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The Fortified Rice Pause: Hidden Hunger, Storage Science, and Policy Complexity

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WHY IN NEWS

The central government temporarily halted its Fortified Rice programme under PDS, ICDS, and PM Poshan schemes following an IIT Kharagpur study that found micronutrients in fortified rice kernels degrade significantly during the 2–3 year storage period in FCI godowns — raising questions about whether beneficiaries were actually receiving the intended nutritional benefit.

India’s decision to temporarily suspend the **Fortified Rice** distribution under major welfare schemes — the PDS (Public Distribution System), **ICDS (Integrated Child Development Services)**, and **PM Poshan** (renamed from the **Mid-Day Meal Scheme (MDM)** in **September 2021** as “PM Poshan Shakti Nirman”) — reveals the enormous complexity of translating nutritional science into large-scale public policy. The pause is not a retreat from the goal of nutrition security; it is a course correction prompted by scientific evidence that the current implementation may not be achieving its intended purpose.

THE PROBLEM FORTIFIED RICE WAS SOLVING: HIDDEN HUNGER

India carries one of the heaviest **malnutrition burdens** in the world — and it manifests not just as hunger (insufficient calories) but increasingly as *hidden hunger*: consuming enough food by volume but being chronically deficient in essential micronutrients.

Key data on India’s micronutrient crisis (from **NFHS-5, the fifth National Family Health Survey, conducted during 2019-21** by the **Ministry of Health and Family Welfare**, with fieldwork carried out by **IIPS (International Institute for Population Sciences), Mumbai**):

Indicator	Statistic	Source
Anaemia prevalence in women (15–49 years)	57%	NFHS-5 (2019–21)
Anaemia prevalence in children (6–59 months)	67.1%	NFHS-5
Vitamin B12 deficiency (national, estimated)	70%+	Multiple studies
Folate deficiency	Significant, especially in pregnant women	ICMR data

Rice is the staple food for the majority of Indians, particularly in eastern, southern, and northeastern India. However, **milling** — **the process of removing the outer bran layer to produce white polished rice** — strips away 75–90% of the grain’s naturally occurring vitamins and minerals. The white rice that reaches the consumer is essentially a refined carbohydrate with minimal micronutrient content.

Food fortification is the globally established solution: adding back essential micronutrients at the processing stage, so that the same staple food delivers nutritional value without requiring consumers to change their diets.

WHAT IS FORTIFIED RICE?

Fortified rice is produced through a process called **extrusion fortification**:

A small proportion of rice grains (typically 1 in 100) are replaced by artificially manufactured “fortified rice kernels” (FRK)

FRKs are produced by grinding regular rice, mixing it with micronutrient premix, and extruding it through moulds into rice-shaped pellets

These kernels are visually indistinguishable from regular rice

When blended into the regular rice supply, they invisibly deliver the required nutrients

The three micronutrients added under India’s programme:

Nutrient	Role	Deficiency Impact
Iron	Oxygen transport in blood; enzyme function	Anaemia, fatigue, impaired cognitive development in children
Folic Acid (Vitamin B9)	DNA synthesis; cell division	Neural tube defects in newborns; anaemia
Vitamin B12	Nerve function; red blood cell formation	Neurological damage, severe anaemia, irreversible damage in infants

These three are specifically chosen because they are the most widespread deficiencies in the Indian population and because rice fortification is technically feasible for them.

THE PROGRAMME’S SCALE AND AMBITION

The political impetus for the programme came from Prime Minister Narendra Modi, who **announced rice fortification at a public event on World Food Day, October 16, 2021**, pledging that all rice supplied under government welfare schemes would be fortified by 2024. The **Union Cabinet formally approved the rice fortification programme in February 2022**, mandating it across all major food-based welfare schemes.

