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Use of Quality Seeds and Rice Productivity in Odisha: An Analysis

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***Abstract*: Odisha is primarily an agrarian economy and agriculture plays a crucial role in ensuring food security and livelihoods, thereby triggering overall development of the Odisha's economy. Rice stands unique position in the sphere of agriculture in Odisha. For instance, rice is the principal crop in the state of Odisha, covering 60.55% of the total cultivated area. The objectives of this article are to know yield rate of rice from 2010-11 to 2016-17 in Odisha as well as to analyze the use of distribution of certified quality seeds (Paddy) in Odisha from 2010-11 to 2016-17 and also to study the impact of certified quality seeds on the yield of rice.**

Data are collected from secondary sources such as Agricultural Statistics of Odisha, 2013-14, Agricultural Status of Odisha, NIC and Odisha Economic Survey 2017-18. The percentage change in yield rate were negative at -10.27%, -22.87% and -36.90% in 2011-12, 2013-14 and 2015 -16 respectively. The percentage change in yield rate of rice is negative in spite of use of certified quality seeds (Paddy). Though the use of certified quality seeds (Paddy) was as high as 660200 quintals in the year 2015-16 but the percentage change in yield rate of rice was negative because of various bottlenecks like unfavorable climatic condition. The use of distribution of certified quality seeds (Paddy) is one of the independent variable which directly linked with the productivity of rice. The regression result shows distribution of certified quality seeds has a positive association with the productivity of rice. One quintal change in the distribution of certified quality seeds brings 0.00013 quintal change in the yield. The calculated coefficient is significant at 5%. So, the government has to bring in more attention towards increasing productivity of rice in Odisha by addressing the challenges and constraints of production and distribution of certified quality seeds.

***Keywords*: Productivity, Rice, Quality Seeds**

1. Introduction

Odisha is primarily an agrarian economy and agriculture plays a crucial role and ensuring food security and livelihoods, providing raw materials to the industry, thereby triggering overall development of the Odisha's economy. More than 62% of workforce depends on agriculture (Odisha Economic Survey, 2018-19). This sector is reinforced by a sectoral share of about 20 percent in total Gross State Domestic Product (GSDP) of the state (Odisha Economic Survey, 2017-18). Rice stands unique position in the sphere of agriculture in Odisha. For instance, rice is the principal crop in the state of Odisha, covering 60.55% of total cultivated area. Production of rice alone has increased during the year 2016-17 with 97.94 lakh MT from 68.28 lakh MT during 2010-11 registering an increase of about 43.44%. No doubts, the productivity of rice as a dependent variable on different independent variables like use of certified quality seeds, irrigation, climatic condition, farm mechanization, plant protection etc. As rice is the predominant crop and in order to augment its productivity, supply of quality seeds of suitable varieties specific to the agro-climatic situation is essential.

2. Review of Literature

Mamane M. Annou et al (2001) have examined that the crop rotation schemes, which maximizes farm returns in the Mississippi River Delta region with introduction of biotech rice. The authors find that the results show greater flexibility in planting decisions for rice producers through alternative rotation schemes. The study also points out that increased returns to rice producers under optimal crop rotation but these returns are dependent on the cost of biotech rice, relative price of rice and soybeans as well as the effectiveness of red rice control. The authors have suggested that results benefit producers as well as the industry by means of providing information on the potential effects of the new biotech rice on crop rotation decisions and farm income.

P.A. Lakshmi Prasanna et al. (2009) have studied that there is relationship between farm productivity and farm structure by highlighting the channel of transmission, i.e., input use pattern in the rice production. The paper tested hypothesized relationship i.e, land inequality influences access or use of resources in rice production and productivity. The negative effect of land inequity on productivity is aggravated by market imperfections. The paper shows that small holder's share in inputs such as fertilizers and irrigation has increased with the time, but large number of small holders still don't have access to these type of resources. The study points out that policies such as fertilizer subsidy, agricultural credit as well as minimum support prices (MSP) are able to partially address market imperfections. This paper suggests that productivity and profitability of rice production of small holders can be improved in particular and other farmers in general, by way of addressing of structural inequity with highlighting on technology.

