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‘Plastic Rice’: Why the Govt’s Experiment With an Artificial Grain is Hard to Swallow for Rural Adivasis

Anumeha Yadav

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Rice growing farmer communities refuse to accept new fortified rice kernels, while public health experts express concern at the food scheme’s lack of safety mechanisms for vulnerable groups.

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India is among the world's top food producers; yet, it faces a chronic undernourishment crisis with 16% of its population malnourished compared to the global average of 8%. This series traces the structural causes of hunger and food insecurity in inequalities in power. It examines the solutions the state is offering to ask what their true meaning is for people and the climate.

In this series, a three-part investigation focuses on the policy of rice fortification in India's public-sector food programmes. Does such a policy really help those with anaemia and malnutrition? Who benefits from it instead?

Monocropping rice and wheat after the Green Revolution and

cereal-heavy diets have depleted soils and worsened nutrition. Then, what does it mean to seek the solution in artificially fortifying cereals with factory-made micronutrients? These stories uncover the policy's impact on the ground.

Read parts two and three of this investigation here.

East Singhbhum, Latehar, Jharkhand:

A long time ago, in the true age — *Sedai*
tahe khan jugdo tahekhan

There were many creepers in the forest — *Bir*
buru se dare nari ho tahekhan

A breeze brought rain from the sky in the — *Hisit*
hoye te serma jari te dinge sawaeled

right time

We made a long way short — *Sedai*
horbon kato ke a

[we built roads]

[after clearing the jungle]

we built cities and markets — *Sohor*
bajorbon teyar rana

As the forest was gone, the rain stopped — *Bir*
buru ujar saont te serma jari hoy bagi ked

...We used to eat a bowl of rice, now we — *Barti*
daka bon chuput hatin

are sharing only a fistful

Even two real brothers do not get along — *Boko*
boeha bakin sapahob

Daily they fight.
Dipin rapachakhan

*– A Santhal song connecting a forest's degradation to loss of food, and to heightened conflict in Chakulia in East Singhbhum**

Kamal Kant Gope lives in Jharkhand's Dalbhumgarh, part of the state's "rice bowl" in the forested Kolhan region along the state border with Bengal. The area, along with Chakulia and Behragorha block in East Singhbhum district, accounts for a significant proportion of the state's paddy production. It has rich groves of bamboo and cashew. Along with rice, Gope and other farmers here grow numerous vegetables such as *bhindi* (okra), *barwati(string bean)*, *sem phali(field bean)*, *kundri(gourds), pitha* (pumpkins) on thousands of small farms.

In the sowing season last year, Jharkhand received the **lowest rainfall in 121 years**. This year, as the skies remained hot and clear even till the month of August, erratic monsoon rains have delayed paddy sowing. The Singhbhum region's farmers hold a rich but diminishing resource. They have a history of cultivating hundreds of indigenous varieties of paddy, names which linger in memory and conversations: *Chandra Kanthi*, *Lolaat*, *Joradhaan*, *Maanjhi*, and so on. Scientists at the Birsa Agricultural University's district campus, on the highway connecting Jamshedpur city to Gope's village Panajea, say that over the years the soil has turned more acidic. Many farmers now rely on hybrid seeds varieties, such as "MDU1010", "IR64" and "PH76", and use fertilisers to grow paddy.

Singhbhum's farmers grow hundreds of nutritious folk varieties of rice, but over the years, they have switched to cultivating other varieties. Photo: Anumeha Yadav.

As part of the Modi government's new strategy to combat anaemia and malnutrition, two years ago, in October 2021, it began supplying new kind of rice, chemically fortified with iron, vitamin B12 and folic acid, to the poor here, including small farmers such as Kamal Kant Gope in Jharkhand's Panajea village.

Industrial processing, and abrasive polishing to increase the "whiteness" of rice strips the grain of its bran layer, a dietary fibre rich in minerals and other nutrients. As rice grains get stripped of nutrients, some development experts advocate re-introducing nutrients into rice, by fortifying it with a micronutrient premix.Under the policy called "large scale fortification", micro-nutrients are artificially added to staples, such as rice. How it is being done in rice is this – a dried powder "pre-mix" of vitamins and minerals – iron, vitamin B12, folic acid – is added into broken rice, or powdered rice grains. The paste, containing factory-made nutrients, is passed through pasta-extrusion equipment to manufacture new grains, with a slightly artificial appearance compared to natural rice. The new grains are mixed into regular rice supplied to the poor monthly in gunny bags as a food subsidy under the National Food Security Act.

