Orissa Rice Value Chain Analysis and Recommendations

Appendix

July 2013
Content

Supply-demand dynamics

Value chain & constraints

Policy & government context

Prioritized interventions
Globally, rice production expected to grow in line with demand

- **World consumption** expected to grow mainly due to **population growth**
  - Average per capita consumption will continue to decline slightly driven by urbanization, income growth, aging populations, and diet diversification in a number of Asian countries

- World rice **production expected to grow in line with consumption** mainly due to **increase in yields** as at world level
  - Area under rice is projected to remain ~flat, with an expected retreat in some Asian countries (e.g. China) balancing expansion in others

Production also expected to meet consumption in USDA and OECD-FAO forecasts

Source: European Commission Agricultural Commodity Markets Outlook (2010), OECD, FAO, FAPRI, USDA
Asian majors (Thailand, India, Vietnam, Pakistan) expected to continue to dominate exports, while imports more fragmented

| TRADITIONAL ASIAN RICE EXPORTERS EXPECTED TO UPHOLD TOP POSITIONS | PHILIPPINES EXPECTED TO REMAIN TOP IMPORTER |

Source: European Commission Agricultural Commodity Markets Outlook (2010), OECD, FAO, FAPRI, USDA
India has managed to attain rice self-sufficiency and built a rice surplus

- Rice production has generally been able to meet consumption
- Negligible imports since 1985
- Government has managed to amass considerable stocks

Source: United States Department of Agriculture, Production, Supply & Distribution Online
Majority of India’s basmati exports going to Middle East; non-basmati to Africa

INDIA EXPORTS MOST OF BASMATI TO MIDDLE EAST…

Top 3 countries account ~65% of Basmati exports

…AND MOST NON-BASMATI RICE TO AFRICA

Top 3 countries account ~36% of non-Basmati exports

Source: Director General of Commercial Intelligence & Statistics; All India Rice Exporters Association, Business Standard online, Lit. Search
Indian rice continues to be price competitive

ACROSS 4 NON-BASMATI RICE MARKETS
INDIA IS PRICE COMPETITIVE

INDIA GROWING SHARE DUE TO PRICE ADVANTAGE WHILE

“Indian non-basmati rice for export remains very price competitive, with Indian common rice varieties ranging from USD375-450 per tonne on freight on board (FOB) in the fourth week of September”.

US Department of Agriculture, October 2012

“Some credit should also be given to Indian exporters, who adopted modern techniques to process rice and scouted for newer markets,” said Prem Garg, managing director of Sri Lal Mahal group and a leading rice exporter. He said Africa, particularly Nigeria, was one such market which Indian exporters managed to capture because of the quality of rice and the price differential.”

The Hindu, 5 May 2012
Rice cultivation is the most important agricultural operation in India from both a food security and livelihood perspective.

**Rice is a dominant part of the Indian diet**

- Plays a vital role in national foodgrain supply, contributing ~42% of total foodgrain* production and ~45% of total cereal production.
- On average, rice provides ~30% of an Indian’s calorie intake (single largest contributor) and ~22% of protein intake (2nd largest contributor after wheat).

ALSO CENTRAL TO FARMER LIVELIHOODS, PARTICULARLY IN EASTERN INDIA

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*Foodgrain includes cereals (rice, wheat, coarse cereals) and pulses

Source: ICRISAT-WWF, GoI Planning Commission
Production has been growing steadily, driven by increased yields, while area under cultivation has remained relatively flat.

Source: FAOStat (latest data available)
India is the 2nd largest rice producer globally, though yields significantly lag global averages

**INDIA IS WORLD’S 2\textsuperscript{ND} LARGEST PADDY PRODUCER**
Top 10 paddy\textsuperscript{1} producing countries, 2010

**BUT ONLY # 59 GLOBALLY IN TERMS OF PADDY YIELD**
Top 10 paddy\textsuperscript{1} yield countries and India, 2010

1. After threshing and winnowing but pre-milling. Also known as rice in the husk and rough rice

Source: FAOStat (latest data available)
India has not matched yield achievements of other Asian countries

**India Lags Behind Asian Counterparts in Rice Productivity**

Rice paddy yield (kg/ha) of various Asian countries, 1961-2010

**Due Mostly to Later/Less Expansive Adoption of HYV and Hybrid Seeds**

- **India’s rice productivity is lower** than that of nearly all of its rice-producing Asian neighbors, with exceptions such as Thailand, Nepal, etc.

- **Average rice yield across Asia** in 2010 was 1.3x higher than India’s average yield

- Productivity improvements **typically driven by govt. promotion of HYVs** – and in China’s case, hybrids
  - **China**: Rapid expansion of hybrid rice since mid-1970s; now ~ 50% of rice area is under hybrid rice cultivation vs. <6% for India
  - **Vietnam**: Productivity boost came after govt. established a rice market system in 1986 (vs. farming communes/controlled prices) incentivizing productivity increases; also helped by modern early maturing rice varieties and better water and nutrient management
  - **Indonesia**: Due to govt.’s investments in irrigation, disseminating HYV along with subsidized fertilizer, pesticides, and credit as well as technical assistance

**Source**: FAOSTAT, FAO
Wastage and inefficiency pose significant challenges in India

**POST-HARVEST LOSS OF PADDY IS HIGH AT ~9-10% OF TOTAL STOCK**

- Estimated that ~9-10% of paddy is lost post-harvest due to:
  - Outdated drying and milling methodologies
  - Improper / unscientific methods of storage, transport, and handling

- Losses at producer level is ~3% of total production,
  - Biggest losses incurred during transport from field to threshing floor and threshing

**COMPOUNDING THIS ARE SERIOUS DIVERSION CHALLENGES**

- Remaining stock faces distribution issues under current Public Distribution System (PDS)
  - Informal sale of PDS grain, meant for ration card holders, on open market
  - Lack of transparency / accountability in transport arrangements, leading to losses

- At an all-India level, proportion of rice that is being diverted* is estimated at up to ~35%
  - One study estimates diversion peaked at ~41% in 2004-5
  - Since then, there has been a marginal decline (~5 p.p.)

