

# **SRI Adoption Dynamics:** ***Identifying policy parameters***

## **Voice of Farmers in Eastern India**

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**SRI**

System of Rice Intensification (SRI) is a pro-poor option, gaining farmers' acceptance globally as well as nationally.

The novelty of producing more with less external inputs has been attractive to SRI.

It also performs well under climate change scenario .

(According to Global data on status of SRI collated by Cornell University, 5 million farmers in 50 countries adopted SRI. Presently about a million hectares are under SRI among nearly 2 million farmers in India).



# **SRI: A FARMERS CHOICE; Because**

<b>1. PREFERENCE:</b>	<b>Small farmer Oriented Agro Ecological Innovation</b>
<b>2. UNIVERSALITY</b>	<b>Appropriate for resource poor as well as resource rich production conditions to produce food “more with less</b>
<b>3. TANGIBILITY:</b>	<b>Direct benefits exceed indirect benefits: Farmers show great enthusiasms and acceptance to adopt the practice</b>
<b>4. INCLUSIVITY:</b>	<b>Great potential to address the issues of household food security of the poor</b>
<b>5. COST EFFECTIVENESS:</b>	<b>Research on SRI is cost effective and require less investment.</b>

# Potential Effect of Intensive management:

## *Experiences and Expectation-summary*

- **Grain and straw yield increased** (in rainfed condition, it is even double or triple)
- **Profuse tillering as compared to conventional system** (50 to 60 in SRI as against 15 to 20 in CMP)
- **Plants express different characteristics vis-à-vis under conventional knowledge**
- **Crop growth is induced by intercultivation with weeder**
- **Resistance to pest and disease**
- **Crop duration is often shortened**



# SRI principles widely adaptable: Innovation spillover



SRI in Wheat – 25,000 farmers



Rajma – 553 farmers



Sugar cane under SSI



Maize 64 farmers



Finger Millet 473 farmers



Soyabean 34 farmers



# Adoption Dynamics and impact of SRI: EMPIRICAL EVIDENCES

- A large scale longitudinal farmer survey- conducted during 2010-14
- Objective is
  - to assess the SRI Adoption and its status
  - Identify factor affecting adoption and what constrains it and
  - Assess the Impact on household food security

Presenting analysis of data of four **rainfed rice growing states:**

- Studied 705 practitioner farmers in six districts:
- 3 broad category of farmers selected consisting of SRI adopters, non-adopters and drop out farmers.

# WHY RAINFED AREAS Targeted

- Inefficient use of natural resources- but high potentiality exist
- House a large poor population, small farmers dominated RFA and
- Rice is main staple
- RFA Vulnerable to extreme climatic variation
- Poor penetration of technology
- Precarious food security at Household level
- Farmers needs your help and encouragement

**Table 1: % area and production of rice in total cereals and average yield**

State	Area (%)	Production (%)	Yield (q/ha)
<b>Bihar</b>	<b>52.84</b>	<b>40.16</b>	<b>12.71</b>
<b>Chhattisgarh</b>	<b>90.65</b>	<b>93.90</b>	<b>13.20</b>
<b>Jharkhand</b>	<b>75.39</b>	<b>79.68</b>	<b>17.06</b>
<b>Odisha</b>	<b>95.91</b>	<b>96.26</b>	<b>15.77</b>
<b>All India</b>	<b>21.09</b>	<b>28.90</b>	<b>21.80</b>

**Rainfed Areas and SRI: Study concentrated on adoption of SRI in Rainfed Areas**

# Sampling design-

6 states:

