

## Impact of Water Resources Utilization and Cropping Pattern in Shrigonda Tahsil, Ahmednagar, Maharashtra: A case study

<sup>1</sup>A.P.Pandit , <sup>2</sup>A.B. Aher and S.D.Kulkarni

<sup>1</sup>Department of Geography, New Arts Commerce & Science College, Ahmednagar.

<sup>2</sup>Savitribai College of Arts, Pimpalgaon Pisa, BOS Chairman, Geography, University of Pune.

appandit2007@gmail.com , drankushaher@rediffmail.com, satishdkulkarni@gmail.com

**Abstract** - Irrigation has become an important aspect of agriculture. Recently irrigation becomes most essential and without it most crops cannot be grown. It becomes essential part due to variation of monsoon and uneven distribution of rainfall throughout the year. Even those crops, which are grown during rainy season, also depend upon irrigation because farmers try to irrigate the crops in time so that crops might be ready in time and give higher yield. In case of failure of rainfall use of irrigation becomes much more essential areas growing multiple crops need intensive irrigation facilities. In present study Shrigonda tahsil was selected as a study area which came under rain shadow and semi arid region. The irrigation water resource availability and management practices were consider from study area in relation with a cropping pattern during 1961 to 2001. Mostly the irrigation practices increases chronologically with change in land use and cropping pattern i.e. semi arid crop to cash crop which significantly increased up to 23% and increase in surface water irrigation facilities by 28%. The monsoon pattern mostly influencing the land use and cropping pattern. The scarcity and availability of water resources influenced the ground water utilization rate.

**Key Words** : Water resources, land use, cropping pattern, irrigation facilities.

### Introduction:

Irrigation has become an important aspect of agriculture. Recently irrigation becomes most essential and without it most crops cannot be grown. It becomes essential part due to variation of rainfall n monsoon and uneven distribution of rainfall throughout the year. Even those crops, which are grown during rainy season, also depend upon irrigation because farmers try to irrigate the crops in time so that crops might be ready in time and give higher yield. In case of failure of rainfall use of irrigation becomes much more essential areas growing multiple crops need intensive irrigation facilities. Although the modernization in the irrigation practices cannot abide the rainwater availability. Rainwater is considered as base of irrigation. Inadequate rainfall disturbs the ground water availability in the resources and rivers, canals, get dry and farmers became replace the importance of rainwater. Irregularities in monsoon pattern in space and time, makes the artificial irrigation practices are essential for most of the crops cultivated in the region. Where as sugar cane, groundnuts etc are totally depend on artificial irrigation.

The surface water irrigation practices like the tank, river, canal, and lake play vital role in irrigation. Were as underground is also during The underground water is also being tapped by dug and tube wells and these became important due to reliance.

### Study Area:

The Shrigonda tahsil is located in the southern drought prone zone of Ahmednagar district. The tahsil situated partly Bhima, Ghod and Kuakdi River and canal basin. In the tahsil length of 60 Km. from East to West and 51 Km. from North to South. The height of tahsil is recorded 600 Mtr. Above the sea level. Generally slope of tahsil is North to South.

The latitudinal extend is 18°27' 18" to 18°51' 54" North and longitudinal extend is 74° 23' 24" to 74° 52' East. It is surrounded by Parner and Nagar tahsil to the northern part, Pune district to the west and south - east Karjat tahsil. It's an area of 1630 Sq. Km. is the third rank of tahsil in Ahmednagar district. It is historical and religious which is situated on the bank of river Saraswati.



Location Map

### Database and Methodology:

The present paper is primarily based on secondary data. The data on census year have been collected. Considering a village as a unit for the shrigonda tahsil in Ahmednagar district of Maharashtra, the data have been collected of village Panchyat Samiti, Tahsil office Shrigonda, Department of irrigation, socio-economic review book, statistical abstract of Ahmednagar district. The data pertaining to the period from 1960-61 to 2000-01

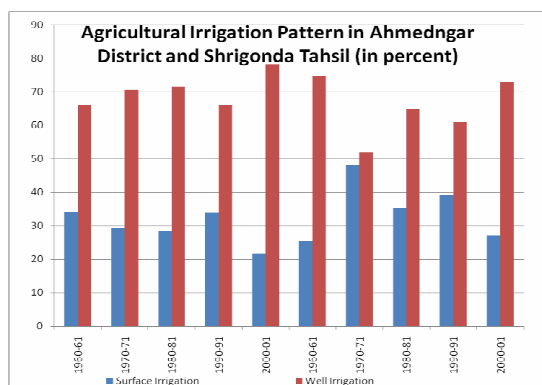
Further all sorts of published and unpublished data were processed and then suitable maps and diagrams, represented data, choropleth maps, graphs has been constructed and interpreted. Prepare a base map of tahsil for analysis the subject matter. We are studying the methods necessity to subject. e.g. area irrigated under different source, irrigated area under different crop and land utilization etc.