Dalbhumgarh and Chakulia blocks were among the sites in a national pilot study for this mandatory rice fortification scheme, chosen because most of Jharkhand's rice mills are located here, and also because of the history and trend of paddy production here. It has now been many months since Gope, who lives in Dalbhumgarh, first held a new opaque rice grain made in an industrial unit in his palm, instead of translucent grains that ripen every year in the emerald stalks in his fields. He remained sceptical of what the government was providing as "food".

"If the government pressures us to eat it saying it is "Vitamin Rice", at least it ought to have some taste or the qualities of rice?" Gope asked. He explained with some exasperation, "This is not rice. If I hold it tight in my fist, it falls away like a grain of sand, it does not stick like rice. Even its *maarh* (the water left after rice is cooked) is of very thin consistency. Then how can it be nutritious?"

The fortified rice made using extrusion machine in a factory have an artificial appearance compared to natural rice.

Gope said that those who cultivate rice such as him know

what “good food” is. “In our village, we have eaten *dheki ka chaawal*, we know how to pound and mill paddy into rice ourselves at home, in small batches. The *maarh* [starch] of that rice is so thick, it contains nutrients from nature.”

“Locally, we have paddy varieties such as *Makarkanthi, Kaankri,* and *Nohaachi-dhaan,”* he continued.

“*Nohaachi-dhaan* with thick bran is red, almost black, in colour with grains filled with nutrients. The maarh is delicious – thicker than milk with Horlicks! Yet, the local rice is light and easy to digest.”

Gope who is the traditional headman of his village Panajea, was not only unconvinced by the government policy on rice fortification – he was also alarmed and anxious. He believed that the new fortified grains may not be suitable for those who are not well. “I believe, not everyone will be able to digest this new rice.”

“In fact, since this rice started being distributed, we have had two instances where people who fell ill needed blood transfusions,” he said. “If this rice has additional vitamins, then why is that happening? How do we know if it is even helping?”

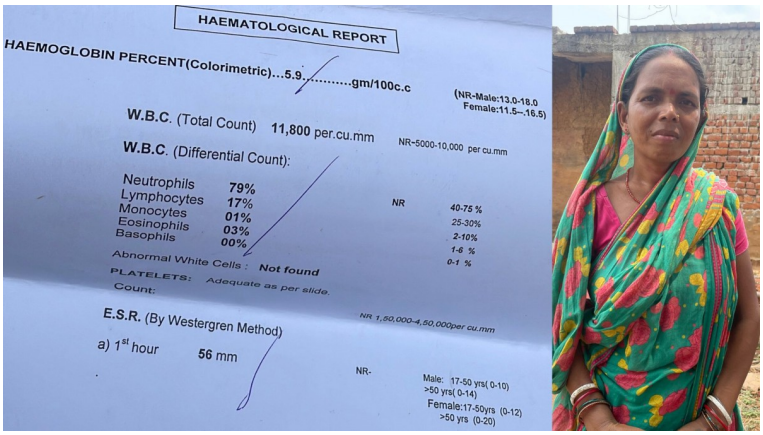
At risk and uncertain

Inside Panajea village, this reporter met one of the individuals whose health Gope was concerned about. Rahul Gope, a quiet teenager dressed in a t-shirt and shorts, had a slight build, which made him appear smaller than his age. His face was pale and his eyes had turned yellow.

Rahul’s mother, Chherani Gope shared multiple laboratory reports that showed how Rahul had undergone two blood transfusions in the previous three weeks for the first time in his life this summer.

At the time of the first blood transfusion, laboratory reports showed, he had a blood haemoglobin level – an essential protein carrying oxygen in the body – of merely 5.9. This was not even half of the healthy norm for his age. He was severely anaemic.

The reports also showed excess bilirubin, more than three times the normal, showing an excess in his body of a pigment formed from a breakdown of blood cells.

