THEMES: NATURAL RESOURCES MANAGEMENT AND CLIMATE SMART AGRICULTURE

IMPACT ASSESSMENT REPORT


Photo taken by PW team in Sehore, MP

Prepared by : Price Waterhouse Chartered Accountants LLP

Prepared for : ITC Limited

2026

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Overview of Themes under assessment

Theme 1: Natural Resources Management (NRM)

The objective of the programme was to promote water security through community-based conservation and replenishment of natural water bodies, drought proofing agriculture in agri-catchments by improving groundwater status and reducing crop water demand and achieving positive water balance in factory and watershed locations. In line with the RFP requirements, the study evaluated the programme's effectiveness, efficiency, and sustainability at the thematic level using the IRECS framework, while also capturing variations across states.

Specifics of "Natural Resources Management Programme"

Geographical Presence: Madhya Pradesh, Maharashtra, Punjab, Rajasthan, and Uttar Pradesh

Total number of beneficiaries: 7,759

Implementation partners: *BAIF, DSC, IIRD, FES, UMANG, PANI, NCHSE, MVS

Period of Review: FY 2023-24

Theme 2: Climate Smart Agriculture (CSA)

The objective of the programme was to build climate-change adaptation and resilience among smallholder farmers by making agriculture regenerative, productive, sustainable, and remunerative. It promoted crop-specific practices for cost reduction and yield improvement, improved water-use efficiency, GHG-efficient practices, and farmer capability building through Farmer Field Schools and institutional support mechanisms. The study assessed the thematic-level effectiveness, efficiency, and sustainability of these interventions using the IRECS framework, while also reflecting variations across states.

Specifics of "Climate Smart Agriculture Programme"

Geographical Presence: Madhya Pradesh, Maharashtra, Punjab, Rajasthan, and Uttar Pradesh

Total number of beneficiaries: 1,92,598

Implementation partners: BAIF, SJSM, DSC, UMANG, PANI, NCHSE, MVS

Period of Review: FY 2023-24

Source: Project documents shared by ITC and RFP document

*DSC- Development Support Center, IIRD- Institute for Integrated Rural Development, FES- Foundation for Ecological Security, PANI- Peoples' Action for National Integration, NCHSE- National Centre for Human Settlements and Environment, Manav Vikas Sanstha, SJSM- Shramjivi Janata Sahayyak Mandal.

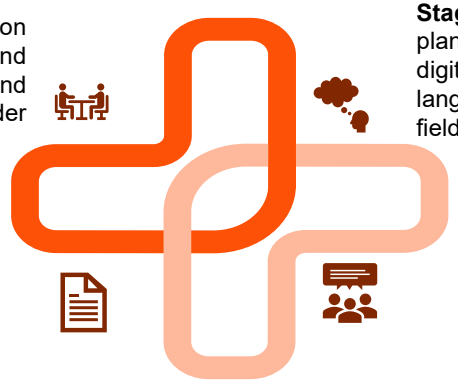
Approach and Methodology

ITC Limited engaged **Price Waterhouse Chartered Accountants LLP (PWCALLP) to conduct impact assessment of two themes: (1) Natural Resources Management (NRM) (2) Climate Smart Agriculture (CSA).** The assessment aimed to evaluate the effectiveness, efficiency, and sustainability of ITC's social impact initiatives under the aforesaid themes. The assessment was undertaken using quantitative and qualitative methods to understand the impact of the activities undertaken under the CSR projects. **PW's scope of work involved conducting the desk review of the project documents, mapping of key project stakeholders, developing research methodology, data collection from the field (Quantitative and Qualitative), analysis (using difference-in-difference method) and report writing.**

Key Stages of Impact Assessment

Stage 1: Conducted an inception meeting with the ITC team to understand project interventions, align on scope and expectations, and initiate stakeholder interactions and mapping.

Stage 2: involved finalising data collection plan and research tools with ITC's feedback, digitising and translating tools into the local language, and briefing ITC's team on the field visit data collection strategy.



Stage 3: Field team received training on data collection tools and initiated the process of conducting quantitative surveys and qualitative discussions with beneficiaries and other stakeholders to gather and corroborate feedback.

Stage 4: Team performed data cleaning and analysis, ensured validation through triangulation from all data collected, assimilated key findings, and prepared the report for ITC management's consideration.

IRECS Framework used for the Impact Assessment

Inclusiveness

Ability of different stakeholders, particularly poorest and most marginalised to access the benefits of activities

Relevance

Are the services /inputs in the project able to meet community priorities? How was the planning done ? Was it participatory ?

Effectiveness

Have the activities been able to effectively address community expectations? How efficiently have the resources been deployed, monitored and utilised?

Convergence

Degree of convergence with government/other partnerships; relationship between individuals, community, institutions and other stakeholders

Sustainability

Do communities feel ownership over assets created by activities and/or will the Project initiated community interventions sustain even after the exit?

The sample size for the quantitative assessment was determined using a confidence interval of 95% and Margin of Error at 5%. Further 25% of each theme's case group sample size is proportionately allocated to the control group, selected via systematic random sampling from 1-non-intervention blocks of project districts and matched with intervention groups on socio-economic and environmental characteristics (excluding ITC interventions) to minimize extraneous variation and ensure comparability.

Quantitative sampling plan

State	Theme	Sample targeted (Case Group)	Sample Achieved (Case Group)	Sample targeted (Control Group)	Sample Achieved (Control Group)
Uttar Pradesh	NRM	110	116	45	50
	CSA	311	317	85	85
Maharashtra	NRM	100	82	26	26
	CSA	100	154	26	26
Rajasthan	NRM	250	235	65	73
	CSA				
Madhya Pradesh	NRM	150	156	39	40
	CSA	150	170	39	40
Punjab	NRM	50	50	13	23
	CSA	50	50	13	26
Total		**1,271**	**1,330**	**351**	**389**

Qualitative Sample

Theme	Sample size for KII^	Actual Coverage for KII	Sample Size for FGD^	Actual Coverage for FGD
NRM	71	71	28	28
CSA	46	46	18	18
TOTAL	**117**	**117**	**46**	**46**

^KII- Key Informant Interview
^FGD- Focus Group Discussion

Profile of the Respondents

The below section discusses the socio-demographic profile of the study respondents. The analysis is based on **1330 respondents in case villages and 389 in control villages covering 5 project locations** drawn from similar districts and agro-climatic conditions.

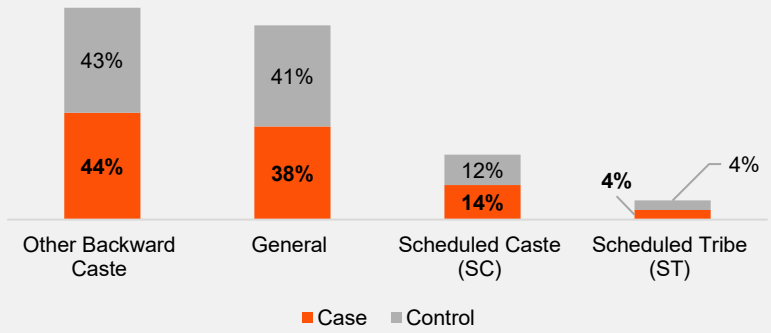
Gender of Respondents

Gender	Case	Control
Female	8.3%	7.9%
Male	91.7%	92.1%

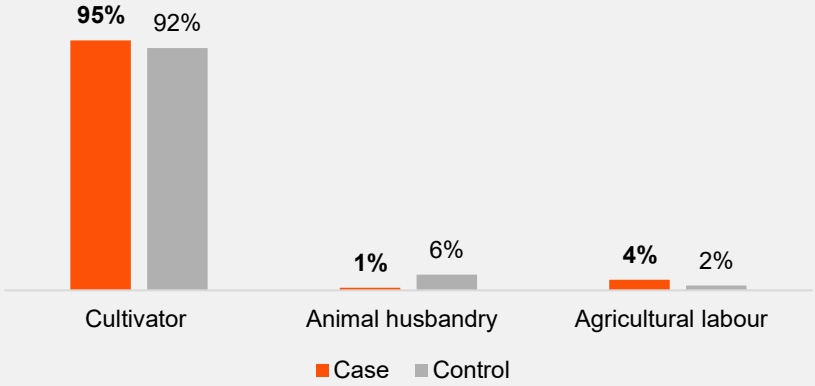
Age of Respondents

Category	Mean age
Case	44.8
Control	42.2

Social Category of respondents



Primary income source of respondents



- The respondent profile reveals similarity in gender distribution, with males constituting approximately 92.5% in the case group and 91% in the control group. The average age of respondents is slightly higher in the case group, at around 44.7 years, compared to 42.2 years in the control group.
- Education levels indicate that a higher proportion of case group respondents have completed secondary education (24% 10th pass and 21% 12th pass) and graduation (12%) than those in the control group, where secondary completion is about 20% and graduation 13%. Illiteracy is somewhat more prevalent among cases (8.9%) compared to controls (4.4%).
- Regarding social categories, both groups are dominated by General and OBC categories, with the control group having a higher proportion of OBC respondents (43%) than the case group (37%).
- Cultivation stands as the primary income source for the vast majority in both groups (approximately 91.6% cases and 89.2% controls). Alternative sources of income are reported more frequently by respondents in the case group (25%) in comparison to the control group (19.5%).

Theme 1: Natural Resources Management

Image: Chombhut village from Kapurthala Punjab. Photo taken by PW team during field visit

Overall Impact of NRM activities

NRM interventions among case respondents (n=639) showed improved irrigation reliability, enabling higher Rabi cultivation, greater cropping intensity, and early diversification, while among control respondents (n=212) it showed only modest changes.

Average Number of Crops Grown by Season (Case vs Control)

Average number of crops grown	Case Group		Control Group	
	Pre	Post	Pre	Post
Kharif	2	2	2	2
Rabi	2	3	2	2
Zaid	0	0	0	0

Impact on Cropped Area, Irrigation and Cropping Intensity (Case vs Control)

Indicator	Case: Pre	Case – Post	% change	Control – Pre	Control – Post	% change
Gross Cropped Area (acres)	9.1	10.2	12%	7.68	7.8	2%
Net Cropped Area (acres)	5.22	5.22	0%	4.42	4.42	0%
Cropping intensity	171%	195%	14%	171%	174%	2%
Groundwater level (feet)	144.96	131.68	-9%	88	162.66	85%

- In Madhya Pradesh, NRM investments primarily deepened Rabi diversification. While Kharif continued to be dominated by Soybean and paddy, improved irrigation allowed farmers to add gram alongside wheat and mustard, increasing intensity without changing Zaid cultivation.
- In Rajasthan, water-harvesting and soil-moisture conservation measures helped stabilise the traditional Bajra–Guar system in Kharif and the cumin–mustard–isabgol mix in Rabi, consolidating existing diversified portfolios rather than triggering new crop introductions.
- In Maharashtra, farm ponds and field channels created scope for adding maize into the Rabi season, on top of onion and wheat. Kharif remained anchored in Soybean and sugarcane, indicating cautious diversification within an established cash-crop landscape.
- In Punjab, NRM interventions reinforced the paddy–wheat rotation by improving reliability of irrigation and drainage. Farmers largely retained this simple two-crop system, using better water control to stabilise yields rather than broaden the crop basket.
- In Uttar Pradesh, project villages continued with a relatively diverse Kharif mix of paddy, sugarcane and mustard, but Rabi gradually narrowed from wheat–mustard to predominantly wheat, suggesting a shift towards more water-reliable, remunerative cereals as NRM assets matured.

Impact on Agriculture: Cropping Profile, Cultivation Costs, Productivity, and WUGs

NRM interventions in case villages (n=156) improved irrigation reliability and crop management, enabling higher Rabi cultivation, greater cropping intensity, and early diversification, while control villages (n=80) showed only modest changes. These interventions also increased productivity compared to control villages. Survey findings highlighted WUGs' critical role in strengthening water access, governance, and maintenance (total respondents n=236).

