

WFP Experience on Rice Fortification in the Gajapati District of Odisha



World Food Programme

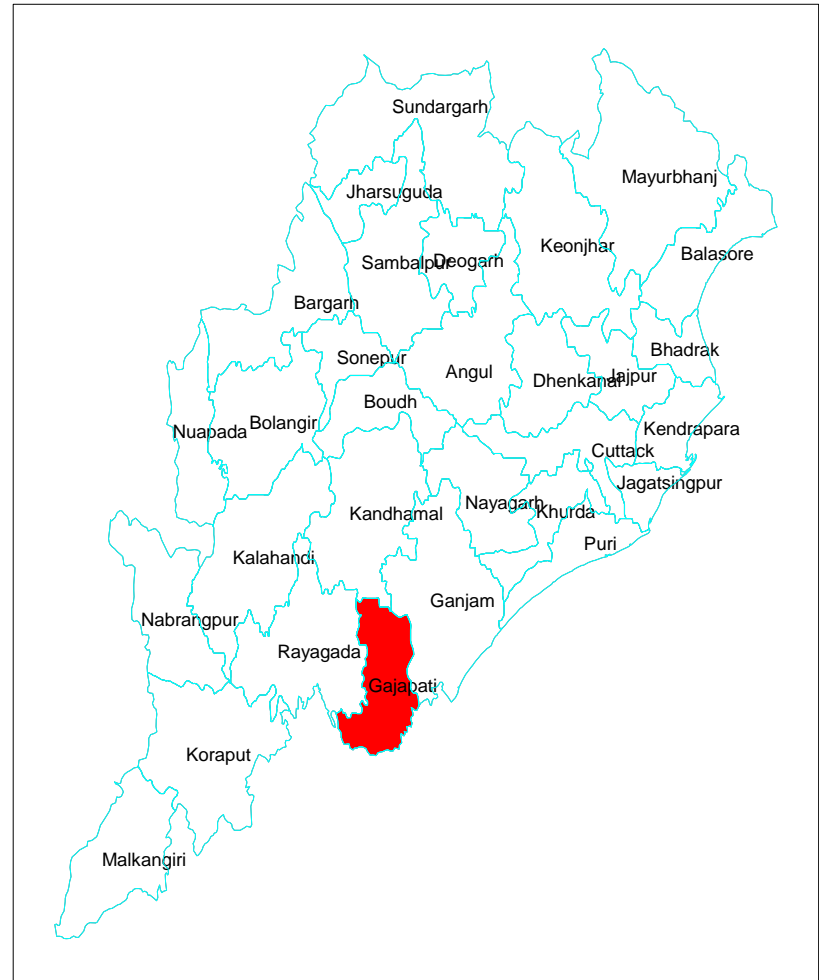
Project at a glance

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

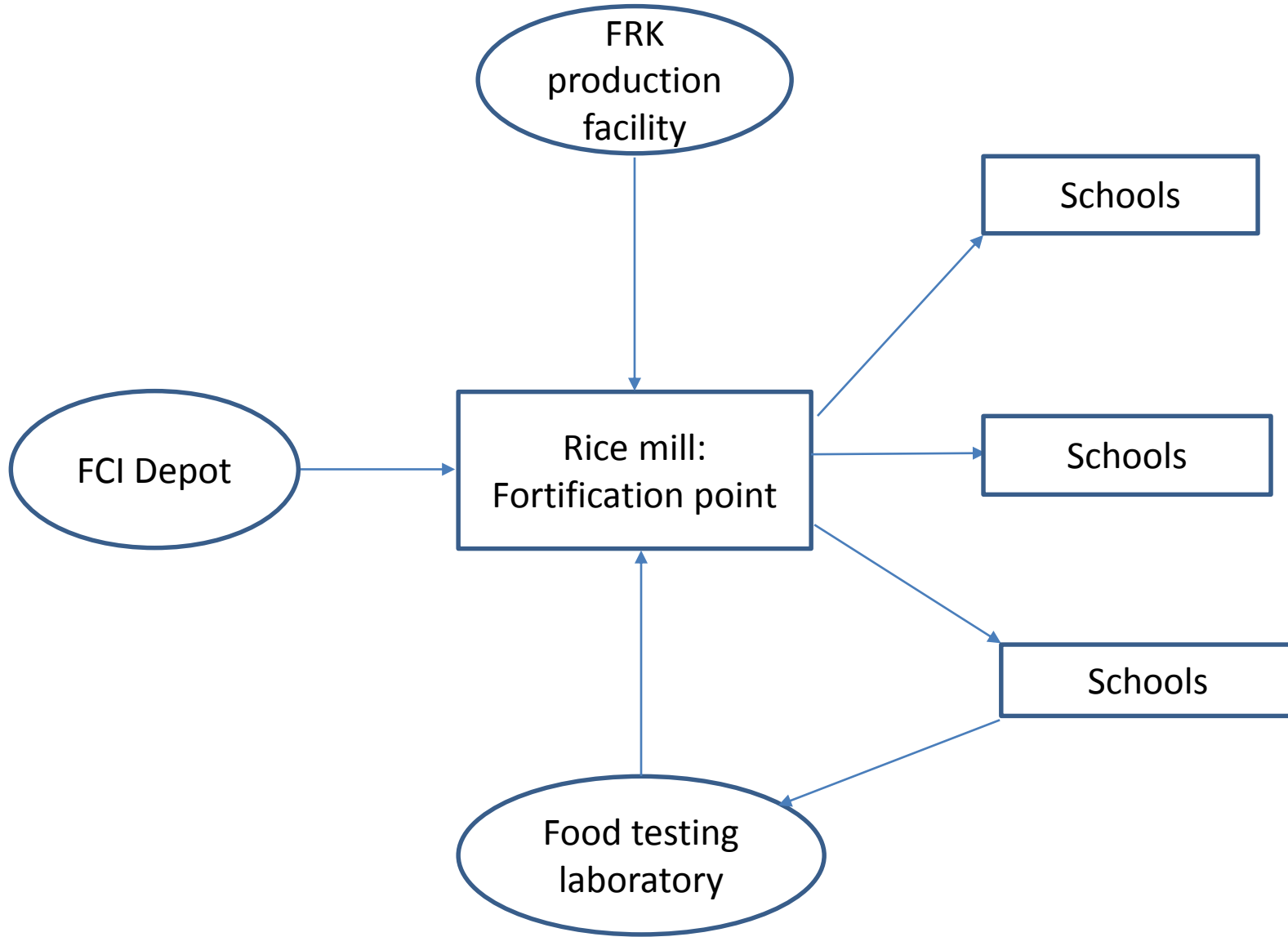
Duration: 28 months (duration of intervention is 24 months)



