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## A study on replacement rate of paddy (*Oryza sativa*) seed in Chandauli district of Uttar Pradesh

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### Abstract

Paddy is one of the most important staple food crop grown and consumed by the population of Chandauli district of Uttar Pradesh. In general, farmers of the district growing paddy under the irrigated condition and farmers were getting lower crop yield due to the non-adoption of improved agronomic practices for paddy production including less seed replacement. The seed replacement of crop can enhance the crop production by 10-20 per cent without any change of other inputs of crop production. Present study was an attempt to find out the seed replacement rate in Chandauli districts of Uttar Pradesh. The standard rate of seed required for paddy is 40-45 kg per hectare depending on the crop variety and location. For the estimation of total paddy demand in Chandauli district, we considered two paddy seed rate i.e. 40 kg (standard seed rate) and 60 kg (as farmers' point of view) per hectare. Total seed requirement for the paddy under the both seed rate was estimated to be 17352 and 26028 quintal under both seed rate respectively during 2016-17. The gap between standard seed rate (40 kg per hectare) and farmers' point of view (60 quintal per hectare) was estimated to be 7623 and 16299 quintal respectively during 2016-17.

**Keywords:** Paddy, food crop, cultivation, market services, replacement rate

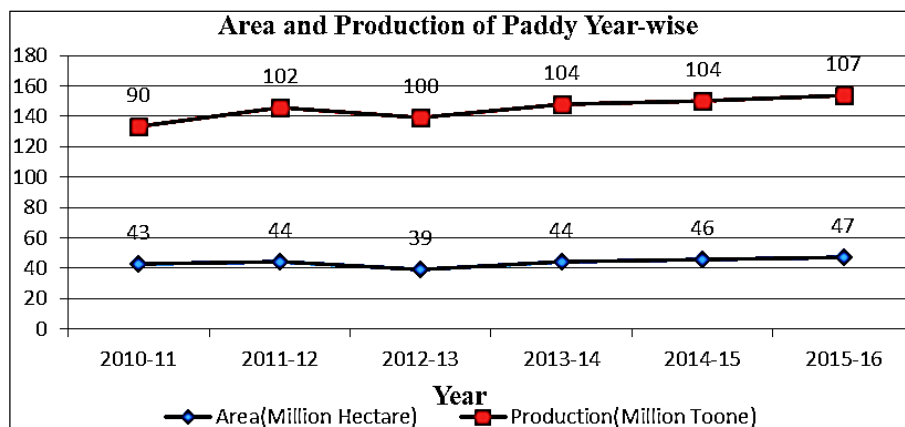
### Introduction

Rice (*Oryza sativa* L.) is one of the most important staple food crop for more than half of the world population, especially for south-eastern Asia, where 90 per cent of the world population of rice is grown and consumed. In India, it is cultivated on an area of 44.47 million hectares with a total production 104.32 million tonnes. Ideally seed should be replaced every year for hybrid and every three to four year for non-hybrids. However, in practice seed is replaced less often especially, in case of open pollinated crops. As a consequence, seed replacement rates are lower than recommended for different crop varieties. As adequate information is not available on replacement schedule followed by a farmer, How to compute actual replacement rate one simple method to take the ratio of quality seed of a particular crop produced during the year to the total seed needed during the year. Seed replacement rate for different crop during different year for country as whole. In case of Uttar Pradesh, highest seed replacement rate was found for moong with 96.5 per cent and lowest for pigeon pea (26 per cent) during 2014. In case of paddy, the seed replacement rate was 22 per cent in 2008 and it was increased to the level of 38 per cent by the year 2014. In case of wheat, the seed replacement rate was 19 per cent in 2009 and it was increased to 45 per cent by the year 2014.

**Source:** Seednet.gov.in

### Area and production of paddy in India

The area and production of rice in India is over a period of time is presented in Figure 5.1. It is clear from the Figure 5.1 that the rice production in the country was increasing over a period of time. The rice production in the country was 70.2 million tonnes in 2002-03 and it was increased to the level of 104.65 million tonnes by the year 2013-14. The growth trend analysis suggests that production of the rice in the country was growing with a compound growth rate of 3.32 per annum during 2002-03 and 2016-17. Total area under rice cultivation in the country was 41 million hectare during 2002-03 and it was increased to the level of 80.2 million hectare by the year 2013-14. The area under the rice production was showing up and down fall.



