

The Rice Boom

What it is, what's causing it, and why this boom might be dangerous to Pakistan's groundwater reserves.

LAND

MARKET

WATER



CONTENTS

Five things that moved together

01	The growth	Area rose 37%. Yield rose 7%. .
02	Land was moving	Cotton released 505,000 hectares. Rice claimed 725,000.
03	The market was moving	Export value nearly doubled in three years, then gave it all back.
04	Pumping economics were moving	Solar went from near zero to 61% of tubewells in three years.
05	What it may have cost	Concerns around groundwater preservation remain.

Every figure in this deck is reconstructable from a published source.



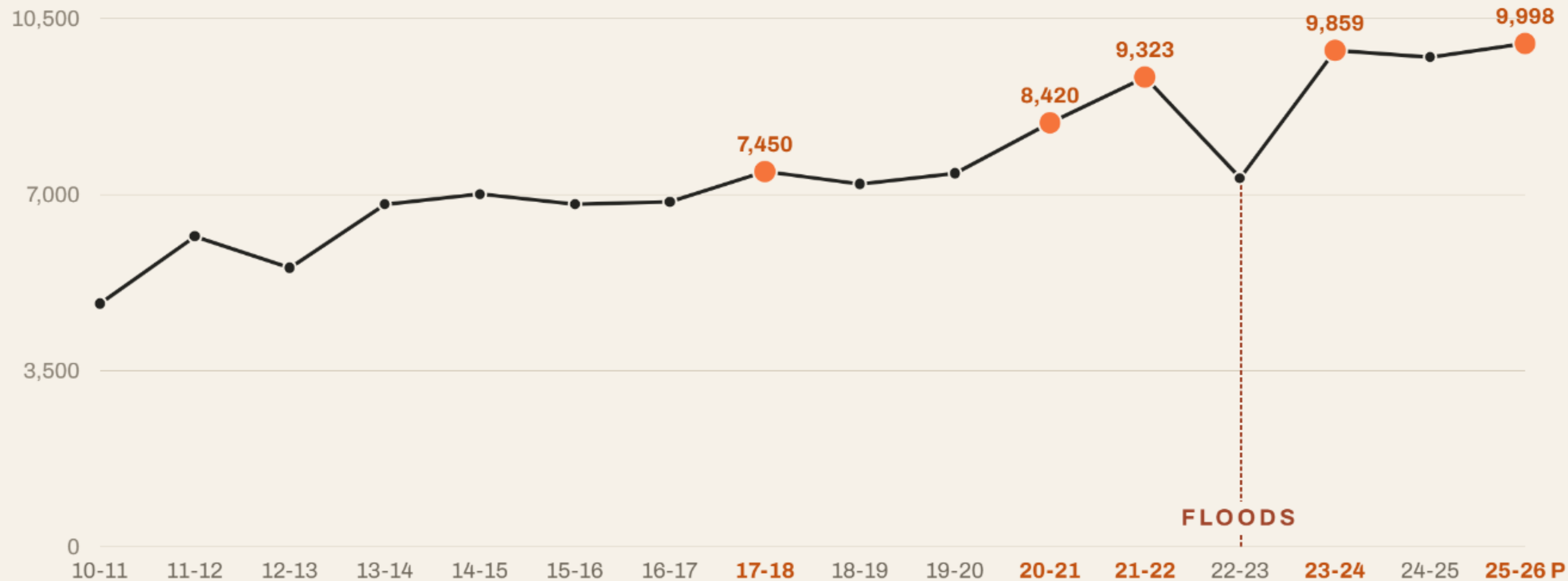
The growth

Sixteen years of rice. Three series, one axis each, nothing indexed.

PRODUCTION · 000 TONNES, MILLED RICE

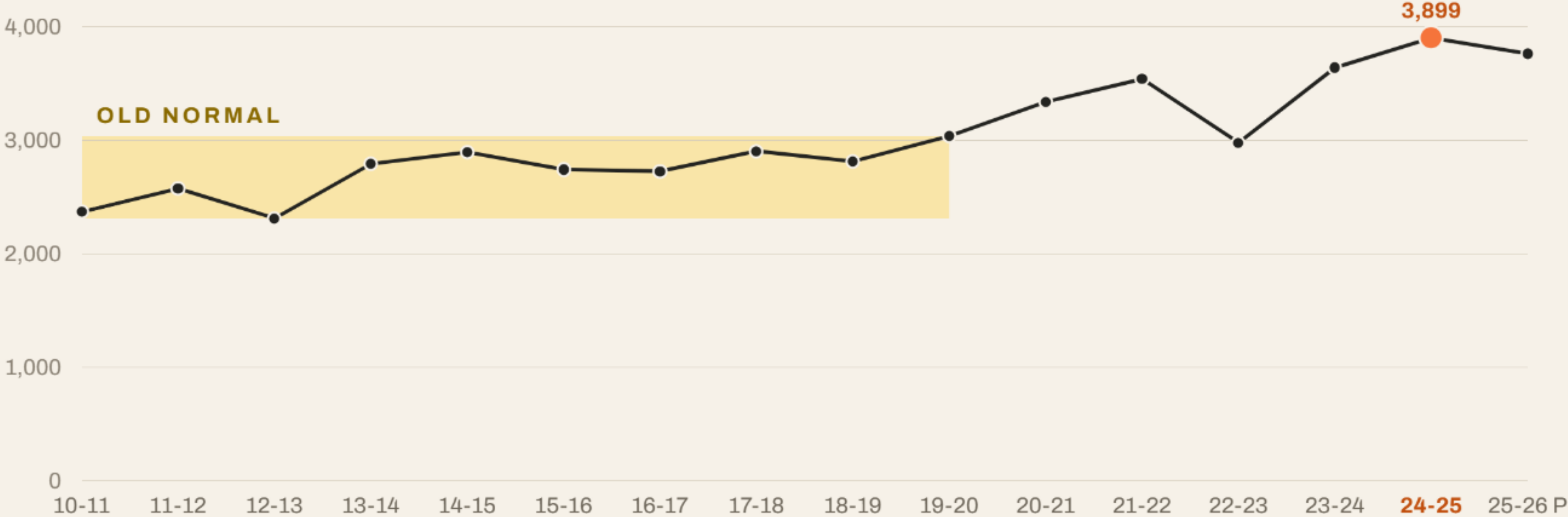
Output more than doubled — and set records in five of the last eleven years

