

WFP Experience on Rice Fortification in the Gajapati District of Odisha



World Food Programme

Average daily intake of micronutrients in school age children

Age group		Calcium (mg)	Iron (mg)	Vit A (µg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)	Vit C (mg)	Dietary Folate (µg)
7-9 yr	RDA	600	16	600	0.8	1.0	13.0	40	120
	Intake	226	8.6	79	0.8	0.5	9.4	19	86.9
10-12 yr (boy)	RDA	800	21	600	1.1	1.3	15	40	140
	Intake	248	9.8	87	0.9	0.6	10.8	22	95.2
10-12 yr (girl)	RDA	800	27	600	1.0	1.2	13	40	140
	Intake	230	9.3	81	0.9	0.5	10.3	21	92.2
13-15 yr (boy)	RDA	800	32	600	1.4	1.6	16	40	150
	Intake	266	11.2	98	1.1	0.7	12.3	24	105.6
13-15 yr (girl)	RDA	800	27	600	1.2	1.4	14	40	150
	Intake	249	10.1	92	1.0	0.6	11.4	24	97.3

Strategies for Addressing Gaps in Micronutrient Intake

- Dietary diversification
- Fortification
- Supplementation

Possible Modalities of fortification in the MDM

- Fortification of staples
- Fortification of other ingredients used in meals
- Fortification of cooked meals

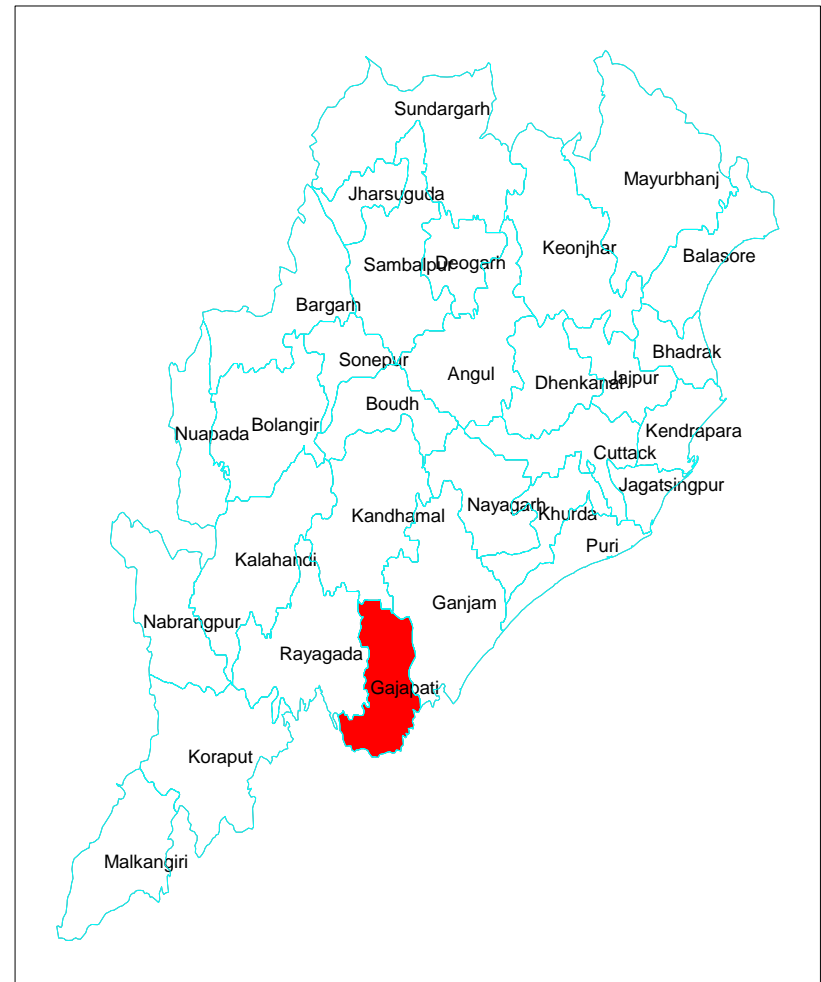
WFP Rice Fortification Project at a glance

