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**Roshni Verma**

Research Scholar, Department of  
Agricultural Economics, Indira  
Gandhi Krishi Vishwavidyalaya,  
Raipur, Chhattisgarh, India

**Praveen Kumar Verma**

Assistant Professor, Department  
of Agricultural Economics, Dau  
Kalyan Singh Krishi  
Mahavidyalaya, Bhatapara,  
Chhattisgarh, India

## Availability and utilization of paddy straw at Balodabazar-Bhatapara district of Chhattisgarh

**Roshni Verma and Praveen Kumar Verma**

**Abstract**

Present study was conducted to analyze the availability of paddy straw and its uses at Balodabazar-Bhatapara district of Chhattisgarh state of India. India produces around 600 million tons of agricultural residues annually with wide regional variability. India generates 97.19 MT rice straw during the crop season 2016-17. In present investigation 160 sample farmers were selected and categorized them according to size of farm holdings into marginal (less than 1 ha.), small (1.0-2.0 ha.), medium (2.0-4.0 ha.) and large (more than 4 ha.). On an average the grain to straw ratio in study area was 1:1.27. Utilization of paddy straw depends on harvesting method and average total production of straw was 57.52 qt./ha. Manually harvest straw used for cattle feeding was 7.16 qt./ha. (12.45 percent) of total straw production. Mechanically harvested straw used for mulching 3.56 qt./ha (6.19 percent), left to decompose or incorporation in soil 46.40 qt./ha. was maximum of total production, burning of straw 0.18 qt./ha. (0.32 percent) and other purposes 0.20 qt./ha. (0.35 percent). total quantity utilized for feeding, mulching and other purposes was on an average 10.93 qt./ha. (19.00 percent) and remaining quantity was marketable surplus 46.59 qt./ha. (80.99 percent). Constraints faced in paddy straw collection were lack of market demand, used mostly for cattle feeding, high labour cost, lack of marketing facilities, lack of time and resource.

**Keywords:** Paddy straw, straw production, grain: straw ratio, harvesting method, cattle feeding

**Introduction**

The paddy straw was a remaining by-product of rice production at harvest. The total biomass of the by-product depends on lots of factors such as crop variety, soils, nutrient management and weather. At the time of harvesting, rice straw was piled or spread in the field which depends on the harvesting methods, like- stationary threshers or self-propelled combine harvesters. The quantity of rice straw taken off the field depends mainly on the cutting height of crop (i.e., height of the stubble left in the field). Crop biomass (Paddy straw) that remains in the field after harvest can be collected, burned, or left to decompose (soil incorporation).

India produces around 600 million tons of agricultural residues annually. In India total area under paddy production is 3.83 million hectare and Chhattisgarh accounts 8.87 percent to India's total rice production. Availability of paddy straw is mainly depends on harvesting method Straw which is manually harvested used for cattle feeding and straw harvested by combined harvester was used for mulching, soil incorporation or rest in the field for decomposition and burned.

**Materials and Methods**

Balodabazar-Bhatapara district was selected purposively out of 27 districts of Chhattisgarh. Balodabazar-Bhatapara district consists six blocks namely Balodabazar, Bhatapara, Bilaigarh, Kasdol, Simga and Palari Out of these Palari block will be selected purposely for the study purpose. Six villages (about 5% of total villages) were selected for study purpose out of 132 villages in Palari block. 160 farmers were selected for study purpose which is 2 percent of their total population.

**Analytical tool**

Marketable Surplus of produce may be expressed as -

$$MS = P - (C + Cf + S)$$

Where,

MS = Marketable Surplus, P = Production, C = Livestock consumption, Cf = Quantity used for cattle feed, S = Quantity kept for other purpose

**Corresponding Author:****Roshni Verma**

Research Scholar, Department of  
Agricultural Economics, Indira  
Gandhi Krishi Vishwavidyalaya,  
Raipur, Chhattisgarh, India

Henry Garrett's ranking method- Present position  

$$=100 \frac{R_{ij}-0.5}{N_j}$$

Where,  
 Rij = Rank given for the Ith variable by Jth respondents  
 Nj = Number of variables ranked by Jth respondents.

