

POLICY BRIEF 04

October-2026

From Fallow to Fertile: Policy Insights on Rejuvenation of Rice Fallow Lands in West Bengal

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Highlights

- Rice fallow areas declined by 10.18% in West Bengal, from 21.73 lakh hectares in 2020–21 to 19.52 lakh hectares in 2023–24.
- The government scheme of Targeting Rice Fallow Areas (TRFA), successfully rejuvenated rice fallow lands through pulses and oilseeds, achieving an 83.96% reduction in fallow area among the surveyed beneficiaries in two districts.
- Crop diversification increased substantially, with farmers adopting pulses such as lentil, chickpea, green gram and grass pea, along with mustard as the major oilseed crop.
- Rejuvenated fallow lands generated significant economic returns, with rabi pulses and mustard cultivation contributing a gross income of about ₹33,500 per hectare.
- Major barriers remain, particularly climate vulnerability, water scarcity, soil health concerns and high input costs, highlighting the need for better irrigation, timely quality seeds, extension advisory services, market support and Geographical Information System (GIS)-based planning.



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Context

Agriculture remains a cornerstone of India's rural economy, providing employment to 46.1% of the country's workforce and contributing 18.1% of Gross Value Added (GVA) at basic prices. The sector has recorded an average annual growth rate of 4.4% over the past five years, with a decadal growth rate of 4.45%. Achieving the vision of Viksit Bharat @ 2047 will therefore require sustained agricultural growth, complemented by the expansion of allied sectors, particularly livestock and fisheries, which recorded growth rates of 7.1% and 8.8%, respectively (Economic Survey 2025–26, Government of India)¹. Despite this progress, the productive utilisation of agricultural land remains a critical policy concern. India's total geographical area is approximately 328.7 million hectares. In 2013–14, the net sown area was 141.4 million hectares and the gross cropped area was 200.9 million hectares, corresponding to a cropping intensity of 142%. By 2023–24, the net sown area had declined to 138.99 million hectares, while the gross cropped area increased to 217.88 million hectares, raising cropping intensity to 156.8%^{2,3}. This indicates that the expansion of agricultural production has relied substantially on more intensive land use rather than an expansion of the net area cultivated. At the all-India level, the total cropped area has expanded significantly—by 65.2% between 1950–51 and 2023–24³. However, greater cropping intensity has not fully translated into higher agricultural productivity across crops and regions. Fragmented landholdings, inadequate farm investment, limited access to mechanisation and quality inputs, and uneven adoption of improved technologies continue to constrain yield growth. Addressing these constraints is essential for strengthening farm incomes, improving resource-use efficiency and advancing sustainable agricultural intensification. The persistence of fallow land further underscores the scope for enhancing land-use efficiency. In 2023–24, current fallow and other fallow land accounted for 14.91 and 11.16 million hectares, respectively, representing a substantial area with potential for improved agricultural utilisation where biophysical and socioeconomic conditions permit (Annual Report, Department of Agriculture & Farmers Welfare, GoI, 2025–26)⁴.

These challenges are particularly relevant to West Bengal, one of India's leading rice-producing states, contributing approximately 11.32% of national rice production (Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, 2023; APEDA, Third Advance Estimates, 2023–24). Remote Sensing (RS) and Geographic Information System (GIS) assessments by the Agro-Economic Research Centre (ADRTC), Institute for Social and Economic Change (ISEC), Bengaluru, indicate that the state's rice fallow area declined from 2,173,029 hectares in 2020–21 to 1,951,892 hectares in 2023–24, a reduction of 10.18%. Although this decline suggests progress in bringing rice fallows under cultivation, the persistence of nearly 1.95 million hectares of rice fallow land points to considerable untapped potential for crop diversification and the intensification of rabi-season agriculture, subject to water availability, soil conditions, production costs and market access.