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

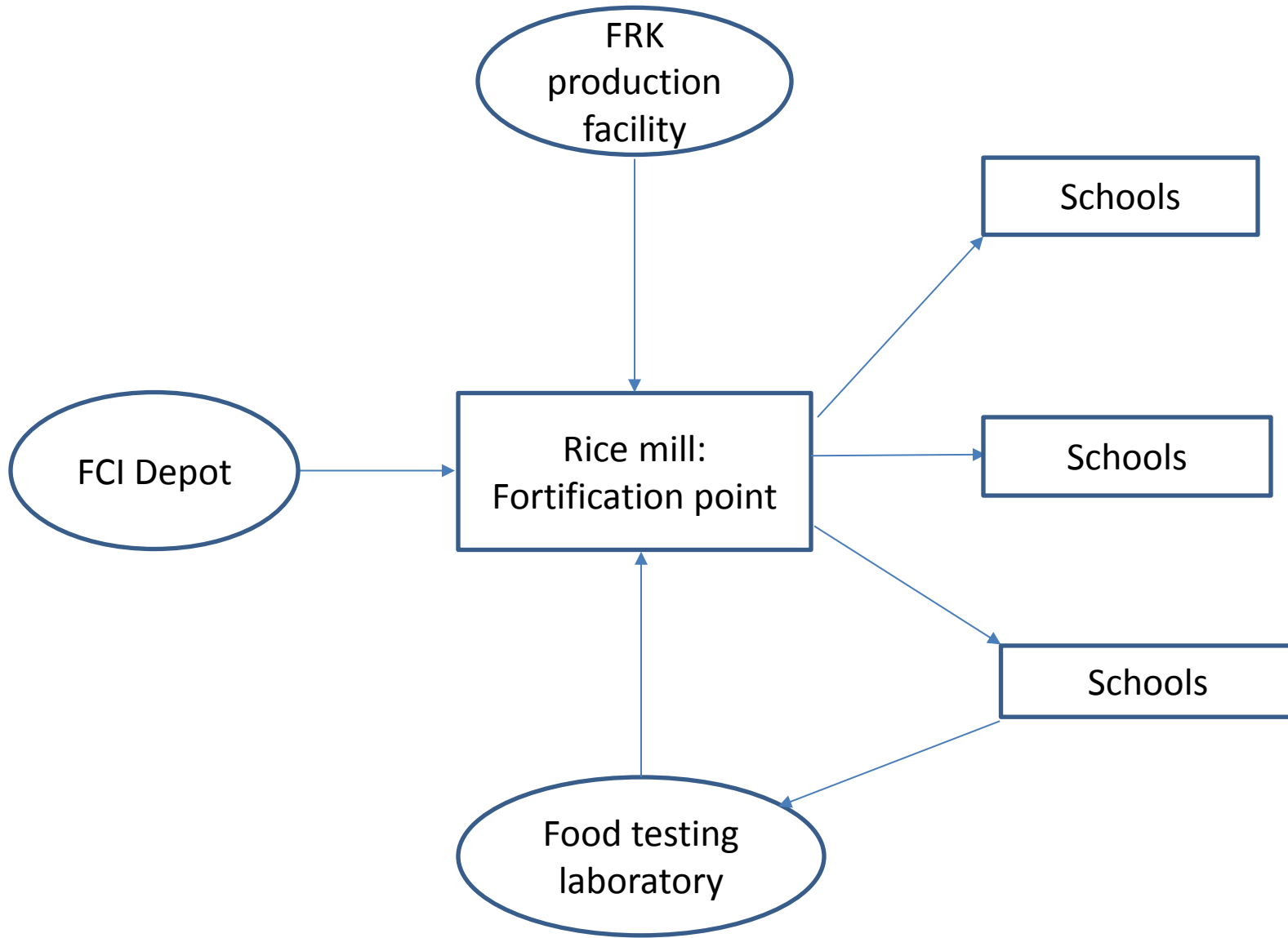
Duration: 28 months (duration of intervention is 24 months)



Project objectives

- Support provided for fortification of 4602 Metric Tonnes (MTs) of rice to be provided for on-site cooking of supplementary food provided under the MDM programmes in Gajapati district of Odisha;
- At least 90 percent of the intended MDM beneficiaries in the age-group of 6 to 14 years receive fortified rice based meals;
- Prevalence of iron deficiency anaemia in the intended beneficiaries reduced by 5 per cent.
- Capacity of the state government built for procurement of appropriately fortified rice and its quality assurance.
- Capacity of the rice miller built on blending of regular rice with fortified rice kernels and quality assurance protocols.
- About 80% of the school children, teachers, and formal/informal community leaders are aware of micronutrient malnutrition, its consequences and strategies to address the same.
- A replicable model developed for the state government based on monitoring and evaluation of the supply chain management of fortified rice provided in the MDM programmes.

Project in the field



Nutrition health education sessions are conducted in the schools while focus group discussions are conducted with the community.

