BC-GIF pilot to test the inclusion of women co-farmers within BCI's quality assurance programme

Pilot outcomes report and suggested roadmap

16th March, 2021

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Introduction to the pilot and key objectives

Strengthening the role of women cultivators on the cotton farm has been an evidence-led effort that started in 2018

2018 - 2019

Sattva and IDH conducted a gender analysis to measure women cultivators' economic contribution to cotton cultivation. Key findings:

- Women cultivators play a majority role in key cotton production activities.
- Women cultivators' role on the farm directly impacts the quantity and quality of cotton produced.
- However, women have limited access to productive resources and information, which restricts their contribution.
- In spite of their proximity to the cultivation process, they are not involved in decision making. Social norms impact the way women cultivators engage with the agri-ecosystem.
- Solving for these gaps will potentially improve cotton production, increase HH income and empower women cultivators.

2019

Sattva & BCI built a model to project ROI from inclusion of women cultivators in BCI's quality assurance program. Key findings:

Benefits of inclusion

Given that women undertake 70-90% operations in cotton cultivation, strengthening their farm practices can improve output and yield. This could translate to improved income for farming HHs. Greater participation of women in decision making can also positively impact cotton production.

Cost implications

The extension of these programs to women will mean overall increase in implementation costs for BCI, largely attributed to personnel and direct costs of building farmers capacity. These costs will depend on the number of co-farmers enrolled. However, desirable per farmer cost can be achieved in the long-term.

2020- 2021

BC-GIF along with Sattva and Lupin Foundation implemented a co-farmer pilot to test study findings on the ground. The pilot included:

Pilot blueprint

2000 women co-farmers would mobilize into 50 LGs across 2 PUs in Dhule, Maharashtra, to strengthen their agronomic knowledge & skills and life skills through training and demo plots; while male farmers would be provided gender sensitisation training to ensure sustainable inclusion of women on the farm.

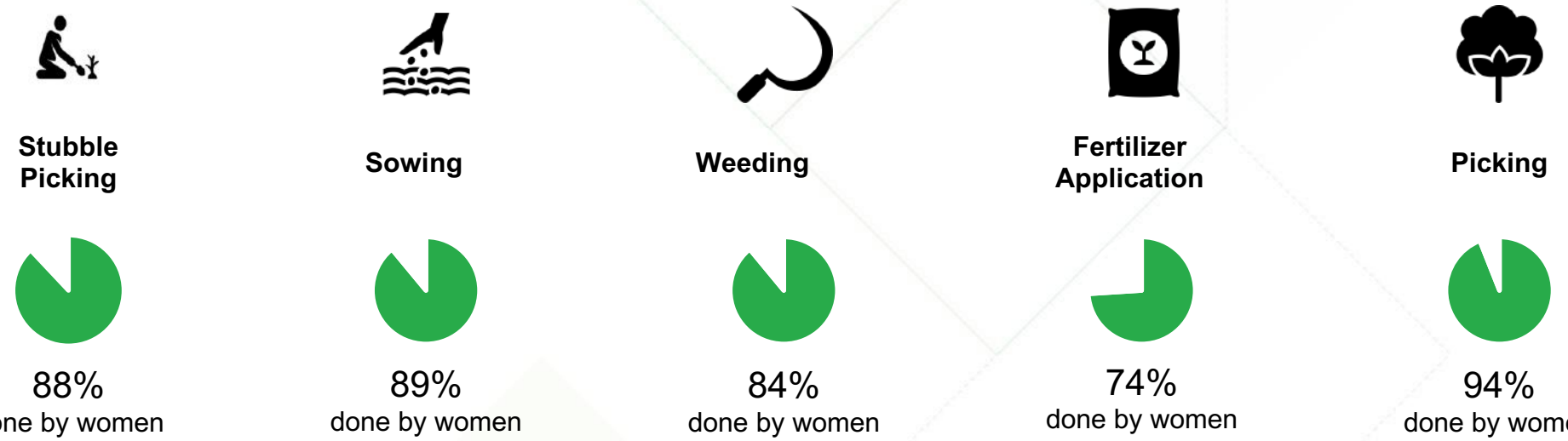
Key objectives

The objective of the pilot was to test relevance and effectiveness of programme activities with co-farmers, measure impact emerging across BCI's result indicators, and test cost efficacy of inclusion of women co-farmers in BCI smallholder programmes.

Sources:
1. Dwivedi M., Damle N., 2019, Business case for gender mainstreaming in cotton in Maharashtra, IDH the Sustainable Trade Initiative 2019. Retrieved from here.

The 2019 Sattva-IDH gender analysis study found that women cultivators play a prominent role in cotton cultivation; their role directly impacts cotton production

Specifically, women cultivators were found to play a majority role across the following production activities*:



Tasks undertaken by women cultivators directly impact the quantity and quality of cotton produced:

- **Sowing:** Low plant population can delay boll maturity, reduce lint yield and boll density; inaccuracies in sowing can delay germination
- **Weeds:** Bad weeds can reduce lint yields between 10% and 40%; weeds can affect fiber length, uniformity, strength, or microns, and increase moisture in the bolls
- **Fertilizer application:** Delayed application of fertilisers can reduce yield; inefficient fertiliser usage increases cost of production
- **Picking:** Unscientific picking causes contamination (dirt, hair, plastic, etc.) and results in reduced quality of cotton and fiber loss; cotton with higher grade, staple and strength claims a better price

**Detailed break-down of roles and responsibilities has been given in Annexure-1*

***Sources**:*

1. *Dwivedi M., Damle N., 2019, Business case for gender mainstreaming in cotton in Maharashtra, IDH the Sustainable Trade Initiative. Retrieved from here.*
2. *2017, Planting The Seed: A Journey To Gender Equality In The Cotton Industry, Cotton Connect. Retrieved from here.*

Despite their role in cotton production, women cultivators have limited access to resources; their engagement with the agri-ecosystem is influenced by social norms

Agronomic training

33% of the women cultivators surveyed attended any agronomic training in the last two years

SHG membership

50% of the women cultivators surveyed were part of SHGs. FPO presence was low

Government schemes

15% of the women cultivators surveyed accessed government support

Land ownership

16% of the women cultivators surveyed had land in their name

Credit access

28% of the women cultivators surveyed took credit from SHGs.

Extension services

11% had ever accessed extension services.

Moreover, social norms impact the way women cultivators engage with the agricultural ecosystem

Gendered Farm Roles

- Women perform tasks that are are drudgery-prone & time intensive
- They are given limited access to tools or information that can enhance productivity

Dual Responsibilities

- Women perform time consuming household chores
- They have limited disposable time to access extension services / training

Decision Making

- Women cultivators play a limited role in decision-making related to the farm

Unequal Access

- Women cultivators are less likely to participate in extension / training programmes
- They also do not engage with markets

Solving for these gaps can enhance cotton productivity and benefit households

Sources: 1. Dwivedi M., Damle N., 2019, Business case for gender mainstreaming in cotton in Maharashtra, IDH the Sustainable Trade Initiative 2019. Retrieved from here.

