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HYBRID SEEDS:A GLANCE AT PRODUCTION, PRODUCTIVITY AND ADOPTION IN ODISHA

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ABSTRACT

In the context of agriculture scenario of Odisha, Hy. Seeds of different crops have occupied an important position indicating future prospective of the state. Instead of Odisha Paddy is the principle crop of Odisha which is grown in Kharif and to some extent in Rabi season. Maximising agriculture production or doubling the farmer's income are directly or indirectly related to adoption of hybrid varieties of different crops and particularly rice which is principle crop of state.

The present statistics indicates as much as 34.11 lack hect. of land in Odisha are covered under hybrid varieties of paddy. In the context of changing agriculture scenario both in irrigated and non-irrigated tract of the state there is need to analyse hybrid rice in relation to production , productivity and profitability. Keeping these considerations of view a study was conducted in Odisha.

KEYWORDS: *Hy. Seeds, hybrid rice, irrigated, agriculture, productivity, Hybrid Paddy*

INTRODUCTION

In the context of agriculture scenario of Odisha, Hy. Seeds of different crops have occupied an important position indicating future prospective of the state. Instead of Odisha Paddy is the principle crop of Odisha which is grown in Kharif and to some extent in Rabi season. Maximising agriculture production or doubling the farmer's income are directly or indirectly related to adoption of hybrid varieties of different crops and particularly rice which is principle crop of state.

The present statistics indicates as much as 34.11 lack hect. of land in Odisha are covered under hybrid varieties of paddy. In the context of changing agriculture scenario both in irrigated and non irrigated tract of the state there is need to analyse hybrid rice in relation to production , productivity and profitability. Keeping these considerations of view a study was conducted in Odisha under following objectives.

1) To analyze area under Hybrid Paddy over last ten years in the state to determine rate of increase in area.
2) To find out the trend of production, productivity of Hybrid Paddy over last ten years in Odisha.
3) To find out reaction of the Hy. Paddy seed producer in the state with regard to production and distribution of Hy. Seed.
4) To enlist the constraints experiences of Hy. Paddy Seed producer.

Rice is a unique creation of crop plant domestication; it is unique in having cultivars of maturity duration varying from less than 80 days to more than 180 days and showing adaptability to a wide range of land situation and water regimes including conditions of water stagnation where no other crop could possibly be grown.

Rice production in Odisha can reach 82 lakh tonne mark by 2017-18, a 17% rise from the current level of about 70 lakh tonne through increased usage of high yielding varieties of rice, improving soil drainage, spreading rice-fish culture and taking other such measures, according to a study by the apexindustry body, the Associated Chambers of Commerce and Industry of India (Assocham).

In Odisha rice is synonymous with food; agriculture in Odisha to considerable extent means growing rice. Age-old social customs and festivals in Odisha have strong relevance to different phases of rice cultivation: Akhyatrutiya in May-June marks the seeding of rice, Rajasankranti in mid June marks the completion of sowing, Garbhanasankranti in October symbolizes reproductive phase of rice while Nuakhaee and Laxmipuja coincide with harvesting of upland and lowland rice respectively. Makarsankranti in mid January is celebrated as Chaita Parab by the tribal people as by this time rice is threshed and brought to the granary.

REVIEW OF LITERATURE

A comprehensive and systematic review of the past relevant literature is a prerequisite for carrying out any research in a scientific manner. It is necessary to examine available research and development done elsewhere as regards the area of study. It gives a better insight of the issue, its scope and importance. It enables the researcher to prepare a strong study from different angles. It adds value to the study and analysis of empirical data.

Aldas Janaiah[a] (2002) In spite of huge capital and human resources invested over the past decade to develop and supply hybrid rice technology for Indian farmers, there has not been a noticeable impact on the sector. India has tried to emulate China's success story in the area of hybrid rice research and development, but Indian farmers have not readily accepted hybrid rice technology. This paper provides insights on why this has been so, based on the evalution results of a study on farmer's experiences with hybrid rice adoption in India.

