

Fortified rice: An opportunity to address micronutrient deficiencies



World Food Programme

Rice fortification: understanding a few key terms

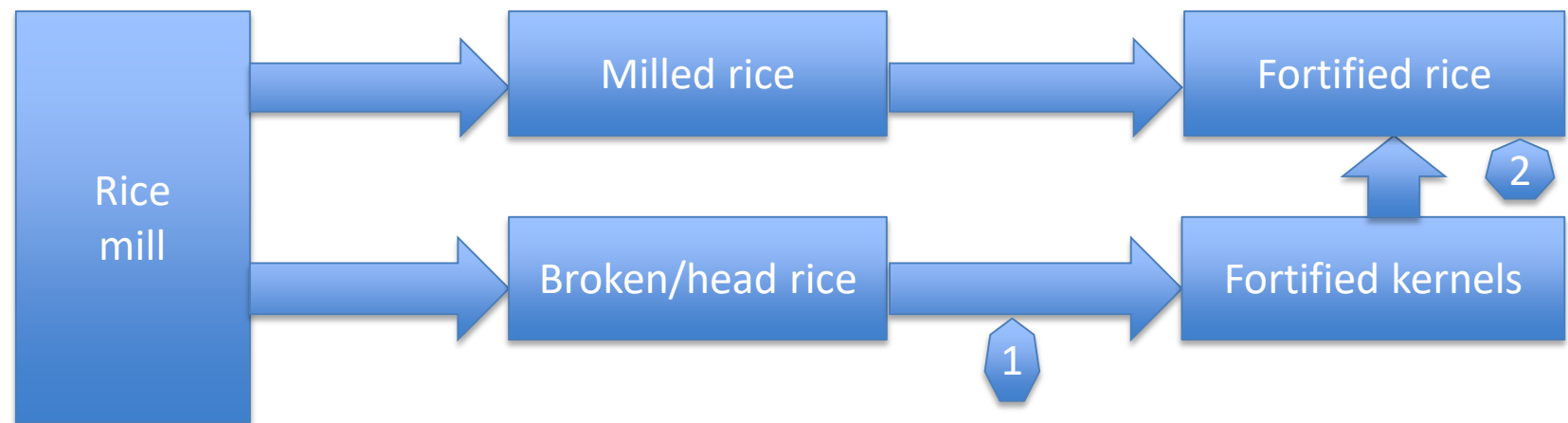
Term	Definition
Fortificant	Selected micronutrient in a particular form to fortify selected food
Fortificant mix (premix)	Blend that contains several fortificants (vitamins and minerals)
Fortified kernels	Rice-shaped kernels, made of rice flour, fortified with the fortificant mix
Fortified rice	Non-fortified rice blended with the fortified kernels (at 0.5 – 2% ratio; typically 1%)

The process to fortify rice comprises two main steps

Fortifying rice: making rice more nutritious by adding essential vitamins and minerals

Fortifying rice is a **two-step process:**

Low cost high quality production facility (Usher Agro Ltd) for producing fortified rice enabled in India



1: Add vitamins and minerals (pre-mix)

2: Blend 0.5-2% ratio

6 countries mandate fortification of rice



* Legislation has the effect of mandating grain fortification with at least iron or folic acid. This does not reflect how much grain is available in that country. Grain availability data from the Food and Agriculture Organization (2011). Legislation status from the Food Fortification Initiative (www.FFInetwork.org).

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Fortified Rice Delivery Options in India

Mandatory: Mass consumption

Voluntary: Market driven

Social safety nets: Targeted



Why rice fortification in India?

65%

Population in India consumes rice ([NSSO, 68th round](#))
Rice forms a large source of calories and core component of agriculture and nutrition in most of India

Milling of rice removes the fat and micronutrient rich bran layers to produce the commonly consumed starch white rice. **Polishing** further removes 75-90% of Vitamin B-1, Vitamin B-6, Vitamin-E and Niacin.