Inclusion of women cultivators in agricultural programmes can impact both social and economic outcomes

Economic outcomes

- Inclusion can strengthen agronomic capabilities within the household by ensuring that both male and female farmers have access to improved knowledge and skills
- Strengthening capabilities can, in-turn, improve production volumes and quality of cotton
- This can reduce cost of cultivation and improve income of cotton cultivating households

Social outcomes

- Sensitizing male farmers and strengthening the skills of women can increase agency and participation of women cultivators in decision-making on the farm
- This can positively influence household / community perceptions towards the economic role and contributions of women cultivators
- Inclusion of women in decision-making will further benefit farm productivity (given their proximity to the crop)

The report found that driving inclusion of women cultivators will require the following input:

- Building knowledge and skills in agronomic practices
- Strengthening functional financial literacy, confidence / negotiation skills and providing knowledge of govt schemes
- Collectivizing women through Self- Help Groups or Learning Groups
- Sensitizing the community on the role of women cotton cultivators and positively influencing social norms

Sources:
1. Dwivedi M., Damle N., 2019, Business case for gender mainstreaming in cotton in Maharashtra, IDH the Sustainable Trade Initiative 2019. Retrieved from here.

The BC-GIC co-farmer pilot conducted in FY 2020-21 aims to validate the expected business and social outcomes on the ground

IDH aims to strengthen the inclusion and role of women within the cotton value chain, with a focus on driving both social and business outcomes for farmers.

BCI wants to test the co-farmer model. The co-farmer concept will get the efficacy of men and women working together as equal farming partners, with a focus on driving BCI's RIRs (social, economic and environmental indicators).

BC-GIF co-farmer pilot

The following activities have been identified for the pilot intervention with women co-farmers:

1. Agronomic and life skills training
Build knowledge and skills in agronomic practices, functional financial literacy, negotiation skills and knowledge of govt scheme

2. Gender sensitisation
Sensitise male farmers on the role of women cotton cultivators and the benefits of strengthening their involvement

3. Demonstration plots and LGs
Enable participation of women in learning groups (LGs) and demo plots to ensure continuous learning

This will be complemented with on-going advisory support provided by field facilitators to the BCI co-farmers.

Evaluation framework adopted to measure pilot success

The objective of the pilot is to test relevance, effectiveness, impact and cost of inclusion of women cultivators in the Quality Assurance Programme

	Relevance	Effectiveness	Impact	Cost
Definition of parameter	Assess the extent to which the programme ensures suitability to the needs of women co-farmers, pertinence to the market conditions and maximization of impact as part of design and execution	Assess the extent to which the objectives of the program have been achieved	Assess the extent and type of change produced as an outcome of the programme interventions, measured against key economic and social indicators	Assess the short term and long term cost implications of running the program in a given geographical area / at a desirable scale
Measurement of parameter	• Evidence built through primary research • Feedback gathered from co-farmers, male farmers and field facilitators	Measured through **output** indicators: • Increase in knowledge of good agronomic practices • Increase in functional financial literacy • Shift in knowledge of male farmers towards the role and contribution of women co-farmers	Measured through **outcome** indicators: • Adoption of good agronomic practices by co-farmers • Economic and social outcomes as per select BCI result indicators • Attitudinal shift of male farmers towards co-farmers and increased involvement of co-farmers in decision-making	• Conducting cost analysis to understand proportionate scale up costs basis pilot costs • Projecting per farmer costs to benchmark against BCI cost norms

An M&E framework was designed to measure pilot effectiveness and impact

Input/Activity Indicators

These indicators measure the resources that are deployed as well as the activities carried out to achieve specific impact objectives

Community mobilization and formation of Learning Groups (LGs)

This indicator measures the inputs and activities undertaken to successfully mobilise 2000 co-farmers and form 50 LGs

Agronomic, Life skills and Gender Sensitisation trainings

This indicator measures the number of co-farmers who have received agronomic and life skills training and the number of male farmers who have received gender training

Demonstration Plots

This indicator measures the number of demonstrations undertaken

Output Indicators

These indicators measure the tangible and immediate knowledge and practice changes among the community that result from the activities that are undertaken

Increase in Knowledge

This indicator aims to measure the increase in co-farmer's knowledge occurred through agronomic and life skills training

Outcome Indicators

These indicators measure the indirect or intangible benefits that are incurred by the community that follow from delivery of outputs

Adoption of Agronomic Practices

This indicator aims to measure the increase in adoption of agronomic practices among co-farmers

Economic Outcomes

This indicator aims to measure the overall economic benefits accrued by the households through the program activities

Environmental Outcomes

This indicator aims to measure the environmental benefits achieved through adoption of environmentally friendly practices

Social Outcomes

This indicator aims to measure the gender upliftment that has happened in co-farmer households

Effectiveness indicators were mapped to shift in knowledge and practice while *impact indicators* were measured against BCI's result indicators

Input/Activity Indicators

Community mobilization and formation of Learning Groups (LGs)

- 2 producer units and 5 FFs identified
- 11 villages identified
- 2 Field meetings conducted in villages to share program details with potential co-farmers
- 2000 women co-farmers selected
- 50 co-farmer learning groups formed

Agronomic, Life skills and Gender Sensitisation trainings

- 3 cycles of agronomic training provided to 2000 co-farmers
- 2 cycles of life skills training provided to 2000 co-farmers
- Gender sensitization ToT to the Lupin team
- 2 round of gender sensitization to 4000 male farmers (100 LGs)

Demonstration Plots

- 11 demo plots identified and mapped to 11 women co-farmers; demonstrations conducted as per identified practices

Output Indicators

Increase in Knowledge

- Increase in knowledge of good agronomic practices, as per BCI package of practices
- Increase in financial literacy and knowledge of Government schemes
- Shift in knowledge of male farmers towards the role of women co-farmers

Outcome Indicators

Adoption of Agronomic Practices

- Number of co-farmers adopting practices related to improved sowing, storing and harvesting, as per BCI PoP
- Number of co-farmers adopting practices related to improved fertilizer use, as per BCI PoP

Economic Outcomes

- Reduction in farming costs through optimized use of labour; fertilizers and pesticides (as per CICR guidelines)
- Increase in cotton yield and profitability, on the 10 demo plots

Environmental Outcomes*

- Reduction in use of harmful pesticides and fertilizers

Social Outcomes

- Increase in participation of women cotton cultivators in agricultural decision-making within the household
- Change in perception of women co-farmers economic roles and capabilities, amongst the male farmers
- Number of co-farmers experiencing a change in perception from male farmers

**Measurement of Environmental Outcomes was dropped given the limitations posed by*

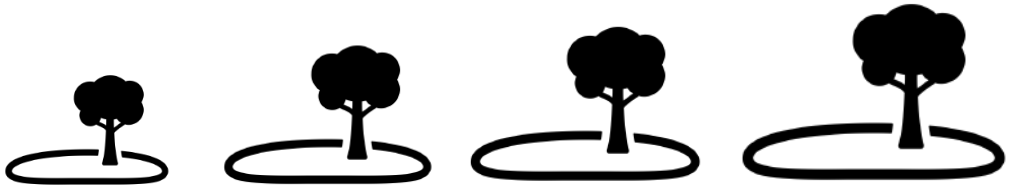
Co-farmer profile and key activities conducted during the pilot

On average, co-farmers are middle-aged women with 10+ years experience in cotton cultivation and no prior exposure to agri-training; majority are small-holders