M.P. Pandey[a] , S.B. Verulkar[b], A.K. Sarawgi[c] (2010) The major emphasis in rice research over past few decades has been given on the development of technology for irrigated ecosystem, which has resulted in higher productivity. Most of the regions with extensive poverty in Asia, as also true for Chhattisgarh state in the country are dominated by rainfed ecologies where rice is the principal source of staple food, employment, and income for the rural population. Success has been limited in increasing productivity in rainfed rice systems. Rice yields in these ecosystems—home to 80 million farmers who farm a total of 60 million ha—remain low at 1.0 to 2.5 tonnes/ha, and tend to be variable due to erratic monsoons. Similar is the condition for submergence, problem soils, and other abiotic stresses.

David J. Spielman[a], Deepthi E. Kolady[b], Patrick S. Ward[c] (2013) The government of India has set a target of expanding the cultivation of hybrid rice to 25 % of the area occupied by the crop by 2015. Current growth trends suggest that this target will not be met, despite the potential contribution of hybrid rice to lagging growth in national rice yields, overall rice production, land-use reallocation and food security. This unfolding experience suggests a different trajectory from that of China, where hybrid rice accounts for more than half of the area under the crop and has contributed significantly to yield and output growth, reallocation of land to other agriculture and non-agricultural uses and food security. This paper examines the technical challenges, market opportunities, and policy constraints relating to hybrid rice in India.

Aldas Janaiah[a], Fangming Xie[b] (2013) A macro-level assessment of hybrid rice R&D program showed that the adoption rate of hybrid rice, which was less than 1% during the first decade after the release of the first hybrid in 1994, increased substantially to 3.2% by 2008, and contributed about 5.6% of the total rice output in the country. As rice is a key source of livelihood in eastern India, where poverty and malnutrition persist widely, a considerable increase in yield through hybrid rice will have a major impact on household food security, income, and nutrition, besides an economy-wide impact in the region.

Manjunatha B L[a] D.U.M. Rao[b] M.B. Dastagiri[c] (2013) The establishment of National Seeds Corporation (NSC) in 1963 marked the begining of formal seed sector in India and the Indian seed industry has come a long way since then. The seed industry was dominated by the public sector during the first 25 years, ie till 1988. The growth drivers in this period were the ushering of green revolution and special government schemes to increase SRR through programmes like National Seed Project. The liberalisation of seed policy in the form of New Policy on Seed Development (NPSD) 1988 opened the doors for private domestic and multinational seed companies for import of seeds and technologies as well as investment in research and development. The laws and policies thereafter have encouraged private participation, benefitted private seed companies and provided better market access to foreign seed companies. The fact that from 1984 to 1995, around 50-60% of the seed requirement was met by the private sector and in 2010 it was estimated that 80% of turnover in seed business came from private companies establishes the dominance of private seed companies at present. The seed production has quadrupled from 1991 to 2011. The growth was more spectacular in the last decade (2001 to 2011) when seed production tripled with a robust Compound Growth Rate (CAGR) of 15% pa.

S.K. Singh[a], P.K. Bhati[b] , Amita Sharma[c], Vikas Sahu[d] (2015) Rice is a staple food for over half of the world's population and has the second largest cereal production after maize. Rice yield has experienced many fold jumps since the 1950s. This happened primarily as the result of genetic improvement and increasing harvest index by reducing plant height using the semi-dwarf genes and utilization of heterosis by producing hybrids. Hybrid rice technology is one of the strongest tools to break the yield barrier. To make hybrid rice technology practically feasible it needs strong system of hybrid seed production at commercial rate. Unlike maize, rice is a self-pollinated crop and needs special techniques, like utilization of male sterility system for hybrid seed production. The first hybrid rice variety for commercial cultivation was released by China in 1976. Seeing the China's success many countries started the hybrid rice breeding programme. India also started this programme in 1989. In about two decades of efforts India released 65 hybrid rice varieties till 2013. Though, China is cultivating about 50% of its rice area under hybrid rice varieties, India is still struggling to enhance its acreage under hybrid rice from 4% to more. Because of complicated seed production system, higher seed cost and less preferred qualities of hybrid varieties it could not cover more area under cultivation in India