● Record year — exceeds every year before it



AREA · 000 HECTARES

For a decade the area sat in a band it never left. Then it broke out



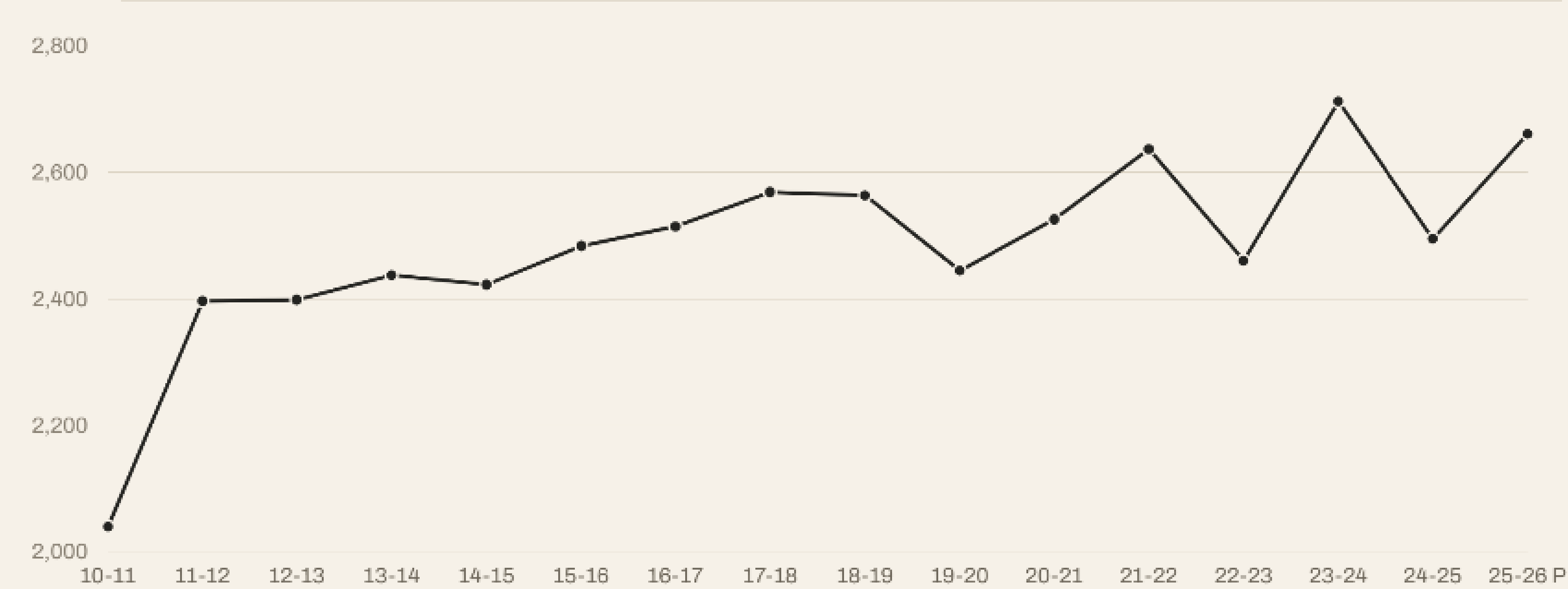
All-time record, 3,899

2024-25 · 43.7% above the old-normal mean

−140,000 ha, −3.6%

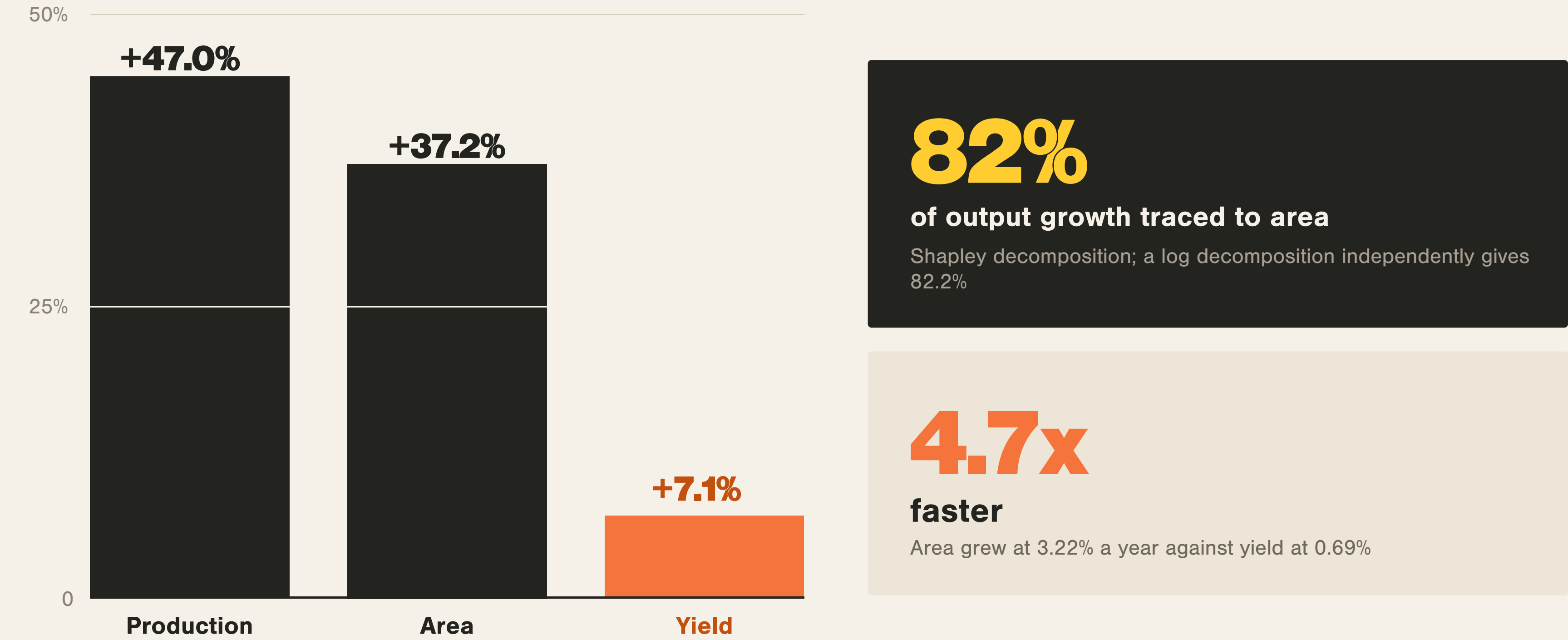
2025-26 · first fall since 2022-23

Same sixteen years. Productivity has barely moved



Across the last eleven years yield has stayed between 2,444 and 2,711 kg/ha — roughly 2,600, give or take five per cent. The 2010-11 low is the year of the 2010 floods.

Production, Area, and Yield



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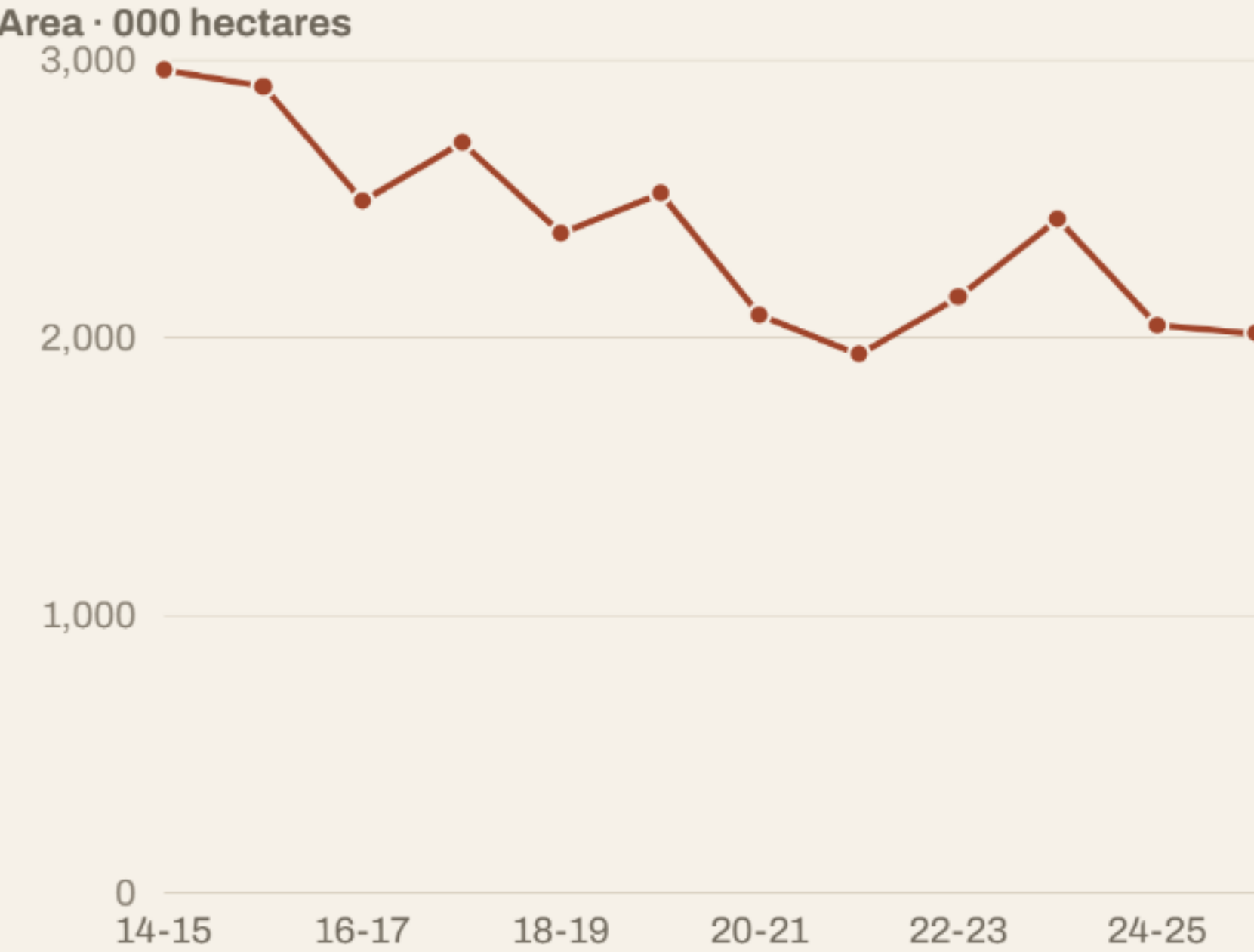