Fortification of rice provides an opportunity to add the micronutrients lost during milling and polishing. It also provides an opportunity to add others micronutrients such as **Iron, Zinc, Folic acid, Vitamin B-12 and Vitamin A**

India summary of evidence on rice fortification N=4

Type of Research	Research Organization	Country/ Year	Study Objectives
Efficacy	National Institute of Nutrition, Indian Council of Medical Research, Hyderabad, India	India 2007-2008	To assess the impact of consuming rice fortified with iron, Ultra Rice, on the iron status of children in a mid-day meal program in India.
Efficacy	Division of Nutrition, St. John's Research Institute, St. John's National Academy of Health Sciences, Bangalore, India.	India 2009-2010	To study the efficacy of rice-based lunch meals fortified with multiple micronutrients, including vitamin A, thiamine, niacin, itamin B-6, vitamin B-12, folic acid, and zinc, in combination with high or low concentrations of iron on anemia, micronutrient status, and the physical and cognitive performance of Indian schoolchildren.
Acceptability, Sensory	National Institute of Nutrition, Indian Council of Medical Research, Hyderabad, India	India 2006	To test the organoleptic properties of rice fortified with iron Ultra Rice.
Acceptability, Sensory	Indian Market Research Bureau International (IMRB), New Delhi, India	India 2003	To gauge the organoleptic acceptance of Ultra Rice fortified with ferrous sulfate and the sensitivity of potential target segments.

Food based safety net schemes

Targeted public distribution system

- Household rations distributed to priority households belonging to antodaya anna
- Ration include wheat, rice and coarse cerea

30.463
Million
metric
tonnes

Mid day meal scheme

- School going children between 6 to 14 years
- 450 kcal and 12gm proteins to primary school children and 300 kcal and 20 gm proteins to upper primary

2.19
Million
metric
tonnes

Integrated Child Development Services scheme

- Children till 6 years of age; pregnant; lactating women
- 500kcal and 12-15gm proteins to children below 6 years and 800kcal and 20-25 gm proteins to pregnant women.

0.89
Million
metric
tonnes

Fortified rice kernels

Industries capable of manufacturing fortified rice kernels

- Rice Mills
- Extruded snack manufacturers
- Pasta manufacturers

FRK production capacity in India

Manufacturer	Location	Per day capacity
DCP India	Sonepat, Haryana	3MT (approx.)
Daawat Foods Ltd.	Bhopal, MP	2MT
Christy Foods India Pvt. Ltd	Namakkal, Tamil Nadu	3MT

FSSAI has notified standards for fortified rice
2 brands of fortified rice available in the commercial market



Rice fortification of mid-day meals in Gajapati, Odisha

Every 100 grams of rice provides 10 mg of iron. The form of Fe used is ferric pyrophosphate. The daily ration for rice is 100gm and 150gm respectively for children between 6-10 yrs. and 11-14 yrs. respectively.

Goal: Operationalizing rice fortification through the platform of the mid-day meal

Modality: Fortification of FCI rice at a centralized location and its distribution and consumption in the MDM across schools in Gajapati.