Deepak K Mishra[a] (2015) This paper examines the production and exchange relations in rice production systems in rain-fed agriculture. The two objectives were i) to capture the essential features of 'traditional' rain-fed agriculture persisting into the 21st century, ii) to examine the rice sector as a system – involving distribution as well as production. Two districts: Koraput and Nuapara (part of undivided Kalahandi) were chosen for the field-survey. A complete census of two purposively chosen villages, one from each of the selected districts, was undertaken to understand the production relations of dry-land agriculture.

RESEARCH METHODOLOGY

The study was based on primary as well secondary sources. The secondary sources information related to area and production were collected. The sources are mainly agriculture year book/report of state Govt.

To obtain primary data 50 seed producer were selected from district **Puri & Bargarh** who had experienced of producing seeds of hybrid paddy for not less than 05 years and are in commercial domain. The selected respondents are

interviewed personally by the scholar through a structured interview schedule developed on the basis of objective. The secured information was put under appropriate statistical treatments to revel the result.

RESULT

01- Area under Hybrid Paddy:-

The hybrid seeds are mostly grown under assured irrigation facilities for which area remain adjacent to cannel and lift irrigation point. The area under hybrid seed production reported to be as follows.

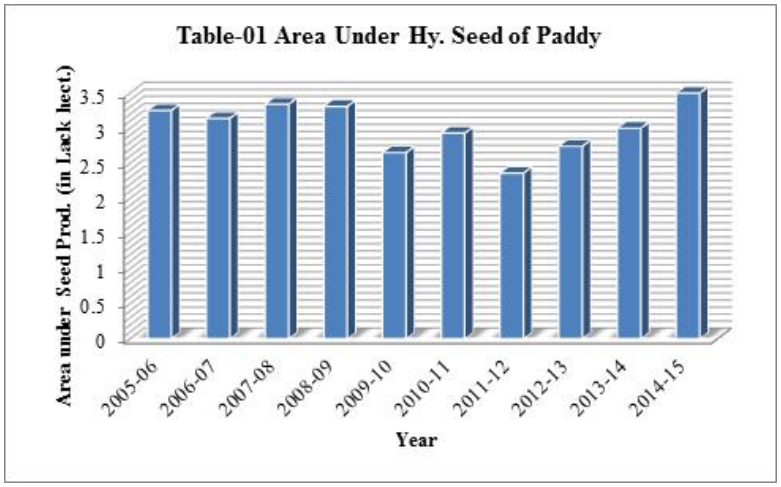


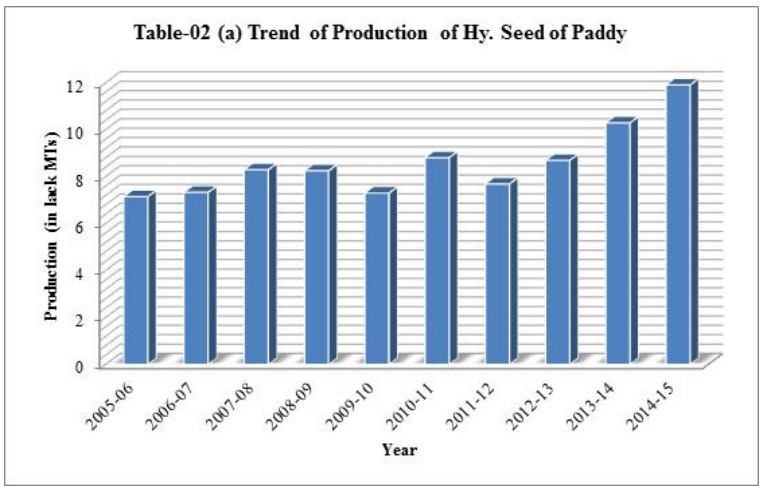
Table-01 Area Under Hy. Seed of Paddy			
Sl. No.	**Year**	**Area Under Seed Production (in lack hect.)**	**(%) of +/- over Proceeding Year**
1	2005-06	3.25	0.00
2	2006-07	3.14	-3.38
3	2007-08	3.34	6.36
4	2008-09	3.31	-0.89
5	2009-10	2.65	-19.93
6	2010-11	2.93	10.56
7	2011-12	2.36	-19.45
8	2012-13	2.74	16.1
9	2013-14	3.00	9.48
10	2014-15	3.50	16.66
Source-Status of Agriculture in Odisha 2014-15			

