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Rice to Ethanol India

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Agricultural Economics · Energy Policy · Environment · Agri-Policy Desk India buys rice at ₹43. It sells it for fuel at ₹24. The rice-to-ethanol push is sold as smart surplus management. Read the invoice closely and it is a story about incentives — in money, in groundwater, and in methane. Agri-Policy Desk Published 2026-08-12 18 min read ≈3,100 words Written for NABARD Grade A/B aspirants, UPSC and RBI Grade B aspirants, policy readers, agri-business analysts FCIMSPethanolE20food securitygroundwatersubsidy reformNABARD

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01 · The starting point India solved scarcity. Now it is paying to store abundance. A country that once imported grain under emergency terms now sits on rice stocks several times larger than it needs, and the storage bill has become a policy problem in its own right. Rice output touched roughly 154 million tonnes in 2025-26. India also shipped out 24.5 MMT in 2025 — close to 40% of everything traded in rice worldwide. At home, around 800 million people receive free foodgrain under the National Food Security Act. Even after all that distribution and export, FCI rice stocks on 1 April stood at nearly five times the buffer norm. Surplus is not free. Carrying stocks above the norm cost about ₹10,712 crore in FY25 — warehousing, interest, transit and the slow deterioration of grain nobody is eating. Godowns also need to be empty before the next kharif harvest, which creates a hard, calendar-driven pressure to move rice out of the system. Grain-based distilleries can absorb rice in bulk, and the Ethanol Blended Petrol programme has a growing appetite. Nearly 5 MMT of rice went into ethanol in FY26; the ESY 2026-27 allocation has been raised to 7.2 MMT. On paper, one problem is being fed to another. ≈154 MMTRice production, 2025-26source note24.5 MMT (~40% of global trade)Rice exported, 2025source note₹10,712 croreCost of carrying excess stock, FY25source note7.2 MMTRice allocated to distilleries, ESY 2026-27parliament reply 02 · The core number The paradox: dear when bought, cheap when burnt FCI's economic cost is not the MSP alone. It stacks up the procurement price, mandi fees and state levies, arhtiya commission, bagging, transport, storage, interest on working capital and an allowance for losses. For FY27 that figure is estimated at roughly ₹43-44 per kg. The same rice is issued to ethanol distilleries under the Open Market Sale Scheme at about ₹23.90 per kg. The ₹19.20/kg wedge is not a discount anyone earns — it is a transfer from the exchequer that shows up later in the food subsidy bill. The scale is no longer notional. A July 2026 Rajya Sabha reply confirmed FCI dispatched 6.35 million tonnes of rice worth ₹14,596.78 crore to ethanol distilleries between June 2025 and June 2026, at roughly 40% below average acquisition cost. Haryana (8.44 lakh tonnes) and Uttar Pradesh (8.39 lakh tonnes) led recipient states, followed by Punjab and Himachal together, West Bengal and Madhya Pradesh. Two cases of diversion were detected and allocations to those distilleries stopped. What one kilogram of rice costs, and what a distillery pays for it ₹ per kg · ESY 2026-27 FCI economic cost ₹43.10 Issue price to ethanol distilleries ₹23.90 Absorbed by the exchequer ₹19.20 Where the rice went, June 2025 – June 2026 Haryana 844,141 t Uttar Pradesh 838,645 t

