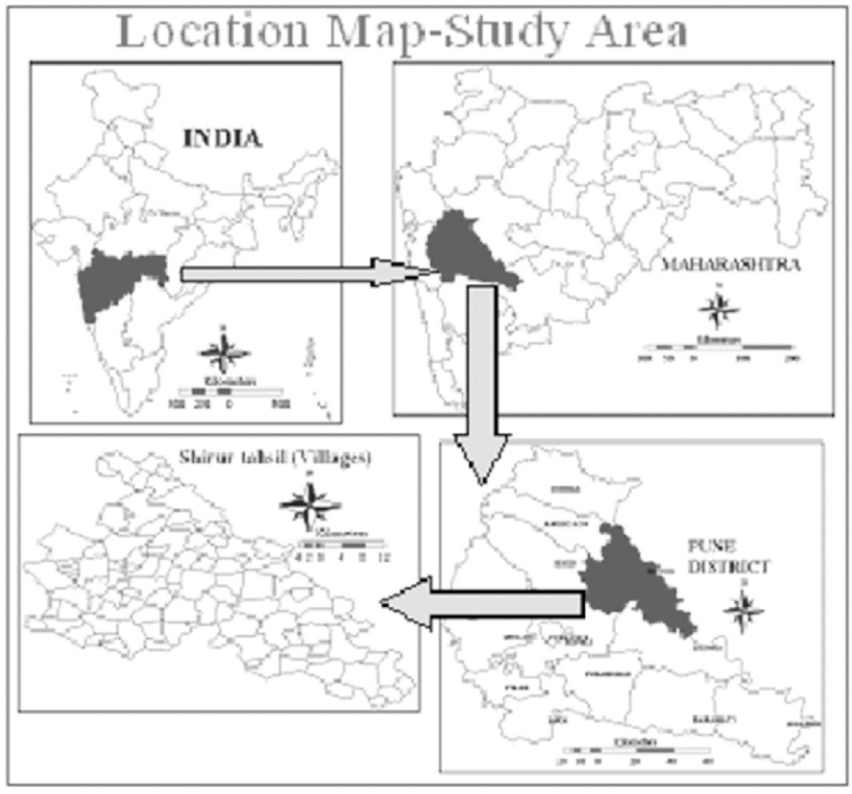
Pune Ahmadnagar state highway passes west-east through the tahsil from Koreagaon Bhima to Shirur. Shirur is well connected by roads to the surrounding villages on all sides.

Shirur tahsil contains 113 villages and only one urban centre. According to the 2001 census the population is 310590. It may be noted that the Fact Finding Committee (FFC, 1973) has determined that Shirur tahsil is a drought prone area with agriculture as the major economic activity.

3.Study area:

The Shirur tahsil of the Pune district has been selected for the present study. The Shirur tahsil is located in the north-eastern part of the Pune district. The headquarter of the tahsil, is 68 km away from Pune. The Shirur tahsil is the drought prone area as decided by fact finding committee (FFC, 1973)

The study area lies in the river basins of Bhima, Ghod and Vel. These rivers together with rainfall offer water resource for agriculture and other activities. The geographical location of the study area can be expressed as from 18°49'N latitude to 19°14'N latitude and from 74°22'E to 75°3'E longitude. The Tahsil has 1,587 km2 area out of which 1,20,600 ha is cultivable land. The agriculture is the main activity in the tahsil and 85 percent people are engaged in agricultural activities.



4.Objectives:

1. To study the changing cropping pattern
2. To study the relation between the water and crop production
3. To study the crop production its interrelationship with agriculture practices and development.

5. Database Methodology:

The present study is based on the changing cropping pattern of the shirur tahsil. After the introduction of the chaskaman canal irrigation the change in the cropping pattern. The present study has been based on the village wise data of cropping pattern procured from the tahsil office at Shirur. Using the total area under cultivation with specific crops relative to the Net Sown Area serves as a good indication or of the relative areal strength of each particular crop in the study area..We have employed GIS techniques to devise and develop crop distribution and its relationship to the environment and physiographic structure of the region. For our study areas there are 20 critical crops to be considered. The data Data from the Tahsil office showing village wise crop distribution in 5 year increments from 1995-2010 have been used for this study. Fifteen years should provide a significant longitudinal period to determine a reasonable history. This allows the change in patterns to be analyzed over an adequate time frame. Of this data, We used three specific years, 1994, 2001, and 2007 in table 4.1 below to represent these changes.

6. Cropping Pattern:

In the study area about 81.26 % area of TGA is cultivable. Approximately 5.7% is classified as culturable waste, 9.5% is classifed as non agriculture for various reasons and approximately 3.7% of the TGA is other vegetation. For the most part agriculture is prevalent along the rivers such as the Bhima, the Vel and Ghodnadi. Agriculture decreases with distance away from the rivers toward the basin divides. As one might expect access to river water and rich floodplain soils support more productive agriculture. Studies of cropping patterns by scholars such as Bhagat (2002), Ugale (2006), and More (2009) have supported the notion that agricultural patterns in a Tahsil are closely related to the physiographic factors such as climate, soil, and water resources as well as adequate skilled labour.