Taken together, these trends reveal three interrelated policy challenges: the substantial dependence of the workforce on agriculture relative to its contribution to national economic output; the coexistence of increasing cropping intensity with persistent fallow land; and India's strong aggregate foodgrain production alongside continuing yield constraints. In West Bengal, the declining but still extensive rice fallow area presents an opportunity to promote suitable second crops, improve cropping intensity and diversify farm livelihoods. Evidence-based interventions that integrate location-specific land-use planning, appropriate crop and water management, access to quality inputs, mechanisation and market linkages can help convert this potential into more productive, remunerative and sustainable agricultural systems.

Challenges Prior to TRFA Intervention

Rice-fallow land refers to fields where rice is cultivated during the *Kharif* (monsoon) season but remains uncropped during the subsequent *Rabi* (winter) season, often for up to five consecutive years due to inadequate irrigation, poor soil health, and socio-economic constraints. Despite remaining idle in

¹<https://www.policyedge.in/p/economic-survey-2025-26-strengthening>

² [Annual rpt 201617.pdf](#)

³ https://agriwelfare.gov.in/Documents/DAFW_AnnualReport_2025_26_En.pdf

⁴ https://agriwelfare.gov.in/Documents/DAFW_AnnualReport_2025_26_En.pdf

winter, these lands retain residual moisture after the *Kharif* harvest, supporting short-duration crops such as pulses, oilseeds, millets, and other drought-tolerant crops (Kumar et al., 2025; Geethika et al., 2024).

Rejuvenating rice fallows remains challenging because of inadequate up-to-date spatial datasets and the dispersed, heterogeneous nature of these lands. Climate variability, soil moisture stress, poor soil health, limited irrigation and mechanization, and livelihood dynamics further constrain their utilization (Ghosh et al., 2016). Drought, seasonal submergence, and poor soil fertility also hinder optimal land use, particularly in Eastern Indian States (Jha et al., 2012).

Against this background, the “Targeting Rice Fallow Area” (TRFA) scheme, launched in 2016–17 under the “Rashtriya Krishi Vikas Yojana” (RKVY) and later integrated into the “National Food Security Mission” (NFSM), addresses underutilization of rice fallows in West Bengal. This policy brief examines the causes and impacts of rice fallows and pathways for crop intensification following the sustainable agricultural practices.

Rejuvenation of Rice Fallows through TRFA Scheme

The TRFA scheme was launched to rejuvenate rice fallow lands through pulses and oilseeds, improving food security, soil health, and farmer’s income while reducing import dependence. At inception, the specific goals of the TRFA scheme were the following:

1. Bringing one million hectares of rice fallow under pulses and oilseeds cultivation, with an estimated additional production of 2.50 lakh tonnes of pulses and 3.5 lakh tonnes of oilseeds by the end of 2019.
2. Targeting 100 specific villages in each of the 15 districts of the region to achieve tangible results.
3. Capacity building of extension functionaries for sustainable cultivation of oilseeds and pulses in rice fallows by adopting the latest crop production technologies.
4. Creation of need-based irrigation, mechanisation, post-harvest and marketing infrastructure for sustainable cultivation of oilseeds and pulses.⁵

In West Bengal, the TRFA scheme has revived cultivation on current fallow land among 144 surveyed beneficiary households in Birbhum and South 24-Parganas districts of West Bengal (AERC, Visva-Bharati Study Report 198, 2026).

Extent of Rice Fallow Areas across Districts in West Bengal

ADRTC, Bengaluru (along with KRSAC and ISRO) provided the district-wise data for West Bengal across the years 2020–21 to 2023–24, using Remote sensing and GIS⁶. The data reveals that in 2020–21, Bankura recorded the highest rice fallow area (2.98 lakh ha), followed by Purulia (2.91 lakh ha), Purba Bardhaman (2.74 lakh ha), and Paschim Medinipur (2.47 lakh ha). Among the moderate-class districts, Paschim Bardhaman led with 0.64 lakh ha, followed by Murshidabad (0.61 lakh ha), North 24-Parganas (0.50 lakh ha), Howrah (0.31 lakh ha), and Uttar Dinajpur (0.28 lakh ha).