Land was moving

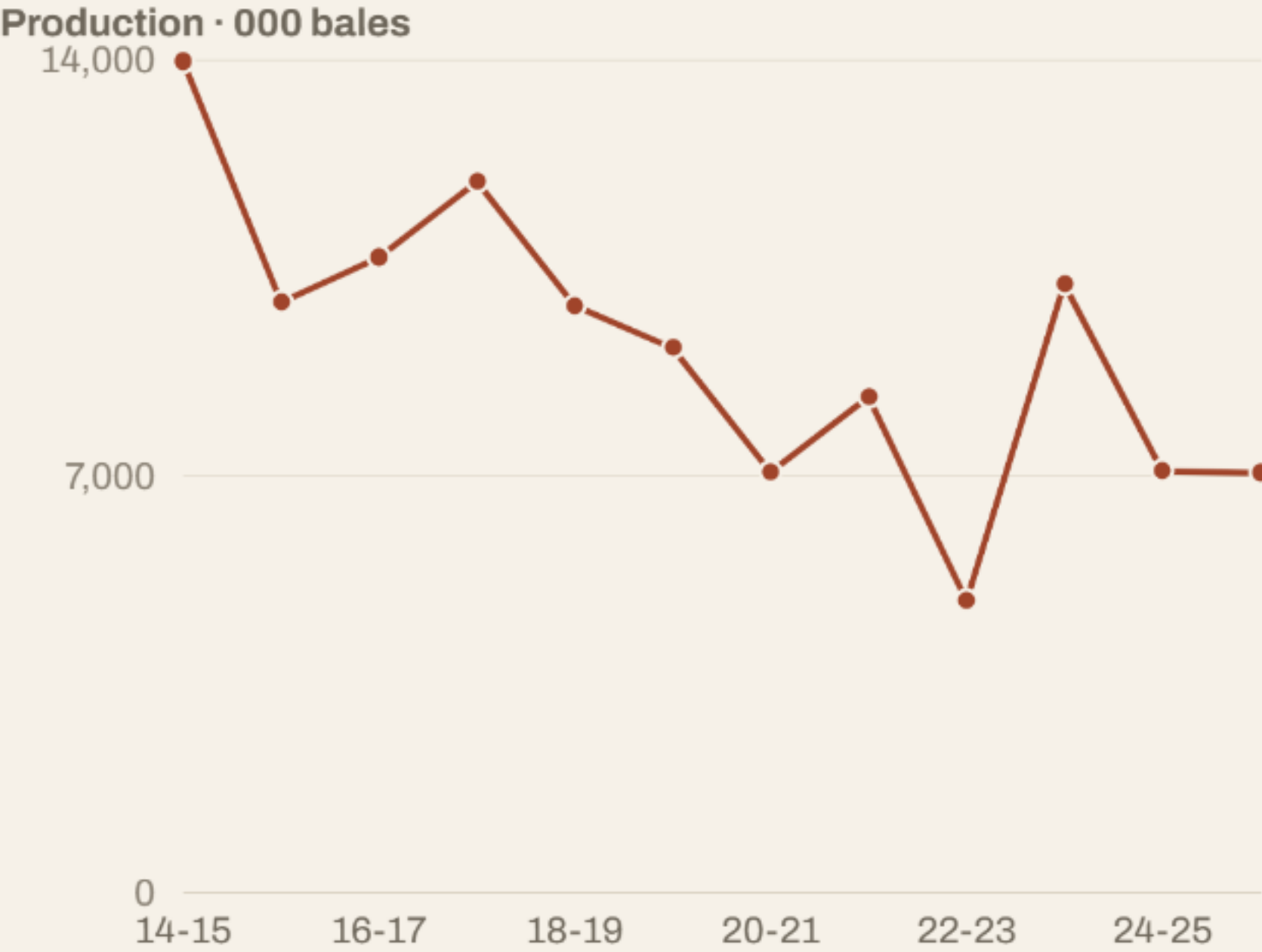
Cotton was in retreat before rice climbed. This indicates a correlation, at least in Southern Punjab.

COTTON · 000 HECTARES AND 000 BALES

Cotton peaked in 2014-15 — five years before rice began climbing



Area —32% from peak



Production —49% from peak

Every Kharif crop that moved, in one frame

CROP	HECTARES RELEASED	HECTARES CLAIMED	CHANGE
Cotton	-505k		-20.1%
Bajra	-272k		-52.1%
Jowar	-159k		-79.9%
Sugarcane		+182k	+17.5%
Maize		+183k	+13.0%
Rice		+725k	+23.9%

936,000 ha

released by crops that shrank

1,437,000 ha

claimed by crops that grew

Rice alone is 50.5% of everything gained, and its increase equals 77.5% of everything released. National totals cannot allocate a hector from one crop to another.

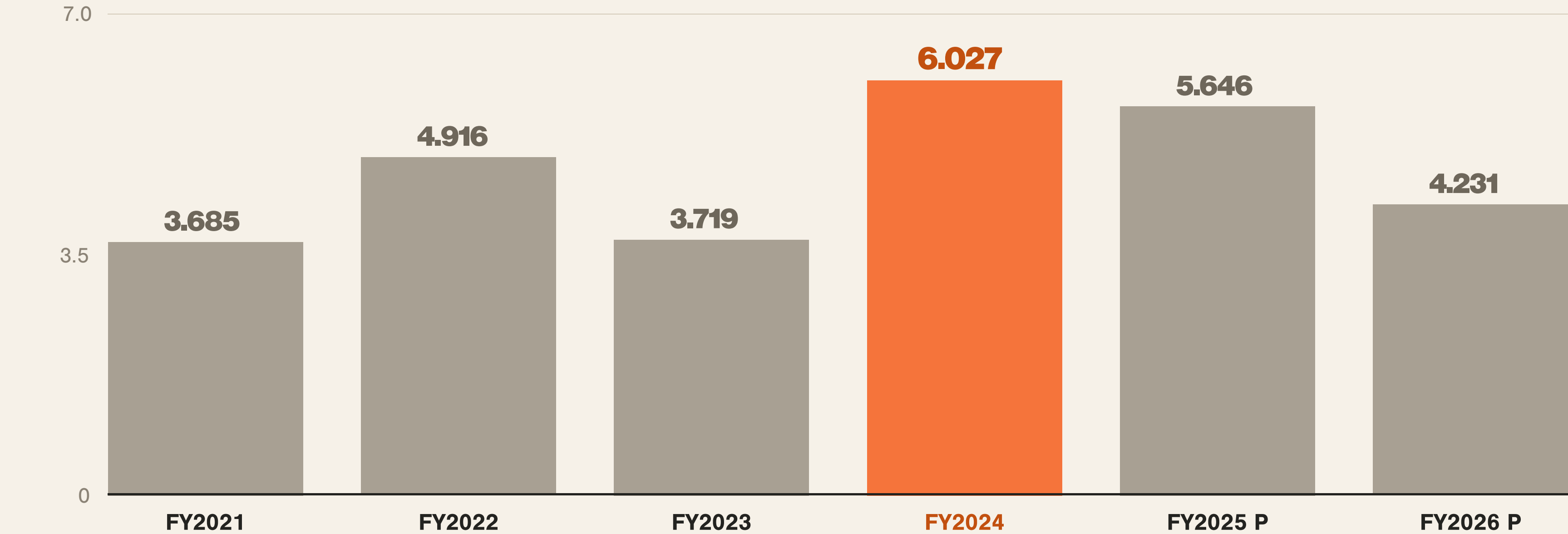
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The market was moving

India left the market for fourteen months. Prices, volumes and receipts all moved with it.