The present scenario of irrigation practices then shrigonda tahsil that is study area compared with the district irrigation status. The main irrigation practices in the study area of well water and surface water were observed since 1961-2001. The table 01 reveals the data in relation to the land under irrigation and practices. In 1961 the gross area available for agricultural practices were 154472 hectares were as 135824 hectares were actual under the irrigation. In respective the surface irrigation practices contribute 34.14 percent were as well irrigation 65.86%. consequent the 1970-71 the surface and well water irrigation practices were 29.30% and 70.70% respectively. Were as in 1980-81 the surface water irrigation practices decline (29.30%) and increases the burden on ground water. (71.50%). But in 1990-91 enhances the 5% in irrigation by surface water availability and reduces the dependency on ground water. Again in 2001 rain water availability decline showing the impact on surface water availability for irrigation and parasite on ground water for agriculture practices.

| Area                | Year    | Total Gross Area Irrigation (In hectors) | Net Area Irrigation (In hectors) | Surface Irrigation (%) | Well Irrigation (%) |
|---------------------|---------|--|----------------------------------|------------------------|---------------------|
| Ahmednagar District | 1960-61 | 154472                                   | 135824                           | 34.14                  | 65.86               |
|                     | 1970-71 | 174209                                   | 147030                           | 29.30                  | 70.70               |
|                     | 1980-81 | 287289                                   | 243772                           | 28.50                  | 71.50               |
|                     | 1990-91 | 311178                                   | 246391                           | 33.86                  | 66.14               |
|                     | 2000-01 | 382807                                   | 321663                           | 21.73                  | 78.25               |
| Shrigonda Tahsil    | 1960-61 | 14212                                    | 12216                            | 25.25                  | 74.75               |
|                     | 1970-71 | 16159                                    | 13878                            | 48.19                  | 51.81               |
|                     | 1980-81 | 21101                                    | 20756                            | 35.16                  | 64.84               |
|                     | 1990-91 | 31851                                    | 25379                            | 39.07                  | 60.93               |
|                     | 2000-01 | 60061                                    | 36575                            | 27.00                  | 73.00               |

Table 1. Area irrigated by different source (Source:-Socio-Economic Review Ahmednagar district

Table shown irrigated area by surface and well irrigation in Ahmednagar district and Shrigonda tahsil. According to 1961 report total irrigated area was 154472 hectors in Ahmednagar district. Where as on 1971, 1991 and 2001 it was 174029, 287289, 311178 and 382807 hectors respectively.(Figure 01). The increase in the irrigation area was reported . The surface water irrigation shown the contribution of 34.17% 29.30% 28.50%, 33.86%, and 21.73% respectively. The pattern almost uneven i.e. increase and decrease which was directly proportional with rainwater availability in the region. In the study area. (Shrigonda tahsil) surface water irrigation contributed between 27.25% to 48.19%. Mainly the irrigation practices were on tube well and dug well i.e. up to 73%. This indicates the meteorological condition that monsoon availability and the pattern can influence the surface water and ground water recharging. As the study area is rain shadow area mostly depend on retreating monsoon. With mostly having uneven pattern. (Ref. Gazetteers)



ig.1 Agricultural Irrigation Pattern in Ahmednagar District and Shrigonda Tashil (in percent

#### Irrigation and cropping pattern :

In Ahmednagar district, the northern area having surface irrigation where as southern area of district mostly depend on ground water irrigation practices. The irrigation water availability reflects the land use and cropping pattern in the district. In study area the short term cropping pattern likewheat, jowar bajara were dominating in compare to district scenario. The land under the wheat cultivation were increased by 7.86% to the 23.69% were as in study area i.e. shrigionda tahsil it was 4.93% to 22.65%, in jowar and bajara at district level land under cultivation declines from 34.27% to 23.74% and 3.28% to 8.7%, where as the cash crop like sugarcane, cultivation were dominating in the district. Where as in comparison with the study area in shrigionda tahsil the jowar and bajara cultivation were decline from 69.22% to 47.63% and 10.10% to 5.9% respectively. Surprisingly cash crop like sugarcane cultivation increased form 7.63% to 10.10%. The cash crop cultivation practices were increased due to irrigation project (kukadi canal project) available in study area attracting the farmers from indigenes to cash crop. This indicates the surface water availability impacting on land use pattern and agricultural economy. (fig. 01)

