

System of Rice Intensification

SRI Promotion in India & Orissa State



25 Dec. 2010
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Food Problem in India

Demand of rice will increase due to population increase, but rice production is stagnated, and fresh water resources for rice production are limited.

There is a possibility of food crisis in the future.

- ✓ **Rice cultivation in India is No.1 in area, and No.2 in production.**
- ✓ **Over 50% of rice area is irrigated, contributing 75% of the total production, but also consuming 50-60% of the water resources.**
- ✓ **India's 1.15 billion people, 70% rely on rice, 1/3 energy requirements.**
- ✓ **India's population is projected to grow to 1.6 billion in 2050.**
- ✓ **In 2008-09 (=best in recent years), rice area is 45.5 million ha, production is 99.2 million tons, and productivity is 2.2 t/ha.**
- ✓ **Growth rates of rice area, production, and productivity during 1994-95 to 2009-10 were (-) 0.04%, 1.15% and 1.04% respectively.**
- ✓ **The estimate for 2009-10 and 2010-11 shows the alarming downward trend in rice area and production.**

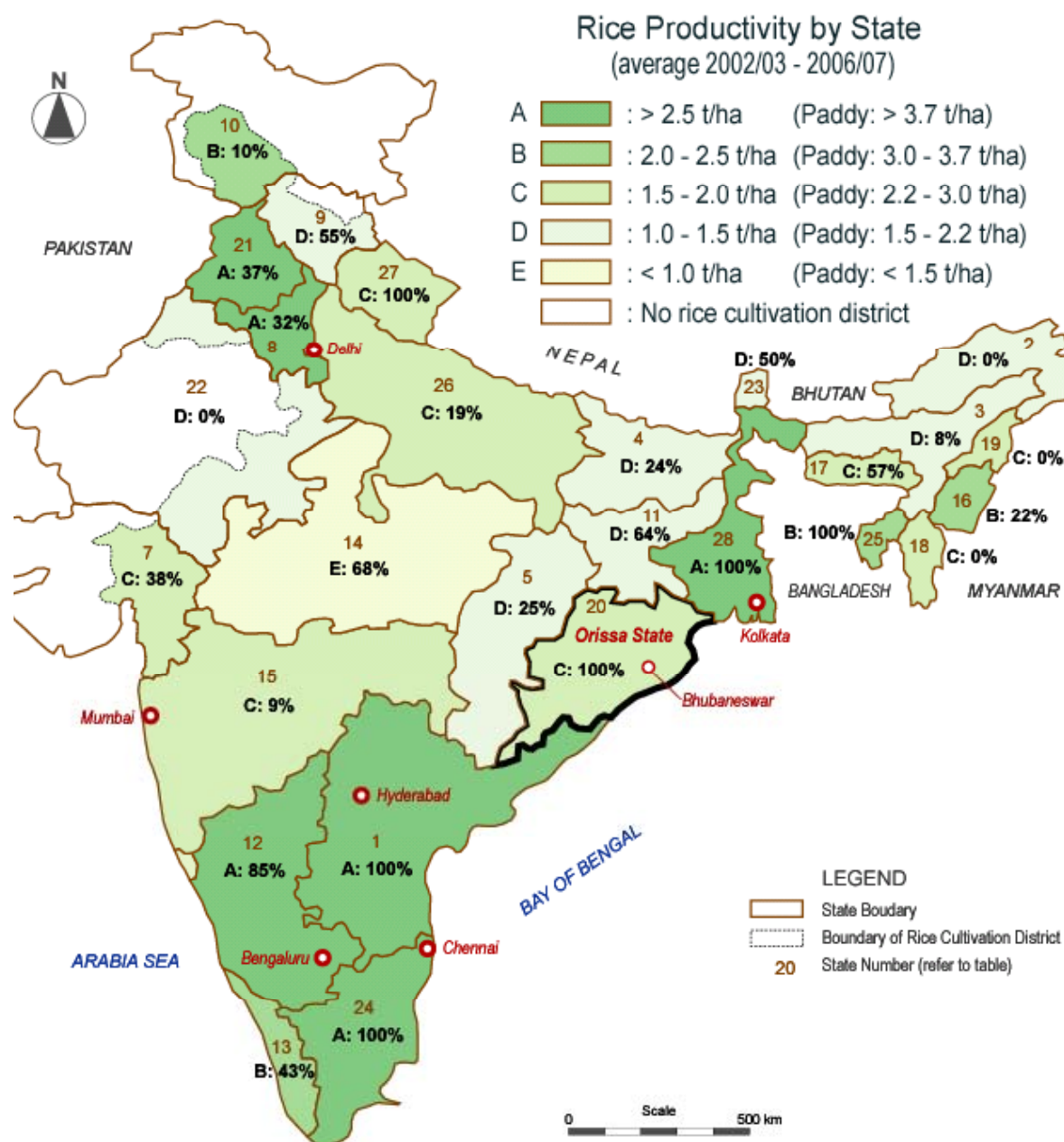
National Food Security Mission

- Scheme:** Centrally sponsored scheme launched in **August 2007**. Budget Rs.48,825 million in XI Plan (2007-08 to 2011-12)
- Objective:** To increase production and productivity of food crops on a sustainable basis so as to ensure food security.
- Target:** To increase production of rice, wheat and pulses by 10, 8, 2 million tons, respectively
- Location:** 136 districts in 14 states (in Orissa, 15 districts)
- Method:** 50% subsidy to farming activities (government list) on farmer's request (= loan from the bank).
- Component:** Comprehensive support includes technical assistance (free), procurement of seeds, equipment, fertilizer and pesticide, implementation of Farmers Field School, field demonstration, etc.

Support programs for SRI include: (1) Field demonstration of SRI, (2) Certified seeds of HYV, (3) Nursery bed preparation, (4) Conoweeder, (5) Soil test for nutrient status (free), etc.

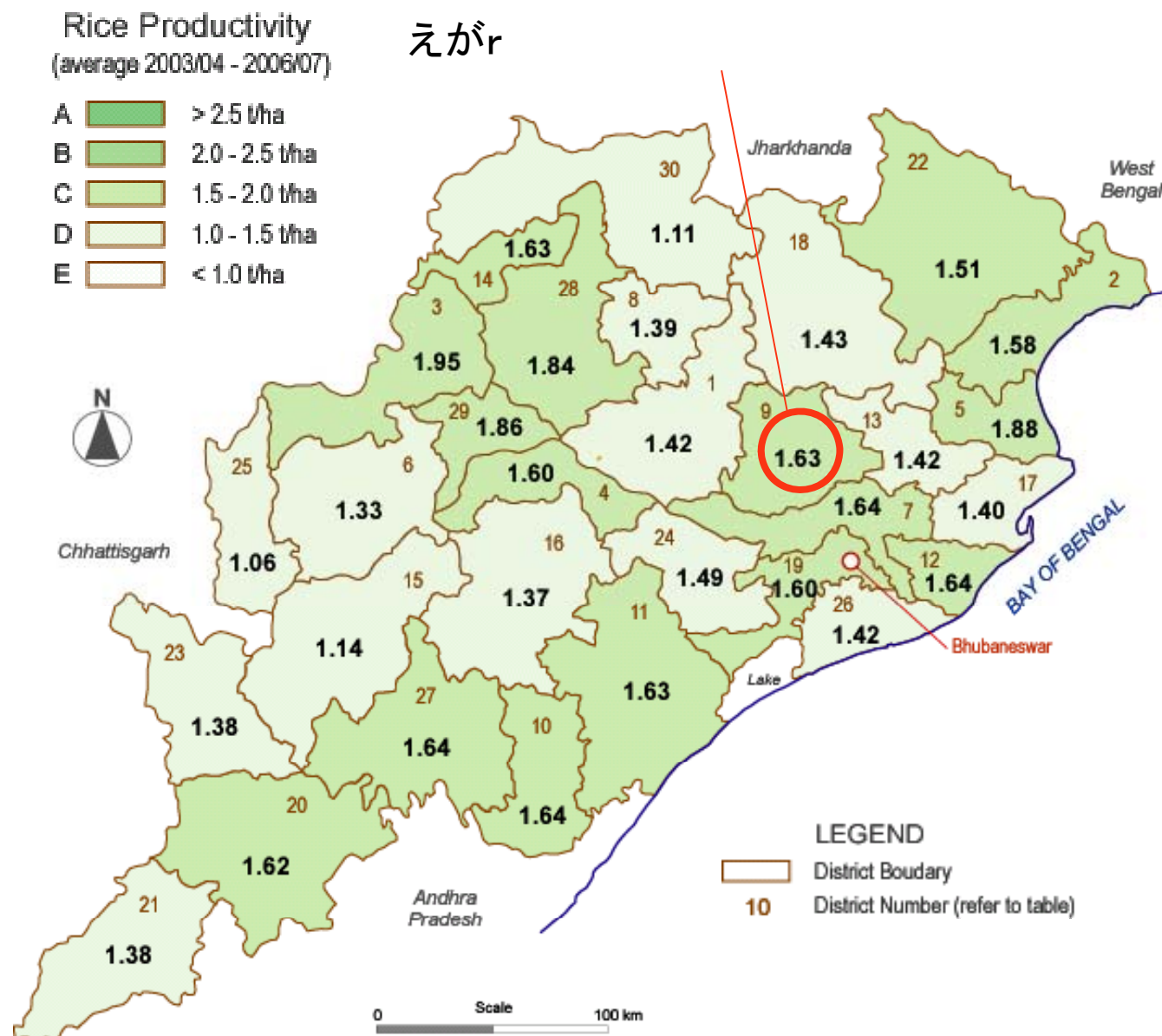
Using this scheme, a lot of field SRI demonstrations are under way.