6.1. Area under cereals:

The Net Sown Area in the Shirur Tahsil was 134091 hectares in the year 2007. In the year 1994, the cereals have occupied 86859.17 hectares area (52.66 % NSA). The main crops have been Jowar 23.75 % NSA, Wheat 6.39 % NSA, Bajara 20.58 % NSA and Maize 1.93 % NSA and depicted in the table (Table No.4.1). Jowar and Bajara are the important food grain crops in the tahsil. Jowar and Wheat are cultivated in rabbi crops while bajara and hybrid jowar are in kharip season. Maize is mostly grown in the irrigated areas as green fodder purpose. High proportion of cereals indicates that the tahsil has very low level of commercialization of agriculture. The present study is data at the village level that was obtained from the tahsil office in Shirur.

The field observations revealed that the tahsil dominated by cereals with slightly more than half the total cultivated area being used for cereals for the three target years.

It is observed form the table (Table No.1) that the area under jowar has declined from 1994-2007 by about 6000 hect. On the contrary area under bajara has increased by 1200 hects in the same period. Similarly area under wheat has increased by 4800 hects. This information may be interpreted as jowar is being replaced by wheat and bajara. Bajara is generally taken in kharip season and hence it must have replaced hybrid that was grown in the same season.

This may be because of hybrid variety of bajara irrigating good prices in the market in the last decade. The increas in hectrage under wheat is quite significant. The black cotton soils are suitable for both jowar and wheat. The choice of wheat may be a result of increased irrigation facilities in the region between 2001 and 2007.

The field study has revealed that people choose wheat if assured supply of water is available. So far as area under cereals is concermed it has show slight increase in the year 2001 and again decreasing trend in 2007.

Table No.1
Area under Cereals (1994, 2001 and 2007)

Year	Crop	Jowar	Bajra	Wheat	Maize	Total
1994	Area (Hectares)	39224.7	33985.3	10555.9	3193.26	86959.17
	% of NSA	23.75	20.58	6.39	1.93	52.65
	% of Cereals	45.11	39.08	12.14	3.67	100
2001	Area (Hectares)	39063.1	34289	11192	3444.58	87988.68
	% of NSA	23.66	20.77	6.78	2.09	53.30
	% of Cereals	44.4	38.97	12.72	3.91	100
2007	Area (Hectares)	33222.6	35189.7	15313.7	1124.3	84850.29
	% of NSA	20.12	21.31	9.27	0.68	51.38
	% of Cereals	39.15	41.47	18.05	1.33	100

Source: Tahsil office, Shirur

6.2. Jowar:

In the other drought prone zones of Maharashtra jowar is a dominant crop. Many farmers use it for a dual purpose, for food grain and for fodder. It is a long tested crop of the scarcity zone mainly because high frequency of incidences of crop failure. The crop if failed can produce fodder by way of short leaves crop. It is locally known as “batuk”.

Areas that are cultivated in jowar are easy to change to other crops such as wheat or sugarcane should irrigation become available. The choice of wheat or sugarcane is highly dependent on the type of irrigation available. With limited irrigation the jowar can be replaced with wheat and in areas with perennial irrigation sugarcane could be substituted.

Jowar may not be single dominat crop. Actually it is 2nd ranking crop. Hybrid jowar is gaining popularity in the recent past. There is various variety of hybrid jowar which can fetch good prices. It is dwarf variety viz. vasant 5 and raised in just 90 to 100 days.

Jowar is a dominant crop during the rabbi (winter) season and is abundant in all parts of the tahsil. It constituted well over 20% of all net sown area for 1994, 2001, and 2007 with 23.75, 23.66, and 20.12% respectively. The decrease in jowar over the years is the result of higher levels of available irrigation.Villages along the banks of Bhima, Ghod, and Yel River they take the advantage of black cotton soil and irrigation facilities for cultivation of cash crops like sugarcane, groundnut and vegetable.

The field study reveals that the average output of Jowar is about 15 to 20 quintals / acre if new variety of seeds fertilizers and pesticides is given

The jowar cultivation is basically related to firstly low rainfall and secondly soil in the area. Jowar is traditionally cultivated as a rain fed crop in the rabbi season. In the year 1994 some villages show the land under the kharip jowar like Nimgaon Bhogi 87.72 % NSA, Shastabad 81.92 % NSA, Babhulsar Khurd 80.43 % NSA, Nimgaon Malungi 67.92 % NSA, Sone sangavi 64.35 % NSA, Chincholi 47.35 % NSA, Dhok Sangavi 39.85 % NSA, Karagaon 31.60 % NSA, Varude 21.63 %

NSA, Rautwadi 18.06 % NSA, Kanhur 13.57 % NSA, Alegaon Paga 11.99 % NSA, Shivtakrar malungi 10. % NSA, Khairenagar 8.25 % NSA, Dhanore 5.84 % NSA, Kuruli 5.56 % NSA, Dingazwadi 5.33 % NSA,Wadhu B. 1.12 % NSA, Dhamari 1.10 % NSA, Koregaon Bhima 0.22 % NSA.etc.

In the year 2000 kharip Jowar has occupied the following villages. Shastabad 81.92 % NSA, Bambhulsar Bk. 81.40 % NSA, Nimgaon Bhogi 77.97 % NSA,
Nimgaon Mhalungi 72.28 % NSA, Sone Sangavi 64.35 % NSA, Chinchani 44.83 % NSA, Dhok Sangavi 22.85 % NSA, Varude 21.94 % NSA, Rautwadi 18.94 % NSA, Alegaon Paga 16.06 % NSA, Karegaon 14.91 % NSA, Shivtakrar Mahalungi 10.43 % NSA, Khaire Nagad 9.43 % NSA,etc.