By 2023–24, overall rice fallow areas declined compared to 2020–21, though Purba Bardhaman (2.82 lakh ha) and Paschim Medinipur (2.56 lakh ha) saw increases. This indicates that while the general trend across the state points toward contraction, certain agriculturally significant districts are experiencing localized expansion, possibly due to shifts in cropping intensity, irrigation constraints, or farmer-level decisions regarding land use. Conversely, rice fallow areas expanded in districts located in the hilly and sub-Himalayan belt, where fragile agro-ecological conditions, dependence on rainfed cultivation, and limited irrigation infrastructure often contribute to fluctuations in land-use patterns. Within the moderate category, Murshidabad (0.43 lakh ha), Paschim Bardhaman (0.48 lakh ha), North 24-Parganas (0.38 lakh ha), and Howrah (0.27 lakh ha) recorded significant declines. These reductions suggest successful utilization of land resources, possibly aided by better irrigation coverage, crop diversification, or policy-driven interventions. However, Uttar Dinajpur stands out as the only district in this group to show an increase (0.49 lakh ha) compared to 2020–21.

⁵ https://rkvy.da.gov.in/static/download/pdf/Rice_Fellow_Guideline.pdf

⁶Source: ADRTC, Bengaluru (KRSAC and ISRO)

Therefore, it is felt essential to examine the percentage change in rice fallow area over the four-year period rather than relying solely on year-to-year variations, which often reflect short-term fluctuations. Table 1 presents the district-wise percentage changes, calculated using the formula below:

$$\text{Percentage Change} = \frac{\text{Rice Fallow Area}_{2023-24} - \text{Rice Fallow Area}_{2020-21}}{\text{Rice Fallow Area}_{2020-21}} \times 100$$

In this approach, 2020–21 serves as the base year, and the latest change in rice fallow land is measured relative to it. Subsequently, districts are ranked by the magnitude of these changes, highlighting the spatial pattern of rice fallow land dynamics across West Bengal during the study period.

It is evident from Table 1 that the reduction in rice fallow land has been most pronounced in Nadia (-52.74%), followed by Kolkata (-40.60%), Purulia (-31.93%), Murshidabad (-29.79%), Paschim Bardhaman (-25.81%), and North 24-Parganas (-23.76%). Collectively, these negative values extend to South 24-Parganas (Rank 15) and indicate districts where rice fallow land declined over the period.

In contrast, the remaining eight districts recorded positive values, reflecting an increase in rice fallow land. This upward trend suggests that, despite the overall decline observed in several districts, certain regions are experiencing a reversal in land-use dynamics. Among them, Kalimpong (+194.42%) registered the sharpest rise (Rank 23), while Purba Bardhaman (+2.95%) showed the smallest increase, pointing to a relatively stable agricultural base. This dual pattern highlights the spatial heterogeneity of rice fallow land dynamics across West Bengal, emphasizing how district-specific factors (like soil fertility, irrigation coverage, cropping intensity, and socio-economic issues), shape deviating outcomes.

Table 1: District-Wise Percentage Change in Rice Fallow Areas (2020-21 to 2023-24)

Districts	Change (in %)	Rank	Districts	Change (in %)	Rank
Nadia	-52.74	1	Purba Medinipur	-7.22	13
Kolkata	-40.60	2	Hooghly	-5.77	14
Purulia	-31.93	3	South 24-Parganas	-1.38	15
Murshidabad	-29.79	4	Purba Bardhaman	2.95	16
Paschim Bardhaman	-25.81	5	Pashchim Medinipur	3.62	17
North 24-Parganas	-23.76	6	Dakshin Dinajpur	10.46	18
Maldah	-23.46	7	Uttar Dinajpur	13.64	19
Cooch Behar	-22.65	8	Darjeeling	28.58	20
Bankura	-14.81	9	Jalpaiguri	31.45	21
Howrah	-12.27	10	Alipurduar	88.89	22
Jhargram	-10.99	11	Kalimpong	194.42	23
Birbhum	-10.82	12			

Sources: ADRTC, Bengaluru and the authors' Calculation

Factors behind Non-Cultivation of Rice Fallow Lands in Pre-TRFA Period

Beneficiary farmers indicated multiple constraints that resulted in rice fallow areas prior to the implementation of the TRFA scheme. The Fig. 1 systematically presents these barriers, highlighting the relative significance of climate vulnerability, water scarcity, soil health concerns, economic limitations, and institutional gaps in shaping farmers' decisions to monocropping leading to the rice fallows.