Coverage: 99,231 school children across 1473 schools in Gajapati

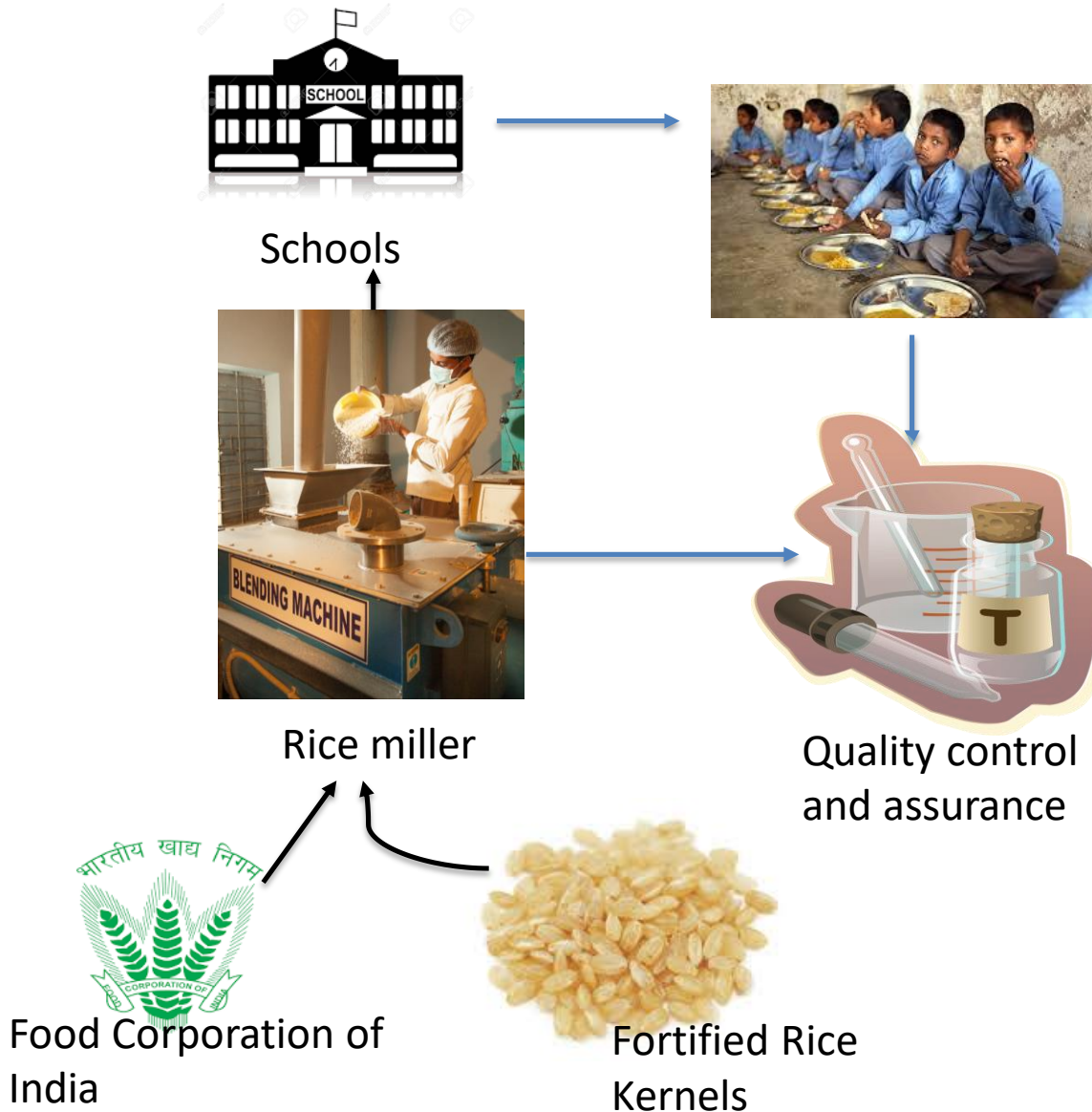
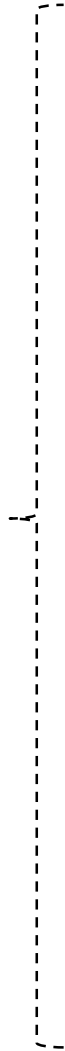
Duration: 40 months (duration of intervention was 31 months)



A school girl in Gajapati district of Odisha, with a plate of cooked fortified rice: the World Food Programme (WFP) in collaboration with the Govt. of Odisha plans to scale-up of rice fortification in the state

Project strategy for fortification of rice.