6. 3 Bajara:

Bajara is the important food crop cultivated in the tahsil. It is usually grown on the light to medium black soil. It requires dry climate and less rainfall. Bajara is grown everywhere in the tahsil. There is increase in the area under Bajara cultivation from the year 1994 to the year 2007. The area under Bajara was 20.38 % NSA in 1994 and increased in the years 2001 (20.77 % NSA) and 2007 (21.31 % NSA). The farmer mostly grows this crop when the amount of rainfall is less. The use of (High Yielding Varities of seeds) is increased in the western side because of medium black soil and moderate rainfall for the cultivation of Bajara.

Though Bajara is the important kharip crop, it is also grown in the rabbi season. Rabbi Bajara is grown in the summer season in the villages having the irrigation facilities; e.g. the villages Wajewadi, Pimple Jagtap, Jategaon Kh. etc. Those villages along to the left bank canal of Chaskaman dam grow rabbi bajara e.g. the villages Wajewadi, Pimple Jagtap.

The village wise maximum proportion of the area under Bajara has been observed in the area situated in the rain fed zone of the tahsil. The percentage of Bajara is low along the bank of the rivers Ghodnadi, Bhima, and the Yel. The middle part of the tahsil and north and north-eastern part of the study area show high proportion of bajara.

In the year 1994 some villages show the area under bajara cultivation. Dahiwadi 85.5 % NSA, Bambhulsar Bk. 78.49 % NSA, Nhavara 77.03 % NSA, Parodi 72.27 % NSA, Uralgaon 71.46 % NSA, Kendur 67.38 % NSA, Ravadewadi 67.24 % NSA, Jategaon Bk. 65.88 % NSA, Parhadwadi 61.26 % NSA, Hivare 58.95 % NSA and Malwadi 56.65%NSA.

In the year 2000 the following villages show the Bajara cultivation like Chandoh 98.05 % NSA, Vadgaon Rasai 78.49 % NSA, Chavhanwadi 77.30 % NSA, Parodi 71.54 % NSA
In the year 2007 some villages show area under Bajara namely Nhavara 77.97 % NSA, Nimgaon Mhalungi 74.15 % NSA, Dahiwadi 73.51 % NSA, Uralgaon 71.54 % NSA, Kendur 65.40 % NSA, Parodi 62.97 % NSA, Jategaon Bk. 58.63 % NSA, Hivare 57.89 % NSA, Pimpale Khalsa 55.96 % NSA, Malwadi 54.75 % NSA, Savindane 54.65 % NSA, etc.

6.4 Wheat:

Wheat is the third important food grain in the tahsil. It occupied 6.39 % NSA in the year 1994-95 and increased up to 9.27 % NSA in the year 2007. This crop is grown in the medium and black soil. The farmers have grown the crop on a very small scale in the tahsil in the dry and cool months of winter. The crop is taken as an irrigated crop. There is close relationship between wheat cultivation and irrigation is observed in the tahsil (Fig. No.4.7). The agriculture land is prepared after the harvested season of Bajara. Sowing is done in the month of October or November. The crop takes 3½ to 4½ months to mature from the date of sowing and becomes ready in the month of February and March. The improved verities of seeds are sown in the tahsil. In the study area, few villages show good percentage of wheat production, e.g. Kanhur Mesa and, Nimgaon Bhogi.

The number of villages have increased the production mainly because of increase in area under irrigation by Chinchani dam in the north-eastern part, Thitewadi dam in the north-western part,

Chaskaman, project and K.T. weirs on the rivers Bhima, Ghod and Vel. In 1994 some villages has occupied the area under the wheat like Parhadwadi 85.33 % NSA, Inamgaon 50.36 % NSA, Chinchani 39.83% NSA, Nimgaon Bhogi 38.99% NSA, Mandavgan Farata 35.98% NSA, Dhanore 33.25% NSA, Kasari 28.42% NSA, Ganegaon Dumala 28.18% NSA, Kanhur mesai 24.68% NSA, Vitthalwadi 24.44% NSA, Bambhulsar Bk.22.29% NSA, Sone Sangavi 19.31% NSA, Vadner Kh. 17.62% NSA, Sanaswadi 13.72% NSA, Parodi 13.66% NSA, Motewadi 13.21% NSA, Midgulwadi 13.07% NSA, Ranjangaon Sandas12.96% NSA, Khairewadi 12.67% NSA, Vadgaon Rasai12.47% NSA, Mukhai12.40% NSA, and Khaire Nagad 10.61%.

In the year 2000 some villages show the area under wheat like Parhadwadi 84.10% NSA, Chincholi 48.30% NSA, Dhanore 37.32% NSA, Mandavgan Farata 35.48% NSA, Pimpalsuti 34.58% NSA, and Nimgaon Bhogi 34.11% NSA.In the year 2007 some villages show the area under the wheat cultivation like Shikrapur 61.62% NSA, Rautwadi 61.23% NSA, Darekarwadi 58.13% NSA, Chinchani 52.59% NSA and Pimpalsuti 46.97% NSA.