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*Proportion of rice that does not reach beneficiary households. Estimated by comparing 'off-take' (procurement) data from FCI with data on household purchase from PDS shops, collected by NSS. As a results, shows upper bound for diversion. Analysis by Centre for Development Economics, Delhi study (March 2011)
Rising incomes are having multi-faceted impact on India’s rice consumption trends

| WITH RISING INCOMES, CONSUMPTION OF CEREALS DECLINING RELATIVE TO OTHER FOOD ITEMS | RURAL SPEND | URBAN SPEND |
|---|---|

THOUGH WITHIN CEREALS, SHIFT TO HIGHER-VALUE CEREALS SUCH AS RICE

- Despite shift away from cereals, rice remains a **staple food source** for majority of Indians, constituting ~53% of **cereals consumed** in 2007-08
- For rural poor, simultaneous shift from **coarse cereals** (bajra, ragi, jowar etc.) to **higher-value cereals such as rice** and wheat
  - Destitute and tribals in rural areas are increasingly growing and consuming higher-value cereals
  - Government procurement and distribution prices and practices favour rice and wheat

* Prices shown indicate value of consumption in rupees, per person, per 30 day average period, inflation adjusted using CPI with 2009-10 as base year
Net result has been a gradual decline in per capita rice consumption

- Overall rice consumption trend has been one of decline: from ~84 kg per capita in 1990 to ~74 kg today
- Gradual decline expected to continue amongst both rural and urban consumers
- Rural rice consumption expected to remain ~30% higher than urban

Source: United States Department of Agriculture, Production, Supply & Distribution Online; NSSO 66th Round 2009-10
Market demand is differentiated primarily by type of processing rather than variety: ~70% of Orissa rice consumption is parboiled, with ~25% raw rice and ~5% aromatic

<table>
<thead>
<tr>
<th></th>
<th>Parboiled (usna)</th>
<th>Raw* (arwa)</th>
<th>Aromatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-polished</td>
<td>40%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Polished</td>
<td>30%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Broken content</td>
<td>5-10%</td>
<td>1-3%</td>
<td>1-3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Avg. price (Rs.)</th>
<th>Parboiled (usna)</th>
<th>Raw* (arwa)</th>
<th>Aromatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open market, non-PDS price</td>
<td>~18-20</td>
<td>~20-22</td>
<td>~40-45</td>
</tr>
<tr>
<td>Raw* (arwa)</td>
<td>~25-30</td>
<td>~30-35</td>
<td></td>
</tr>
</tbody>
</table>

**Trends**

- Trend towards polished rice, driven by middle class and commercial (hotel, restaurant) consumption
- Aromatic consumption increasing slowly, but off a very low base
- Ratio between parboiled and raw consumption likely to remain in the same range – decision to consume parboiled vs. raw based on taste preferences rather than pricing

Note: *Raw rice refers to non-parboiled rice
Source: Primary interviews
Rice demand within Orissa expected to continue to grow

**~14% GROWTH DEMAND BY 2025**

**DRIVEN BY POPULATION GROWTH...**

- Pop. to grow by ~4M by 2025
- Assuming constant consumption of ~145kg per annum, add. ~0.6M MT of rice will be required by 2025
- However, increasing urbanization likely to reduce this figure by ~0.05 million MT (urban consumption lower than rural)

**...AND LATENT DEMAND BEING MET**

<table>
<thead>
<tr>
<th>Group</th>
<th>Latent demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely food insecure* paddy farmers</td>
<td>~0.1 million MT (assumes additional 600 cal / 150 gm rice per day)</td>
</tr>
<tr>
<td>Extremely food insecure* non-paddy farmers</td>
<td>~0.1 million MT (assumes additional 700 cal / 175 gm rice per day)</td>
</tr>
<tr>
<td>‘Remaining poor’ (assumed to be food insecure^)</td>
<td>~0.1 million MT (assumes additional 200 cal / 75 gm rice per day)</td>
</tr>
</tbody>
</table>

**Note:** Latent demand segments utilize same definitions as Slide 14 i.e.: *Extremely food insecure population consumes less than 1,800 kcal per day (less than 75% of the recommended minimum intake); ^Remaining poor or food insecure farmers consume between 1,800 kcal and 2,400 kcal per day.

Source: Govt. of Orissa; GoI Census; Team analysis, FAO, Lit. Search; Census on India 2001
Finally, regardless of actual market demand dynamics, government is obliged to absorb any additional production

**FARMER GROUPS ACTIVE IN DEMANDING PROCUREMENT RIGHTS**

- **Jan 2012**: Farmers stage 5-day road blockade in Malkangiri district, protesting non-procurement of paddy

- **Nov 2012**: Thousands of farmers protest ‘government indifference’ in Sambalpur, W. Orissa
  - Organized by Western Odisha Farmers Associations' Coordination Samiti (WOFACS)
  - Warned govt. of severe law and order problems if govt. continues to neglect farmers
  - Demand govt. increase price of paddy to Rs 1,500/qtl from present Rs. 1080

- **Dec 2012**: 4 hour protest in 11 districts across state
  - Organized by Paschim Odisha Krushak Sangathan Samanwaya Samiti (POKSSS)
  - Lobbying govt. to implement ‘uniform’ paddy procurement policy in state and pay Rs.300 bonus per qtl of paddy

**OPPOSITION FREQUENTLY USES PADDY PROCUREMENT ISSUE TO ATTACK GOVT.**

“**Opposition Congress**…came down heavily on the BJD government over the issue of distress sale of paddy and staged a walk out in its protest on Thursday.”

Times of India, Jun 2009

“We demand cancellation of the question hour and hold a discussion on the plight of the farmers… There is nobody for them. This time the crop condition is very good and the procurement that has been decided by government is one-third of the procurement of paddy in the districts. **What about the two-third rest paddy, where they will sell it?**”

Bhupinder Singh, Leader of Opposition, Odisha, Nov 2012

**ORISSA**

Government forced to step in to ensure ‘close to’ MSP given political sensitivity

Source: Team analysis
Content

Supply-demand dynamics

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The northern drought-prone, tribal zone also has lowest yields

AVERAGE PADDY YIELD BY DISTRICT (2010-2011)

Yield (kg/ha)
- <1500
- 1500-1999
- 2000-2499
- 2500-2999
- 3000+

Odisha average: 2448 kg / ha

Source: Directorate of Agriculture & Food Production, Odisha
SDTT (through Livolink Foundation) promoting improved agronomic practices in paddy amongst almost ~30,000 farmers

LIVOLINK HAS RAPIDLY SCALED ITS “SRI” PROMOTION INITIATIVE IN ORISSA

WORKS IN >HALF DISTRICTS OF ORISSA THROUGH ~37 PARTNERS

~20% farmers involved in Livolink program are from Orissa

Note: SDTT = Sir Dorabji Tata Trust

Funding (India wide)
2008-2011: Rs. ~100 million ($2.0M)
2011-2014: Rs. ~240 million ($4.4M)
Pradan is also promoting “SRI”, with a focus on tribal districts

**NGO FOCUSED ON ENHANCING LIVELIHOOD CAPABILITIES OF ‘POOREST OF THE POOR’**

- Pradan aims to reduce rural poverty through **promoting and capacitating Self-Help Groups (SHGs)**
  - Creates SHGs Self Help Groups (SHGs) and works with them to develop sustainable livelihood plans
  - Trains specific local villagers as community development service providers in relevant areas, including good agronomic practices for paddy cultivation (termed “SRI”)

- Pradan has **aggressive expansion plans** in Orissa, targeting **reaching 100,000 households in 5 years**
  - Will concentrate on expansion in present six districts within 3 years
  - Will expand to more districts between 3-7 years

- Will continue replicating its livelihood model and will **seek Government collaboration** in doing so

