

An Analysis of Trend, Growth and Variability of Rice Production and its Productivity in Odisha: Issues and Challenges of Marketing



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Abstract

In this paper an attempt has been made to show the growth of rice production and its productivity in Odisha as it is the principal crop, covering 60.55% of total cultivated area in 2017-18. It has been observed that there has been a fall in the percentage of area under rice cultivation in Odisha from 77.71% in 2002-03 to 60.55% in 2017-18. The compound annual growth rate (CAGR) of production of rice in the study period is only 2.82% whereas CAGR of productivity i.e. yield rate is 3.87% which implies productivity has increased at better rate than total production in the study period. There has been high instability in the yield rate with an instability index of 17.10% compared to the instability index of 3.40% of total production. Rising production and increasing productivity of rice in Odisha strengthen the supply to the market, leading to accelerating the welfare of rice growing farmers. One of the major challenges faced by the rice producers is inadequate marketing system and rice-growing farmers fail to get a fair price for their product due to various bottlenecks such as poor warehousing and logistic infrastructure, inefficiency of existing procurement centre at Primary Agriculture Co-operative Society (PACS), less accessibility of the farmers to avail minimum support price, lack of grading and standardization. So, the government has to bring reforms in the marketing system so as to encourage farmers for larger production of rice.

Keywords: Cropping Pattern, Marketing, Production, Productivity, Yield Rate.

Introduction

Agriculture in Odisha is the mainstay of majority of the populace and thus, holds the key to the socio-economic development of the state. Growth of agricultural sector is important not only for ensuring food security and reduction of poverty in rural areas, but also sustaining growth of rest of the economy. Moreover, growth of two non-farm sectors i.e. secondary and tertiary sectors, can be sustained only when the agricultural sector continues to grow and provide adequate demand for goods and services along with market for the farm produce. Near about 60 percent people in Odisha earn their livelihood through agriculture and allied activities (Odisha Agriculture Statistics, 2012-13).

Rice is the staple food of almost the entire population of Odisha. In the agricultural sector, the position of rice production and productivity in Odisha is unique because paddy is the largest cultivated crop, covering 60.55 percent of total cultivated area (Odisha Economic Survey, 2017-18). Odisha produces about 10 million metric tonnes of paddy in a year from about 3.8 million hectares of land. It has an average yield of about 2.7 tonnes per hectare (Triennium Ending 2017-18). The state grows paddy both in kharif and rabi season producing about 9.9 MMTs and 1.13 MMTs respectively. Yields in the kharif season (2.7 tonnes/ha) are lower than those in the rabi season (5.1 tonnes/ha) (TE 2017-18). The cost of cultivation of paddy in Odisha is comparatively higher than in neighboring states and is rising mainly on account of increased labour cost. The paddy farmer is observed to be in a low cost, low value, and low profit equilibrium. Compared to neighbouring states, Odisha's cost of cultivating paddy is low but so is the value at which the paddy is sold. Besides, there is also the yield gap issue. Paddy yields in Odisha are low compared to other states. There is high volatility in the yield rates from year to year basis. There is

also yield disparity between districts. There are a number of regions with high acreage under paddy but with very low yields. There is also an issue of markets. Although procurement has been stepped up, there are still some farmers who are not able to realise the minimum support price during the harvest months. Therefore, the state economy is directly linked with improvement in production and productivity of rice.

With this background the paper makes an attempt to examine the growth trend of rice production and its productivity and the extent of variability and instability in the last sixteen years i.e., 2002-2003 till 2017-18 and also the challenges faced by the farmers in its marketing.

Review of Literature

A humble attempt has been made to review some of the literature relating to production of rice and problems of marketing.

Nguyen Cong Thanh et al. (2013) have examined on rice production and its marketing by farmers in Mekong delta. The study showed that farmers in Mekong had 0.5 ha, 2.2 ha and 6.5 ha for minimum, average and maximum farm size per household respectively. The research says farmers would be strongly recommended to reduce growing areas of IR 50404 (low grain quality) and to promote high quality rice varieties for the purpose of export. Moreover, the study says farmers are looking at the opportunities and have expectations from government and other related organizations in order to improve their rice price for better production and export point of view.

Anjani Kumar et al. (2014) have studied rising population and changing dietary habits are the main reasons for increased global demand for food. Globally, shrinking water and agricultural land resources and climatic vagaries will reduce the assurance of food supply through altered weather patterns and increased pressure from pests and diseases. Again, maintaining harmony with the fragile environment, the farmers will have to produce more rice from lesser land, using less water, energy and other inputs to meet the country's stated goal of ensuring food for all.

Mrs. S. Anitha Jose (2016) has examined to know the scope for paddy cultivation in Kanyakumari district and also to know the modern technologies applied in agriculture. The author has also pointed out to analyse the various problems faced by paddy cultivators, getting yield and marketing of paddy. The article also pointed out those factors influencing to choose the agriculture and reasons for the poor economic level of the farmers. The study concluded that farmers in Kanyakumari district prefer agriculture mainly due to the availability of land. Moreover, the study suggested that advanced technologies should be used in the agriculture sector to make more profits in agricultural activities as result farmers will be economically sound.