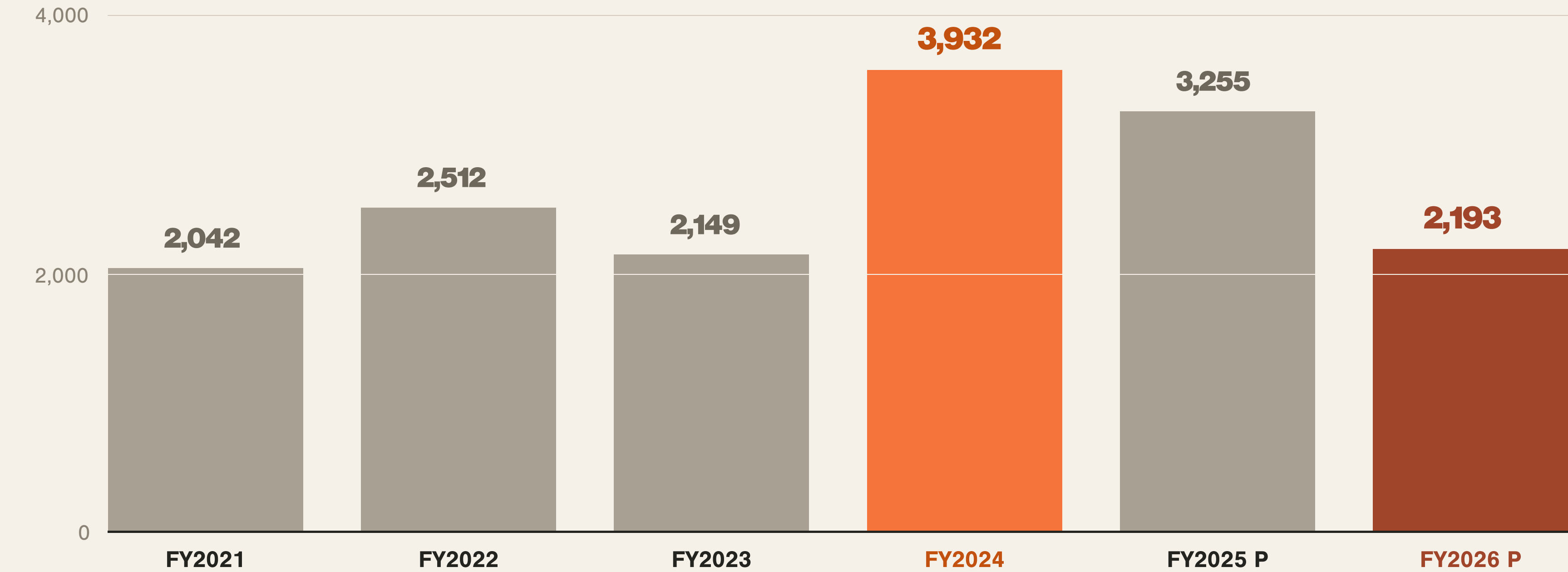
EXPORT VOLUME · MILLION TONNES

The spike sits inside the fourteen months India was absent



India banned non-basmati white rice exports on 20 July 2023 — inside FY2024. The ban was lifted on 28 September 2024 and the minimum export price removed on 23 October.

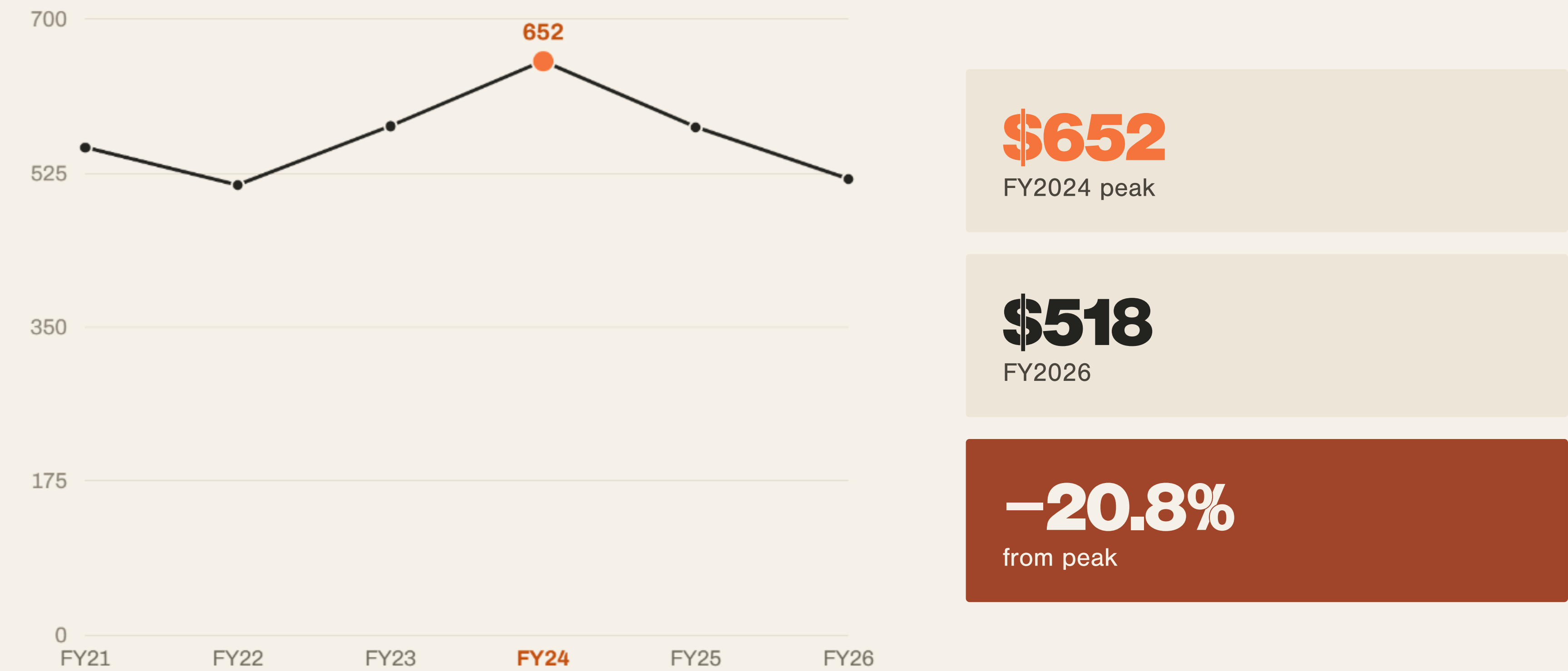
Receipts nearly doubled in three years



FY2021 to FY2024: +\$1,890m, +92.6%. FY2024 to FY2026: -\$1,739m, -44.2%. FY2026 sits within 7% of FY2021.

