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Estimation of Seed Feed Wastage Ratio of Major Food Grain Crops in the State Odisha

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SUMMARY

The apparent use of total food grains produced in any country is for the purpose of human consumption, animal feed and seed requirements. Despite all possible preventive efforts, large quantities are also wasted from the time the grain is harvested till it reaches the consumer. The purpose of this paper is to discuss the outcome of a pilot study for estimation of seed, feed and wastage ratio of major food grains for the state of Odisha of India. The data collection work in Odisha state was conducted in the Agricultural Year, 2014-15. In this study our aim was to reevaluate the current seed, feed and wastage ratio of major food grain crops based on improved sampling design and reduced sample sizes proposed under this pilot project. Through this study it was found that the seed, feed and wastage ratio of major food grain crops was reduced to around 7 % from the present 12.5 % in India.

Keywords: Seed feed and wastage ratio, Crop estimation surveys, Two stage sampling, Major food grain crops.

1. INTRODUCTION

The food grains produced in any country are utilized mainly for the purpose of human consumption, animal feed and seed requirements. Also, some quantities are wasted starting from the time of harvesting to storage, transit/transportation etc. before it reaches the consumer. Thus in order to arrive at the net availability of food grains for human consumption, it is necessary that reliable estimates are available on seed, feed and wastage ratio based on scientifically planned studies. The seed, feed and wastage ratios were worked out on the basis of Farm Management Surveys, till early 1980s, During the eighties, an Expert Committee was constituted comprising of members from the Directorate of Economics and Statistics, National Sample Survey Office, Central Statistics Office, Indian Agricultural Statistics Research Institute and Ministry of Food and Civil Supplies, which worked out the seed, feed and wastage ratios as 12.5% of the total production with breakup. Seed 5%, Feed 5% and Wastage 2.5%. This ratio is still being used in estimating the quantities of food grains not available for human consumption. According to Bansil, (2012) seed, feed and wastage ratios to the production of food grains as 12.5%, seems to be on the higher side. Further though seed and wastage ratios have some relation to the total production, the requirement of feed, has to depend upon livestock population, their mix and per capita feed requirement. Despite the importance of the subject as discussed above, it is unfortunate that no comprehensive field study has been conducted to come up with empirical norms applicable for the country. In view of this a project entitled "Pilot study for estimation of seed, feed and wastage ratios of major food grains" has been undertaken at ICAR-Indian Agricultural Statistics Research Institute New Delhi-12. This study will also pave way for developing a suitable sampling methodology for estimation of seed, feed and wastage ratios of major food grains by taking large scale sample surveys for the purpose in future.

2. COVERAGE OF THE SURVEY AND SAMPLING DESIGN

The aim of the project is to provide reliable estimates by collecting primary data on production,

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seed, feed and wastage of major food grains in five states of the country. The survey work of the project has been carried out in the state of Odisha. The state has been selected on the basis of maximum food grain production during the agricultural years 2009-10, 2010-11 and 2011-12. The survey work was conducted in four districts of Odisha State in the Agricultural Year 2014-15 namely, Ganjam, Puri, Baragarh and Kalahandi. The nodal agency responsible for data collection is Directorate of Economics & Statistics, Bhubaneswar, Odisha.

The sampling design adopted for data collection is that of stratified two stage random sampling with district as stratum, village as first stage sampling unit (fsu) and the farmer growing food grain crops and having livestock as second stage unit (ssu). For each of the selected district, a sample of 20 villages was fixed and allocated to different tehsils/blocks in the district in proportion to number of villages. Sample villages from tehsil/block were selected by simple random sampling without replacement (SRSWOR). If any selected village was found to be in-habited, it was substituted with another village falling in the same tehsil/block with prior intimation to IASRI. Farmers of each of the selected villages were divided into three operational holding size groups, namely Small (up to 2 ha), Medium (2-4 ha) and Large (more than 4 ha) on the basis of operational holding sizes as supplied by district/village officials. Further, the farmers in the each group were also classified into two sub-groups. A total of 50 farmers were enumerated in each sample village for selecting a sample of 15 farmers.