Average Number of Crops Grown by Season (Case vs Control)

Average number of crops grown	Case Group		Control Group	
	Pre	Post	Pre	Post
Kharif	2	2	2	2
Rabi	2	3	2	2
Zaid	0	0	0	0

Changes in Cropping Pattern by Season (Pre vs Post)

Season	Crops grown (Pre)	Crops grown (Post)
Kharif	Soybean, Paddy	Soybean, Paddy
Rabi	Wheat, Mustard	Wheat, Mustard, Gram
Zaid	None	None

Change in Productivity per Acre (Case vs Control)

Productivity per acre (in Quintals (Q))	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Soybean	12	13	8%	13	12	-8%
Paddy	16	18	13%	16	16	0%
Wheat	15	18	20%	16	16	3%
Mustard	4	6	50%	4	5	25%
Gram	8	9	13%	8	8	0%

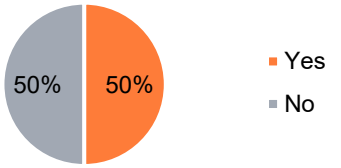
Impact on Cropped Area, Irrigation and Cropping Intensity (Case vs Control)

Indicator	Case: Pre	Case – Post	% change	Control – Pre	Control – Post	% change
Gross Cropped Area (acres)	9.4	10.8	15%	9.6	10	4%
Net Cropped Area (acres)	5.4	5.4	0%	5.5	5.5	0%
Cropping intensity	174%	200%	15%	175%	182%	4%
Groundwater level (feet)	136.8	132.4	-3% (rise)	137.3	142.3	4% (fall)

Change in Cost of Cultivation per Acre (Case vs Control)

Cost of Cultivation per acre (in INR)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Soybean	18,500	17,400	-6%	18,400	19,600	7%
Paddy	20,100	19,200	-4%	20,600	22,100	7%
Wheat	14,500	14,100	-3%	14,300	15,200	6%
Mustard	14,900	15,700	5%	15,100	15,900	5%
Gram	11,900	12,100	2%	12,100	12,700	5%

Respondents who are part of WUGs



Benefit Type	% respondents reporting (n=78)
Better access to water	69%
Knowledge sharing on water conservation	50%
Improved infrastructure maintenance	40%

- Before the programme, farmers repeatedly reported water scarcity for irrigation, unreliable rainfall, high irrigation costs and soil erosion, directly undermining productivity and livelihoods.
- The intervention addressed these core constraints through improved water harvesting, storage and soil conservation, aiming to stabilise supply, cut irrigation costs and reduce land degradation. In the case villages, average irrigated and Rabi area increased by 35%, compared to only 10% in control villages, indicating a much stronger improvement in assured irrigation.
- Construction of water conservation structures such as gabion structures, farm ponds, earthen dams and stop dams, along with formation of WUGs and 20% community contribution, substantially improved local rainwater harvesting. This increased reliance on surface storage and **reduced dependence on groundwater**, lowering pumping requirements and associated energy costs over time.
- Improved timeliness and reliability of irrigation **raised seed survival**, enabling farmers to reduce seed rates without compromising plant population. This directly cut expenditure on seed and other follow-up inputs, contributing to lower overall cost of cultivation in case villages.

- Pond storage extended Rabi irrigation from January-end to mid-March (vs. drying by January), eliminating costly groundwater dependence and boosting productivity.
- NRM activities improved yields in target crops (wheat, soybean, paddy) and others (mustard, gram).
- Better water security enabled switch to high-yielding, longer-duration varieties in soybean (Punjab-1/JS-335 → 2172/1135) and wheat (147/Lok-1 → Tejas 8759/322).
- Yield increases of 8% (soybean), 13% (paddy), 20% (wheat), 50% (mustard) vs. control groups, with reduced costs and higher profitability.

- Water User Groups emerged as critical community institutions for sustaining water intervention gains, though formal mechanisms are absent in 58% of villages.
- Programme shifted villages from frequent water shortages and high irrigation costs to longer-lasting water supplies, increased cultivated land, and reduced irrigation costs/time for farmers.
- WUGs facilitated this transition by converting physical water infrastructure investments into shared, community-managed assets.

Impact on Agriculture: Cropping Profile, Cultivation Costs, Productivity, and WUGs

NRM interventions in case villages (n=235) improved irrigation reliability and crop management, enabling higher Rabi cultivation, greater cropping intensity, and early diversification, while control villages (n=73) showed only modest changes. These interventions also increased crop yields and productivity compared to control villages. Survey findings highlighted WUGs' critical role in strengthening water access, governance, and maintenance (total respondents n=308).

Average Number of Crops Grown by Season (Case vs Control)

Average number of crops grown	Case Group		Control Group	
	Pre	Post	Pre	Post
Kharif	2	2	2	2
Rabi	3	3	3	3
Zaid	0	0	0	0

Changes in Cropping Pattern by Season (Pre vs Post)

Season	Crops grown (Pre)	Crops grown (Post)
Kharif	Bajra and Guar	Bajra and Guar
Rabi	Cumin, Mustard, Isabgol	Cumin, Mustard, Isabgol
Zaid	None	None

Impact on Cropped Area, Irrigation and Cropping Intensity (Case vs Control)

Indicator	Case – Pre	Case – Post	% change	Control – Pre	Control – Post	% change
Gross Cropped Area (acres)	11	12.5	14%	10.5	10.5	0%
Net Cropped Area (acres)	6.5	6.5	0	6.2	6.2	0%
Cropping intensity	169%	192%	14%	169%	169%	0%
Groundwater level (feet)	300	280	-7% (rise)	320	350	9% (fall)

Change in Cost of Cultivation per Acre (Case vs Control)

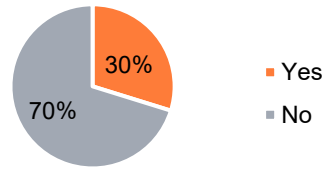
Cost of Cultivation per acre (in INR)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Bajra	6,000	6,000	0%	6,000	6,000	0%
Guar	20,550	22,100	8%	20,550	23,550	15%
Cumin	48,550	43,700	-10%	47,800	50,600	6%
Mustard	12,800	11,500	-10%	12,600	13,400	6%
Isabgol	9,800	8,500	-13%	9,500	9,950	5%

- **Enhanced water storage:** Pond desiltation, bunding, and farm pond construction/rehabilitation extended water availability from mid-January to early March, adding several weeks to Rabi season irrigation.
- **Improved groundwater access:** Farmers no longer need to lower tubewell pipes by 30-50 ft in winter. Programme villages show improved groundwater levels vs. control villages with falling water tables and rising pumping costs.
- **Increased cropping intensity:** Without expanding total land, higher irrigation enabled 33% increase in Rabi area and 14% overall cropping intensity growth through more irrigated area and frequent Rabi irrigations.
- **Control village challenges:** Without interventions, control villages face higher irrigation costs, declining groundwater, and greater vulnerability to rainfall shocks.
- **Efficient input use:** In case villages, cumin, Isabgol, and mustard show 10-13% lower/stable costs with higher yields due to assured irrigation enabling precise fertilizer timing, avoiding defensive over-application seen in control villages.

Change in Productivity per Acre (Case vs Control)

Productivity per acre (in Quintal)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Bajra	3	3.5	17%	3	2.8	-7%
Guar	5	5	0%	4.5	4.5	0%
Cumin	1.5	1.8	20%	1.5	1.3	-13%
Mustard	1.5	1.6	7%	1.5	1.5	0%
Isabgol	2.5	2.8	12%	2.5	2.5	0%

Respondents who are part of WUGs



Benefit Type	% respondents reporting (n=70)
Better access to water	90%
Knowledge sharing on water conservation	70%
Improved infrastructure maintenance	47%

- Stable or improving Kharif yields of Bajra, Moong and Moth bean in case villages mainly reduce grain purchases rather than increase sales. Although not fully captured in profit metrics, this in-kind food security cushions households against price and climate shocks, complementing the income gains from intensified Rabi cash crops.
- For cumin case farmers face a sharp price fall (₹30,000 to ₹20,000/Q) but maintain strong income growth through higher yields and expanded Rabi area enabled by reliable water. In control villages, flat or declining yields combined with the same price shock severely constrain income growth.

- Several WUGs in the sample reported informal or need-based scheduling practices, indicating scope to strengthen routine planning and proactive water management.
- While 68% cite village committees and 63% cite Panchayats for water structure maintenance, 15% report "no formal mechanism."
- Where functioning, WUGs improve water access, conservation knowledge, and fair water sharing practices.

Impact on Biodiversity

Survey findings and field insights highlight how the programme has begun to reshape governance of commons and trigger early ecological recovery, while “downstream” livelihood gains from fodder, fuelwood and NTFPs are still emerging. The following analysis is based on the information from 235 case respondents and 73 control respondents.

Emerging outcomes – institutional & ecological

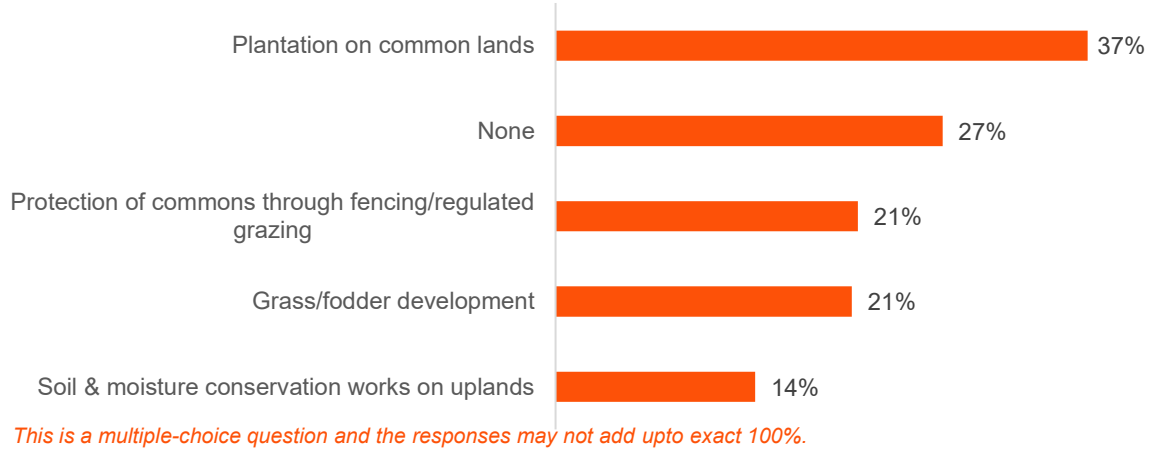
Strengthened governance of commons

- Officials (CEO, Zila Parishad and Executive Engineer, MGNREGA) report higher awareness and clearer roles on commons management and biodiversity (e.g., Charagah Vikas Samiti - CVS, Oran registration, pasture development).
- There is an increase in the number and quality of proposals from Gram Panchayats for restoration of grazing lands, tree planting, grassland development and renovation of water conservation structures on commons.
- Policy implementation has gained momentum, including orders on pasture demarcation, use of MGNREGA for commons and freeing encroached land.

Early signs of biodiversity-supportive actions

- Plantation of traditional/native species (e.g., Neem, Khejri, Roida, Jar, Ber, Dhaman, Karad, Sevan grass) on commons and pastureland, with emphasis on fodder-rich and locally adapted species.
- Grassland improvement and fencing over identified areas (officials mention ~25–30 ha in some blocks), protecting regenerating vegetation from grazing in initial years.
- Renovation of ponds and water structures on commons, improving habitat conditions for flora and fauna and supporting livestock and wildlife.
- Action on encroachments: officials and Panchayats have initiated processes to reclaim encroached common lands, creating space for ecological restoration.

Key biodiversity related activities carried out



This is a multiple-choice question and the responses may not add upto exact 100%.