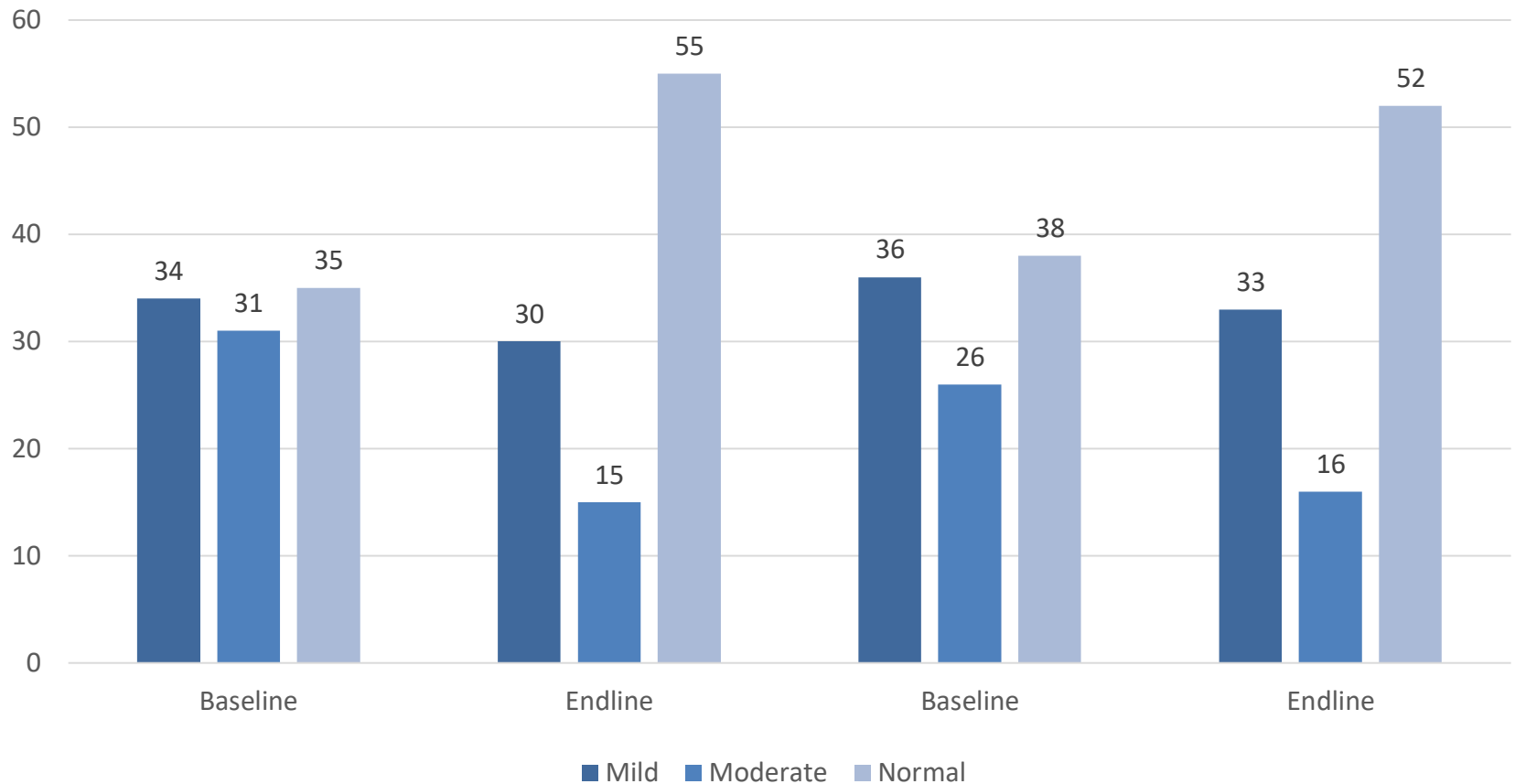
Technical Advisory Group (TAG) for review & monitoring the implementation, Meet on a Quarterly basis



Capacity building of teachers and cooks, information, education & communication and monitoring

Results: prevalence of anemia

There was an overall decrease in the prevalence of anemia from 65% to 45% in Gajapati.



Gajapati (intervention)

Rayagada (control)



Conclusions from rice pilot in Odisha:

- *Use of rice as a vehicle for fortification is technically effective and operationally feasible in existing government systems and schemes such as the MDM.*
- *Rice fortification reinforces, complements and supports ongoing nutrition improvement programmes such as supplementation & dietary diversification.*

Multi-micronutrient fortification of mid-day meals in Dhenkanal, Odisha

Goal: To provide the Government of Odisha with an operationally feasible and economically viable model to create a positive impact on the micronutrient status and functional performance of school children for potential scale-up across the state.

Modality: Two modalities of implementation

1. Use of multi-micronutrient fortified rice (FRKs) in 4 blocks* (Fortification of Rice) and
2. Fortification of cooked MDM meals using multi-micronutrient powders (MNPs) in other 4 blocks (Fortification of curry)^

