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#### AGRICULTURAL PRODUCTIVITY OF PHALTAN TAHSIL IN SATARA DISTRICT, (MAHARASHTRA)

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#### ABSTRACT:

This research paper has been intended to analyse the Agricultural productivity pattern or levels in Phaltan Tahsil during the year 2010-2011. It is based on information collected from the secondary sources. Agricultural productivity for the most part is influenced by physical, climatological, socio-economical, technological and organizational factors and to some extent by the farmer's attitude. An attempt has been made to study the variations in agricultural productivity in different circles of Phaltan Tahsil during the year 2010-2011. The relevant data obtained has been processed with the help of Enyedi's Index technique. For this purpose, 10 crops have been considered for calculating the agricultural productivity. These include Jowar, Wheat, Bajara, Sugarcane, and Fodder crops, Maize, Sunflower, Pulses, Vegetables and Fruits. Accordingly the ranking of crops has been done for the aforementioned crops in order to understand productivity pattern or level of Phaltan Tahsil.

**KEYWORDS:** Geomorphology, Soil, Agriculture, Productivity, Productivity index.

#### **INTRODUCTION**

Agricultural Productivity is a multidimensional concept, which involves technological advancement, effective management of available resources and organizational set-up for increasing and optimizing agricultural production. The term 'Productivity' is regarded as the measurement of crop production, whereas, the inputs

required for this production to get subsequent output is known as Agricultural Productivity. Rao and Jasbir Singh (1981) considered "Productivity as the degree at which the economic, cultural, technical and organizational variables are able to exploit the biotic resources of the area for agricultural production". Bhatia (1967) defined Agricultural Efficiency as "The aggregate performance of various crops in regard to their output per acre". Singh and Dhillion (2000) suggested that the "yield per unit" should be considered to indicate agricultural productivity. This may be defined as the "Ratio of index of local agricultural output to the index of total input used in farm production".

#### **STUDY AREA:**

Phaltan Tahsil is selected for the study. Phaltan Tahsil covering the part of the Nira river basin is one of the economically prosperous Tahsils of Satara district in the southern Maharashtra. It lies between  $17^{0}58$  North to  $18^{0}5$  North latitude and  $74^{0}20$  East to  $74^{0}40$  East longitude. It has total geographical area of 1190 sq.km.with 128 villages and one urban settlement. (2011 census) This area is bounded by the Nira River in north side. The region attains 576 metres height (M.S.L.) with northward slopping land drained mainly by the Banganga River, a right bank tributary of the Nira River.

The medium black and deep black soil appears within study area. The soil fertility encourages growth of various crops like sugarcane, jowar, bajara, maize, vegetables. According to 2011 Census the area has 3, 42,667 population, out of these 1, 76,250 are males and 1, 66,417 are females and density of population is 333 per square kilometre (Fig.1).





#### **OBJECTIVES:**

i) Examining the physical background.

ii) Identifying agricultural productivity of the Phaltan Tahsil.

#### DATA SOURCES AND METHODOLOGY:

The present study aims at computing of crop productivity for Phaltan Tahsil having diversity in soil, local relief and irrigation. The productivity data, at village level is not available. To overcome this difficulty, yield data of each crop was collected during fieldwork both on yield and acreage basis for four villages. The four villages are considered as Sample villages and the data obtained from these villages are representative for whole Tahsil. They have been selected on the basis of sampling technique. These four samples villages Barad, Sasakal, Dhaval and Padegaon. Enyedi's method was chosen to compute crop productivity for Phaltan Tahsil because of its accuracy.

#### Productivity Index = $[(Y/Yn) / (T/Tn)] \times 100$

Where,

Y = Production of the selected crop in unit area i.e. villages Yn = Total Production of the selected crop of entire study region T = Area under Selected Crop in unit area (Village level) Tn = Total cropped area in entire study region.

Using this formula, the productivity index values were calculated for four sample villages for the year 2010-11 and demarcated the productivity regions as very high, high, medium, low and very low productivity regions. This classification is shown in the map prepared with the help of Productivity Indices.

#### PHYSIOGRAPHY AND DRAINAGE

The physical bases, particularly the relief, drainage pattern, geology, climate and soil play vital role in agricultural activity in any region. The hilly region occupies a smaller part sharing 9.92percent (118.05 square kilometres) of the Tahsil area in the southern part. This hilly region is a part of Mahadeo ranges having more than 900 meters elevation (Figure-2) and includes various Ranges and Ghats. Moderate to steep slopes are observed from southward to northward. These slopes provide low accounting for agricultural productivity. Towards the



north of hilly zone, parallel to Nira River, transitional belts has been characterized by various minor land forms. It occupies 422.77 square kilometers of area (35.52percent). This zone is also medium suitable for agricultural productivity. Plain level is an extensive zone covering 649.18 square kilometers of area (54.55percent) and is mainly confined to the northern border and parallel to the Nira river. It is widened towards the east having fertile soil cover due to the availability of recurrent water supply from the Nira right bank canal. This zone is high suitable for agricultural productivity throughout the year.