Ramakrishna. B et al. (2016) have analysed the trends and variability of rice export, assess the prospects of rice export and the various problems or constraints of rice export from India for the period

2001-02 to 2013-14. This paper signifies that there is good market for some Indian rice varieties, especially basmati rice in the world market. In spite of considerable area being under rice cultivation in the country, the share of India in world rice export is very low. The reasons of low productivity of rice in the country may be due to use of less quantity of chemical fertilizers, pesticides, more area under the traditional varieties as well as more dependence of rain as per the study. The research also suggested that export of rice can be increased by creating adequate surplus of rice in the country.

Muhammad Abdullah et al. (2013) have examined the problems faced by rice growing farmer at different stages of rice cultivation such as rice production, rice crop protection and rice marketing stages in Sialkot. In terms of production related problems, the findings highlighted that farmers perceived high price of fertilizer, shortage of canal water, high price of agricultural input and machinery, lack of consultancy facilities as well as lack of credit facilities as the major problems during the rice crop production process. Moreover, in the context of rice crop protection related problems, costly pesticides and ineffective fungicide were identified by the farmers and also in terms of marketing related problems of rice crop, unsatisfactory price offered of the produce, poor transportation facility, storage issues as well as lack of knowledge about market prices were identified by the farmers.

Evans A. Atera et al. (2018) have examined that rice farming remains an important concern in Kenya due to its positive impact on increasing household food security, raising farmers income as well as reducing risks in the years of poor weather conditions. The study says that increasing rice production and productivity in Kenya requires a number of measures to be put in place such as providing improved rice varieties that are attractive to farmers as well as consumers. The possible factors that constrain the rice sub-sector trading including low production, high competition from cheap rice imports, changing consumer preferences as well as government policy restrictions.

Objectives of the Study

1. To examine the growth trend of area, production and yield of rice as well as variability of production and yield in Odisha for the period 2002-03 till 2017-18.
2. To analyze the problems of farmers regarding marketing of rice.

Methodology of the Study

The present study is based on secondary data only. The key sources of secondary data are Odisha Economic Survey of different years, Draft Agricultural Policy 2018-19 and Orissa Agricultural Statistics 2013-14. The study period covers from 2002-03 to 2017-18. Simple statistical tools such as compound annual growth using semi-log model, standard deviation and coefficient of variation have been used to show the growth and variability of rice production. Data on area, production, and yield of the crops were collected from Directorate of Economics and Statistics, Odisha.

The agricultural variability and instability can be measured by different methods, such as the coefficient of variation (CV), dispersion, Cuddy Della Valle Index (CDI), Coppock Instability index, etc. The present study applies the coefficient of variation and Cuddy Della Valle Index for measuring the instability. Cuddy Della Valle index first de-trends the given series and gives a clear direction about the instability. The use of coefficient of variation as a measure to show the instability in any time series data has some limitation. If the time series data exhibit any trend, the variation measured by CV can be overestimated, i.e. the region which has growing production are at constant rate will score high in instability of production if CV is applied for measuring instability. As against that, Cuddy Della Valle index attempts to de-trend the CV by using coefficient of determination. Thus it is a

better measure to capture instability in agricultural production. A low value of this index indicates the low instability in farm production and vice-versa. CDVI was originally developed by Cuddy and Valle (1978) for measuring the instability in time series

$$CDVI = CV \times \sqrt{1 - R^2}$$

CV= Coefficient of variation

R^2 = Adjusted coefficient of multiple determination

Analysis and Interpretation of Data

Area under Rice Cultivation in Odisha from 2002-03 to 2017-18

The Table-1 shows the total area under cultivation in Odisha and the area under rice cultivation. However, it is a dynamic concept as it changes over space and time.

Table-1: Area under Rice Production in Odisha from 2005-06 to 2017-18

(Area in 000 hectare)

Year	Gross Cropped Area	Cropping Area under Rice Cultivation	Annual percentage growth rate of cropping area under rice	Percentage of Rice Cultivated area to Gross Cropped Area
2002-03	5499	4273		77.71
2003-04	5891	4501	5.34	76.40
2004-05	5840	4492	-0.20	76.92
2005-06	6035	4479	-0.29	75.47
2006-07	5880	4451	-0.63	75.70
2007-08	5955	4452	0.22	74.76
2008-09	5874	4455	0.067	75.84
2009-10	5979	4363	-2.07	73.00
2010-11	5938	4226	-3.14	71.17
2011-12	5239	4006	-5.21	76.45
2012-13	5531	4023	0.42	72.74
2013-14	5413	4180	3.90	77.22
2014-15	5636	4166	-0.33	73.92
2015-16	5234.3	3942	-5.38	75.31
2016-17	6545	3962.8	0.52	60.55
2017-18	6180	3766.9	-4.94	60.95
CAGR	0.00016	-1.014		

Source: Odisha Economic Survey of different years and Odisha Agricultural Statistics 2013-14

From table-1, it is observed that the percentage of area under rice cultivation has declined from 77.71% in 2002-03 to 60.95% in 2017-18. The compound growth rate of area under cultivation of rice is -1.014% whereas CAGR total cropped area has been very less at 0.0017% but positive. One of the factors responsible for declining tendency of area under rice production may be due to erratic rainfall and increasing cost of cultivation due to rising labour

cost in rural areas. Marketing of paddy has also been the challenge for farmers resulting in distress selling, thereby making cultivation rice un-remunerative.