Analysis of table revels area under Hy. Paddy for 10 years starting from 2005-06 to 2014-15, there has been decrease in area under Hy. Paddy in the year 2006-07, 2008-09, 2009-10, 2011-12, where as in all other years there has been increase in area under Hy. Paddy. The decrease due to unfavourable climate condition which lead to conclude that expansion of area under Hy. Paddy is subjected to climatic condition.

The input intensive Hy. Paddy cultivation is considered from both suitability and profitability point of view taking all the trend of 10 years. It is revel that there has been increase in area in the limited scale over the years because of fluctuations in climatic conditions. However during 2013-14, 2014-15, there is an increase of area under Hy. Paddy which does not appear to be significance.

02-Trend of Production and Productivity of Hy. Paddy:-

Further analysis was made to determine production and productivity of Hy. Paddy in the state over 10 years ranging from 2005-06 to 2014-15.



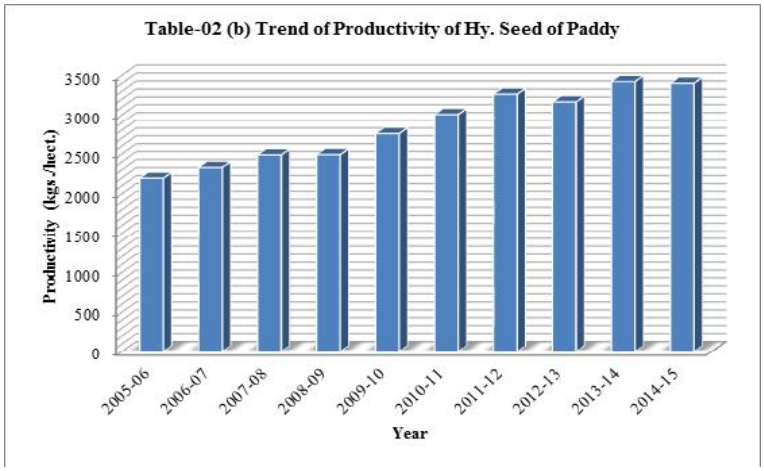


Table-02 Trend of Production & Productivity of Hy. Seed of Paddy					
Sl. No.	Year	Production (in lack MTs)	(%) of +/- over Proceeding Year	Productivity (kgs./hect.)	(%) of +/- over Proceeding Year
1	2005-06	7.14	0.00	2193	0.00
2	2006-07	7.32	2.52	2328	6.15
3	2007-08	8.29	13.25	2484	6.70
4	2008-09	8.24	-0.60	2488	0.16
5	2009-10	7.29	-11.52	2754	10.69
6	2010-11	8.80	20.71	3004	9.07
7	2011-12	7.68	-12.72	3262	8.58
8	2012-13	8.68	13.02	3165	-2.97
9	2013-14	10.28	18.43	3422	8.12
10	2014-15	11.90	15.75	3400	-0.64
Source-Status of Agriculture in Odisha 2014-15					

In case of production there is decline in the year 2008-09, 2009-10 and 2011-12. But the increase in production found to be highest in 2010-11followed by 2013-14 and 2014-15. Taking increase and decrease in production over 10 years and found to be significantly highest.