Profile of co-farmers who participated in the pilot

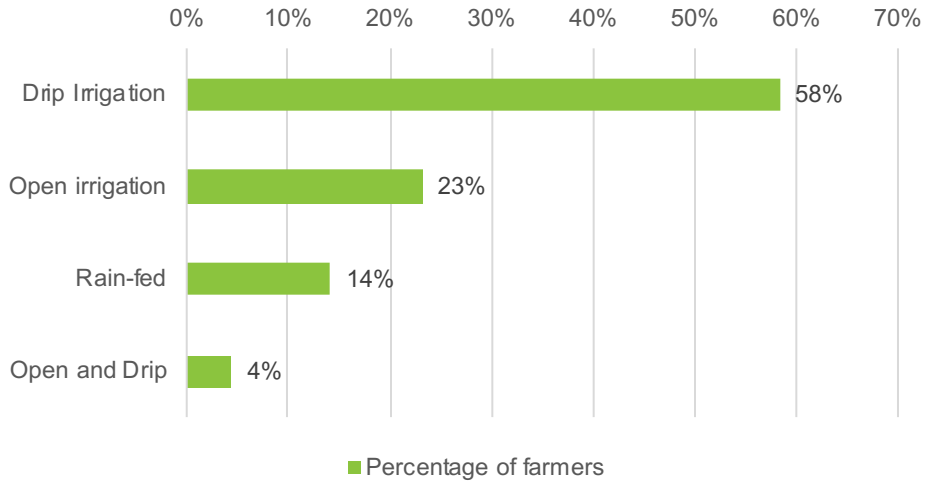
- 70% of the co-farmers were between 30-50 years of age
- 70% of co-farmers have studied up to grade 10 and 18% have never gone to school
- Majority of the co-farmer households have an average of 1.4 hectares of agricultural land
- 58% co-farmers rely solely on drip irrigation and 23% solely on open irrigation
- 64% co-farmers have worked in cotton cultivation for 10-20 years; 23% co-farmers have worked in cotton cultivation for <10 years
- 97% of the co-farmers received formal agronomic training for the first time through the pilot

Land holdings* across co-farmer households



Marginal 33% | Small 39% | Semi-medium 24% | Medium 24%

Source of irrigation used



Note: Male farmers enrolled in the pilot for gender sensitisation training include BCI farmers who are either: 1. from within the co-farmer household or 2. from with the pilot production units

*As per the Agricultural Census of India, marginal = less than 1 hectare, small = 1 to 2 hectares, semi-medium = 2 to 4 hectares, medium = 4 to 10 hectares, large = more than 10 hectares; 1 hectare = 2.4 acre

The pilot focuses on strengthening capabilities of co-farmers and male farmers across 2 production units in Dhule, Maharashtra

Planned Project Interventions

50 **Learning Groups** consisting of 2000 co-farmers from 2 PUs (Shirud and Boris) in Dhule, Maharashtra

2000 Co-farmers to be provided **Agronomic Training** across 3 phases of training

2000 Co-farmers to be provided **Life Skills Training** focused on functional financial literacy, negotiation skills and awareness of government schemes

10 **Demonstration Plots** to be run to demonstrate innovative farming practices (to be led by co-farmers)

4000 Male farmers to be provided **Gender Sensitisation Training** to bring about desired knowledge and attitudes of the community towards co-farmers

Project Partners

Better Cotton Initiative co-funded the pilot to test efficacy of involvement of co-farmers in QAP

IDH Sustainable Trade Initiative co-funded the project alongside BCI to test the findings and recommendations of the 2019 IDH-Sattva Report

Lupin Foundation implemented the pilot on the ground with co-farmers and male farmers, including administering agri-training, life skills training, gender sensitisation training and demo plots management

Sattva Consulting led pilot co-creation efforts, designed and delivered gender sensitisation modules, conducted the pilot M&E, prepared the outcome report / roadmap and supported pilot governance

Agronomic training was held in 3 phases and included pre-season, mid-season and end-season modules

Training delivered by

Female field facilitators with a farming background in cotton and qualifications of MSW / Agriculture Diploma

Training design

The agronomic training was imparted following the same format as is followed in BCI smallholder programmes in India

Components	Duration	Total farmers trained
Pre-season training	2 hours	479 co-farmers trained
Mid-season training	2 hours	1556 co-farmers trained
End-season training	2 hours	1790 co-farmers trained

What was the scope of the agronomic training?

Pre-season training

- Better Cotton standard systems
- Introduction to IPM, use of bio / homemade pesticides and safety standards for spraying
- Soil testing
- Seed treatment, sowing, intercropping and managing plant population
- Sowing & plantation practices
- Introduction to decent work principles

Mid-season training

- Identification of pesticide by labels; phasing out of harmful pesticides
- Identification of pests, scouting and ETL
- Preparation of pesticide and safety standards for spraying
- Decent work principles (non-discriminatory and harassment free work environment for labour)
- Integrated Nutrient Management and fertilizer application

End-season training

- Water management
- Maintaining fibre quality (harvesting and storing practices)
- Considerations for selling (BCI ginner versus agents; good practices)
- Early clearance of field for next season
- Crop rotation

*The training was planned for 2000 co-farmers but due to the onset of COVID-19, the actual numbers were lower

The life-skills training was a 3-hour session which aimed to provide functional skills to co-farmers

Training delivered by

Female field facilitators with relevant experience and qualifications of 12th pass / MSW / Agriculture Diploma

Training design

Life skills training was designed to provide functional financial literacy and knowledge of govt schemes; delivered through a single session

Components	Duration	Total farmers trained
Life skills training	3 hours	1676 Co-farmers Trained

What was the scope of the life-skills training?

Financial literacy

- Concept of financial literacy
- Need for financial literacy
- Components of financial literacy
  - I. Financial management
  - I. Tracking family income-expenditure
  - II. Secured savings
  - III. Avoid unnecessary spending
  - IV. Income sources & finance

Government schemes

- Importance of social security schemes
- Pradhan Mantri Jan Dhan Yojana
- Prashan Mantri Jivan Jyoti Bima Yojana
- Pradhan Mantri Suraksha Bima Yojana
- Prashan Mantri Fasal Bima Yojana
- Atal Pension Yojana
- Janani Shishu Suraksha Programme

Personal Development

- Self-respect
- Stress Management
- Effective Communication
- Problem solving
- Decision Making

*The training was planned for 2000 co-farmers but due to the onset of COVID-19, the actual numbers were lower

Demonstration plots were selected to demonstrate the benefits of adoption of good agronomic practices and innovations

Supervised by

Female and male field facilitators with a farming background in cotton and qualifications of MSW / Agriculture Diploma

Intervention design

The demo plot sought to demonstrate innovative farming practices and were led by the co-farmers

Components	Total demo plots
Pre-season activities	11 Demo Plots
Mid-season activities	11 Demo Plots
Post-season activities	11 Demo Plots

What was done on the demo plots?

Pre-season activities

- Seed treatment
- Inter-cropping

Mid-season activities

- Bio Fertiliser application
- Trap crops
- Installation of pheromone traps, and yellow and blue sticky traps
- Installation of light trap
- Bio-pesticide spraying
- Food sprays
- Personal protective equipment use

Post-season activities

- Cotton storage
- Display banner

*10 demo plots were planned but 11 were selected for actual implementation.