The drainage pattern in Phaltan Tahsil has been influenced due to the variation in the relief. The River Nira is the only important river in the study region, which is the main tributary of the Bhima River, which in turn is a main left bank feeder of River Krishna. The River Nira ascends in the Sahyadri range near Bhor in Pune district and from there it runs eastward to form the boundary between Pune and Satara district. The river has acquired great economic importance due to the Bhatghar dam and Veer dam from which Nira right bank and left bank canals supply water to Phaltan and Khandala Tahsils. The Banganga River is one of the feeders of the Nira River. The river bed is sandy and the banks are highly eroded. It joins the Nira River at Somanthali village of Phaltan Tahsil. Besides, there are many small streams draining the entire region following towards north. These streams have provided potential sites for agricultural activities in this region.



Figure-2 Physiography and Drainage Pattern

**Figure-3: Phaltan Tahsil, Soils** 



Source: Topographical Maps, Survey of India.

#### SOIL TYPES:

There are four groups of soils found in the study region and their distributions match up with the relief features. However they vary in their depth and also according to their sub-types. The deep black soils (above 100 cm) are close to the river course which are fertile and are dedicated mainly for Sugarcane crop. This is been followed by medium black soils (50-100 cm) with 32,873 hectares of area. The shallow black soils (25-50 cm) fall into the transitional zone and have less scope for irrigation. Jowar and Bajara are the two major food crops grown on this type of soil. In the extreme south, Laterite soils are observed. They are found to be poor in nature and are creating obstacle in the development of agriculture (Figure-3).

#### **PRODUCTIVITY OF JOWAR**

The spatial distribution of Productivity of Jowar is shown in Table-1. It is observed that local topography, soil and rainfall distribution influence the Productivity of Jowar. Least productivity is recorded in the south-western part in the Sasakal village (73.12) where maximum area is under Sugarcane cultivation and fodder crops. Dhaval village soil is coarse shallow to medium black. It is situated in the western part of study region. Jowar shows high productivity (112.56) in this village. Jowar is Rabi crop which requires less amount of water. It is a

drought resistant crop. Highest Productivity of Jowar is observed in Padegaon village (140.73) which lies in the south-western part of the study region. The productivity pattern of Jowar shows an increasing trend towards the western part due to plane topography, medium to deep black soil and irrigation. Variation in soil type, local relief and rainfall differentiate the productivity pattern in the west and eastern part.

| Sr. | Name of the | Area in  | Total     | Production  | Index of    |
|-----|-------------|----------|-----------|-------------|-------------|
| No. | Village     | Hectares | Productio | Quintal/hec | Productivit |
|     |             |          | n         | t           | У           |
|     |             |          | Quintal   |             |             |
| 1   | Barad       | 275      | 4125      | 15          | 84.41       |
| 2   | Sasakal     | 70       | 910       | 13          | 73.12       |
| 3   | Dhaval      | 257      | 5140      | 20          | 112.56      |
| 4   | Padegaon    | 72       | 1800      | 25          | 140.73      |
|     | Total       | 674      | 11975     | Average     | _           |
|     |             |          |           | 17.77       |             |

#### **Table-1.Index Productivity of Jowar**

Source: Computed by Researcher.

#### **PRODUCTIVITY OF BAJARA:**

Bajara, a drought resistant crop of Kharif season, is grown on inferior quality soil having less commercial value. The lowest productivity is observed in two administrative regions, One in Dhaval village (western part of Phaltan Tahsil) having 83.57 productivity index and the other one Sasakal village (the South-eastern part of the Phaltan Tahsil) having 98.32. The highest productivity of Bajara is recorded in Padegaon village (122.90) in western part, followed by Barad village (103.23) situated in eastern part of the study region. The general productivity pattern of Bajara shows increasing trend towards south-west and eastern part of the study area. The Productivity trend of Bajara does not have any significant co-relation with soil, water and physiography since poorer soils are available at each and every village levels which are generally brought under bajara cultivation. Productivity Index of Bajara for four selected villages is shown in Table-2.



| Sr. | Name of     | Area in  | Total      | Production | Index of    |
|-----|-------------|----------|------------|------------|-------------|
| No. | the Village | hectares | Production | Quintal/He | Productivit |
|     |             |          | Quintal    | с.         | У           |
| 1   | Barad       | 269      | 5657       | 21         | 103.23      |
| 2   | Sasakal     | 140      | 2800       | 20         | 98.32       |
| 3   | Dhaval      | 243      | 4131       | 17         | 83.57       |
| 4   | Padegaon    | 145      | 3625       | 25         | 122.90      |
|     | Total       | 797      | 16213      | Average    | -           |
|     |             |          |            | 20.34      |             |

#### IRJIF IMPACT FACTOR: 3.52 Table-2.Index Productivity of Bajara

Source: Computed by Researcher.