One of the foremost constraints is Climate Vulnerability (31%), as erratic rainfall, saltwater intrusion, recurrent droughts, and rising temperatures reduce the reliability of cultivating short-duration crops after the Kharif season. Closely linked is Water Scarcity (30%), as the lack of assured irrigation during Rabi discourages farmers from investing in additional cycles, even when residual soil moisture remains.

Equally significant are Soil Health Concerns (11%): nutrient depletion, declining organic matter, and salinity issues that limit the productivity of alternative crops. Farmers also face High Input Costs (9%) for seeds, fertilizers, and pesticides, making post-rice cultivation economically unviable. In addition, Government Policies (6%) and institutional support often remain inadequate or poorly targeted, failing to provide incentives or infrastructure for diversification.

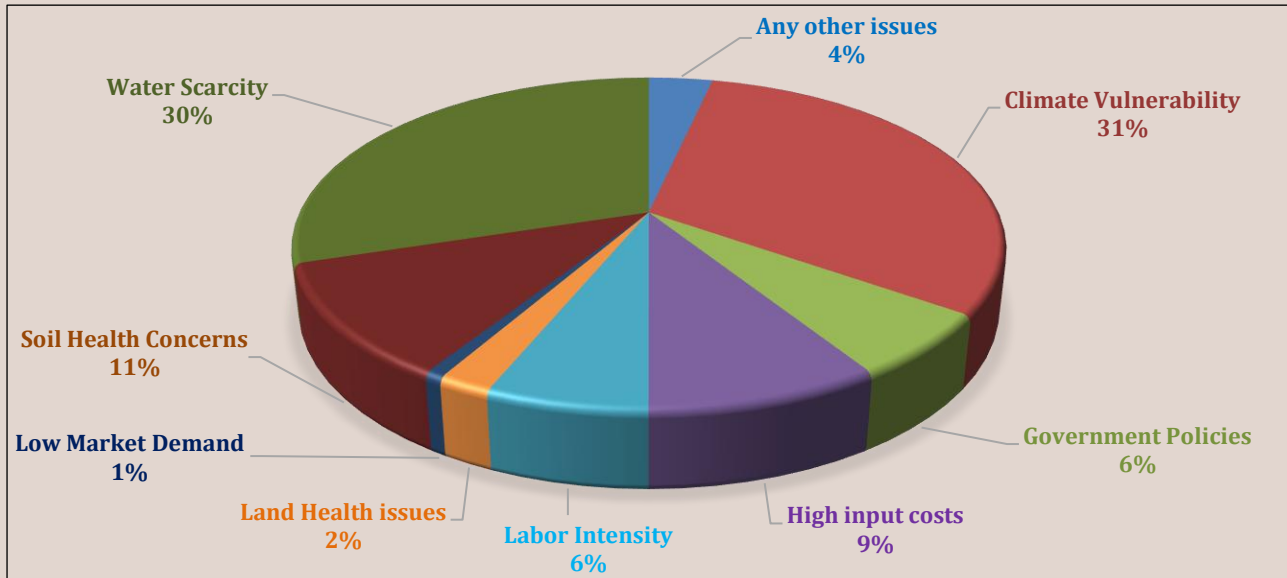


Figure 1: Major Reasons for Not Cultivating the Rice Fallow Lands

(Source: Primary survey, 2024-25)

Socio-economic factors also compound the problem. The Labour Intensity (6%) of short-duration crops discourages smallholders, especially where rural outmigration reduces labour availability. Moreover, Low Market Demand (1%) and price volatility for pulses and oilseeds undermine confidence in profitable returns. In some cases, Land Health Issues (2%), such as fragmentation, erosion, or poor drainage, make cultivation difficult. Finally, Other Localized Issues (4%), such as traditional practices, lack of awareness, and risk aversion, reinforce the tendency to leave rice fallow lands uncultivated.

