RAJASTHAN MIDLINE IMPACT REPORT ON CLIMATE-RESILIENT AGRICULTURE IMPLEMENTATION

JUNE 2026

Table of Contents

ABOUT THE NOURISHING SCHOOLS PROGRAMME 01

PROGRAMME CYCLE 02

SURVEY METHODOLOGY 02

KEY RESULTS 04

CONCLUSION 24

ACKNOWLEDGEMENTS 25

INTRODUCTION

Climate-resilient agriculture plays a critical role in strengthening food security, improving rural livelihoods, and helping farming communities adapt to changing climatic conditions. However, adopting sustainable farming practices requires more than access to information. It requires practical knowledge, confidence, and continued support for farmers to test and apply new approaches.
Through the Climate-Resilient Agriculture module, the Nourishing Schools Foundation works with local implementation partners to equip Self-Help Groups and farmer communities with practical tools on composting, bio-fertilisers, water conservation, crop diversification, seed saving, and other sustainable farming practices. The programme is delivered through monthly facilitated sessions using an illustrated manual designed for low-literacy contexts.

This report presents findings from the midline survey conducted with 418 farmers across 20 villages in Bikaner and Banswara districts of Rajasthan. It examines changes in farming practices, food security, and income after the first year of programme implementation, providing insights into early progress and areas that will continue to be strengthened during the second year of the programme.

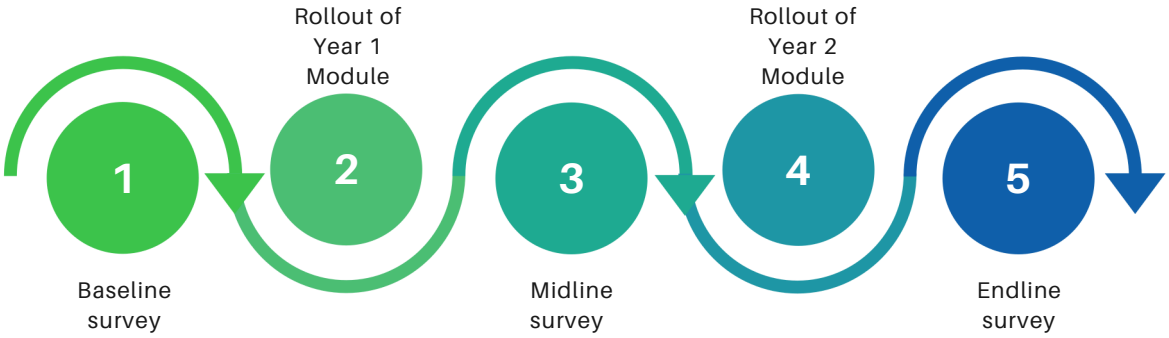


About Nourishing Schools Foundation
Nourishing Schools Foundation is a non-profit organisation that empowers children and communities to improve nutrition, health, and livelihoods through evidence-based education programmes. Working with governments, schools, civil society organisations, and community groups, NSF has reached over 360 schools and 100,000 children across India, while also supporting climate-resilient agriculture initiatives with farming communities.

OVERVIEW

Climate Resilient Agriculture Module Cycle

The Nourishing Schools Foundation, along with partner organisations, introduces the module through women-led Self-Help Groups and other farmer groups in rural villages, with monthly facilitated meetings guiding members through action plans. The diagram below outlines the programme cycle that includes module implementation and data collection process that we follow at the level of villages with implementation support from the partner organization.



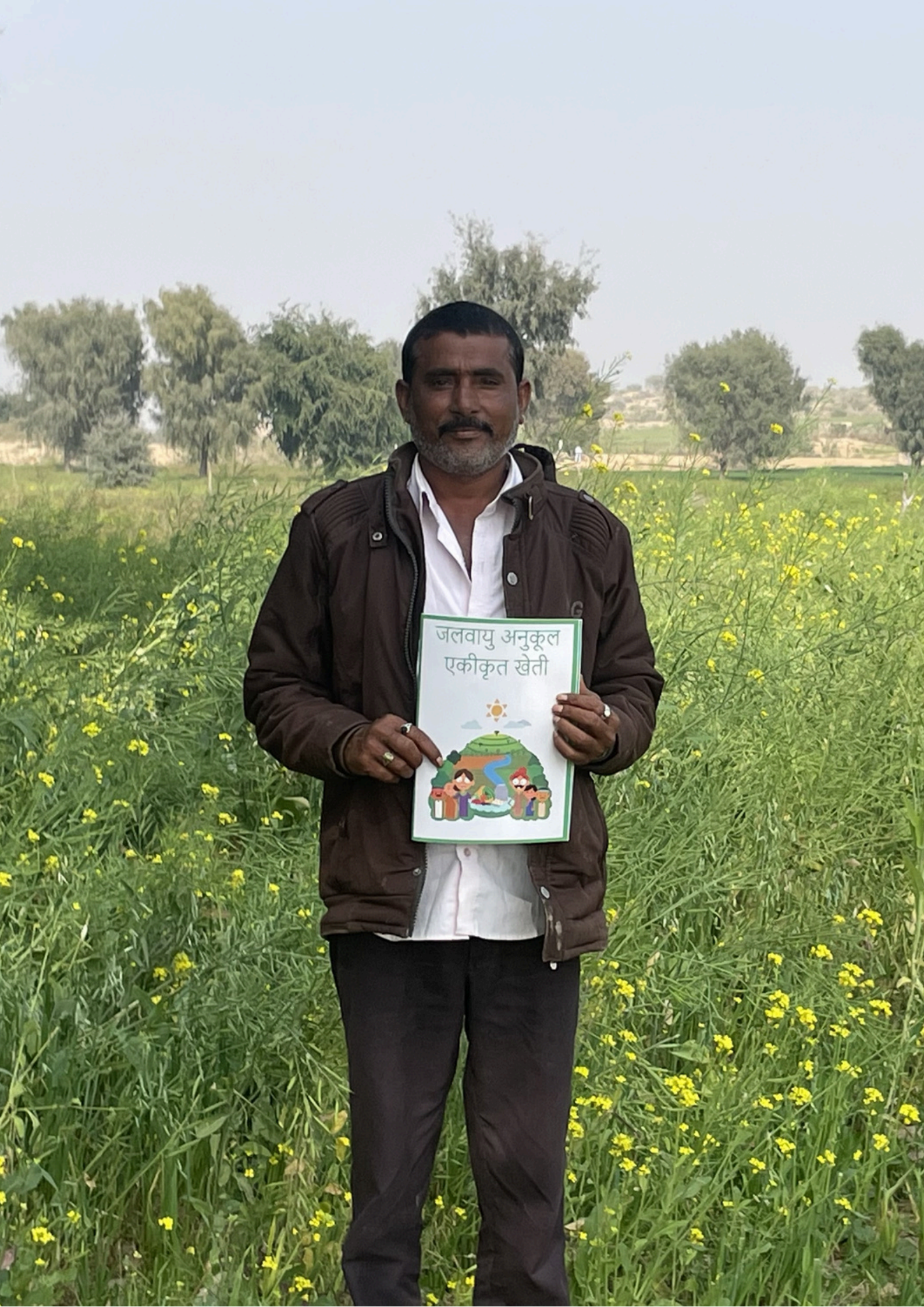
Survey Methodology

The sample size for the baseline survey consisted of 418 farmers from 20 villages across two districts – Bikaner and Banswara in Rajasthan, India. The participating farmers are members of Self-Help Groups operating in the villages who enrolled for the Climate Resilient Agriculture module. The midline survey was conducted with the same farmers who participated in the baseline survey. The endline survey will be conducted with this same cohort. Consent was obtained from the farmers before data collection.

The baseline and midline surveys were conducted in partnership with URMUL Trust and VAAGDHARA, non-profit organisations working with small and marginalised farmer communities in Bikaner and Banswara districts, respectively.

URMUL Trust works closely with women, children, and marginalised groups to strengthen their confidence, skills, and collective voice. Through initiatives in education, livelihoods, health, and natural resource management, the organisation supports communities to come together, address their own challenges, and move towards a life of dignity and resilience.

VAAGDHARA has been actively engaged with tribal communities in western India, leveraging the power of technology for the upliftment of tribal communities and the underprivileged. Guided by the Swaraj principles, they prioritise True Farming initiatives that center around food and farming sovereignty.