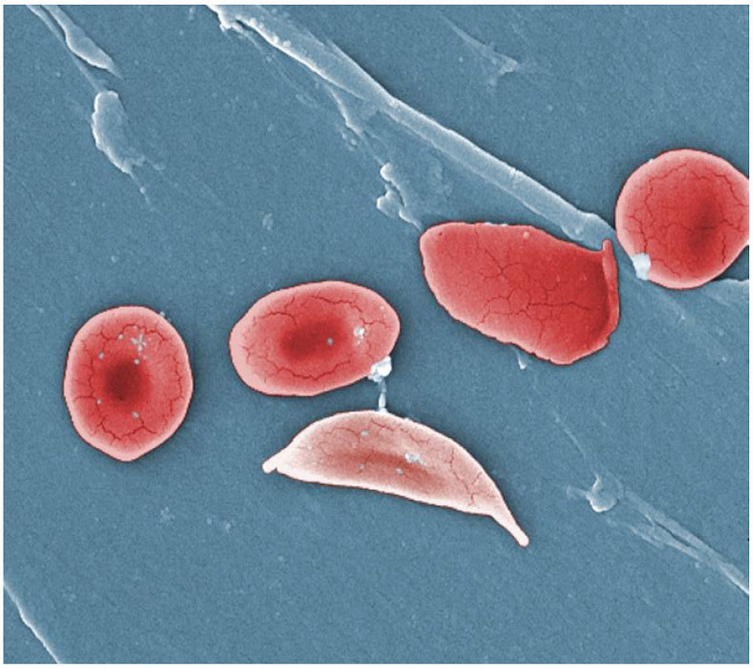


Rahul's mother Chherani Gope shared medical reports that showed no clear diagnosis of his severe anaemia, accompanied with jaundice. Photos: Anumeha Yadav.

The family said they had spent more than Rs 20,000 on multiple visits to the nearest health facility and laboratory, 40 km away in Jhargram in Bengal (the neighbouring state), but they did not have a diagnosis for Rahul's condition. They live more than 100 km away from Jamshedpur city, where tertiary health facilities are located.

The government's mandatory rice fortification in public schemes is a response to chronically high levels of anaemia in the Indian population, which manifests, among other forms, in low haemoglobin levels such as Rahul's. But at the same time, the government acknowledges that it could potentially harm those like him, whose low haemoglobin could be a result of other conditions such as inherited blood disorders prevalent in this region's Adivasi residents.

One of these is **sickle cell disease**, a blood disorder caused by a genetic mutation. In it, an individual's blood cells are misshapen, like sickles or crescents. Such misshapen cells can get stuck in blood vessels, causing organ damage, debilitating pain, and strokes. In India, it largely affects Adivasi communities. **Thalassemia** is another inherited blood disorder caused by damaged or missing genes in which the body does not make adequate haemoglobin. It is managed with regular blood transfusions.



In sickle cell anaemia, an individual's misshapen blood cells look like sickles, and can block the major blood vessels.

In fact, each gunny bag containing fortified rice in the public distribution system carries a warning in small print in English – a language neither understood nor spoken by the vast majority of India's rural poor – that the fortified rice is not meant for those with conditions such as sickle cell disease and thalassemia. This is because the effect of additional iron stores from iron fortified food is not clear or known on **such individuals' bodies**. If the excess iron gets stored, it may potentially damage their organs, **say experts**.

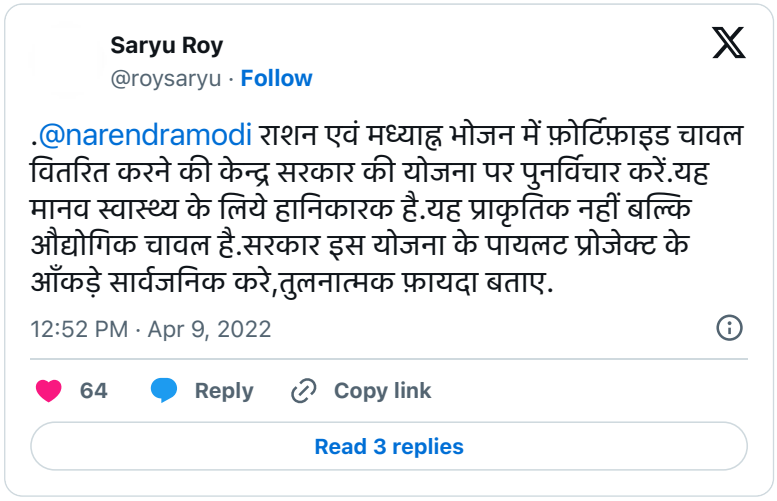
The symptoms Rahul was suffering from – very low haemoglobin combined with jaundice – has been seen in those with sickle cell disease. But that afternoon, Rahul had neither any information nor access to tests to determine whether he was among those who ought to avoid eating the iron fortified rice. Nor was any alternate food provided to him in the public system.