Odisha, Bihar, Uttarkhand, Chattisgarh,  
Uttarkhand & Tamilnadu

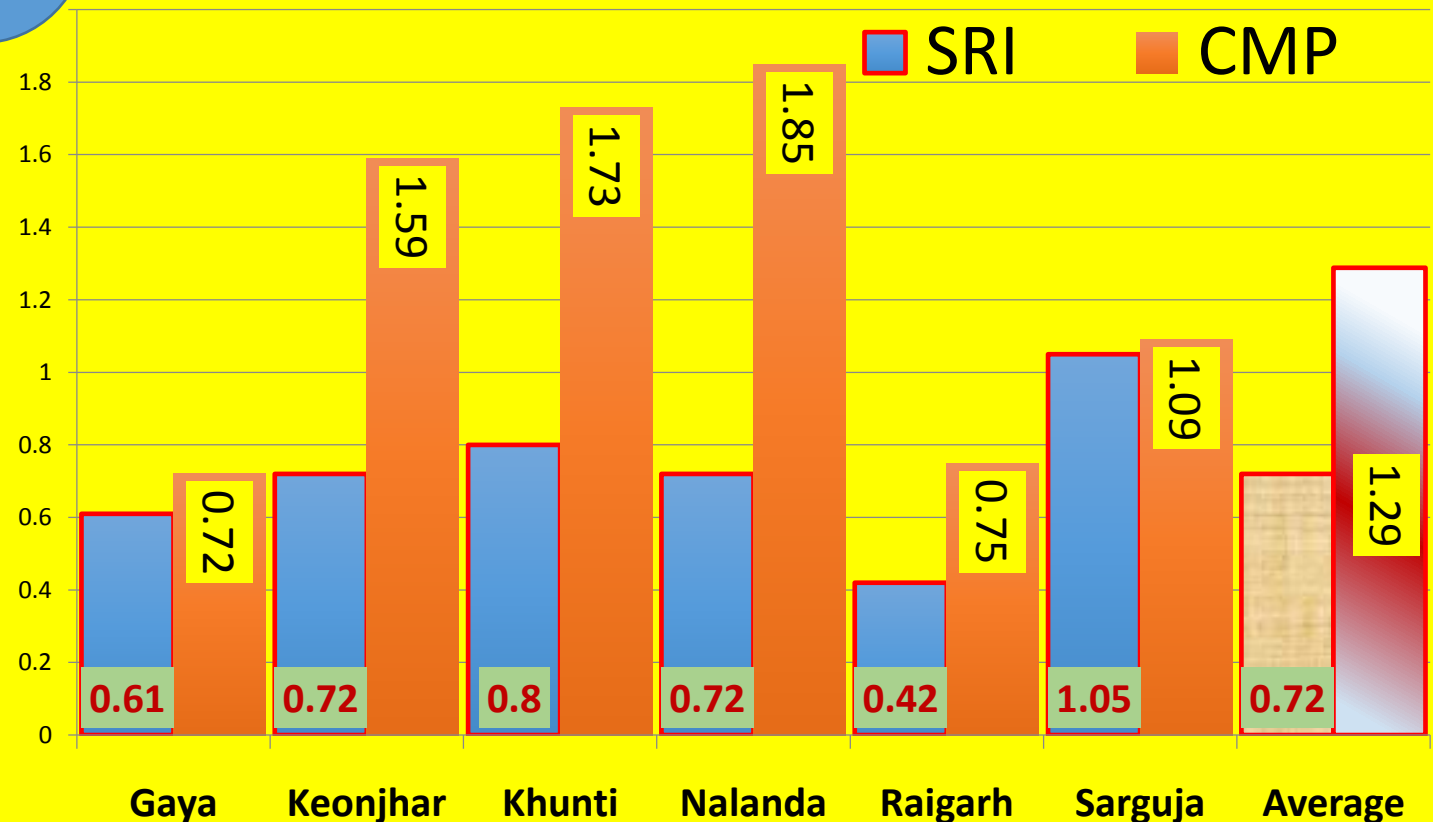
9 districts:

1015 Farmers

Presenting analysis of six districts and  
705 farmers

District	Sample size (farmers)	Percentage of sample
Gaya	109	15.5
Keonjhar	199	28.2
Khunti	104	14.8
Nalanda	104	14.8
Raigarh	92	13.0
Sarguja	97	13.8
<b>Total</b>	<b>705</b>	<b>100</b>

