DOES THE SYSTEM OF RICE INTENSIFICATION (SRI) OUTPERFORM CONVENTIONAL SYSTEM? A CASE STUDY OF GUJARAT

The important aspects of SRI and Traditional Paddy Cultivation

Important aspects	Traditional rice	SRI paddy
Transplanting young seedlings	1 month	8-12 days
No of seedlings transplanted per hill	No specifications followed	One seed per hill
Spacing of transplanted seeds		50*50 cms between seedlings
Water management	flooded	Alternatively kept wet and dry
Weeding	As per the need	4 times; 10 days after transplantation

Experiences in Other Countries

***** the beneficial effects of SRI methods had been documented in 28 countries, most recently in **Bhutan, Iraq, Iran, Zambia, China, Cambodia**

* In India, states like **Tamil Nadu, Andhra Pradesh, West Bengal, Jharkhand, Chhattisgarh and Gujarat** have started growing paddy using SRI methods

Literature has the mention of the reduction in cost (8% - 20%) **in**
* Seed
* Fertilisers and pesticide
* Watering (?46%)
* **Net returns** ? 22%-97%
Other benefits: Maturity day is shortened by 15 days, plant resistant to drought, food security for farmer households.

Baseline Study: 756 farmers (Sagbara cluster = 148 farmers; **Dediapada cluster = 263 farmers; Mandavi cluster = 211 farmers** and Netrang cluster taluka = 122 farmers). **Baseline survey=237 SRI growing farmers. Final Survey=119** farmers in 13 villages of Dediapara, Umarpada, Mandavi and Songadh taluka
Total Population 839, Av Family size = 7.1

Percentage of Area under Cultivation and Irrigation, Land Cultivated under Paddy Crop using SRI Method and Traditional Method

Particulars	
Land Area	
Land owned (in ha.)	151.2 (119)
Land cultivated (in ha.)	**151.2 (119)**
Irrigated to total cultivated area (%)	55.1 (119)
Total area under Paddy (in ha)	**80.2**
Area under paddy to total cultivated area (%)	**53.1**
% to total irrigated area under paddy	61.7 (153)
% to total unirrigated area under paddy	38.3 (84)
Percentage of total area under paddy	
SRI	33.4 (119)
Traditional	66.6 (118)
Area under SRI Method of Paddy Cultivation (ha)	**26.8 (119)**
Irrigated (% to total area)	70.5 (84)
Unirrigated (% to total area)	29.5 (35)
Area under Traditional Method of Paddy Cultivation (ha)	**53.4 (118)**
Irrigated (% to total area)	57.3 (69)

Average Yield and Returns Incurred to Farmers Cultivating Paddy using SRI and Traditional Methods

Particulars	SRI method	Traditional method	Difference in mean of paddy cultivated using SRI and traditional methods
Total Input cost (Paid-up cost)	8922 (119)	7814 (119)	1108 [14.2]
Yield	3150 (119) {97.5}	2005 (118) {92.3}	1145 [57.1]
Returns (Rs/ha)			
Gross Return	26830 (119)	14850 (119)	11980 [80.7]
Net Returns	17909 (119)	7036 (119)	10873 [154.5]

Percentage Distribution of Area under Crops before Cultivating SRI Paddy

Crops	Area under crops (% to total)
Traditional paddy (area=26.0 ha.)	97.4 (114)
Vegetables Giloda (area=0.5 ha.)	1.9 (3)
Tuver (area=0.1 ha.)	0.4 (1)
Jowar (area=0.1 ha.)	0.3 (1)
Total (area=26.7 ha.)	**100.0 (119)**

Average Input Costs (Rs/ha) Incurred to Farmers Cultivating Paddy using SRI and Traditional Methods

Particulars	SRI method	Traditional method	Difference in mean of paddy cultivated using SRI and traditional methods
Seed	120 (119)	945 (118)	-825 [-87.3]
Manure	1517 (80)	1528 (61) [11]	-11 [-0.7]
Organic manure	897 (14)	1385 (7)	-488 [-35.3]
Chemical fertiliser	450 (108)	618 (100)	-168 [-27.2]
Pesticides	545 (12)	370 (6)	175 [47.2]
Water charges	2059 (86) ((2.8))	1509 (71) ((3.04))	550 [36.4]
Cost of Bullocks	1163 (119)	1143 (118)	20 [1.8]
Tractor Charges	1892 (29)	1341 (20)	551 [41.1]
Labour cost	4692 (104) {{45.96}}	3479 (110) {{41.16}}	1214 [34.9]
Total Input cost (Paid-up cost)	8922 (119)	7814 (119)	1108 [14.2]