Core Project Activities

- Fortification
- Supply chain management
- Capacity building of the teachers and school management committee members
- Information, education and communication
- Quality assurance and quality control
- Monitoring



Fortification process

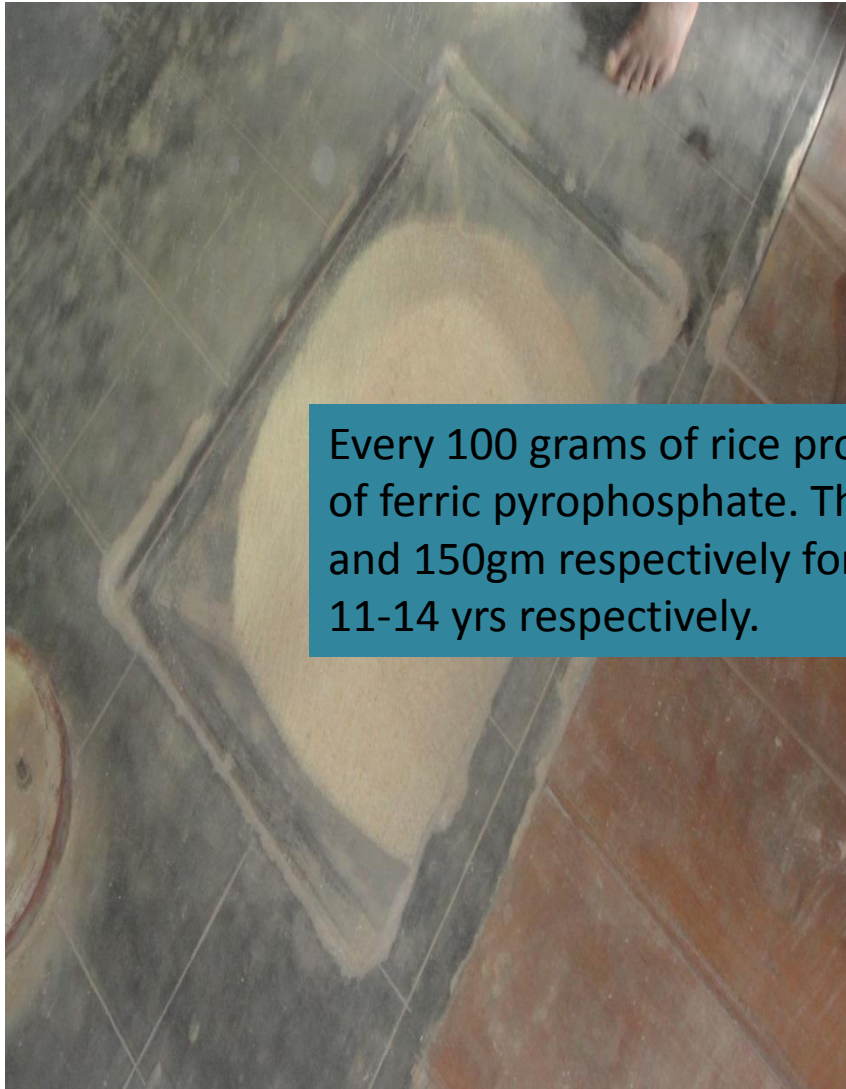
a) Weighing the FRK



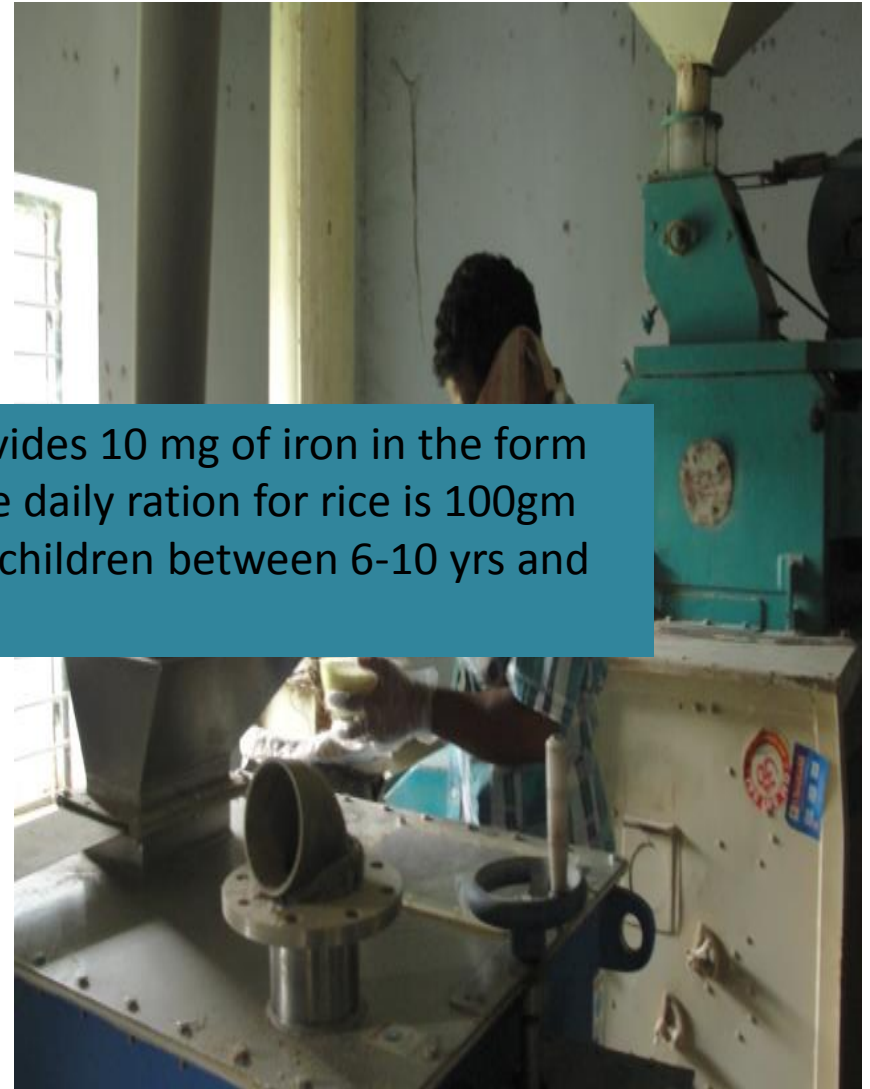
To every 50 kg batch of FCI rice, 500gm of FRK is added

Fortification process

b) Blending the FRK with Milled Rice from FCI



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



50 kg FCI rice added to the inlet space