'Diktat' to feed fortified rice

Officials in the state capital Ranchi, 180 km away, who run the scheme to distribute ration rice, said they lack information on how many of existing food rations card holders in Jharkhand already suffer from such "hemoglobinopathies", disorders such as sickle cell disease or thalassemia, and are thus supposed to avoid eating the iron-fortified rice. Nor did the department have provisions to give them an alternative to the chemically fortified rice, which would mean continuing to provide them custom milled rice as it did earlier.

"The only positive thing is that since the distribution of iron-fortified rice began, we have not got an adverse health report from the field yet," a senior official in the Jharkhand

government, overseeing the new policy's implementation, stated about his discomfort with the scheme. He added that when several critics, including the state's former minister for food and civil supplies Sarayu Roy, publicly **opposed** the scheme, to improve public understanding, the department had organised workshops, inviting medical experts from the All India Institute of Medical Sciences (AIIMS), organisations who work on sickle cell anaemia and civil society groups.



The official said that the Jharkhand state government, which looks after the health and nutrition needs of some of the poorest communities of India, was provided no choice by the Union government in implementing this new policy, even when Jharkhand lacks adequate infrastructure, such as laboratories which can test the added micronutrient content, to ensure quality control and safety.

"The situation came to this: the Food Corporation of India, which supplies us the rice which we distribute to the poor, said that if you do not take chemically fortified rice, you will not get any rice. Then the public grain distribution in Jharkhand would stop," said the official.

In Jharkhand, so far, the Food Corporation of India (FCI), under the Union Ministry of Consumer Affairs, Food and Public Distribution, acted as an aggregator. Under the National Food Security Act, it procured paddy and provided it to Jharkhand from a central pool. After the paddy is milled, it is transported to FCI warehouses, and then the state-level bodies distribute it further at retail outlets.

"The food ministry told us: 'If you wish to distribute simple "custom made rice" (CMR) like before, then make your own arrangements for that.' The Jharkhand state government does not have the wherewithal to do so, without FCI's support," the official stated. "State government *ko unhone majboor kiya ki aap ko* fortified *lena hi hai, doosra koi* option *nahi*. (They made it compulsory for us, giving us no option but to distribute fortified food.)"

'Mandatory' scheme?

In 2021, the Union government selected a district each in 15 states to distribute fortified rice as a pilot scheme. It started distributing fortified rice in the government's food safety programmes in 2022. It plans to expand this scheme to all districts of India by March 2024 with a yearly budget of nearly Rs 3,000 crore, or $350 million approximately. From March 2022, it made fortified rice compulsory in the children's schemes. From March 2023 onwards, it introduced it in ration, or the public distribution scheme.

India's ration scheme is the largest food safety scheme in the world, reaching 80 crore or 800 million individuals. For a comparison, the World Food Programme(WFP) **reached 160 million people** in 2022. After years of advocacy by grassroots activists' networks such as the Right to Food Campaign, the previous government expanded food security schemes to include 67% of India's population. Under the National Food Security Act, 2013, every member of a poor household receives five kg of grains, wheat or rice, at very low costs at village ration shops. The poorest households get 35 kg grains each month. Under the midday meal programme, 115 million school children get a hot cooked meal daily, and under the Integrated Child Development Scheme(ICDS), the world's largest early childcare program, 158 million infants, pregnant and lactating women, get supplementary nutrition at community creches.

In the ICDS and school lunch schemes, the government supplies around 3.5 million(35 lakh) metric tonnes of iron-fortified rice. This increases ten-fold to more than 35 million (350 lakh) metric tonnes fortified rice in the public distribution scheme, when scaled to all districts by 2024. In

October this year, the government distributed nearly **17,74,153 metric tonnes** of fortified rice in its welfare schemes.

India has the **second highest** sickle cell disease burden incidence in the world, and the largest number of children with thalassemia-major in the world. The government has provided a few numbers in parliament.

