

Geographical Analysis of Rice Crop with the Help of Competition Index in Chandrapur District

By

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Abstract

Agriculture is the main occupation of India and it is through this that humans get their food. Rice is the staple food of half of the world's population. It is the major dietary energy source for 17 countries in Asia and the Pacific, 9 countries in North and South America, and 8 countries in Africa. Rice provides 20% of the energy in the world's diet. Whereas wheat provides 19% and maize provides 5%. Chandrapur is an important district for rice production in Vidarbha in Maharashtra. Rice is the most cultivated crop in this district. In the present research paper, the crop of rice in Chandrapur district has been studied tehsil wise.

Keyword Agriculture, Rice, Cultivated, Competition Index

Introduction

According to historical records, in the Yangtze River basin in China, BC. Rice cultivation started six to seven thousand years ago. In India, rice cultivation started two thousand years ago in the Ganges valley. According to Purumugam "Rice may have traveled to India through traders from China and hybridized with local species there.

India ranks second in the world in terms of rice production. China is the largest rice producing country in the world. In Maharashtra, rice is grown in the Konkan coastal areas, on the Ghats and in some eastern areas. Chandrapur, Raigad, Thane, Bhandara, Kolhapur, etc. are rice producing district

In the presented research paper, the study of rice crop in Chandrapur district during the period 2011 and 2021 is done tehsil wise.

Objectives

The main objectives of the present study are as follows.

- 1) To study the area under rice crop in Chandrapur district.
- 2) To conduct a comparative study of the competition index of rice crop in the district.

Data Source and Methodology

The research presented is done on the basis of secondary data. The relevant information is collected from District Agriculture Office, Chandrapur, as well as Socio-Economic Reviews, Chandrapur District. It is also compiled from information available on the internet and previously published work related to the subject.

The present study is based on the data of the year 2011 and 2021. The collected information is displayed in a table showing its distribution through a map. The method suggested by Dr. Agarwal has been adopted to calculate the competition index of rice crop. The following formula is used for this.

$$CI = \frac{(Yaa - Yab) \times (Ybb - Yba)}{Yaa \times Ybb}$$

CI – Competition Index

Yab – Area Under Rice

Yba – Area Under Total Crops

Yaa – Production of Rice

Ybb – Production of Total Crops

Study Region

Chandrapur district is located in southeast of Maharashtra state. The district extended from 18° 4' north to 20° 5' north latitudes and 78° 5' east to 80° 6' east longitudes.

District is abounded with Gadchiroli district at east, Yavatmal towards west. Wainganga river makes the eastern boundary of the district. Total geographical area of the district is 11443 SqKm and stands at 14th number in Maharashtra state about the geographical area.

Chandrapur district has 15 tahsils (Table No 1), and total population of the district is 2204307 according to the census 2011. District having total 1792 villages and out of them 1463 are habited and 329 are uninhabited.

Area Under Rice

Table No. 1 Chandrapur District – Area under Rice (2011 - 2021) (Area in Hectares)

Name	Area (Hector)	2011		2021		
		% to Total Cultivation	Irrigation %	Area (Hector)	% to Total Cultivation	Irrigation %
Warora	3418	4.24	93.01	2884	3.10	100.00
Chimur	22823	28.98	60.91	23865	34.28	42.98
Nagbhir	26488	84.88	63.53	25831	87.96	20.00
Brahmapuri	28022	68.52	4.84	28903	84.64	42.09
Sawali	18872	64.03	100.03	23958	85.70	87.72
Sindewahi	18033	83.45	72.81	18014	88.77	14.10
Bhadravati	4819	14.54	71.47	3971	10.11	100.00
Chandrapur	3340	15.57	65.09	3961	18.68	17.17
Mul	19524	73.72	81.42	23331	72.22	42.45
Pombhurna	8910	49.56	0.00	12025	55.67	34.31
Ballarpur	2723	27.12	99.34	2917	29.00	30.30
Korpana	171	0.43	0.00	173	0.36	0.00
Rajura	1943	4.34	67.99	2192	4.78	6.71
Gondpipri	7149	22.59	44.72	10992	26.27	100.00
Jiwati	42	0.33	92.86	44	0.24	0.00
Total District	166277	31.92	57.76	183061	33.08	46.34