**Result and Discussion**

Table-1 indicates: harvesting method of paddy. Manually harvesting was maximum for marginal farmers and minimum for large farmers and in case of machine harvesting was maximum for large farmers and minimum for marginal farmers. Data was taken in quintal per hectare.

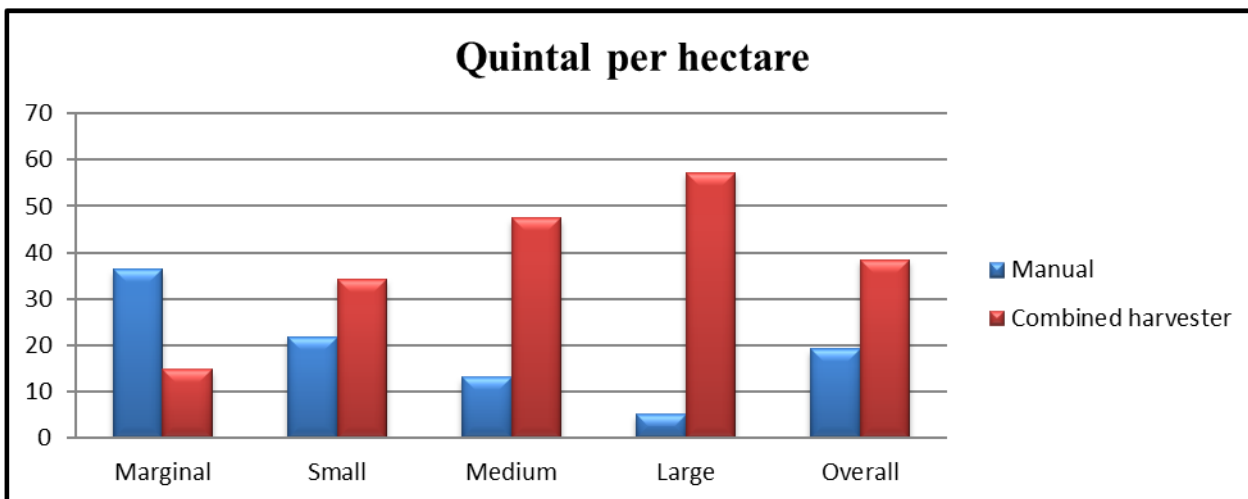
**Table 1:** Harvesting method of paddy of sampled households (qt./ha.)

S. No.	Harvesting method	Marginal	Small	Medium	Large	Overall
1	Manual	36.41	21.82	13.10	5.12	19.11
2	Combined harvester	14.69	34.26	47.36	57.28	38.40
	Total	51.11	56.09	60.46	62.41	57.52

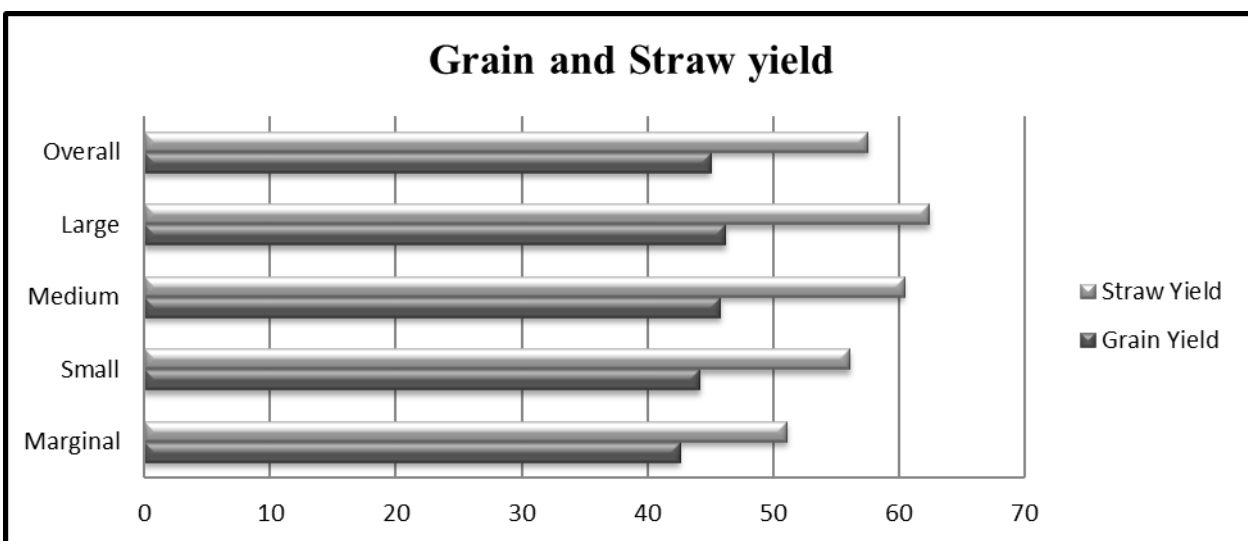
Table 2 indicates grain to straw ratio of paddy for farmers marginal, small, medium, large and overall.