**PRADAN WORKS PRIMARILY IN TRIBAL DISTRICTS**

- ~50 permanent field staff
- Currently working with ~12,000 households

Source: Govt. of Odisha; Team analysis
Women play a significant role in the production of rice in Orissa

### Women’s role in rice production

<table>
<thead>
<tr>
<th>Production</th>
<th>Processing</th>
<th>Trading / retailing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land preparation</td>
<td>Nursery preparation</td>
<td>Planting</td>
</tr>
<tr>
<td>Nursery preparation</td>
<td>Weeding</td>
<td>Harvesting</td>
</tr>
<tr>
<td>Planting</td>
<td>Threshing</td>
<td>Milling</td>
</tr>
<tr>
<td>Weeding</td>
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<tr>
<td>Harvesting</td>
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<td>Threshing</td>
<td></td>
<td></td>
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<tr>
<td>Milling</td>
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</tbody>
</table>

- **Carried out by men**
- **Both by physical (plough) and mechanical (tractor) means**
- **Carried out in or near household**
- **Majority work done by women**
- **Majority work done by women (for surplus areas)**
- **Majority work done by women if done manually**
- **Majority work done by women, and is generally done manually**
- **Both men and women**
- **Men typically thresh and women carry paddy; collect loose grains etc.**
- **Typically carried out by men**
- **Typically carried out by men**

**Preference for female labour often driven by lower wage rate**
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Supply-demand dynamics

**Value chain & constraints**

**Surplus**

Tribal

Policy & government context

Prioritized interventions
Seeds: Many farmers not growing appropriate varieties – over 40% total area still under Swarna

<table>
<thead>
<tr>
<th>Estimated % area by agro-climatic condition</th>
<th>Recommended varieties</th>
<th>Actual varieties grown</th>
</tr>
</thead>
</table>
|                                            | • Short-duration HYVs e.g. Lalat, Pratikshya  
• Drought-tolerant Sahbhaghi Dhan         | • Swarna (~40%)         |
|                                            | • Med.-duration HYVs e.g. Pooja, Rani Dhan, Pratikshya  
• Hybrids e.g. Arize 6444 Gold, Arize Tej | • Lalat, Pooja (~10% each) |
|                                            | • Med.-duration HYVs e.g. Pooja, Rani Dhan, Pratikshya  
• Hybrids e.g. Arize Dhani, Arize 6444 Gold | • MTU-1001, Naveen (<10%) |
|                                            | • Submergence tolerant Swarna Sub-1, IR 64 Sub-1 | • Swarna (~35%)  
• Pooja (~10%)  
• MTU-1001, CR-1018 (<10%) |
|                                            | • Drought tolerant Sahbhaghi Dhan | • Swarna (~40%)  
• Lalat (~10%)  
• Pooja, MTU-1001, Sahbhaghi Dhan (<10%) |

In total, ~40%+ area still under Swarna, which is increasingly pest and disease prone.

Source: IRRI; Primary interviews; Lit. Search
Seeds: Farmers also have doubts about hybrids’ profitability & quality

COST-BENEFIT AND QUALITY CONCERNS HAVE HAMPERED ADOPTION

- **On-farm yields do not match those of trials**
  - Though hybrid rice requires greater pesticide and fertilizer use to achieve full potential, proper quantities frequently not applied in practice
  - Consequently, for many farmers yields for hybrids only marginally higher than OPV

- **As a result, unclear value proposition for farmer**
  - Realized yields do not balance higher input prices
  - Hybrid seed cost 5-6x OPV; seed can only be used once

- **Many consumers and millers perceive hybrid rice/paddy as inferior**, though these perceptions are slowly changing
  - Hybrid not sometimes not used for farmers’ own consumption due to poor taste and cooking quality perception; regarded as less nutritious
  - Hybrid also unpopular with some millers due to high breakage and lower recovery rates, as well as marketability, and hence they pay a lower price for hybrid paddy

- **Poor previous experience** during failed hybrid promotion attempt in 1996

THESE CONCERNS GRADUALLY BEING OVERCOME, BUT WILL TAKE TIME

“**Yes, I suppose there is a slight difference in taste [between hybrids and non-hybrids], but hybrids are easy enough to cook. I don’t see a huge consumer bias against hybrid rice.**”

Rice retailer, Cuttack

“**These days there’s really no difference between hybrid and regular paddy in terms of milling quality**”

Miller, Bargarh

“**The past experience such as the 1996 hybrid failure has given the wrong impression about hybrids to the farmers. Therefore, there is a big challenge to convince farmers to adopt the hybrids** In this respect, the Government participation in hybrid promotion has to improve.”

Bayer Regional Manager, Orissa

Source: Primary interviews; Lit. Search.
Fertilizer: Fertilizer consumption in Orissa is extremely low due to low awareness and almost no soil testing.

FERTILIZER USAGE IN ORISSA IS ONE OF THE LOWEST IN COUNTRY

KEY DRIVER IS LACK OF AWARENESS AND NEGLIGIBLE SOIL TESTING

<table>
<thead>
<tr>
<th>Driver</th>
<th>Impact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>• Extremely limited soil testing and farmer education on soil management</td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td>• Limited availability of fertilizers at PACS at right time</td>
<td></td>
</tr>
<tr>
<td>Affordability</td>
<td>• High prices of P &amp; K fertilizers ever since Centre decontrolled prices on April 2010 as part of nutrient based subsidy scheme</td>
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</table>

Source: Team analysis
### Pesticides/herbicides: Reasonable by Indian standards, with limited government intervention in sector

<table>
<thead>
<tr>
<th>PESTICIDE USAGE JUST UNDER INDIA AVERAGE</th>
<th>PRIVATE SECTOR LED AREA, WITH NO GOVT. DISTORTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In surplus areas, pesticide usage is reasonable with most farmers using pesticides</td>
<td></td>
</tr>
<tr>
<td>• Pesticide sector dominated by private players with no subsidy offered</td>
<td></td>
</tr>
<tr>
<td>• Main companies active in Orissa are United Phosphorus Limited and Rallis India</td>
<td></td>
</tr>
</tbody>
</table>
  - Most popular pesticides are Ustaad Super, Nova Plus and Contaf Plus | |
| • Adulteration and quality problems were not found to be issues during fieldwork | |

India still lags rice-producing Asian neighbours e.g. Thailand: ~1.5 China: ~2.5

Source: Pesticide Unit, Dept. of Agriculture; Field interviews
Agronomic practices: Improvement in recent years, within intense focus on line transplanting

LINE PLANTING IS PRIMARY FOCUS OF GOVT. FROM A PRACTICES PERSPECTIVE

• Orissa government earlier used to support comprehensive set of SRI practices, but now is focusing on line transplanting

• In 2012-13, State Govt. is investing Rs. 150 million (~2.7M USD) in paddy line transplanting and line sowing under RKVY
  - Aims to promote line sowing / line transplanting on 100,000 hectares
  - Rs. 1,250 per ha paid to farmer as incentive; Rs. 250 per ha paid to NGOs to mobilise and supervise farmers