Source: Govt. of India, Ministry of Agriculture and Farmers Welfare (Indiastat.com)

Fig 1: Area and Production of Paddy Year-wise

### Research Methodology

Data has been collected both from farmers and market functionaries; multistage sampling was used. The Uttar Pradesh State was purposively selected for the present study. The Uttar Pradesh has 75 districts. Among these districts, in eastern UP, Chandauli district being highest rice producers was selected purposively for present study. There are 9 development blocks in Chandauli district namely Barhani, Chahaniya, Chakiya, Chandauli, Dhanapur, Naugarh, Niyamatabad, Sakaldiha, Shahabganj and among the nine development block, Chakiya was selected purposely, because Chakiya development block was having highest production of rice as compared to other development block of the district. A list of all rice growing village was prepared and five villages out of hundred villages were selected purposely. These five villages were Amara, Baliya Kalan, Bhagupur, Dahiya, Jogiya, Kalan.

The present study was based on primary data and secondary data. Primary data were collected from the farmers using pre-tested schedule. The secondary data was collected from the District Agricultural Office, Chandauli. The secondary data was related to year wise area under rice in Chandauli district and year-wise different types of rice seed sold to the farmers in the district.

### Analytical tools

#### Paddy seed replacement rate

The seed replacement rate (SRR) for paddy crop was worked out using following formula as given by (Sangeeta & Sidhu 2009)<sup>[17]</sup> for certified seeds using Equation;

$$\text{Formula SRR} = \frac{C \times 100}{A \times K}$$

Where,

- SRR = Seed replacement rate for the paddy crop,
- C = Certified seeds used by the farmers,
- A = Area under the paddy crop,
- K = Seed rate per unit of area.

### Results and Discussion

The primary data was collected from the selected area from the farmers on size of land holding, area under paddy cultivation, types of paddy seed used by the farmers etc. Based on the land holding of the sample farmers was categorized into three groups viz., marginal farmer (less than 0.5 hectare), small farmer (0.5 to 1.0 hectare) and medium farmer (1.0 to 2.0 hectare).

Total area allocated by the marginal farmers under paddy cultivation in the study area was 25.94 hectares and total paddy seed used for the planting paddy was 1640 kg. Out of this, highest share comes from the certified seed followed by own seed and lowest from the HYV seed. In case of small farmers, total area allocated by the sample farmers for paddy cultivation in the study area was 13.13 hectare and total seed was used by the sample farmers was 372 kg. The highest quantity of seed used by the farmer was certified seed followed by own seed and lowest for HYV. In case of medium farmers, total area allocated by these farmers under paddy was 5.25 hectares and most of the farmers were using certified seed.

Table 1: Types of seed used by sample farmers

Sl. No.	Land holding size of the farmers (Ha)	Total sample farmer	Total area under paddy crop (ha)	Total seed used by farmer (kg)			Total seed (Kg)
				Certified seed	Own seed	HYV seed	
1	Marginal farmer (Less than 0.5)	70	25.94	1301	279	60	1640
2	Small farmer (0.5-1.0 hectare)	25	13.125	282	80	10	372
3	Medium farmers (1-2 hectare)	4	5.25	438	10	30	478
	Total	100	44.32	2021	369	100	2490

Source: Field survey, 2016

### Seed replacement rate

The seed replacement rate by sample farmers in the study area is presented in Table 2. Overall seed replacement rate in the study area was estimated to be 76.00 per cent. The seed replacement rate for paddy crop in the study area by marginal

farmers was estimated to be 48.924 per cent. In case of small farmers, the seed replacement rate was found to be 10.604 per cent, whereas in case of medium farmers, it was 16.471 per cent.

**Table 2:** Seed replacement rate in Chandauli

Sl. No.	Land holding size of the farmers (Ha)	Area (Ha)	Seed replacement rate (%)
1	Marginal farmer (Less than 0.5)	25.94	48.924
2	Small farmer (0.5-1.0 hectare)	13.125	10.604
3	Medium farmers (1-2 hectare)	5.25	16.471
	Total	44.32	76.00

### Conclusion

A list of all rice growing village was prepared and five villages out of hundred villages were selected purposely. The criterion for selection of village was that the village having highest area under paddy cultivation. These five villages were Fattepur, Kharawan, Eshipur, Dev chandrapur, Namapur. A list of rice growers from each selected village was prepared separately and rice growers were categorized into four groups based on their land holding.

These groups are:

1. Marginal size group having less than 0-1 hectare.
2. Small size group having 1-2 hectare.
3. Medium size group having 2-3 hectare.

From the each village 20 samples were selected proportionately using sample random sampling. Total 100 rice growers were selected for primary data collection. Overall seed replacement rate in the study area was estimated to be 76.00 per cent. In case of marginal farmer, the paddy seed replacement rate was estimated to be 48.92 per cent. In case of small farmers, the seed replacement rate was found to be 10.604 per cent, whereas in case of medium farmers, it was 16.471 per cent.

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