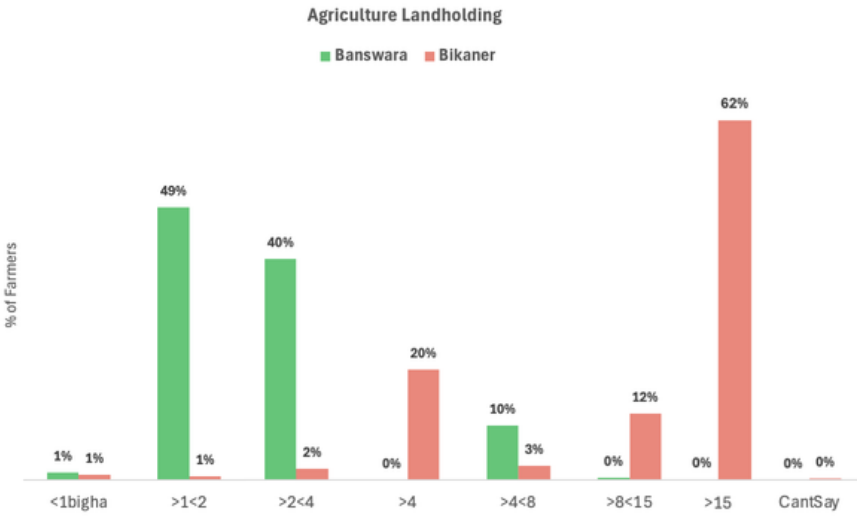

जलवायु अनुकूल
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RESULTS

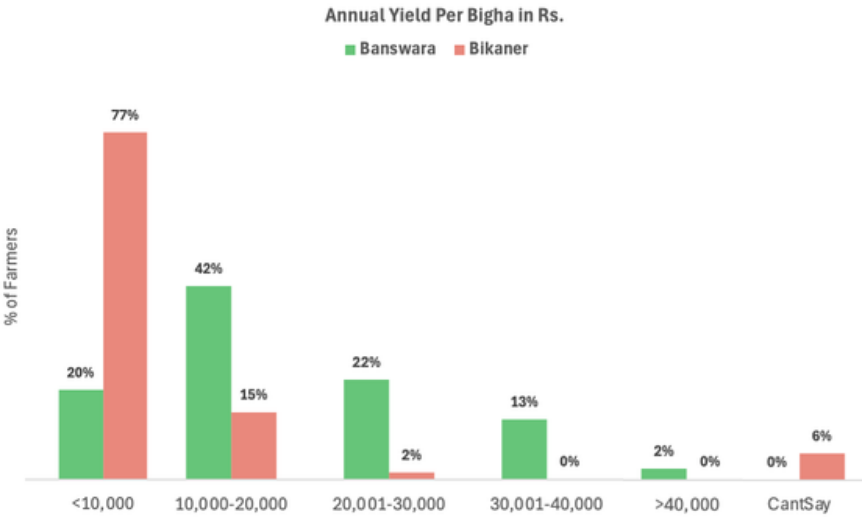
Nourishing Schools Foundation and various partners conducted the midline survey in 20 villages across Banswara and Bikaner in Rajasthan, India (completed in June 2025). Results from this survey are compared with the results from the baseline survey (completed in April 2024) before the introduction of the Climate Resilient Agriculture module. Findings from 418 farmers covered in the midline survey were compared with the same 418 farmers covered in the baseline survey. The results shown below are changes observed between the baseline and midline surveys.

Demographics

Landholdings diverge sharply across the two districts. Farmers in Bikaner tend toward larger holdings (>15 bigha is more prevalent), while farmers in Banswara have smaller holdings (<2 bigha). The desert land in Bikaner requires large parcels for sparse, low-yield cropping, as crops grow far apart in sandy soil.



Bikaner's low yield per bigha is a structural consequence of sandy desert soil, where per-bigha productivity is constrained by water availability rather than farm size. Larger landholdings in Bikaner partially offset lower per-bigha productivity, meaning total farm income is not as disadvantaged as yield figures alone suggest. Banswara's smaller, fragmented holdings limit absolute income even where per-bigha yields are relatively higher.



The two districts operate under fundamentally different production frontiers: equal investment in knowledge transfer will yield unequal returns given the underlying water constraint in Bikaner.

RESULTS

1. The Programme Delivered Visible Gains

This report presents evidence that foundational climate-resilient practices such as composting, organic fertiliser production, water conservation, seed banking, sun drying, and diversified cropping produce measurable improvements in food security, income resilience, and farmer self-sufficiency within a single programme cycle.

The charts focus on the strongest positive changes confirmed by Wilcoxon signed-rank testing, including seed banks, own fertiliser production, composting pits, crop diversification, food security, and water conservation.

Reading the charts:

- Chart A shows the overall increase in adoption of each practice between baseline and midline, measured as the percentage of farmers practising it at each of the two timelines.
- Chart B presents the paired conversion rate, which is the proportion of farmers who reported "No" or "Can't Say" at baseline and shifted to "Yes" at midline. This shift is confirmed as statistically significant by Wilcoxon signed-rank testing ($p < 0.05$).

Chart-A: Shift in Agricultural Practices

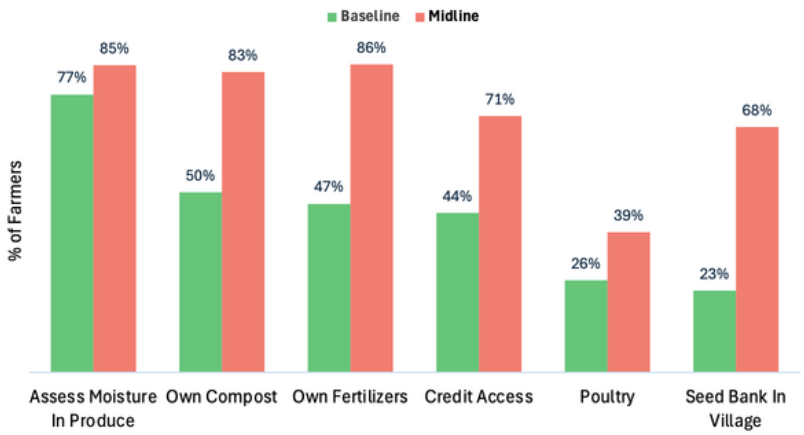
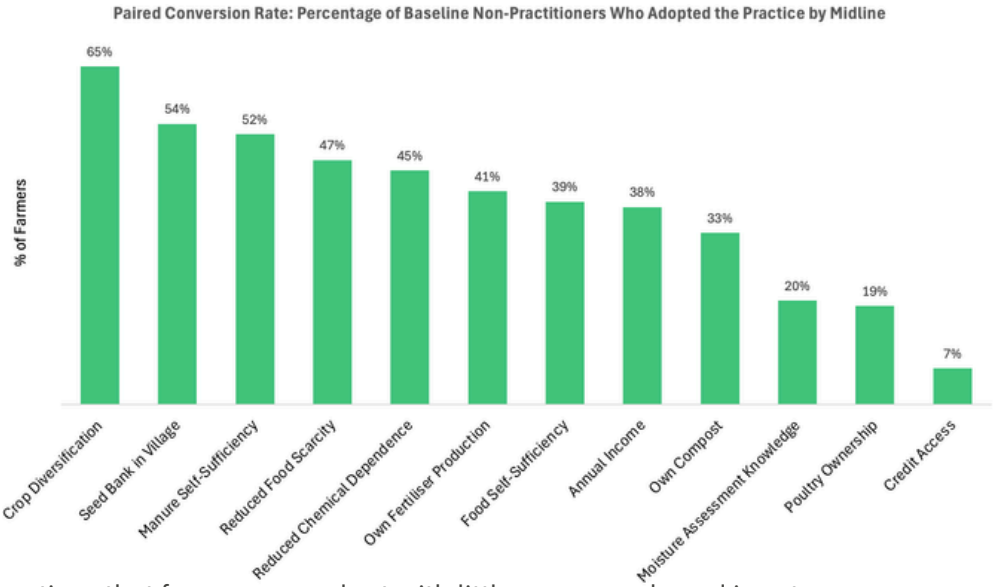


Chart-B: Statistically Significant Positive Changes (Wilcoxon p < 0.05, paired panel of 418 farmers)



What the plots show:

- The largest positive shifts are in practices that farmers can adopt with little or no purchased input.
- Seed bank establishment, composting, and own fertilizer production show especially strong gains.
- Food scarcity declines, meaning more households report fewer months of shortage.