The gender sensitisation training was delivered to male farmers across 2 sessions to provide conceptual and practical understanding of gender dynamics

Training delivered by

Male field facilitators with a background in cotton and qualifications of 12th pass / MSW / Agriculture Diploma

Training design

The gender sensitisation training was designed to be delivered in two sessions, to build both conceptual and practical understanding

Components	Duration	Total farmers trained
Session 1: Introduction to 'gender', gender roles, & gender division of labour	4 hours	1790 Male-farmers Trained
Session 2: Gender Relations, access to resources & decision making	3 hours	2291 Male-farmers Trained

What was the scope of the gender sensitisation training?

Session 1

- Introduction to the term 'gender'; Socialization across the lifecycle
  - i. Activity I: Gender vs sex
  - ii. Activity II: Socialization across the lifecycle
  - iii. Activity III: Gender norms
- Gender roles, Gender division of labour
  - i. Activity IV: Daily activity clock
  - ii. Activity V: Activity profile

Session 2

- Gender Relations
  - i. Activity VI: Power walk exercise
- Access to resources, Decision making
  - i. Activity VII: Access to and control over resources
  - ii. Activity VIII: Decision-making

*The training was planned for 2000 co-farmers but due to the onset of COVID-19, the actual numbers were lower

Pilot relevance to co-farmers and male farmers

Interviews with Field Facilitators, co-farmers and male farmers depict how the interventions of the BCI-IDH pilot are relevant at both economic and social level

	Social relevance	Economical relevance
Agronomic Training	The agronomic training is the first step to instil the skills and knowledge among co-farmers which will enable them to participate in decision making	While the 2019 study revealed that co-farmers undertake key tasks that impact the quality and quantity of cotton produced, the baseline highlights that co-farmers lack knowledge of seed quality, chemical use, cotton transportation, market prices and pest identification which are key to improve economic outputs
Life-Skills Training	Over and above building agronomic capabilities, women also reported a lack of confidence to voice their opinions given the rigid gender structure. Life Skills aimed to bridge this gap along with imparting knowledge of financial literacy and government scheme which would enable co-farmers to become independent	The baseline study revealed that co-farmers lack the time to dedicate to critical farming activities which impact the quality and quantity of cotton. Saving time has allowed many co-farmers to become a more active participant in farm activities and decision making as revealed through case studies
Gender Training	The 2019 IDH-sattva research study established the need for awareness creation in the community on the amount and value of work co-farmers do and the importance of involving co-farmers in decision making	Social norms restrict co-farmers' access to productive resources and information which limits their economic contribution. To improve economic outcomes, gender sensitisation becomes key to transform rigid gender roles and norms
Demo-Plots	Demonstration plot aimed to demonstrate the impact of co-farmers co-leading farming alongside their husbands for the community to witness	Demonstration plots results reveal the economic outcomes that co-farmers have been able to achieve through adaptation of new agronomic practices

Bharthi from Vinchur Village is now actively involved in farm-related decision-making and has produced 20 additional quintals of high quality cotton this season

Context

“My name is Bharthi Suresh Borse. I live in a village called Vinchur in Dhule. When the Lupin team first approached me for setting up a demo plot, my husband was not very eager to participate. He was not confident that I can run the farm along with him even though I am fairly well educated. I convinced him to participate. We did all farm activities collaboratively on the demo plot. I attended the agronomic and life skills training and my husband and I attended the gender sensitisation training together. His perspective towards me slowly started changing after the gender sensitisation training and he has also gained more confidence on my skills.”

Social Changes

“I learnt about the importance of women participating in decision making and through life skills training, I acquired the confidence to make decisions related to the farm for the first time in my life. After the training, I felt like women can do anything, women’s role does not need to be restricted to the house. After the agronomic training, I ensured that my husband uses protective gear while spraying pesticides. My husband is very happy with my contributions, and his perception towards me has changed. He accepts that I also have all the requisite capability. I even accompany him to the market now, which has further built my knowledge of cotton selling. Lately we have been taking decisions together because he is starting to understand that there is benefit in taking decisions together.”

Economic Changes

“Through the demo plot activities, we have been able to save money on seeds, pesticides, and fertilizers, saving nearly INR 5000. We also produced 20 additional quintals of high-quality cotton this year on our demo plot!”

Anita Patil has gained confidence to participate more actively on her farm, inspite of her struggles with domestic violence

Context

“My name is Anita Mahesh Patil. I belong to a village named Sarvad. My life has changed a lot after I have started to participate in this programme. My husband never used to let me go out of the house unless it was for farming. My husband has a drinking problem and he never really contributed to farm activities himself. Whatever work was due on the farm, my children or I used to take it up. Over and above, he used to abuse me physically and verbally. I could never attend any training or even talk other women before. At first, my husband was hesitant to let me take up a demo plot in this programme but I managed to convince him. We also attended all other trainings in this last year.

Social Changes

“I’ve observed some changes after the gender sensitisation training. My husband has become more open to me attending various trainings or group meetings. He also participates more in farm activities now. The trainings have completely changed the way we grow cotton. I used to feel helpless and depended upon my husband for the smallest of things. I feel more equipped now to manage my farm. In fact, I am confident that even if my husband cannot support our farm, I will be able to do it by myself for my household and children. I take all decisions on the farm now.”

Economic Changes

"Earlier we used to just put fertilizer and pesticide without putting much thought into it. Now we prepare our own bio-alternatives and apply them in a systematic manner. We used to spend INR 10,000 for 3 sprays on a 3-acre farm, but we have saved nearly INR 5000 per acre through adoption of bio pesticides. Our earning have increased by INR 10,000 per acre. This year, we intercropped cotton with Zhandu flowers, which also provided some additional income.

Chagan Amrutkar has realized the importance of women participating in decision making after co-running the demo plot with his wife

Context

"My name is Chagan Amrutkar. I live in a village named Chinchkheda. I was never helpful around the house and didn't provide my wife much support. I used to wake up at 7 am to start planning farm-related tasks while my wife would wake up at 4 am and do all the household work. As men, we never used to think about the amount of work women do on a daily basis. I attended the gender sensitisation training and my wife attended the agronomic and life skills training. I was exposed to this kind of training for the first time."

Social Changes

"The training has influenced the way I think. Now I wake up early and go to the well to fetch water and then help clean our house. I have started taking up a few of my wife's household responsibilities. Women work for extended hours and I want to help. We have also started dividing some of her farm tasks between us. We do these tasks at the same time now. I have also made it a point to discuss farm purchases with her before they are made."