On August 9, 2021, **responding to a parliament question**, Minister of State for tribal affairs Renuka Singh Saruta replied that 1,13,83,664 (1.13 crore or 11.3 million) persons in India were screened for sickle cell disease and "8.75% (9,96,368, or 9 million) tested positive (trait in 949057, disease 47,311)." Further, the minister stated that "studies undertaken by Indian Council of Medical Research show prevalence of sickle cell anaemia across the country is 5-34% (as per document on sickle cell anaemia control programme published by Government of Gujarat)". On a question about thalassemia, on March 20, 2020, the government replied that **in India**, "an estimated 10,000-12,000 children with B (the **beta)-Thalassemia** are born every year".

Also read part two: States Lacked Capacity to Test Fortified Rice, But Had to Give it to the Poor

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In pilots conducted for launching the intervention, the government tested how the supply chain of fortified rice works – or how it would reach from the manufacturing unit to a rice mill, to government godowns to retail rations shops. It did not study the impact of the intervention on public health, or on anaemia, or how the individuals with certain health conditions would tolerate this rice.

Activists pointed out that despite significant populations being at risk, the government launched the scheme without safeguarding how individuals with such blood disorders would be affected when they ate the fortified food, or how their bodies would react to the additional synthetic iron in food. Not only activists, but even members of the government's scientific panels have publicly spoken **against** giving such rice to those suffering from sickle cell disease and thalassemia patients.

Such iron-fortified food should also not be given to those with other conditions such as severe malnutrition, and newly diagnosed tuberculosis, said Dr Sylvia Karpagam, a doctor and public health researcher, who works on right to health and nutrition among marginalised communities. "Malnutrition and tuberculosis can often remain undiagnosed and untreated in India. Then, why are policymakers surging ahead with iron fortification of rice on such a large and irreversible scale?" asked Dr Karpagam. "Is it because these conditions affect the poor more than the elite?

Each gunny bag of fortified rice in the ration system carries a health warning in small print in English, a language neither understood nor spoken by the majority of poor. Photo: Anumeha Yadav.

Balram, of the Right to Food Campaign was one of the first to study the implementation of the fortified rice scheme in Jharkhand and Chhattisgarh.

“We tracked it in four villages in two pilot blocks. Printing a health warning in small print in English in rural areas is totally ineffective. And anyway, the rice is distributed to the poor as loose grains, not in bags,” he said. “Despite the formal warning, we found grassroots health workers had no instructions to make this distinction for the affected individuals in the villages. It shows the government’s utter lack of concern. There are no real safeguards to enforce it. Yet, the scheme has been scaled up, like a royal diktat disregarding the palate, food habits, taste of millions.”

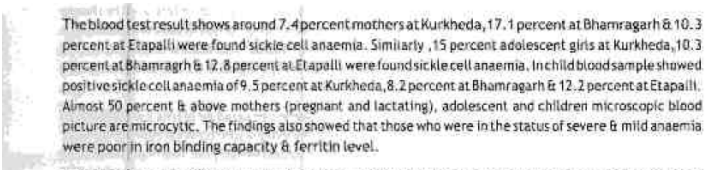
Activist Rajesh Krishnan, who was part of the campaign, filed a public interest litigation in the Supreme Court last December over the impact on health of such vulnerable groups. Hearing the case last month, the court asked the government to respond in November.

Among the evidence the Union government considered in the scheme’s favour was a randomised control trial (a study in which two groups – one which receives an intervention and the other which doesn’t – are compared) on the impact of fortified rice on reducing anaemia conducted by the Tata Trusts, which is a philanthropic initiative of the Indian multinational Tata Sons. The Bill and Melinda Gates Foundation (BMGF) has funded Tata Trusts to advocate for and work on fortification in India. For instance, **it gave** Sir Dorabji Tata Trusts US $ 3 million for “Food Fortification MIYCN (maternal and child nutrition) Joint Programming Platform” in 2016.

Food and health activists have criticised relying on such sources which were conducting “friendly research” financed

by lobbying groups as a potential conflict of interest. Tata is a conglomerate which owns several businesses, including in chemicals, food and in nutraceutical sectors. Moreover, even this promotional study conducted by Tata Trusts in Gadchiroli district, one of the poorest parts of Maharashtra in western India, which is a glowing evaluation of such an intervention, was cautious on providing the rice to those with sickle cell disease.