# Share of Area under SRI and conventional method (acre)





# Yield under SRI and its advantage over conventional method

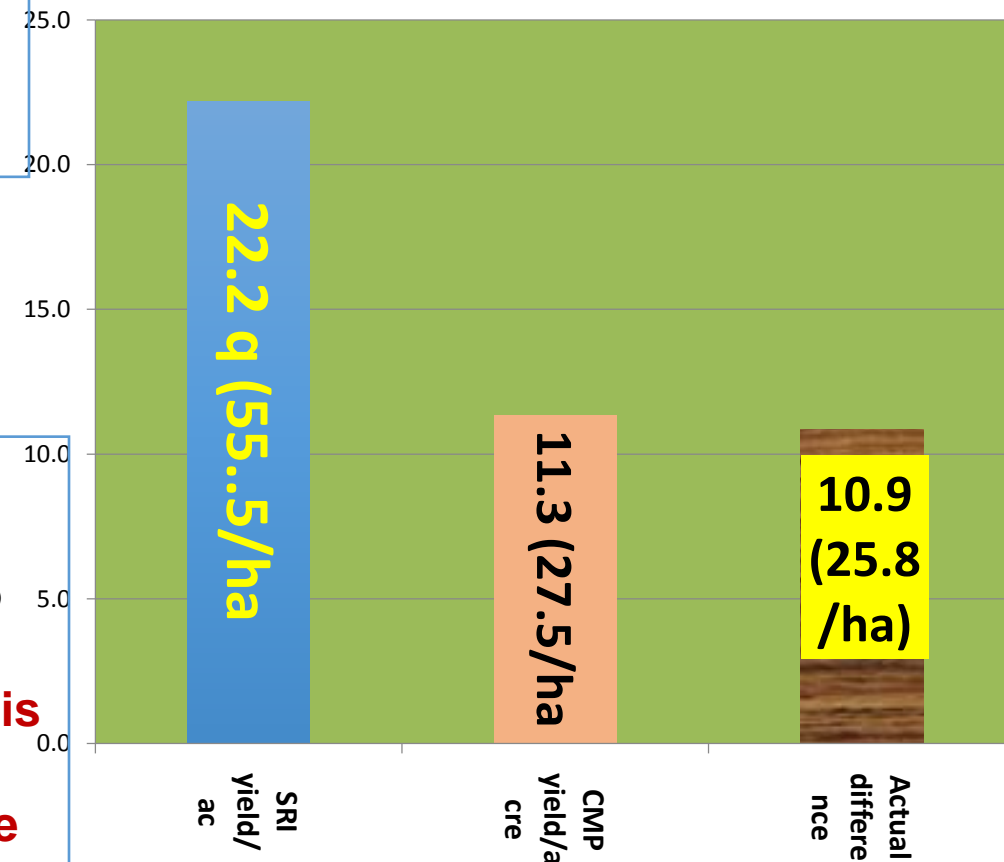
Average SRI yield estimated at 22.19 q/ac (5.55 t/ha) compared to 11.3 q/ac under conventional method (2.83 t/ha)

The yield advantage of SRI is 96%

$$\text{Yield Advantage} = \frac{\text{SRI yield} - \text{CMP yield}}{\text{CMP yield}} \times 100$$

- Yield Performance: Yield of CMP varied from 7.9 q/ac in Keonjhar to 15.25 q/ac in Nalanda.
- At the same time, SRI yield varied from 15.39 q/ac in Khunti to 27.44 q/ac in Surguja.
  - Yield advantage is more where the normal average yield is poor, as observed in the rainfed districts of Surguja and Raigarh. This indicates wide inter-district disparity in rice yield.