Taken together, these constraints show non-cultivation arises from environmental stress, economic limits, institutional gaps, and socio-cultural practices. In the pre-TRFA phase, integrated interventions-improving irrigation, enhancing soil health, reducing costs, strengthening markets, and targeted policy support- were required to unlock rice fallow lands for sustainable diversification.

Rejuvenation of Rice Fallows through Pulses and Oilseeds Cultivation

The implementation of the TRFA scheme during 2023–24 promoted the productive utilization of rice fallows through the cultivation of pulses and oilseeds, although distinct crop preferences emerged across the two districts. In Birbhum, 92.15% of farmers cultivated oilseeds, predominantly mustard, while 26.88% cultivated pulses. In contrast, South 24 Parganas exhibited a strong preference for pulses, with 73.12% of farmers undertaking pulse cultivation, compared with 7.85% cultivating oilseeds. Overall, pulses accounted for 65% of cultivation, encompassing lentil, green gram, lathyrus, and chickpea, while mustard cultivation accounted for the remaining 35%. The distribution of seeds under the TRFA scheme provided critical support for crop diversification and the utilization of otherwise underutilized rice-fallow lands. These district-level variations highlight the importance of agroecological conditions, resource endowments, and farmers' crop preferences in shaping the adoption of alternative crops. The findings underscore the potential of targeted interventions to strengthen rice-fallow productivity, diversify cropping systems, and enhance the productive use of fallow land, while emphasizing the need for district-specific crop planning to maximize scheme outcomes.

Table 2: Distribution of Pulses and Oilseeds Cultivators across Sample Beneficiaries

Districts	Pulses	Oilseeds	Total
Birbhum	25 (26.88%)	47 (92.15%)	72 (50%)
South 24-Parganas	68 (73.12 %)	4 (7.85%)	72 (50%)
Total	93 (100%)	51 (100%)	144 (100%)

Source: Primary survey, 2024-25

The impact of the TRFA scheme on rice-fallow rejuvenation was assessed based on pulses (chickpea, grass pea, green gram, lathyrus, and lentil) and mustard, the crops for which seeds were distributed in the two surveyed districts of West Bengal. The impact of the scheme on rice-fallow rejuvenation is evident across the two districts. Rice fallow area declined from 62.96 acres to 52.86 acres, a net reduction of 10.10 acres. The reclaimed land supported diversified cropping, with 40.88 acres under the first rabi crop, 11.51 acres under the second rabi crop, and 0.47 acres under the first summer crop. These findings indicate progress in utilizing rice fallows for additional crop production and enhancing cropping intensity among beneficiary farmers.

Table 3: Impact of the TRFA Scheme in Rejuvenating Rice Fallows

Particulars		Birbhum	South 24-Parganas	Total
Rice fallow land - After TRFA	First Rabi Crop's Area (in Acres)	22.39	18.49	40.88
	Second Rabi Crop's Area (in Acres)	10.54	0.97	11.51
	First Summer crop's area (in Acres)	NA	0.47	0.47
	Total	32.9	19.93	52.86
	Rice fallow area-Before TRFA (in Acres)	37.39	25.57	62.96
	Reduction in rice fallow area (in Acres)	4.49	5.64	10.10
	Reduction in % (difference between before and after)	87.99	77.94	83.96

Source: Primary survey, 2024-25

Economic Gains from Rice-Fallow Diversification

The TRFA scheme has demonstrated considerable potential to transform underutilized rice fallows into productive agricultural assets through the cultivation of pulses and oilseeds. Across 52.32 acres, farmers diversified rabi cultivation across six crops, generating a reported gross income of approximately ₹7.00 lakh. Mustard was the leading contributor (₹3.11 lakh), followed by lentil (₹1.78 lakh) and grass pea (₹0.99 lakh). This diversification demonstrates the scope for improving land utilization, expanding seasonal crop production, and strengthening farm livelihoods through targeted seed support and appropriate crop selection.