In case of productivity there has been constant increase except for the year 2012-13, 2014-15. In other words the reflection of technologically has yielded significance yield in the farmer's field. It is therefore inferred that in spite of climatic hazard the productivity level of hy. paddy is satisfactory.

Reaction of Hybrid Seed Producer:-

As per the objective of study efforts were made to collect reaction of the hy. seed producer on different aspect.

03-Registered Seed Producer:-

The information obtained from the sample revel the following result with regard to their registration status of the growers.

Table-03 Registration Status of Hy. Seed Producer (N=50)			
Sl.No.	**Agencies**	**Frequency (f)**	**Percentage (%)**
1	Govt.	08	16.00
2	Private	22	44.00
3	Non Registered	20	40.00
	Total	50	100.00

A look at the table revels that out of total sample 16% have registered under Govt. Agencies 44% under private agencies while 40% have not registered in any of the agencies but produce Hy. Paddy seed.

04-Producing of Different Paddy Seeds:-

Normally we have Paddy seeds named as local, Improved, and Hybrid (High Yielding). In finding out frequency of producer of local seeds, improved seeds and Hybrid seeds the following results obtained.

Table-04 Producing of Different Paddy Varieties (N=50)			
Sl.No.	**Paddy Seeds**	**Frequency (f)**	**Percentage (%)**
1	Local	08	16
2	Improved	12	24
3	Hybrid	50	100

The result indicates that besides hybrid seeds as much as 24% of them producing improved seeds of paddy and 16% local seeds. It is shown because there are also good markets among the farmers to use improved seeds of paddy and local seed. It is informed that in comparison to hybrid seed local and improved seeds of paddy are much more demand in the area under study.

05-Decision of Producing Specific Paddy Varieties:-

The sample farmers were asked to mention as how do they decide to grow different varieties of paddy seeds which yielded the following information.

Table-05 Reasons of Growing Different Paddy Varieties (N=50)			
Sl.No	**Reasons**	**Frequency (f)**	**Percentage (%)**
1	As per indent of Seed agencies	40	80.00
2	As per indent of state seed cooperation	30	6000
3	As per demand of local farmers	18	36.00

As seen in table the demand of seed agencies and state seed corporation remains high to produce required varieties of paddy seeds. However, the demand of local farmers is also contributing to the quantum of paddy seed production.

06-Opinion bout Seed Production Business:

The farmers producing seeds for sale should have business attitude. The seed producers are comparatively better up in the rural community. In finding out the opinion of the sample about seed business in their locality the following responses were obtained.

Table-06 Opinion about Profitability of Seed Production (N=50)			
Sl.No	**Opinion**	**Frequency (f)**	**Percentage (%)**
1	Very Profitable	21	42.00
2	Profitable	06	12.00
3	Manageable	20	40.00
4	Not Profitable	03	06.00
	Total	50	100.00

The results reveal that samples are in opinion that seed production for business is profitable over normal arming. There are about 6% of the samples who had negative opinion may be due to some specific position. It is the observation of the authors that there remains high demand for quality seeds in the area under study because of irrigation facilities.

07-Approximate Profit per hectare:

Further probing as made to know the profit in production of Hybrid seeds of paddy per hectare which yielded the following results.

Table-07 Approximate Profit per hectare in Seed Production (N=50)			
Sl.No	**Profit range**	**Frequency (f)**	**Percentage (%)**
1	Op to 50,000.00	42	84.00
2	50,000 – 100.000	05	10.00
3	100,000-1,50,000	03	6.00
4	1,50,000-2,00,000	00	0.00
	Total	50	100.00

Hybrid seed production per hectare of land is mostly within Rs 50,000 and to some extent Rs, one lakh. The inference is that profit in seed production business is quite visible.

08-Increase in production and productivity of Hybrid seed:

The aim of the state Government and farmers is to increase the production as well as productivity of seeds. In the area under study more emphasis is given to increase seed production of cereals so that he state could become self sufficient in seed production. The opinion of the sample in this regard is recorded as follows.