Key findings:

- Seed banks rose sharply, from about 23% to 68% at the village level.
- Own fertiliser production increased from roughly 47% to 86% of farmers.
- Composting pits increased from around 50% to 83%.
- The average number of water conservation techniques deployed increased from an average of 1.85 to 3.02 per farmer.

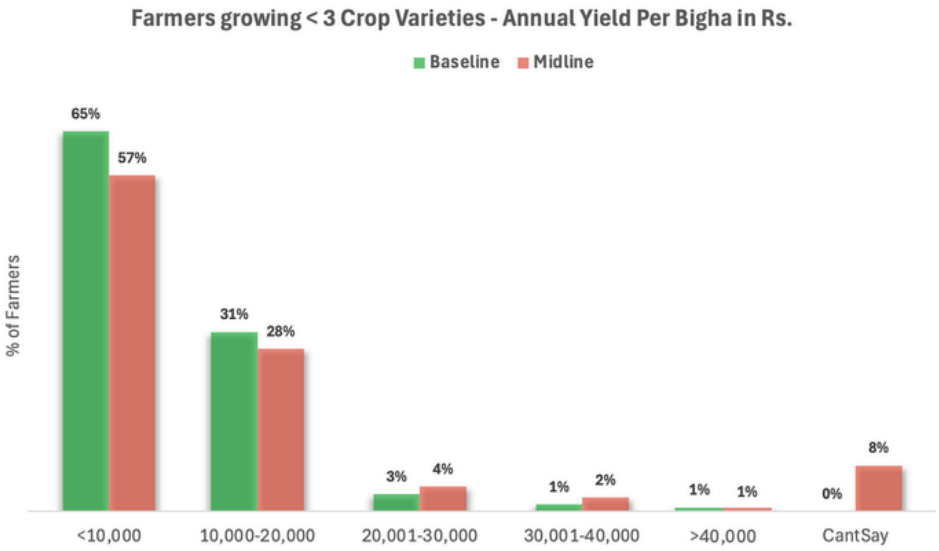
RESULTS

2. Crop Diversification Is Associated With Higher Farm Income

This section examines the financial implications of crop diversification between baseline and midline. The two charts compare income distributions at baseline and midline, split between farmers growing fewer than three varieties and those growing more than three. The contrast illustrates the income benefit associated with greater crop diversification.

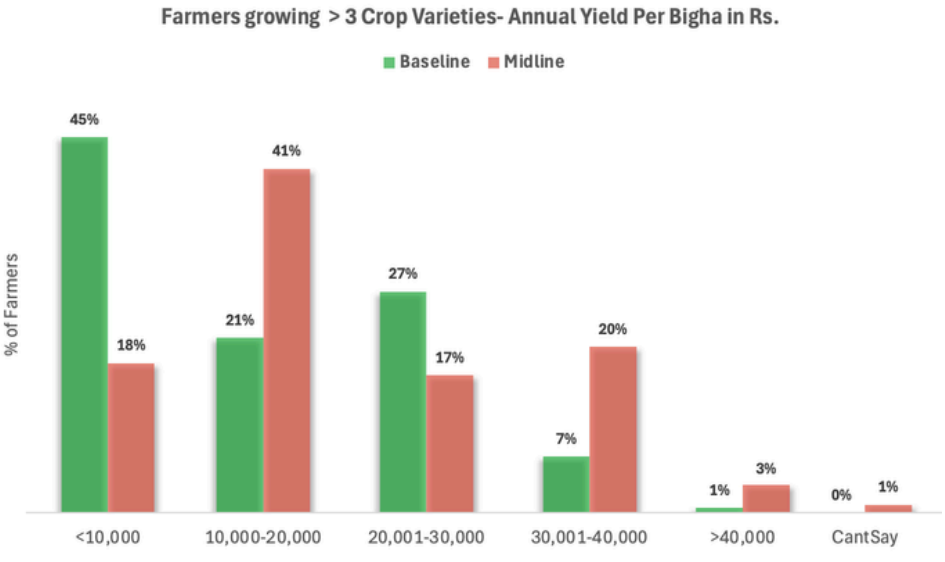
What the plots show:

- Farmers with lower crop diversity (fewer than 3 varieties) are concentrated in the lowest income bracket, with little upward shift between baseline and midline.
- Farmers with higher crop diversity (more than 3 varieties) show a clear shift toward higher income brackets by midline.
- Crop diversification appears to be a meaningful driver of income improvement across the programme period.



Key findings:

- Among farmers growing fewer than 3 varieties, 65% earned under Rs. 10,000 per bigha at baseline, dropping to 57% at midline.
- Among farmers growing more than 3 varieties, those earning under Rs. 10,000 per bigha fell from 45% at baseline to 18% at midline, while higher income brackets expanded.
- The share of diversified farmers earning Rs. 30,001 – Rs. 40,000 per bigha grew from 7% to 20%, a near-tripling.
- Mixed cropping is associated with measurably better income outcomes, reinforcing the programme's emphasis on crop diversification as a pathway to financial resilience.



TESTIMONIALS FROM THE FIELD



Picture Description: *Farmer Pappu Devi cultivates 4-5 native pulses, 3 grains & leguminous vegetables & greens between July & December on her farm. In the dry season, she grows 6-7 fruit & vegetable varieties in her homestead, supplemented by stored produce. February 2026, Bikaner district, Rajasthan*



Picture Description: *Farmer Tholi Devi and her mother-in-law harvested maize, wheat, sugarcane, lentils, fenugreek, tomatoes, and 6 additional varieties of vegetables and greens this winter — meeting nearly every one of their household's food needs from their own land. February 2026, Banswara district, Rajasthan.*

RESULTS

3. Self-Sufficient Compost Use Associated With Higher Farm Income

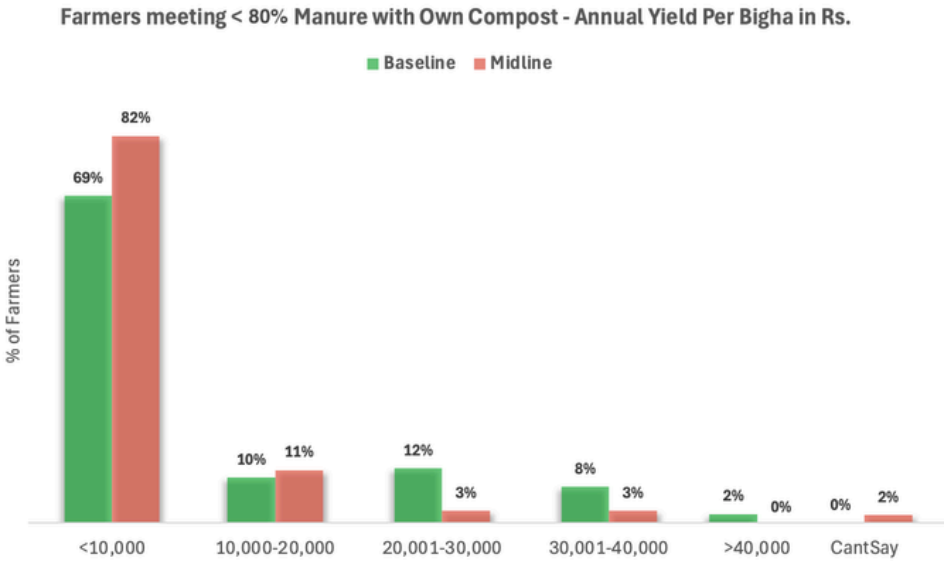
This figure examines the relationship between bio manure self-sufficiency and farm income per bigha.The two charts compare income distributions at baseline and midline for farmers meeting less than 40% of their manure needs from own compost, against those meeting more than 80%. The contrast highlights how on-farm organic input production is associated with improved income outcomes.