Comparison of average yield in SRI and CMP along with yield advantage (q/ac)

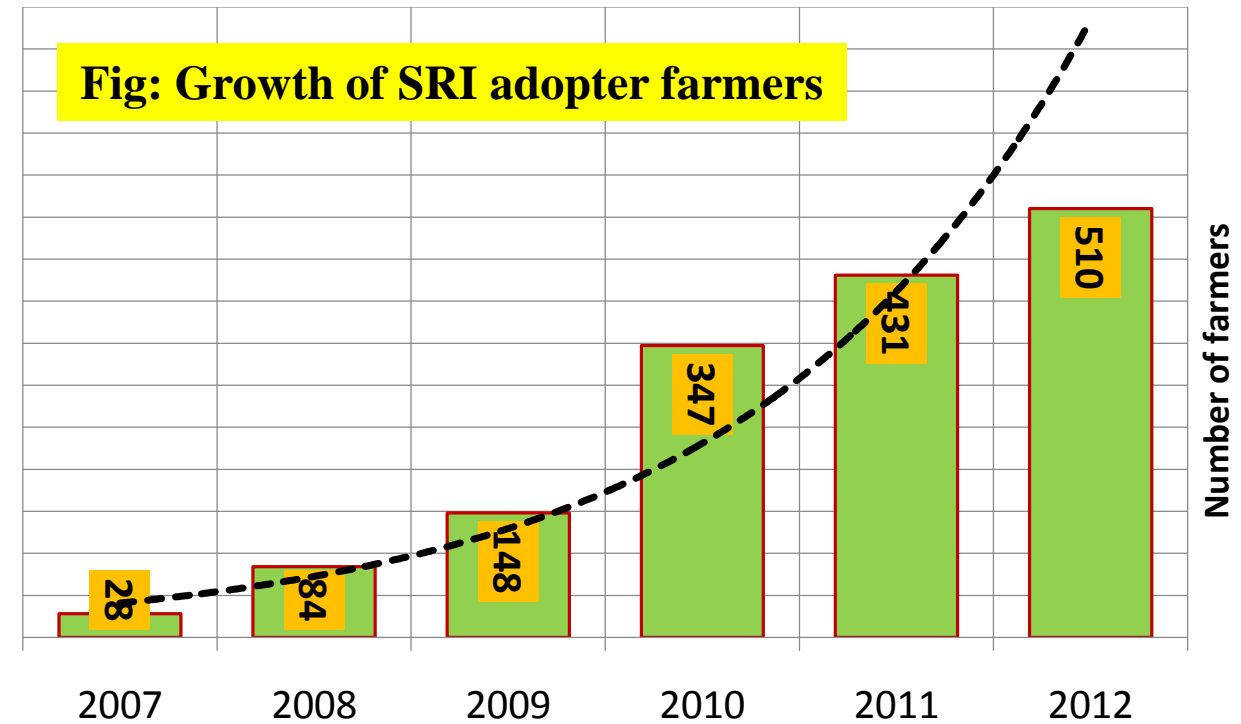


# Table: Yield advantage with SRI

<b>District</b>	<b>Yield with CMP (q/ac)</b>	<b>Yield with SRI (q/ac)</b>	<b>Actual difference</b>	<b>Yield Advantage of SRI in %</b>
Gaya	11.92	23.14	<b>11.22</b>	94
Keonjhar	7.90	21.74	<b>13.84</b>	175
Khunti	9.16	15.39	<b>6.23</b>	68
Nalanda	15.25	24.86	<b>9.61</b>	63
Raigarh	15.09	20.56	<b>5.47</b>	36
Sarguja	8.65	27.44	<b>18.79</b>	217
<b>Average</b>	<b>11.33</b>	<b>22.19</b>	<b>10.86</b>	<b>108.83</b>

# • SRI adoption

- High intensity adoption village defined –( >10% of the farmers)
- Medium Intensity:(5-10% of the farmers)
- Low Intensity (< 5% of the farmers in village)



**Table: Performance of yield in different SRI intensity classes**

SRI Intensity	Avg. SRI yield/ac	CMP yield/ac	Difference in Yield (q/ac)	Difference in Avg. Labour Cost (Rs.)
<b>High</b>	19.89	10.40	9.49	3798
<b>Medium</b>	20.65	9.03	11.62	3921
<b>Low</b>	17.85	10.50	7.35	6269
<b>Overall</b>	19.77	10.18	9.59	4289



## Labour usage in SRI and CMP (Labour man-day/acre)

- Survey shows, 3 out of six districts i.e. Gaya, Keonjhar and Sarguja reported labour savings in SRI method.
- New adopters found to use more labour (as in Khunti, Nalanda and Raigarh districts).
- Labour use efficiency improves as they gain expertise in SRI processes.