Source – District Agriculture Office, Chandrapur

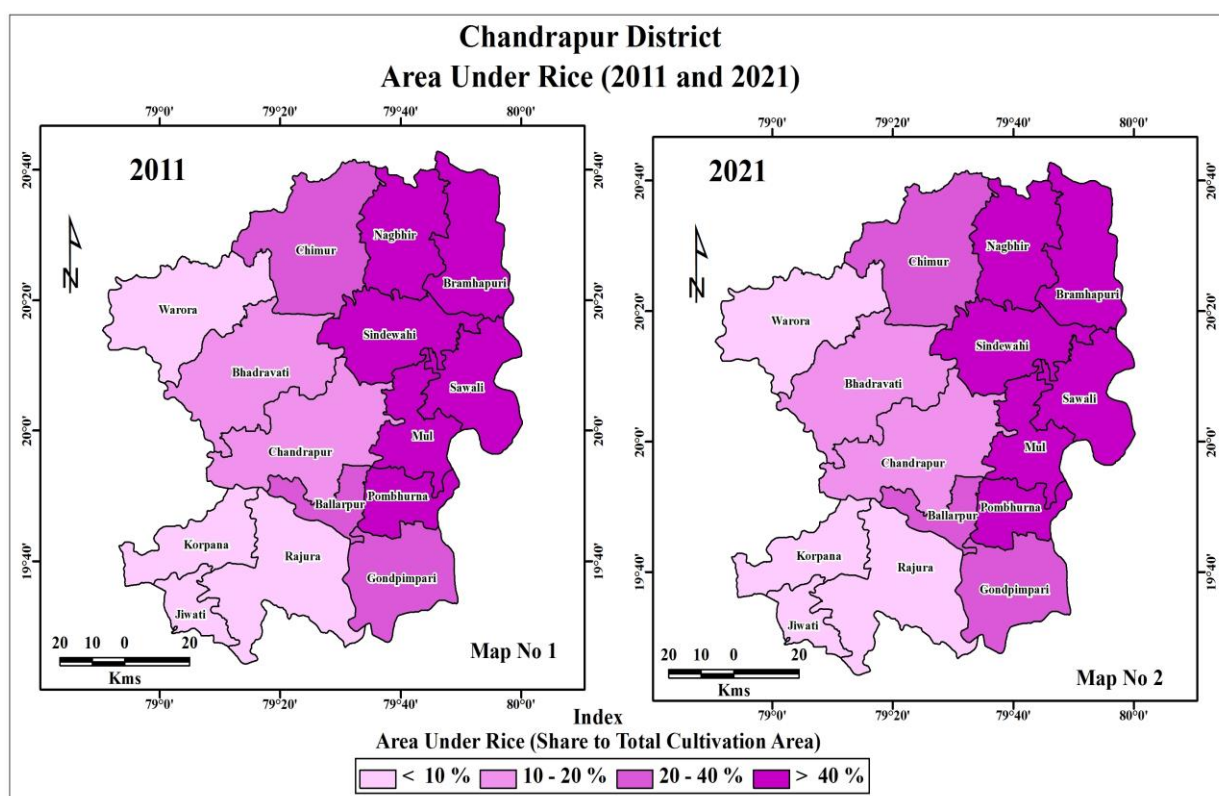
In Chandrapur district rice is the dominant crop in the food grain cultivation area. In both the years 2011 and 2021, the rice crop area is found to be more. Area of rice crop is more in the following areas under total cultivation. The following table no.1 shows the area of rice crop in the district as well as its irrigated area tahsil wise.

There are total 166277 hector area is found under rice cultivation in the year 2011 and its share to total cultivation is 31.92%. Area under irrigation of rice is recorded 57.76% in 2011. In the year 2021 area under rice cultivation is increased and it is recorded 183061 hector and its is 33.08% to the total cultivation. Area under irrigation in 2021 is decreased than 2011 and it is recorded 46.34%.

Area Under Rice (2011)

In the year 2011 Nagbhir (84.88%) and Sindewahi (83.45%) tehsil recorded more than 80% area under rice cultivation in their total agricultural land. Mul (73.72%), Bramhapuri (68.52%) and Sawali (64.03%) recorded more than 60% land under rice crop. Rajura (4.34%), Warora (4.24%), Korapna (0.43%) and Jiwati (0.33%) recorded lowest cultivation of rice in the district i.e. less than 10%. The remaining tehsils found 10 to 50% area under rice cultivation.