A.H.M.M. Haque et al. (2012) have examined a farmer

participatory research which was carried on to ascertain the yield advantage of cleaned seeds over farmer-saved seeds in seven sites in Bangladesh in five seasons of cropping. The study finds significantly higher grain yield in the cleaned seed than the farmer-saved seeds of 10.1% in Boro season as well as 11.3% in transplant Aman season. This paper shows that using cleaned rice seeds raised grain yield, increased crop growth and also declined damage from weeds, insect pests as well as diseases.

Mohapatra Shruti et al. (2018) have studied efficiency in marketing of paddy crop in Nimapara block, Puri district of Odisha. The study highlights that average revenue as well as B:C ratio were found to be the highest for large farm followed by the marginal followed by small farmers. The gross ratio was the highest for small farms followed by large farms and marginal farms. In this paper, there was sub-optimal use of labour, machine, fertilizer and pesticide as MVP of individual input is greater than the individual unit price. This paper suggests that inclusion of high yielding potential paddy seeds, adequate capital provision, assurance of proper of medical aids, sufficient market news and market intelligence and timely crop insurance which can lead to enhance in marketing efficiency in paddy crop in Odisha.

S. K. Ghritlahre et al. (2018) have studied that rice productivity in Assam is significantly lower than the national average because of lack of availability of quality seeds of HYV. This paper finds that only one farmer producer company for paddy is in operation in the state. As per the study suggestion, farmer's producer company (FPS) need to be enhanced. The income of rice farmers in the state can be improved by the timely availability of quality rice seeds.

3. Objectives of the Study

The objectives of the study are

1. To know yield rate of rice in Odisha from 2010-11 to 2016-17.
2. To analyse the use of distribution of certified quality seeds (Paddy) in Odisha from 2010-11 to 2016-17.
3. To study the impact of certified quality seeds on the yield of rice.

4. Methodology of the Study

The present study is based on secondary data only. The key sources of secondary data are Odisha Economic Survey and Odisha Agriculture statistics 2013-14 and Agricultural Status of Odisha prepared by NIC. The period of study ranges from 2010-11 to 2016-17 to depict the yield rate and distribution of certified seeds corresponding to the same period. To study the impact of use of certified quality seeds on the yield of rice for the period 2002-2003 to 2016-17. Because of non-availability of data for the year 2009-10, the data for that year has been interpolated. The simple linear regression analysis has been carried out taking yield of rice as dependent variable and amount of certified quality seeds as independent variable. t-statistics, p-value are used to test the significance at 5% level of significance. R^2 is used to explain the total variance in the dependent variable caused by the single independent variable.

5. Analysis and Interpretation of Data

The analysis and interpretation of data is as follows:

A. Yield Rate of Rice in Odisha

Yield rate of rice is the primary indicator to assess its productivity. The yield rate of rice in Odisha is given in the table 1.

Table 1
Yield rate of Rice in Odisha from 2010-11 to 2016-17 (Quintal/Hectare)

Year	Yield rate of Rice	% of change in Yield rate of Rice
2010-11	16.16	-
2011-12	14.50	-10.27
2012-13	23.61	62.82
2013-14	18.21	-22.87
2014-15	23.63	29.76
2015-16	14.91	-36.90
2016-17	24.72	65.79

Source: (1) Odisha Economic Survey, 2014-15
(2) Odisha Economic Survey, 2017-18

From the table 1, it is observed that yield rate of rice in Odisha increased to 24.72 quintal per hectare during 2016-17 from 16.16 quintal per hectare in the year 2010-11. The yield rate of rice were negative during 2011-12, 2013-14 and 2015-16 during the study period.

The yield rate of rice in Odisha from 2010-11 to 2016-17 is also expressed in figure 1.