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Punjab and Himachal Pradesh 658,952 t West Bengal 584,672 t Madhya Pradesh 432,485 t The double subsidy Public money supports the crop twice: once on the way in, through assured procurement and cheap inputs, and again on the way out, through a discounted issue price for fuel conversion. Between the two lies the storage bill. 03 · The upstream cause Why does India grow so much rice in the first place? Farmers are not being irrational. They are responding accurately to the prices policy has set for them. 1 Open-ended MSP procurement Assured government purchase strips price risk out of paddy in a way it does not for pulses, oilseeds or millets. Some states layer bonuses on top of MSP, widening the gap further. 2 Free or near-free farm electricity Paddy may need up to 25 irrigations a season. When the marginal cost of running a pump is near zero, the private cost of lifting groundwater is nothing like its social cost, and extraction runs past recharge. 3 Deeply subsidised urea Urea's retail price has stayed near ₹242 for a 45-kg bag while the government absorbs most of its economic cost. Nitrogen is cheap relative to decontrolled phosphorus and potash, so it is over-applied and the NPK balance drifts. Combined power, fertiliser and canal irrigation subsidies for paddy in Punjab worked out to roughly ₹38,973 per hectare in 2023-24. That is the number a farmer weighs against every alternative crop — and almost nothing else comes close. 04 · The mechanism The distortion chain, start to finish 01 Assured MSP + state bonuses Price risk removed for one crop, not for its alternatives 02 Free power + subsidised urea The two costliest inputs are made to look almost free 03 Paddy becomes artificially attractive Area shifts in, diversification stalls 04 Excess production and procurement FCI buys what the market did not need 05 Stocks far above buffer norms Storage, interest and deterioration costs mount 06 Rice diverted to ethanol at a discount The symptom is treated; the incentive that created it is untouched The sharpest version of the critique Rice-to-ethanol is a disposal mechanism, not a correction. It relieves pressure on godowns, which reduces the political urgency of fixing MSP, power and fertiliser incentives — the very things generating the surplus. A pressure valve that works too well can keep a broken system running longer. 05 · The hidden input Four thousand litres of water in every kilogram Producing 1 kg of rice takes roughly 4,000 litres of irrigation water on average in Indian conditions. The trouble is where that water comes from. Much of the marketed surplus is grown in Punjab, Haryana and western Uttar Pradesh, precisely the belt where groundwater tables have been falling for decades. Water in an aquifer that recharges over centuries is priced as though it were rainfall. Ethanol inherits the footprint Judging rice-based ethanol only by how much petrol it displaces ignores the aquifer that financed the feedstock. A litre of fuel is not clean if it was distilled from depletion. Rice exports are water exports Shipping 24.5 MMT of rice abroad exports the embedded irrigation water with it — virtual water leaving a water-stressed country at a price that never included the aquifer. 06 · The climate ledger A biofuel with a methane problem

Gas	Where it comes from	GWP-100	Why it matters
Methane (CH₄)	Anaerobic conditions in flooded, transplanted paddy fields	~27-30× CO ₂	Does most of its warming work in the first two decades, which matters for near-term targets.
Nitrous oxide (N₂O)	Nitrogen applied beyond crop uptake	~270× CO ₂	Also depletes stratospheric ozone. Cheap urea makes over-application the rational private choice.
Nitrate (not a GHG)	Excess nitrogen leaching downward	—	Contaminates the same aquifers that supply drinking water in these districts.

Rice-to-ethanol cannot be filed as an energy-policy question. It is an agriculture-water-energy-environment nexus problem, and treating any one strand in isolation produces the wrong answer. 07 · A necessary distinction Is ethanol blending the villain here? No. India hit 20% average blending (E20) in 2025, five years ahead of the original 2030 target set under the National Policy on Biofuels, 2018 — up from about 1.5% in 2014. Sale of E20 petrol became the norm across states and union territories from 1 April 2026. Government accounting puts foreign exchange savings at roughly ₹1.36 lakh crore, payments to farmers at about ₹1.18 lakh crore, and avoided CO₂ at around 698 lakh tonnes. Distillation capacity expanded from 518 crore litres in 2017-18 to over 1,600 crore litres by 2023-24. Nor is the programme

costless for consumers: ARAI-led testing found a fuel-economy reduction of up to about 6% on E20 in vehicles not calibrated for it. Note what actually happened in tendering: at one point an entire ethanol supply cycle was restricted to ethanol produced from subsidised FCI rice. That is not a market signal — it is administrative allocation deciding what a distillery may ferment. Weak argument Ethanol blending is environmentally harmful. Strong argument The sustainability of ethanol depends on the choice of feedstock and the resource intensity of producing it. The objection is not to blending, but to compelling distilleries to run on subsidised FCI rice instead of letting them choose efficient feedstocks. 08 · The alternative Why maize is the better bet