Economic Changes

"This year, we implemented the one-seed technique, intercropped pulses along with cotton, and put fly traps on the farms, all of which has helped increase our crop production. Earlier we used to be able to grow a maximum of 4-5 quintals per acre but now we grow 9 quintal per acre. We used to spend INR 50,000 and earn INR 70,000. But after all the training, we now spend only INR 30,000 instead. We have also started using cotton cloth bags to transport cotton instead of plastic, which retains the quality of cotton"

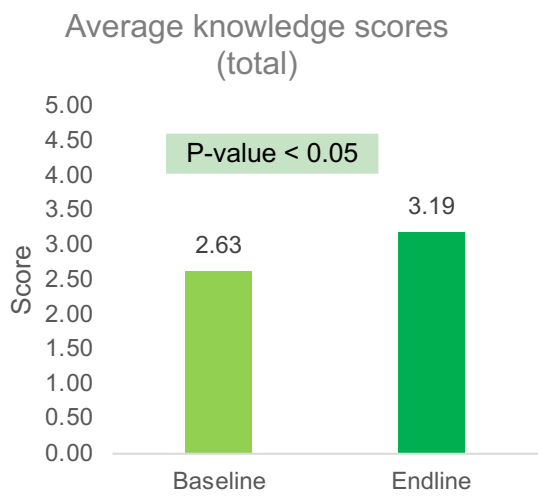
Pilot effectiveness: Change in agronomic knowledge

Co-farmers saw an increase in agronomic knowledge; knowledge score increased from 2.63 at baseline to 3.19 at end-line, out of a total of 7

To evaluate outputs achieved through the co-farmer agronomic trainings, co-farmers were administered questions that tested change in agronomic knowledge before (at baseline) and after the training (at end-line). This included:

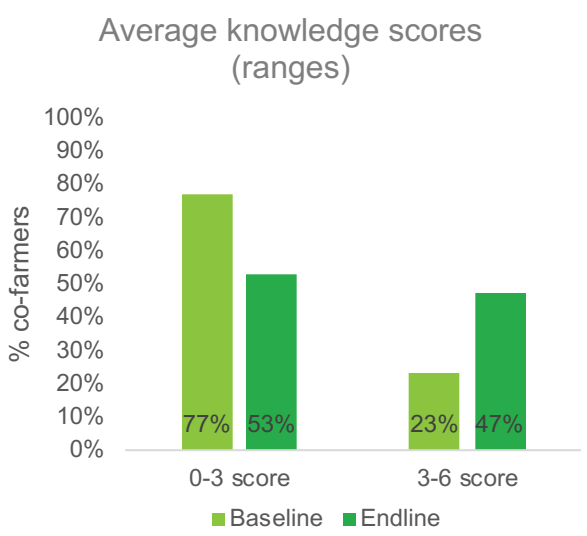
1. Focus on tasks that co-farmers are directly responsible for on the farm. For example, fertiliser application methods, sowing techniques etc.
2. Focus on tasks / activities that co-farmers could positively influence. For example, decent work practices or limiting purchase / usage banned pesticides.

Average knowledge scores across co-farmers increased by 0.56 points



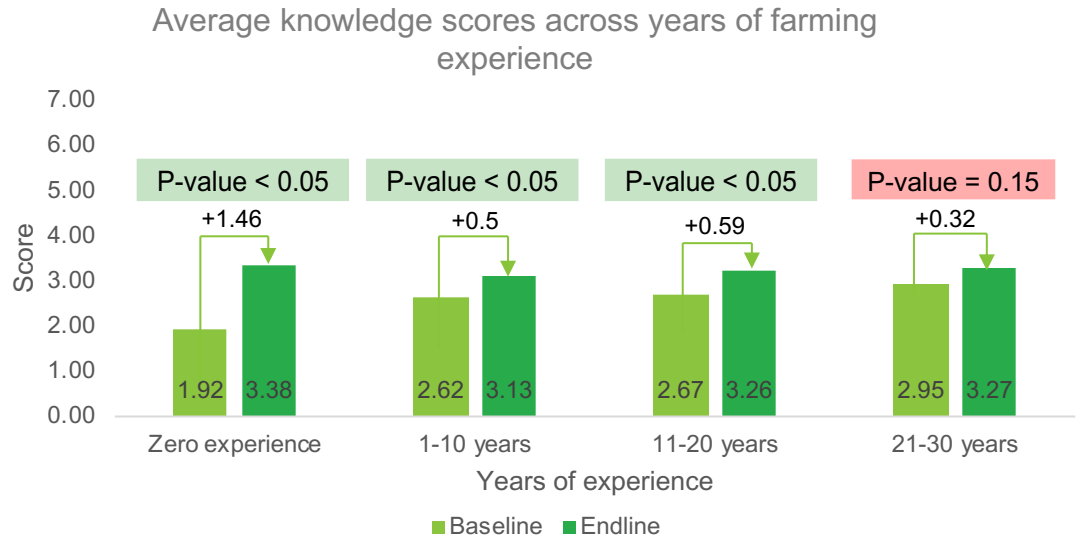
The p-value suggests that the change in knowledge is statistically significant i.e. the increase is not due to as-usual increase, but can be attributed to external factors (eg, the pilot).

There is a 24% rise in co-farmers scoring between 3-6 points



At baseline, 23% farmers scored between 3-6 points on the 'knowledge' test; this increased to 47% co-farmers scoring between 3-6 points at end-line

Other than farmers with 21-30 years of experience, all farmers have seen a statistically significant gain in agricultural knowledge after the pilot



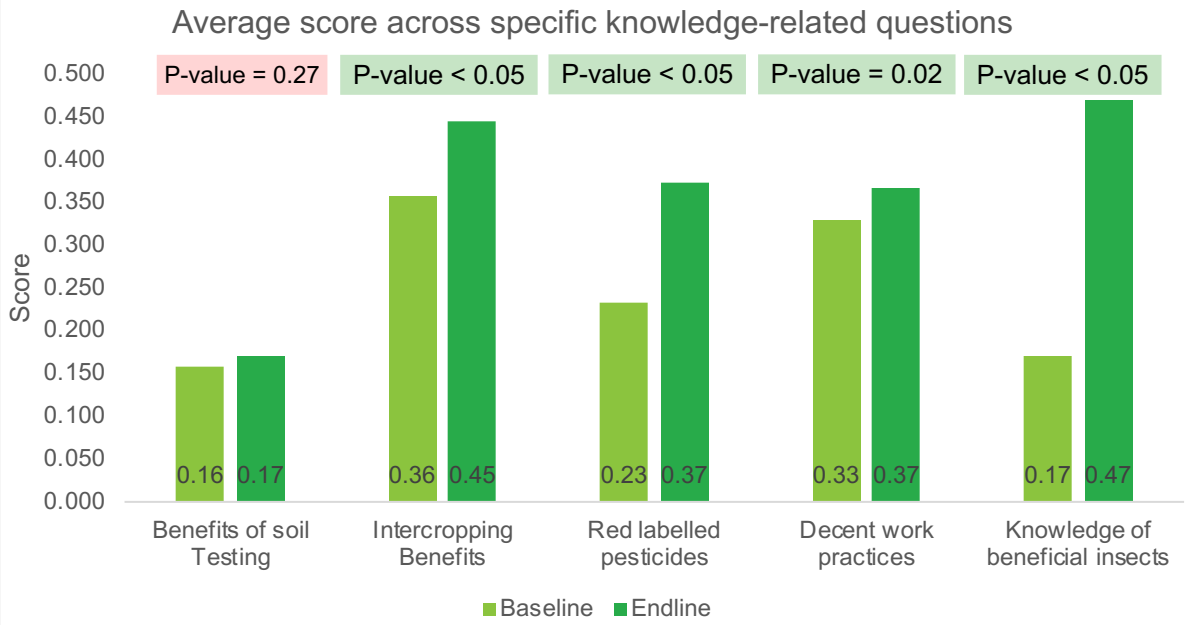
Farmers with relatively less cotton farming experience have gained the most in knowledge.