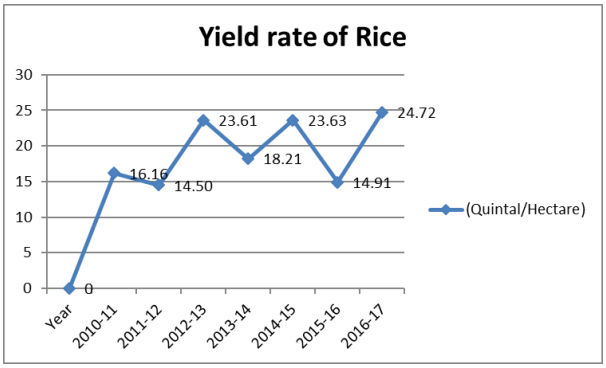

Fig. 1. Yield rate of Rice in Odisha from 2010-11 to 2016-17

The figure-1 shows the yield rate of rice in Odisha from 2010-11 to 2016-17. It is found that yield rate of rice were negative during the years like 2011-12, 2013-14 and 2015-16. It has shown a zig-zag course, showing alternate period of rise and fall.

B. Use of Distribution of Certified Quality seeds (Paddy) in Odisha from 2010-11 to 2016-17

The use of distribution of certified quality seeds (Paddy) in Odisha from 2010-11 to 2016-17 is given in table 2.

The table 2 indicates that the use of distribution of certified quality seeds (Paddy) in Odisha from 2010-11 to 2016-17. The use of distribution of quality seeds (Paddy) in Odisha increased

to 531696 quintals during 2016-17 from 523298 quintals in the year 2010-11 registering growth of about 1.60%.

Table 2
Use of Distribution of Certified Quality Seeds (Paddy) from 2010-11 to 2016-17 in Odisha (Figures in Quintals)

Year	Paddy
2010-11	523298
2011-12	521375
2012-13	535129
2013-14	556938
2014-15	657267
2015-16	660200
2016-17	531696

Source: Odisha Economic Survey, 2017-18

The table 2 may also be shown in figure 2.

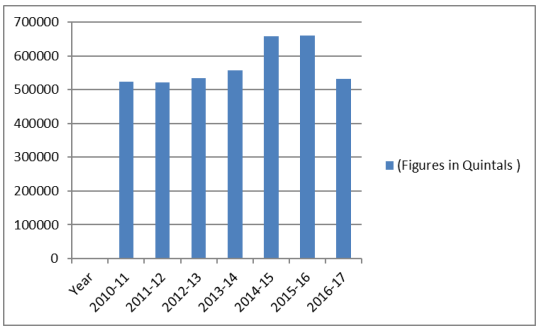

Fig. 2. Use of Distribution of Certified Quality Seeds in Odisha from 2010-11 till 2016-17

The figure shows that the highest use of distribution of certified quality seeds in Odisha is 660200 quintals in the year 2015-16 during the study period.

6. Regression Result

Y= a + bX where Y is the yield of rice of different years from 2002 -03 till 2016-17 and X is amount of certified quality seeds distributed among the farmers in Odisha during the same period. The obtained regression line is Y= 11.69 +0.000013X t-value = 2.68* p-value= 0.0189 and R^2=0.36 It is revealed from the regression equation that the supply of certified quality seeds has a positive impact on yield rate of rice which is significant at 5 per cent. The independent variable explains only 36% variation in the dependent variable because there is other unexplained variable such as level of irrigation, use of fertilizers, use of technology, use of pesticides etc.

7. Findings of the Study

From the above analysis, it is found that the percentage change in yield rate of rice in Odisha were negative during the periods i.e. 2011-12, 2013-14 and 2015-16. The percentage change in yield rate of rice was negative in spite of use of certified quality seeds (Paddy). Though the use of certified quality seeds (Paddy) was high as 660200 quintals in the year 2015-16 during the study period, but the percentage change in yield rate of rice was negative. The prices charged for procuring certified quality seeds is too high to afford and also insufficiency of supply of seeds in relation to demand.

8. Conclusion

The productivity of rice in Odisha is indicated in the form of yield rate. The use of distribution of certified quality seeds (Paddy) is one of the important factors which has an impact on the productivity of rice. In spite of the use of certified quality seeds (Paddy) in cultivation, its percentage change in yield rate is negative in some years because of different challenges. There is supply and demand gap in both Kharif and Rabi seeds. Farmers face constraints in getting seeds because of no availability of seeds in the nearby village and non-opening of seeds sales centre. So, government may bring more attention towards increasing productivity of rice in Odisha by addressing the challenges with the present successful facilitation schemes like distribution of certified quality seeds by bringing adequate technical support staff to supervise production and distribution of seeds.

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