- Community and CVS feedback indicates that livelihood-linked biodiversity gains such as fodder, fuelwood, and NTFP availability are still emerging and were not yet visible at scale during the assessment period.
- This is consistent with ecological timelines: capacity building in 2023–24 is only now feeding into Gram Sabha planning, and plantations/grasslands require several seasons before translating into harvestable biomass.
- To date, the programme has primarily delivered “upstream” biodiversity impacts—stronger institutions, better awareness, improved policy implementation, and a surge in restoration proposals and early works on commons.
- “Downstream” livelihood outcomes linked to biodiversity (fodder, fuelwood, NTFPs, reduced feed purchases) are expected to materialise over the medium term as MGNREGA and pasture development works mature and commons are fully restored and managed.

Impact on Cropping Profile, Cost of Cultivation, and Productivity

NRM interventions improved irrigation reliability and crop management in case villages, enabling farmers to increase crop intensity, expand irrigated area for Rabi crops, reduce cultivation costs, and boost productivity compared to control villages. The analysis is based on responses from 82 case and 52 control respondents (n=134).

Average Number of Crops Grown by Season (Case vs Control)

Average number of crops grown	Case Group		Control Group	
	Pre	Post	Pre	Post
Kharif	2	2	1	1
Rabi	2	3	2	1
Zaid	0	0	0	0

Impact on Cropped Area, Irrigation and Cropping Intensity (Case vs Control)

Indicator	Case – Pre	Case – Post	% change	Control – Pre	Control – Post	% change
Gross Cropped Area (acres)	7.0	8.5	**21.43%**	4.0	4.2	**5%**
Net Cropped Area (acres)	4.6	4.6	-	2.5	2.5	-
Cropping intensity	152%	184%	**21.05%**	160%	168%	**5%**
Groundwater level (feet)	54	36	**-33% (rise)**	88	76	**-14% (rise)**

Changes in Cropping Pattern by Season (Pre vs Post)

Season	Crops grown (Pre)	Crops grown (Post)
Kharif	Soybean, Sugarcane	Soybean, Sugarcane
Rabi	Onion, Wheat	Onion, Wheat, Maize
Zaid	None	None

Change in Cost of Cultivation per Acre (Case vs Control)

Cost of Cultivation per acre (in INR)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Soybean	15,099	14,215	-5.5%	14,855	16,880	+13.6%
Wheat	20,639	19,211	-6.9%	17,065	18,185	+6.5%
Onion	46,426	39,195	-15.5%	45,250	46,350	+4.6%
Sugarcane	42,808	37,585	-12.2%	41,600	44,665	+7.4%
Maize	18,260	16,801	-8.0%	16,665	17,598	+5.6%

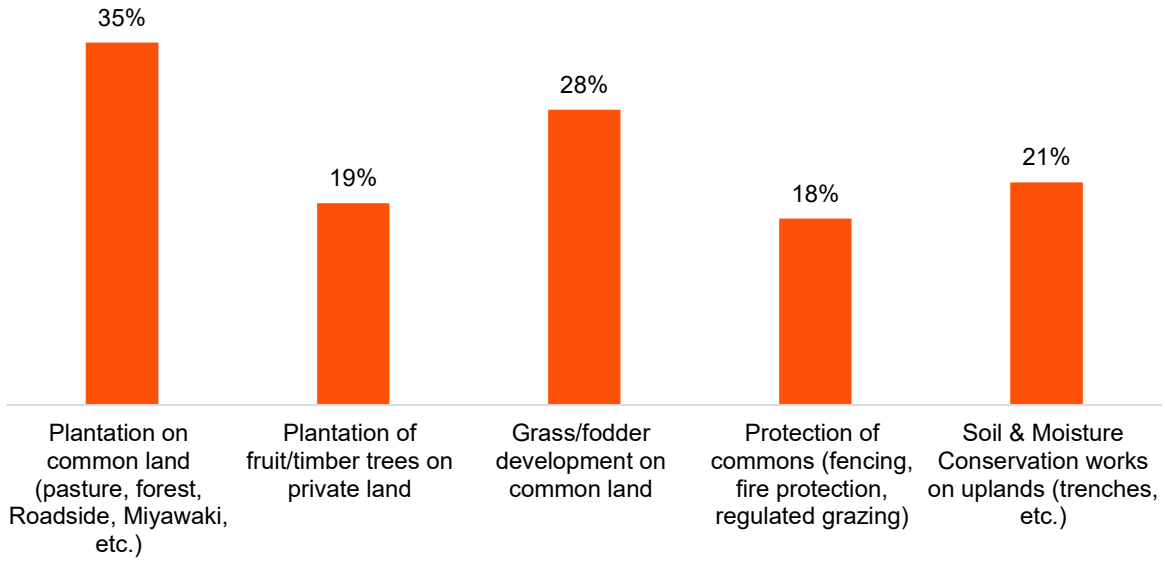
Change in Productivity per Acre (Case vs Control)

Productivity per acre (in Quintal)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Soybean	15.0	18.3	+22.0%	14.5	15.2	+4.8%
Wheat	22.0	26.1	+18.6%	21.8	22.2	+3.8%
Onion	80.0	95.2	+19.0%	78.0	81.6	+4.6%
Sugarcane	700	835	+19.3%	680	705.1	+3.75%
Maize	18.0	21.2	+17.8%	17.0	17.7	+4.1%

- Water stewardship activities (percolation tanks, check dams, farm ponds, contour trenches) significantly improved groundwater levels and extended reliable irrigation from 3-4 months to 8 months in many wells. Case groups showed more prominent improvements than control groups across cultivable area, cropping intensity, and groundwater levels.
- Case group achieved clear cost reductions across all major crops through improved water-use efficiency and better irrigation timing, with onion (-15%) and sugarcane (-12%) showing substantial decreases. Control group faced cost increases in all crops, highlighting intervention effectiveness.
- Case group yield improvements outpaced control group due to reliable irrigation and adoption of superior crop varieties, increasing both productivity and profitability while reducing seed costs and improving input use efficiency.
- Farmer Field Schools and Water User Groups actively support farmers in water management and conservation practices, contributing to sustainable production systems.
- Assured water supply enabled shift towards horticulture crops (fruits, grapes, vegetables), with Sangli showing gradual transition to grapes as a preferred crop due to ITC promotion activities.
- Increasing adoption of micro-irrigation practices (drip/sprinkler systems) is enhancing water-use efficiency and crop productivity across programme areas.

Impact on Biodiversity

The biodiversity-related activities carried out by ITC in the region have had a positive impact on the environment and local communities, as discussed below. These efforts, including widespread plantation on common lands, grass and fodder development, and conservation works. The following analysis based on the information from 82 case respondents.



This is a multiple-choice question, and the responses may not add up to exact 100%.

- **Additional benefits due to biodiversity activities**:

Due to increase in fodder, beneficiaries have stated that

- They have saved approximately INR 8,000 annually on procuring fodder.
- They have saved approximately INR 2,000 annually in procuring fuel wood
- Additionally, farmers have noticed an increase in bird species diversity (27%), presence of more bees and butterflies (21%), and a greater variety of small animals / mammals (18%).

Major benefits of the activities conducted by ITC:

- Increase in trees and green cover (40%)
- Increased availability of fodder (20%)
- Increased availability of fuelwood (16%)
- Increased flora and fauna (27%)
- Reduced soil erosion (11%)

- 40% of the respondents from local communities reported a visible increase in trees and green cover in and around their villages, contributing to the restoration of degraded landscapes, the development of habitats for native species, and a measurable improvement in local biodiversity.
- 20% of the respondents observed that the increased availability of fodder has led to better livestock health, higher milk yields, and improved productivity, directly supporting farm-based livelihoods and household incomes.
- 16% of the respondents reported improved access to fuelwood within closer proximity to their households, reducing the time and physical effort spent on long-distance collection (particularly by women) and ensuring a more reliable source of household energy.
- 27% of the respondents noted the return of various plant and animal species previously absent from the area, indicating a recovering ecosystem and stronger resilience to environmental stressors such as drought and soil degradation.
- 11% of the respondents reported a noticeable reduction in soil erosion on agricultural and common lands, which has helped retain topsoil, maintain soil fertility for cultivation, and slow the progression of land degradation in the region.

Impact on Cropping Profile, Cost of Cultivation, and Productivity

NRM interventions improved irrigation reliability and crop management in case villages, enabling farmers to reduce irrigation time, improve groundwater levels, decrease cultivation costs, and increase crop productivity, with greater improvements in the case group compared to control. The analysis is based on responses from 50 case and 49 control respondents (n=99).

Average Number of Crops Grown by Season (Case vs Control)

Average number of crops grown	Case Group		Control Group	
	Pre	Post	Pre	Post
Kharif	1	1	1	1
Rabi	1	1	1	1

Impact on Cropped Area, Irrigation and Cropping Intensity (Case vs Control)

Indicator	Case – Pre	Case – Post	% change	Control – Pre	Control – Post	% change
Gross Cropped Area (acres)	13.6	13.6	**0%**	9.9	9.9	**0%**
Net Cropped Area (acres)	6.8	6.8	**0%**	5	5	**0%**
Cropping intensity	200%	200%	**0%**	200%	200%	**0%**
Groundwater level (feet)	200	180	**-10% (rise)**	200	210	**+5% (fall)**

Changes in Cropping Pattern by Season (Pre vs Post)

Season	Crops grown (Pre)	Crops grown (Post)
Kharif	Paddy	Paddy
Rabi	Wheat	Wheat

- Both groups maintained stable cultivated area (6.8 vs. 4.95 acres) and 200% cropping intensity, showing productivity gains came from intensification, not expansion.
- Ponds reduced waterlogging risks and provided supplemental irrigation during dry spells, improving yield stability against erratic rainfall.
- Case group achieved 32% more irrigations with 33% less time per acre through AWD and sprinkler adoption, while control group stagnated.
- Despite higher irrigation frequency, case group reduced costs by 25% and improved groundwater levels by 10%, vs. control group's rising costs (+13%) and declining water tables (-5%).
- Unchanged cropping patterns (paddy-wheat) showed interventions targeted efficiency within existing systems rather than crop diversification.

Change in Cost of Cultivation per Acre (Case vs Control)

Cost of Cultivation per acre (INR)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Wheat	10,831	7,173	-33.78%	10,704	9,339	-12.75%
Paddy	12,476	11,928	-4.39%	12,409	13,196	6.34%

Change in Productivity per Acre (Case vs Control)

Productivity per acre (in Quintal)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Wheat	10	15	50%	10	12	20%
Paddy	19	25	32%	19	20	5%

- Significant cost reduction: Case group achieved 33.78% reduction in cultivation costs per acre vs. control group's 12.75% decline, through effective adoption of cost-saving equipment (happy seeder, super seeder) and resource optimization.
- Contrasting cost trends: In paddy, case group managed 4.39% cost reduction while control group saw 6.34% increase, demonstrating intervention effectiveness in stabilizing costs despite rising input prices.
- Superior yield gains: Wheat yields increased 50% (case) vs. 20% (control); paddy productivity rose 32% (case) vs. 5% (control), highlighting effectiveness of improved techniques like AWD and modern equipment.
- Field observations confirm benefits: Beneficiary farmers actively used cost-saving machinery, reducing labor and fuel expenses. They demonstrated greater awareness of precise resource application, careful irrigation scheduling, and nutrient management.
- AWD adoption success: Alternate Wetting and Drying technique was widely visible in rice fields, with farmers showing confidence in this water-saving method that enhanced yields while containing costs.
- Integrated approach results: Combining modern equipment with improved crop management led to better germination, reduced weed pressure, timely operations, and overall improved crop health and yields.

Impact on Cropping Profile, Cost of Cultivation, and Productivity

NRM interventions improved irrigation reliability and crop management in case villages, enabling farmers to increase crop intensity, expand irrigated area for Rabi crops, reduce cultivation costs, and boost productivity compared to control villages. The analysis is based on responses from 116 case and 135 control respondents (n=251).