| Area                | Year | Wheat | Jowar | Bajra | Groundnuts | Sugarcane | Gram | Total Fruits & Vegetable |
|---------------------|------|-------|-------|-------|------------|-----------|------|--------------------------|
| Ahmednagar District | 1961 | 7.86  | 34.27 | 3.28  | 1.89       | 5.53      | 3.17 | N.A.                     |
|                     | 1981 | 17.38 | 39.42 | 5.84  | 1.82       | 29.46     | 2.69 | 3.39                     |
|                     | 2001 | 23.69 | 23.74 | 8.71  | 2.49       | 24.25     | 6.24 | 1.88                     |
| Shrigonda Tahsil    | 1961 | 4.93  | 69.22 | 1.11  | 4.58       | 7.63      | 3.54 | N.A.                     |
|                     | 1981 | 15.49 | 58.45 | 2.42  | 2.27       | 14.5      | 1.95 | 5.37                     |
|                     | 2001 | 22.65 | 47.63 | 5.95  | 1.68       | 10.10     | 2.76 | 9.23                     |

Table 2: Irrigation practices and cropping pattern in Shrigonda tahsil, Ahmednagar (In Percent) (Source: Socio-Economic Review, Ahmednagar District).

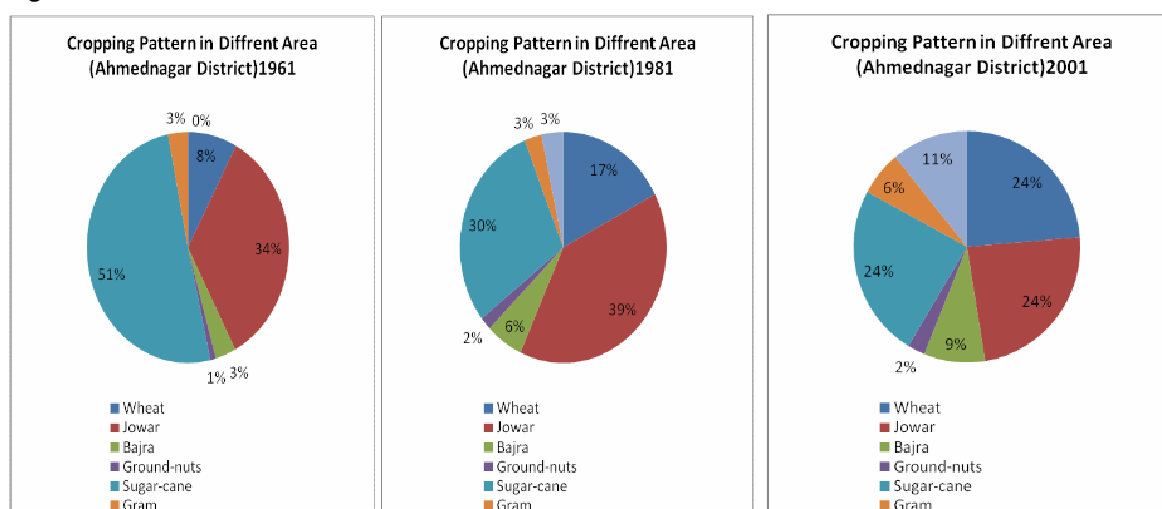


Fig. 2 A, B, C

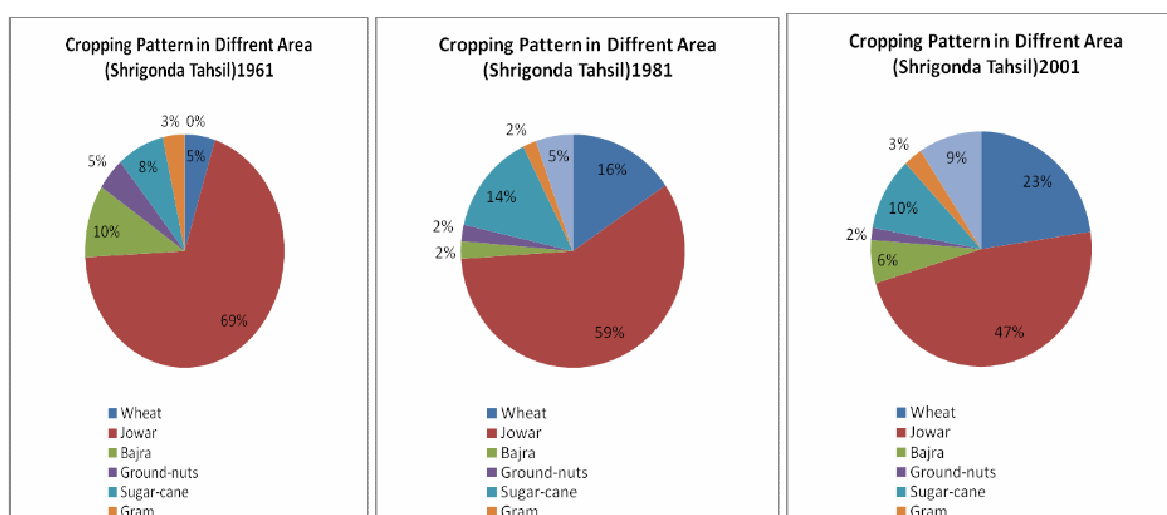


Fig.3 A,B,C

### Conclusion:

In the present study the data reveals the landuse pattern and the irrigation practices in the Shrigonda tahsil, Ahmednagar. The data from 1961 to 2001 of the irrigation practices reflects the land use pattern of a district. The southern part of the district mostly influenced by irrigation facilities (Mula dam and Bhandardara dam) the minor irrigation projects also enhances the landuse pattern in comparison with the data, the district scenario mostly dominated by cash crops in northern part. Whereas the study area which came under rain shadow area i.e. list availability of monsoon. Which influences the irrigation facilities the present study area in not having any major irrigation project the partially depend on Kukadi and Ghod canal irrigation. The agriculture pattern reflects mostly the tube well and dug well is a prime source for irrigation. The cropping pattern mostly reflects the short term crops

like jawar, bajara, wheat, groundnuts and gram. But in 1961 to 2001 data reflects the cash crop existence in agriculture pattern i.e. the availability of irrigation facilities increased the farmer's interests towards the such type of crop.

### References:

- Biswas Asit K., (1997), Water resources: environmental planning, management and development, McGraw-Hill.