Source: Pilot baseline/end-line data; N=500

*One tailed t-test used to check statistical significance. Results were considered statistically significant if P-Value < 0.05.

This change in knowledge was observed across nearly all areas of enquiry

Co-farmers were administered specific questions to test shift in agronomic knowledge from baseline to end-line. Analysis was done to check whether the shift in knowledge was statistically significant.

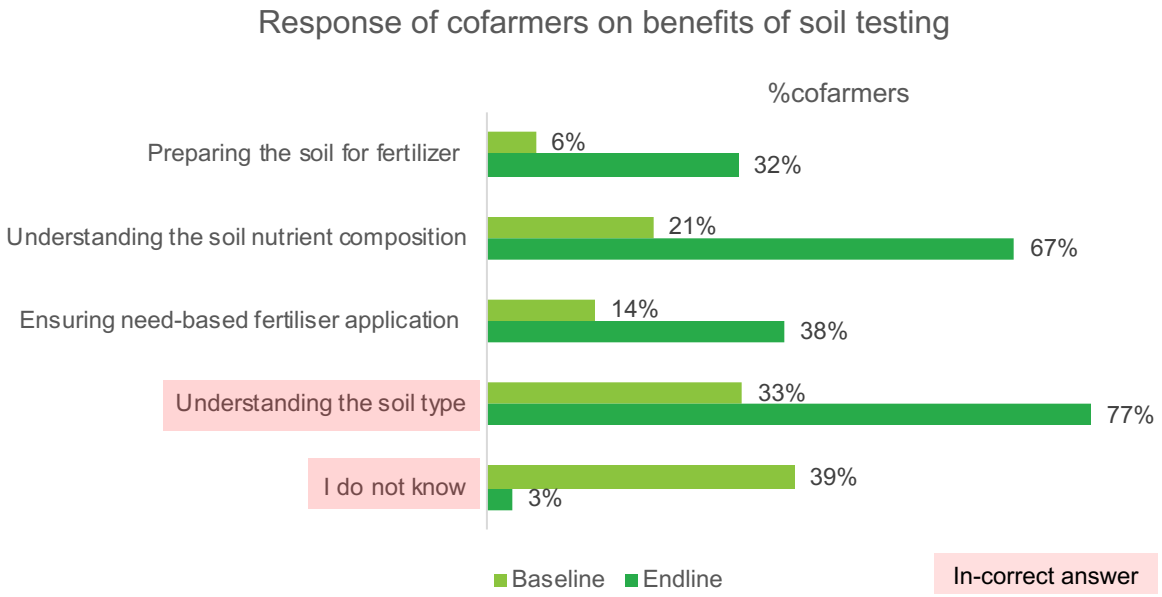


A meaningful shift in knowledge was seen across:

- Benefits of soil testing
- Benefits of intercropping
- Identifying red labelled (banned) pesticides
- Decent work practices
- Beneficial insects

Here, 'statistically significant' means that the shift can be attributed to external factors, wherein the intervention could be one such factor.

Co-farmers did not see any significant increase in knowledge of the benefits of soil testing.

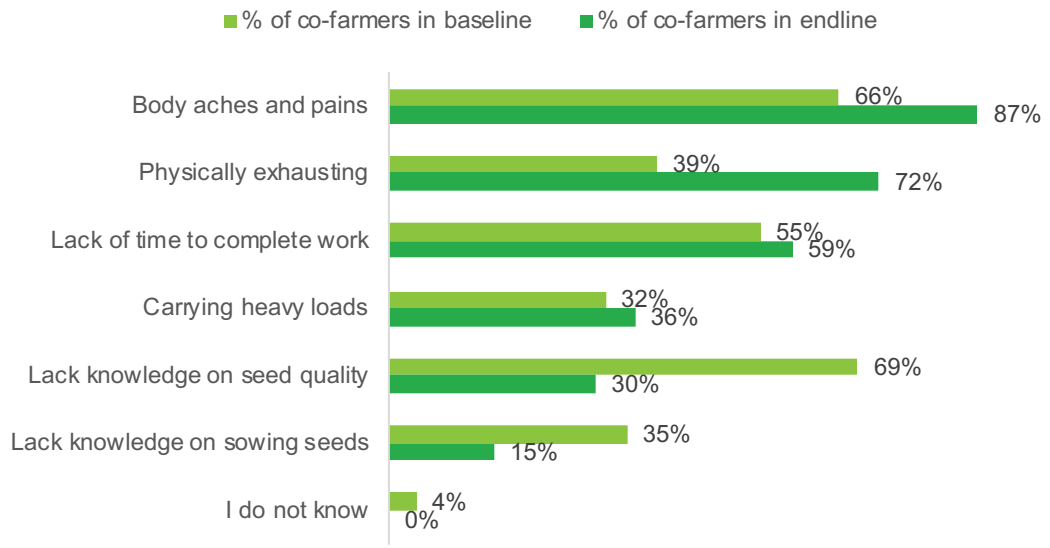


- Overall, there is a general increase in the percentage of co-farmers who identified the benefits of soil testing correctly at end-line. There is also a decrease in the percentage of co-farmers who have responded with "I do not know" at end-line.
- However, 77% of co-farmers surveyed in the end-line believe that understanding the soil type is also a benefit of soil testing, which is incorrect.
- This means that greater emphasis will have to be laid on clarifying misconceptions during agronomic trainings.

Source: Pilot baseline/end-line data; N=500

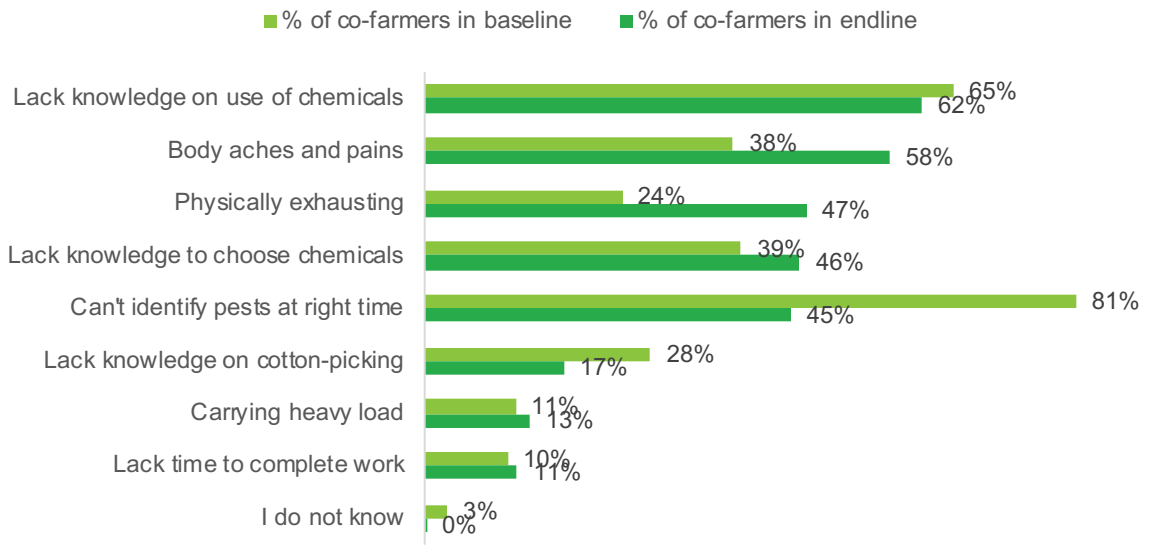
*One tailed t-test used to check statistical significance. Results were considered statistically significant if P-Value < 0.05.