The potential for rice-fallow utilization also extends beyond scheme-supported interventions. In South 24 Parganas, one farmer independently cultivated summer green gram on 0.47 acres, achieving a yield of 6 quintals per acre. Based on the reported cultivation cost of ₹8,000 per acre and an indicative price of ₹6,500 per quintal, the estimated net return was ₹18,330; however, the produce remained unsold at the time of the survey, making this an indicative rather than realized return. While this single case cannot establish wider economic viability, it highlights an opportunity to explore summer pulse cultivation where residual soil moisture, irrigation access, and local agroecological conditions permit. Scaling up these gains requires timely access to quality seeds, crop-specific extension advisories, demonstrations of suitable cultivation practices, and systematic assessment of crop-wise costs and returns. Such measures can help strengthen the contribution of rice-fallow diversification to farm income, cropping intensity, and sustainable agricultural production.

Table 4: Cropping Outcomes in Rice Fallow Areas: Pulses and Oilseeds

Seasons	Crops	Area (in acres)	Average yield per acre (in quintals)	Average cost of cultivation per acre (in Rs)	Average price per quintal	Gross income increased
Rabi	Chick Pea	1.84	3.9	₹ 5,300	₹ 5,250	₹ 37,674
	Grass pea	11.85	2.11	₹ 5,276	₹ 4,000	₹ 99,807
	Green gram (Mung Bean)	0.85	3.32	₹ 10,500	₹ 7,200	₹ 20,318
	Khesari Bean	8.43	1.9	₹ 12,133	₹ 3,350	₹ 53,657
	Lentil	11.71	2.76	₹ 14,160	₹ 5,500	₹ 1,78,056
	Mustard	17.64	3.39	₹ 8,813	₹ 5,200	₹ 3,10,931
	Grand Total	52.32				₹ 7,00,443
Summer	Green gram (Mung Bean)	0.47	6	₹ 8,000	₹ 6,500	₹ 18,330
	Grand Total	0.47				₹ 18,330

Source: Primary survey, 2024-25

Conclusions and Policy Recommendations

Evidence from TRFA beneficiaries demonstrates the potential of pulses and mustard cultivation to bring fallow land under additional crop production and generate economic returns. Realizing the full potential of rice-fallow cultivation requires an integrated, location-specific strategy that combines technological, infrastructural, institutional, and market interventions. Key policy recommendations are:

- Strengthen Targeted TRFA Implementation:** Prioritize rice-fallow hotspots using GIS and remote sensing, supported by district-level land-use databases and periodic monitoring. Tailor interventions to local agroecological conditions and farmers' needs.
- Ensure Timely Access to Quality Seeds:** Strengthen seed distribution systems to ensure adequate quantities of quality seeds reach farmers before sowing. Promote suitable short-duration pulses and oilseeds, particularly lentil, chickpea, green gram, grass pea, and mustard.
- Expand Irrigation and Climate Resilience:** Invest in pond restoration, minor canal rehabilitation, community water-harvesting structures, and affordable micro-irrigation. Promote moisture-conservation practices and climate-resilient cropping options suited to local conditions.
- Enhance Extension and Capacity Building:** Scale up demonstration plots, farmer field schools, and mobile-based advisories on relay cropping, zero tillage, residue management, and crop-specific production practices. Strengthen soil testing and locally tailored technical guidance.
- Improve Farm Profitability and Market Access:** Reduce cultivation risks through improved access to institutional credit, crop insurance, input support, aggregation, storage, processing, and reliable market linkages. Strengthen Farmer Producer Organisations (FPOs) and explore suitable procurement and price-support mechanisms for pulses and oilseeds.
- Promote Integrated Institutional Coordination:** Strengthen TRFA interventions under the National Food Security Mission (NFSM) and Pradhan Mantri – Rashtriya Krishi Vikas Yojana (PM-RKVY) with state and district agricultural development plans. Establish district-level coordination mechanisms involving agriculture departments, research institutions, extension agencies, FPOs, and local bodies.
- Monitor Outcomes and Economic Viability:** Track changes in rice-fallow area, cropping intensity, crop yields, cultivation costs, farm returns, and adoption rates. Undertake periodic assessments across agroecological settings to identify scalable interventions and distinguish realized income gains from projected returns.

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