6.5 Maize:

Maize is important crop which is mostly used as a fodder in the tahsil. The area under maize has decreased from the year 1994 (1.93 % NSA) to the year 2007 (0.68 % NSA).

In the year 2000 some villages show the Maize cultivation like Khaire Nagad 14.15%NSA, Mandavgan Farata 13.70%NSA, Parhadwadi 11.94%NSA, Nimgaon Bhogi 11.70%NSA, and Sadalgaon 8.91%NSA.

Some villages shows maize cultivation in 2007, e.g. Mandavgan Farata 15.8%NSA, KhaireNagad 15.80%NSA, BambhulsarBk.14.77%NSA, Dhanore12.89%NSA, Darekarwadi11.22%NSA, Chinchani11.03%NSA, Kanhurmesai9.87%NSA, NimgaonBhogi 9.75%NSA, and Pimpale Jagtap8.87%NSA.

6.6 Pulses:

Pulses account 21.07 % NSA in the year 1994 and 19.11% NSA in the year 2001 and 17.50 % NSA in the year 2007. In the tahsil a variety of pulses are grown like gram, tur, green gram, hulga etc. Almost all the pulses except gram are cultivated in kharip
season. Local varieties of pulses are cultivated in the tahsil. The pulses are grown on the light soil, in the study area. The village wise distribution of different pulses are shown in the table no (Table No 5.3). The cultivation of pulses depends upon environment influence.

6.7 Gram:

Gram is the 4th rank crop among pulses in the tahsil. It accounts for 2.36% NSA, 2.09% NSA and 2.57% NSA in the years 1994, 2001 and 2007 respectively. The gram is grown in the tahsil as a rabbi crop throughout the year. Gram is sown in June and July and harvested in the months of November or December.

Some villages show the land under gram crop in the years 1994 Bambhulsar Bk.35.85%NSA, Dhanore 23.07%NSA, Kanhur mesai 18.51%NSA, Sanaswadi 14.63%NSA, Ambale 13.39%NSA, Sone Sangavi 12.87%NSA, Vadner Kh. 10.35%NSA, Kohakdewadi 10.24%NSA, Dhok Sangavi 10.10%NSA, Nimgaon Bhogi 9.75%NSA, Ganegaon Dumala 9.49%NSA, Arangaon 9.24%NSA, Nhavara 8.19%NSA, Nimgaon Mhalungi 7.56%NSA, Pimpale Jagtap 6.83%NSA, Talegaon Dhamdhere 6.45%NSA, Takali Bhima 6.14%NSA,etc

Some villages show the area under the Gram in 2000 namely Bambhulsar Bk. 31.01%NSA, Dhanore 25.11%NSA, Kanhur mesai 17.03%NSA, Sanaswadi 16.24%NSA, Ambale 13.39%NSA, Sone Sangavi 12.87%NSA, Ganegaon Dumala 11.11%NSA, Shastabad 9.89%NSA, Kohakdewadi 9.82%NSA, Dhok Sangavi 9.67%NSA, Nhavara 8.93%NSA, Nimgaon Bhogi 8.77%NSA, Arangaon 8.55%NSA, Vadner Kh. 8.37%NSA, Pimpale Jagtap 8.19%NSA, Nimgaon Mhalungi 8.14%NSA, Chinchani 7.24%NSA, Takali Bhima 6.50%NSA, Talegaon Dhamdhere etc.

The gram is grown in different types of soil in the tahsil. Mostly it is taken as a mixed crop with another crop like jowar. In the month of March or April, the crop is ready, the leaves of Gram fall down, became dry and plants pulled out from the soil. The Gram cultivation is more nearby the bank of the river like Wadhu Bk, Takali Haji, Koregaon and Jategaon, wajewadi.

6.8 Hulga:

It is another crop grown in the tahsil. The crop contributes 0.37% NSA in the year 1994 and in the year 0.38% NSA in 2001 and 0.39% NSA in 2007. In the year 1994 some villages show the area under Hulga are Chincholi 11.93% NSA, Varude 6.18% NSA, Ganegaon Khalsa 5.95%NSA, Sone Sangavi 5.15% NSA, Shastabad 4.94% NSA, Dongargan 3.12% NSA, Pimpari Dumala 2.88%NSA, Jambut 2.82%NSA, Waghale 2.73%NSA, Khandale 2.71%NSA, Khaire Nagad 2.36% NSA and Karanjawane 2.15% NSA.

In the year 2000 some villages showing the area under Hulga are Chinchani 9.31 % NSA, Wajewadi 6.91 % NSA, Shastabad 6.36 % NSA, Ganegaon Khalsa 5.89% NSA, Sone Sangavi 5.15% NSA Varude 3.91% NSA, Dongargan 3.79 % NSA, Khandale 3.36 % NSA, Pimpari Dumala 2.84 % NSA, Hivare 2.63 % NSA and, Khairewadi 2.5 3 % NSA.

There are few villages showing land under Hulga cultivation in 2007 namely Chincholi 10.23 % NSA, Shastabad7.77 % NSA, Ganegaon Khalsa5.70 % NSA, Sone Sangavi 5.15%NSA, Wajewadi 4.4 9% NSA, Kanhur mesai 3.95%NSA, Midgulwadi 3.92 % NSA, Varude 3.30 % NSA, Shingadwadi3.16%NSA, Pimpari Dumala 3.15% NSA ,Khandale 2.80 %NSA,etc.