“We are not exactly promoting SRI but you might term it ‘modified SRI’ where we follow certain principles of the SRI practice. Line transplanting as well as irrigation are the main focus points for us in this respect.”
  District Agriculture Officer (DAO), Bargarh

“As most of the area is rain fed, we cannot follow all the principles of SRI. Therefore, we try to follow good agronomic practices as much as possible and line transplanting forms an essential component of it.”
  Deputy Director of Agriculture (DDA), Keonjhar

Source: Primary interviews, Team analysis
Agronomic practices: Govt. moved away from wholesale promotion of SRI due to labour constraint and its unsuitability for all agro-climatic conditions

SRI EXTREMELY CHALLENGING TO REPLICATE ON THE GROUND

- Knowledge intensive package of practices which requires intensive upfront support and training for farmers
  - Government extension services often unable to provide this level of support

- SRI is also labour intensive, particularly for larger farmers who are reliant on hired labour (vs. family labour)
  - Unavailability of quality labour willing to carefully and rigorously follow practices
  - For farmers who do adopt, increased labour costs due to additional activities (levelling of fields, creating drains, weeding 3+ times a season)
  - Lack of availability of mechanization (e.g. cone weeders) makes labour requirements even greater

AND DOES NOT EVEN WORK IN ALL CONDITIONS / FARMER SEGMENTS

- Alternate wetting and drying is highly risky in rainfed areas

- Use of only organic fertilizers is simply not feasible in meeting soil nutrition requirements
Agronomic practices: However, “SRI” still promoted in pockets by government, with impressive results

**NON-SRI**

- **Avg. yield:** 40 qtls per ha
- **Avg. land holding:** 1.6 ha

Represents ~21% profitability

**SRI**

- **Avg. yield:** 88 qtls per ha
- **Avg. land holding:** 1.8 ha

PoP

- Swarna seed
- 12 day old seedlings
- 25cm x 25 cm spacing
- 1 seedling per hill
- 5 times weeding
- Vermicomposting, green manuring
- Organic pesticides

Represents ~69% profitability

**Bhdrak District**

“SRI” promoted by State Govt. via various local NGO partners

**Note:** Estimation based on field interviews (n = 31 for non-SRI; n = 5 for SRI). Entire sample using OPV seeds. Interviews in Bhdrak district. Sources: Primary interviews; Team analysis.
Sufficient milling capacity in Orissa, which is underutilized due to govt. strictures; paddy is exported to neighbouring states with excess milling capacity

ENOUGH MILLING CAPACITY WITHIN ORISSA, THOUGH UNDERUTILIZED

- Currently ~2,000 millers in state with average capacity of ~2 MT / hr
- Implies total annual milling capacity of ~13 million MT paddy, in line with ~13 million MT production
- However, proportion of this capacity is underutilized due to tight regulations on milling
  - Custom millers can only mill for the government: even after meeting their custom milling targets they are not allowed to procure additional paddy on their own and mill for the open market
  - Although in reality most mill informally on the side, under-utilization exists

Source: Department of Agriculture and Cooperation; FCI; Primary interviews
Infrastructure: Not a roadblock to development of milling industry, market linkages etc.

REASONABLE ROAD NETWORK, EVEN IN RURAL AREAS

AND DECENT ELECTRICITY SUPPLY

Source: Govt. of India; Lit. Search
Content

Supply-demand dynamics

Value chain & constraints

   Surplus
   Tribal

Policy & government context

Prioritized interventions
Fertilizers: Even lower usage than in surplus areas primarily driven by lack of awareness; affordability also a key issue

FERTILIZER USAGE TENDS TO BE LOWER IN TRIBAL AREAS

<table>
<thead>
<tr>
<th>Key Challenges</th>
<th>Impact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>• Extremely limited soil testing and farmer education on soil mgmt.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Poorer than in surplus areas due to state of govt. extension services in these areas</td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td>• Limited availability of fertilizers at PACS at right time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Slightly poorer than in surplus areas due to lower PACS penetration in tribal districts</td>
<td></td>
</tr>
<tr>
<td>Affordability</td>
<td>• High prices of P &amp; K fertilizers ever since Centre decontrolled prices on April 2010</td>
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</tr>
<tr>
<td></td>
<td>• Affordability a more serious challenge for tribal farmers given lower incomes</td>
<td></td>
</tr>
</tbody>
</table>

Source: Govt. of Odisha; Primary interviews
Agronomic practices: When farmers do adopt integrated PoPs through NGO interventions, impressive yield and income impact

**TRADITIONAL**

Avg. yield: 27 qtls paddy per ha
Avg. land holding: 1.9 ha

Represented ~35% profitability

**DIRECTIONAL**

Keonjhar District
“Modified SRI” promoted by Pradan

“MODIFIED” SRI

Avg. yield: 35 qtls paddy per ha
Avg. land holding: 2.3 ha

Pradan PoP in Keonjhar
- HYVs e.g. Naveen, Lalat
- 10-12 day old seedlings
- 25cm x 25 cm spacing
- 1 seedling per hill
- 5 times weeding
- Use combination of chemical fertilizers and vermicompost

Represents ~58% profitability

**TRIBAL**

Note: Estimation based on field interviews (n = 13 for non-SRI; n = 8 for SRI). Entire sample using OPV seeds. Interviews in Keonjhar.
Sources: Primary interviews; Team analysis
Content

Supply-demand dynamics

Value chain & constraints

Policy & government context

Prioritized interventions
While constitutionally agriculture is a state responsibility, Centre formulates overall policy and provides financial resources through a number of ministries.

<table>
<thead>
<tr>
<th>Ministry of Agriculture</th>
<th>Ministry of Rural Development</th>
<th>Ministry of Consumer Affairs, Food and Public Distribution</th>
<th>Ministry of Commerce and Industry</th>
<th>Ministry of Food Processing</th>
<th>Ministry of Chemicals and Fertilizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Consists of three main departments:</td>
<td>• Engaged in accelerating the socio-economic development of rural India</td>
<td>• Divided into two departments</td>
<td>• Responsible for development and regulation of trade policies for India</td>
<td>• Promotes development of food processing sector</td>
<td>• Responsible for policy, planning, development and regulation of chemicals, petrochemicals and fertilizers</td>
</tr>
<tr>
<td>- Agricultural Research and Education</td>
<td>- Two main departments</td>
<td>- Dept. of Rural Development implements govt. policies related to rural agriculture and self-wage employment of rural poor</td>
<td>• This ministry formulates all import and export policies related to agriculture produce and products</td>
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<tr>
<td>- Agriculture and Cooperation</td>
<td>- Dept. of Land Resources works primarily in area of increasing biomass production and development of wastelands in the country</td>
<td>- Dept. of Food and Distribution looks into timely procurement and distribution of food and grains so as to ensure food security</td>
<td>• Aims to create increased job opportunities in rural areas, enable farmers to reap benefit from modern technology, create surplus for exports and stimulate demand for processed food</td>
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<tr>
<td>- Animal Husbandry and Dairying</td>
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<td>- Dept. of Consumer Affairs is responsible for formulating pricing policies and looking after other consumer cooperatives and institutions</td>
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<td>• Responsibilities:</td>
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<td>- Coordinate and promote agricultural research &amp; education</td>
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# Effectiveness of various State/Centre interventions often reduced because of administrative and political factors, though RKVY may be a new way forward