Average Number of Crops Grown by Season (Case vs Control)

Average number of crops grown	Case Group		Control Group	
	Pre	Post	Pre	Post
Kharif	3	3	3	3
Rabi	2	2	2	1
Zaid	0	0	0	0

Impact on Cropped Area, Irrigation and Cropping Intensity (Case vs Control)

Indicator	Case – Pre	Case – Post	% change	Control – Pre	Control – Post	% change
Gross Cropped Area (acres)	4.5	5.6	**24.4%**	4.4	4.4	-
Net Cropped Area (acres)	2.8	2.8	-	2.9	2.9	-
Cropping intensity	160%	200%	**25%**	151%	151%	-
Groundwater level (feet)	34	30	**-12% (rise)**	35	35	-

Changes in Cropping Pattern by Season (Pre vs Post)

Season	Crops grown (Pre)	Crops grown (Post)
Kharif	Paddy, Sugarcane, Mustard	Paddy, Sugarcane, Mustard
Rabi	Wheat, Mustard	Wheat
Zaid	None	None

Change in Cost of Cultivation per Acre (Case vs Control)

Cost of Cultivation per acre (in INR)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Paddy	30,593	24,594	-19.6%	36,443	40,336	10.7%
Sugarcane	26,785	24,386	- 8.9%	22,203	22,978	3.5%
Mustard	10,034	8,462	-15.7%	10,484	12,356	17.9%
Wheat	22,190	18,390	-17.1%	24,076	24,194	0.5%

Change in Productivity per Acre (Case vs Control)

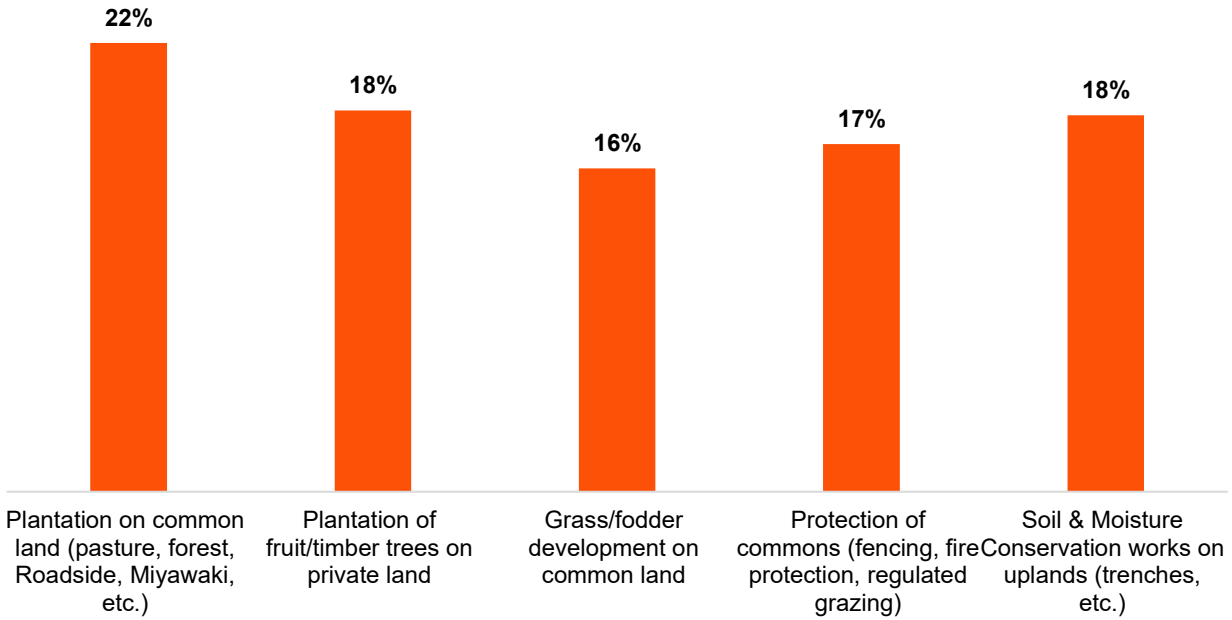
Productivity per acre (in Quintal)	Case Group			Control Group		
	Pre	Post	Change %	Pre	Post	Change %
Paddy	28	33.6	20.00%	27	27.8	2.90%
Sugarcane	375	435	16.00%	370	377	1.90%
Mustard	10	11.5	15.00%	9.5	9.7	2.10%
Wheat	28	32	14.30%	27	27.5	1.90%

- Case group expanded Rabi area by 65%, increased irrigated area by 47%, and raised cropping intensity from 160% to 200% (25% increase), while control group remained stagnant with no changes in these indicators.
- Case group achieved 12-foot groundwater level improvement through better water management practices, while control group showed no improvement.
- Case group reduced cultivation costs across all crops - paddy (19.6%), sugarcane (8.9%), mustard (15.7%), and wheat (17.1%), contrasting with control group's higher costs.
- Case group productivity increased substantially - paddy (20%), sugarcane (16%), mustard (15%), wheat (14.3%) - while control group achieved minimal gains (1.9-2.9%), demonstrating direct intervention impact.
- Farmers adopted high-yielding varieties like HD 2967 (wheat) and PUSA Jaikisan (mustard), contributing to better yields alongside improved resource efficiency.
- Construction of farm ponds, irrigation tanks, soil moisture conservation, land contouring, and training programs enhanced water availability, reduced soil erosion, empowered farmers with sustainable practices, and built agricultural resilience against climate variability while ensuring long-term environmental sustainability.

Impact on Biodiversity

As discussed with the implementing partner and farmers, biodiversity conservation activities were carried out around water structures such as farm ponds and in common land areas where greenery had been damaged due to adverse climatic and environmental conditions. The following analysis is based on the information from 116 case respondents and 135 control respondents.

Biodiversity related activities carried out in region by ITC



This is a multiple-choice question and the responses may not add upto exact 100%.

Major benefits of the activities conducted by ITC:

- Increase in trees and green cover (22%)
- Enhanced availability of fodder (17%)
- Better availability of fuelwood (13%)
- Improved flora and fauna (20%)
- Reduced soil erosion (12%)

Additional benefits due to biodiversity activities:

Due to increase in fodder, beneficiaries have reported:

- Saving approximately INR 4,200 annually on procuring fodder.
- Saving approximately INR 2,300 annually in procuring fuel wood

- The biodiversity conservation programme implemented by ITC has contributed to the restoration and enhancement of the natural environment in the region.
- Key interventions, such as plantation on common lands, development of grass and fodder on common lands, and protection of commons through fencing and regulated grazing, have collectively improved the green cover and ecological balance. For instance, 22% of efforts focused on plantations on common land, while 18% involved planting fruit and timber trees on private lands.
- Additional activities included soil and moisture conservation works and protection measures, all of which have helped mend areas where vegetation had been damaged by adverse climatic and environmental factors.
- A notable example of this is in Gonda, where trees were planted near a village's cremation site, rejuvenating an area previously stripped of vegetation.
- The programme's impacts extend beyond environmental benefits to improve livelihoods and resource availability.

Theme 2: Climate Smart Agriculture

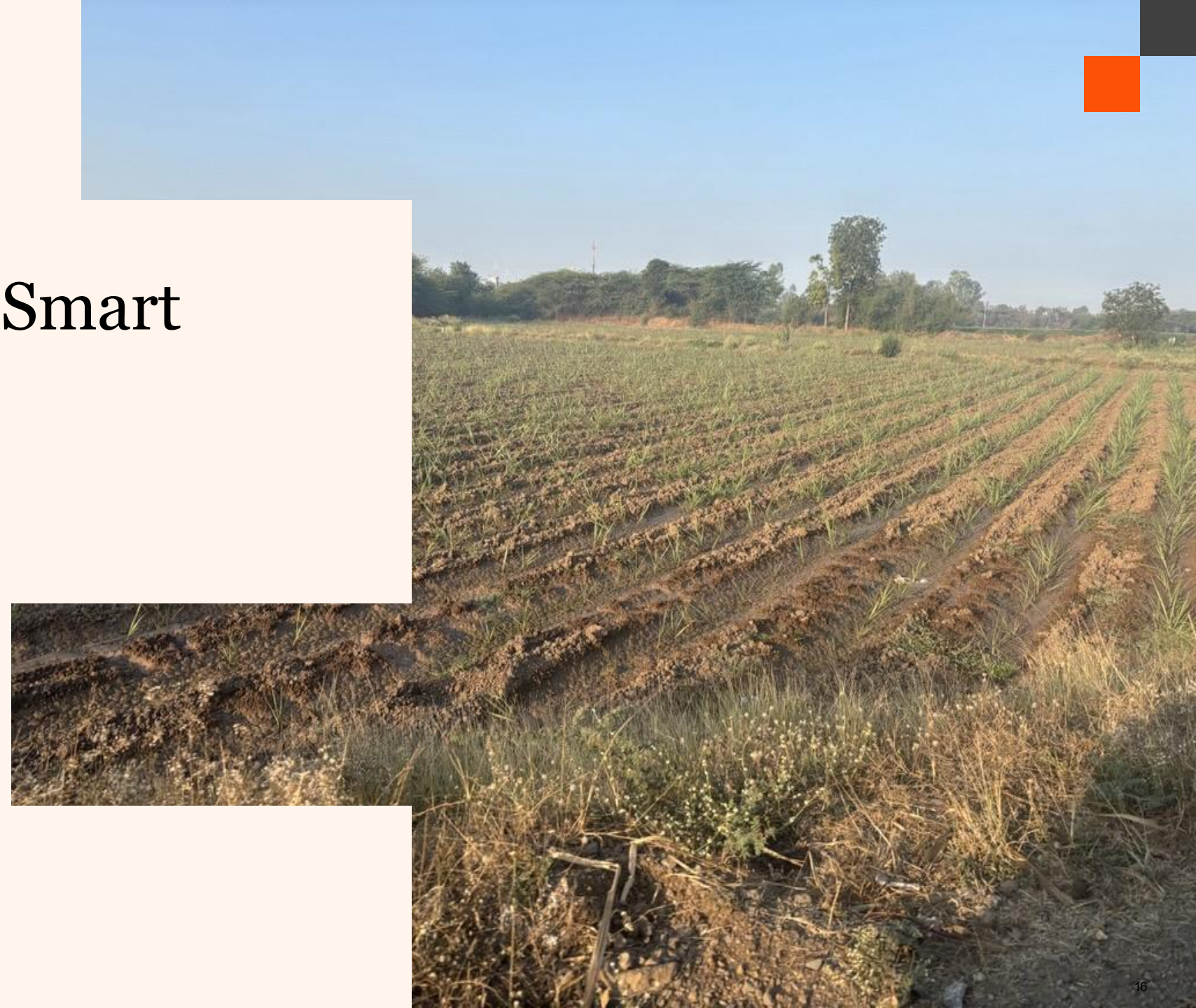
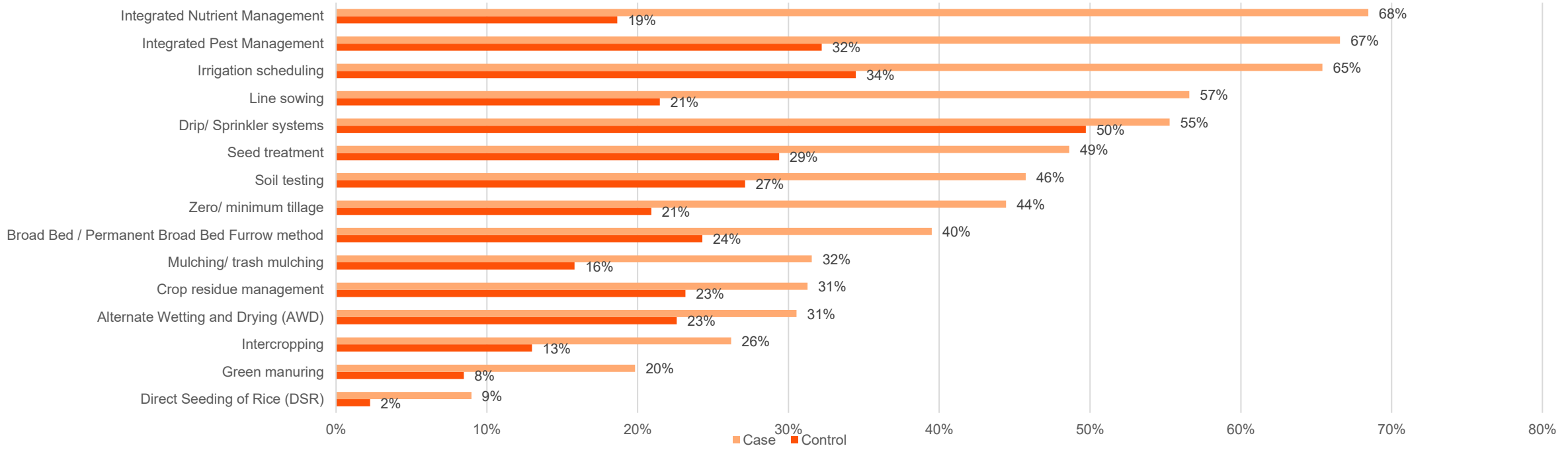


Image: Farmers field with furrows taken by PW team during field visit in Maharashtra

Overall Impact of CSA activities

The programme interventions have led to increased adoption of climate smart agriculture practices among case group respondents (n=691) leading to reduced cost of cultivation and improved crop yields (discussed in latter slides). For instance, in Madhya Pradesh, Maharashtra, Rajasthan, Punjab and Uttar Pradesh, study revealed that compared to control, yield of wheat was minimum 13% higher for programme farmers, while cost of cultivation was lesser by at least 8%

Adoption rate of Climate Smart Agriculture Practices
The control group respondents (n=177) have lesser rate of adoption for all the practices as shown in the below figure.