**Table 2:** Grain and straw yield per hectare (qt./ha.)

S. No.	Produce	Marginal	Small	Medium	Large	Overall
1	Grain Yield	42.59	44.1691	45.81	46.23	45.07
2	Straw Yield	51.11	56.09476	60.46	62.41	57.52
	Straw : grain ratio	1.2	1.27	1.32	1.35	1.27



**Fig 1:** Harvesting method of paddy



**Fig 2:** Grain and straw yield

**Utilization of paddy straw**

Table 3 indicates: the utilization of paddy straw for cattle

feeding, mulching, incorporation in soil, burning and other purposes.

**Table 3:** Utilization of Paddy straw of sampled households (qt./ha.)

S. No.	Utilization	Marginal	Small	Medium	Large	Overall
1	Cattle feeding	16.04 (31.39)	8.03 (14.33)	3.79 (6.27)	0.76 (1.23)	7.16 (12.45)
2	Mulching	5.46 (10.68)	4.16 (7.42)	3.33 (5.51)	1.28 (2.05)	3.56 (6.19)
3	Left to decompose/ Incorporation in soil	29.23 (57.20)	43.63 (77.78)	52.43 (86.70)	60.31 (96.63)	46.40 (80.66)
4	Burning of straw	0.00 (0.00)	0.00 (0.00)	0.75 (1.25)	0.00 (0.00)	0.18 (0.32)
5	Other purposes	0.36 (0.71)	0.25 (0.46)	0.15 (0.25)	0.05 (0.08)	0.20 (0.35)
	Total	51.11 (100)	56.09 (100)	60.46 (100)	62.41 (100)	57.52 (100)

Note: Figures in parentheses indicate percentages of the total straw yield.

**Marketable surplus of paddy straw**

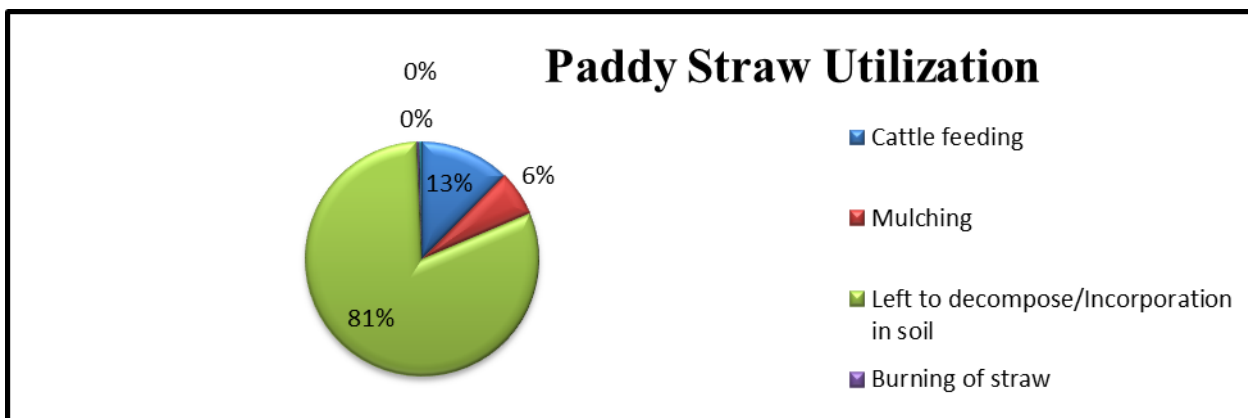
Table 4 indicates the marketable surplus for different sampled

households which were increases with the size of the farm holdings.

