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Quantification of yield gaps and productivity difference in char-suttri and traditional paddy cultivation methods in Kolhapur district of Maharashtra

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Abstract
The present study is an attempt to analyze the "Quantification of Yield Gaps and Productivity Difference in Char-Suttri and Traditional Paddy Cultivation Methods in Kolhapur District of Maharashtra". For present study traditional method, and Char-suttri method of paddy cultivation are studied. Yield gap III was 45.60 qtls and having yield gap per cent 46.35. The total productivity difference between the char-suttri paddy and traditional paddy was estimated to be 40.31 per cent. The difference in technology contribution was more and to the extent of 25.34 per cent.

Keywords: char-suttri method, SRT method, yield gap, productivity difference

Introduction
Paddy having botanical name *Oryza Sativa* L. Family Poaceae. Rice is one of the most important staple food-grains, and ranks third in production among food-grain crops in the world next to maize and wheat. It is also the most irrigation-intensive crop in the world: more than two-thirds of irrigated area is under rice cultivation. However, it is the only cereal crop that can grow under both flooded and dry conditions. The practices of rice cultivation have undergone changes over time from simple broadcasting to systematic transplantation and direct seeding.

Objectives
1. To estimate yield gap of paddy in Char-suttri and Traditional methods of cultivation
2. To estimate productivity difference between the Char-suttri and Traditional paddy cultivation methods

Material and Methodology
For present paper area were selected in the Kolhapur district of Maharashtra. Two tahsils Kagal and Karveer were selected purposively. The three villages selected from Kagal and Kaveer tahsils. Total sample of 90 growers are selected who adopted traditional method, Saguna Rice Technology (SRT) method and char-suttri method. The comparison between 30 growers of SRT and 15 growers of Traditional and 30 growers of Char- Suttri are compared with 15 traditional growers which selected in same area for present study.

Yield Gap
Yield gap was estimated by using the methodology develop by International Rice Research Institute (IRRI), Manila, Philippine for different methods of paddy cultivations.

Yield Gap I= Y_p-Y_d

Where,
Y_p=Potential yield (Maximum yield obtained at farmers level)
Y_d= Potential farm yield (Yield realized on demonstration plot)

Yield Gap II= Y_d-Y_a

Where,
Y_d=Potential farm yield (Yield realized on demonstration plot)

Y_a= Actual yield (Yield realized on traditional sample farm)

Total yeild Gap= Y_p-Y_a

Where,
Y_p= Potential yield (yield realized at research station)
Y_a= Actual yield (yield realized on sample farm)

Indices of yield gap

a) Index of yield gap refers to the percentage of yield potential unrealized i.e.

$$\text{Index of yield gap (IYG)} = \frac{(Yp - Ya)}{Ya} \times 100$$

b) Index of realized potential yield is defined as the percentage of the yield potential achieved.

$$\text{Index of Realized Potential Yield (IRPY)} = \frac{Ya}{Yp} \times 100$$

c) Index of realized potential farm yield is defined as the ratio of actual yield to potential farm yield, expressed in percentage. Thus,

$$\text{Index of realized demonstration plot yield (IRPDY))} = \frac{Ya}{Yp} \times 100$$

It may not possible for all farmers to raise the crop productivity on their farms to the level of research station. However, it would be realistic to aim at demonstration plot yield (potential farm yield) level. Therefore, emphasis was given on yield gap-II and here in after simply referred as yield gap. For the computation of yield gap, simple tabular analysis was used.

Decomposition Analysis

The decomposition model was used for decomposing the productivity difference between the SRT method, char- suttri method and the traditional method of rice cultivation. The equation involves decomposing the logarithm of ratio of per hectare productivity of SRT, char- suttri and traditional method of rice cultivations. The approximate a measure of percentage change in per hectare output between the SRT cultivation and traditional cultivation was analysed. In following equations 'S' stands for SRT method, 'T' stands for traditional method and 'C' stands for Char-suttri method.
In logarithm form, Cobb-Douglas production function for SRT method of paddy is;

$$LnYs = \ln b_{s0} + b_{s1} \ln X_{s1} + b_{s2} \ln X_{s2} + b_{s3} \ln X_{s3} + b_{s4} \ln X_{s4} + b_{s5} \ln X_{s5} + b_{s6} \ln X_{s6} + U_s-$$

Logarithm form of Cobb-Douglas production function for traditional method of paddy is;

$$\ln Y_T = \ln b_{T0} + b_{T1} \ln X_{T1} + b_{T2} \ln X_{T2} + b_{T3} \ln X_{T3} + bT4 \ln X_{T4} + b_{T5} \ln X_{T5} + b_{T6} \ln X_{T6} + U_T$$

In logarithm form, Cobb-Douglas production function for Char- suttri method of paddy is;

$$LnY_c = \ln b_{co} + b_{c1} \ln X_{c1} + b_{c2} \ln X_{c2} + b_{c3} \ln X_{c3} + b_{c4} \ln X_{c4} + b_{c5} \ln X_{c5} + b_{c6} \ln X_{c6} + U_c-$$

By using logarithm rule equation for SRT and Traditional becomes;

$$\ln (Y_S/Y_T) = \{ \ln [b_{S0}/ b_{T0}) \} + \{ (b_{S1} - b_{T1}) \ln X_{S1} + (b_{S2} - b_{T2}) \ln X_{S2} + (b_{S3} - b_{T3}) \ln X_{S3} + (b_{S4} - b_{T4}) \ln X_{S4} + (b_{S5} - b_{T5}) \ln X_{S5} + (b_{S6} - b_{T6}) \ln X_{S6} \} + \{ b_{S1} \ln (X_{S1}/X_{T1}) + b_{S2} \ln (X_{S2}/X_{T2}) + b_{S3} \ln (X_{S3}/X_{T3}) + b_{S4} \ln (X_{S4}/X_{T4}) + b_{S5} \ln (X_{S5}/X_{T5}) + b_{S6} \ln (X_{S6}/X_{T6}) \} + [(U_2 - U_1)]$$

The same method was used for char-suttri and Traditional method for calculation of decomposition.
The summation of first and the second terms on the right-hand side of the decomposition model together represented the productivity difference between the SRT method and traditional method, attributable to the difference in the cultural practices. The third term provided the productivity difference between the SRT cultivation and traditional cultivation attributable to the differences in the input use.