Rice Productivity and SRI in India



State	Nos of District			Rice Cultivation	
	Total	w Rice Planting	w SRI Practice	Area (mil. ha)	Yield (t / ha)
1. Andhra Pradesh	23	22	22	3.369	2.94
2. Arunachal Pradesh	16	16	0	0.122	1.20
3. Assam	27	26	2	2.411	1.46
4. Bihar	38	38	9	3.379	1.27
5. Chhattisgarh	18	16	4	3.765	1.20
6. Goa	2	2	0	0.052	2.80
7. Gujarat	26	16	6	0.646	1.78
8. Haryana	20	19	6	1.008	2.95
9. Himachal Pradesh	12	11	6	0.081	1.40
10. Jammu & Kashmir	15	12	1	0.252	2.01
11. Jharkhand	22	22	14	1.402	1.41
12. Karnataka	29	27	23	1.283	2.76
13. Kerala	14	14	6	0.285	2.23
14. Madhya Pradesh	50	44	30	1.668	0.84
15. Maharashtra	35	32	3	1.523	1.59
16. Manipur	9	9	2	0.162	2.37
17. Meghalaya	7	7	4	0.107	1.76
18. Mizoram	8	8	0	0.056	1.63
19. Nagaland	8	8	0	0.156	1.61
20. Orissa	30	30	30	4.435	1.52
21. Punjab	20	19	7	2.611	3.78
22. Rajasthan	32	19	0	0.100	1.41
23. Sikkim	4	4	2	0.015	1.48
24. Tamil Nadu	31	31	31	1.754	2.70
25. Tripura	4	4	4	0.246	2.30
26. Uttar Pradesh	70	70	13	5.601	1.94
27. Uttarakhand	13	13	13	0.293	1.89
28. West Bengal	19	18	18	5.790	2.53
29. Union Territories	20	8	0	0.074	-
Total / Average	622	565	256	42.646	2.01