#### **PRODUCTIVITY OF WHEAT:**

Wheat as a Rabi crop is cultivated over medium to deep black soil with subsoil moisture and hence hardly requires irrigation facility. Highest productivity of Wheat is observed in Padegaon village (121.45) in the western followed by Barad village (101.21) in the eastern part of study region. The lowest productivity is recorded in Sasakal village (72.87) followed by Dhaval village (80.96) situated in the north and the south respectively. The productivity pattern of Wheat is increasing towards north-west and north-eastern part due to plane topography, medium to deep black soil and irrigation. Central and Northern parts have low productivity of Wheat due to high relief, coarse shallow soil with low moisture retention capacity and lack of irrigation facility. It is observed that there is potential to large hectares of land under wheat to increase production and quality by sowing improved varieties of seeds.

| Sr. | Name of     | Area in  | Total     | Production   | Index of     |
|-----|-------------|----------|-----------|--------------|--------------|
| No. | the Village | hectares | Productio | Quintal/Hect | Productivity |
|     |             |          | n         | •            |              |
|     |             |          | Quintal   |              |              |
| 1   | Barad       | 113      | 2800      | 25           | 101.21       |
| 2   | Sasakal     | 47       | 846       | 18           | 72.87        |
| 3   | Dhaval      | 34       | 680       | 20           | 80.96        |
| 4   | Padegaon    | 88       | 2640      | 30           | 121.45       |
|     | Total       | 282      | 6966      | Average      | -            |
|     |             |          |           | 24.70        |              |

**Table-3: Index Productivity of Wheat** 

Source: Computed by Researcher.

#### **PRODUCTIVITY OF SUGARCANE:**

Sugarcane is a long duration crop grown medium black and deep black soil with assure supply of irrigation. The highest productivity of sugarcane is found in Padegaon village (107.64) situated in the western part along the bank of Nira River, followed by Dhaval village (92.28) situated in the western part of the study region (Table-4). Apart from the favourable soil type, the main reason behind this increased productivity is the improvisation of irrigation facilities. Lowest productivity of Sugarcane is observed in the south-west and the western part in Sasakal village (78.93) and Barad village (89.70) respectively. The southern and the south-western parts in this villages have extensive coverage of high relief, rugged and stony surface which are considered to be inferior and hence the reason for less productivity. The rugged topography, coarse shallow soil and unavailability of irrigation in the northern part make less productivity of Sugarcane.

The productivity of sugarcane is increasing in northwest to the north-east direction. This region physiographical lies in the Nira right canal and the bank of river Nira and Banganga. Moreover, it is observed that the north and the north-eastern part of the villages yield very high productivity of sugarcane than northern part due to high fertility of soils.

| Sr. | Name of     | Area in  | Total      | Production   | Index of    |
|-----|-------------|----------|------------|--------------|-------------|
| No. | the Village | hectares | Production | Quintal/Hect | Productivit |
|     |             |          | Quintal    | •            | У           |
| 1   | Barad       | 93       | 11675      | 125          | 89.70       |
| 2   | Sasakal     | 48       | 5280       | 110          | 78.93       |
| 3   | Dhaval      | 02       | 260        | 130          | 92.28       |
| 4   | Padegaon    | 255      | 38250      | 150          | 107.64      |
|     | Total       | 398      | 55465      | Average      | -           |
|     |             |          |            | 139.36       |             |

**Table-4: Index Productivity of Sugarcane** 

Source: Computed by Researcher.

#### **CONCLUSION:**

Agricultural productivity is an important indicator of Agricultural development of any region. It serves as an important tool for better planning and development of agriculture. Productivity trend of Jowar has shown an increasing trend from southern part to northern part of the Phaltan Tahsil. The highest Jowar productivity has

been observed in Padegaon village while the lowest was observed in Sasakal village. But an inverse trend has been seen in case of Wheat production. It showed an increasing trend towards southern side. The highest Wheat productivity has been observed in Padegaon village while lowest was recorded in Sasakal village due to silt land. Productivity of Bajara is higher in north-western and eastern part of study area. The highest productivity of Bajara has been recorded in Padegaon village and the lowest was seen in Dhaval village. The highest Productivity of Sugarcane was seen in Padegaon village and lowest in Sasakal village. This variation in productivity of Sugarcane is a result of various factors like topography, irrigation, farming methods etc. Finally, it can be concluded that agricultural productivity is not uniform throughout the region. It varies from crop to crop and also from region to region. Another reason observed behind this in most villages is that the farmers have small land holdings and majority of them lack modern agricultural facilities. Most of the agricultural practices are done manually which is more labour intensive, time consuming, expensive and less efficient where are hindering the productivity level of the study region.

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