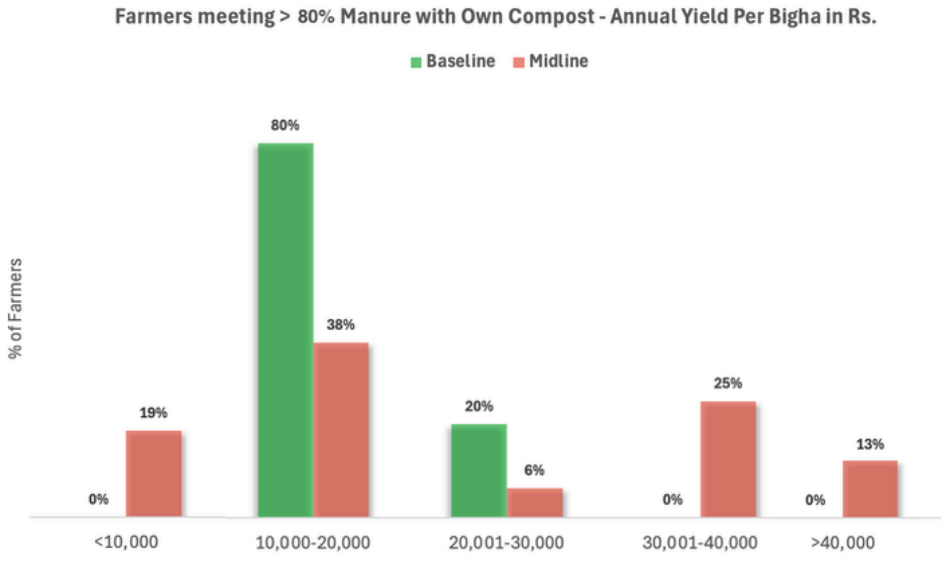
What the plots show:

- Farmers with low manure self-sufficiency (less than 80% from own compost) are heavily concentrated in the lowest income bracket, with minimal change between baseline and midline.
- Farmers with high manure self-sufficiency (more than 80% from own compost) show a shift into higher earning ranges.

Key findings:

- Among farmers meeting less than 80% of manure needs from own compost, 69% earned under Rs. 10,000 per bigha at baseline, rising further to 82% at midline — suggesting stagnation or worsening without self-sufficiency.
- Among farmers meeting over 80% of manure needs from own compost, the share of high self-sufficiency farmers earning Rs. 30,001 - Rs. 40,000 per bigha increased from 0% to 25% and those earning > Rs. 40,000 increased from 0% to 13%, brackets that were entirely absent at baseline.
- Bio manure self-sufficiency is closely linked to income advancement, reinforcing the programme's focus on composting and organic input production.





TESTIMONIALS FROM THE FIELD



Picture Description: *Farmer Okita Devi's small compost pile in her homestead at the start of the Climate-Resilient Agriculture module. October 2024, Banswara district, Rajasthan.*



Picture Description: *A scaled up bio-compost pile 2 years hence, prepared with straw and cow/goat dung in Okita Devi's expanded farm. February 2026, Banswara district, Rajasthan.*

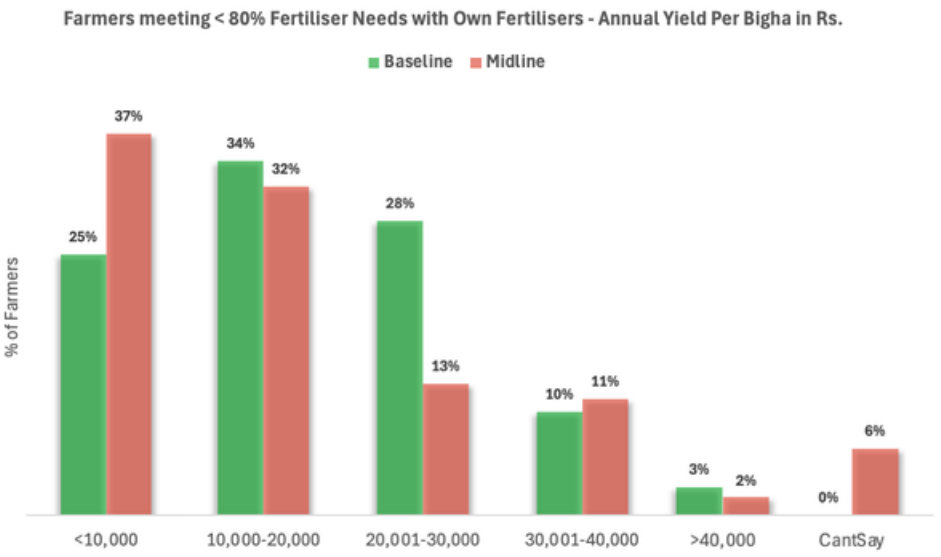
RESULTS

4. Self-Sufficient Bio-Fertiliser Use Linked to Higher Farm Income

This figure indicates that when farmers produce their own bio-fertiliser preparations rather than relying on purchased inputs, it translates into better incomes. Farmers who sourced more than 80% of their fertiliser needs from own preparations saw a pronounced upward income shift by midline, while those still dependent on external sources showed virtually no movement. The contrast highlights the income advantage associated with greater on-farm fertiliser independence.

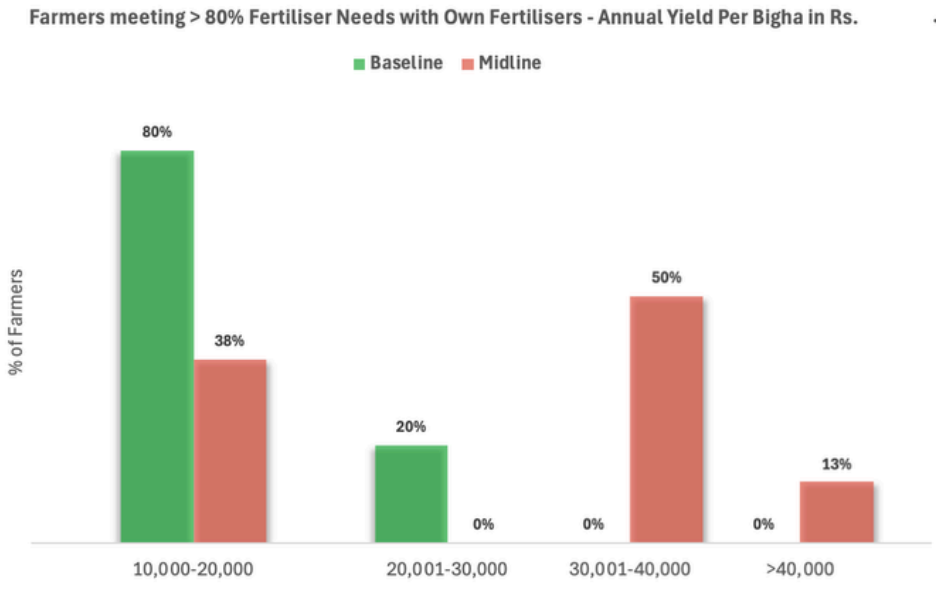
What the plots show:

- Farmers with lower fertiliser self-sufficiency (less than 80% from own bio preparations) show a spread income distribution at baseline, with income concentrated below Rs. 20,000 per bigha and little upward movement at midline.
- Farmers with higher fertiliser self-sufficiency (more than 80%) show a dramatic shift toward higher income brackets by midline.
- The income distribution for high self-sufficiency farmers is dominated by the Rs. 30,001 - Rs. 40,000 per bigha bracket at midline, a bracket largely absent at baseline.



Key findings:

- The share of high self-sufficiency farmers earning Rs. 10,000 - Rs. 20,000 per bigha fell from 80% at baseline to 38% at midline, as yield moved into higher brackets.
- Farmers earning Rs. 30,001 - Rs. 40,000 per bigha rose from 0% to 50% among the high self-sufficiency group, which is the single largest bracket at midline.
- Bio-fertiliser self-sufficiency is strongly associated with income advancement, reinforcing the programme's emphasis on reducing external input dependency.