| Wide range of interventions with differing political objectives |  • Proliferation of policy interventions makes it difficult for Centre and State to coordinate their objectives and make them consistent  
• For instance, Centre supplies subsidized rice to the poor through PDS, but certain States sell rice even cheaper at ~Rs. 2 per kg increasing the subsidy burden  
  - Moves largely politically driven to win more votes 
  - E.g. Tripura government, in July, distributed rice at Rs. 2 to all people living below the poverty line just before the 2012 polls; similar situation occurred in Orissa before the 2009 elections |
|---|---|
| Uncoordinated implementation approach |  • Interventions are often rolled out in a piecemeal manner and are uncoordinated between the institutions making decision making difficult for all stakeholders  
• This often creates confusion on interpretation of policy leading to ineffectiveness and misuse.  
• For example, in the programme on agriculture extension by Agriculture Technology Management Agency (ATMA), poor coordination between the stakeholders led to great disparities in implementation within and across states  
  - 11th Planning Commission acknowledges lack of coordination between ATMA and other state agencies – particularly Krishi Vigyan Kendra (KVK) – has led to programmes failing to achieve implementation goals and objectives |
| Funding of state agricultural institutions |  • Many State agriculture institutions depend on central government for their funding requirements. As a result, these institutions tend to align their objectives and activities with Central government rather than deal with state specific issues  
• E.g. State Agriculture Universities are very poorly funded by the State and rely heavily on Centre (primarily Indian Council of Agricultural Research), reducing amount of research on regional topics |
| Recent introduction of Rashtriya Krishi Vikas Yojna may provide way forward |  • Rashtriya Krishi Vikas Yojna (RKVY) a new scheme implemented by the Planning Commission in 2007 as part of the 11th Five Year Plan aims to reduce confusion between Centre and State by allowing states to make independent agriculture policy decisions  
• Incentivises State governments to draw up agriculture plans that will address state specific issues  
• Too early to judge success, though Centre continuing with RKVY framework in 12th Five Year Plan |
Rice productivity enhancement is a key priority of GOI and it has launched a number of flagship schemes to do so

<table>
<thead>
<tr>
<th>NATIONAL FOOD SECURITY MISSION (NFSM)</th>
<th>BRINGING GREEN REVOLUTION TO EASTERN INDIA (BGREI)</th>
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<tbody>
<tr>
<td>• Launched in <strong>2007</strong> by GoI's National Development Council</td>
<td>• Launched by GoI in <strong>2010-2011</strong> to improve productivity of rice-cropping systems in eastern India</td>
</tr>
<tr>
<td>• Set out to <strong>increase production of rice, wheat and pulses</strong> by 10M, 8M and 2M metric tons respectively by end of 11th Plan (2012)</td>
<td>• <strong>Operates in seven states:</strong> Assam, West Bengal, Odisha, Bihar, Jharkhand, Eastern Uttar Pradesh and Chhattisgarh</td>
</tr>
<tr>
<td>• <strong>Rs. 255 billion</strong> (~US$5.1B) funds under 12th Five-Year Plan (2012-17)</td>
<td>• <strong>Allocation increased</strong> from Rs. 4 billion in 2011-12 to Rs. 10 billion in 2012-13</td>
</tr>
<tr>
<td>• <strong>100% Central government funding to State level autonomous agencies</strong></td>
<td>• <strong>Sub-scheme of RKVY,</strong> a Central government scheme aimed at giving high levels of flexibility to the states in developing their agri. Sectors</td>
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</tbody>
</table>
| • **Farmer subsidies for approved seed varieties** and micro-nutrients | • **Block-demonstrations** for rice & wheat (~63% of funds)  
  - Identification of progressive farmers to handhold  
  - Provision of implements e.g. drum seeders, cone weeder |
| • **Farmer trainings** on crop evaluation, crop protection technologies, etc. | • **Asset building to enhance water utilization** e.g. tubewells, borewells, pump sets (~17% funds) |
| • More than **50,000 demonstrations of SRI** and nearly **25,000 demonstrations of hybrid rice** have already been conducted | • **Site-specific activities** e.g. construction/renovation of irrigation channels/electric power supply (~19% of funds) |
| • During 2008-09, nearly **50% of rice districts** (70 out of 143) recorded more than **10-20% enhancement in productivity** compared to base year of 2006-07 | • In 2011-12, rice production from Eastern region was **estimated ~56 million MT,** an increase of **19.8% over last year** vs. all India increase of 7% |

GOI = Govt. of India  
Source: NFSM website, RKVY website, GOI
Orissa state government also focused on productivity improvement through enhanced inputs and extension

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<tr>
<th>Priorities under Orissa’s State Agriculture Policy (2008*)</th>
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<tr>
<td><strong>SEEDS</strong></td>
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<tr>
<td>• Major initiatives include <strong>provision of subsidy</strong> oncertified seeds from Orissa State Seed Corporation and <strong>Seed Village Program</strong></td>
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<tr>
<td>• Also plan to <strong>increase capacity of seed processing plants</strong> and strengthen <strong>Seed Certification Agency</strong></td>
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<tr>
<td>• Plans to open <strong>seed sale centers</strong> in each village (though successful implementation of program remains to be seen)</td>
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<tr>
<td><strong>IRRIGATION</strong></td>
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<tr>
<td>• Goal of establishing <strong>at least 35% irrigation</strong> in each block</td>
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<tr>
<td>• ‘Jalanidhi’ scheme provides <strong>50% subsidy</strong> for tubewell, borewell and lift irrigation</td>
</tr>
<tr>
<td><strong>MECHANIZATION</strong></td>
</tr>
<tr>
<td>• State Govt. committed to providing <strong>additional subsidy over and above</strong> assistance approved by Govt of India</td>
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<tr>
<td>• ~50% <strong>subsidy</strong> on most types of equipment e.g. tractor, power tiller, combine harvesters etc.</td>
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<tr>
<td><strong>EXTENSION</strong></td>
</tr>
<tr>
<td>• Push to strengthen extension services through <strong>retraining and retooling</strong> extension staff, plus <strong>increasing manpower</strong></td>
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<tr>
<td>• Leverage <strong>ATMA</strong> (Agricultural Technology Management Agencies), central govt.’s flagship extension scheme</td>
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*Most recent refresh
Source: Dept of Agriculture Government of Orissa; Lit. Search
Government active at most stages of rice value chain