District	SRI	CMP	% Labour saving
Gaya	83.6	91.3	8.4
Keonjhar	89.9	98.0	8.3
Khunti	58.8	48.5	-21.3
Nalanda	107.5	82.0	-31.0
Raigarh	62.7	54.2	-15.7
Sarguja	30.1	36.8	18.2
<b>Total</b>	<b>76.1</b>	<b>77.0</b>	<b>1.2</b>

# Gender perspective and labour use pattern in intercultural operations

Family labour use	Transplanting		Weeding		Harvesting	
	Male	Female	Male	Female	Male	Female
<b>SRI Family</b>	<b>10</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>8</b>	<b>10</b>
<b>CMP Family</b>	<b>13</b>	<b>17</b>	<b>11</b>	<b>13</b>	<b>10</b>	<b>12</b>

Hired labour use	Transplanting		Weeding		Harvesting	
	Male	Female	Male	Female	Male	Female
<b>SRI Hired</b>	<b>2</b>	<b>8</b>	<b>2</b>	<b>4</b>	<b>1</b>	<b>4</b>
<b>CMP Hired</b>	<b>3</b>	<b>10</b>	<b>1</b>	<b>8</b>	<b>1</b>	<b>7</b>

Total labour use	Transplanting		Weeding		Harvesting	
	Male	Female	Male	Female	Male	Female
<b>SRI (Total 81)</b>	<b>12</b>	<b>23</b>	<b>9</b>	<b>14</b>	<b>9</b>	<b>14</b>
<b>CMP (T=106)</b>	<b>16</b>	<b>27</b>	<b>12</b>	<b>21</b>	<b>11</b>	<b>19</b>

## Factors favoring SRI adoption (perception analysis) (Positive experience as % of the respondent farmers (N) only)

<b>District</b>	<b>More Yield</b>	<b>Less seed</b>	<b>Less water</b>	<b>Less labour</b>	<b>Less expenses</b>	<b>More work</b>	<b>Easy Transplanting</b>
Gaya	<b>68</b>	<b>49</b>	28	28	11	0	0
Keonjhar	<b>89</b>	<b>46</b>	5	60	57	0	12
Khunti	<b>86</b>	<b>39</b>	10	22	43	1	6
Nalanda	<b>88</b>	<b>55</b>	17	5	17	0	1
Raigarh	<b>38</b>	<b>40</b>	4	34	3	0	1
Sarguja	<b>43</b>	<b>20</b>	45	0	82	49	1