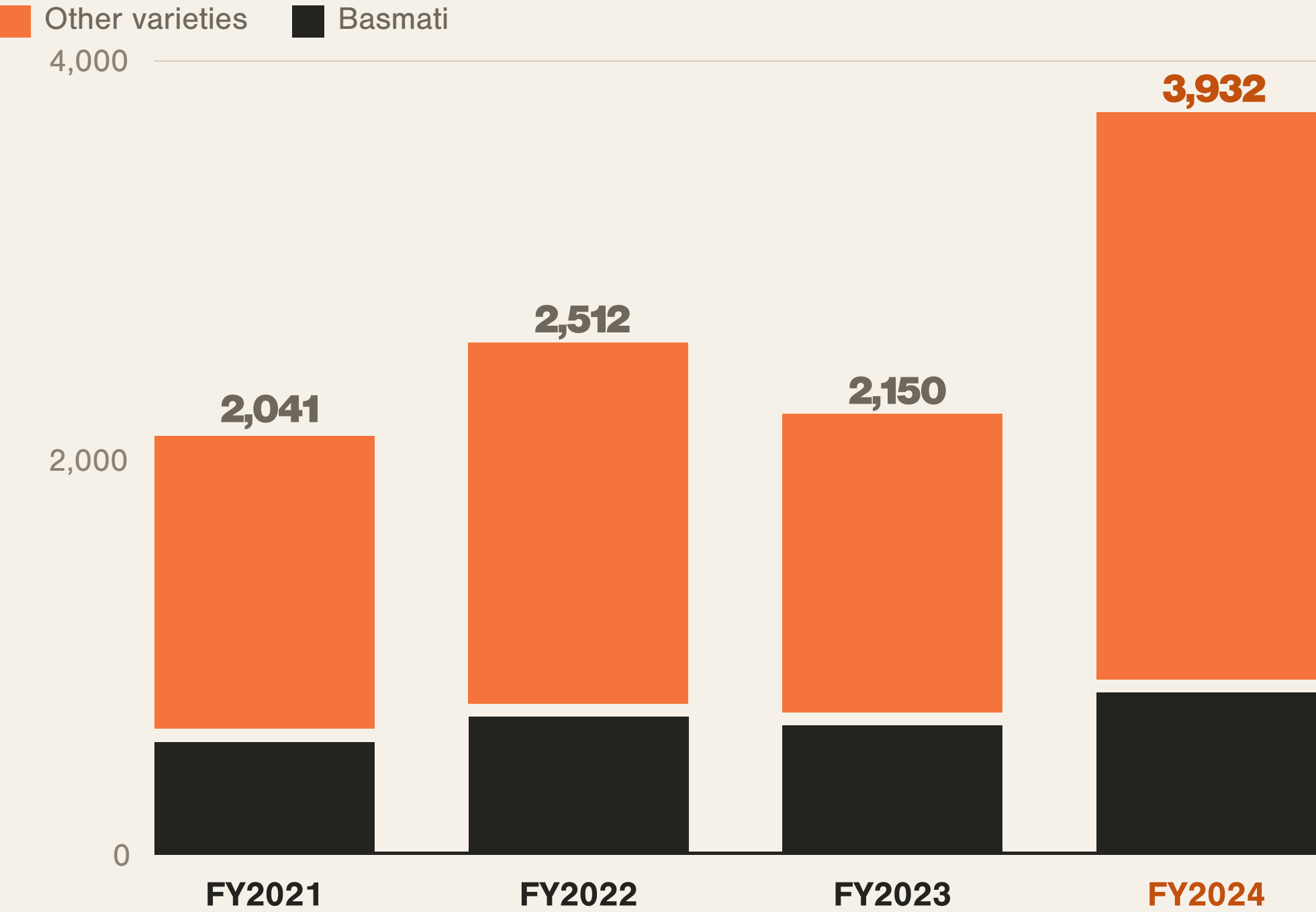
REALISED UNIT PRICE · US\$ PER TONNE

The premium arrived with the ban and hasn't stayed



Source: Derived from PBS and PRAL / MNFSR volume and value series

84% of the entire boom was non-basmati — precisely the segment India vacated



VOLUME, FY2021 TO FY2024

+25% basmati

+71% other varieties

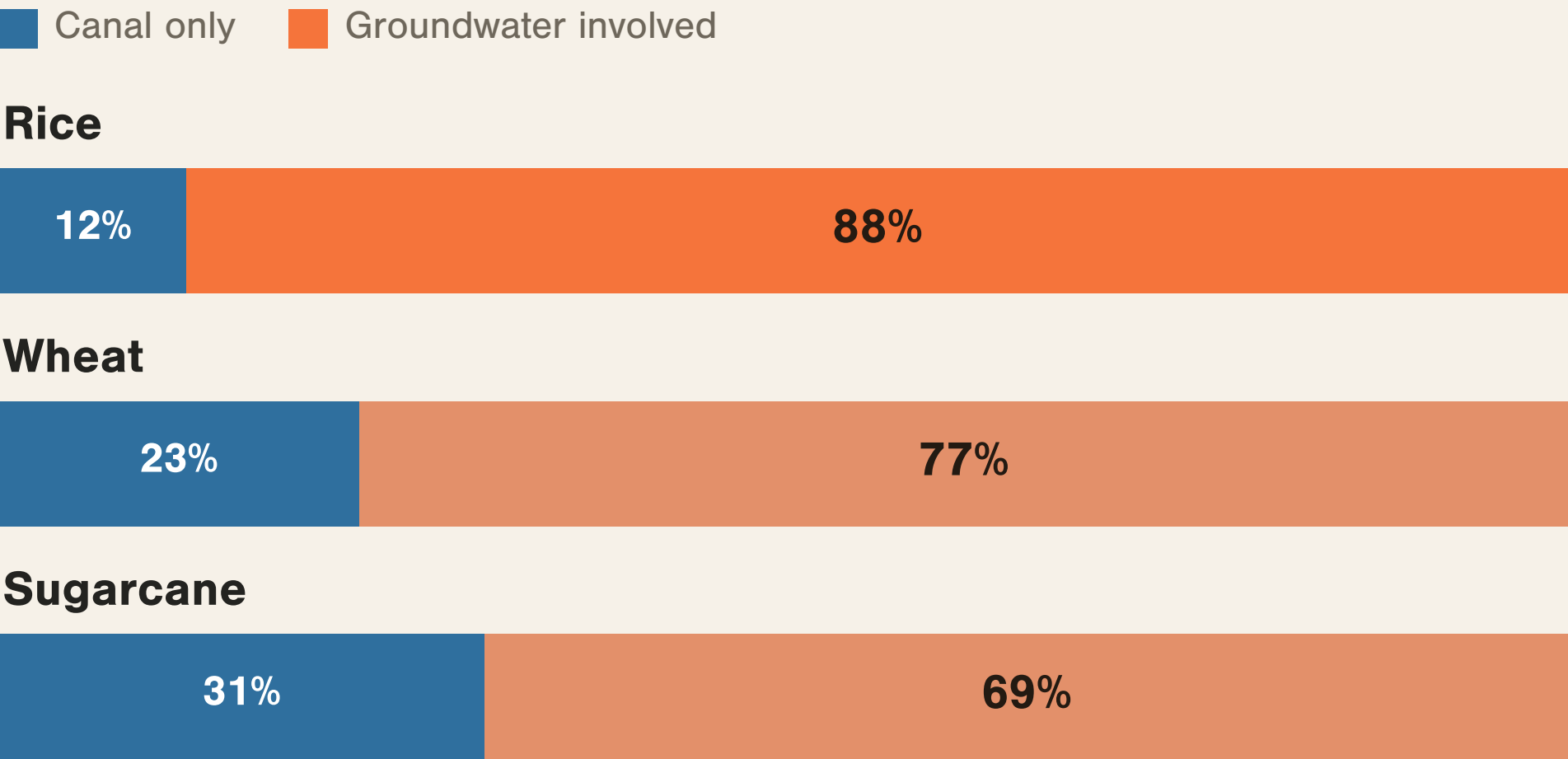
Non-basmati rose from 72.1% to 77.7% of export value. Basmati is the premium grain; the boom was in the cheap one.

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Pumping economics were moving

Punjab rice was already drawing on groundwater. Solar changed the marginal cost of lifting it.