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

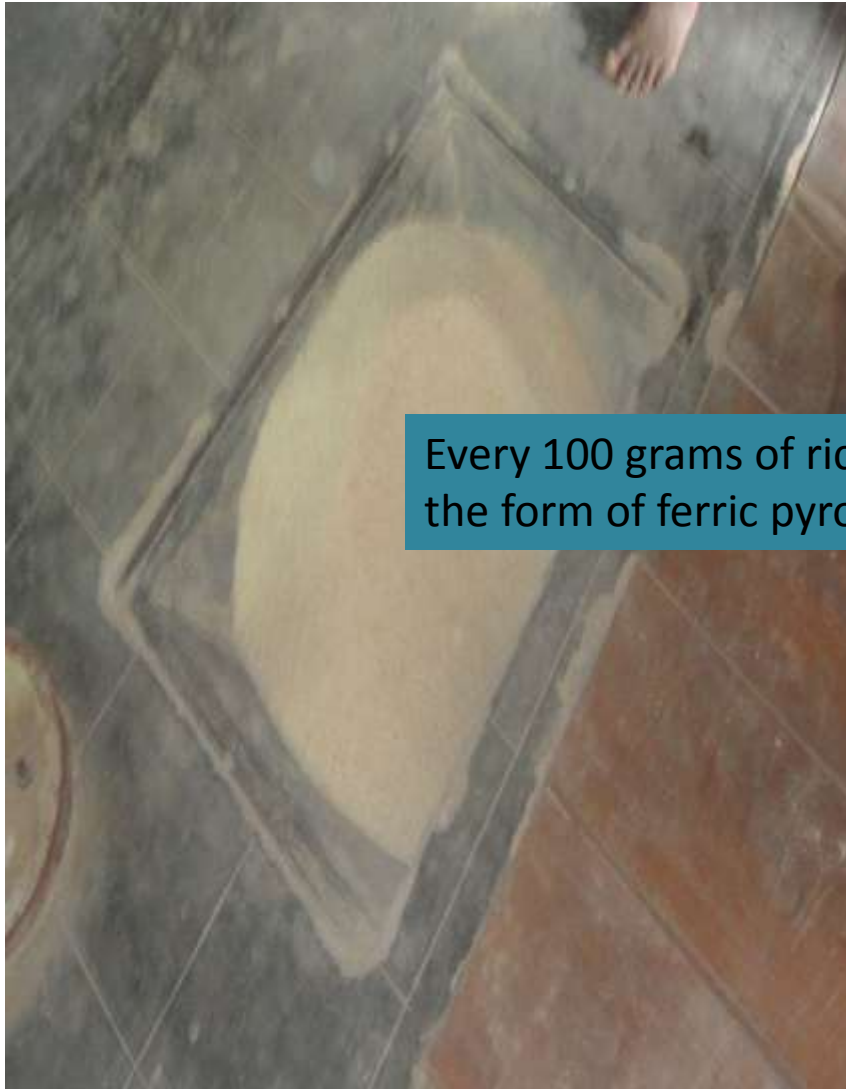
a) Weighing the FRK



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.



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.