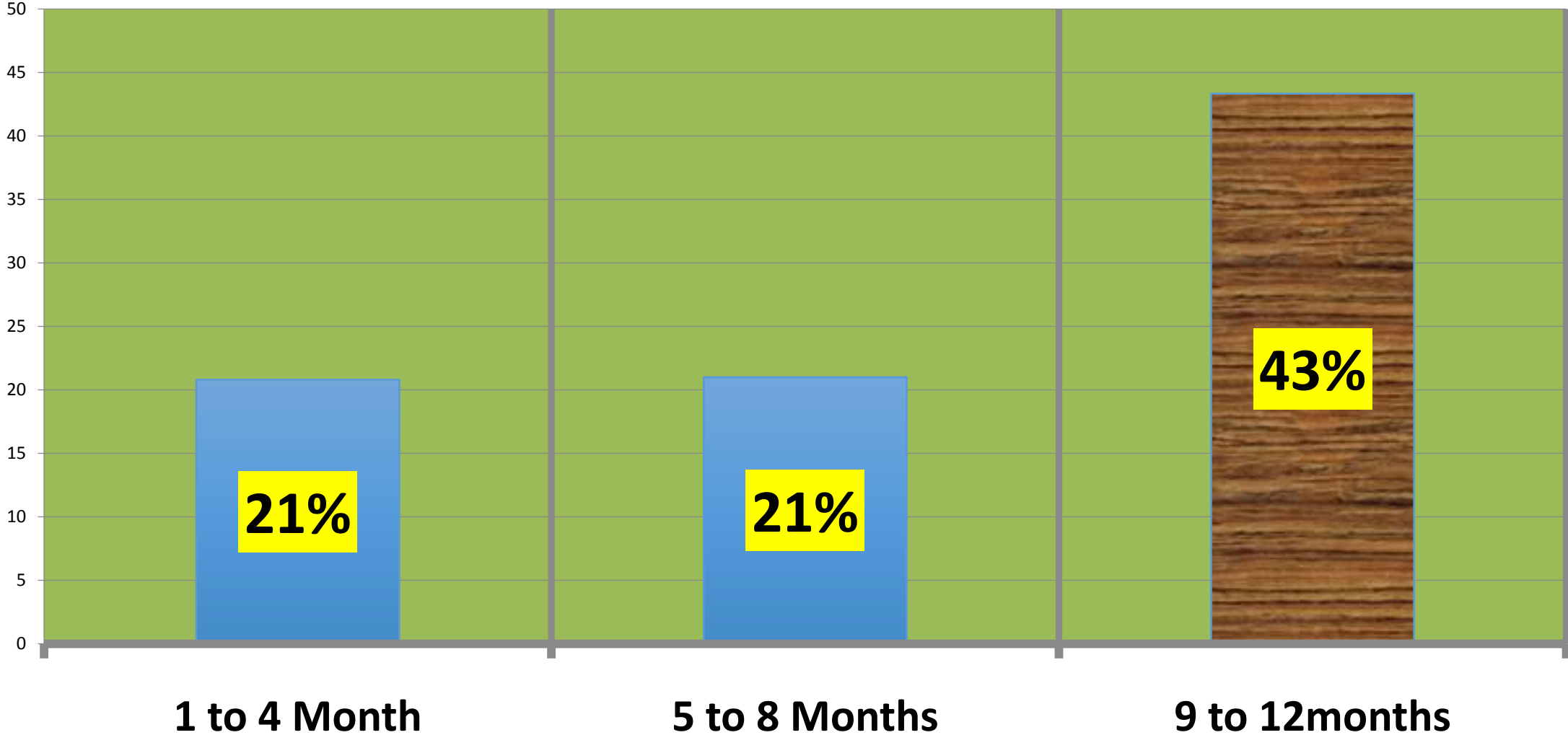


# Experience and perception of Farmers about SRI-adoption

- **Perception on increasing yield**
- **Perception on seed saving**
- **Farmers' perception about water usage**
- **Perception about cost of production**