The **Tata Trusts study** recorded a "loss of sample". It had to exclude a sizeable number of individuals from the study sample because it found they "suffered from sickle cell disease". Ministries' correspondence first accessed by *The Reporters' Collective* notes that in blood tests, "7.4% mothers at Kurkheda, 17.1% at Bhamragarh", "15% adolescent girls at Kurkheda, 10.3% at Bhamragarh" and among children, "9.5% at Kurkheda, 8.2% at Bhamragarh" were found to "have sickle cell disease". The evaluators avoided feeding iron-fortified rice to these women, adolescents and children who suffered from the blood disorder resulting from a flawed haemoglobin mechanism in their bodies.


The blood test result shows around 7.4 percent mothers at Kurkheda, 17.1 percent at Bhamragarh & 10.3 percent at Etapalli were found sickle cell anaemia. Similarly ,15 percent adolescent girls at Kurkheda, 10.3 percent at Bhamragrh & 12.8 percent at Etapalli were found sickle cell anaemia. In child blood sample showed positive sickle cell anaemia of 9.5 percent at Kurkheda, 8.2 percent at Bhamragarh & 12.2 percent at Etapalli. Almost 50 percent & above mothers (pregnant and lactating), adolescent and children microscopic blood picture are microcytic. The findings also showed that those who were in the status of severe & mild anaemia were poor in iron binding capacity & ferritin level.

The Tata Trusts study recorded that they could not study those with sickle cell anaemia.

The government had ignored that even such studies, financed by entities such as Tata, had avoided giving this rice to vulnerable groups. "In all studies, certain groups are excluded and we don't fully know or understand the impact on them," explained a doctor working in the government, who declined to be named. "We have no way to know the full impact on such groups."

Medical experts explained one of the less understood concerns, firstly, how excess iron may get stored in a form that was of no use to the body, and secondly, it could do harm.

"Studies **show** some such patients will not be able to down-regulate their iron absorption, and will continue to absorb iron. The problem with excess iron is that it ends up in a toxic form in the blood," explained Dr Anura Kurpad, a professor at St John's Medical College, Bengaluru, who chaired the Indian Council of Medical Research's (ICMR) expert committee on nutrient requirements, and was a member of the scientific committee of the food regulatory body, the Food Safety and Standards Authority of India.

Also read part three: Who Did the Union Govt's Food Policy Help? India's Anaemic, or Vitamin Businesses and Big NGOs?

"This excess iron that is unbound to the usual transport protein called transferrin is (quite unimaginatively) called "non transferrin bound iron" or NTBI. This is particularly toxic as it forms reactive oxidative species that cause a lot of damage to cells." Dr Kurpad said this could lead to "cardiac damage, liver fibrosis, gonadal dysfunction, and growth retardation, among many others" for such individuals. Dr Kurpad further said that the storage form of iron – ferritin – would also increase, with increased rick of chronic diseases like diabetes. In the European Journal of Clinical Nutrition, Dr Kurpad **showed** this was linked to increased risks among adolescents of non-communicable disease. "There must be a mechanism for the problem of balancing the risks and benefits of iron supplementation in these areas – there is no shortcut," he told *The Wire*.

After criticism by activists and academics, the food safety regulator, FSSAI in August 2021 **issued a gazette** adding "persons with Sickle Cell Anemia" in the language of its fortification regulations of 2018, advising them not to consume "iron fortified products". Taking no responsibility to ensure this, it left it to already overburdened health departments in states to identify and protect such persons.

In mid-2021, the Union government **set up a Sickle Cell Disease Support Corner** in collaboration with the Piramal Foundation's Piramal Swasthya Management and Research Institute to "create a database of individuals with sickle cell disease, or traits in the tribal population". Under this, **it is carrying out** a "universal screening of 7 crore people in the age group of 0-40 years in affected tribal areas". Piramal Foundation is the philanthropy arm of US $ 4 billion-worth Piramal Group of Companies. The Swiss pharmaceutical, Hoffman-La Roche Ltd., which was then the world's largest multinational company making synthetic vitamins had sold its India **business'** majority stakes to Piramal. Piramal Group includes a **nutraceutical business** manufacturing synthetic vitamins and minerals, and **is among the suppliers** of factory-made nutrients in the government fortification programme.

Public health experts expressed wariness at the involvement of nutraceutical-funded entities which advocated for the mandatory fortification of staples, and they questioned the ethics of such a mass screening of millions.