Rice Productivity in Orissa



No.	District	Rice Area (ha)	Production (ton)	Yield (t / ha)
1	Angul	113,033	160,698	1.42
2	Balasore	243,495	383,988	1.58
3	Baragarh	299,898	584,575	1.95
4	Baudh	69,975	111,975	1.60
5	Bhadrak	174,230	327,590	1.88
6	Bolangir	224,710	299,325	1.33
7	Cuttack	144,895	238,210	1.64
8	Deogarh	44,853	62,550	1.39
9	Dhenkanal	118,905	193,973	1.63
10	Gajapati	37,190	61,150	1.64
11	Ganjam	267,800	437,400	1.63
12	Jagatsinghpur	93,718	153,398	1.64
13	Jajpur	135,418	192,408	1.42
14	Jharsuguda	59,515	96,900	1.63
15	Kalahandi	272,630	311,775	1.14
16	Kandhamal	56,725	77,550	1.37
17	Kendrapara	138,218	192,975	1.40
18	Keonjhar	204,980	292,633	1.43
19	Khordha	116,828	186,350	1.60
20	Koraput	131,880	214,008	1.62
21	Malkangiri	88,410	121,943	1.38
22	Mayurbhanj	324,943	489,925	1.51
23	Nabarangpur	167,708	231,775	1.38
24	Nayagarh	98,505	146,500	1.49
25	Nuapada	107,365	114,223	1.06
26	Puri	176,608	250,945	1.42
27	Rayagada	60,828	99,700	1.64
28	Sambalpur	149,935	275,350	1.84
29	Sonepur	122,220	227,843	1.86
30	Sundargarh	228,045	253,125	1.11
Total / Average		4,473,458	6,790,755	1.52

Rengali Irrigation Project

Features of the Project

Rengali dam (comp. 1985)

- 70.5 m high, 1,050 m wide
- 3,414 MCM net storage
- 250 MW hydropower

Samal barrage (comp. 1994)