In the year 2011 Sawali tehsil found 100% area under irrigation of rice, also Ballarpur (99.34%), Warora (93.01%) and Jiwati (92.86%) tehsils having more than 90% area under irrigation of rice crop. There is no irrigation found in Korapna tehsil also Bramhapuri (4.84%) and Gondpipri (44.72%) found less than 50% area under irrigation. While other tehsil recorded 50 to 82% area of irrigation under rice (Map No. 1).



Area Under Rice (2021)

In the year 2021 Sindewahi (88.77%), Nagbhir (87.96%), Sawali (85.70%) and Bramhapuri (84.64%) tehsils found their more tha 80% area under rice cultivation. Mul has 72.22% and Pomphurna 55.67% area under rice crop. Rajura (4.78%), Warora (3.10%),

Korapna (0.36%) and Jiwati (0.24%) less than 5% area of rice crops and it is lowest in the district. Area under rice cultivation of these tehsils has been increased but their share to total cultivation has decreased in 2021 compare to 2011. In other tehsils rice cultivation is found in between 10 to 35% of total agricultural cultivated land.

In this year Gondpipri, Bhadravati and Warora thesil has 100% area under irrigation of rice. Sawali has 87.72% area of irrigation and other tehsil has found less than 50% area of irrigation in rice crop. There is no irrigation in Korapna and Jiwati tehsil in the year 2011 (Map No. 2).

Competition Index of Rice Crop

In agricultural studies, competitive index is used to study any single crop. This index is used in agricultural science department. Since both production and cultivation are taken into consideration in this index, it has helped to understand the development of rice crop compared to other crops.

Table No. 2 shows the tehsil wise distribution of competition index in the district during 2011 and 2021.

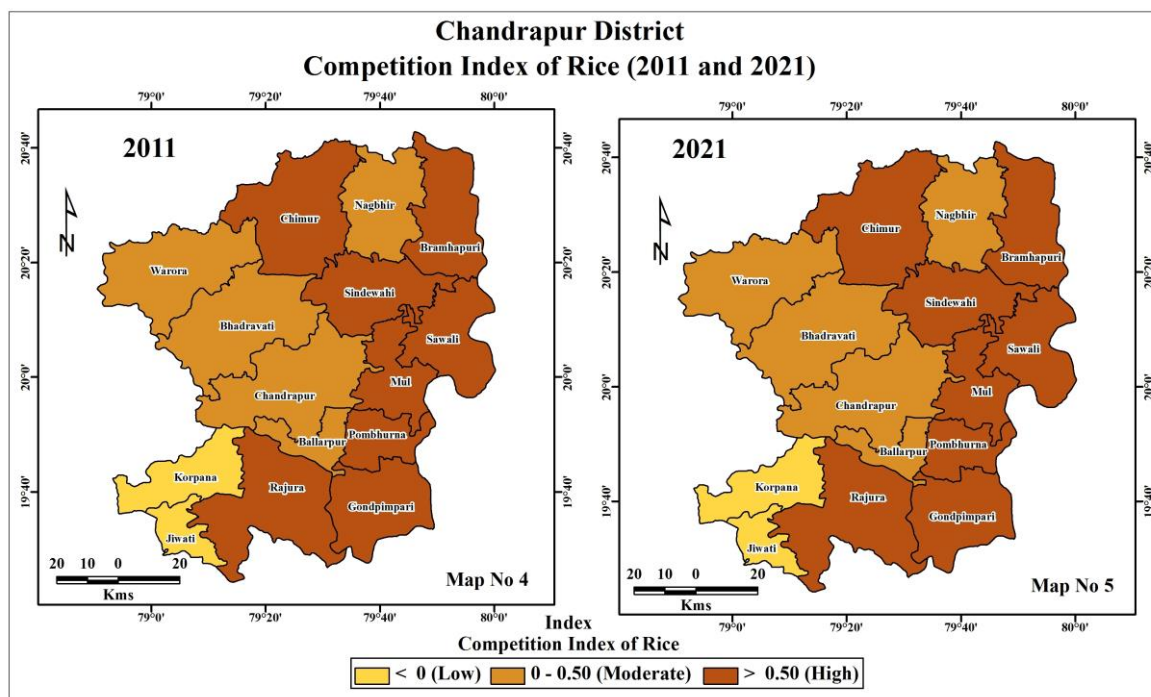
Table No. 2 Chandrapur District – Competition Index of Rice Crop (2011 & 2021)
(According to Dr Agrawal's Method)