Small (up to 2 ha)	Medium (2-4 ha)	Large (more than 4 ha)
Enumeration of 20 farmers	Enumeration of 15 farmers	Enumeration of 15 farmers
10 farmers having up to 2 livestock	8 farmers having up to 2 livestock	8 farmers having up to 2 livestock
10 farmers having more than 2 livestock	07 farmers having more than 2 livestock	07 farmers having more than 2 livestock

2.1 Sample Size at various Levels

District: 20 villages × 15 farmers = 300 farmers

State: 4 districts × 20 villages × 15 farmers = 1200 farmers

2.2 Details of schedules and data collection in this study

For the purpose of data collection, List-1, List-2, Schedule-1 and Schedule-2 have been designed as per the objectives of the project.

List-1: list of 20 selected villages in each district of the State has been prepared and sent to the nodal officer/in-charge in each of the state.

Schedule-1: Schedule-I is meant for recording the information of farmers growing food grain crops and having livestock in each holding size group. On the basis of operational holdings, the farmers of the selected villages have been divided into three operational holding size groups, namely **Small (up to 2 ha), Medium (2-4 ha) and Large (more than 4 ha)**. The information was collected with the help of village head-man as well patwari/taluka official who maintains the land records.

List-2: Out of the listing of the farmers in schedule 1, the random selection of 3 farmers having up to 2 livestock and 2 farmers having more than 2 livestock from each holding size group was made for detailed enquiry.

Schedule-2: Schedule-II is meant for recording the information from each of the selected farmer growing food grain crops and having livestock in each holding size group. In schedule-II, detailed enquiry regarding the food grain crops grown and area under crop (irrigated and un-irrigated), production and utilization of crop produce for seed, livestock feed, home consumption etc. has been collected by enquiry. The data on wastage at different harvesting and post-harvest stages at farmer's level have also been collected by enquiry. The information on consumption of the food grain crop grown, losses/ wastage incurred during the intervening period, has been collected from each farmer after an interval of 2 months in each of the season. Information on total quantity of food grains produced and out of this, the quantity utilized for seed, feed and wastage incurred at harvesting and post-harvest stages at farmer's level and as such, the quantity of food grains available for human consumption has been estimated.

The data collection work was carried out by the Field Investigators/Supervisors under the supervision of Nodal Officer in the State. Prior to conduct of survey,

intensive training was imparted by the Scientists/ Field Officer from IASRI to the Field Investigators/ Supervisors including the Officials of the State Government at the Head Quarter of the State. In the training programme, method of data collection, listing and random selection of farmers growing food grain crops and having livestock and filling of the information in the two schedules etc. were discussed and clarified. Copies of Instruction Manual were distributed to each of the Field Investigators/Supervisors along with the Officials of the State Government. Scientists and the Field Officer from ICAR-IASRI have made regular field visits for supervision/inspection of data collection work in the State and clarified the queries raised by Field Investigators/supervisors.

3. RESULTS OF THE STUDY

In this section, district-wise estimates of yield, seed, feed and wastage and the estimates of seed, feed and wastage ratios to the production with their percentage standard errors for major food grain crops grown in the four selected districts, namely Puri, Ganjam, Kalahandi and Bargarh districts during Kharif 2014-15, Rabi 2014-15 and Zaid 2014-15 are presented.

The major food grain crops of paddy, green gram and ragi were grown in four selected districts of Odisha State during Kharif 2014-15. District-wise estimates of seed, feed and wastage ratios together with their corresponding percentage standard errors are given in Table 4.1.

Table 4.1. District-wise estimates of seed, feed and wastage ratios to the production of major food grain crops grown during Kharif 2014-15 in Odisha

District	Crop Name	Crop Area of Sample Farmers (ha)	Estimates (kg/ha)			
			Seed	Feed	Wastage	Total
Bargarh	Paddy	152.060	4.427 (6.67)	0.623 (20.89)*	2.947 (17.38)*	7.997
	Green gram	30.360	5.613 (5.72)	1.063 (38.36)*	5.020 (12.23)*	11.696
Ganjam	Ragi	12.530	1.253 (9.22)	1.049 (55.68)*	2.496 (11.65)*	4.798

*Note: *The figures within parentheses indicate the percentage standard error of the corresponding estimate Based on few observations with higher variation among them due to small sample sizes.*

During the Rabi season 2014-15, Paddy was the only crop grown in all four selected districts of Odisha State. The estimates of seed, feed and wastage ratios along with their percentage standard error of paddy crop are presented in Table 4.2.