### INPUTS

<table>
<thead>
<tr>
<th>1a Seeds</th>
<th>2a Agronomic practices</th>
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<tr>
<td>Ministry of Agri.</td>
<td>Ministry of Agriculture</td>
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<tr>
<td>Central Rice Research Institute</td>
<td>Directorate of Agriculture</td>
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<tr>
<td>Directorate of Agri.</td>
<td>Agri. Universities</td>
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<tr>
<td>Orissa State Seed Corp.</td>
<td>National Rural Livelihood Mission (TRIPTI)*</td>
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<tr>
<td>Orissa State Seed Certification Agency</td>
<td>Agriculture Technology Management Agency (ATMA)</td>
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<tr>
<td>PACS</td>
<td>Krishi Vigyan Kendras (KVKs – Agricultural Science Centres)</td>
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<td>District extension staff</td>
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<tr>
<th>1b Fertilizers</th>
<th>2b Mechanization &amp; labour</th>
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<tr>
<td>Ministry of Chemicals &amp; Fertilizers</td>
<td>Ministry of Rural Development</td>
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<td>PACS</td>
<td>Directorate of Agriculture</td>
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<td>Agri. Universities</td>
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<td>ATMA</td>
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<td>KVKs</td>
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<th>1c Pesticides</th>
<th>2c Irrigation</th>
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<tr>
<td>Ministry of Chemicals &amp; Fertilizers</td>
<td>Min. of Water Resources</td>
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<tr>
<td>Orissa State Seed Corp.</td>
<td>Watershed Development Mission</td>
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<td>Orissa State Seed Certification Agency</td>
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<td>Cen. Insecticides Board</td>
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<th>1d Access to credit</th>
<th>2d</th>
<th>3 Post-harvest practices</th>
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<tr>
<td>NABARD</td>
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<td>Directorate of Agriculture</td>
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<td>Public sector banks</td>
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<td>Nat. Rural Livelihood Mission (TRIPTI)*</td>
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<th>1e Infrastructure</th>
<th>2e</th>
<th>3d</th>
<th>4 Market access</th>
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<tr>
<td>Ministry of Surface Transport</td>
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<td>Ministry of Consumer Affairs, Food and Public Distribution</td>
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<tr>
<td>National Highway Authority of India</td>
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<td>Commission for Agricultural Costs and Prices</td>
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<td>Grid Corporation of Orissa</td>
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<td>Food Corporation of India</td>
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<td>Directorate of Agriculture</td>
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<td>Department of Food Supplies &amp; Consumer Welfare</td>
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<td>Orissa State Civil Supplies Corporation</td>
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<td>Tribal Development Cooperative Corporation</td>
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<td>Regulated Market Committees</td>
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<th>5 Milling</th>
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<tr>
<td>Ministry of Food Processing</td>
<td>Ministry of Agri.</td>
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<tr>
<td>Small Industries Development Bank of India (SIDBI)</td>
<td>Central Rice Research Institute</td>
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<tr>
<td>Directorate of Agriculture</td>
<td>Director of Agri.</td>
</tr>
<tr>
<td>Department of Industries</td>
<td>Orissa State Seed Corp.</td>
</tr>
<tr>
<td>Department of Micro, Small &amp; Medium Enterprise</td>
<td>Orissa State Seed Certification Agency</td>
</tr>
</tbody>
</table>

*Only recently operational

PACS = Primary Agriculture Cooperative Societies
Central government also exerts heavy control over fertilizer sector

**INDIAN FERTILIZER SECTOR HEAVILY REGULATED**

- **Urea sector** (accounting for ~50% of fertilizer consumption) is fully regulated where retail price is fixed and subsidy is variable in order to ensure cost plus return

- Since **April 2010**, non-urea sector (i.e. P and K fertilizers) has functioned under a fixed subsidy-variable retail price framework
  - Previously also had fixed retail price, but prices were decontrolled under Nutrient Based Subsidy (NBS) scheme, announced in April 2010

- **Retail price differential** between urea and non-urea fertilizers widening
  - Partial price deregulation – fixed urea price and variable non-urea fertilizer prices
  - Lower subsidies to P and K under NBS
  - Weak rupee – India heavily dependent on imports for P and K fertilizers

- This has further skewed consumption in favour of urea

**RAPIDLY RISING P & K PRICES SKewing CONSUMPTION**

<table>
<thead>
<tr>
<th>Pre-NBS period</th>
<th>Post-NBS period</th>
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**INPUT SUBSIDY REGIME LIKELY TO REMAIN AT CURRENT SCALE**

*Preliminary, some 2008-09, 2009-10 data used in calculation
Source: ICRA, FAI, GOI, Industry Sources, Lit. Search; United States International Trade Commission*
NREGA has led to agricultural labour shortage and is continuing to push up wages

MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GUARANTEE ACT

- NREGA is a job guarantee scheme providing a legal guarantee for **100 days of employment every financial year** to adult members of any rural household
  - Provides public work-related unskilled manual work at statutory minimum wage
  - Effective from August 2005

- NREGA has **pushed labour wages in agricultural sector** from <Rs. 60-80 pre-NREGA to ~Rs. 200 per day currently

“NREGA was supposed to be ‘fallback option’ in situations when rural economy failed to provide normal job opportunities in agriculture….In reality NREGA…has resulted in **drawing out agriculture labourers from agricultural operations**. Since critical agricultural operations are required to be carried out at appropriate times and cannot be postponed, this has led to **increasing agricultural wage rates, impacting cost of cultivation and affecting farming viability adversely.**”

  Sharad Pawar, India Agriculture Minister, December 2011

“What has **hurt profitability most**, farmers said, is **rising wages for labourers**, driven by government efforts to ensure a minimum level of paid work for rural households under NREGA. NREGA’s impact on labour markets and broader inflation **prompted India’s farm ministry to ask the rural development ministry to halt the scheme** during the sowing season.

Reuters, October 2011

Source: NREGA website; Lit. Search
Heavy government involvement in rice procurement and distribution likely to continue

**INCREASING SHARE OF RICE PURCHASED THROUGH GOVT. REGIME**

- Rice Procurement as % of total production

**FOOD SUBSIDY INCREASING BOTH ABSOLUTELY & AS % OF AG. SECTOR**

- Food subsidy by Centre (Rs. Billion)

**MOOTED FOOD SECURITY BILL MAY REQUIRE FURTHER STEP-UP IN PROCUREMENT**

- Proposed National Food Security Bill (NFSB) aims to meet dietary requirements of ~67% of the population
  - This includes a promise to provide 25kg of rice/wheat per family every month
- The target food requirement is 60 million MT of rice/wheat
- Procurement of rice is expected to increase by at least 1 million MT if the NFSB passes

Source: GoI, FCI, Lit. Search

Food sub. as % of GDP from Ag.  1.8  2.6  2  2.4  2.3  4  5.2  4.3  4.4  6.3  NA
Even assuming farmers are able to receive MSP for all produce, the trend of rapidly increasing rice cultivation costs continues to lower margins.

