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# SEED REPLACEMENT RATIO IN DIFFERENT SELECTED CROPS OF NFSM TRIBAL BENEFICIARIES' FARMERS IN NORTHERN HILLS OF CHHATTISGARH INDIA

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**ABSTRACT**

The present study was undertaken in four districts of Northern hills Agro-climatic zone of Chhattisgarh, India to know the seed replacement ratio of different selected crops. The seed replacement ratio of National Food Security Mission (NFSM) beneficiary respondents is comparatively higher than the non-beneficiary respondents in all selected crops of the study area. It means that NFSM has positive and significant impact on beneficiary farmers with regards to use of improved quality seeds from various interventions introduced during the programme. Nearly half of respondents obtained sometimes timely availability of inputs may be because most of the study area is hilly and remote area where transportation or other facilities are not so good therefore all inputs are not available at the proper time. In order to know the seed replacement ratio of respondents, five major crops (rice, maize, wheat, arhar, urd) has been identified based on maximum seed replacement in selected crops in the study area.

***Key words :*** Seed Replacement Ratio, National Food Security Mission**,** Production.

## Introduction

In India food insecurity is major reason which is still keep with the growing population. Over dependence of rural people on agriculture and allied sectors, decreasing growth rate of agricultural production due to the poor management of different available natural resources and inadequate implementation of developmental programms. Among these obstacle, food security is the most essential problem that is hampers the overall development of the people and nation as well. Seeds are the vehicle for delivering benefits of technology and influencing the growth, income and sustainability of Indian agriculture. It is immensely required that the farmers must use pure, healthy seeds as per the minimum certification standards which have standard germination percentage. Therefore, farmers prefer to depend on farm saved seeds, seed replacement rate continues to remain in the range of 2-10 per cent in certain states for certain crops, which is much below the desired level of 20 per cent for most crops. The seed replacement ratio gives an idea about the quantity of the quality seeds used by the farmers which is positively affect the productivity of crops. Seed Replacement Rate is the percentage of area sown out of total area of crop planted in the season by using certified/ quality seeds other than the farm saved seed. This is essential for maintaining genetic purity and quality seed production.

## Materials and Methods

Chhattisgarh state has 27 districts *i.e.*, Bijapur, Sukma, Dantewada,, Bastar, Kondagaon, Narayanpur, Kanker, Kawardha, Rajnandgaon, Balod, Durg, Bemetara, Dhamtari, Gariyaband, Raipur, Baloda Bazar, Mahasamund, Bilaspur, Mungeli, Korba, Janjgir-Champa, Jashpur, Raigarh, Koriya, Surajpur, Surguja, Balrampur. Out of these, the study was conducted in Surguja, Surajpur, Jashpur and Balrampur district of Northern hills Agro-climatic zone of Chhattisgarh, India state during the year 2014-2015. Out of total blocks of these selected districts, 08 blocks were selected for the study. Total 288 (beneficiaries 192 and non-beneficiaries 96) farmers were

selected randomly from 16 selected villages with purpose to collect the data. The data were collected personally with help of interview schedule developed for the collection of data. Collected data were analyzed with the help of suitable statistical methods. The seed replacement rate gives an idea about the quantity of the quality seeds used by the farmers.

Seed Replacement Rate (SRR) = X / Y x 100

Where,

X = Net replaced area with the using improved quality seeds

Y = Total cropped area

## Results and discussion

Average seed replacement ratio of selected crops among respondents from the year 2013 to 2016 is elicited and presented in Table 1 and Fig. 1.

On perusal of the data in Table 1 revealed that average seed replacement ratio of selected crops among respondents from the year 2013 to 2016. Majority of NFSM beneficiaries respondents (87.22%) were replaces maize seeds, followed by 71.72 per cent rice seeds, 61.64 per cent arhar seeds, 57.22 per cent wheat seeds and 50.61 per cent respondents replaces their urd crop seeds. Whereas, most (53.20%) of the Non-beneficiaries respondents replaces rice seeds followed by 47.31 per cent urd seeds, 44.45 per cent arhar seeds, 37.41 per cent maize seeds and 28.45 per cent respondents replaces wheat seeds respectively.

Further, close observation of data regarding the seed replacement ratio of selected crops from the year 2013 to 2016. In case of rice crop maximum (73.38%) of NFSM beneficiaries respondents replaced seeds in year 2015 which is followed by 72.91 per cent SRR in 2016, 70.89 per cent SRR in 2014 and 69.72 per cent in 2013 respectively. Regarding Non-beneficiaries maximum (57.36%) of respondents replaced seed in year 2016 followed by 52.97 per cent SRR in 2013, 52.68 per cent SRR in 2015 and 49.80 per cent SRR in year 2014 respectively.