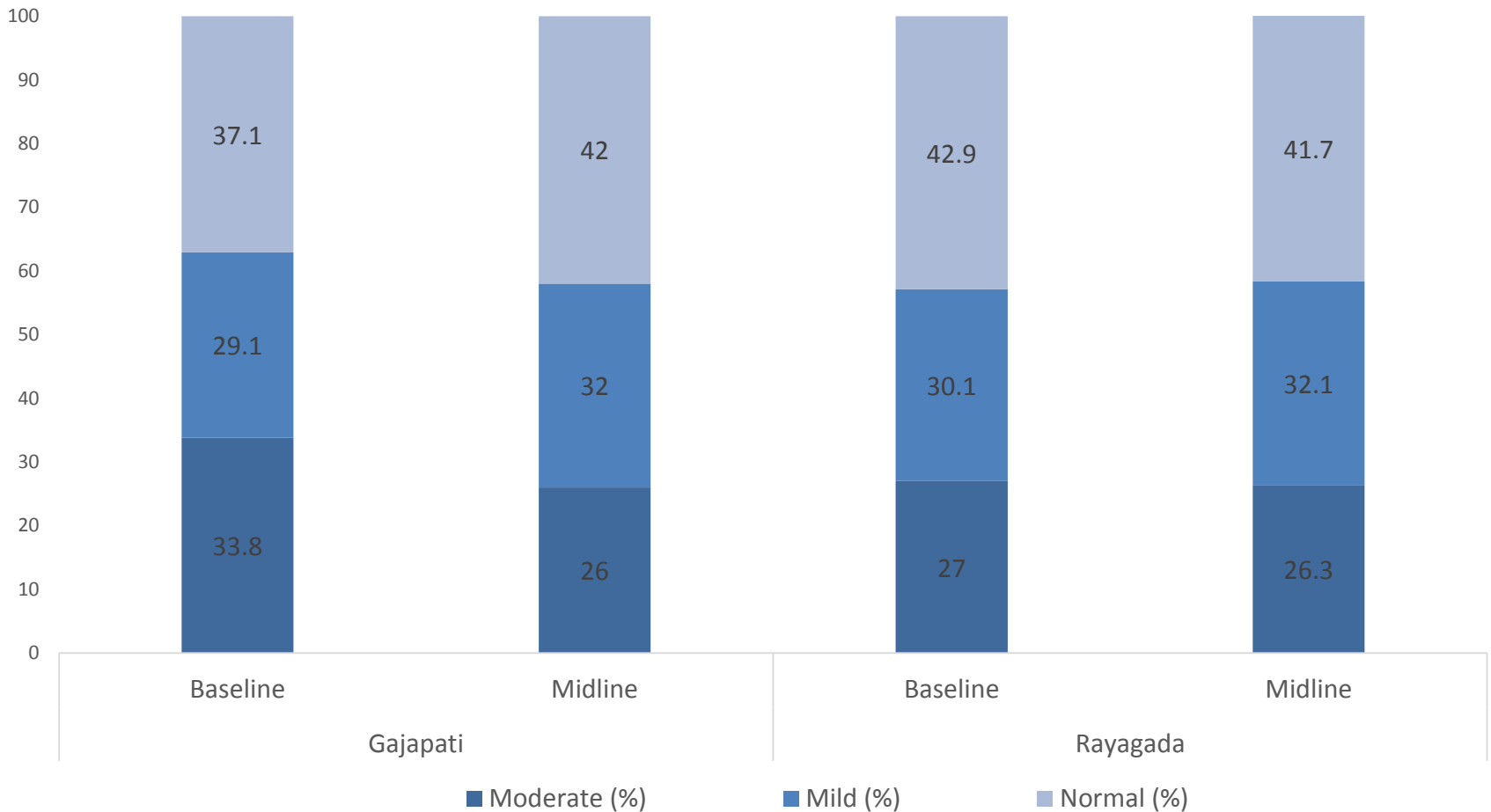
Study participants: Sub-sample of baseline assessed longitudinally at mid-term to establish change between baseline and mid-term in both intervention and control districts.