Rice is the least canal-fed of the three crops measured here

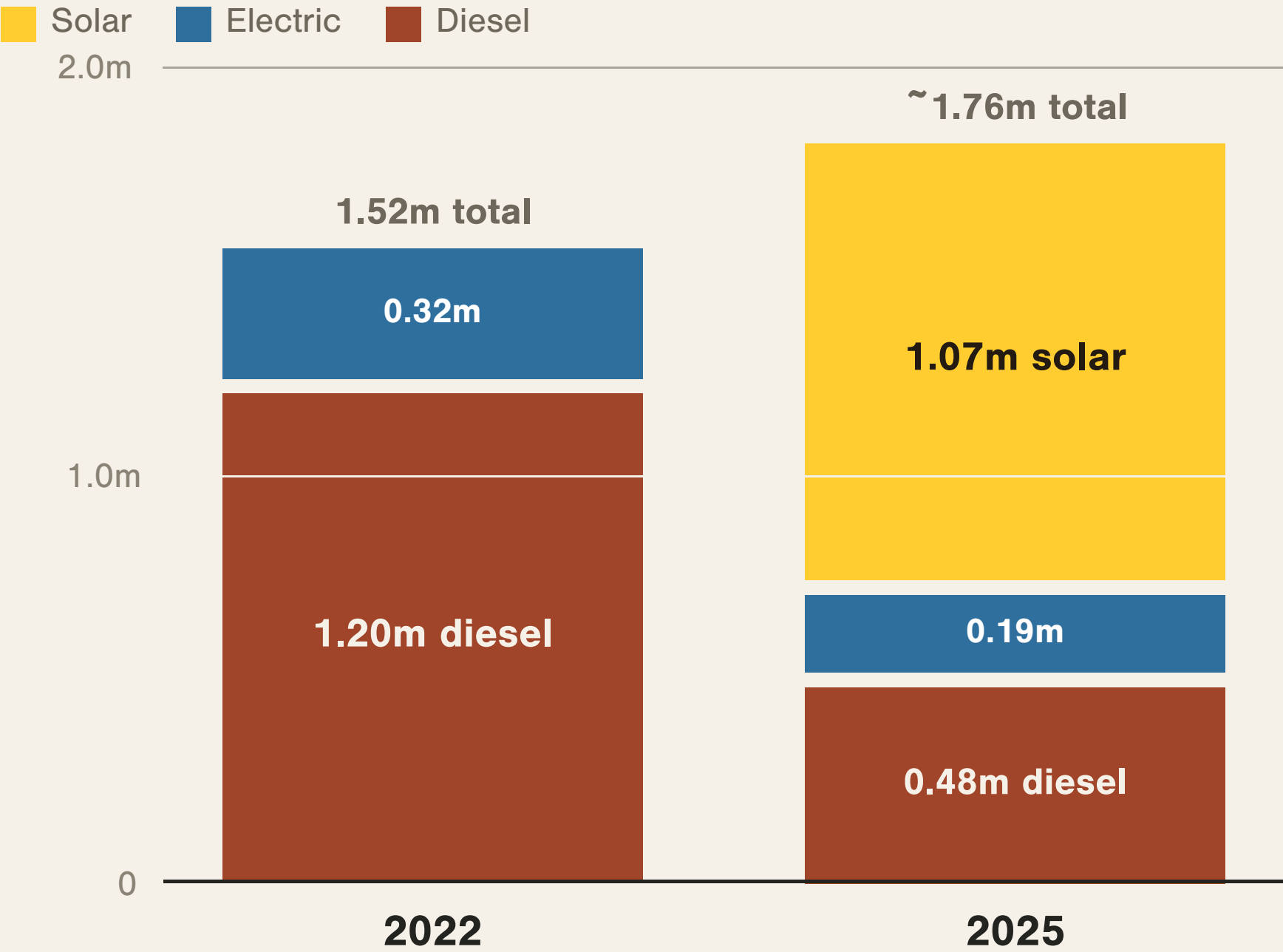


88%

of Punjab's rice area draws on groundwater in some form — 57% conjunctively with canal water, 31% on groundwater alone.

The share held between 87% and 89% from 2000 to 2018. This is the picture before solar arrived.

Solar went from nothing to 61% of the national tubewell stock in three years

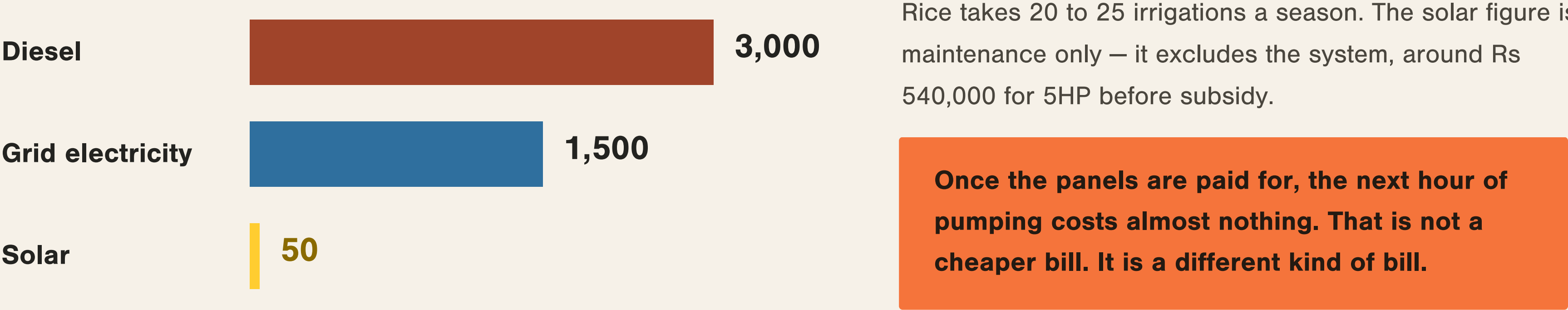


+240,000
net new tubewells, a 16% increase in the national stock

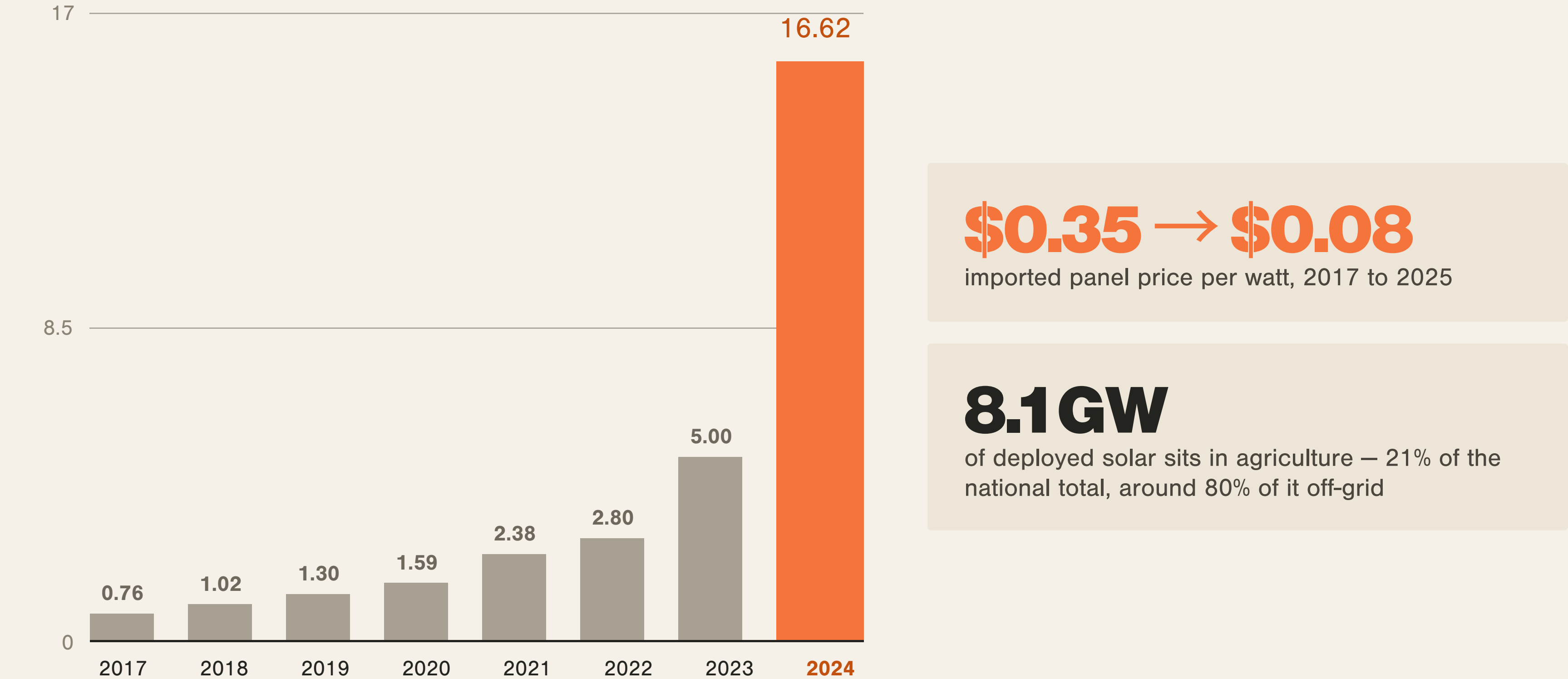
79% → 28%
diesel's share of tubewells, 2022 to 2025

1.9bn litres
of diesel no longer burned each year

Diesel charged by the hour. Solar charges once, at installation.