Name	2011	2021
Warora	0.29	0.39
Chimur	0.60	0.59
Nagbhir	0.45	0.46
Brahmapuri	0.58	0.58
Sawali	0.62	0.56
Sindewahi	0.62	0.62
Bhadravati	0.24	0.36
Chandrapur	0.48	0.41
Mul	0.59	0.54
Pombhurna	0.63	0.54
Ballarpur	0.41	0.38
Korpana	-1.25	-1.28
Rajura	0.62	0.58
Gondpipri	0.69	0.57
Jiwati	-1.26	-1.36
Total District	0.59	0.56

Source - Author

The competition index of rice crop is found 0.59 in 2011 and 0.56 in 2021 and it is high in the district. Rice has the maximum production compare to the other crops in the district.

In the year 2011 Korapna (-1.25) and Jiwati (-1.26) has found this index as negative. It means there is very low production of rice in this part and rice is not main crop in these tehsils in the agriculture cultivation. Bhadravati (0.24), Warora (0.29), Ballarpur (0.41), Nagbhir (0.45), Chandrapur (0.48) tehsils found this index in upto 0.50 and there is moderate production of rice compare to other crops in the tehsils. Other tehsils found this index more than 0.50 and it is high in the study area. Gondpipri tehsil found this index 0.69 and it is highest in the district (Map No. 3).



In the year 2011 again Korpana (-1.28) and Jiwati (-1.26) tehsils found negative index and this year also the price production is poor in this part due to the low cultivation of rice. Bhadravati (0.36), Ballarpur (0.38), Warora (0.39), Chandrapur (0.41) and Nagbhir (0.46) tehsils found moderate index. The index of these tehsils is found in between 0 to 0.50. Other part of the district found this index more than 0.50 and it is high in the district. This year Sindewahi (0.62) tehsil found highest competition index of rice crop because of highest cultivation of rice in the district (Map No. 4).

Conclusions and Remedies

In Chandrapur district, the agricultural sector is dominated by rice crop and the maximum cultivated area is under rice crop. But Korpana and Jiwati tehsils have very low area and production of rice crop.

In the year 2021, the area under rice cultivation in Chandrapur district has increased by a total of 16784 hectares as compared to 2011. Also compared to the total cultivated area, rice cultivation has increased by about 1.16%. Similarly, there has been an increase of 14.42% in irrigation of rice crop in 2021.

In the district, Competition Index has increased in 2021 compared to 2011 only in Bhadravati, Warora and Mul tehsils. In all other tehsils this index has decreased, as the area and yield of rice increased in these tehsils but not due to the extent of cultivation. Also, the area of other crops is less and their productivity per hectare has increased.

The area and production of rice crop varies in Chandrapur district. Also, the maintenance taken for it is not the same everywhere and it is noticed that there is a deficiency in it. The following measures are required in the district to increase the production of rice crop.

- Before replanting the plants should be mulched by conventional method or with the help of machine

- Soft varieties should be replanted after 21 to 25 days, semi-heavy varieties after 23 to 27 days and heavy varieties after 25 to 30 days.
- 2 to 3 plants should be kept in a pot. For hybrids only 1 to 2 plants should be kept in a pot. Seedlings of appropriate age should be transplanted at 15 x 15 cm in tender varieties, 20 x 15 cm in semi-dwarf, heavy and hybrid varieties.
- For rice cultivation, 100 kg of nitrogen, 50 kg of phosphorous and 50 kg of palash per hectare have been recommended as chemical fertilizers. This fertilizer should be applied at the time of planting in soft varieties with 50% nitrogen, total phosphorus and palash and 50% nitrogen after 25 to 30 days after planting.
- The amount of chemical fertilizers recommended for hybrid varieties is 120 kg of nitrogen, 50 kg of phosphorous and 50 kg of palash per hectare. This fertilizer dose should be 50% nitrogen, total phosphorus and palash at the time of planting, 25% nitrogen after 25 to 30 days after planting and remaining 25% nitrogen after 55 to 60 days after planting.
- Weevils, armyworms, leaf curlers, caterpillars, mealybugs, weevils etc. on rice crop. Insect infestation is detected. After harvesting the paddy crop, the paddy litter should be collected and destroyed by plowing to help control pests and diseases.

Adoption of the above important factors will lead to better yield of rice crop even in less area and also increase the productivity per hectare. It is possible to develop agriculture by intercropping rice with other crops. This will help in improving the financial condition of the farmers in the rural areas.

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