- 660 m wide, 17 bay

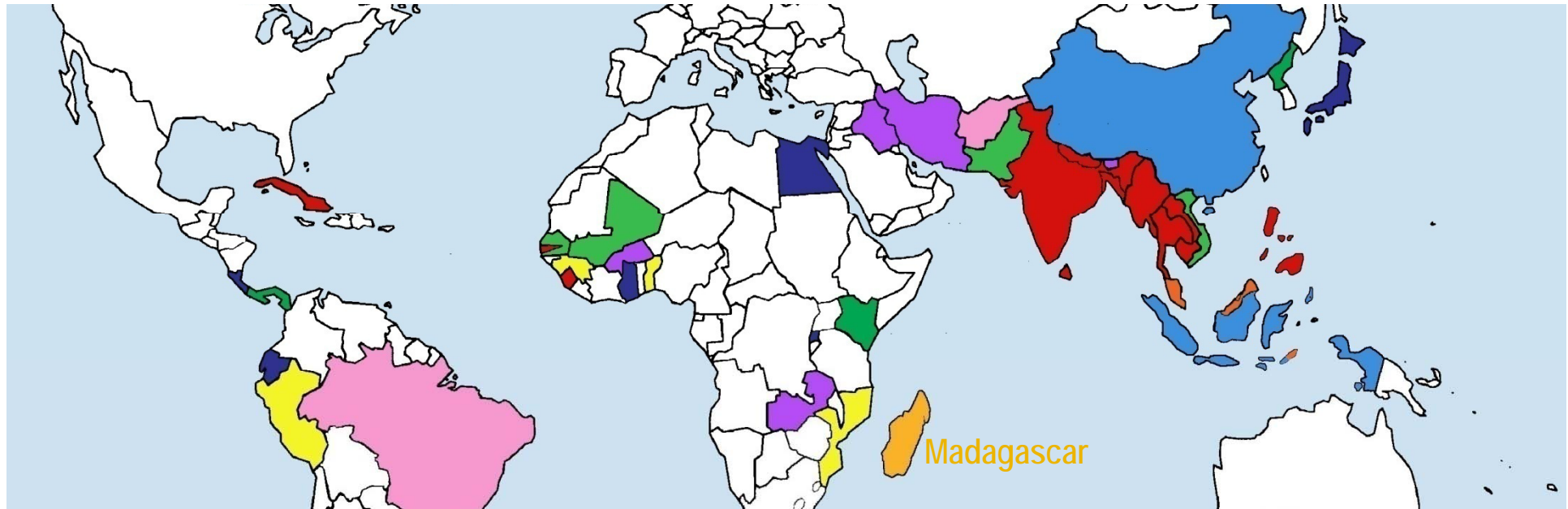
Irrigation area

- Command area: 235,500 ha
- Right Bank Cana: 121,200 ha
- Left Bank Canal: 114,300 ha
- JICA Sub-project: 29,000 ha



Spread of SRI in the World

In 2010 SRI benefits have been validated in 41 countries



Before 1999: Madagascar

1999/2000: China, Indonesia

2000/01: India, Bangladesh, Cambodia, Laos, Thailand, Philippines, Sri Lanka, Nepal, Gambia, Nepal, Myanmar, Sierra Leone, Cuba

2002/03: Benin, Guinea, Mozambique, Peru

2004/05: Senegal, Mali, Pakistan, Vietnam

2006: Burkina Faso, Bhutan, Iran, Iraq, Zambia


2007: Afghanistan, Brazil

2008: Rwanda, Costa Rica, Ecuador, Egypt, Ghana, Japan

2009: Malaysia, Timor Leste

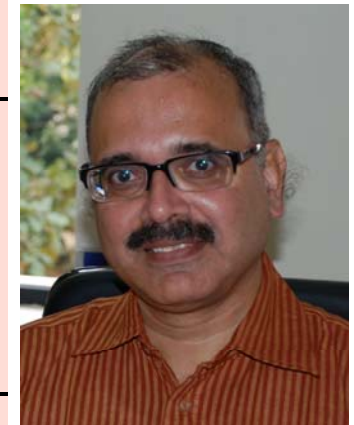
2010: Kenya, DPRK, Panama

SRI Timeline in India

Year	State	Introduced by
2000	Tamil Nadu Tripura Puduchery	Tamil Nadu Agricultural University,  Ramasamy Selvam (Organic farmer), Dept.of Agriculture, Auroville Farm
2001	Karnataka	Narayana Reddy, Organic farmer
2002	Bihar	Rajendra Agricultural University
2003	Andhra Pradesh West Bengal	Acharya NG Ranga Agricultural. University, Timbaktu Collective PRADAN
2004	Kerala Andaman Orissa Punjab Assam Gujarat	Mitraniketan KVK Central Agricultural Research Institute Central Rice Research Institute Dept. of Agriculture Assam Agrlcultural University Anand Agricultural University
2005	Chattisgarh Maharashtra Uttarakhand Meghalaya Jharkhand	Indira Gandhi Krishi Vishwavidyalaya Dr Balasaheb Sawant Konkan Krishi Vidyapeeth Govind Ballabh Pant University of Agriculture & Technology ICAR Research Complex for NE region Birsa Agricultural University
2006	Himachal Pradesh Jammu & Kashmir Nagaland	Peoples' Science Institute Sher-E-Kashmir University of Agricultural Sciences & Technology 'Prodigals Home'



Dr. Thiyagarajan



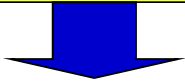
Dr. Shambu XIMB

After 2006 SRI has spread to almost all rice growing states

Process of SRI Dissemination

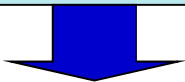
Stage-1: Promotion

- Policy to Promote SRI by the Government
- Workshop on SRI to present advantage
- Meeting at site to confirm action needed
- Demonstration farm operation



Stage-2: Field trial & evaluation

- Government's research station involve.
- Field trials to confirm key factors on SRI
- Yield survey & analysis
- Labor & financial analysis



Stage-3: Dissemination

- Campaign by the government & media
- Make SRI manual, and training materials
- Budget to disseminate SRI & to use NGOs
- Farmer training at Demo-plot and on-site