**WHILE MSP FOR COMMON RICE HAS DOUBLED OVER LAST DECADE**

MSP for common rice, 2002-2011

1. For years 2006-07 to 2009-10, the MSP captures the bonus payment.

2. Source: FCI, CACP, Hindu Business Line online, Financial Express online

**NOT RISING FAST ENOUGH TO COVER RAPIDLY RISING CULTIVATION COSTS**

- For the 2012-13 kharif season, the **MSP of paddy will increase by Rs. 170 (~16%) to R1,250 per quintal** given rising input costs.

- CACP themselves state that **2012-13 MSP barely covers the projected cost of cultivation (C2) for farmers**, which includes paid out costs, imputed cost of family labour and rentals of land foregone on account of cultivation.

- Over last 3 years, CACP has found that the **C2 (currently at average of ~Rs 1,185 a quintal) has increased 53% but paddy MSP has only gone up ~20%**

  - Sharp increases in inputs such as labour wages, fertilizers, diesel, fodder and cattle feed have occurred over the last 3 years.
  
- Average labour wages increased 74% in last 3 years while price of fertilizers such as DAP more than doubled in the past 1 year.

“[Rising costs] has squeezed farmers’ margins in paddy cultivation and served a double blow to the farmer with the rising costs and declining margins even with respect to MSP.”

CACP latest report (Financial Express)
OFFICIALLY, THE LEVY SYSTEM IS STILL IN FORCE

- According to the Director of Agriculture, the Levy Act is still in force and the government has first claim to 75% of all rice produced by millers procuring paddy of their own accord.

THOUGH MILLERS PREFER CUSTOM MILLING

- Millers prefer custom milling to levy due to ease of doing business and better economics:
  - Under custom milling, do not face hassle of ensuring proper procurement and MSP payment to hundreds of small farmers.
  - Also ties up less capital (only small deposit has to be given to OSCSC vs. buying huge quantities of paddy outright under levy).
  - Price received by millers for 75% delivered to government typically Rs. 200-300 below what OSCSC receives for delivering to FCI.

AS DOES GOVERNMENT

- Govt. also prefers to meet its procurement targets via custom milling:
  - For KMS 2012-13, out of initial procurement target of 3 million MT rice, at least 2.9 million MT was to be procured via custom milling and <0.1 million MT via levy.

- Government is keen to have tighter control on paddy entering government system, which is available through custom milling strictures:
  - Paddy assigned to custom millers based on miller capacity.
  - Custom millers can only mill for the government - even after meeting their custom milling targets they are not allowed to procure additional paddy on their own and mill for the open market.
  - This regulation is specific to Orissa – most other states (e.g. Bihar, Chhattisgarh) do not have this restriction.

"The price offered for the 75% we must give the government under the levy scheme is pathetic. The OSCSC receives ~Rs. 2100 for the rice they give to the FCI, but we would get only ~Rs. 1800 under the levy scheme. And the quality of the paddy we receive is so poor that the 25% we can sell on the open market won’t fetch a high price."

Miller, Bargarh District

"The Odisha Rice and Paddy Procurement (Levy) and Restriction on Sale and Movement Order, 1982...is in force in the State during the Kharif Marketing Season 2012-13. Collectors will ensure that the levy due as per law is collected from the millers before they dispose any stock in open market."

Clause 5a, Food and Procurement Policy for the Kharif Marketing Season (KMS) 2012-13

Source: Govt. of Orissa, Lit. Search
There are a number of miller & farmer associations lobbying for various reforms, but relations between them & govt. are strained

**MILLER’S ASSOCIATION AND SEVERAL FARMERS GROUPS**

- Primary millers’ association is **All-Odisha Rice Millers Association (AORMA)**, who are active lobbyists
  - AORMA is relatively well-organized and has high membership – almost all custom millers are members
  - Frequently lobby government for reforms and have contacts with senior Govt. officials
  - Key advocacy platform includes: tax reform (i.e. lowering tax), legalisation of open-market milling

- Several farmer’s associations also relatively active in voicing their grievances
  - Several farmer’s associations e.g. Orissa Krushak Sabha, Utkal Rajya Krushak Sabha, Akhil Bharat Krushak Mahasabha, Akhil Bharat Kissan Majdoor Sabha etc.
  - Demands include: greater allowances of rice under Rs.2/kg scheme; higher relief packages for drought/flood-affected farmers; additional ‘bonuses’ above MSP etc.

**HOWEVER, RELATIONS BETWEEN THESE GROUPS AND GOVT. ARE STRAINED**

- Govt. highly suspicious of milling community due to frequent attempts to ‘game’ the system e.g. informal procurement/milling for open market; rice ‘recycling’, ‘cutting’
- Tense relations due to inefficiencies and delays in government procurement systems

- Historical experience of millers exploiting farmers whenever they had opportunity
- E.g. Distress sales at only ~50% of MSP back in 2003-04 during messy handover from central to state government under decentralized procurement

Source: Primary interviews; Lit. Search
World Bank’s Agri. Competitiveness Project demonstrates impact leading international agencies can have through partnering with govt.

APMC ACT WAS IN SERIOUS NEED OF REFORM, BUT GOVT. FACED CHALLENGES IN RECTIFYING ISSUES

- Agricultural Produce Market Committees (APMCs) are responsible for providing marketing services/facilities throughout India, but faced serious efficiency challenges
  - Though APMCs were meant to enable direct market access for smallholder farmers, the agricultural supply chain remained fragmented with a large number of intermediaries
  - As a result, the functionality and relevance of the APMCs was questioned

- In conjunction with the Ministry of Agriculture and the State Governments, the World Bank developed and distributed Model APMC Rules in 2007
  - Guidance on market reforms included regulation related to private markets, direct marketing, contract farming and market fees

WORLD BANK WAS ABLE TO LEVERAGE ITS CREDIBILITY AND FUNDING TO EFFECT SUCCESSFUL CHANGE

- Given its vast experience in the development sector and its access to funding, the World Bank was ideally positioned to implement market reforms
- Agriculture Competitiveness Projects were established in Maharashtra, Rajasthan and Assam with the aim of increasing productivity, profitability and market access of the farming communities
- World Bank committed a total of US$350 million to these projects
- Reforms created favourable environment for private sector involvement
  - For example, Maharashtra attracted US$5.6 million in setting up private wholesale markets between 2009 and 2012. In addition, licences for 18 new markets were issued
- These projects provides a useful benchmark for other states looking to incorporate the model rules into a revised version of the APMC Act

Source: Indira Gandhi Institute of Development Research; World Bank
Content

Supply-demand dynamics

Policy context & challenges

Value chain & constraints

Prioritized interventions
Objectives: Rice strategy goals based on BMGF’s South Asia agriculture development strategy

**Objective**

Sustainable income improvement of rice farmers in Bihar, Orissa and Bangladesh

---

**Vision:**

Anchor geographies:
- Bihar
- Orissa
- Bangladesh

**Goal:**

More than double productivity for 45M farming households in India & Bangladesh by 2030