Regarding Maize crop, maximum (89.89%) of seed replaced in year 2016 by the NFSM beneficiaries respondents which is followed by 89.77 per cent SRR in 2014, 88.76 per cent SRR in 2015 and 80.45 per cent SRR in the year 2013 respectively. While, in case of Non-beneficiaries respondents maximum (42.11%) per cent of respondents replaced seed in year 2016 followed by 37.07 per cent SRR in 2014, 35.96 per cent SRR in 2015 and 34.48 per cent SRR in year 2013 respectively.

Further findings about arhar crop, maximum (68.09%) of seed replaced in year 2015 by the NFSM beneficiaries respondents which is followed by 64.54 per cent SRR in year 2016, 59.40 per cent SRR in year 2013 and 54.55 per cent SRR in the year 2014 respectively. While, in case of Non-beneficiaries respondents maximum (50.00%) per cent of respondents replaced seed in year 2016 followed by 43.90 per cent SRR in 2014 & 2015, 40.00 per cent SRR in 2013 respectively.

Results observed from wheat crop, revealed that maximum (64.29%) of seed replaced in year 2016 by the NFSM beneficiaries respondents which is followed by 58.62 per cent SSR in year 2015, 52.99 per cent SRR in year 2014 and 2013 respectively. While, in case of Non-beneficiaries maximum (31.03%) per cent of respondents replaced seed in year 2015 & 2016 which is followed by the 27.59 per cent SRR in 2014 and only 24.14 per cent in year 2013 respectively.

Regarding urd crop, maximum (57.63%) of seed replaced in year 2016 by the NFSM beneficiaries respondents which is followed by 56.67 per cent SSR in year 2013, 54.24 per cent SSR in year 2014 and 33.90 per cent SSR in year 2015 respectively. Whereas, in case of Non-beneficiaries maximum (53.85%) per cent of respondents replaced seed in year 2016 followed by 46.15 per cent SRR in 2014 & 2015, 43.08 per cent SRR in year 2013 respectively.

Thus, from the above discussion it can be concluded that the seed replacement ratio of beneficiary farmers is comparatively higher than the non-beneficiary farmers in all selected crops of the study area. It means that NFSM has positive and significant impact on beneficiary farmers with regards to use of improved quality seeds from various interventions introduced during the programme.

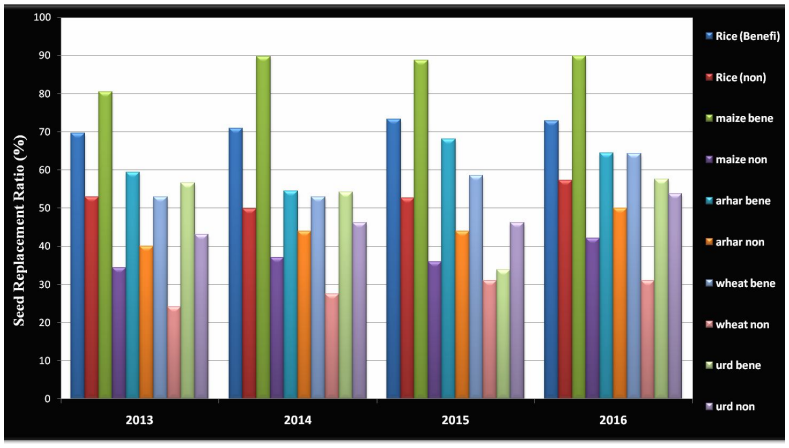


**Fig. 1:** Distribution of the respondents according to their Seed Replacement Ratio in selected crops.

**Seed replacement ratio of the overall respondents in selected crops**

It is evident from Table 4.32 and Fig. 4.5 revealed that average seed replacement ratio among overall respondents in selected crops during year 2013 to 2016. Majority (67.63%) of overall respondents were replaces maize seeds, followed by 65.37 per cent rice seed, 57.76 per cent arhar seed, 49.61 per cent urd seed and 47.59 per cent seed replacement in wheat crop respectively.

Further, observation of data regarding the seed replacement ratio from overall respondents of selected crops from the year 2013 to 2016 is presented in Table 2. In case of rice crop most of respondents replaced their seeds (67.58%) in year 2016 followed by 66.26 per cent SRR in 2016, 64.02 per cent SRR in 2013 and 63.63 per cent SRR in 2014 respectively.