There is a drop in the number of co-farmers who cite ‘lack of knowledge’ as a primary agricultural challenge (at end-line there is emphasis on drudgery-related challenges)



Top 3 challenges at baseline	Top 3 challenges at end-line
Lack knowledge on seed quality	Body aches and pains
Body aches and pains	Physical exhaustion
Lack of time to complete all work	Lack of time to complete all work

- At baseline, lack of knowledge on seed quality and on sowing techniques were cited as key challenges.
- At end-line, women co-farmers emphasized drudgery-related challenges.
- This could be owing to interventions made in the former and not the latter.



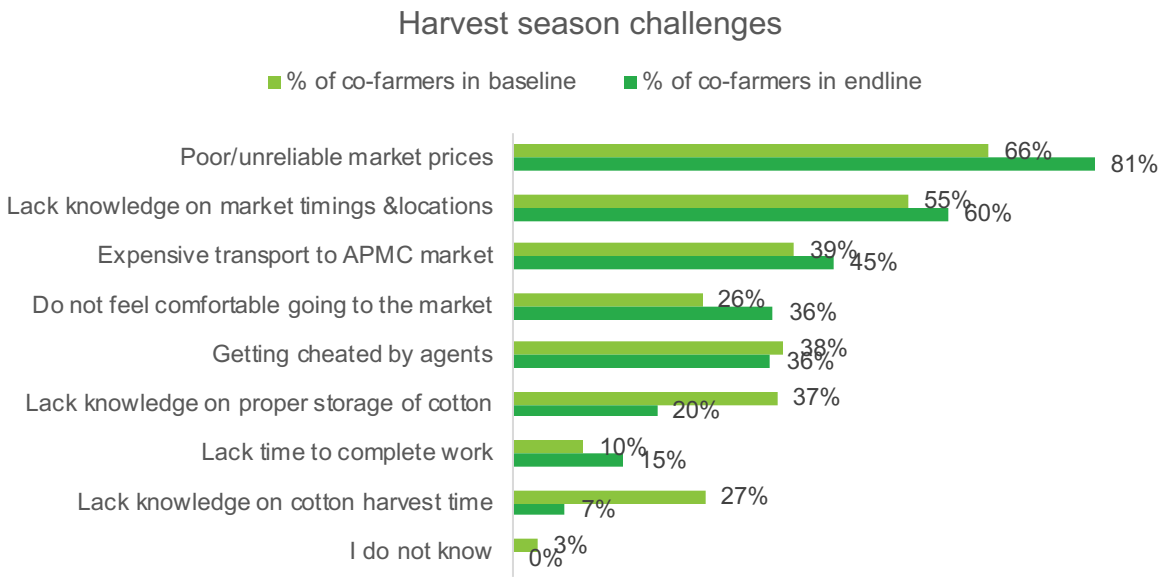
Top 3 challenges at baseline	Top 3 challenges at end-line
Can’t identify pests at right time	Lack knowledge on chemical* use
Lack knowledge on chemical* use	Body aches and pains
Lack knowledge on chemical* choice	Physical Exhaustion

- At baseline, 81% co-farmers couldn’t identify pests at the right time, but only 45% co-farmers face this as a primary challenge at end-line.
- Similarly, lack of knowledge on cotton-picking has also reduced.
- Co-farmers cited a need for greater knowledge on selecting the right chemicals.

Source: Pilot baseline/end-line data; N=500

* Chemicals: Pesticides and fertilisers

At end-season, knowledge-related challenges have reduced and there is greater emphasis on challenges related to accessing cotton markets, cotton prices, and so on



Top 3 challenges at baseline	Top 3 challenges at end-line
Poor/Unreliable market prices	Poor/Unreliable market prices
Don't know market time & place	Don't know market time & place
Transport to APMC market expensive	Transport to APMC market expensive

- Only 7% farmers at end-line report that it is challenging to identify the right time to harvest cotton as against 27% co-farmers at baseline.
- Interestingly, at end-line co-farmers shared that key challenges include unreliable market prices, limited market information and need for negotiation skills, indicating a growing interest in supporting cotton sales.

Source: Pilot baseline/end-line data; N=500

Key learnings / reflections based on challenges faced by co-farmers across cotton cultivation seasons

Challenges cited by the co-farmers suggest that there has been improvements in knowledge possessed by them. At end-line, co-farmers were less likely to cite knowledge-related challenges, especially when compared to baseline. This has been further validated through the statistically significant increase in knowledge seen at end-line. However, 1-time agronomic trainings may not bring about a desirable shift in knowledge that can be sustained. To do this, refresher training and handholding support is critical.

Specifically, co-farmers continue to require support with:

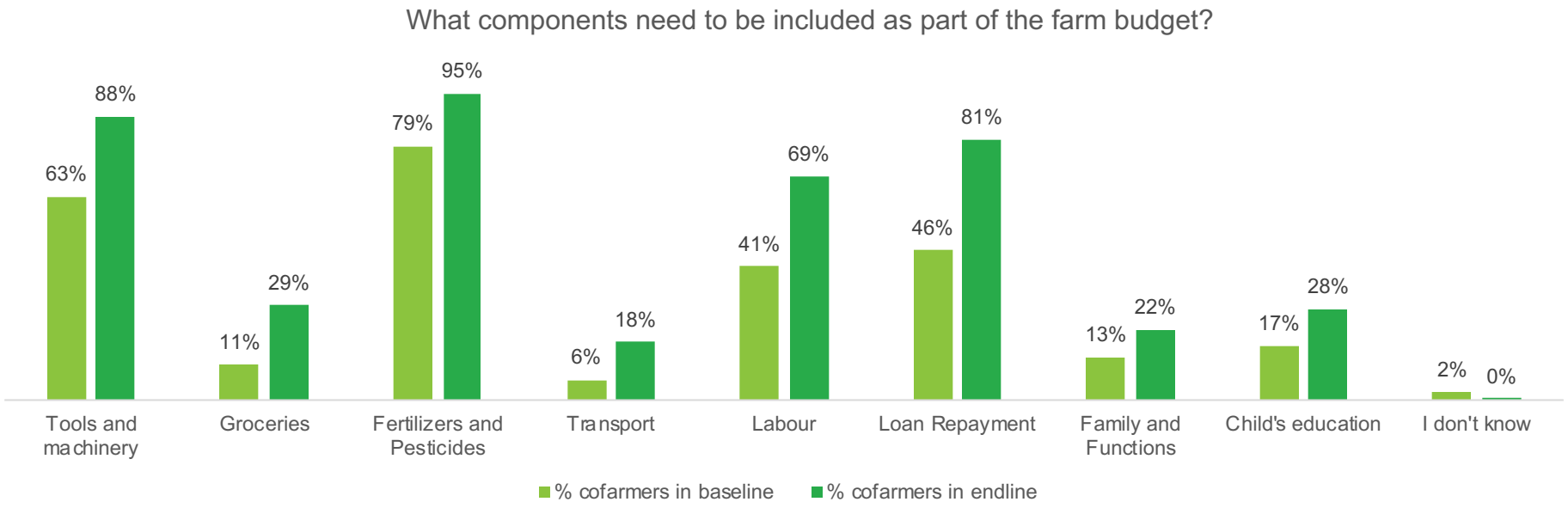
- Usage of safe chemical pesticides and fertilisers
- Accessing markets and market information
- Negotiation skills
- Tools and techniques that can reduce drudgery and physical strain

There is scope to abet these challenges through refresher agronomic training, including components on effective market access, gaining appropriate market information and negotiating appropriate selling price for cotton.