It takes 3 minutes to fortify a single 50 kg batch

Blending unit



Packaging, storage and delivery of fortified rice



Packaging in 25 kg HDPE bags



Door-step delivery to the schools

Mid-term assessment

Methodology:

Study design: Intervention-control approach adopted; wherein Gajapati is the intervention district while Rayagada is the control district.

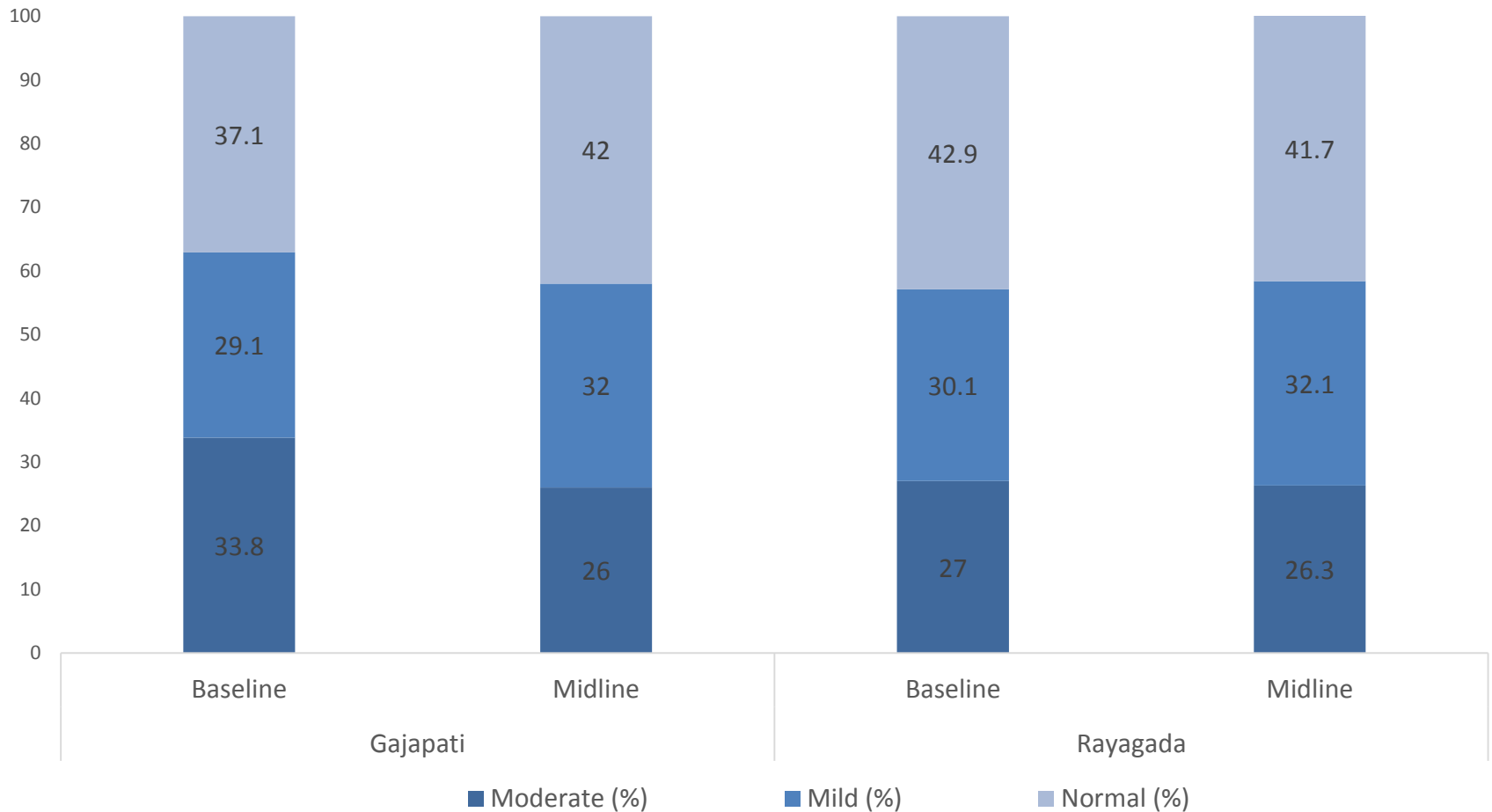
Study participants: Sub-sample of baseline assessed longitudinally at mid-term to establish change between baseline and mid-term in both intervention and control districts.