Table 4.2. District-wise estimates of seed, feed and wastage ratios to the production of major food grain crops grown during Rabi 2014-15 in Odisha

District	Crop Name	Crop Area of Sample Farmers (ha)	Estimates (kg/ha)			
			Seed	Feed	Wastage	Total
Puri	Paddy	627.00	2.504 (7.61)	0.740 (18.86)*	2.050 (13.02)*	5.294
Ganjam	Paddy	805.30	3.040 (5.58)	0.158 (16.61)*	1.097 (22.48)*	4.295
Kalahandi	Paddy	525.86	3.074 (5.11)	0.002 (57.61)*	1.296 (15.08)*	4.372
Bargarh	Paddy	608.84	3.218 (11.73)*	0.610 (15.00)*	1.537 (12.03)*	5.365

*Note: *The figures within parentheses indicate the percentage standard error of the corresponding estimate Based on few observations with higher variation among them due to small sample sizes.*

During the Zaid 2014-15, green gram and paddy was only found in all the 4 districts of Odisha. The estimates of seed, feed and wastage ratios along with their percentage standard error of paddy crop are presented in Table 4.3.

4. SUMMARY AND CONCLUSION

The pooled estimates of seed, feed and wastage ratios for all major food grain crops grown during Kharif 2014-15, were to the tune of 4.570% with 5.20 percentage standard error, 0.721% with 18.00 percentage standard error and 3.341% with 12.43 percentage standard error respectively with a total of 8.632% during Kharif 2014-15 in Odisha. It indicates that 91.368% of the food grains grown in Kharif season would be available for human consumption in the State. Paddy was the only crop grown in the selected districts of Odisha state during the Rabi 2014-15. The estimates of seed, feed and wastage ratios to the production of paddy were of the order of 3.014% with 4.15 percentage standard error, 0.328% with 10.03 percentage standard error and 1.391% with 8.71 percentage standard error respectively with a total of 4.733%. It shows that 95.267% of the production of

Table 4.3. District-wise estimates of seed, feed and wastage ratios to the production of major food grain crops grown during Zaid 2014-15 in Odisha

District	Crop Name	Crop Area of Sample Farmers (ha)	Estimates (kg/ha)			
			Seed	Feed	Wastage	Total
Puri	Green Gram	283.54	2.504 (7.61)	0.740 (18.86)*	2.050 (13.02)*	5.294
	Paddy	178.53	1.808 (8.06)	0.604 (21.96)*	3.487 (16.67)*	5.899
Kalahandi	Green Gram	161.47	3.074 (5.11)	0.002 (57.61)*	1.296 (15.08)*	4.372
Bargarh	Green Gram	30.13	3.218 (11.73)*	0.610 (15.00)*	1.537 (12.03)*	5.365
	Paddy	256.05	1.928 (14.30)*	0.951 (100.56)*	0.899 (23.46)*	3.778
Ganjam	Green Gram	209.90	3.040 (5.58)	0.158 (16.61)*	1.097 (22.48)*	4.295

*Note: *The figures within parentheses indicate the percentage standard error of the corresponding estimate Based on few observations with higher variation among them due to small sample sizes.*

paddy crop would be available for human consumption in the State. The pooled estimates of seed, feed and wastage ratios accounting all the major food grain crops grown during Zaid 2014-15 in Odisha were to the tune of 3.726% with 4.74 percentage standard error, 1.249% with 41.22 percentage standard error and 2.584% with 8.82 percentage standard error respectively with a total of 7.559%. It indicates that 92.441% of the food grains grown in Zaid would be available for human consumption in the State. Pooled estimates of percentage of ratios of seed, feed and wastage to the production for all food grains grown during Agricultural Year 2014-15 were to the tune of 3.895, 0.611 and 2.086 respectively with a total of 6.59% in Odisha.

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