The government mandated fortified rice across all major food-based welfare schemes from 2022 onwards:

PDS (NFSA): The **National Food Security Act (NFSA)**, enacted in **2013**, covers approximately **75% of the rural population and 50% of the urban population** — totalling ~81 crore beneficiaries. It distributes rice at ₹2–3/kg or free under PMGKAY

PM Poshan (formerly Mid-Day Meal Scheme): The Mid-Day Meal Scheme, one of India’s oldest nutrition programmes, was **renamed PM Poshan Shakti Nirman in September 2021**. It serves ~11.8 crore children in government schools daily across Classes 1–8

ICDS (Integrated Child Development Services): Launched on **October 2, 1975** under Prime Minister Indira Gandhi’s government, ICDS is one of the world’s largest integrated early childhood programmes. Now restructured under **Poshan 2.0**, it covers ~9.9 crore children under 6 and pregnant/lactating women through a network of over 14 lakh Anganwadi centres

The total annual rice distributed through these channels: approximately **37.2 million metric tonnes**. This is one of the largest food-based nutrition intervention programmes in human history.

The government earmarked significant funding: the cabinet approved ₹2,700 crore for rice fortification in the FY2022–23 to FY2023–24 period alone.

WHY THE PROGRAMME WAS PAUSED: THE IIT KHARAGPUR FINDING

Researchers at **IIT Kharagpur** — India’s first Indian Institute of Technology, established in **May 1950** (formally inaugurated on **August 18, 1951**) and located in **West Bengal** — were commissioned to study the nutritional integrity of fortified rice in the distribution chain. They found a critical problem: **micronutrients in fortified rice kernels degrade significantly under real-world storage conditions**.

The specific challenges:

Factor	Effect on Micronutrients
High temperature and humidity	Accelerates oxidation of iron; degrades B-vitamins
Prolonged storage (2–3 years)	Most fortified rice kernels lose significant nutritional potency
Moisture absorption	FRKs can absorb moisture, altering the matrix that holds micronutrients
Repeated handling and transit	Physical abrasion reduces the FRK premix coating

The central pool — from which PDS rice is sourced — is managed by the **Food Corporation of India (FCI)**, established on **January 14, 1965** under the **Food Corporations Act, 1964** by the Government of India. The FCI routinely stores grain for **2–3 years** before distribution. The storage conditions in government godowns, while improved in recent years (covered storage capacity of FCI has expanded), still vary enormously across states.

The finding raises a fundamental policy question: if the fortified rice delivered to beneficiaries has lost a significant portion of its micronutrients during storage, is the programme actually delivering its promised benefit? Or is it spending public money — and creating consumer perception of nutritional safety — without

measurable impact?

THE BROADER DEBATE

The pause has re-ignited a longer-standing debate about the best approach to addressing micronutrient deficiency in India:

Pro-fortification argument:

Fortification is the most cost-effective way to reach 800+ million people at scale without requiring behaviour change

It works invisibly — consumers don't have to do anything different

The WHO and UNICEF endorse food fortification as a primary tool for hidden hunger elimination

Even if 30–40% of micronutrients are lost in storage, the remaining 60–70% still represents a meaningful addition over zero

Alternative approaches:

Dietary diversification: Encouraging consumption of fruits, vegetables, and pulses — but behavioural change is slow and income-dependent

Direct micronutrient supplementation: Iron tablets, B12 injections — more reliable delivery but dependent on health system reach and compliance

Biofortification: Breeding naturally micronutrient-rich crop varieties (e.g., iron-biofortified pearl millet) — a long-term, sustainable solution being promoted by HarvestPlus and ICAR

Critics of fortification also point to:

FRK recognition: Beneficiaries who recognise the slightly different-coloured FRK sometimes remove it, negating the fortification

Washing losses: Some micronutrients (particularly water-soluble B-vitamins) leach out when rice is washed before cooking — a universal practice in India

Cost-effectiveness questions: The FRK procurement has faced allegations of quality issues and cartelisation in some state bids

WHAT THE GOVERNMENT HAS COMMITTED TO

The pause is explicitly temporary — pending a technical review:

No reduction in foodgrain entitlements: Every beneficiary under PDS, PM Poshan, and ICDS continues to receive their full allotment of rice. Only the fortification component is paused

Review committee: The Ministry of Consumer Affairs, Food and Public Distribution has convened a technical expert group to examine storage protocols, FRK procurement standards, and distribution chain integrity

Likely resumption: The programme is expected to resume with improved FRK storage packaging (possibly moisture-resistant hermetic bags) and modified storage protocols

UPSC RELEVANCE

What fortified rice contains (Iron, Folic Acid, B12); schemes it was used in (PDS, PM Poshan, ICDS); extrusion fortification process; FCI storage capacity.

MAINS GS-2:

Food security and nutrition policy; welfare scheme effectiveness; role of science in policy; NFHS data on malnutrition.

GS-3:

Food processing industry; public distribution system; procurement and storage policies.

GS-4:

Evidence-based policy making; government accountability to beneficiaries.

★ FACTS CORNER — KNOWLEDGE PEDIA

Fortified Rice adds: Iron + Folic Acid (Vitamin B9) + Vitamin B12

Process: Extrusion fortification — 1 Fortified Rice Kernel (FRK) blended per 100 regular grains

Milling loss: Polished white rice loses **75–90%** of its natural vitamins during processing

Schemes covered: PDS (NFSA), PM Poshan (Mid-Day Meals), ICDS (Anganwadis/Poshan 2.0)

PM Modi announced rice fortification: World Food Day, October 16, 2021

Union Cabinet approval: February 2022

PM Poshan renamed from: Mid-Day Meal Scheme (MDM); renamed September 2021 as “PM Poshan Shakti Nirman”

ICDS full form: Integrated Child Development Services; launched October 2, 1975 under PM Indira Gandhi

FCI full form: Food Corporation of India; established January 14, 1965 under Food Corporations Act, 1964

NFSA full form: National Food Security Act, 2013; covers 75% rural and 50% urban population

PDS beneficiaries: ~81 crore (810 million) under NFSA

PM Poshan beneficiaries: ~11.8 crore school children daily

ICDS/Poshan 2.0 beneficiaries: ~9.9 crore children under 6 + pregnant/lactating women

Annual rice distributed via welfare schemes: ~37.2 million metric tonnes

Cabinet allocation for rice fortification: ₹2,700 crore (FY2022–23 to FY2023–24)

Reason for pause: IIT Kharagpur study — micronutrients in FRKs degrade during 2–3 year storage in central pool

IIT Kharagpur: Established May 1950 (inaugurated August 18, 1951); India’s first IIT; located in West Bengal

NFHS-5: Conducted 2019–21 by Ministry of Health & Family Welfare; fieldwork by IIPS (International Institute for Population Sciences), Mumbai

Anaemia in women (15–49 yrs): 57% — NFHS-5 (2019–21)

Anaemia in children (6–59 months): 67.1% — NFHS-5

“Hidden hunger”: Adequate calorie intake but chronic micronutrient deficiency

OTHER RELEVANT FACTS:

PM Poshan was renamed from Mid-Day Meal Scheme; covers Classes 1–8 in government schools

Biofortification — alternative approach: breeding naturally micronutrient-rich crops (e.g., iron-biofortified pearl millet); promoted by HarvestPlus and ICAR

FCI — Food Corporation of India; manages central pool storage; covered storage capacity has expanded significantly post-2014

India is signatory to **UN SDG Goal 2** (Zero Hunger) and **SDG Goal 3** (Good Health) — rice fortification was part of achieving these targets

Vitamin B12 deficiency is particularly acute in vegetarian populations — India’s predominantly vegetarian diet makes this a national public health concern

Washing losses: Water-soluble vitamins (B-group) leach out when rice is washed before cooking — a standard Indian kitchen practice that further reduces fortification benefit

Sources: [PIB](#), [The Hindu](#), [Down to Earth](#), [NFHS](#), [Food and Nutrition Bulletin](#)

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