Assessment included: (i) Desk review (ii) Quantitative survey including biomedical assessment (iii) Survey of school facility

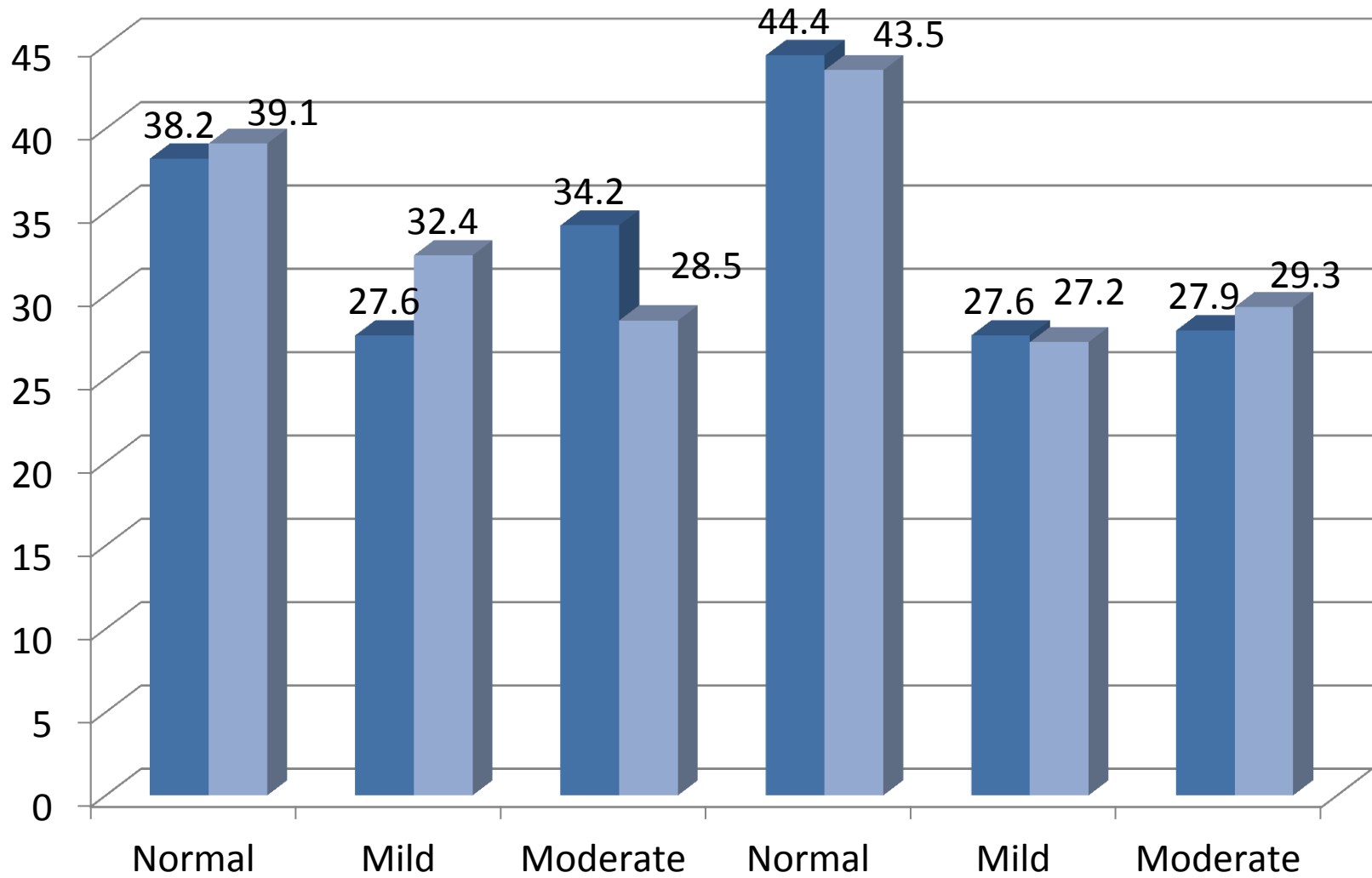
Duration of intervention: 10 months

Results: Anemia

Overall anaemia prevalence in Gajapati reduced by 5 percent points



Distribution of students by categories of anemia based on the Hb value



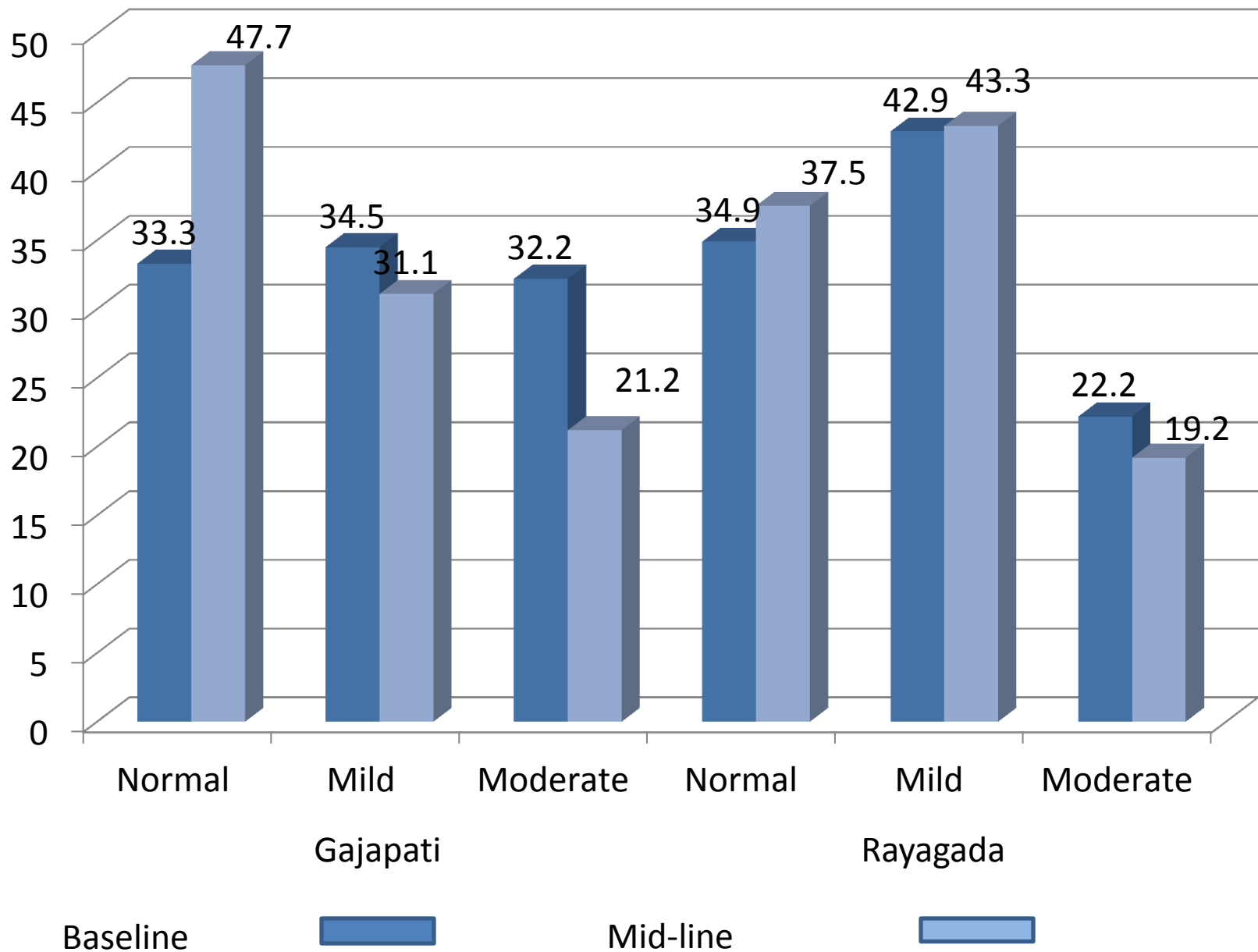
Baseline



Mid-line



Level of anemia in children between 6-11 years of age



Level of anemia in children between 12-14 years of age