The hardware got cheap at the same time

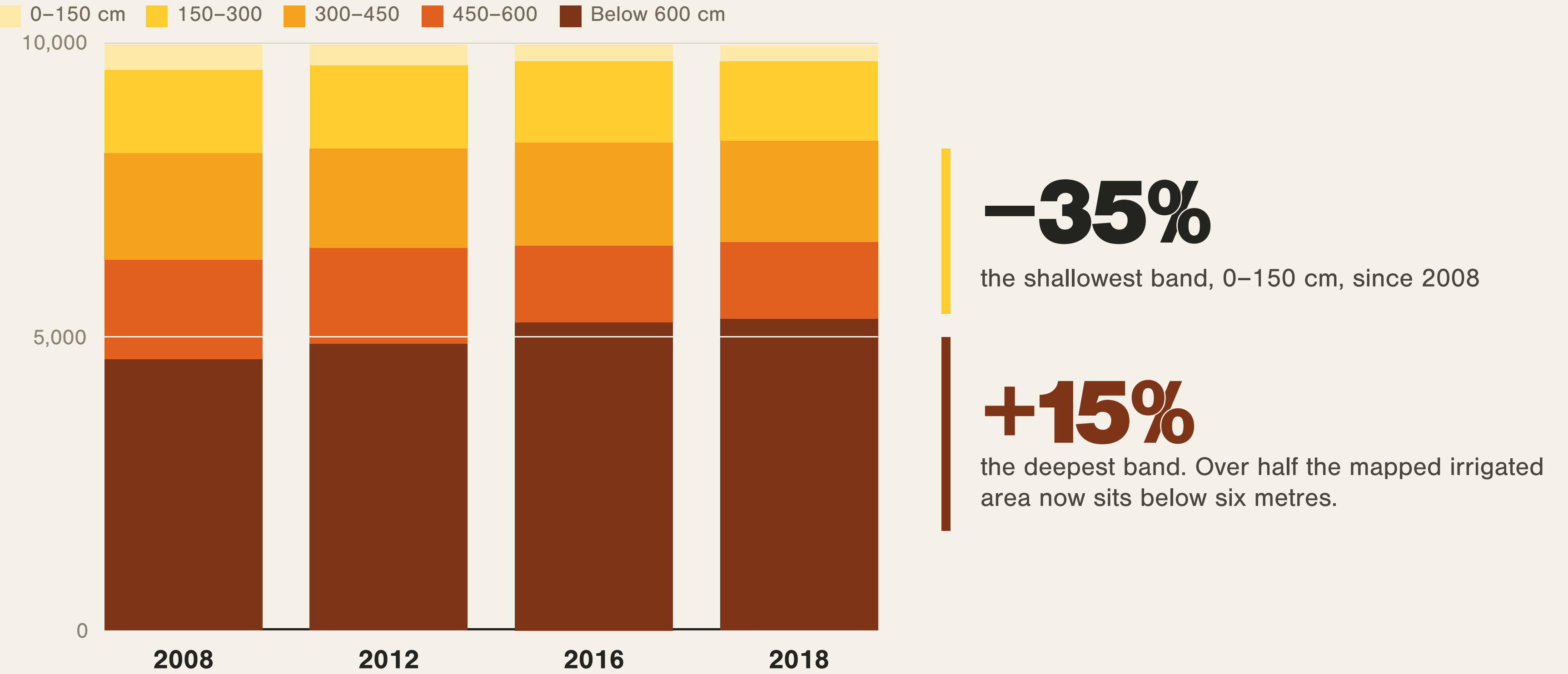


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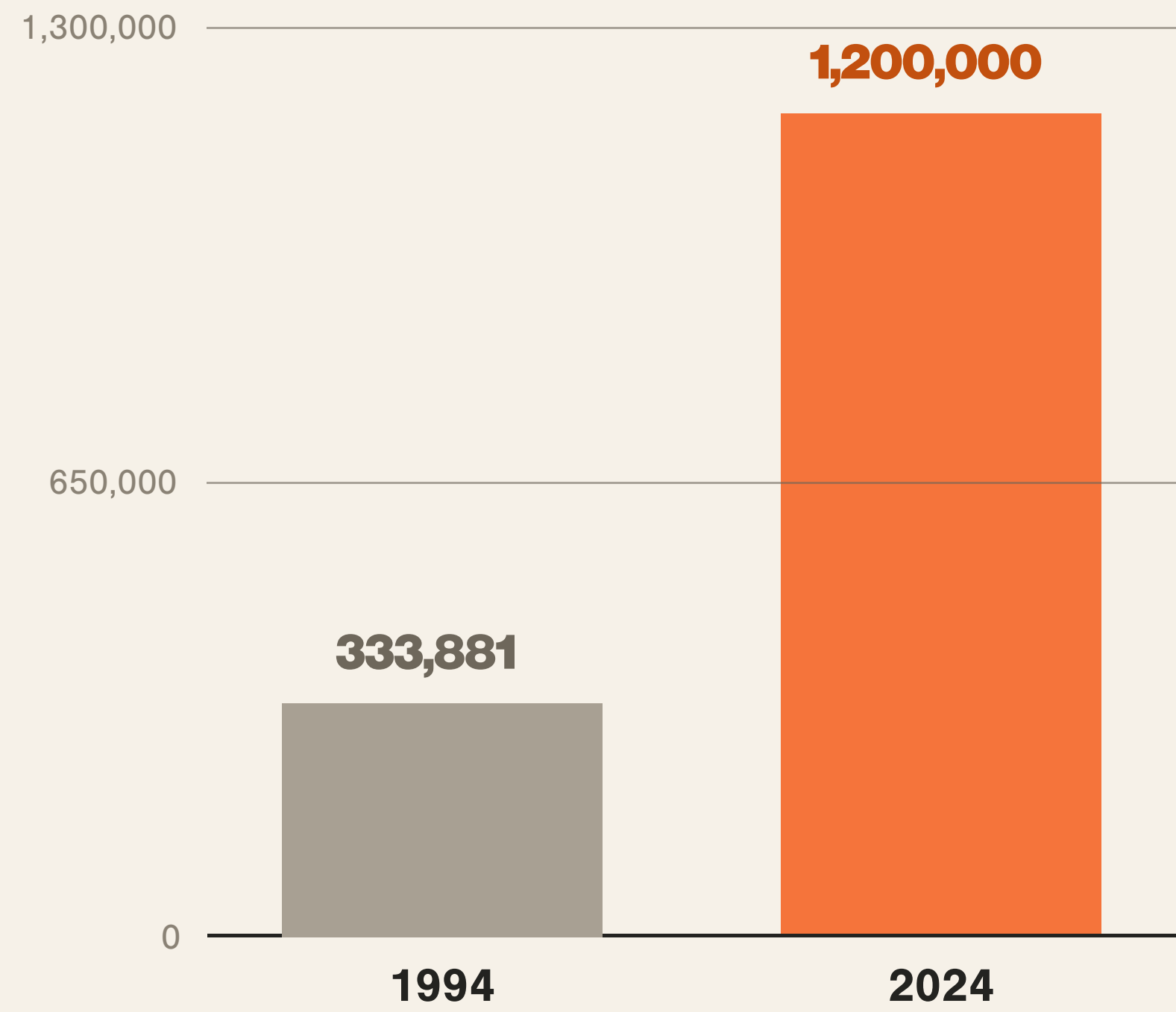
What it may have cost

Solar may have allowed groundwater depletion to accelerate.