Feedstock	Fiscal load	Water intensity	Methane	Verdict
FCI rice	High — issued ~₹19/kg below economic cost	Very high — ~4,000 L/kg	High — flooded cultivation	Disposal tool, not a sustainable feedstock
Maize	Low — no open-ended MSP procurement	Low to moderate — rain-fed in much of India	Negligible — upland crop	Preferred first-generation option; drives crop diversification
Sugarcane (juice / B-heavy molasses)	Moderate — FRP and cane arrears politics	Very high in Maharashtra and Karnataka	Low	Useful but capacity-capped and water-constrained
Damaged / non-issuable grain	Low — the stock is already a sunk loss	None additional	None additional	Genuinely sensible salvage use
Crop residue (2G, cellulosic)	Capital-intensive; needs viability support	None additional	Cuts stubble burning	The right long-run destination

The underlying principle Give ethanol producers freedom to choose feedstock. A distillery paying full economic cost for every input will land on the efficient answer by itself. Administrative allocation of subsidised rice guarantees it will not. 09 · The way out Ten reforms, and what each one actually fixes 01 Rationalise MSP-linked procurement Removes the artificial price advantage paddy holds over pulses, oilseeds and millets 02 Discourage state bonuses over MSP Stops the incentive from being amplified state by state 03 Cap procurement instead of open-ended buying Puts an upper bound on how much surplus the state can accumulate 04 End compulsion to source FCI rice Restores efficient feedstock choice to distilleries 05 Actively promote maize for ethanol Builds a demand-led route to crop diversification 06 Scale up Direct Seeded Rice (DSR) Cuts irrigation demand and methane by removing standing water 07 Reform fertiliser subsidy design Corrects the N:P:K imbalance and reduces N₂O and nitrate losses 08 Shift towards direct income support Supports farm incomes without dictating which crop is grown 09 Rationalise free foodgrain distribution Focuses the entitlement on the most vulnerable and shrinks procurement pressure 10 Price power and water closer to cost, with transfers Makes groundwater extraction visible in a farmer's own accounts Every one of these concentrates costs on identifiable, organised groups today and spreads benefits thinly across the future. That asymmetry, not any lack of technical clarity, is why the incentive structure has proved so durable. 10 · The framework One kilogram of rice, five ways of counting it FOOD → FUEL → FISCAL → WATER → CLIMATE Food Should grain meant for people be routed into fuel? With stocks near five times the buffer norm the immediate answer is yes — but the answer changes in a bad monsoon year. Fuel Ethanol displaces imported crude, saves foreign exchange and builds a domestic fuel base. E20 arrived in 2025, five years early. Fiscal Procurement, input subsidies, storage and a discounted issue price to distilleries — the same kilogram is subsidised on the way in and again on the way out. Water About 4,000 litres of irrigation water per kilogram, drawn largely from aquifers in the north-west that are already falling. Climate Methane from flooded fields and nitrous oxide from surplus nitrogen complicate any claim that rice-based ethanol is a clean fuel. The question to hold on to How can India achieve ethanol blending and energy security without creating perverse incentives for water-intensive crops, excessive fertiliser use, fiscal stress and a food-versus-fuel conflict? 11 · Exam corner For NABARD, UPSC and RBI Grade B aspirants Answer skeleton ·