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

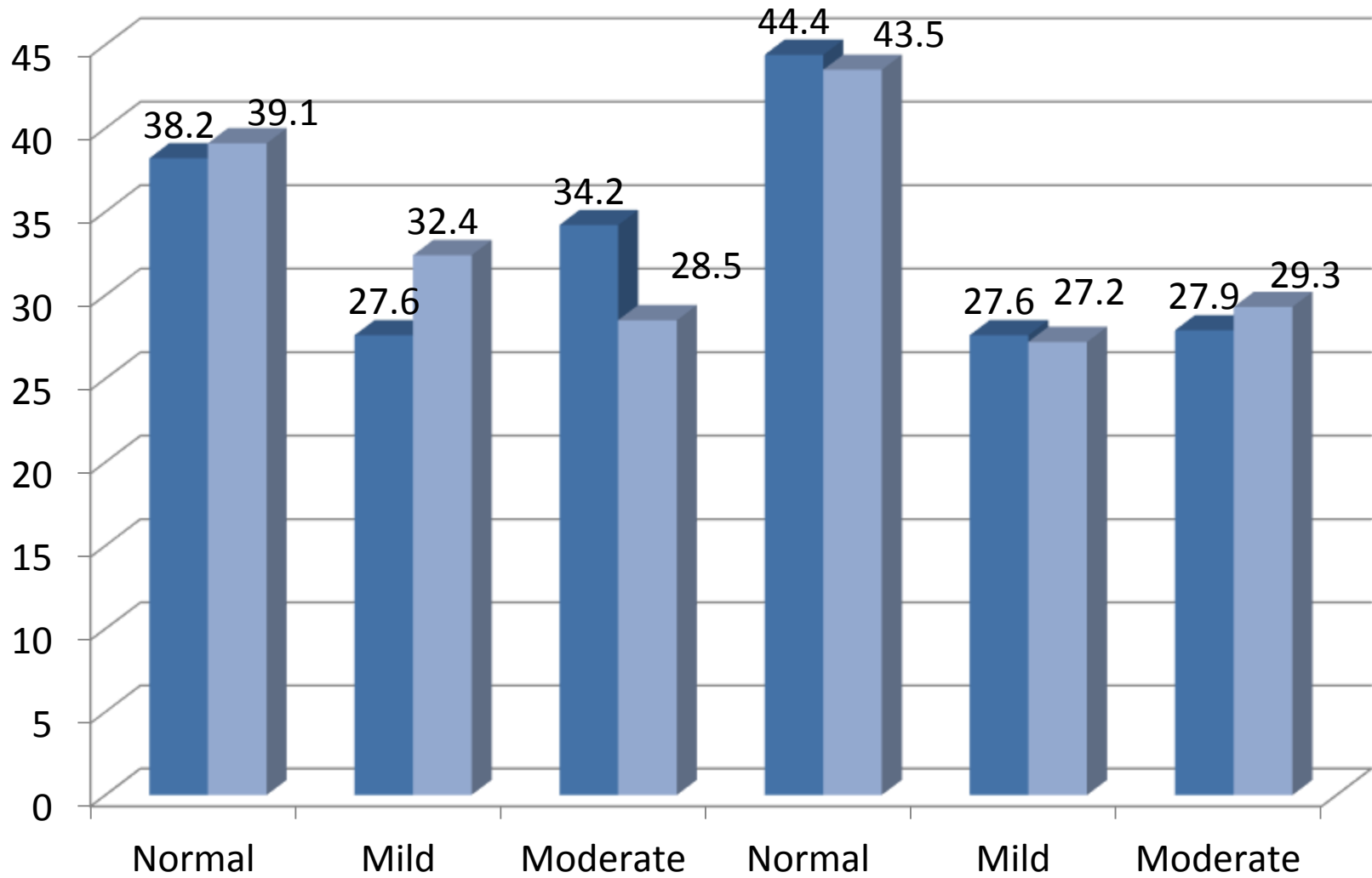
Duration of intervention: 10 months

Results: Anemia

Overall anaemia prevalence in Gajapati reduced by 5 percent points



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