TESTIMONIALS FROM THE FIELD



Picture Description: *Farmers from a Self Help Group in Phalwa village prepare a bio-fertiliser called Dashparni using locally sourced herbs and cow urine. September 2024, Banswara district, Rajasthan.*

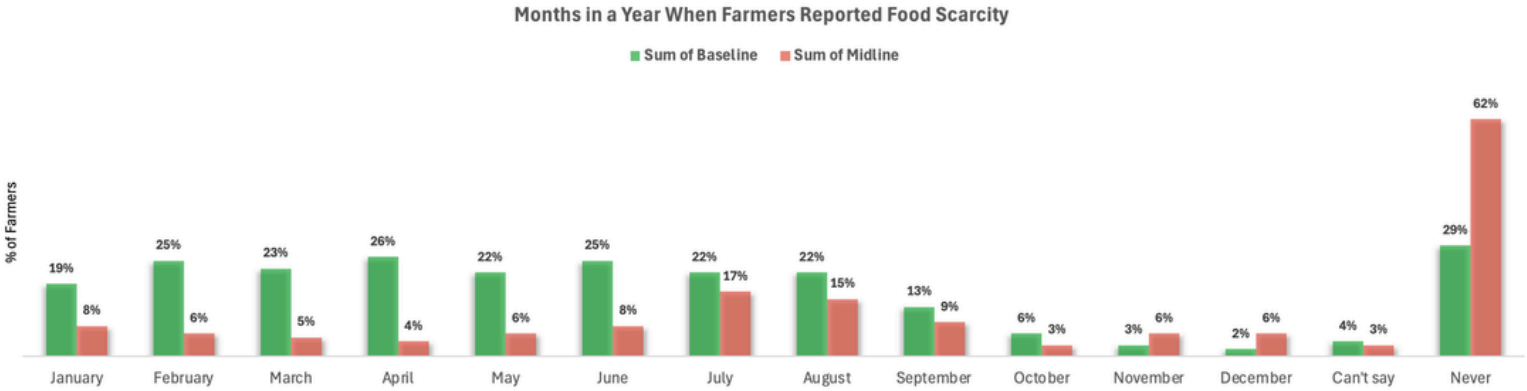


Picture Description: *Since 2024, Okita Devi has been preparing her own pesticides and fertilisers. She too, collaborates with fellow Self-Help Group members to produce these inputs collectively. February 2026, Banswara district, Rajasthan.*

RESULTS

5. Stronger Local Systems Support Year-Round Resilience

Together, these figures track two related shifts: how easily farmers can source native seeds within their own village, and how many months of the year households go without enough food. Both point to the same underlying trend, a move toward more self-reliant, locally rooted farming systems between baseline and midline.

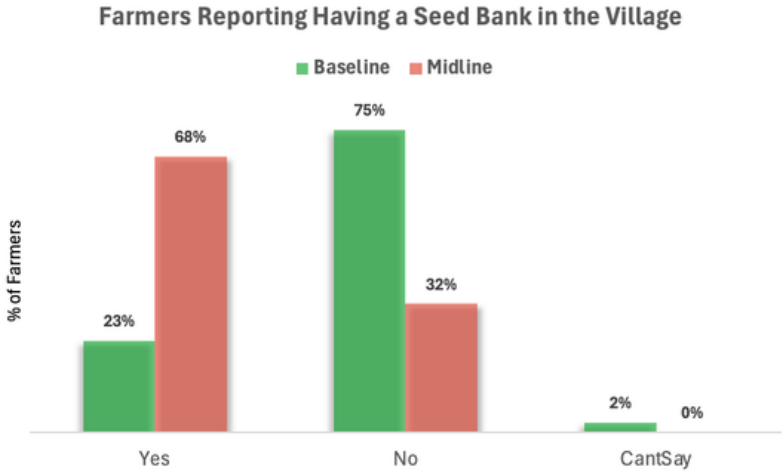


What the plots show:

- Far more farmers now have a seed bank or seed exchange system in their village, while the share with no such access has fallen by more than half.
- Food scarcity has eased across nearly every month of the year, with the largest gains in the months that previously saw the most shortages.
- The share of farmers reporting no food-scarce months at all ("Never") rose substantially between baseline and midline.
- A few months (February to June) still show meaningful scarcity at midline, suggesting some seasonal gaps remain despite overall progress.

Key findings:

- Access to village-level seed banks nearly tripled, rising from 23% to 68% of farmers.
- Farmers reporting no seed bank access fell from 75% to 32%.
- Farmers reporting no food-scarce months at all rose from 29% to 62%.
- Food scarcity in the leanest months fell sharply: April dropped from 26% to 4%, and February from 25% to 6%.



TESTIMONIALS FROM THE FIELD



Picture Description: *Farmer Pappu Devi's store of native seeds harvested from her farm includes varieties of native pulses and grains, which she exchanges for seeds of native vegetables with other farmers. February 2026, Bikaner district, Rajasthan.*



Picture Description: *Native seed and crop diversity displayed at farmer Okita Devi's homestead, grown entirely on her own farm. October 2024, Banswara district, Rajasthan.*

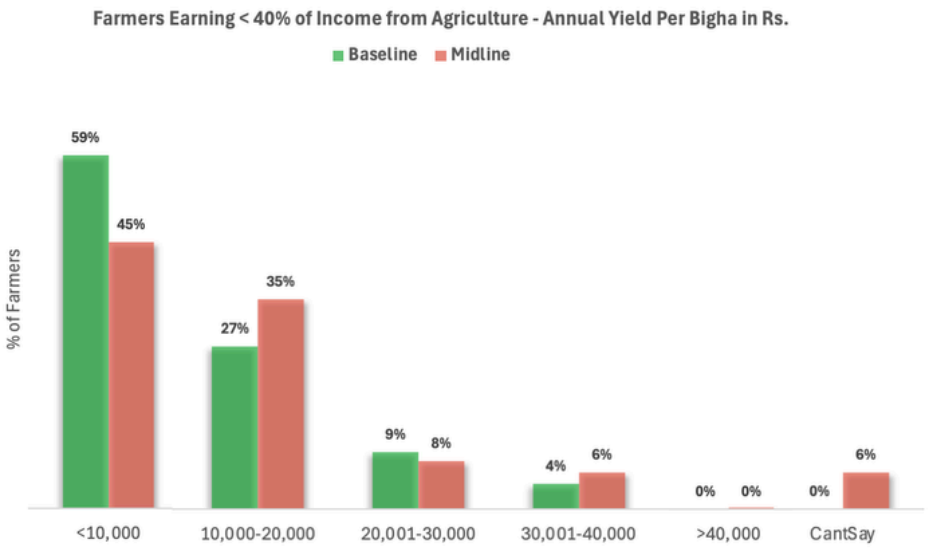
RESULTS

6. Yield Gains Concentrated Among Agriculture-Dependent Farmers

This comparison looks at income per bigha at baseline and midline, split by how reliant farmers are on agriculture for their overall income. Farmers who depend more heavily on farming show a marked shift toward higher-yield brackets, while those less reliant on agriculture see a more modest improvement.

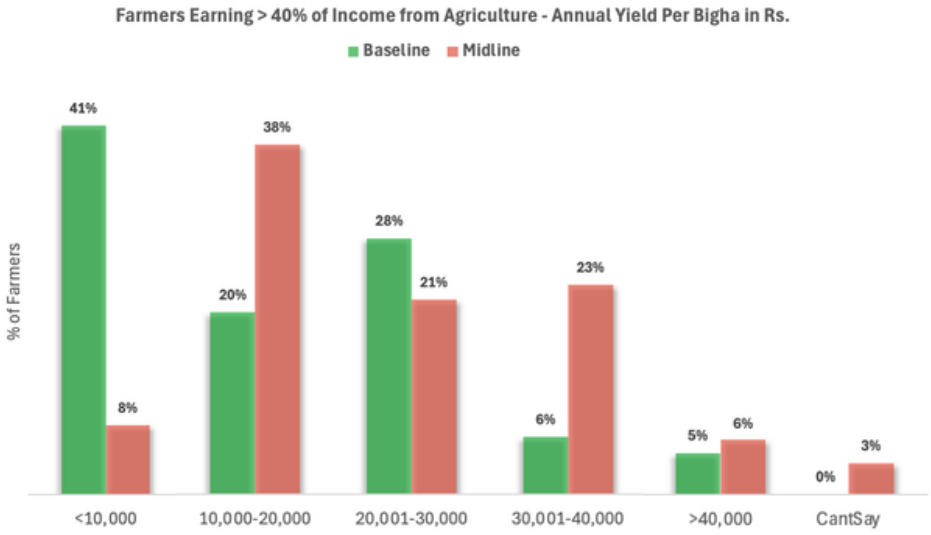
What the plots show:

- Among farmers earning more than 40% of their income from agriculture, the share in the lowest bracket (under Rs. 10,000 per bigha) fell sharply between baseline and midline.
- This more agriculture-dependent group shows a clear rightward shift, with growing shares in the mid and upper income brackets.
- Farmers earning less than 40% of their income from agriculture also improve, but the shift is smaller, and most remain concentrated in the lower brackets.



Key findings:

- Among agriculture-dependent farmers (over 40% of income), 50% earned more than Rs. 20,000 per bigha at midline, up sharply from 39% at baseline.
- Among less agriculture-dependent farmers (under 40% of income), only 14% reached yields above Rs. 20,000 per bigha at midline.
- The lowest income bracket (under Rs. 10,000 per bigha) shrank from 41% to 8% among agriculture-dependent farmers.
- For less agriculture-dependent farmers, the same lowest bracket declined more modestly, from 59% to 45%.