- Adoption of CSA practices is consistently higher among case farmers, especially Integrated Nutrient Management, irrigation scheduling, zero/minimum tillage, line sowing and seed treatment, reflecting ITC's intensive promotion of resource-efficient, climate-resilient agronomy in project villages.
- Despite clear water and cost benefits, technologies like DSR and Broad Bed Furrow show relatively low uptake due to equipment constraints, rocky soils and higher weeding requirements, which increase labour demand and limit large-scale adoption. There is still a lot of scope to increase adoption of BBF/ PBBF practices by creating better access to agri-equipments among farmers.
- In Punjab, combining AWD with DSR, mechanised seeders and improved residue management has lowered wheat and paddy cultivation costs, boosted yields and sharply reduced stubble burning, delivering simultaneous economic and environmental gains for case farmers.

Adoption of CSA practices and Impact on Cost of Cultivation

The programme promoted Climate-Smart Agriculture (CSA) practices including Broad Bed Furrow (BBF) and Direct Seeded Rice (DSR) to reduce cultivation costs, enhance water-use efficiency, and improve farmers' net returns. The following analysis compares traditional vs. CSA cultivation costs, adoption rates (n=170), and shows how BBF, DSR, Integrated Pest Management (IPM), Integrated Nutrient Management (INM), and improved seeds altered pre- and post-intervention cost structures across major crops.

Comparative analysis in case of Soybean (₹/acre)

Cost Component	TFC#	BBF Cultivation#
Land preparation	1,500	2,500
Seeding/ planting	3,000	2,500
Nutrient management	2,500	2,500
Plant protection	2,000	2,000
Harvesting	1,500	1,500
Total cost of cultivation	10,500	11,000
Average yield (Quintal per acre)	**7**	**9**
Approx market price	5,500	5,500
Gross return	38,500	49,500
Net return	28,000	38,500

Comparative analysis in case of Wheat (₹/acre)

Cost Component	TFC#	BBF Cultivation#
Land preparation	2,000	3,000
Seeding/ planting	2,000	1,500
Nutrient management	2,000	2,000
Plant protection	1,000	1,000
Harvesting	2,500	2,500
Total cost of cultivation	9,500	10,000
Average yield (Quintal per acre)	16	20
Approx market price	2,585	2,585
Gross return	41,360	51,700
Net return	31,860	41,700

- Out of 170 respondents, only 42% adopted Broad Bed and Furrow for soybean/wheat in last 2 years due to unavailability of specific furrows for land preparation in villages.
- Direct Seeded Rice reduced water consumption by 20% and planting labor costs by 35-40%, but increased weeding costs by 25-30%. Overall cultivation cost was 10% lower (INR 20,000 vs INR 22,000 per acre for PTR) with 10% higher yield (24 vs 22 quintals/acre). However, adoption remained very low (8%) due to rocky soil preventing proper seed penetration, making DSR more labor-intensive than traditional methods.

Change in average cost of cultivation per acre for Case Group (n=170) (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Soybean	1,568	1,430	2,925	1,868	2,517	1,948	2,055	1,516	1,533	1,823	8,000	9,000	18,598	17,585	-5%
Paddy	1,926	2,054	1,737	1,453	1,941	1,855	509	1,026	6,063	3,875	8,000	9,000	20,176	19,263	-5%
Wheat	2,006	2,007	2,065	1,230	1,992	1,589	982	791	2,122	2,415	5,333	6,000	14,500	14,032	-3%
Mustard	2,075	1,969	524	581	2,551	1,903	521	521	3,932	4,731	5,333	6,000	14,936	15,705	5%
Gram	1,534	1,467	1,526	1,171	1,149	801	516	510	1,934	2,157	5,333	6,000	11,992	12,106	1%

Change in Average cost of cultivation per acre for Control Group (n=80) (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Soybean	1,469	1,432	2,913	2,927	2,555	2,543	2,008	2,117	1,501	1,560	8,000	9,000	18,446	19,579	6%
Paddy	2,090	2,132	1,839	1,967	2,089	2,295	483	488	6,094	6,317	8,000	9,000	20,595	22,199	8%
Wheat	1,989	2,052	1,918	1,939	1,939	1,981	972	967	2,188	2,285	5,333	6,000	14,339	15,224	6%
Mustard	2,051	2,094	512	508	2,597	2,681	508	558	4,152	4,121	5,333	6,000	15,153	15,962	5%
Gram	1,441	1,384	1,445	1,423	1,243	1,280	525	515	2,069	2,148	5,333	6,000	12,056	12,750	6%

- In Soybean case farms, total cost per acre declined from ₹18,598 to ₹17,585 despite higher irrigation costs (₹8,000 to ₹9,000), mainly due to reductions in land preparation, seeding and nutrient-management through BBF, INM and improved seeds.
- Paddy case farmers reduced total cost from ₹20,176 to ₹19,263. DSR lowered seeding cost (₹1,737 to ₹1,453) and harvesting cost (₹6,063 to ₹3,875), even though plant-protection and irrigation expenses increased.
- Wheat case farmers saw a moderate decline in total cost (₹14,500 to ₹14,032) as better seed, INM and IPM reduced nutrient-management (₹1,992 to ₹1,589) and plant-protection costs (₹982 to ₹791).
- 35% farmers reported regular use of farm compost and vermicompost, reducing dependence on purchased fertilisers at a time when market prices of nutrients have increased.
- Several farmers are themselves preparing biological pesticides such as panchpatrikara, neem seed kernel extract, dashparni and chilli–garlic extract, partially insulating them from rising prices of commercial pesticides.

*PTR- Puddled Transplanted Rice

#TFC – Traditional Furrow Cultivation; BBF: Broad Bed Furrow

Impact on Productivity and of Additional Programmatic Support

The intervention has led to measurable improvements in crop productivity and farmer incomes, with BBF and related climate-smart practices driving higher yields and better price realization. At the same time, farmers continue to depend on local markets and traders, highlighting the need for more remunerative market linkages to fully capture these gains.

Impact on Productivity – Case Group (n=170)

Crops	Total production (in Q)		Yield per acre (in Q)		Price per Q (in INR)		Total income (in INR)		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Soybean	39	42	12	13	5,000	5,500	1,95,000	2,31,000	18%
Paddy	25	28	16	18	2,165	2,310	54,125	64,680	20%
Wheat	50	53	15	18	2,125	2,585	1,06,250	1,37,005	29%
Mustard	4	5.5	4	5	4,856	5,460	19,424	30,030	55%
Gram	4	5	8	9	4,453	5,261	17,812	26,305	48%

Impact on Productivity – Control Group (n=80)

Crops	Total production (in Q)		Yield per acre (in Q)		Price per Q (in INR)		Total income (in INR)		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Soybean	40	38	13	12	4,831	5,140	1,93,240	1,95,320	1%
Paddy	24	24	16	16	2,146	2,290	51,504	54,960	7%
Wheat	55	55	15.5	16	2,107	2,455	1,15,885	1,35,025	17%
Mustard	4	4	4	5	4,948	5,117	19,792	20,468	3%
Gram	4	4	8	8	4,302	4,881	17,208	19,524	13%

Change in Annual Gross Income

Respondent	Timeframe	Income
Case group	Pre	392,611
	Post	489,020
	Change %	25%
Control group	Pre	397,629
	Post	425,297
	Change %	7%

- Higher yields through reduced plant competition for nutrients, moisture, and sunlight, resulting in better plant population, healthier crops, and improved produce quality.
- Surveyed farmers expressed continued interest in improved market access, with current sales largely routed through local mandis and traders during the study period.
- Case group showed improved total production and per-acre yields in soybean, wheat, and mustard, leading to higher farm incomes.
- Natural agri-produce price changes contributed to income changes across both case and control groups.

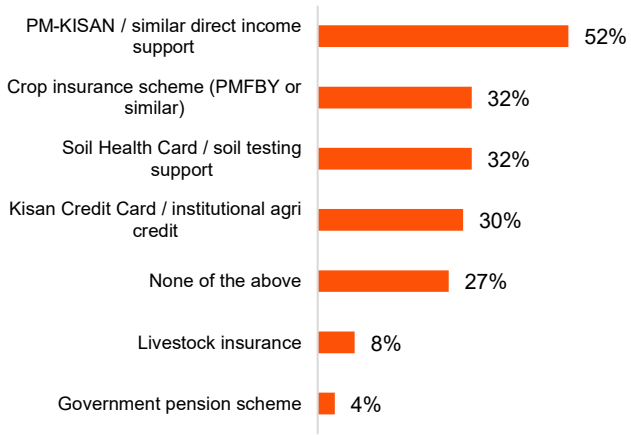
Agri Business Centres / Farmer Groups (n=170)

- **Membership**: 27 of 170 respondents (16%) are active members of ITC-promoted Agri-Business Centre/Farmer Groups; 22 used at least one service in last two years.
- **Input cost savings**: 22 respondents reported 5-10% savings from collective input purchases due to bulk buying and better negotiation.
- **Mechanisation**: No respondents rented agri-machinery from ABCs/farmer groups.
- **Institutional credit**: No respondents took credit from ABCs/farmer groups.

Extension Services Provided by Pashu Sakhis

- **Reduced animal mortality:** Pashu Sakhis' extension services (vaccination, first-aid, livestock training) decreased animal mortality from 25-30% to less than 5% in local communities.
- **Cost-effective veterinary services:** Farmers previously paid INR 800-1000 per visit to local quacks; now access similar services from Pashu Sakhis for INR 150-200 per visit.
- **Skill development interest:** Many Pashu Sakhis expressed interest in learning new skills like Artificial Insemination.

Scheme Linkages Facilitated by the Project (n=170)



This is a multiple-choice question and the responses may not add upto exact 100%.

Annual income from schematic linkages

Schemes	N	Annual income/ savings per person (INR)
PM-KISAN receipts	88	16,878
Fertiliser savings – SHC users (all crops, per year)	54	4,250
Interest cost savings via KCC/institutional credit	51	710
Pension premium received	6	0

A small set of households (6) reported linkage to government pension schemes. Recorded premium payments and pay-outs are limited in the current dataset, suggesting that pension-related activities may be at an early stage or not yet fully captured in reporting.