Trend and Growth of Rice Production and its Productivity in Odisha from 2002-03 to 2017-18

An analysis of growth rice production and its productivity has been done Table-2. The rice production in Odisha from 2002-03 to 2017-18 is given in table- 2.

Table-2: Rice production and Yield rate in Odisha from 2002-03 to 2017-18

Year	Rice Production (in Lakh MT)	Yield Rate(Quintal per Hectare)
2002-03	32.44	7.59
2003-04	67.34	14.96
2004-05	65.37	14.55
2005-06	68.59	15.34
2006-07	68.25	15.34
2007-08	75.41	16.94
2008-09	68.13	15.29
2009-10	69.17	15.85
2010-11	68.28	16.16
2011-12	58.07	14.50
2012-13	94.97	23.61
2013-14	76.13	18.21
2014-15	98.45	23.63
2015-16	58.75	14.91
2016-17	97.94	24.72
2017-18	65.51	17.39
CAGR	2.82	3.87
Average	70.8	16.81
Coefficient of Variation	3.98	23.01
R ²	0.217	0.407
Instability Index	3.40	17.10

Source: Odisha Economic Survey, Directorate of Agriculture & Food Production, Odisha, and Directorate of Economics and Statistics, Odisha

The compound annual growth rate of production of rice in the study period as shown in Table-2 is only 2.82 % whereas CAGR of total yield is 3.87% which implies productivity has increased at better rate than total production. The area under rice cultivation has declined, but the output per hectare has increased. The variability of yield is more than that of total production. This is mainly due to the concentration of rainfed area under rice in the region, which constrains the adoption of available technology, and a lack of dependable market support, which makes the cropping and associated technology used in the production process uneconomical. (Naik et al 2008) The reasons for low productivity of rice can be broadly grouped under four categories biophysical, technological, institutional and socio-economic constraints. Frequent occurrences of drought and flood, poor irrigation, low and imbalance input use and soil problems are the bio-physical constraints. Lack of flexible technology options for varied rainfall situations, delay in sowing/transplanting and continuance of the rice-rice cropping system are the technological constraints. Lack of research-extension linkage, inadequate credit facilities, non availability of quality seeds and fertilizers, small and fragmented landholdings, concentration of poverty and poor credit-market-technology linkage are some of the institutional and socio-economic factors for low production and productivity.

Issues and Challenges of Marketing

Agricultural markets for paddy serve as the key platforms for providing benchmarks and indicators of prices to the various stakeholders in the supply chain for various commodities being transacted. The quantity and quality of foodstuffs available to the population at large is governed primarily by the arrivals of the various commodities into these markets. The major challenges faced by the farmers

are poor warehousing and logistic infrastructure, inefficiency of existing procurement centre at Primary Agricultural Cooperative Society (PACs), less accessibility of the farmers to avail Minimum Support Price (MSP), lack of grading and standardization, inadequate transport facilities and slow moving transport vehicles are bottlenecks in achieving marketing efficiency. In the Draft Agricultural policy, 2019, the government is going to step up its initiatives to strengthen the agricultural marketing system to encourage farmers to produce and supply to the markets, thereby increasing their welfare.

Conclusion and Suggestions

The percentage of area under rice cultivation has declined from 77.71% in 2002-03 to 60.95% in 2017-18. The compound annual growth rate of area under cultivation of rice is negative at -1.014% whereas CAGR of total cropped area has been positive at 0.00016% less than that of area under rice cultivation. The compound annual growth rate of production of rice in the study period is only 2.8% whereas CAGR of total yield is 3.87% which implies productivity has increased at better rate than total production. The area under rice cultivation has declined, but the output per hectare has increased. The variability of yield measured in terms of coefficient of determination is more than that of total production. The Cuddy Della Valle Index (CDI) used to measure instability in total production and yield rate indicates there is more instability in the yield rate compared to total production. The major challenges faced by the rice producers is poor marketing system and failure to get a fair price for their product due to various bottlenecks such as poor warehousing and logistic infrastructure, inefficiency of existing procurement centre at PACs, less accessibility of the farmers to avail minimum support price and lack of grading and standardization, So, the government has

to bring reforms in the marketing system so as to encourage farmers for larger production of rice.

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