TESTIMONIALS FROM THE FIELD





Picture Description: *For Okita Devi, household income grew through livestock rearing, the sale of surplus produce and savings from growing their own vegetables, fruits, and grains — enabling her family to build a new home. February 2026, Banswara district, Rajasthan*

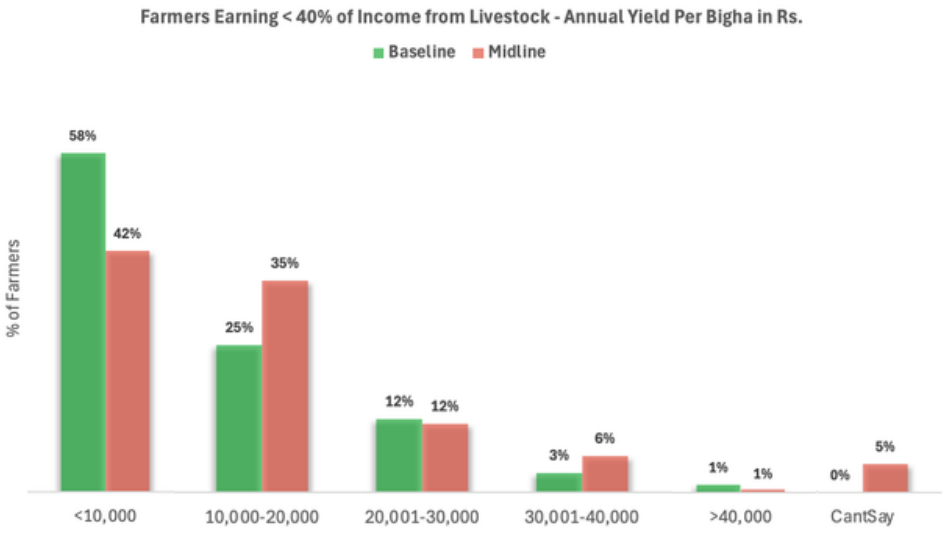
RESULTS

7. Livestock-Dependent Farmers See Larger Income Gains

These charts compare income per bigha at baseline and midline, grouping farmers by how much of their income comes from livestock. Households drawing more than 40% of their income from livestock move into higher-yield brackets more decisively than households with a smaller livestock share.

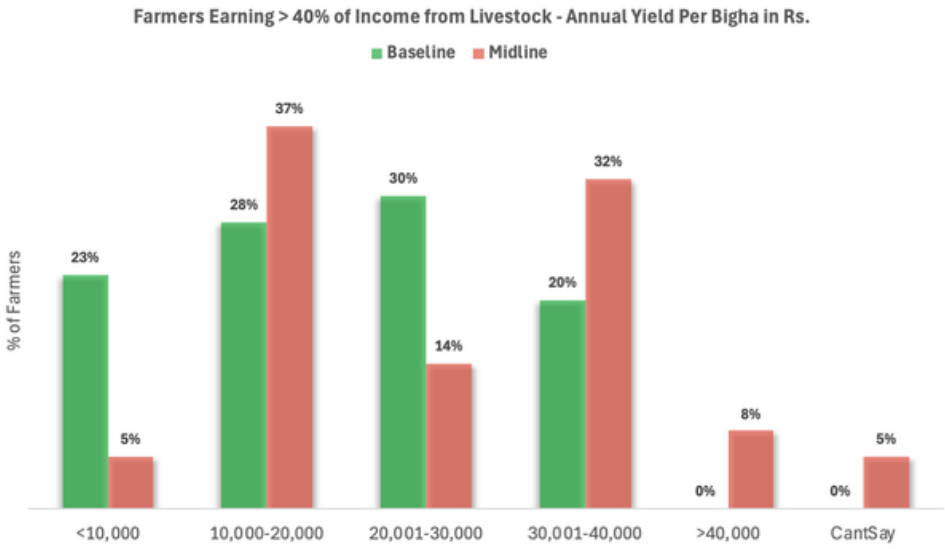
What the plots show:

- Farmers who earn over 40% of their income from livestock shift more decisively into higher-yield brackets than less livestock-reliant farmers.
- For this more livestock-dependent group, the lowest bracket (under Rs. 10,000 per bigha) thins out considerably, with most farmers moving into the Rs. 10,000-40,000 range.
- Farmers earning under 40% of their income from livestock also improve, but a large share remains in the lowest bracket even at midline.
- A small "Can't say" share appears at midline in both groups, suggesting a few farmers found it harder to estimate income precisely.



Key findings:

- Of the farmers earning over 40% of income from livestock, the lowest bracket (under Rs. 10,000 per bigha) dropped from 23% to just 5%.
- In that same group, the Rs. 30,001-40,000 bracket grew from 20% to 32% of farmers.
- Of the farmers earning under 40% of income from livestock, the lowest bracket fell more modestly, from 58% to 42%.



TESTIMONIALS FROM THE FIELD



Picture Description: *Rearing of native breeds of cattle is common in most farmer households, supplementing not just incomes but also the nutritional needs of the families. February 2026, Banswara district, Rajasthan.*

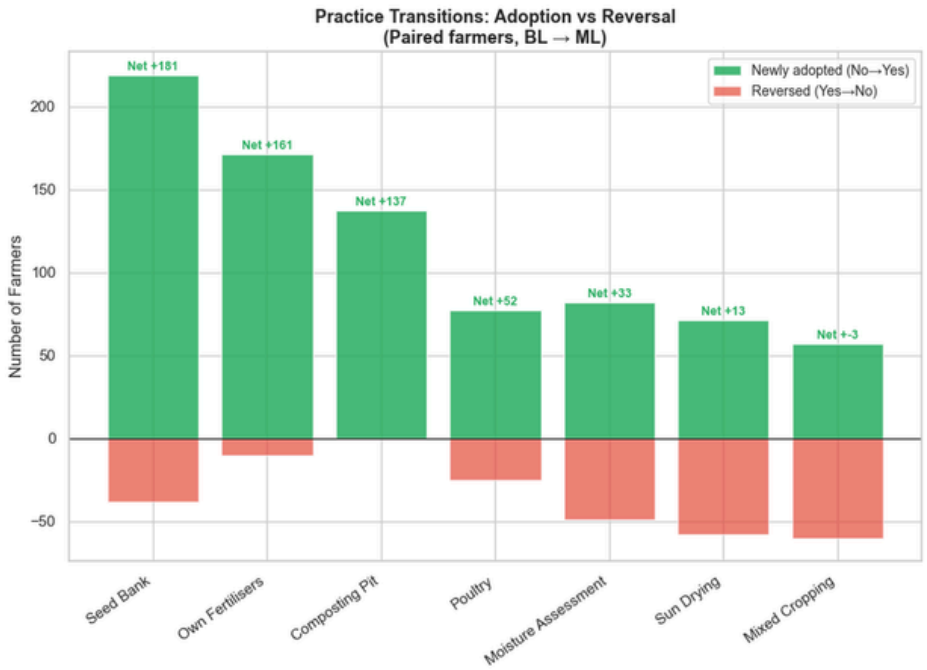


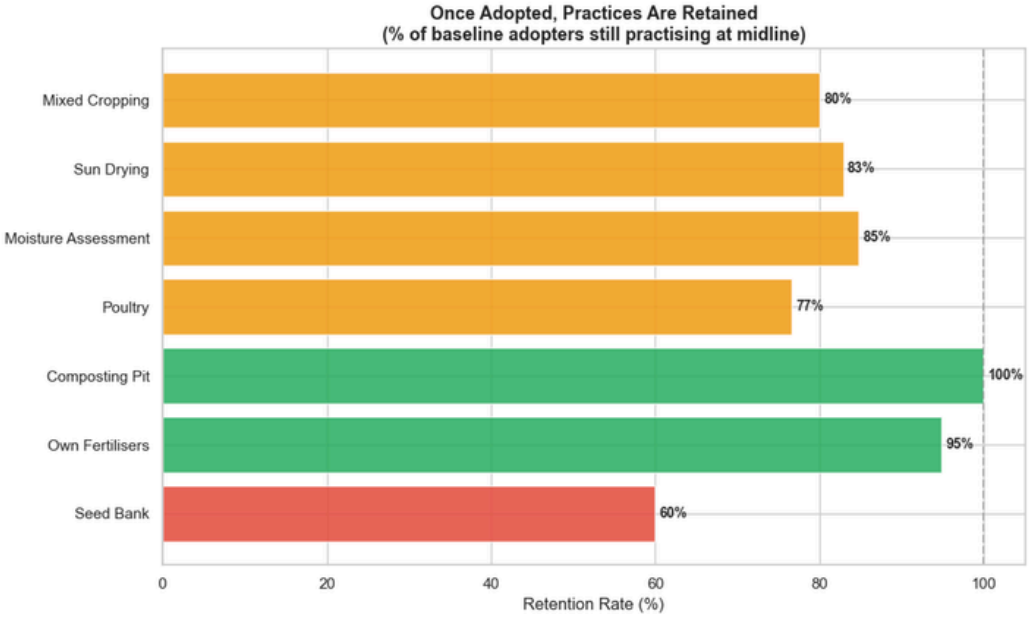
Picture Description: *Goat rearing further contributes to supplemental income and nutrition while also providing an additional source of farm manure. February 2026, Banswara district, Rajasthan.*

RESULTS

8. Greater Adoption and Retention of Climate Resilient Agriculture Practices

The charts below compare the number of farmers who newly adopted each practice against those who stopped practising it, while also showing retention among baseline adopters.