6.9 Mataki:

Mataki is important crop among the pulses grown in the tahsil. The percentage of net sown area of the tahsil is 0.38%NSA and 0.35% to pulses in the year 1994. The percentage increases in 2007 (3.68% to NSA and 21.05 % to pulses). The area under Mataki decreases due to increase in the cash crop; 0.35% NSA and 1.83% to pulses in the year 2001. Mataki is grown throughout the tahsil as a kharip crop in the months of June or July and harvested in the month of November.

Mataki is grown as a mixed crop with Bajara it covers a soil and it increases the fertility of soil. Some villages showing land under Mataki in the year 1994 are Nimgaon Bhogi 9.75%NSA, Chincholi 8.33 % NSA, Wajewadi 6.91%NSA, Ganegaon Khalsa 5.82%NSA, Shastabad 5.65% NSA, Sone Sangavi 5.15%NSA, Thapewadi 4.67%NSA, Pimpari Dumala 3.55 % NSA, Karade 3.50%NSA, Khaire Nagad 3.07%NSA, Burunjwadi 2.96 % NSA, Khandale 2.89% NSA, Waghale 2.73%NSA, Varude 2.57%NSA, Kanhur mesai, and 2.47 % NSA.

Some villages showing land under Mataki in the year 2001 are Chinchani 10.69%NSA, Nimgaon Bhogi 9.75%NSA, Ganegaon Khalsa 5.91%NSA, Sone Sangavi 5.15%NSA, Wajewadi 4.84%NSA, Pimpari Dumala 3.79%NSA, Kanhur mesai 3.70%NSA and Shastabad 3.53%NSA.

Some villages showing land under Mataki in the year 2007 are Shikrapur 75.80%NSA, Rautwadi 74.89%NSA, Nimgaon Mhalungi 50.76%NSA, Talegaon Dhamdhere 46.1%NSA and Takali Bhima 31.02%NSA.

6.10 Tur:

Another important crop in the pulses is Tur as a kharip crop and it depends upon the climate and environmental conditions.

The area under Tur was 0.67 % NSA, 0.65 % NSA and 0.64 % NSA in the years 1994, 2001 and 2007. The Tur is a kharip crop and seen as a unirrigated crop in the tahsil. There are few villages showing land under crops in the year 1994 e.g. Shirur 25.51%NSA, Kendur 9.83%NSA, Ambale 7.46%NSA, Kanhur mesai 6.17%NSA, Jambut 3.86%NSA, Nimgaon Bhogi 3.51%NSA, Ranjangaon Ganpati 3.39%NSA, Apti 3.37%NSA, Khandale 3.00%NSA, Takali Bhima 2.74%NSA, Parhadwadi etc. In the year 2001 some villages show the crop under the Tur like Ambale 6.80%NSA, Kanhur mesai 5.55% NSA, Shastabad 3.53%NSA, Khandale 3.19%NSA, Rautwadi 3.08%NSA,

Bhambarde 3.02%NSA, Mukhai 2.66%NSA, Takali Bhima 2.64%NSA, Hivare 2.63%NSA, Uralgaon 2.57%NSA, Jambut 2.38%NSA, and Pimpari Dumala 2.37% NSA.

In the year 2007 some villages show the area under the Tur crop namely Ambale 7.55%NSA, Sukrewadi 6.00%NSA, Kanhur mesai 5.55%NSA, Nimgaon Bhogi 4.87%NSA, Apti 3.37%NSA, Nagargaon 3.36%NSA, Khandale 3.36%NSA, Mahadeo Wadi 3.28%NSA, Bhambarde 2.83%NSA, Shastabad 2.82%NSA, Jambut 2.82%NSA, Kendur 2.67%NSA, Nhavara 2.62%NSA, Pimpari Dumala 2.40%NSA, Uralgaon 2.19%NSA, Ganegaon Khalsa 2.15%NSA, Khaire Nagad 2.12%NSA, Waghale 2.02%NSA, Burunjwadi 1.84%NSA, Karanjawane 1.73%NSA, Chincholi 1.70%NSA, Thitewadi 1.65%NSA, Kondhapuri 1.60%NSA, Hivare 1.58%NSA, etc. Tur is taken as a mixed crop. The stalks of Tur are used for different purpose it is used as a roof.

6.11 Mug:

Mug is important kharip crop among various pulses. Mug is cultivated in the months of June or July and the crop is ready within 3 to 4 months. The percentage of net sown area of the tahsil in 1994 is 8.83%NSA and 41.89% to pulses.

In the year 1994 some villages showing land under Mug are Shirur 91.84 % NSA, Shikrapur 78.15 % NSA, Rautwadi 77.09 % NSA, Ranjangaon Ganpati 72.46 % NSA, Midgulwadi 64.68% NSA, Kondhapuri 58.04 % NSA, Nimgaon Mhalungi 56.45 % NSA, Khairewadi 47.64 % NSA, Talegaon Dhamdhere 43.61 % NSA, Sone Sangavi 38.61 % NSA, Pimpari Dumala 36.38 % NSA, Khaire Nagad 35.38 % NSA, Takali Bhima 34.20 % NSA, , Karegaon 0.60 % NSA, Ganegaon Dumala 0.45 % NSA, and Kawathe 0.35 % NSA.