Adoption of CSA practices and Impact on Cost of Cultivation

CSA interventions in Rajasthan show a clear cost advantage for programme farmers across both Kharif and Rabi crops. Case farmers report lower cultivation costs than control farmers for Soybean and Wheat, with the largest savings coming from seeding/planting and plant-protection practices in Soybean, and from plant protection, irrigation and nutrient management in Wheat.

Cost benefit for Soybean and Wheat (per acre)

Cost Component	Wheat	Soybean
Land preparation	1,400	1,338
Seeding/ planting	1,536	2,650
Nutrient management	2,049	2,890
Plant protection	842	1,072
Irrigation	794	-
Harvesting	2,160	2,400
Total cost of cultivation	8,781	10,350
Average yield (Quintal per acre)	**19.6**	**6.3**
Approx market price	2,425	6,800
Gross return	47,530	42,840
Net return	38,749	32,490

Change in average cost of cultivation per acre for Case and Control Group (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Cost Reduction in Case vs Control
	Case	Control	Case	Control	Case	Control	Case	Control	Case	Control	Case	Control	Case	Control	
Soybean	1,338	1,351	2,650	3,759	2,890	2,780	1,072	1,314	2,400	2,400	0	3,600	10,350	15,205	32% lower
Wheat	1,400	1,377	1,536	1,442	2,049	2,448	842	1,396	2,160	2,400	794	1,280	8,781	10,343	15% lower

- Case farmers in Kota show lower cultivation costs for both major crops. Total cost of cultivation is 11% lower for Soybean and 15% lower for Wheat compared to control farmers.
- Soybean savings are mainly driven by crop establishment and plant protection. Case farmers spend around ₹1,109/acre less on seeding/planting and ₹242/acre less on plant protection, while harvesting and irrigation costs remain unchanged.
- Wheat shows stronger cost-efficiency gains due to savings in irrigation and input management. Case farmers spend ₹486/acre less on irrigation, ₹554/acre less on plant protection, and ₹399/acre less on nutrient management than control farmers.
- Irrigation cost is nil for Soybean in both groups, indicating largely rainfed Kharif cultivation; therefore, the observed savings are not water-cost driven but arise from seeding/planting and plant-protection efficiencies.
- The Rabi crop Wheat reflects the clearest NRM-linked cost advantage, with lower irrigation and nutrient-management expenses suggesting improved water availability, better timing of farm operations, and more efficient input use in case villages.
- Overall, programme farmers in Kota retain a ₹1,255/acre saving in Soybean and ₹1,562/acre saving in Wheat, strengthening farm-level profitability and resilience compared to control farmers.

Source: the above information is based on the project documents provided by ITC

Adoption of CSA practices and Impact on Cost of Cultivation

The programme promoted Climate-Smart Agriculture (CSA) practices including drip irrigation, crop residue management (trash mulching), and intercropping to reduce cultivation costs, enhance water-use efficiency, and improve farmers' net returns. The following analysis shows CSA practice adoption in Maharashtra and compares pre- and post-intervention cost structures across major crops, based on responses from 154 case and 52 control respondents (n=206).

Comparative analysis in case of Sugarcane (price/acre) (in INR)

Cost Component	With CSA activities*	Without CSA activities
Land preparation	7,875	9,250
Seeding/ planting	1,522.5	2,900
Nutrient management	5,985	7,100
Plant protection	1,732.5	3,300
Harvesting	5,460	7,800
Irrigation	5,880	7,600
Total cost of cultivation	28,455	37,950
Average yield (Quintal per acre)	**650**	**700**
Approx market price	430	395
Gross return	2,79,500	2,76,500
Net return	2,51,045	2,38,550
Income from intercropping (moong and urad)	6,400	-
Total income per acre	2,57,445	2,38,550

Average cost of cultivation per acre for Case Group (n=154) (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Soybean	4,850	4,370	1,650	1,550	3,600	3,100	1,200	1,000	2,900	2,650	1,900	1,750	16,100	14,420	-10%
Wheat	7,000	6,500	2,150	1,950	4,200	3,900	1,600	1,325	3,100	2,975	2,300	2,160	20,350	18,810	-8%
Onion	12,650	11,150	5,250	5,200	8,250	6,600	4,100	3,750	7,100	6,150	9,300	7,800	46,650	40,650	-13%
Sugarcane	9,250	7,500	2,900	1,450	7,100	5,700	3,300	1,650	7,800	5,200	7,600	5,600	37,950	26,300	-31%
Maize	3,800	3,500	1,250	1,150	2,750	2,400	1,000	875	2,200	2,000	1,100	1,050	12,100	10,975	-9%

Average cost of cultivation per acre for Control Group (n=52) (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Soybean	4,570	4,850	1,520	1,700	3,400	3,350	1,150	1,350	2,750	2,900	1,800	2,130	15,190	16,880	11%
Wheat	6,350	6,850	2,000	2,150	3,900	4,250	1,500	1,600	3,200	3,125	2,165	2,260	18,965	20,235	7%
Onion	12,500	12,600	4,900	5,000	7,500	7,900	4,000	4,350	6,800	7,250	9,150	9,750	44,850	46,250	3%
Sugarcane	8,900	9,200	2,850	2,950	6,900	7,250	3,100	3,300	7,600	7,850	7,450	7,950	36,800	38,500	5%
Maize	3,600	3,800	1,100	1,140	2,450	2,580	900	950	2,100	2,150	1,000	1,080	11,150	11,700	5%

High Adoption Practices:

- **Drip irrigation** is the most widely used practice as reported by 60% of the farmers.
- **Crop Residue Management** (no burning) through trash mulching is a standard and adopted practice by 42% of farmers.
- Qualitative discussion highlight the use of **weather alerts** through the MahaVISTAAR AI app by farmers.
- The most clearly defined package is the (Drip Irrigation + Trash Mulching + Wide Spacing) along with Intercropping system, which is applied to the village's main crop like, Sugarcane.
- The Case Group showed significant cost reductions in sugarcane cultivation, primarily due to the adoption of wide spacing, drip irrigation, and automation, which halved labor costs and eliminated electricity expenses for irrigation.
- Nutrient management costs decreased notably in sugarcane by approximately 20%, reflecting the use of more efficient fertilizers and bio-pesticides.
- Onion cultivation in the Case Group achieved a 20% reduction in nutrient and harvesting costs, aligned with increased biomass yield and better crop quality.
- Improved irrigation practices in the Case Group, especially daily drip irrigation, led to less effort and lower overall irrigation costs despite increased frequency, compared to the Control Group's infrequent flooding irrigation and higher energy expenses. In contrast, the Control Group maintained stable costs reflecting traditional practices without significant improvements in labor efficiency, irrigation, or input management.
- Overall, the shift towards advanced practices in the Case Group translated into better resource use and potential for higher profitability through cost savings and yield improvements.

*This implies: Intercropping and (Drip Irrigation + Trash Mulching + Wide Spacing) system

Impact on Productivity and of Additional Programmatic Support

The intervention has led to measurable improvements in crop productivity and farmer incomes, with BBF and related climate-smart practices driving higher yields and better price realization. At the same time, farmers continue to depend on local markets and traders, highlighting the need for more remunerative market linkages to fully capture these gains.

Impact on Productivity – Case Group (n=154)

Crops	Total production (in Q)		Yield per acre (in Q)		Price per Q (in INR)		Total income (in INR)		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Soybean	45	55	15	18.3	3,500	3,650	1,57,500	2,00,385	27%
Wheat	44	52	22	26.1	2,800	3,000	1,23,200	1,56,600	27%
Onion	160	190	80	95.2	5,000	5,200	8,00,000	9,90,080	24%
Sugarcane	350	418	700	835	425	430	1,48,750	1,79,740	21%
Maize	18	21	18	21.2	1,800	2,000	32,400	42,400	31%

Impact on Productivity – Control Group (n=52)

Crops	Total production (in Q)		Yield per acre (in Q)		Price per Q (in INR)		Total income (in INR)		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Soybean	29	30.4	14.5	15.2	3,500	3,650	1,01,500	1,10,960	9%
Wheat	32.7	33.7	21.8	22.2	2,800	3,000	91,560	99,900	9%
Onion	19.5	20.4	78	81.6	5,000	5,200	97,500	1,06,080	9%
Sugarcane	680	705.1	680	705.1	425	430	2,89,000	3,03,193	5%
Maize	4.2	4.2	17	17.7	1,800	2,000	7,650	8,850	16%

Change in Annual Gross Income

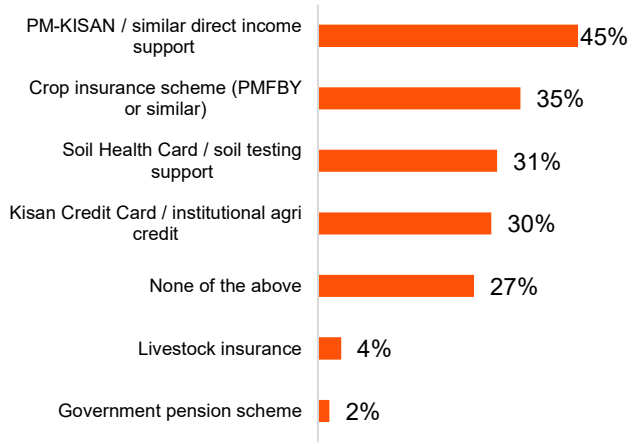
Respondent	Timeframe	Income
Case group	Pre	392,611
	Post	489,020
	Change %	25%
Control group	Pre	397,629
	Post	425,297
	Change %	7%

- Higher yields through reduced plant competition for nutrients, moisture, and sunlight, resulting in better plant population, healthier crops, and improved produce quality.
- Farmers still seek better market access, remaining dependent on local mandi and few traders for price discovery and sales.
- Case group showed improved total production and per-acre yields across all crops, leading to higher farm incomes.
- Natural agri-produce price changes contributed to income changes across both case and control groups.

Agri Business Centres / Farmer Groups (n=154)

- **Membership and service use:** 22 out of 154 (14%) are active members of an ITC-promoted Agri-Business Centre/Farmer Group. Among them, all 22 members have used at least one service in the last two years.
- **Impact on input procurement cost:** For 22 respondents, report cost savings from collective purchase of inputs, with self-reported savings typically in the 15–25% band reduction in input costs.
- **Impact on mechanisation cost:** None of the respondents reported renting agri-machinery from ABCs/ farmer groups.
- **Impact on interest cost through institutional credit:** None of the respondents reported taking credit from ABCs/ farmer groups.

Scheme Linkages Facilitated by the Project (n=154)



This is a multiple-choice question and the responses may not add upto exact 100%.

Extension Services Provided by Pashu Sakhis

- **Reduced animal mortality:** Pashu Sakhis' extension services (vaccination, first-aid, deworming, livestock training) decreased animal mortality from 25% to less than 10% in local communities.
- **Cost-effective healthcare:** Local access eliminates need to purchase deworming tablets (INR 5-10 from external sources), making essential animal healthcare affordable and convenient.
- **Lower veterinary costs:** Farmers previously paid INR 1,000 per visit to local quacks; now access similar services from Pashu Sakhis for INR 250 per visit..

Annual income from schematic linkages

Schemes	N	Annual income/ savings per person (INR)
PM-KISAN receipts	69	15,541
Fertiliser savings – SHC users (all crops, per year)	48	2,160
Interest cost savings via KCC/institutional credit	46	1,140
Pension premium received	3	0

A small set of households (3) reported linkage to government pension schemes. Recorded premium payments and pay-outs are currently negligible in the dataset, suggesting that pension work is at a very early stage or under-reported.

Adoption of CSA practices and Impact on Cost of Cultivation

The programme promoted Climate-Smart Agriculture (CSA) practices, particularly Alternate Wetting and Drying (AWD) combined with Direct Seeded Rice (DSR) and mechanization, leading to reduced expenditure and decreased overall cultivation costs per acre across various categories. Additionally, use of CRM practices such as Happy Seeder and Super Seeder have led to decreased instances of crop burning. The following analysis compares traditional cultivation costs with CSA adoption rates, based on responses from 50 case and 49 control respondents (n=99).