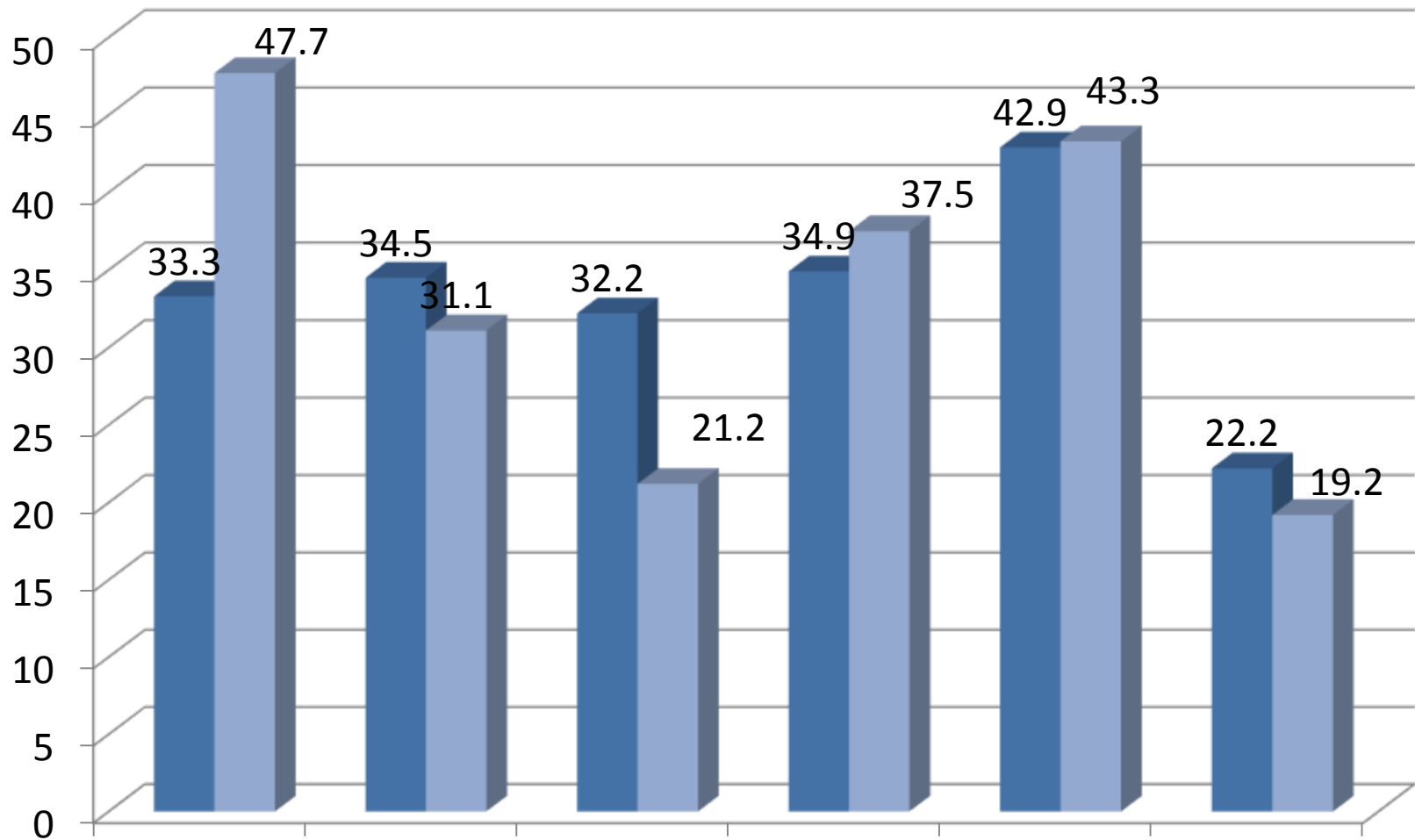
Baseline



Mid-line



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



Baseline



Mid-line



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 | | | | | | | |

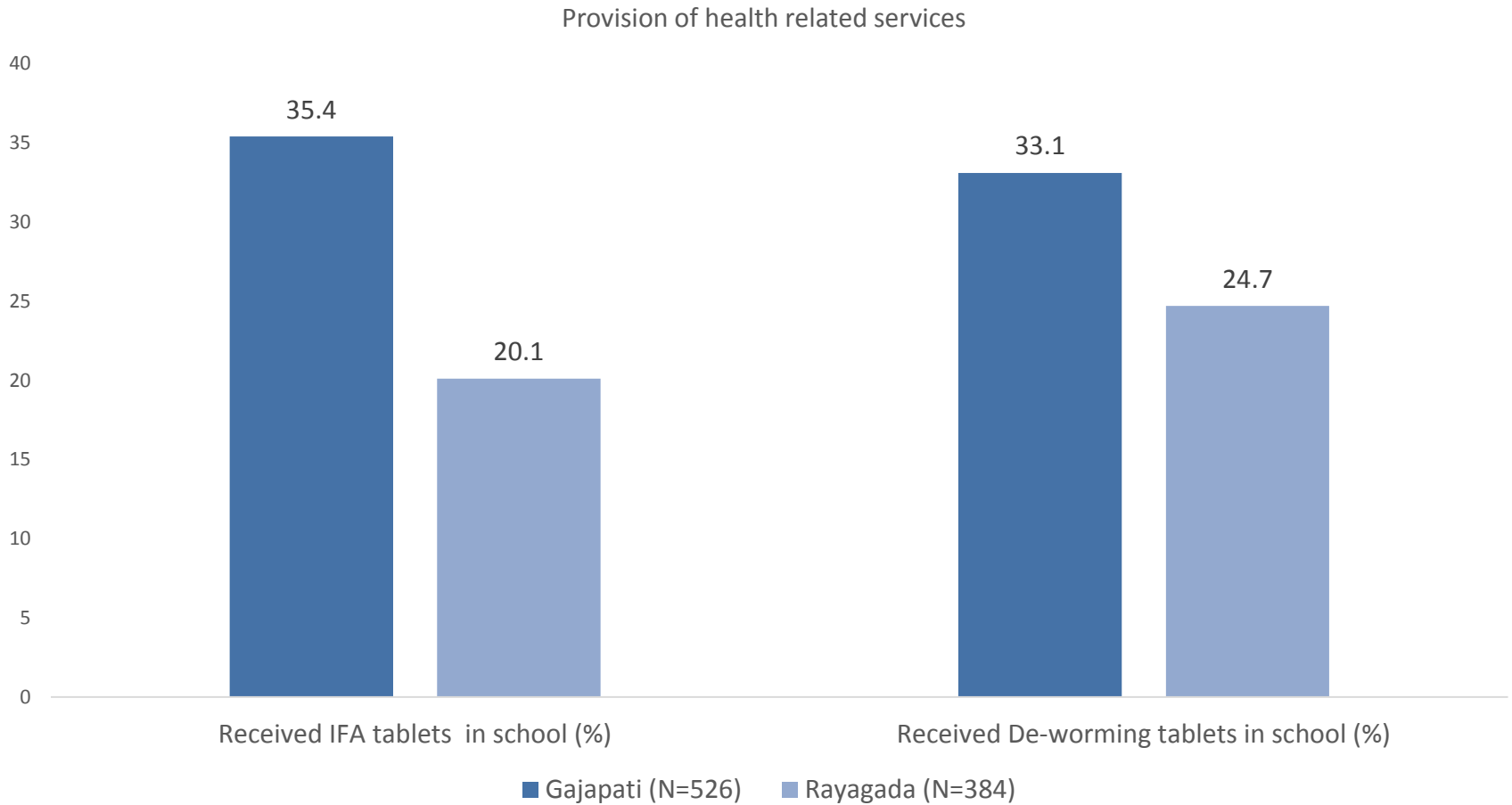
The reduction in anaemia levels when compared to baseline is statistically significant. This achievement is attributable to consumption of fortified rice only- other components such as awareness/consumption of IFA/deworming tablets have minimal coverage and impact

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.



Thanks