In the year 2001 the following villages show the land under Mug cultivation. Shikrapur 77.54 % NSA, Rautwadi 76.21 % NSA, Midgulwadi 61.85 % NSA, Kondhapuri 59.77 % NSA, Nimgaon Mhalungi 53.38 % NSA, Kasari 47.62 % NSA, Khairewadi 47.47 % NSA, Talegaon Dhamdhere 43.65 % NSA, Khaire Nagad 40.09 % NSA, Sone Sangavi 38.61 % NSA, Pimpari Dumala 35.36 % NSA, and Shastabad 31.78 % NSA.

In the year 2007 some villages show land under Mug namely Midgulwadi 64.46 % NSA, Kondhapuri 59.63 % NSA, Khairewadi 51.01 % NSA, Kasari 47.44 % NSA, Khaire Nagad 44.81 % NSA, Sone Sangavi 38.61 % NSA, Pimpari Dumala 36.04 % NSA, Chincholi 28.98 % NSA, Shastabad 27.54 % NSA, Burunjwadi 26.19 % NSA and Uralgaon 24.02 % NSA.

Mug is cultivated with bajara as a mixed crop throughout the tahsil. The leaves of mug increase the fertility of soil.

6.12 Chavali:

In the year 1994 area under Chavali was 4.90% NSA and 23.28% to pulses. In the year 2001 the Chavali shows 4.78% NSA and 25.00% to pulses. In the year 2007 area under Chavali was 2.94%NSA and 16.78% to pulses. In the year 2007 some villages shows land under Chavali namely Wajewadi 2.59%NSA, Vitthalwadi 2.26%NSA and Pimple Jagtap 2.04%NSA.

6.13 Wal:

Wal is important kharip crop in the tahsil. In the year 1994 it contributes 0.04% NSA and 0.18% pulses. In the year 2001 the area under wal is 0.04% NSA and 0.21% pulses. In the year 2007 the tahsil data shows no cultivation of Wal. Few villages showing land under Wal crop in the year 1994 are Kanhur Mesai 3.70%NSA, Wajewadi 1.73%NSA, Pimple jagtap 1.37%NSA, etc. In the year 2007 some villages showing land under Wal are Pimple Khalasa 1.95%NSA, Kathapur Kh. 1.15%NSA, Karegaon 1.7%NSA and Ranjaongaon Sandas 1.74%NSA.

6.14 Green Peas:

In the year 1994 it contributes 0.01% NSA and 0.04% to pulses. In the year 2001area under green peas was 0.01% to NSA and 0.05% to Pulses. Some villages show lands under Green Peas in 2001 are Vitthalwadi 1.69%NSA, Ranjaongaon 1.31%NSA.

6.15 Oilseeds:

Groundnut, Karadi, Jawas, Teel are the important oilsedds grown in the tahsil. Oilseeds cover 4.53%NSA in 2007. Oilseeds include Groundnut (3.78%NSA) Karadi (0.45%NSA), Jawas (0.10%) NSA, Teel (0.21%NSA) in 2007.

6.16 Groundnut:

Groundnut is the important commercial crop in the tahsil. It is mostly grown as a Kharip rainfed crop in the rabbi season with irrigation facilities. In the year 1994 it accounts 4.20% NSA and 87.23% to oilseeds. In the year 2001 it accounts 3.79%NSA and 86.21% to oilseeds. In the year 2007 it accounts 3.78%NSA and 83.30% to oilseeds. It ranges from medium black and alluvial soil. The seeds are sown in June and July by hand or with tractor or with the help of old instrument ox.

In the study area few villages show land under groundnut in the year 1994 namely Kathapur Kh. 0.33 % NSA, Bambhulsar Bk. 33.91 % NSA, Parhadwadi 30.49 % NSA, Kendur 24.56 % NSA, Uralgaon 22.52 % NSA, Ranjangaon Ganpati 21.62 % NSA, Khaire Nagad 21.23 % NSA, Apti 19.99 % NSA, Nimgaon Bhogi 19.49 % NSA, Koregaon Bhima 17.04 % NSA, Hivare 15.79 % NSA, Chincholi 15.15 % NSA and Ganegaon Dumala 13.91 % NSA.

In the year 2001 some villages show land under groundnut cultivation namely Bambhulsar Bk. 33.91 % NSA, Kendur 24.56 % NSA, Parhadwadi 23.24 % NSA, Uralgaon 20.97 Khaire Nagad 20.75 Apti 19.54 Nimgaon Bhogi 19.49 Koregaon Bhima16.26 % NSA, Hivare 15.79 % NSA, Varude 15.45 % NSA, Chinchani 13.79% NSA, Sanaswadi 12.98 % NSA, Sone Sangavi 12.87 % NSA, Ganegaon Dumala 12.38 % NSA, Midgulwadi 11.32 % NSA, Ambale 10.32 % NSA, Karandi In the year 2007 some villages show land under ground nut cultivation namely Khaire Nagad 44.81 %NSA, Dhok Sangavi 29.76 %NSA, Kendur 27.23 % NSA, Uralgaon 22.52 % NSA, Apti 20.66 % NSA, Hivare 16.84 % NSA, Varude 16.48 % NSA, Chincholi 15.53 % NSA, Saradwadi 14.17 % NSA, Sanaswadi 14.0 % NSA and Sone Sangavi 12.87 % NSA.