200–250 words Open with the paradox, not the background: ₹43/kg economic cost against a ₹23.90/kg issue price. Establish the surplus: 154 MMT output, stocks ~5× buffer norm, ₹10,712 crore carrying cost in FY25. Trace the distortion chain: MSP and bonuses → free power → subsidised urea → surplus → diversion. Quantify the resource cost: ~4,000 L water per kg; methane from flooded fields; N₂O and nitrate from excess nitrogen. Make the distinction: blending is sound; compelled use of subsidised rice is not. Close with reforms: capped procurement, feedstock freedom, maize, DSR, fertiliser reform, income support. Practice questions Is rice-to-ethanol a solution or a symptom? Argue with reference to India's foodgrain management. Argue symptom. Diversion clears godowns without altering any of the three incentives generating the surplus, and adds a fresh subsidy layer at the disposal stage. Concede the genuine short-run gains — storage relief, blending volumes, distillery utilisation, rural demand — then argue that a policy which reduces the visible cost of a distortion also reduces the pressure to reform it. "Not all biofuels are equally green." Discuss with reference to feedstock choice. Establish that lifecycle emissions, not tailpipe emissions, are the right measure. Rice-based ethanol carries methane from flooded cultivation, N₂O from surplus nitrogen, and an irrigation footprint of about 4,000 L/kg. Maize, damaged grain and second-generation cellulosic feedstocks score better. Conclude that feedstock choice, not the blending target, determines the environmental verdict. How would you redesign farm support to reduce paddy's artificial advantage? Move from price and input support to decoupled income support. Cap procurement volumes, discourage bonuses above MSP, strengthen MSP operations for pulses, oilseeds and millets, price power and water closer to cost while returning the money as direct transfers, and shift fertiliser support towards balanced nutrition and soil-health-linked payments. Add non-price levers: DSR promotion, assured maize procurement for distilleries, and crop-diversification incentives in the north-west. Five figures worth memorising ₹43/kg FCI economic cost ₹23.90/kg ethanol issue price ~4,000 litres of water per kg of rice ₹38,973/ha combined subsidy for paddy in Punjab (2023–24) ₹10,712 crore excess-stock carrying cost in FY25 12 · Questions readers ask FAQs Why is India using rice to make ethanol? India holds rice stocks far above its buffer norms. Storing that surplus costs thousands of crores a year, so the government releases rice to grain-based distilleries at a discounted issue price. This clears godown space and simultaneously feeds the Ethanol Blended Petrol programme, which needs large volumes of feedstock after the 20% blending target was met. What is the price paradox in rice-to-ethanol policy? FCI's economic cost of rice is around ₹43 per kg, but the same rice is issued to ethanol distilleries at roughly ₹23.90 per kg. The gap of nearly ₹19–20 per kg is absorbed by the exchequer, which means public money subsidises the conversion of foodgrain into fuel. Is ethanol blending bad for India? No. Ethanol blending improves energy security, saves foreign exchange and creates a market for farm produce. The criticism is narrower: it targets the compulsion on distilleries to use subsidised FCI rice, a feedstock that is fiscally expensive, water-intensive and methane-heavy, instead of allowing efficient feedstock choice. How much water does one kilogram of rice need? Around 4,000 litres of irrigation water on average in Indian conditions, with paddy needing up to 25 irrigations per season. In groundwater-stressed states this means ethanol made from rice carries a hidden water cost that fuel-efficiency figures do not capture. Why is maize considered a better ethanol feedstock than rice? Maize needs a fraction of the irrigation water paddy needs, is not flooded so it emits little methane, is not procured at scale under MSP, and therefore carries no hidden storage or issue-price subsidy. Its ethanol yield per tonne is competitive, which is why policy is shifting towards maize and dual-feed distilleries. Why not just export the surplus instead of burning it? India already does, at scale — 24.5 MMT in 2025, roughly 40% of world trade. Pushing volumes much higher depresses global prices against itself, invites trade friction, and exports embedded groundwater from a water-stressed country. Export is a partial outlet, not an unlimited one. Doesn't ethanol from rice still cut oil imports? Yes, and that benefit is real. The argument is about the cheapest way to buy that benefit. If the same litre of ethanol can come from maize without a ₹19/kg fiscal wedge, 4,000 litres of groundwater and methane from flooded fields, then rice is the expensive route to an outcome that was available anyway. Is the food security of 800 million people at risk? Not at current stock levels — the diversion comes out of a surplus several times the buffer norm, not out of entitlements. The concern is structural: building distillery capacity around

guaranteed cheap grain creates a constituency that depends on the surplus continuing, which makes reducing the surplus politically harder in a weaker crop year. What is FCI's "economic cost" made of? MSP paid to the farmer, plus state mandi taxes and levies, arhtiya commission, gunny bags, transport, milling charges, storage, interest on working capital, and an allowance for handling and storage losses. Does E20 damage older vehicles? ARAI-led testing found a fuel-economy reduction of up to roughly 6% in vehicles not calibrated for E20, with startability and drivability holding up in testing. Manufacturers have been producing E20-material-compliant vehicles for several years. For anything specific to a given vehicle, the manufacturer's guidance is the authority. Glossary MSP Minimum Support Price The floor price at which government agencies procure notified crops. Economic cost FCI's all-in cost per kg of grain: acquisition plus distribution and storage costs. OMSS Open Market Sale Scheme The route through which FCI sells stock, including to distilleries. EBP Ethanol Blended Petrol programme The national programme for blending ethanol into petrol, run under the National Policy on Biofuels, 2018. ESY Ethanol Supply Year The ethanol marketing year, running November to October. DSR Direct Seeded Rice Sowing paddy directly into unpuddled soil instead of transplanting into flooded fields. NFSA National Food Security Act, 2013 The statutory basis for subsidised foodgrain entitlements. Virtual water The water embedded in a traded commodity, exported invisibly along with it. 1G vs 2G ethanol First-generation ethanol uses food crops; second-generation uses crop residue and non-food biomass. Buffer norm The quarterly minimum stock of foodgrain the government is required to hold for operational and strategic purposes. Every figure in this article (25)