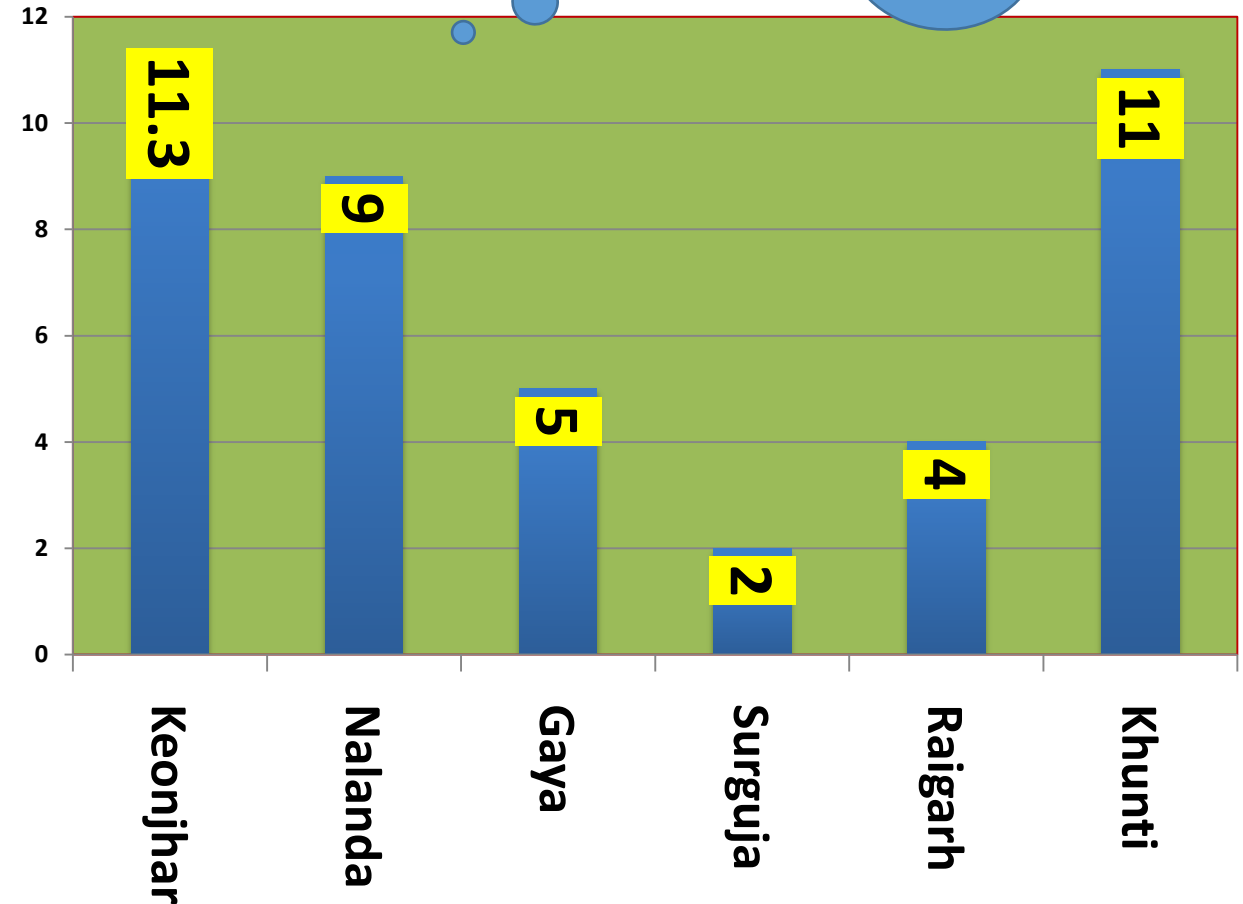
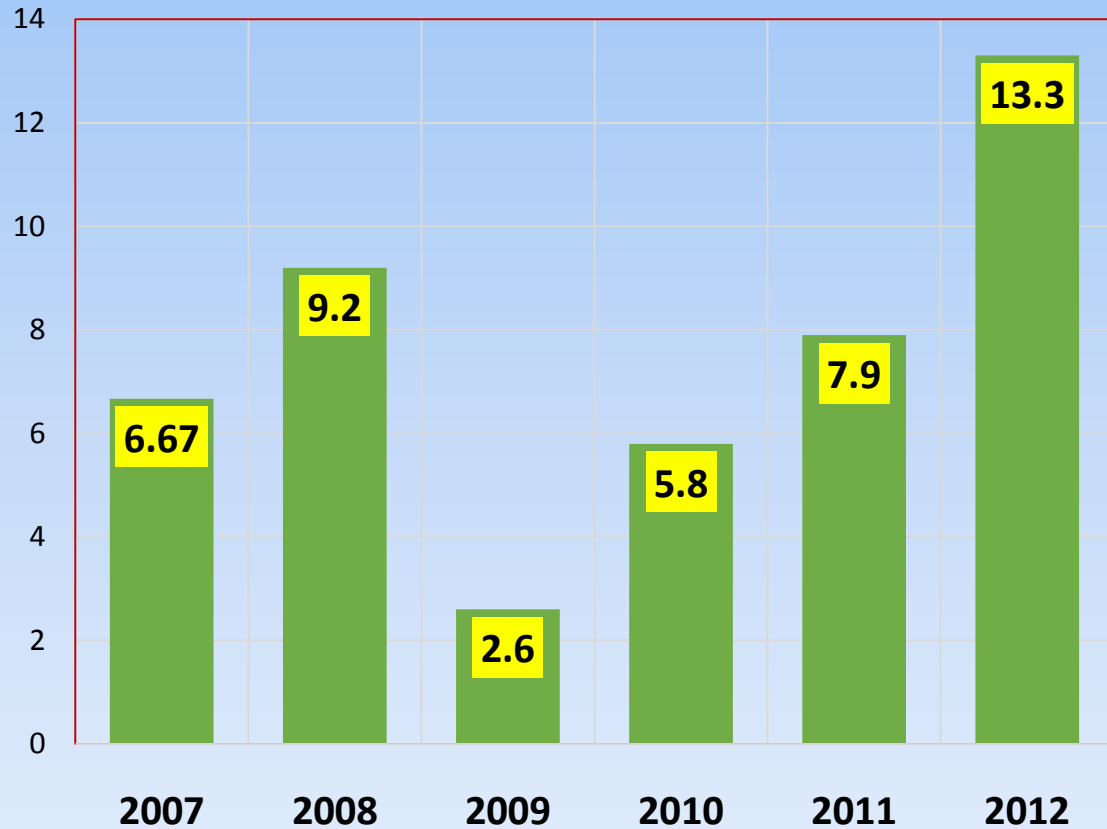
# Changes in Availability of Home grown Food and Food Security