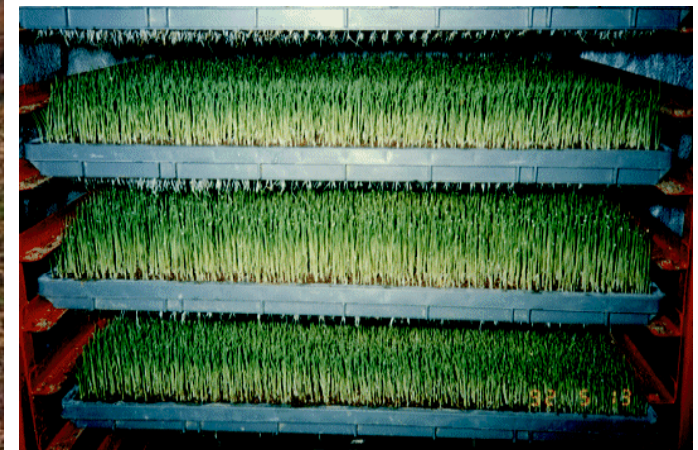
Mechanized Transplanting System

In 1990, Mechanized Transplanting System for Nursling Seedlings (SRI) was established and equipment became available in the market in Japan.



Transplanter of Nursling Seedling (3 hrs/ha)

***Controlled
preparation
system of
Nursling Seedlings***



Grid Making for Transplanting

Grid Marking for SRI Transplanting

25 cm x 25 cm

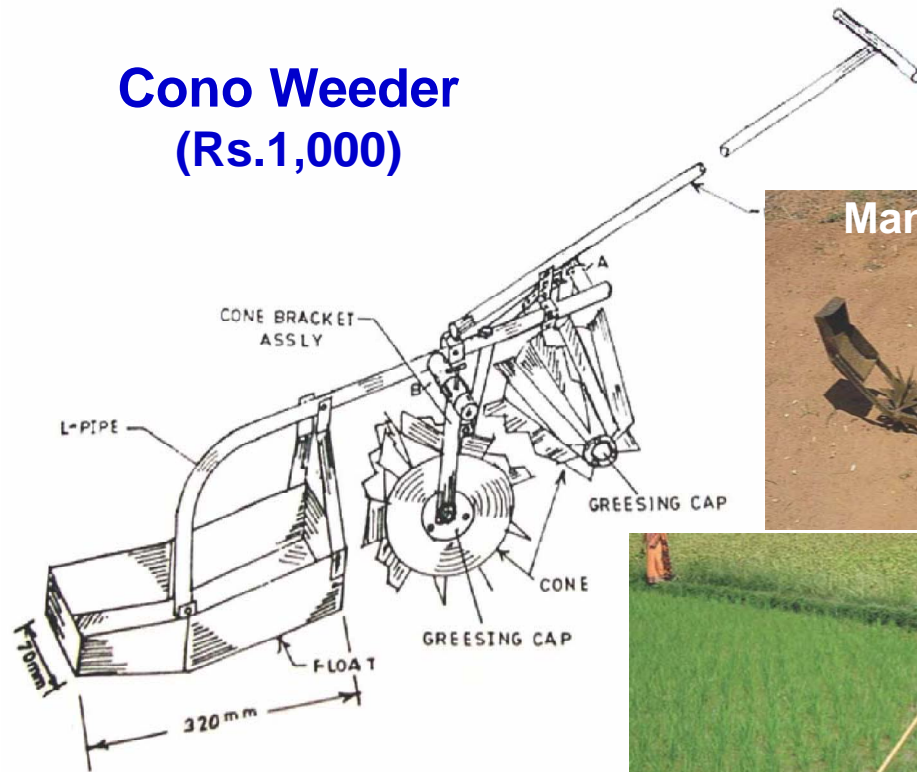
or

30 cm x 30 cm



Rotarry Weeder in India

Cono Weeder
(Rs.1,000)