Comparative analysis of Paddy Cultivation for AWD and DSR practices (price/acre) (in INR)

Component	Cost of PTR (Transplanting)	Cost of AWD	Cost of AWD + DSR
Seed & Nursery	1,200 – 1,500	1,000 – 1,200	1,500 – 1,700
Field Preparation	3,000 – 3,500	2,000 – 2,300	1,800 – 2,000
Planting Labour	5,000 – 6,000	3,000 – 3,200	1,200 – 1,500
Irrigation	3,500 – 4,000	2,800 – 3,000	1,800 – 2,000
Fertilisers & Chemicals	4,000 – 4,500	3,000 – 3,200	3,200 – 3,500
Weeding & Interculture	1,200 – 1,500	1,000 – 1,200	1,500 – 1,700
Harvesting & Threshing	2,500 – 3,000	2,000 – 2,200	2,200 – 2,400
Miscellaneous	650 – 900	500 – 700	600 – 900
Total Cost per Acre	15,000 – 16,000	12,000 – 13,000	12,000 – 13,000

Comparative Analysis on Wheat cultivation for Crop Residue Management practices (n=50)

Component	Traditional Cultivation	Happy Seeder	Super Seeder
Cost of Cultivation (per acre)	INR 9,339	INR 7,850	INR 7,173
Land Preparation	Multiple ploughings, harrowing, levelling (higher fuel & labour)	Zero-till, single pass	One-pass operation: chops, mulches, and sows
Residue Management	Burning common → pollution & nutrient loss	No burning	No burning
Seed Rate	130–140 kg/acre, uneven placement	100–120 kg/acre, precise placement	120–125 kg/acre, precise placement
Labour Demand	High (multiple operations, residue handling)	Low (machine sowing, fewer operations)	Moderate (slightly higher fuel/power use than Happy Seeder)
Irrigation	Higher water requirement due to bare soil	Lower (mulch conserves moisture)	Lower (residue incorporation reduces evaporation)
Fertiliser & Chemicals	Higher due to soil degradation	Lower (better nutrient retention under mulch)	Lower (residue improves fertility)
Yield	17 quintal per acre	20 quintal per acre	20 quintal per acre

Change in average cost of cultivation per acre for Case Group (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Wheat	3,500	0	3,000	2,200	2,500	1,500	2,500	2,000	2,200	2,200	1,200	1,000	14,900	8,900	-40%
Paddy	3,500	3,000	4,000	3,500	2,500	1,500	3,500	3,000	2,200	2,200	4,000	3,000	19,700	16,200	-18%

Change in average cost of cultivation per acre for Control Group (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Wheat	2,145	2,214	3,015	2,115	3,486	2,917	2,500	2,800	2,058	2,093	1,200	1,300	14,404	13,439	-7%
Paddy	3,407	3,606	3,346	3,565	3,575	3,664	3,500	4,000	2,081	2,361	4,200	4,800	20,109	21,996	9%

- The adoption of Alternate Wetting and Drying (AWD) combined with Direct Seeded Rice (DSR), along with the use of Happy Seeder and Super Seeder machines in the Case Group, has led to substantial reductions in the overall cultivation costs for both wheat and paddy in Punjab. The most significant cost savings were observed in key areas such as land preparation, where costs for wheat notably dropped to zero nutrient management, and irrigation expenses.
- In contrast, the Control Group did not experience similar cost reductions; instead, paddy cultivation costs actually increased over the same period. This contrast strongly indicates that the integration of AWD with DSR and mechanized seeding technologies played a critical role in lowering the overall cost of cultivation in the Case Group.
- Farmers in Punjab have reported that merely by using these machines, crop yields have improved by a minimum of 5 to 6 quintals per acre, highlighting the productivity benefits alongside cost savings.
- Additionally, the implementing partner in Punjab noted that crop residue management techniques, combined with farmer training sessions, have successfully reduced stubble burning in the case villages by 75-80% compared to control villages where ITC's intervention and crop residue management training were absent.
- Furthermore, despite inflation and rising labor wages, the promotion and use of mechanized harvesting have helped maintain harvesting costs at stable levels in the Case Group.
- This contrasts with the Control Group, where harvesting costs increased due to higher labor expenses.
- Overall, these findings demonstrate that mechanization and improved water and residue management practices are driving both economic and environmental benefits for farmers in Punjab.

Impact on Productivity and of Additional Programmatic Support

The intervention has led to measurable improvements in crop productivity and farmer incomes, with BBF and related climate-smart practices driving higher yields and better price realization. At the same time, farmers continue to depend on local markets and traders, highlighting the need for more remunerative market linkages to fully capture these gains.

Impact on Productivity – Case Group

Crops	Total production (in Q)		Yield per acre (in Q)		Price per Q (in INR)		Total income (in INR)		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Wheat	108.8	136	16	20	2,015	2,425	2,19,232	3,29,800	50%
Paddy	129.2	170	19	25	2,040	2,369	2,63,568	4,02,730	53%

Impact on Productivity – Control Group

Crops	Total production (in Q)		Yield per acre (in Q)		Price per Q (in INR)		Total income (in INR)		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Wheat	79.2	84.15	16	17	2,015	2,425	159,588	2,04,064	28%
Paddy	94.05	103.95	19	21	2,040	2,369	191,862	2,46,258	28%

Change in Annual Gross Income

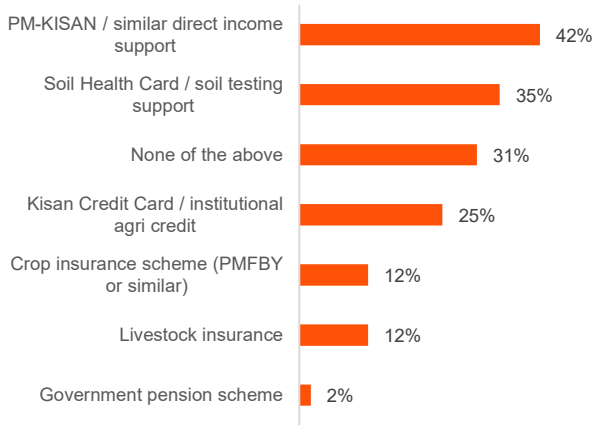
Respondent	Timeframe	Annual gross income (INR)
Case group	Pre	4,82,800
	Post	7,32,530
	Change %	**+52%**
Control group	Pre	3,51,450
	Post	4,50,321
	Change %	+28%

- Significant cost reductions: Case group achieved major savings in land preparation (wheat costs to zero), nutrient management, and irrigation through AWD and mechanization using Happy Seeder and Super Seeder machines.
- Mechanized seeding/harvesting controlled labor costs despite inflation, while farmers reported yield improvements of 5-6 quintals per acre from machine usage alone.
- Crop residue management training reduced stubble burning by 75-80% in case group villages compared to control group.
- Combined adoption of AWD irrigation, mechanized seeding, and crop residue management significantly enhanced productivity, reduced costs, raised incomes, and improved environmental sustainability compared to conventional practices in control areas.

Agri Business Centres / Farmer Groups (n=50)

- **Membership and service use:** Out of 50 respondents, **4 (8%) are active members** of an ITC-promoted Agri-Business Centre/Farmer Group. Among them, **3 members** have used at least one service in the last two years.
- **Impact on input procurement cost:** For **3 respondents**, report cost savings from collective purchase of inputs, with self-reported savings typically in the 5–10% band reduction in input costs.
- **Impact on mechanisation cost:** None of the respondents reported renting agri-machinery from ABCs/ farmer groups.
- **Impact on interest cost through institutional credit:** None of the respondents reported taking credit from ABCs/ farmer groups.

Scheme Linkages Facilitated by the Project (n=50)



This is a multiple-choice question and the responses may not add upto exact 100%.

Extension Services Provided by Pashu Sakhis

- Discussions with Pashu Sakhis indicate that their extension services vaccination, first-aid support, deworming and training on livestock management have helped reduce animal mortality sharply, from around 20% earlier to less than 5% now in the local communities.
- Farmers also shared that earlier they depended on local quacks for veterinary services and paid around INR 1,000 per visit, even for minor issues. Now, similar services are available from Pashu Sakhis at INR 300-400 per visit.

Annual income from schematic linkages

Schemes	N	Annual income/ savings per person (INR)
PM-KISAN receipts	21	16,857
Fertiliser savings – SHC users (all crops, per year)	18	2,389
Interest cost savings via KCC/institutional credit	13	1,160
Pension premium received	1	0

A small set of households (1) reported linkage to government pension schemes. Recorded **premium payments and pay-outs are currently negligible in the dataset**, suggesting that pension work is at a very early stage or under-reported.

Adoption of CSA practices and Impact on Cost of Cultivation

The programme promoted a number of different CSA practices such as Pest Management, Nutrient Management, DSR, Drip Irrigation / Sprinkler Irrigation, Irrigation scheduling, intercropping etc.. The following analysis is based on the information from 317 case respondents and 135 control respondents. The higher adoption of CSA practices among case farmers explains their higher productivity and income gains (seen in this slide), reinforcing the value of CSA as a pathway for sustainable and climate-resilient agriculture.

Comparative analysis in case of Sugarcane (price/acre) (in INR)

Cost Component	With CSA activities*	Without CSA activities
Land preparation	5,775	6,600
Seeding/ planting	3,780	3,900
Nutrient management	4,410	5,400
Plant protection	2,940	2,650
Harvesting	5,460	5,350
Irrigation	2,205	2,700
Total cost of cultivation	24,570	26,600
Average yield (Quintal per acre)	**350**	**370**
Approx market price	375	350
Gross return	1,31,250	1,29,500
Net return	1,06,680	1,02,900
Income from intercropping (moong and urad)	9,840	-
Total income per acre	1,16,520	1,02,900

Change in average cost of cultivation per acre for Case Group (n=317) (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Paddy	7,650	5,400	4,600	3,300	6,100	3,900	3,050	3,500	6,150	6,800	3,050	1,700	30,600	24,600	-20%
Sugarcane	6,600	5,500	3,900	3,600	5,400	4,200	2,650	2,800	5,350	5,200	2,700	2,100	26,600	23,400	-12%
Mustard	2,600	2,000	1,600	1,400	2,100	1,500	1,100	1,000	2,000	1,900	1,100	800	10,500	8,600	-18%
Wheat	5,550	4,000	3,350	2,800	4,400	3,200	2,150	2,000	4,400	4,600	2,350	1,600	22,200	18,200	-18%

Change in average cost of cultivation per acre for Control Group (n=135) (in INR)

Crops	Land preparation		Seeding/ planting		Nutrient management		Plant protection		Harvesting		Irrigation		Total		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Paddy	9,000	9,200	5,200	5,100	7,200	7,400	3,800	3,600	7,500	7,600	4,100	3,900	36,800	36,800	0%
Sugarcane	6,100	6,400	3,300	3,400	4,800	5,000	2,400	2,300	5,000	5,300	1,800	2,100	23,400	24,500	5%
Mustard	2,550	3,000	1,400	1,500	2,450	2,900	1,000	1,100	2,100	2,200	980	950	10,480	11,650	11%
Wheat	6,000	6,200	3,500	3,300	5,500	5,700	2,300	2,400	5,000	5,100	2,300	2,500	24,600	25,200	2%

- Total cost of cultivation is lower with CSA activities (INR 24,570) compared to without CSA activities (INR 26,600), despite a slightly lower average yield (350 quintals vs. 370 quintals). However, due to higher market price and additional income from intercropping under CSA, the total income per acre is significantly higher with CSA activities (INR 1,16,520) than without (INR 1,02,900), indicating better overall profitability using CSA practices.
- The Case Group shows a significant reduction in total cultivation costs for all crops after CSA adoption: Major cost savings are observed in Nutrient management, Land preparation, and Irrigation, reflecting the impact of CSA components like Integrated Nutrient Management, Irrigation Scheduling, Zero/Minimum Tillage, Direct Seeding, and Line Sowing.
- The Control Group's total costs mostly increased or stayed stable, indicating no significant adoption of cost-saving CSA practices. Some costs such as Plant Protection and Harvesting remained relatively stable or increased slightly.
- CSA adoption in the Case Group leads to reduced Post costs especially in: Nutrient Management: 30-40% reduction in Post costs, Irrigation: Around 25-45% reduction, Land Preparation and Seeding/Planting: 10-30% reduction due to better tillage and planting methods. Control Group shows minor fluctuations but no consistent cost-saving trends.
- The higher adoption of CSA practices among Case Group farmers correlates with reduced cultivation costs while maintaining or improving productivity. This reinforces CSA's role in fostering sustainable, climate-resilient agriculture by lowering input costs and increasing economic returns for farmers.