Regression Coefficients of Selected Variables Relating to Total Households (2007-

Variables	SRI method of paddy cultivation	Traditional method of paddy cultivation
Constant	6.370*** (1.030) [6.182]	3.181*** (0.787) [4.041]
Seed (kg/ha)	0.377*** (0.130) [2.903]	-0.331** (0.116) [-3.988]
Manures (kg/ha)	**0.199** (0.092) [2.159]**	**0.462*** (0.111) [3.858]**
Quantity of chemicals and pesticides (kg/ha)	**0.256*** (0.085) [3.010]**	**0.138* (0.108) [1.276]**
Watering (number)	-0.189 (0.206) [-.922]	0.070 (0.295) [.239]
Hired labour days (Rs./ha)	**-0.126* (0.090) [-1.403]**	**0.195* (.110) [1.771]**
Bullock days (days/ha)	-0.048 (0.153) [-.293]	-0.049 (.190) [-0.257]
R^2	0.533	0.603
F	6.244***	7.586***

Note; Figure in parentheses indicates standard error and figures in [ ] indicates t values
*** and **, Significant at the 1% and 5% level respectively

Percentage Distribution of Estimated Technical Efficiency for the Households by Method of Paddy Cultivation (2007-08)

(Households in %

Range of Technical Efficiency	SRI method of paddy cultivation	Traditional method of paddy cultivation
< 0.50	-	4.2 (5)
0.50-0.60	1.7 (2)	39.0 (46)
0.60-0.70	**22.7 (27)**	**20.3 (24)**
0.70-0.80	**60.5 (72)**	**28.8 (34)**
0.80-0.90	14.3 (17)	5.1 (6)
Greater than 0.90	0.8 (1)	2.5 (3)
Total	100.0 (119)	100.0* (118)
Mean efficiency	0.74	0.65

Note: Figures in parentheses indicate number of households
* One farmer household did not cultivate paddy using traditional method

Regression Coefficient of Selective Variables affecting Technical Efficiency for the Sample Households (2007-08)

Variables	**SRI paddy**	**Traditional paddy**
Constant	0.358** (0.134) [0.102]	0.820*** (3.721) [0.220]
Age of the farmer (years)	-0.005** (0.001) [3.654]	0.002 (-0.881) [0.003]
Paddy sold in the market (Rs/ha)	0.030 (0.078) [-0.381]	0.001 (-0.040) [0.037]
Hired labour days (Rs/ha)	0.095* (0.125) [0.765]	0.293* (-1.889) [0.155]
Attended training programme on SRI cultivation (dummy)	-0.098* (0.046) [2.149]	-0.116* (1.915) [0.061]
R^2	0.835	0.656
F	4.228*	2.864*

Note; Figure in parentheses indicates standard error and figures in [ ] indicates t values
*** and **, Significant at the 1% and 5% level respectively

Percentage Distribution of Households Reporting Actual and Recommended Methods of carrying Out Various Agricultural Activities

Details	% hhs
Attended training programme	
Yes	66.9 (79)
No	33.1 (39)
Total (N)	118
1. Recommended: Preparing seedbed	
Making a Puddle or *Gaadi*	100 (119)
Method actually followed: Preparing seedbed	
Making a Puddle or *Gaadi* as suggested	77.3 (92)
Making bunds	22.7 (27)
Reasons for the difference between method of carrying out the activity and actually carried out	
Was not aware of any such method	13
Shortage of time	10
Was aware about the requirement but did not know how to do	4
Total	27

Contd……

Details	Percentage of households
2. Recommended: Distance between Rows and Plants	
9 inches	100.0 (119)
Method actually followed: Distance between Rows and Plants	
As per the recommendation i.e., 9 inches	74.8 (89)
Without measurement	5.0 (6)
Less than required*	11.8 (14)
More than required**	8.4 (10)
Reasons for the difference between method of carrying out the activity and actually carried out	
Did not know	26.7 (8)
Was not convinced	26.7 (8)
Input related constraints/marker did not work	30.0 (9)
Land is less so greed of sowing more	16.7 (5)
Total	100.0 (30)

Contd……

Details	Percentage of households
3. Recommended: Average Quantity of seed used (kg/ha.)	
Average quantity of seed recommended	5.18 (119)
Average quantity of seed used by farmers	8.3 (84)
Reasons for the Difference between recommendations made and actually carried out	
Was not convinced with the recommended quantity and used more to minimize uncertainty	70.6 (84)
4. Recommended: Average Quantity of fertilisers used (kg/ha.)	
Average quantity of fertilisers recommended	26 (119)
Average quantity of fertilisers used by farmers	74 (85)
Reasons for the Difference	
Was not convinced about production	71.4 (85)