Key findings:

- Most practices show far more new adoption than reversal.
- Reversals are minimal, indicating that farmers do not try these practices and then abandon them.
- Composting shows 100% retention among baseline adopters.
- Own fertilizer production shows very high retention, around 95%.



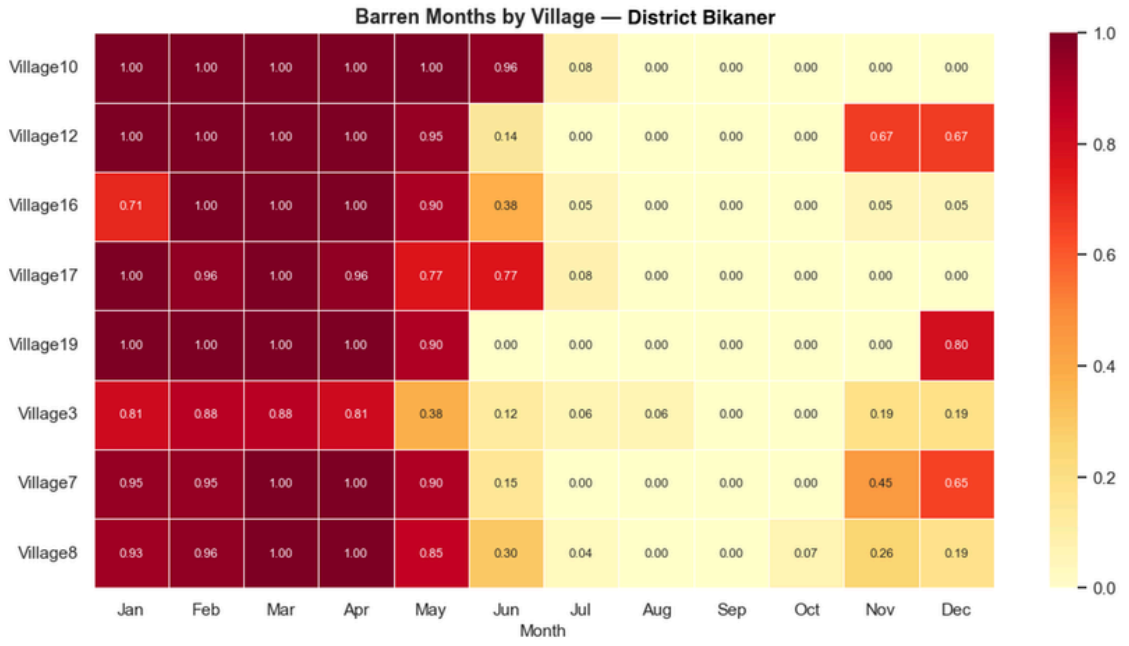
RESULTS

Key Challenges

The heatmaps below show the proportion of farmers in each village reporting barren months across the calendar year, separately for Bikaner and Banswara.

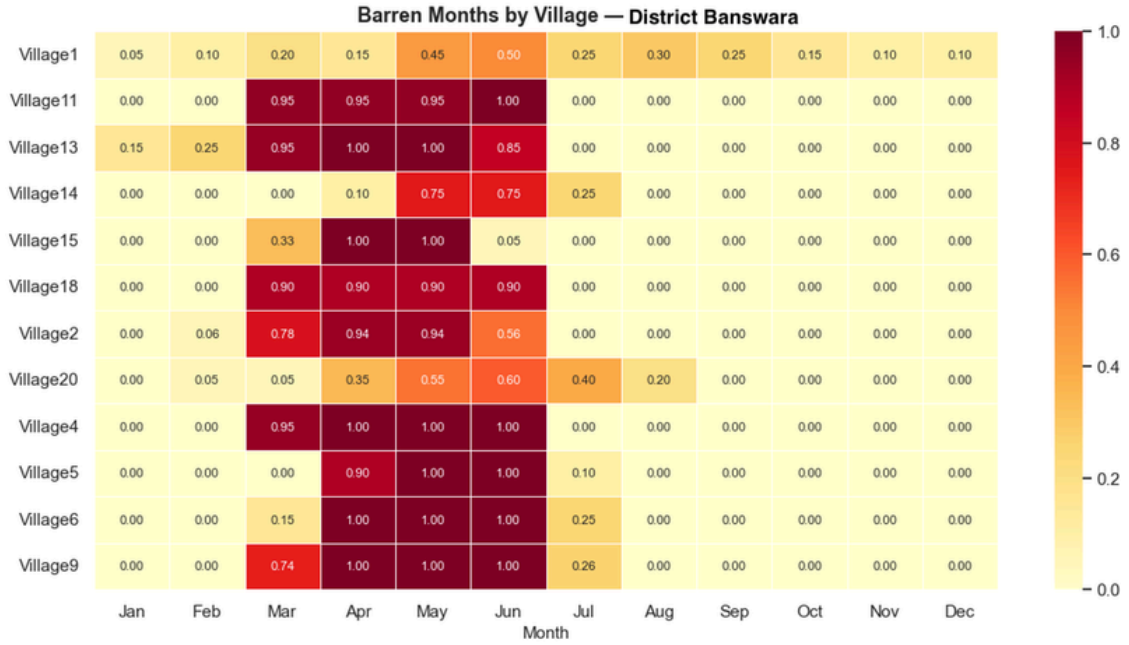
What the plots show:

- Bikaner villages show near-total barrenness from January through May (values close to 1.0), with the productive window confined largely to July–September.
- Banswara villages show a more varied pattern, with barren-month values declining earlier in the year and residual productivity visible across more months.



Key findings:

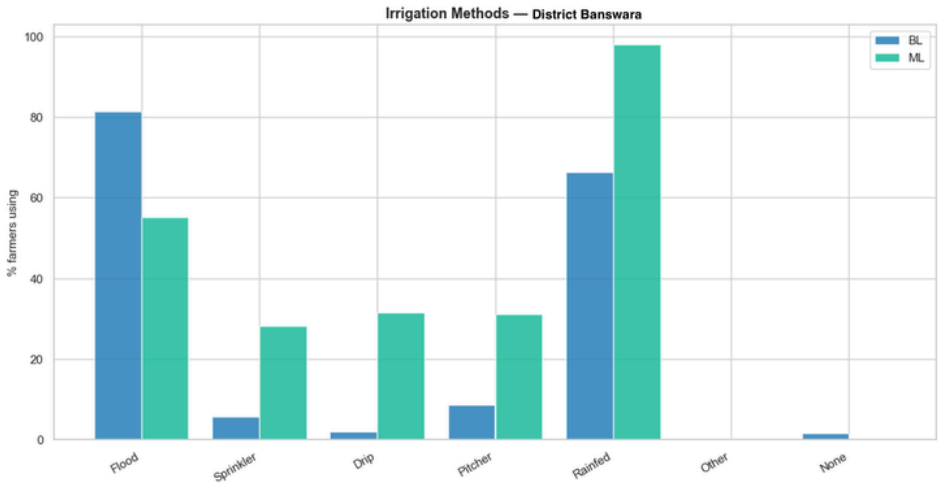
- Bikaner has substantially higher barren-month reporting, with October–May largely unproductive across almost all villages. This compresses the entire productive year into a few months, limiting annual output potential.
- Banswara's barren season is shorter, reflecting residual soil moisture and irrigation access.