What it measures	Value	Basis
Rice production, 2025–26	≈154 MMT	source note
Rice exported, 2025	24.5 MMT (~40% of global trade)	source note
People receiving free foodgrain under NFSA	≈800 million	source note
FCI rice stock vs buffer norm, 1 April	≈5×	source note
Cost of carrying excess stock, FY25	₹10,712 crore	source note
Rice used for ethanol, FY26	≈5 MMT	source note
Rice allocated to distilleries, ESY 2026–27	7.2 MMT	parliament reply
Issue price to ethanol distilleries	₹23.90/kg (₹2,390/quintal)	parliament reply
FCI economic cost of rice	≈₹43/kg	parliament reply
Gap absorbed by the exchequer	≈₹19.20/kg	derived
Rice dispatched to distilleries, Jun 2025–Jun 2026	6.35 MMT worth ₹14,596.78 crore	parliament reply
FCI average acquisition cost, 2024–25	₹3,719.72/quintal	parliament reply
FCI average acquisition cost, 2025–26	₹3,889.46/quintal	parliament reply
Irrigation water per kg of rice	≈4,000 litres	source note
Irrigations per paddy season	up to 25	source note
Urea retail price	≈₹242 per 45-kg bag	source note
Power + fertiliser + canal irrigation subsidy for paddy, Punjab 2023–24	₹38,973/ha	source note
Ethanol conversion rate from rice	≈470 L/tonne	ministry
Ethanol blending achieved	20% (E20) in 2025, five years early	ministry
Ethanol blending in 2014	≈1.5%	ministry
Foreign exchange saved (government estimate)	≈₹1.36 lakh crore	ministry
Paid to farmers under EBP (government estimate)	≈₹1.18 lakh crore	ministry

What it measures	Value	Basis
CO₂ emissions avoided (government estimate)	≈698 lakh tonnes	ministry
Ethanol distillation capacity	518 crore L (2017-18) → 1,623 crore L (2023-24)	ministry
Fuel economy reduction on E20 (ARAI-led testing)	up to ~6%	study

In summary The argument in six lines India's rice problem is a surplus management problem, and surplus is expensive to hold — ₹10,712 crore in FY25 alone. The exchequer pays roughly ₹43/kg for rice and recovers about ₹23.90/kg when it goes to fuel. The surplus is manufactured by three subsidies acting together: assured procurement, free power, cheap urea. Ethanol from rice imports paddy's water and methane footprint into the fuel it produces. Blending is not the problem. Compelled use of subsidised FCI rice as feedstock is. The durable fix is incentive reform — capped procurement, feedstock freedom, income support in place of input subsidy.

Sources source note Key points covered: production, exports, buffer stocks, carrying cost, the ₹44/₹23 comparison, the ₹38,973/ha Punjab subsidy estimate and the 4,000-litre water footprint. parliament reply Rajya Sabha written reply, July 2026: FCI dispatches of 6.35 MMT worth ₹14,596.78 crore to ethanol distilleries, June 2025–June 2026; issue prices of ₹2,250–2,390/quintal; acquisition costs; state-wise allocations; two diversion cases. ministry Ministry of Petroleum and Natural Gas / Department of Food and Public Distribution announcements: E20 achieved 2025, nationwide E20 sale from 1 April 2026, ESY 2026–27 allocation of 7.2 MMT, forex and CO₂ estimates, distillation capacity. study ARAI-led testing of E20 blends: fuel-economy reduction of up to about 6% in vehicles not calibrated for E20. Economic cost, issue prices and allocations are revised periodically. Verify against the Department of Food and Public Distribution, FCI and the Ministry of Petroleum and Natural Gas before citing in formal work. Agri-Policy Desk Version 1.0.0 Updated 2026-08-12 longform explainer

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