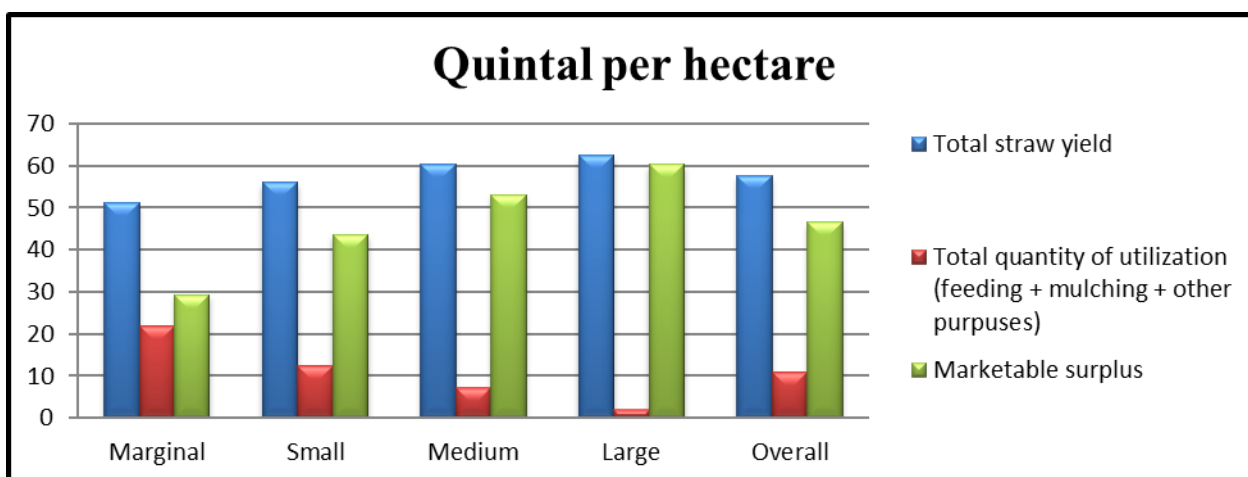
**Table 4:** Marketable surplus of paddy straw of sample farms (qt./ha.)

S. No.	Particular	Marginal	Small	Medium	Large	Overall
1	Total straw yield	51.11 (100)	56.09 (100)	60.46 (100)	62.41 (100)	57.52 (100)
2	Total quantity of utilization (feeding + mulching + other purposes)	21.87 (42.79)	12.46 (22.21)	7.28 (12.03)	2.10 (3.36)	10.93 (19.00)
3	Marketable surplus	29.23 (57.20)	43.63 (77.78)	53.18 (87.96)	60.31 (96.63)	46.59 (80.99)

Note: Figure in parenthesis indicates percentage to the total straw yield.



**Fig 3:** Utilization of paddy straw



**Fig 4:** Marketable surplus of paddy straw

**Constraints in paddy straw collection**

Table 5 indicates: the constrains faced by farmer on paddy straw collection. Most of the paddy growers did not collect

paddy straw because they faced lots of problems are given in table.

**Table 5:** Constraints in paddy straw collection by using hennery garret's ranking

S. No.	Constraints	Garret mean score	Rank
1	Lack of market demand	71.59	I
2	Used mostly for cattle feeding	50.20	III
3	High labour cost	39.46	IV
4	Lack of time and resource	30.83	V
5	Lack of marketing facility	60.75	II

**Note:** Garrett's mean score is in the form of percentage

### Conclusion

The study concludes that out of total production 57.52 qt. per ha. of paddy straw, only 19.00 percent 10.93 qt. per ha. straw was used for cattle feeding and mulching, few percent of farmers burning their straw which was not environmentally good, only 0.35 percent (0.20 qt. per ha.) of straw used for other purposes and remaining quantity left to the field to decompose or soil incorporation. This quantity was very high and farmers didn't collect the straw because maximum quantity of the straw was harvested by machine which was unusable for cattle feeding. Resulted that the 80.99 percent of total produce 46.59 qt. per ha. straw available for marketable surplus which was high volume per ha. which can be used for ethanol production or energy generation. The farmers faces lots of constraints for collection of paddy straw such as; lack of market demand, lack of marketing facilities, used mostly for cattle feeding, high labour cost and lack of time and resources.

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