Mandava Rs.550



Three Row Raichur Weeder
(2 persons) Rs.1,000



English Weeder



Japan Weeder



SRI Yield Survey in Orissa (DOA)

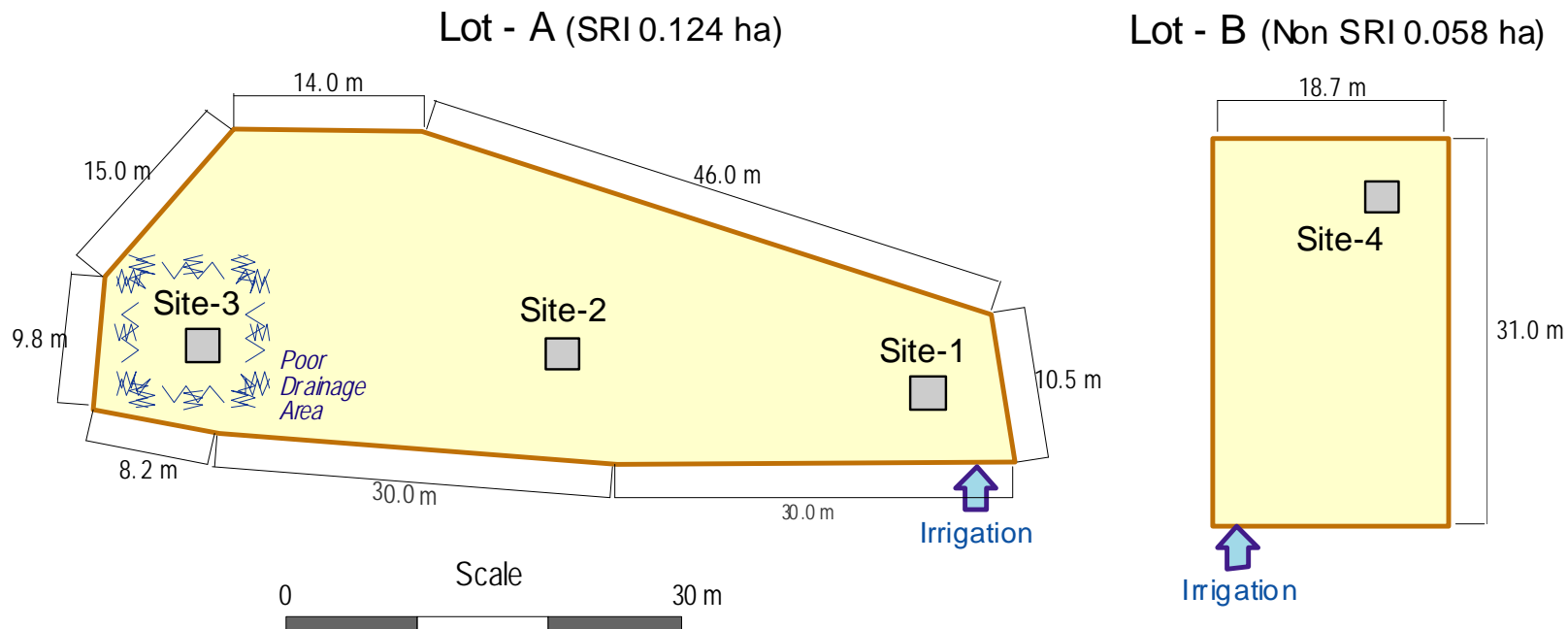
Demonstration Results of SRI Conducted in Farmer's Field by the State Agriculture Department (Dry Season 2007-08)