## Availability of additional months of home grown food due to SRI



# Understanding disadoption of SRI

% disadopted farmers during the period 2007-2012 in the survey areas in sample area



Average % farmer disadopted during last five years (2007-12)



# Reasons behind this **disadoption** (Garrett rank technique)

Districts	Rain failed	Non availability of major inputs	Issues of labour usage	Irrigation problem	Credit problem	Personal health problem	Lack of knowledge of various operations
	(1)	(2)	(3)	(4)	(6)	(7)	(8)
Keonjhar	99	96	81	99	88	97	81
Nalanda	99	96	94	-	-	90	-
Gaya	99	99	96	92	85	92	-
Sarguja	-	99	-	95	-	88	97
Raigarh	99	90	94	83	-	-	97
Khunti	-	97	94	99	-	-	85

# Factors responsible for upscaling of SRI

District	More production (%)	Less seed (%)	Less overall expenses (%)	Less labour (%)	Save time (%)	Save water (%)
Gaya N=83	80	66	5	30	5	33
Keonjhar N=158	96	58	68	74	1	7
Khunti N=91	96	41	45	26	7	13
Nalanda N=80	91	74	21	10	16	18
Raigarh N=67	73	61	12	64	0	3
Sarguja N=39	41	85	55	40	17	13

# To conclude

1. **ADOPTION OF SRI IS OVERWHELMINGLY** due to multiple advantages, i.e. SRI is adoptable
2. **SRI outperforms CMP in production** substantially among other positive attributes
3. Potential **DURABLE IMPACT ON HOUSEHOLD FOOD SECURITY** (availability of home grown food increased even in small holding)
4. **POSITIVE FACTORS DRIVING ADOPTION** identifies
5. Labour Usage: **SHIFT IN LABOUR** usage observed, particularly in gender perspective
6. **NO CLEAR PICTURE** emerged on labour issue as a policy drag for promoting SRI
7. **“INVOLUNTARY DISADOPTION”** Disadoption occurs, but of minor in nature,
8. Most **FACTORS AFFECTING DISADOPTION** are external factors and beyond individual control such as weather failure, lack of input supply, personal health, a few expressed initial labour issue are identified.
9. Farmers identified **PROMINENT UPSCALING FACTORS** which are basically related to knowledge delivery and capacity strengthening that lead to guaranteed **“More with Less”**

# Upscaling SRI: Policy imperatives

- As a best alternative innovation: Tangible benefits need to be assessed and indirect ones evaluated.
- SRI engage million but more millions needs to be reached to make durable impact on household food security and ensure inclusivity,
- The scale, achievable only through effective engagement of the govts institutions.
- Given the will to do, appropriate innovative institutional architecture is needed
- Combined efforts of government, civil Society, research Scientists and farmers will deliver.