Result and Discussion

Table 1: Yield Gap I in Traditional and Char-Suttri Method of Paddy Cultivation

Potential yield gap		
Sr. No.	**Particulars**	**Yield (Qtl.)**
1	Potential yield	85.00
2	Demonstrated yield	59.52
3	Yield gap	25.48
4	Yield gap (%)	29.98

First yield gap estimated to 25.48 qtls. Potential yield was 85.00 qtl and Demonstrated plot yield was 59.52 qtl. Yield gap percentage was 29.98, here need of reduction of yield gap for increasing potential yield.

Table 2: Yield Gap II in Traditional and Char-Suttri Method of Paddy Cultivation

Demonstration yield gap		
Sr. No.	**Particulars**	**Yield (Qtl.)**
1	Demonstrated yield	59.52
2	Actual yield	39.40
3	Yield gap	20.12
4	Yield gap (%)	33.80

Yield gap obtained at demonstration level was 20.12 qtls. Demonstrated plot yield was 59.52 qtl and actual yield obtained was 39.40 qtl. This yield gap is more which shows that, at actual level yield of paddy was less. Yield gap per cent was 33.80 which was higher compare to yield gap I.

Table 3: Yield Gap III in Traditional and Char-Suttri Method of Paddy Cultivation

Total yield gap		
Sr. No.	**Particulars**	**Yield (Qtl.)**
1	Potential yield	85.00
2	Actual yield	39.40
3	Yield gap	45.60
4	Yield gap (%)	46.35

Yield gap III is total yield gap i.e. yield gap between potential yield minus actual yield. Yield gap III was 45.60 qtls and having yield gap per cent 46.35. This yield gap indicates that still yield of traditional Sample cultivators was less compare to SRT Sample cultivators. Yield gap of char-suttri method and traditional method was varied at different level of production as above mentioned, hence hypothesis was accepted.

Source Contributing to the Yield Difference between Traditional and SRT Methods of Paddy Production

Using the decomposition analysis, the productivity difference between the SRT paddy and traditional paddy (yield gap) was decomposed into its constituent sources and the results are presented in Table 4.

Source Contributing to the Yield Difference between Traditional and Char-Suttri Methods of Paddy Production

The total productivity difference between the char-suttri paddy and traditional paddy was estimated to be 40.3 per cent. Among the various sources responsible for total productivity difference, the difference in technology contribution was more and to the extent of 25.34 per cent. This implied that paddy productivity could be increased by about 25.34 per cent if the farmers could switch over from traditional method to char-suttri method with the same level of resource use as in traditional method. The contribution of difference in input use levels to the total productivity difference was 1.03 per cent. The larger quantity of N used in traditional method of cultivation has helped to increase yield of paddy by 1.66 per cent in char-suttri method. This implied that farmers practicing char-suttri method obtained higher output by spending slightly more on these two inputs compared to those practicing traditional method. These finding confirmed the results reported by Basavaraja *et al.* (2008), and Rama Rao (2011).

Table 4: Decomposition of Productivity Difference for Traditional and Char-Suttri Method of Paddy Cultivation (Percentage)

Sr. No.	Particulars	Percentage
A	Total difference observed in productivity	40.31
B	Due to difference in technology	25.34
C	Due to all inputs	1.03
1	Seed	-0.69
2	N	-1.66
3	Intercultural operations	0.02
4	Labours	3.02
5	PPC	-0.08
6	Manures	0.41
D	Total estimated difference in productivity	26.37

Conclusion

First yield gap percentage for char-suttri was 29.98, here need of reduction of yield gap for increasing potential yield. Second yield gap per cent was 33.80 which was higher compare to yield gap I. Third yield gap percentage was 46.35, this yield gap indicates that still yield of traditional Sample cultivators was less compare to char-suttri Sample cultivators. The total productivity difference between the char-suttri paddy and traditional paddy was estimated to be 40.31 per cent. The difference in technology contribution was more and to the extent of 25.34 per cent.

References

1. Deokate TB. Quantification of yield gaps in different planting of sugarcane in western Maharashtra. Adv. Res. J Crop Improv 2014;5(1):34-39.
2. Hile RB, Sanap DJ, Yadav DB. Impact assessment of production technology of paddy in Maharashtra. Journal of Crop and Weed 2016;12(3):36-40.
3. Khade SD. Impact assessment of kharif paddy production technology in Nashik district. M. Sc. (Agri) thesis (unpublished), M. P. K. V. Rahuri 2016.
4. Nguezet Dontsop PM, Okoruwa VO, Adeoti AI, Adenegan KO. Productivity impact differential of improved rice technology adoption among rice farming households in Nigeria, Journal of Crop Improvement 2012;26:1-21.
5. Priyanka K, Suresh S, Patil GM, Hiremath Joshi TA, Kulkarni SA. Comparative analysis of transplanted and dibbled method of red gram cultivation in Bidar district of Karnataka. Karnataka Journal of Agricultural Science 2013;26(2):238-242.