District	Nos.	Variety	SRI Yield t/ha	Control Yield t/ha	Increase %
Kalahandi	132	Lalat	5.98	4.31	38.6
Jajpur	2	Lalat	5.92	4.85	22.0
Bolangir	3	Lalat	5.43	2.87	89.1
Deogarh	7	Lalat	4.85	3.29	47.5
Sundargarh	1	Lalat	4.12	2.31	78.4
Dhenkanal	3	Lalat	7.32	8.30	-11.8
		Pratikhya	6.20	4.77	29.9
		Naveen	6.04	4.84	24.8
Khordha	50	Lalat	5.02	3.57	40.8
Koraput	50	Khandagiri	6.53	3.30	97.9
Kalahandi		KRH-2	8.75	6.67	31.2
		Naveen	6.50	4.50	44.4
Ganjam	NA	JKHY 401	7.45	4.84	53.9
		MTU-1001	6.56	3.34	96.8
		Pooja	6.02	3.46	73.8
		Pratikhya	7.39	4.27	72.9
Average			6.26	4.34	44.2

Source: Strengthening the Learning Alliance-Scaling up options for SRI in Orissa, 2008

SRI Yield Survey in Rengali (1)

SRI and Non SRI Paddy Yield Survey (Nov-Dec 2010) in Rengari Irrigation Sub-project Command Area



A.
SRI
Lot



B.
Non
SRI
Lot

SRI Yield Survey in Rengali (2)

Roots

SRI

Non SRI



Panicle

SRI

Non SRI



SRI Yield Survey in Rengali (3)

SRI and Non SRI Paddy Yield Survey in Rengari Irrigation Sub-project Command Area

Item	unit	Field Lot A			Lot B
		SRI			Non SRI
		Site-1	Site-2	Site-3	Site-4
Measuring site condition		Near water inlet	Manure apply before	Water logging site	Low lying site
Soil texture		Clay	Clay	Clay	Clay
Rice variety		Naveen	Naveen	Naveen	Naveen
Date of activity					
- Seeding		2-Aug-10	2-Aug-10	2-Aug-10	10-Aug-10
- Transplanting		12-Aug-10	12-Aug-10	12-Aug-10	26-Aug-10
- Harvest		27-Nov-10	27-Nov-10	27-Nov-10	14-Dec-10
Transplanting					
- Are of seedling	days	10	10	19	16
- Nos of seedling per hill	nos	1	1	1	2 - 3
- Spacing (hill distance)	cm	25 x 25	25 x 25	25 x 25	random
Weeding	nos	3	3	3	1
Irrigation		Intermittent (5-day wet + 10-15 day dry)			continuous
Unit Yield of paddy	t/ha	5.61	6.01	3.52	2.91

Action to Promote SRI

To shift SRI status to Stage-2 (Field trial & Evaluation), the following activities for 2 years are recommended to implement under the initiative of state DOA.

- (1) Systematic SRI field tests and evaluation together with CRRI and universities.**
- (2) Evaluation of intermittent irrigation cycle at each agro-climatic zone in Orissa.**
- (3) Preparation of SRI guideline/manual for Orissa.**
- (4) Staff training on SRI dissemination by learning from advanced experience in IAMWARM-Tamil Nadu.**
- (5) Support good NGOs to join with SRI field trial as TOT.**

It is preferable to give priority on SRI promotion by DOA to new irrigation areas for successful development, and thus to raise investment efficiency for the country.

Required Conditions for Success of SRI

*SRI can be effective by integration of
Agronomy - Water Management - Farmers*

- ◆ **Good irrigation infrastructure** is essential to meet farmers' need to receive reliable amounts of water.
- ◆ **Good management and O&M** of irrigation schemes by administrative staff are essential.
- ◆ **Strong and active farmer groups**, dynamically interacting and participating in O&M of facilities, are essential.
- ◆ **Motivated farmers** are important, with high levels of agricultural skill and an acute awareness of possibilities for innovation and increasing their yields and crop area.
- ◆ **Local government's support** for SRI dissemination is quite effective to encourage farmers to introduce SRI.

Further Information on SRI

SRI Homepage :

<http://ciifad.cornell.edu/sri/>

Japan SRI Association HP:

<http://www.iai.ga.a.u-tokyo.ac.jp/j-sri/index.html>

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Dewi SRI

*(Goddess of Rice
In Indonesia)*

Thank You