Level of anemia prevalence by sex

District	Sex	Study	Moderate (%)	Mild (%)	Normal (%)	N
Gajapati	Male	Baseline	35.80	28.90	35.30	173
		Midline	30.10	27.20	42.80	173
	Female	Baseline	32.10	29.30	38.60	215
		Midline	22.80	35.80	41.40	215
	Total	Baseline	33.80	29.10	37.10	388
		Midline	26.00	32.00	42.00	388
Raygada	Male	Baseline	23.10	35.40	41.50	195
		Midline	22.10	38.50	39.50	195
	Female	Baseline	30.80	24.90	44.30	201
		Midline	30.30	25.90	43.80	201
	Total	Baseline	27.00	30.10	42.90	396
		Midline	26.30	32.10	41.70	396

Paired sample T-test for Hb values for project district

District	Study	Mean	Paired Difference-Hb Values						
			Mean	Std. Error	95% CI of the Difference		T	Sig. (2-tailed)	N
					Lower	Upper			
Gajapati	Baseline	11.61	0.27	0.01	0.249	0.290	25.81	0.000	388
	Midline	11.88							

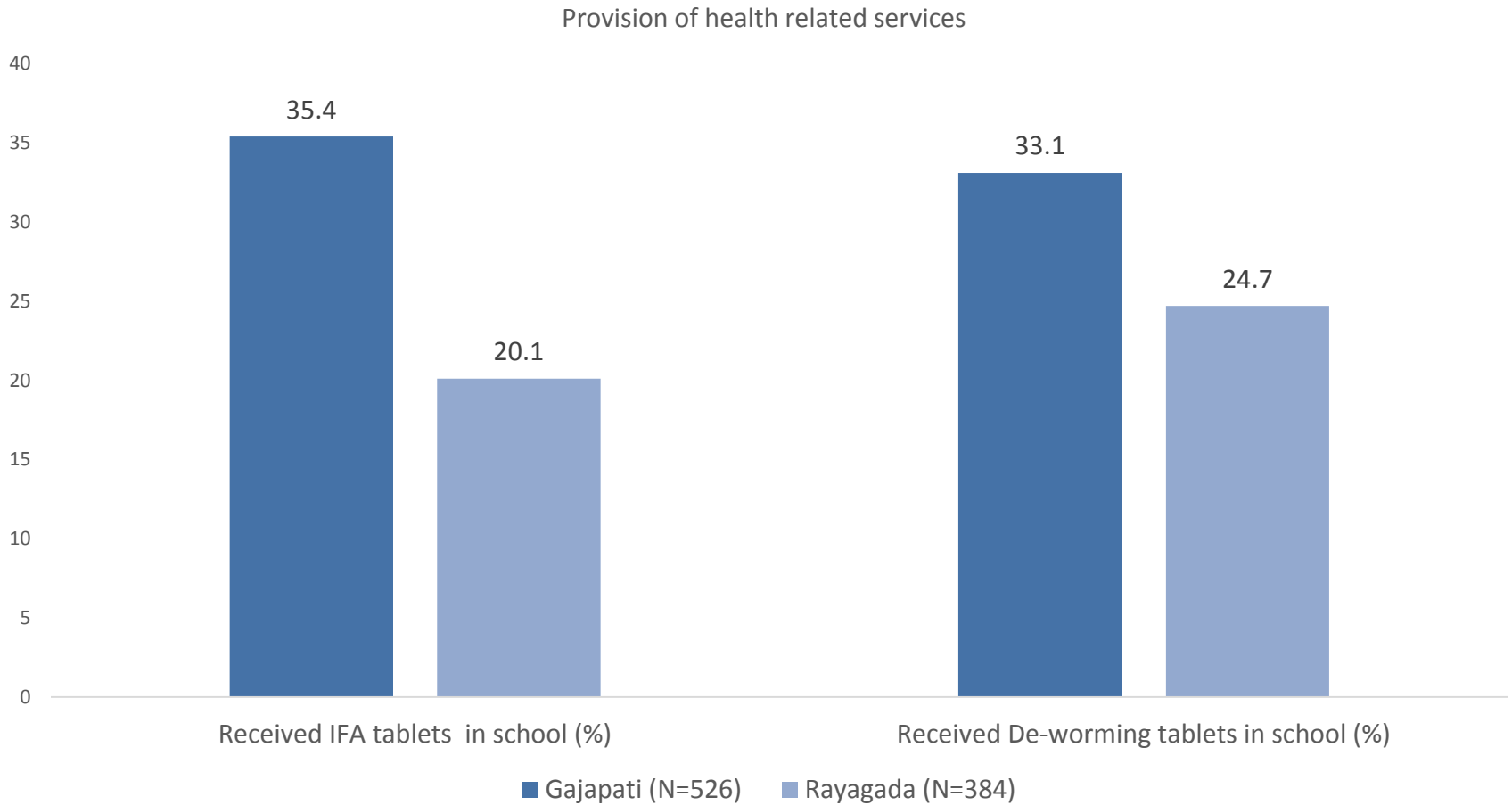
The reduction in anaemia levels when compared to baseline is statistically significant. This achievement is attributable to consumption of fortified rice only- other components such as awareness/consumption of IFA/deworming tablets have minimal coverage and impact