Some villages in the tahsil occupied area under groundnut in summer season also. The irrigation facilities in the tahsil shows change in cultivation of groundnut in summer season, e.g. villages Jategoan Kh, Jategaon Bk, Pimple Jagtap, Wajewadi, Kendur and Karandi.

6.17 Karadi:

Karadi is another important Kharip crop grown throughout the tahsil. The area under karadi in the year 1994 was 0.48% NSA and 9.94% to oilseeds. In the year 2001 it contributes 0.48% to NSA and 10.87% to oilseeds. In the year 2007 the area under Karadi was 0.45%NSA and 10.03% to oilseeds. Karadi is grown as a Kharip crop in black cotton soil as well as on light alluvial soil. It is sown in September and October months and harvested in February. For the growth of karadi crop, low rainfall is required. The karadi is grown for various purpose some people use as vegetables and some farmers use karadi oil as a cooking. In the year 2001 the villages showing land under Kardai cultivation was Kathapur Kh. 7.69 % NSA, Jategaon Bk. 7.25 % NSA, Nimgaon Mhalungi 4.65 % NSA, Mukhai 3.54 % NSA, Motewadi 3.30 % NSA, Jategaon Kh. 3.30 % NSA, etc.

6.18 Jawas:

Jawas is important Kharip crop in oilseeds and it occupied 34.35 hectares area in the year 1994 and 0.02% to NSA and 0.43% to oilseeds. The area under Jawas was 39.85 hectares (0.02% NSA and 0.55% to oilseeds) in the year 2001. In the year 2007 it has increased to 177.99 hectares (0.10% NSA and 2.11% to oilseeds).

Jawas is grown in medium black to deep black. In the year 1994 some villages show land under Jawas, e.g. Shastabad 3.99 % NSA, Nimgaon Bhogi 1.90 % NSA, Chincholi 1.58 % NSA, Wajewadi 1.19 % NSA, Thapewadi 1.04 % NSA, Khaire Nagad 0.72 % NSA, Chavhanwadi 0.07 % NSA, Lakhewadi 0.04 % NSA, Dhamari 0.01 % NSA and Malthan 0.01% NSA.

In the year 2001 some villages showing land under Jawas cultivation are Sadalgaon 1.76 %

NSA, Parhadwadi 1.47 % NSA, Ganegaon Dumala 0.81 % NSA, Vadgaon Rasai 0.56 % NSA. In the year 2007 villages showing jawas cultivation are Mukhai 7.08 % NSA, Parodi 2.4 % NSA, Vitthalwadi 2.28 % NSA.

6.19 Teel:

Some villages show Teel cultivation in 2007 are Takali Bhima 6.31% NSA, Nimgaon Mhalungi 5.78 % NSA, Vitthalwadi 3.32 % NSA, Pimpari Dumala 2.94 % NSA, Shikrapur 2.07 % NSA, Rautwadi 1.76 % NSA, Kendur 0.53 % NSA.

In the year 1994 villages showing Teel cultivation are Wajewadi 8.64%NSA, Darekarwadi 4.93%NSA, Pimpari Dumala 2.88%NSA, Ganegaon Dumala 1.26%NSA, Sadalgaon 1.26%NSA and Jategaon Kh. 0.88%NSA.

In the year 2000 some villages showimg Teel cultivation are Wajewadi 6.05%NSA, Darekarwadi 5.03%NSA, Pimpari Dumala 2.98%NSA, Jategaon Kh. 1.65%NSA and Sadalgaon 1.40%NSA.

In the year 2007 villages showing Teel are Takalihaji 6.31%NSA, Kendur 0.53%NSA and rautwadi 1.76%NSA.

6.20 Vegetables:

In the tahsil onion, brinjal tomato, potato, lasun chilli are grown. They occupied an area of 20138.58 hectares in 1994. In 2001 it occupied 20856.64 hectares area. In 2007 it cooupied 24126.12 hectares area. The (Table No.4.5) gives acerage under vegetables in the year 1994 to 2007 in the tahsil.

The villages having land under vegetables in 2000 are Hivare 6.32 % NSA, Pimpale Khalsa 6.11 % NSA, Darekarwadi 4.81 % NSA, Parhadwadi 4.45 % NSA, Midgulwadi 4.36 % NSA, Pimpari Dumala 4.13 % NSA, Karandi3.83 % NSA, Varude 3.60 % NSA, Burunjwadi 3.26 % NSA, Kanhur mesai 3.08 % NSA and Waghale 3.08 % NSA.

The villages having land under vegetables in 2001 are Karandi 7.65 % NSA, Hivare 6.32 % NSA, Shastabad 4.94 % NSA, Pimpale Khalsa 4.07 % NSA, Pimpari Dumala 3.89 % NSA, Chincholi 3.79 % NSA, Waghale3.59 % NSA, Burunjwadi 3.44 % NSA, Khaire Nagad 3.30 % NSA, Jategaon Bk. 3.29 Mukhai 2.66 Sadalgaon 2.51 % NSA and Kanhur mesai 2.47 % NSA.