Regarding Maize crop, maximum (71.23%) of seed replaced in year 2016 by the respondents which is followed

**Table 1:** Distribution of the respondents according to their Seed Replacement Ratio in selected crops.

| Year | Beneficiaries (n=192) | | | | Non-beneficiaries (n=96) | | | |
|---|---|---|---|---|---|---|---|---|
| | Respondents | Area (ha.) | | SRR (%) | Respondents | Area (ha.) | | SRR (%) |
| **Rice** | | TA | RA | | | TA | RA | |
| 2013 | 110 | 428.5 | 298.75 | 69.72 | 69 | 220.9 | 117 | 52.97 |
| 2014 | 118 | 428.5 | 303.75 | 70.89 | 65 | 224.9 | 112 | 49.80 |
| 2015 | 135 | 431 | 316.25 | 73.38 | 71 | 225.9 | 119 | 52.68 |
| 2016 | 125 | 431 | 314.25 | 72.91 | 71 | 224.9 | 129 | 57.36 |
| Average | 122.00 (63.54) | 429.75 | 308.25 | **71.72** | 69.00 (71.88) | 224.15 | 119.25 | **53.20** |
| **Maize** | | | | | | | | |
| 2013 | 56 | 44.5 | 35.8 | 80.45 | 35 | 29 | 10 | 34.48 |
| 2014 | 50 | 44 | 39.5 | 89.77 | 35 | 29 | 10.75 | 37.07 |
| 2015 | 57 | 44.5 | 39.5 | 88.76 | 35 | 28.5 | 10.25 | 35.96 |
| 2016 | 57 | 44.5 | 40 | 89.89 | 35 | 28.5 | 12 | 42.11 |
| Average | 55.00 (28.65) | 44.38 | 38.70 | **87.22** | 35.00 (36.46) | 28.75 | 10.75 | **37.41** |
| **Arhar** | | | | | | | | |
| 2013 | 39 | 33.25 | 19.75 | 59.40 | 14 | 10 | 4 | 40.00 |
| 2014 | 39 | 35.75 | 19.5 | 54.55 | 15 | 10.25 | 4.5 | 43.90 |
| 2015 | 39 | 35.25 | 24 | 68.09 | 16 | 10.25 | 4.5 | 43.90 |
| 2016 | 39 | 35.25 | 22.75 | 64.54 | 15 | 10 | 5 | 50.00 |
| Average | 39.00 (20.31) | 34.88 | 21.50 | **61.64** | 15.00 (15.63) | 10.13 | 4.50 | **44.45** |
| **Wheat** | | | | | | | | |
| 2013 | 22 | 29.25 | 15.5 | 52.99 | 8 | 14.5 | 3.5 | 24.14 |
| 2014 | 24 | 29.25 | 15.5 | 52.99 | 8 | 14.5 | 4 | 27.59 |
| 2015 | 27 | 29 | 17 | 58.62 | 10 | 14.5 | 4.5 | 31.03 |
| 2016 | 27 | 28 | 18 | 64.29 | 10 | 14.5 | 4.5 | 31.03 |
| Average | 25.00 (13.02) | 28.88 | 16.50 | **57.22** | 9.00 (9.38) | 14.50 | 4.13 | **28.45** |
| **Urd** | | | | | | | | |
| 2013 | 21 | 15 | 8.5 | 56.67 | 10 | 6.5 | 2.8 | 43.08 |
| 2014 | 21 | 14.75 | 8 | 54.24 | 7 | 6.5 | 3 | 46.15 |
| 2015 | 18 | 14.75 | 5 | 33.90 | 8 | 6.5 | 3 | 46.15 |
| 2016 | 20 | 14.75 | 8.5 | 57.63 | 11 | 6.5 | 3.5 | 53.85 |
| Average | 20.00 (10.42) | 14.81 | 7.50 | **50.61** | 9.00 (9.38) | 6.50 | 3.08 | **47.31** |