"Such mass, universal screening for sickle cell anaemia raises ethical concerns because youth diagnosed with it may face discrimination in jobs, marriage and so on," said Dr Yogesh Jain, a community physician who has treated sickle cell disease patients in rural Adivasi areas in north Chhattisgarh. "It may be good to ensure complete diagnosis to those who are symptomatic, and once achieved, screen pregnant women, or newborns. Once that is done, you may consider mass screening after consulting with all communities and be ethically correct."

Dr Jain added that he did not view mandatory iron fortification of rice as a cure for India's anaemic population, because nutritional deficiency is the cause of 60% of all anaemia and iron deficiency is the cause of two-thirds of nutrition deficiency. Thus, iron deficiency anaemia constitutes the cause in less than half of all anaemia cases, the other causes being inflammation, or infections. "Large scale food fortification is a rent-seeking approach shrouded as a technological fix, where companies profit from making and blending nutrients. How will it help?" said Dr Jain. "I believe fortified rice in this form does not even adequately help the iron-deficient. It is corroborated by studies that food-based corrections, such as providing iron in the diet along with a fruit, would be better."

Public health experts say access to eating fresh, diverse foods such as citrus fruits will help an individual in better absorbing iron from food sources. Photo: Anumeha Yadav.

The Union government appointed PATH as a "development partner" in Jharkhand to help implement the scheme. PATH is a **"product development organisation"** initiated by Ford Foundation in 1977, which is heavily funded by the Bill and Melinda Gates Foundation, with which it has long standing institutional ties. In 1998, before the official establishment of the Gates Foundation, Gates created the Bill & Melinda Gates Children's Vaccine Programme with a donation of $100 million and this was administered by PATH's secretariat in Seattle. As per its **2022** financial report, 43% of its funding was from one private foundation, and 32% from United States government agencies. **In 2021**, this was 48% and 23% respectively.

In 2010, the Indian government had **halted a trial by PATH** (funded by the Gates Foundation) among Adivasi children, in which it was testing vaccines against cervical cancer. A **2013 report by the parliamentary standing committee** on health found collusion between Indian health regulators and PATH to downplay the violations in this vaccine trial. It found that PATH had described the project as an "observational study" and circumvented rules around such trials, such as reporting of serious adverse effects within a specific time.

The parliamentary enquiry found that PATH had violated children's rights. It had collected data on a large population of 23,500 children of age 10 to 14. In the case of 5,000 children, the parents/guardians were not literate and could not even sign in their local language, in Telugu or Gujarati, and in Andhra, had simply obtained the consent from hostel wardens of residential schools the Adivasi children were in.

As per the **latest financial documents** on the website of the Piramal Swasthya Management and Research Institute, which is running a "support corner" for sickle cell disease and is tasked with creating a database of individuals with sickle disease or traits in India's tribal population, in the financial quarter July to September 2023, the Gates Foundation donated to it Rs 180.8 crore as a grant, and PATH gave it a grant of Rs 1.4 crore.

Activists critiqued the conflict of interest inherent in these policies. "It is a situation where the for-profit entity of the business is first supplying the fortificant earning profits, and the not-for-profit part of the same entity is managing the potential health harms," said Soumik Banerjee, one of the authors of the RTF and the Alliance for Sustainable and Holistic Agriculture (ASHA) fact-finding report on the scheme in Chhattisgarh. Referring to the government's delayed advisory for those with sickle cell anaemia to avoid eating fortified rice, he called mandatory fortification "a wasteful strategy for the most, while potentially harmful for a few."

Health and food activists say the scheme will help multinationals earn profits in selling micronutrients, but not address the crisis of undernourishment. Photo: Anumeha Yadav.

He added: "Food fortification has been sometimes used as a temporary measure. But in pushing to make it mandatory in India's public schemes, these foundations and multi-nationals are simply creating new markets, while undermining smallholder farmers and their diets."

Piramal Swasthya Management and Research Institute and the Piramal Foundation did not respond to an emailed questionnaire from *The Wire*.

A PATH official administering the programme who declined to be identified in the report said the criticism was exaggerated. “The critics are wrong. On one hand, there is evidence that fortified rice will address anaemia, on the other, in India, it is being done such that it would meet only 25% of an individual’s recommended dietary allowance, thus, there is very little scope of toxicity,” adding, “When these critics say that individuals are at risk, if the exact number of those with sickle cell anaemia is not even known, then where are they getting data to ask such questions from? It’s not clear.”