Coverage: 1,29,009 school children (I-VIII) in 1728 schools in Dhenkanal

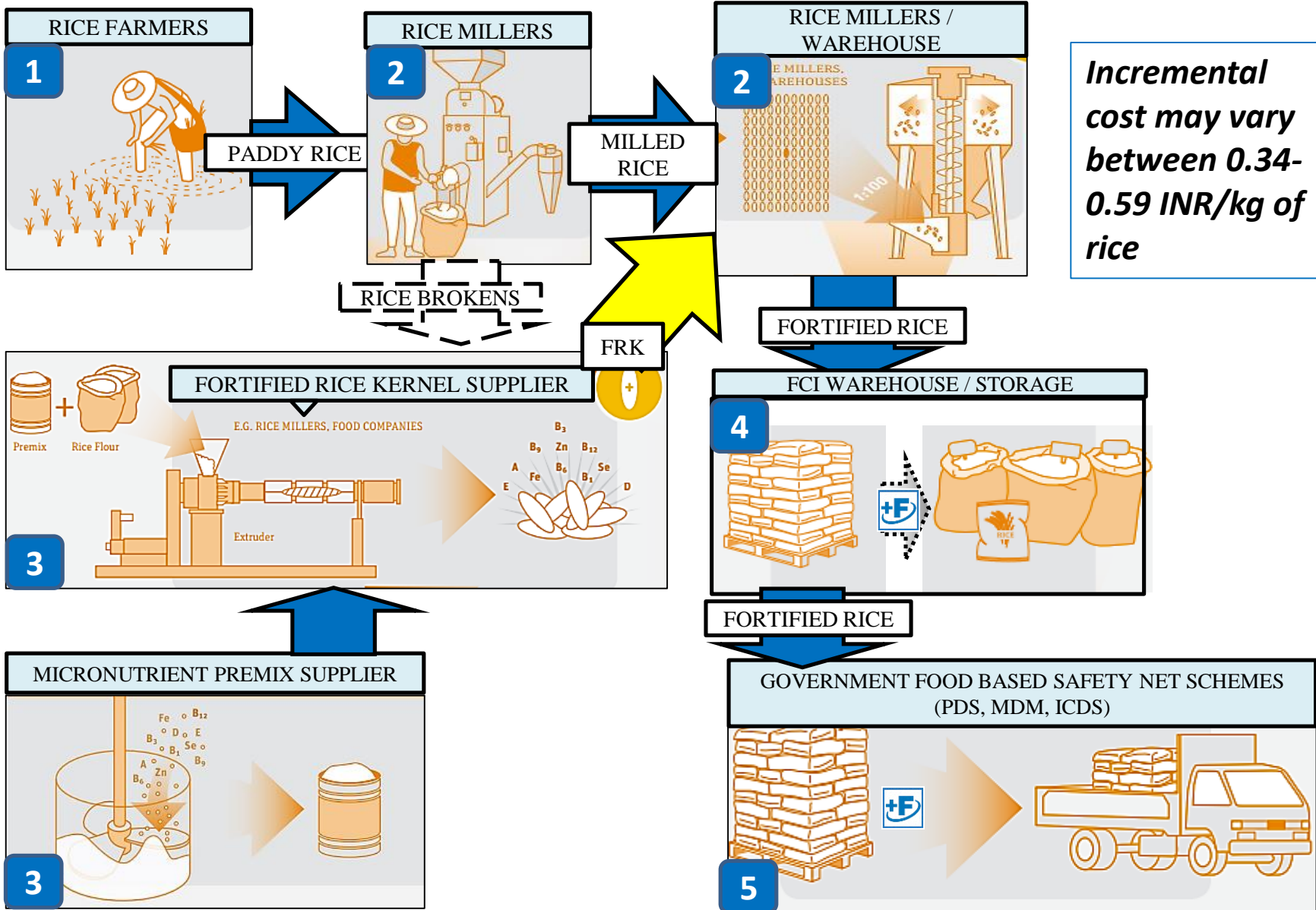
Duration: 24 months of implementation



* - For use of fortified rice kernels: Dhenkanal Sadar, Kamakhyanagar, Bhubhan and Parjang blocks

^ - For use of micronutrient powders: Gondia, Hindol, Kankadahad, Odapada,

Models: During-milling of rice



Scale up of fortified rice in India



Karnataka- 750,000 school children in the MDM (On-going)

Odisha- 1, 776, 079 school children in the MDM and 1 district in PDS/ ICDS (Pipe-line)

Chandigarh- all social safety nets

Tamil Nadu- ICDS & MDM across 10 districts (Pipe-line)

Dadra & Nagar Haveli- 227, 096 beneficiaries in ICDS, MDM and PDS (Pipe-line)

Uttar Pradesh- 197,000 school children in the MDM (Pipe-line)

WFP activities to support scale-up of rice fortification in India



- **Policy advocacy with Ministries in-charge of food based safety nets to ensure issuance of guidelines on inclusion of fortified rice.**
- **Technical assistance to FSSAI on standards, development of technical manuals etc.**
- **Technical assistance to states interested in integration of fortified rice in their safety nets.**
- **Sensitization of private sector.**
- **Increasing the FRK production base in India by working with interested private sector.**

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Thank you



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