The shallow ground has been draining for a long time



More than three times as many wells as thirty years ago



51 MAF

is drawn from the ground by Punjab's tubewells each year – slightly less than the province's entire allocated share of river water under the 1991 Water Apportionment Accord.

Rahim Yar Khan alone holds 97,571 wells drawing around 4 MAF.

Pakistan is not short of water law

1978	Balochistan Groundwater Rights Ordinance — licensing, well registration, and after amendment, water meters
1997	Provincial Irrigation and Drainage Authorities — advocated critical-zone demarcation and monitoring of all tubewells
2006	Provinces made responsible for assessing aquifer condition
2018	National Water Policy · Punjab Water Policy
2019	Punjab Water Act — abstraction licences, meter offences, penalties to Rs 200,000
2020	Khyber Pakhtunkhwa Water Act
2023	Sindh Water Policy
2025	Punjab Water and Sanitation Authority Act — a tubewell licence, in declared basin areas only

Pakistan's own water research council says no law requires anyone to count

No database

No policy or act requires a centralized database of the country's natural resources. PCRWR calls this a major gap.

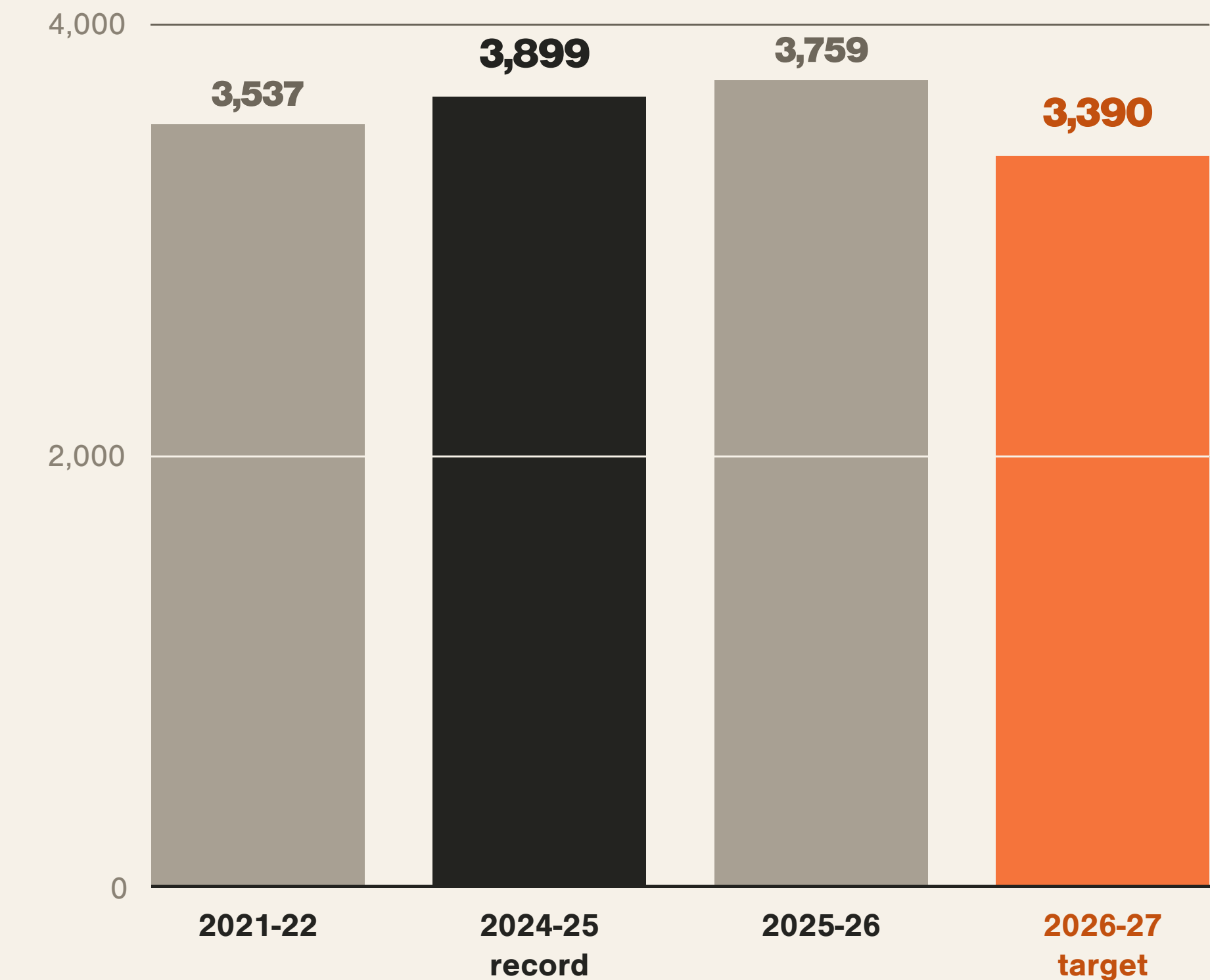
No enforcement

No policy provides a channel for legal action — even against outright water theft.

No mention of solar

A 2025 review of every national and provincial water instrument does not mention solar once.

The government is targeting a retreat



The Federal Committee on Agriculture set a target of 9.17 million tonnes over 3.39 million hectares on 14 April 2026 — below the pre-boom level of 2021-22, and 13% under the record.

But canal water for Kharif 2026 is projected at 67.45 MAF, well above recent years — and cotton is targeted up to 2.16m ha.

THE VERDICT

SETTLED

The expansion was most likely land, not productivity — 82% area against 18% yield. Punjab rice was already 88% groundwater-involved before solar arrived. Solar reached 61% of tubewells in three years.

MOVING

Export receipts have returned to where they were in FY2021. The government is targeting 3.39m hectares for 2026-27, below the pre-boom level.

THE STAKE

Punjab's tubewells draw over 51 MAF a year, against a water table already below six metres across half the mapped irrigated area.

STILL MISSING

Whether the new acreage was specifically tubewell-irrigated. No published water-table series covers the solar period. No instrument meters a well.

Four things moved together in the same six years. There are strong correlations present for the story told in this deck, but establishing causal links require more primary research.

SOURCES & METHOD

Pakistan Economic Survey 2025-26, ch.2 – Pakistan Bureau of Statistics

PBS, Annual Analytical Reports on External Trade Statistics, FY2021-22 and FY2023-24

PRAL / MNFSR, provisional full-year trade series, FY2025 and FY2026

Qureshi, A.S. (2020), Groundwater Governance in Pakistan, Water 12:3017

Ember & Renewables First, The Solarisation of Pakistan's Energy Economy, June 2026

PCRWR (2025), Guidelines for Science Policy Practice Interface, with UNESCO

USDA Foreign Agricultural Service, Islamabad – Grain and Feed reports

MNFSR, Federal Committee on Agriculture, Kharif 2026-27 targets

Raza, Tamoor & Miran (2021), Engineering Proceedings 12:36

Government of Punjab, CM Solarization Programme

METHOD

Rice production is clean rice, not paddy. Paddy figures run roughly 1.5x higher.

Area x yield reconciles to production across all sixteen years to within 0.02%.

Cotton yield in PES Table 2.5 is lint, not seed cotton.

Export figures cross from PBS to PRAL at FY2025; the two series differ by around \$100m.

The irrigation-source and water-table series both end in 2018, before the solar wave.

Nothing in this deck establishes causation. These are series that moved together.