The Gates Foundation and PATH did not respond to an emailed questionnaire from *The Wire* on the advocacy for mandatory fortification, the experimentation and its potential side effects on vulnerable populations, including those with sickle cell anaemia.

‘How can we eat it when the birds don’t?’

Jawahar, a social activist in Palamu, questioned why fortified rice had been mandatory. “If it is harmful for some group of people, such as those with thalassemia or sickle cell disease, why is it being given to anyone at all?” he asked. He said there was little social acceptance of the new grains even months after they had been introduced, and several questions remained. “The people wonder why isn’t “plastic rice” being given in the open market, why only as government ration? Some eat it. But I would say about half do not.”

Most families The Wire interviewed said they separate the fortified grains and feed it to poultry. Photo: Anumeha Yadav

He continued, saying that the fortified rice’s artificial appearance made it hard to accept. “You can visually tell the difference between rice and fortified rice. Those it is given to frequently sort and remove the fortified kernels when they prepare their meals. They believe it is plastic rice from China. They ask, if it’s chemical nutrients-based, what will it do

inside their stomachs?"

In northern Odisha's Adivasi villages too, those receiving the fortified rations continued to be sceptical that government was delivering nutrition through fortified rice. A **Odiya TV** channel's news reports showing that several rural residents instead believed that ration shop owners were mixing fake grains, or "plastic rice" into the subsidised rice grains, went viral this year receiving over one million **views**.

Even though the news report and local health workers clarified that the rice was not "plastic" mixed as pilferage by dealers, and instead was vitamin-enriched rice, there were still very few takers among rural communities in Adivasi villages in Odisha.

Pramila Behera, a social worker in Barpali village in Subdega, questioned why the unnatural looking rice was being given to children in schools and anganwadi. She explained why she found it difficult to believe it was as good to eat as natural food: "It floats separately on water. If you bite it, it makes a "*chakat-chakat*" sound, as if you are biting into a paste or as clay. None of this happens with ordinary, natural rice."

An electrician and a smallholder farmer in the same village, Jugal Kishor Dansena said he had tried other ways to test the grain's goodness. "I first noticed a few months back that there is *krutim* chawal, artificial rice, in the house," he recounted, as he did repairs in a house backyard. "I separated the strange grains and threw them to the hens. But even the hens did not eat it! It took it in its beak and threw it out."

Sunita Oraon, a farmer in Latehar, Jharkhand in her fields on Karam harvest festival. Here, farmers grow many varieties of rice and vegetables on small farm. Photo: Anumeha Yadav.

Twenty five kilometres from Barpali, in Dirgha village in Dhidikiya in Sundargarh Maximus Kulu, a smallholder rice farmer who owns three acre farmland on which he grows *Lohini*, an indigenous variety of paddy without using chemical fertilisers, recounted a number of diverse paddy varieties which the farmers grew locally and compared the appearance of fortified rice kernels to – *Bhajna*, *Lusdi*,

Khandsagar paddy varieties. Kulu, who has three family members, got 20 kilos of rice from the ration shop every month. Since January, he had been receiving fortified rice kernels in food rations, which he separated out. “You can easily spot the differences,” said Kulu. “We sort it out and give it to the hens.”

In East Singhbhum’s Chakulia, which was part of the pilot in Jharkhand, even after a year, women rice farmers said they did not trust the new fortified grains. Phulmani Soren’s family who farm in Digih village on the edge of Chakulia town get 15 kg rice every month as food rations. “We do not eat the new grains, because it is plastic rice.” She said this was even after the local village health worker had told them that the new rice was a kind of “vitamin rice”. “It looks distinct from rice, and it separates from rice when we cook it.”

As Phulmani spoke, a few metres away from her, her mother-in-law Gango Soren skinned two pigeons that she was planning to cook for dinner that evening. “We have tested it,” she said. “When we give it to birds, they don’t eat it. Our hen does not eat it, it walks away. Even the pigeons don’t eat it. Then how can it be rice?” she asked, animatedly. “Why is this being given? How can we eat it when even the birds don’t?”

**As recorded in the ethnography, “Making place through ritual: Land environment and region among the Santals”, 2018.*

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Read parts two and three.

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