Figures in the parentheses are percentages, TA -Total area, RA- Replaced area

**Table 2:** Seed replacement ratio among the respondents in selected crops.

**n=288**

| Year | No. of Respondents | Area (ha.) | | Respondents (%) |
|---|---|---|---|---|
| **Rice** | | **TA** | **RA** | |
| 2013 | 181 | 649.4 | 415.75 | 64.02 |
| 2014 | 183 | 653.4 | 415.75 | 63.63 |
| 2015 | 204 | 656.9 | 435.25 | 66.26 |
| 2016 | 196 | 655.9 | 443.25 | 67.58 |
| **Average** | 191.00 (66.31) | 653.90 | 427.50 | **65.37** |
| **Maize** | | | | |
| 2013 | 92 | 73.5 | 45.8 | 62.31 |
| 2014 | 85 | 73 | 50.25 | 68.84 |
| 2015 | 92 | 73 | 49.75 | 68.15 |
| 2016 | 91 | 73 | 52 | 71.23 |
| **Average** | 90.00 (31.25) | 73.13 | 49.45 | **67.63** |
| **Arhar** | | | | |
| 2013 | 52 | 43.25 | 23.75 | 54.91 |
| 2014 | 55 | 46 | 24 | 52.17 |
| 2015 | 55 | 45.5 | 28.5 | 62.64 |
| 2016 | 54 | 45.25 | 27.75 | 61.33 |
| **Average** | 54.00 (18.75) | 45.00 | 26.00 | **57.76** |
| **Wheat** | | | | |
| 2013 | 30 | 43.75 | 19 | 43.43 |
| 2014 | 32 | 43.75 | 19.5 | 44.57 |
| 2015 | 37 | 43.5 | 21.5 | 49.43 |
| 2016 | 37 | 42.5 | 22.5 | 52.94 |
| **Average** | 34.00 (11.80) | 43.38 | 20.63 | **47.59** |
| **Urd** | | | | |
| 2013 | 31 | 21.5 | 11.3 | 52.56 |
| 2014 | 28 | 21.25 | 11 | 51.76 |
| 2015 | 26 | 21.25 | 8 | 37.65 |
| 2016 | 31 | 21.25 | 12 | 56.47 |
| **Average** | 29.00 (10.06) | 21.31 | 10.58 | **49.61** |

TA -Total area, RA- Replaced area, Figures in the parentheses are percentages.

by 68.84 per cent SRR in 2014, 68.15 per cent SRR in 2015 and 62.31 per cent SRR in the year 2013 respectively. About arhar crop**,** maximum (62.64%) of seed replaced in year 2015 by the respondents which is followed by 61.33 per cent SRR in year 2016, 54.91 per cent SRR in year 2013 and 52.17 per cent SRR in the year 2014

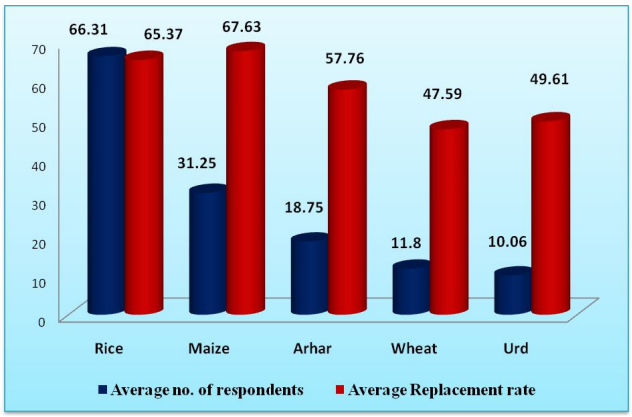


**Fig. 2:** Seed Replacement Ratio among the respondents.

respectively. Data observed from wheat crop, revealed that maximum (52.94%) of seed replaced in year 2016 by the respondents which is followed by 49.43 per cent SSR in year 2015, 44.57 per cent SRR in year 2014 and 43.43 per cent SRR in year 2013 respectively. Regarding urd crop, maximum (56.47%) of seed replaced in year 2016 by the respondents which is followed by 52.56 per cent SSR in year 2013, 51.76 per cent SSR in year 2014 and 37.65 per cent SSR in year 2015 respectively.

## Conclusion

In the light of above results it should be concluded that maximum seed replacement is observed in maize crop which is followed by rice, arhar, urd and wheat respectively. It is very obvious from the results that most of the respondents were replaces their seeds with improved quality of seeds which reflect the productivity of seeds. It is observed that in study area most of the respondents are very much interested in replacing their crop seeds but different constraints like, improved seeds are expensive, seeds are unavailable at proper time and lack of information regarding improved variety of seed etc. are hurdle to adopt the seed replacement of crops. As is widely known, seed replacement rate has a strong positive correlation with the productivity and production of crops. There is a need to rejuvenate the seeds sector through renovating the public sector seed companies, including the State Seed Corporations.

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