**Anchor geographies:**

Priority value chains:
- **Cereals:**
  - Rice
  - Maize
- **Legumes:**
  - Chickpeas
  - Groundnuts
- **Livestock:**
  - Cows
  - Goats
  - Chickens
  - Buffalo

Source: BMGF website; Discussions with BMGF team
CSISA/STRASA already working with OSSC to provide Sahbhagi Dhan, Swarna Sub-1 breeder seeds, technical assistance

CSISA/STRASA HAS RECENTLY PARTNERED WITH OSSC

- Last year OSSC received excess allocation of breeder seeds, mainly due to Swarna Sub 1 and Sahbhagi Dhan breeder seeds received from IRRI
  - Received ~85 qtls of Sahbargi Dhan and ~158 qtls of Swarna Sub 1
  - Equates to ~25% of total ~956 qtls breeder seed received
- Presently these two varieties are in initial phases of seed multiplication, with certified seeds to be released next year

OSSC WELCOMED ASSISTANCE AND WAS KEEN TO COLLABORATE

“The stress-tolerant varieties are important part of our strategy to target the submerged and drought prone districts of Orissa. We are in the seed multiplication phase with the breeder seeders getting transformed to foundation seeds mainly through progressive farmers.”

Production Manager, OSSC

“For large scale seed distribution, the government is essential. And they are keen to work with us, given stress-tolerant varieties are now a priority under BGREI and NFSM, along with hybrids and HYVs.”

Scientist, STRASA

India’s Ministry of Ag. has also recently allocated 25M USD to States for promotion of stress-tolerant varieties

Current status

Breeder seed

Foundation seed

Certified seed

2012
2013

BMGF should leverage existing relationship CSISA/STRASA has with OSSC and expand scope and scale of engagement

Source: Primary interviews; Discussions with BMGF team; Lit. Search
CSISA is also planning to develop community seed banks to supply farmers in tribal areas

CSISA IS PLANNING TO PILOT SEED BANK IN MAYURBANJ DISTRICT NEXT SEASON

- Sahbhagi Dhan was demonstrated in drought-prone Mayurbanj district under NFSM-IRRI during the kharif 2012-13 with good results
  - Created strong demand from farmers
  - Realised higher yields than other local varieties in shorter time period (~105 days)

- To enable sustainable supply of Sahbhagi Dhan seeds, CSISA is planning to set up community seed banks (CSBs) in the district
  - Both men and women farmers will be provided “hands-on” training on improved seed management (from production to postharvest and storage), managerial and entrepreneurial skills
  - Each demonstrating farmer at end of the season will return twice quantity of seeds that he/she had taken from the seed bank
  - These seeds will be cleaned and stored for the next season by the seed banks to sell or share for further multiplication

OPPORTUNITY TO SCALE PROGRAM AND DEVELOP SUSTAINABLE AGRI-BUSINESSES

- Seek State Govt. certification
- Register as FPOs
- Market to neighbouring communities

Source: Primary interviews, Team analysis
Chhattisgarh’s computerized procurement and distribution system is being promoted as a model for other states

IN 2007 CHHATTISGARH COMPUTERIZED PROCUREMENT MODEL…

- Govt. of Chhattisgarh implemented an **end-to-end computerization solution** for its paddy procurement and PDS system in **2007**

- **Computerization at every stage** of operations: Procurement of paddy at 1,532 purchase centres (most run by PACS), miller registration and delivery, transportation to ~10,500 Fair Price Shops, distribution to 3.7M ration card holders

- **Covered 6 different organizations:** Dept. of Food, MARKFED, State Civil Supplies Corporation, FCI, Central Cooperative Bank, PACS

- **National Informatics Centre** was ICT partner in development and implementation

- **Cost** including hardware, software, training and connectivity **Rs. 230 million (~4.2M USD) non-recurring** and **Rs. 30 million (~0.6M USD) recurring annually**

…RESULTING IN EFFICIENCIES IN PROCUREMENT, MILLING & DISTRIBUTION

- **Same-day payment to farmers**
  - Same-day payment to ~1.6M farmers via computer generated cheques vs. 7-10 days delay earlier

- **Reduction of diversions in milling**
  - Centralized miller database, preventing execution of agreements with fake millers
  - Online issue of delivery orders, custom milling receipts, and online reconciliation of stocks

- **Reduction of diversions in PDS**
  - Creation of central PDS database, with ~0.2 fake ration cards eliminated
  - Online allocation and issue to FPSs based on sales of previous month
  - All information in public domain and subject to community monitoring

“The three-member Commission for Agriculture Costs and Prices…has asked other states to *imitate* the Chhattisgarh model. Many states, including Bihar, Orissa, and Madhya Pradesh have also showed interest in replicating the Chhattisgarh model in their respective states.”

Times of India, December 2012

Source: Govt. of India, Govt. of Chhattisgarh, Lit. Search
Helping State Govt. facilitate greater private sector investment in rice value chain will build trust and alignment

STATE GOVT.’S ACTIVELY COMPETING FOR PRIVATE SECTOR INVESTMENT

• Competition between states for private sector investment is intense with bureaucratic efficiency, infrastructure facilities and ease of land acquisition influencing the flow

• While Orissa received 2\textsuperscript{nd} highest amount of private sector investment in 2012 (after Gujarat), has struggled to attract investment in agriculture sector
  - Private sector investment in Orissa typically focuses on metals, petroleum and broad infrastructure sectors rather than agriculture

LOW-RISK ROUTE TO BUILD TRUST AND GENERATE GOVT. INTEREST IN MARKET-BASED SOLUTIONS

• BMGF can support State Govt. efforts to attract private sector investment in Orissa agriculture sector
  - E.g. organize investment summits, facilitate workshops with leading private sector players

• State Govt. particularly keen for investment in paddy procurement infrastructure and value-added processing
  - Storage, packaging facilities
  - Rice bran oil, rice bran flake processing units

“One of the major challenges we are facing in paddy procurement is storage capacity. If a private player were interested in investing in silos, godowns and so forth, we could potentially partner and outsource some of our operations to them.”

Director of Agriculture, Orissa
Donors should mandate equitable participation of women in interventions

<table>
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<tr>
<th>Seed commercialization</th>
<th>Integrated package of practices</th>
<th>Farmer price realization</th>
<th>Mechanization via service provider model</th>
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| Women can take leading role in community seed banks in tribal areas  
  - E.g. Women's self-help group-owned seed bank | Engage female Village Resource Persons in extension pilots  
  - E.g. Test whether female trainers are more effective amongst certain farmer segments | Greater engagement of women-led groups in paddy procurement  
  - E.g. Existing women’s self-help groups | TBD |
| Engage balanced gender mix in co-operative leadership  
  - E.g. PACS, TDCCs, self-help groups | | Involvement of women in farmer/ FPO-owned aromatic rice hulling/marketing | |

Not only is this critical from a gender perspective, but will also enhance core intervention outcomes for both men and women

Source: Primary Interviews