Percentage Distribution of Households Reporting Reasons for not Cultivating Paddy Using SRI Methods in the Area Bigger than the Current Area

Details	Percentage to total
Land is rocky	10.2 (11)
No irrigation facility	18.5 (20)
Land not leveled	71.3 (77)
Total	100.0 (108)

Note: Figures in parentheses indicate number of observations

Percentage Distribution of Households Reporting their Preference of Different Methods of Paddy Cultivation and Reasons for their Preference

Particulars	Total (%)
Preference	
SRI	87.4 (104)
Traditional paddy	0.8 (1)
Combination of SRI and traditional variety	11.8 (14)
Total	**100.0 (119)**
Reasons for preferring paddy using SRI method of cultivation	
More yield and greater gross returns even when some of the input costs are high	79.8 (83)
Less weeding cost	20.2 (21)
Total	**100.0 (104)**
Reasons for preferring paddy using Combination of Traditional and SRI method of cultivation	
More yield and less input cost, more productivity	2
Lack of adequate irrigation facility	7
Land not leveled	5
Total	**14**

Conclusion:

It is too early to compare its yield and returns obtained

But such an attempt would show the **direction of growth along with the factors affecting this growth**.

The socio-economic conditions of farmers in the study area compel them to concentrate more on **increasing economic returns from paddy**

Adoption of SRI method of paddy cultivation depends primarily on **its economic attractiveness to farmers.**

Paddy cultivated using SRI method has shown significant **increase in yield and returns** compared to paddy to conventional methods.

Continuous follow-up of households adopting new method of paddy cultivation would give clear evidence about actual benefits

Motivation and awareness raising exercises

However, **element of risk still plays** a major role in absorbing knowledge about the use level of seeds and fertilisers

Lot of potential still exists to increase net returns

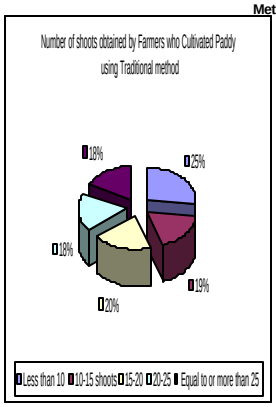
Agricultural extension services to farmers and awareness about the proper use of inputs is increased, benefits would be still greater.

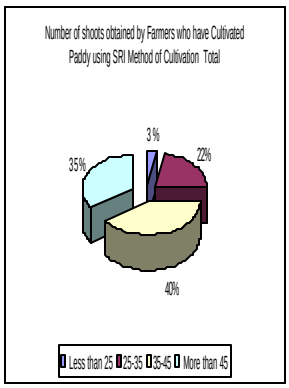
One of the major **constraints** faced by the farmers is lack of irrigation facilities

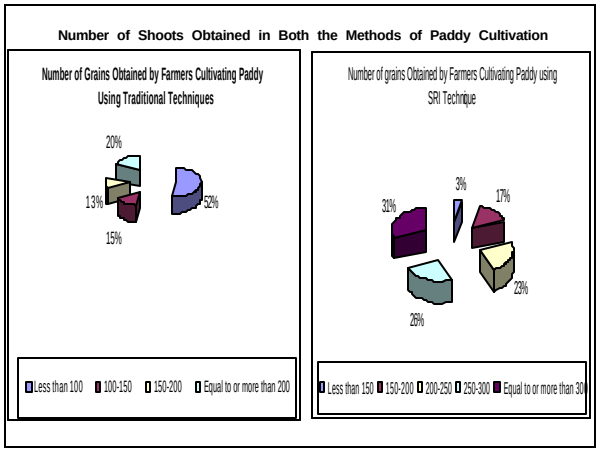
Thus, **promotion of the resource conservation method** of cultivation like SRI requires multi dimensional and integrated effort.

In the backdrop of an increasing demand for food and its inextricable linkage with dwindling water resources, process innovations like SRI need to be encouraged.

Number of Shoots obtained by Farmers using Traditional and SRI Methods






Number of Shoots Obtained in Both the Methods of Paddy Cultivation
Number of Grains Obtained by Farmers Cultivating Paddy Using Traditional Techniques
20%
13%
52%
15%
Less than 100
100-150
150-200
Equal to or more than 200
Number of grains Obtained by Farmers Cultivating Paddy using SRI Technique
3%
17%
31%
23%
26%
Less than 150
150-200
200-250
250-300
Equal to or more than 300