*This implies: Intercropping and (Drip Irrigation + Trash Mulching + Wide Spacing) system

Impact on Productivity and of Additional Programmatic Support

The higher adoption of CSA practices among case farmers explains their higher productivity and income gains (seen in this slide), reinforcing the value of CSA as a pathway for sustainable and climate-resilient agriculture.

Impact on Productivity – Case Group (n=317)

Crops	Total production (in Q)		Yield per acre (in Q)		Price per Q (in INR)		Total income (in INR)		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Paddy	70.0	84.0	28	33.6	1,950	2,250	1,36,500	1,89,000	38%
Sugarcane	93.8	108.8	375	435	350	400	32,830	43,520	33%
Mustard	12.5	14.4	10	11.5	5,100	5,500	63,750	79,200	24%
Wheat	56.0	64.0	28	32	2,100	2,350	1,17,600	1,50,400	28%

Impact on Productivity – Control Group (n=135)

Crops	Total production (in Q)		Yield per acre (in Q)		Price per Q (in INR)		Total income (in INR)		Change %
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Paddy	67.5	69.5	27	27.8	1,950	2,250	1,31,625	1,56,375	19%
Sugarcane	92.5	94.3	370	377	350	400	32,375	37,720	17%
Mustard	11.9	12.1	9.5	9.7	5,100	5,500	60,690	66,550	10%
Wheat	54.0	55.0	27	27.5	2,100	2,350	1,13,400	1,29,250	14%

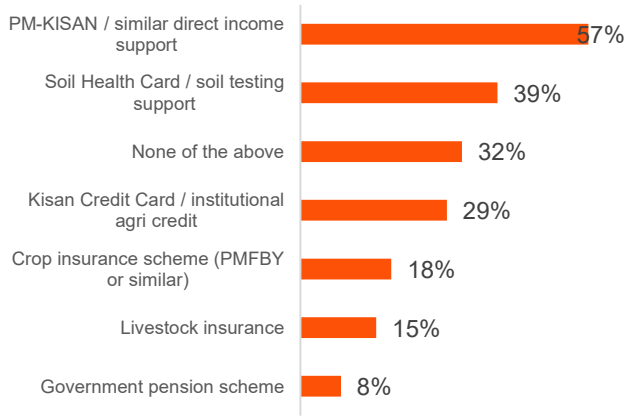
Respondent	Timeframe	Annual gross income (INR)
Case group	Pre	87,670
	Post	1,15,530
	Change %	**31.8%**
Control group	Pre	84,523
	Post	97,474
	Change %	15.3%

- Production and yield gains: Case group achieved notable increases across all crops - paddy production rose from 70 to 84 quintals with yield increasing from 28 to 33.6 quintals per acre. Similar improvements occurred in sugarcane, mustard, and wheat.
- Better market prices: Post-CSA adoption, case group received higher prices for all major crops, reflecting improved quality or market access. Paddy prices increased from ₹1,950 to ₹2,250 per quintal.
- Substantial income growth: Total crop income increased significantly - paddy (₹1,36,500 to ₹1,89,000), sugarcane (₹32,830 to ₹43,520), mustard (₹63,750 to ₹79,200), and wheat (₹1,17,600 to ₹1,50,400).
- Overall income impact: Case group achieved 31.8% increase in annual gross income (₹87,670 to ₹1,15,530), more than double the control group's 15.3% growth rate.

Agri Business Centres / Farmer Groups (n=50)

- **Membership and service use:** Out of 317 respondents, 29 (9%) are active members of an ITC-promoted Agri-Business Centre/Farmer Group. Among them, all 8 members have used at least one service in the last two years.
- **Impact on input procurement cost:** For 8 respondents, report cost savings from collective purchase of inputs, with self-reported savings typically in the 5–10% band reduction in input costs.
- **Impact on mechanisation cost:** None of the respondents reported renting agri-machinery from ABCs/ farmer groups.
- **Impact on interest cost through institutional credit:** None of the respondents reported taking credit from ABCs/ farmer groups.

Scheme Linkages Facilitated by the Project



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Extension Services Provided by Pashu Sakhis

- Discussions with Pashu Sakhis showed that their extension services have helped reduce animal mortality from around 20% earlier to less than 5% now in the local communities.
- Farmers report that there has been increased awareness about common illnesses affecting their livestock and the importance of regular check-ups. However, a gap in livestock management still exists, which ITC aims to address during next year.
- Farmers also shared that earlier they depended on local quacks for veterinary services and paid around INR 1,000 per visit, even for minor issues. Now, similar services are available from Pashu Sakhis at INR 250-300 per visit.

Annual income from schematic linkages

Schemes	N	Annual income/ savings per person (INR)
PM-KISAN receipts	181	15,100
Fertiliser savings – SHC users (all crops, per year)	124	1,365
Interest cost savings via KCC/institutional credit	92	965
Pension premium received	25	0

A small set of households (25) reported linkage to government pension schemes. Recorded **premium payments and pay-outs are currently negligible in the dataset**, suggesting that pension work is at a very early stage or under-reported.

IRECS Analysis

Parameter	Assessment of the study
Inclusiveness	❑ The programme primarily targeted small and marginal farmers (typically <5 acres), who are most exposed to climate and market risks. ❑ It reached households across OBC, SC, ST and General categories, avoiding concentration among better-off groups. ❑ Women's roles strengthened through SHGs, Pashu Sakhis and participation in WUGs, though men still dominate formal decision-making.
Relevance	❑ Focused on water-stressed geographies where falling groundwater and erratic rainfall constrain production. ❑ Addressed rising cultivation costs (energy, inputs, labour) and declining soil quality, both of which were repeatedly flagged by farmers as key constraints. ❑ Interventions around water harvesting, CSA, soil health and risk-mitigating schemes closely match these needs.
Effectiveness	❑ Water security and irrigation reliability • Desilted ponds, check dams and farm ponds have extended water availability into late Rabi and reduced the need to deepen tubewells. • Case villages show better groundwater trends and fewer irrigation breakdowns compared to controls. ❑ Cropping intensity and Rabi intensification • Evidence from multiple states shows expansion of Rabi area and higher cropping intensity with little change in total cultivated land. • Farmers report greater confidence to grow higher-value Rabi crops because of more assured irrigation. ❑ Costs, productivity and profitability • For key Rabi cash crops (e.g., cumin, mustard, Isabgol), case villages see 10–13% lower cost of cultivation with 7–20% higher yields, while controls experience cost increases with stagnant or falling yields. • Reduced irrigation hours and better-timed fertiliser use underpin improved returns per rupee of cost and better margins despite price volatility. ❑ Livestock and commons • Through Pashu Sakhis and commons development, livestock mortality and treatment costs have fallen, and local fodder availability has improved; households report lower market feed dependence and more reliable grazing. • Regenerated commons contribute both fodder development and ecological benefits, reinforcing crop–livestock linkages. ❑ Institutional performance and behaviour change • WUGs and Charagah Vikas Samitis are now recognised forums for water and commons decisions, even if meeting regularity varies. • Adoption of CSA and soil-health practices is visibly higher in case villages, indicating durable behaviour change rather than one-off demonstrations. ❑ Risk management and safety nets • Linkages to PM-KISAN, crop insurance, KCC and livestock insurance have improved income stability and reduced reliance on high-cost informal credit, especially when combined with physical risk-reduction measures
Convergence	❑ Worked closely with Panchayats to plan and execute water structures, often leveraging MGNREGA and line-department funds. ❑ Collaborated with KVKs and technical agencies to develop CSA-oriented Crop PoPs and deliver farmer trainings. ❑ Facilitated access to multiple government schemes (PM-KISAN, SHC, KCC, insurance, pensions), using MSK as a bridge between farmers and public systems.
Sustainability	❑ WUGs and CVS provide a base for long-term O&M of water structures and commons, reducing dependence on the project for routine upkeep. ❑ Promotion of CSA, soil-health management and diversified cropping enhances ecological and agronomic resilience. ❑ Long-term sustainability will hinge on remunerative markets for CSA produce. Better price realisation is crucial to keep farmers investing in and maintaining these improved practices.

Recommendations

1. Focus interventions in selected village clusters
Given that 200–300 villages are currently covered in each state, it may be helpful to work with more focused clusters of villages. This can allow deeper engagement, better handholding, and clearer demonstration of outcomes, without diluting efforts.

2. Consider longer-term MoUs to enable planning
As MoUs are presently renewed on an annual basis, the programme may benefit from agreements of at least three years. A longer horizon could support more robust planning for NRM and CSA, while still allowing for annual reviews and course corrections.

3. Revisit staffing norms for better field support
With 8–10 resources presently managing 200–300 villages, field presence and follow-up can be constrained. Exploring options to either reduce the number of villages per staff member or augment field teams could help improve implementation quality and responsiveness to community needs.

4. Facilitate access to CSA-related agri-equipment
Practices such as Broad Bed and Furrow (BBF) are being promoted, but many farmers currently do not have access to the required machinery. Setting up community-managed or FPO-managed custom hiring services, and linking farmers to existing government schemes for equipment, could encourage greater adoption.

5. Strengthen women-centric interventions
There appears to be good potential to further integrate women's roles into NRM and CSA. Building on existing SHGs and women's collectives for activities such as seed management, nutrition gardens, and value addition may enhance both programme outcomes and women's economic participation.

6. Use remote sensing for continuous monitoring of biodiversity sites
Introducing regular remote sensing–based tracking of biodiversity conservation sites could complement field observations. This would support more systematic monitoring of changes in land use and vegetation and provide useful inputs for assessing ecological impacts over time.

7. Build WUG capacities for regular savings and O&M
Water User Groups may benefit from focused training on financial management and savings practices. Encouraging small, periodic contributions—rather than one-time collections—could reduce the financial burden on members and help ensure that funds for O&M are available when needed.

8. Strengthen market linkages for CSA produce
For long-term adoption of CSA practices, farmers' ability to realise remunerative prices is likely to be critical. Exploring differentiated market opportunities, including better aggregation, basic processing, and linkages to buyers who value CSA-compliant produce, could support sustained farmer interest.

9. Leverage existing FPOs for aggregation and value addition
The FPOs promoted by ITC and government departments offer a strong base for collective marketing. Providing targeted support to these FPOs for business planning, primary processing, and negotiation with buyers can help them connect farmers to more rewarding markets for CSA produce.

10. Enhance livestock services through Pashu Sakhis
Pashu Sakhis have expressed interest in Artificial Insemination. Offering structured training, along with the necessary tools and linkages to veterinary services, could both strengthen local livestock services and create an additional livelihood opportunity for them.

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- PWCALLP’s work was limited to the samples/specific procedures described in this report and were based only on the information and analysis of the data obtained through interviews of beneficiaries supported under the programme, selected as respondents. Accordingly, changes in circumstances/samples/ procedures or information available could affect the findings outlined in this report.
- Our understanding of the programmes was limited to our discussion with the ITC team and its NGO partners as no specific project related documents (MoU/ Programme Monitoring Reports etc.) apart from the beneficiaries list and generic thematic documents was shared with PW team.
- Integrated Animal Husbandry Practices (IAHP) and Social Forestry are not covered under this assessment, as no interventions relating to these themes were implemented in the selected states, as indicated in the RFP. However, where relevant, the study sought to capture the contribution of livestock-related interventions through qualitative research.

Thank you