- Bose Ashish., India's basic demographic statistics, B.R. Publishing Corporation, Delhi.
- Chandana R C., (2000), A geography of population, Kalyani Publication, lundhiyana , 127-214.

Das P., (1993), Cropping Pattern (Agricultural and Horticultural) in Different Zones, their Average Yields in Comparison to National Average/ Critical Gaps/Reasons Identified and Yield Potential.

District Census Handbook (1951 to 2001).

Encyclopedia of population – volume 1 and 2, 10 to 20

Gazetter of Ahmednagar District., (1993).

Gharpure Vithal (2005), Population geography, Pimplapure and company, Nagpur , 1 - 29.

Grafton R Quetin (2011), Karen Hussey; Water Resources Planning and Management ,Cambridge University Press.

Hanji Anita B., (2006), Impact Assessment of Irrigation on Cropping Pattern, Food and Nutrition on Security at Macro and Micro Level in Ghataprabha Malaprabha Command Area – Ph. D. Thesis, Development of Food and Nutrition College of Agriculture, Dharwad University of Agricultural Sciences, Dharwad

Jagdal U G., (2002), Appraisal and planning of human resource in Junner Tahsil, Ph. D. Thesis, Pune University.

Kumar Jainendra., Land use analysis – A case study of Nllanda district, Bihar, inter India publication, New Delhi, 1 to 18.

Manual of Map Reading.

Manual of Nationwide Land Use/Land Cover Mapping Using Satellite Imagery Part-I, II, National Remote Sensing Agency, Department of Space, Government of India, Hyderabad.

Patil V V., (2000), Variation in socio economic characteristics of rural settlement in south konkan during 1951-1991, Ph. D. Thesis, Pune University.

Ranade C G., Impact of Cropping Pattern on Agricultural Production - Paper provided by Indian Institute of Management Ahmedabad, Research and Publication Department in its series IIMA, Working Papers with number WP1979-12-01\_00381.

Satellite Data Products Source Bool, National Remote Sensing Agency, Department of Space, Government of India, Hyderabad.

Singh Vijay P., Seo Won II., H Jung., Sony-Publisher:Water Resources Publication, (1999); Water Resources Planning and Management: Proceedings of the International Conference on Water, Environment, Ecology, Socioeconomics and Health Engineering, Seoul National.

Sinha Udai Prakash and Rashid Abdur., Socio-economic review and statistical abstract of Ahmednagar District (1961-2001), Socio-economic dimensions of integrated development in India, Wisdom publication, New Delhi. 1 - 79.