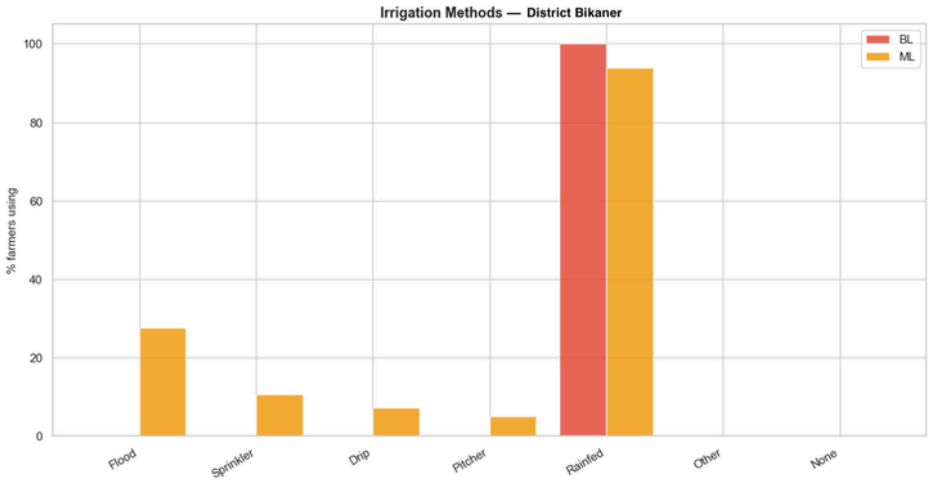


RESULTS

Key Challenges

The charts below compare irrigation methods used by farmers across Banswara and Bikaner, at both baseline (BL) and midline (ML), showing the share of farmers using each method.





What the plots show:

- Banswara shows adoption of modern techniques (drip, sprinkler).
- Bikaner remains largely rainfed. The structural absence of water sources limits irrigation method diversification regardless of knowledge.

Key findings:

- Banswara supplements rain months with irrigation, extending the productive season.
- Bikaner has minimal supplementary irrigation because farmers are largely rainfed, meaning a significant part of the productive year is compressed into the short monsoon.

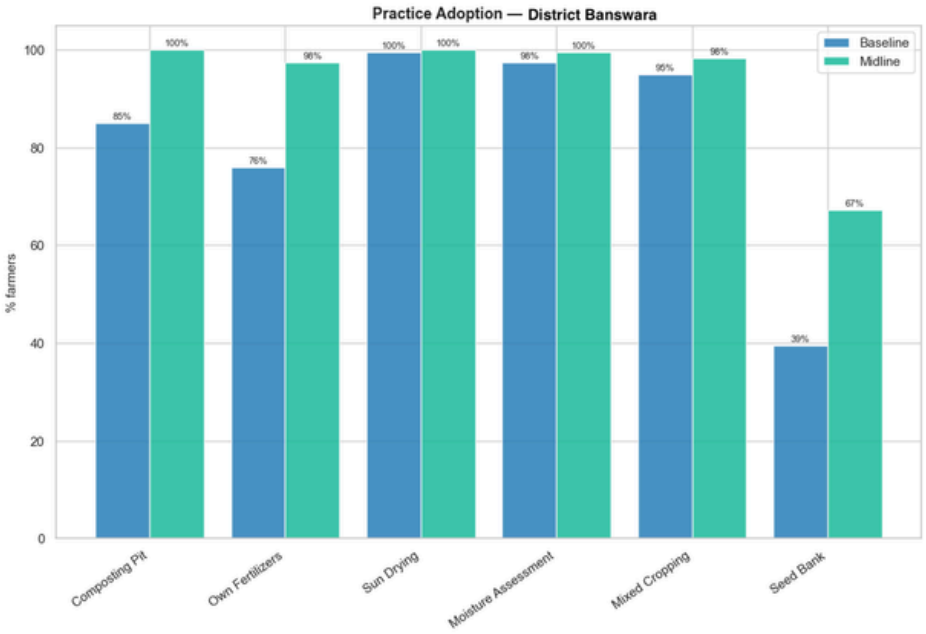
RESULTS

Key Challenges

The charts below compare the percentage of farmers practising each intervention in Banswara and Bikaner, at baseline and midline.

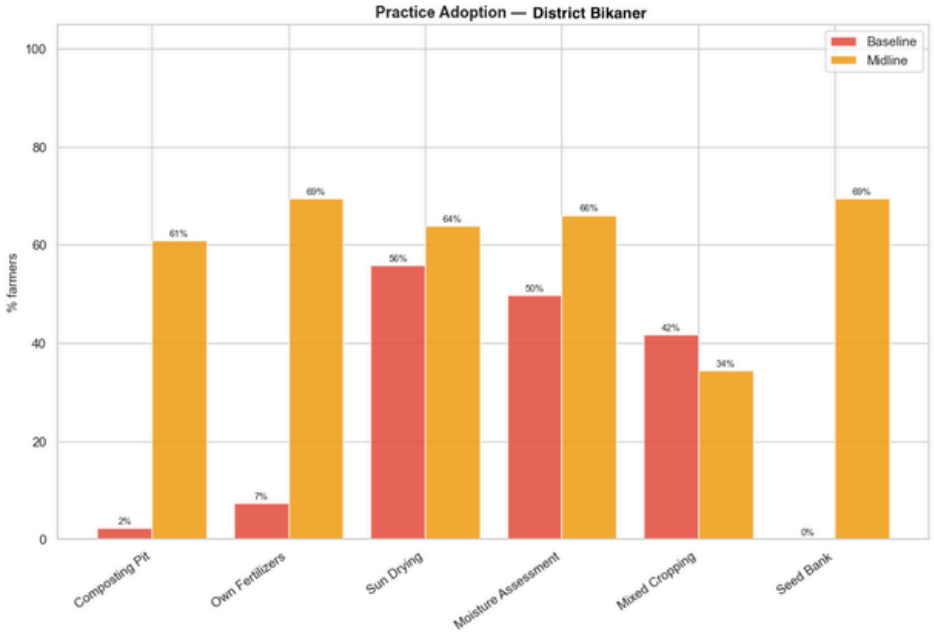
What the plots show:

- With respect to overall practice adoption, both districts show strong uptake between baseline and midline.
- Banswara's starting point was higher and its yield impact greater, confirming that fertile-soil farmers find immediate utility in these practices.



Key findings:

- Mixed cropping adoption is limited in Bikaner not by knowledge but by water. It is challenging to diversify crops when there isn't enough moisture for a single variety.
- Whereas Banswara shows higher adoption because water availability enables multiple concurrent crops.
- The baseline to midline practice gain in Bikaner will not translate to equivalent yield gains until water conservation creates the conditions for those practices to be effective.



RESULTS

Next Steps For Implementation

The 2nd year of the programme implementation will focus on areas that address some of the structural constraints.





Picture Description: *Flexible & portable micro irrigation unit (left) designed for small farmers. Also useful in spraying liquid fertilisers on crops. A battery-operated e-weeder (right) for cutting weeds & harvesting crops. Picture Courtesy: Vikalp. tech.*

To address the structural absence of supplementary irrigation, particularly acute in Bikaner where nearly all farmers remain entirely rainfed, low-cost drip and sprinkler equipment supported by government subsidies could be introduced. These tools are specifically designed for small and marginal farmers, extending the productive season beyond the narrow monsoon window.





Picture Description: *A scythe (left), a women-friendly tool that reduces drudgery for female agricultural labourers, and a bullock-operated tractor (right), designed to support small and marginal farmers. Picture Courtesy: Vikalp. tech.*

CONCLUSION

Across seven key indicators from compost and bio-fertiliser self-sufficiency to crop diversity, food security, and livestock integration, farmers who adopted a broader range of climate-resilient practices achieved higher incomes, greater self-reliance, and stronger household food security.

The shift in income distribution, with the share of farmers earning below Rs. 10,000 per bigha falling from 54% to 34%, reflects a tangible improvement in agricultural viability at the farm level. Testimonials from the field reinforce the data, illustrating how individual farmers have transformed their practices and livelihoods.



Picture Description: *Farmer Okita Devi's farm supports a diverse range of crops, including grains, vegetables, fruits, fodder, and medicinal plants. As a result, the family does not need to buy any food items other than salt from the market throughout the year. Banswara district, Rajasthan*

As the programme moves into its second year, the focus will turn to closing the gaps that remain, particularly around irrigation and cost reduction, while expanding access to climate-smart tools and technologies that can sustain and deepen these gains.



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