Table-08 Increase in Seed Production (N=50)			
Sl.No	Seed Production	Frequency (f)	Percentage (%)
1	Increasing	23	46.00
2	Decreasing	18	36.00
3	Constant	09	18.00
	Total	50	100.00

The sample are in opinion that seed production in the area is increasing in terms of area while rate of decrease is also quite high (36%). The figure is being seasonal as it depends on variety of factors like variety, climate and demand of the seed agencies.

09-Problem in Certification of Seeds:-

As per law of seed production, Certification is must to sell seeds in the market. Earlier the seed certification officer were not available in time for which farmer's had complained. At present these problems have not observed because seeds are produced as per indent and lifted by concerned agencies.

10-Compensation in Case of Loss in Seed Production:-

Seed production is not free from climatic hazard and manmade problems. The seed producer bears loss if seeds do not meet the parameters of quality seeds. The parameters of quality seeds are feeling of grain, weight and germination of grains besides add mixture. In case failure or loss how farmers compensate to it was examine as given in table below.

Table-10 Compensation in Loss of Seed Production (N=50)			
Sl.No.	Compensation	Frequency (f)	Percentage (%)
1	Compensation as per market value	28	56.00
2	Partial Compensation	22	44.00
3	No compensation	00	0.00
	Total	50	100.00

A look the table revels that farmers are compensated by seed agencies as per loss and non suffer on this account.

11-Problems Lifting of Seeds

Farmers after certification desire to dispose the seeds for the reason problem in storage, space availability and insect attack. During study it was observed seeds are lifted after certification by the indenting agent for whom not much problems are observed.

CONCLUSION

The Study entitled "***Hybrid Seeds: - A Glance at Production, Productivity and Adoption in Odisha***" conducted in Odisha with a sample of 50 selected Hy. Paddy seed growers from Puri and Bargarh district lead to arrive at the following conclusions.

1. The area under Hy. Paddy for 10 years starting from 2005-06 to 2014-15, there has been decrease in area under Hy. Paddy in 04 year, where as in all other 06 years there has been increase in area. The decrease due to unfavourable climate condition which lead to conclude that expansion of area under Hy. Paddy is subjected to climatic condition. There is an increase of area under Hy. Paddy which does not appear to be significance.
2. The production and productivity of Hy. Paddy in the state over 10 years ranging from 2005-06 to 2014-15. Taking increase and decrease in production over 10 years and found to be significantly highest. In other words the reflection of technologically has yielded significance yield in the farmer's field. It is therefore inferred that in spite of climatic hazard the productivity level of Hy. Paddy is satisfactory.
3. A look at the table revels that out of total sample 16% have registered under Govt. Agencies 44% under private agencies while 40% have not registered in any of the agencies but produce Hy. Paddy seed.
4. The result indicates that besides hybrid seeds as much as 24% of them producing improved seeds of paddy and 16% local seeds. It is shown because there are also good markets among the farmers to use improved seeds of paddy and local seed. It is informed that in comparison to hybrid seed local and improved seeds of paddy are much more demand in the area under study.
5. The demand of seed agencies and state seed corporation remains high to produce required varieties of paddy seeds. However, the demand of local farmers is also contributing to the quantum of paddy seed production.
6. The samples are in opinion that seed production for business is profitable over normal arming. There are about 6% of the samples who had negative opinion may be due to some specific position. It is the observation of the authors that there remains high demand for quality seeds in the area under study because of irrigation facilities.
7. Hybrid seed production per hectare of land is mostly within Rs 50,000 and to some extent Rs One lakh. The inference is that profit in seed production business is quite visible.
8. The sample are in opinion that seed production in the area is increasing in terms of area while rate of decrease is also quite high (36%). The figure is being seasonal as it depends on variety of factors like variety, climate and demand of the seed agencies.

9. At present these problems have not observed because seeds are produced as per indent and lifted by concerned agencies. If there is any loss the farmers are compensated by seed agencies as per loss and non suffer on this account. The produced seeds are lifted after certification by the indenting agent for whom not much problems are observed.

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