The villages having land under vegetables in 2007 are Karandi 7.65 % NSA, Hivare 6.32 % NSA, Shastabad 4.94 % NSA, Pimpale Khalsa4.07% NSA, Pimpari Dumala 3.89 % NSA, Chincholi3.79 % NSA, Waghale 3.59 % NSA, Burunjwadi3.44 % NSA, Khaire Nagad 3.30 % NSA, Jategaon Bk.3.29 % NSA, Mukhai2.66 % NSA and Sadalgaon 2.51 % NSA.

6.21 Fruit Plantation:

In 1994 the villages showing fruit plantation are Jambut 1.78%NSA, Vadner Kh. 6.12%NSA, Midgulwadi 5.24%NSA, Khaire nagad 2.36%NSA, Pimple Khalsa 4.07%NSA, Mukhai 2.21%NSA, Jategaon Bk. 3.29%NSA, Pimpri Dhumala 1.68%NSA, Ganegaon Khalsa 1.88%NSA, Koregaon Bhima 1.68%NSA, Dingarzwadi 2.25%NSA, Dhanore 3.12%NSA, Arangaon 2.54%NSA, Tandali 5.81%NSA.

In 2001 the villages showing fruit plantation are Midgulwadi 3.27%NSA, Chinchani 2.84%NSA, Sadalgaon 2.66%NSA, B.Khurd 2.36%NSA and Khaire Nagad 2.36%NSA.

In 2007 some villages showing fruit plantation are Pimpale Khalsa 6.11% NSA, Darekarwadi 4.04 % NSA, Khaire Nagad 3.54 % NSA, Dhanore 3.12 %NSA, Hivare 2.63 % NSA, Takali Haji 2.12 % NSA, Nhavara 2.08 % NSA, Ganegaon Khalsa 1.78 % NSA, Pimpari Dumala 1.69 % NSA, Karade 1.53 % NSA, Shirur1.46 % NSA, Motewadi 1.45 Karanjawane 1.37 % NSA, Waghale 1.36 % NSA, Bhambarde 1.30 % NSA, Burunjwadi 1.28 % NSA, Kohakdewadi 1.24 % NSA, Tandali 1.24 % NSA.

The area under various crops. Jowar and bajara are important crops in the tahsil. In 1994 the area under jowar cultivation was higher side, but in 2001 the area under the jowar crop is decreases due

to increase in the irrigation facilities in the eastern and northeastern part of the tahsil. The impact of irrigation shows from the increases the area under the sugarcane cultivation.

7. Findings:

1. The cropping pattern is dominated by jowar till 2006-2007. In the year 2006-2007 Bajara is the first ranking crop in the tashil. Jowar is being replaced by sugarcane, wheat and vegetables due to newly extended irrigation facilities.
2. It is estimated that present cropping pattern has annual requirement of water resource is about 134505.45mh.
3. a) The majority of the villages (92.11%) show area under kharip jowar less than 16% NSA.
   b) 98 % of the villages show very low proportion of irrigated jowar below 13% of NSA and 95% villages show area under irrigated jowar below 16.4 %. This means that jowar is cultivated as rainfed as well as irrigated crop.
4. Sugarcane occupies 8.87% of NSA and abosorb 35.08 mh hect of water resource of the tahsil.
5. Increased in sugarcane by 45.7% from the period 1994 to 2007.
6. The increasing trend of sugarcane crop is mainly observed in the period 2001 to 2007.
7. Area under vegetables shows insignificant change 1994 to 2001 but sizable positive change in the period from 2001 to 2007 about (19.7%NSA)
8. The cereals dominate by occupying 52.66% NSA. However, there are other drought prone tahsil showing areal strength of cereals more than 80%. This means that shirur tahsil has shown increasing trend of cash crop in the recent past owing to irrigation facilities.
9. Among the pulses mug, mataki, and chavali are the important crops occupying 28.6%,21.05%,16.78% NSA respectively.
10. Majority of the villages 85.09% show small proportion of NSA (less than 9%) under groundnut.

8. References:

Banerjee B. (1955): "The infrastructure of Indian Agriculture in Essay in Agricultural Geography, Banerjee (Ed). Calcutta. Pp: 254-277.

Bhagat, Vijay (2002): "Agro – Based Model for Sustainable Development in the Purandhar Tahsil of the Pune District, Maharashtra", Ph.D. Thesis (2002).

Deostali, Vrushali (1997): "Crop Planning For Ahmadnagar and Solapur District, Maharashtra", 'The Indian Geographical Journal' Pp: 20-26.

Dwivedi R S, Sreenivas K, Ramana K V, Redy P R, Ravi Sankar G (2006): "Sustainable development of land and water resources using geographic information system and remote sensing". J. Indian Soc Remote Sensing 2006, 34(4), 351-68.

FFC (Fact Finding Committee) (1973): "Report of The Fact Finding Committee For Survey of Scarcity Areas Maharashtra State, 1973" Government of Maharashtra, Vol: 1, Pp: 140-141, 168-169, 176-182, 199.

Kuswah, Ram Gopal and Chourasia Rajiv Kumar (2004): "Landuse Pattern and Sustainable Agricultural Development, A Case Study of Auraiya District, Uttar Pradesh Geographical Journal, Kanpur, Pp; 48-52

Shinde, S. D. (1988): "Changing Landuse Pattern of Amanpur Village (Sangli District)", 'Reading Irrigated Farming', Ed. Dr. S. D. Shinde Vishwanil Publications, Pune. Pp: 204-211.

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