MDM consumption pattern of students

District	Study	% of students consuming MDM in school	N1 (Total number of students)	% of students eating MDM at school for all 6 days	% of students eating MDM for 1 day	N2 (Total number of students consuming MDM at school)
Gajapati	Baseline	97.5	526	91.1	1.4	513
	Midline	94.7	526	97.0	0	498
Rayagada	Baseline	97.9	384	90.7	0.8	376
	Midline	94.3	384	96.4	0.00	362

More than 90 percent children feel that the taste of MDM with fortified rice is the same or better.

Provision of health services in the schools



Mean attendance in schools

District	Study	Mean attendance - School	% increase in mean attendance from baseline to end line in project and control	% increase in mean attendance from baseline to end line across both districts	N
Gajapati	Baseline	159.6	25.2	26.4	44
	Midline	199.8			44
Rayagada	Baseline	124.0	28.3		36
	Midline	159			36

MDM salt usage in schools

Study	Type of District	% of schools using iodized salt	% of schools using non-iodized salt	% of schools using double fortified salt	N
Gajapati	Baseline	100	0	0	44
	Midline	100	0	0	44
Rayagada	Baseline	94.4	5.6	0	36
	Midline	100	0	0	36

Nutritional awareness of students

District	Study	Topics covered in school covering nutrition (reported by students)(Base N2)	N2
Gajapati	Baseline	Importance of green vegetables (68.5%) Importance of fruits (29%) Importance of MDM (15.1%)	423
	Midline	Importance of green vegetables (96.7%) Importance of fruits (84.3%) Importance of MDM (66.9%) Importance of Fortified Salt (28.1%)	426
Rayagada	Baseline	Importance of green vegetables (76.2%) Importance of fruits (32.4%) Importance of MDM (10.1%)	311
	Midline	Importance of green vegetables (98.7%) Importance of fruits (81.3%) Importance of MDM (67.0%) Importance of Fortified Salt (28.3%)	315

Nutritional Awareness among children has increased- both in project and control district

Conclusions and recommendations

- The results show positive trends in anemia level and acceptability of fortified rice.
- MDM consumption patterns, mean attendance rates in schools and nutritional awareness amongst children in Gajapati and Rayagada is similar. Provision of health services is poor in both districts.
- Multivariate regression analysis conducted to analyze the net-effect of consumption of iron-fortified mid-day meal, iron supplementation and de-worming on the anemia status of the school children shows that consumption of iron-fortified rice meal has a significant positive impact in reducing the prevalence of anemia (10%). Administration of iron supplementation and de-worming of children do not have significant impact on the prevalence of anemia.
- Increased attendance and consistency in consumption of fortified rice in the school meals is required for demonstrating an improved anemia status.
- The supply chain for the delivery / distribution of fortified rice through the mid-day meal platform seems to be working well and there is a great potential to scale-up across the state.

Way forward

- Scoping study on scale-up of rice fortification in Odisha under finalization.
- End-line evaluation and handing over of the Gajapati project in 1st quarter of 2015.
- Pilot on multi-micronutrient rice fortification in MDM in a limited geography in Odisha.
- Support to scale-up of rice fortification in MDM in Odisha.



Thanks