Pilot effectiveness: Change in financial literacy

Knowledge of creating farm budgets has improved amongst co-farmers; need for greater clarity around how to account for personal / household expenses

The pilot sought to provide co-farmers with functional financial literacy. This included building their understanding of how to compute a basic farm budget, including understanding the various components that a budget must include. To test this, during the baseline and end-line co-farmers were asked what cost items should be considered when budgeting for the farm.



- More than 80% co-farmers are now aware of the key components that are required to prepare a farm budget, including cost heads such as tools / machinery and pesticides / fertilisers (at baseline, farmers were unable to identify all the components).
- At end-line 81% co-farmers report needing to plan for loan repayments while planning the farm budget, as opposed to 46% co-farmers at baseline.

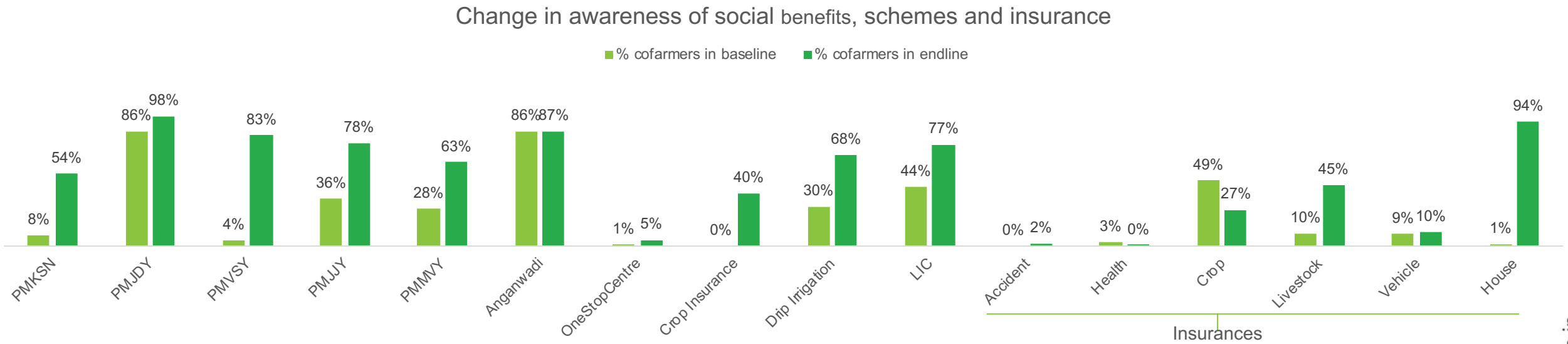
Key learning / reflection from the data

- Co-farmers require greater clarity around how to account for personal / household expenses when planning the farm budget.
- Functional financial literacy can be integrated into the agronomic training to enable co-farmers to form a clear link between farm activities and related financial planning.

Source: Pilot baseline/end-line data; N=500

An increasing percentage of women co-farmers are aware of the social benefits and government schemes that they are eligible for

Through the pilot, co-farmers were provided knowledge of relevant government schemes and types of insurance.
To test the transfer of knowledge, co-farmers were asked what social benefits and government schemes they were aware of, both at baseline and end-line.



- The end-line saw a significant increase in awareness of schemes such as PMKSN, PMVSY, PMJJY and crop insurance schemes.
- Additionally, knowledge of livestock and house insurance also saw an increase.

Key learning / reflection from the data

Greater emphasis to be provided on schemes that saw a low shift in awareness:

- Financial schemes: Pradhan Mantri Kisan Samman Nidhi (PMKSN); drip irrigation scheme
- Agricultural schemes: Pradhan Mantri Matru Vandana Yojana(PMMVY);
- Women-relevant schemes: One Stop Centre against domestic violence

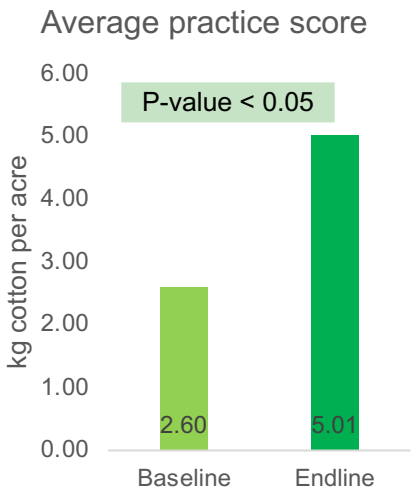
Source: Pilot baseline/end-line data; N=500

Pilot effectiveness: Adoption of agronomic practices

Adoption of good agronomic practices increased; ‘adoption of agronomic practices’ score increased from 2.60 at baseline to 5.01 at end-line, out of a total score of 9

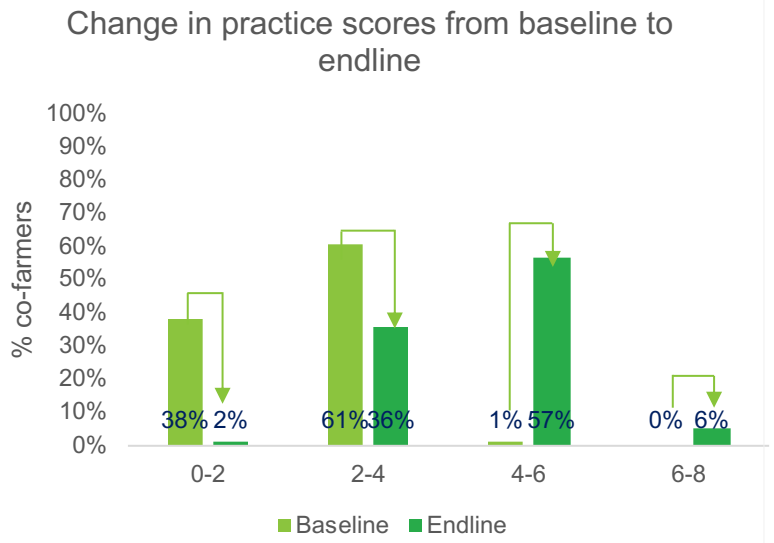
At baseline and end-line, co-farmers were asked about specific agronomic practices that they were implementing on the ground. The questions focus on tasks / activities that co-farmers are responsible for implementing. This included, fertiliser application methods utilised, adoption of biofertilisers, cotton picking methods adopted, and cotton storage practices, amongst several other questions. Co-farmer responses were measured to test alignment with BCI-promoted practices or CICR guidelines.

Score on adoption of good agronomic practices increased by 2.24 points, on average



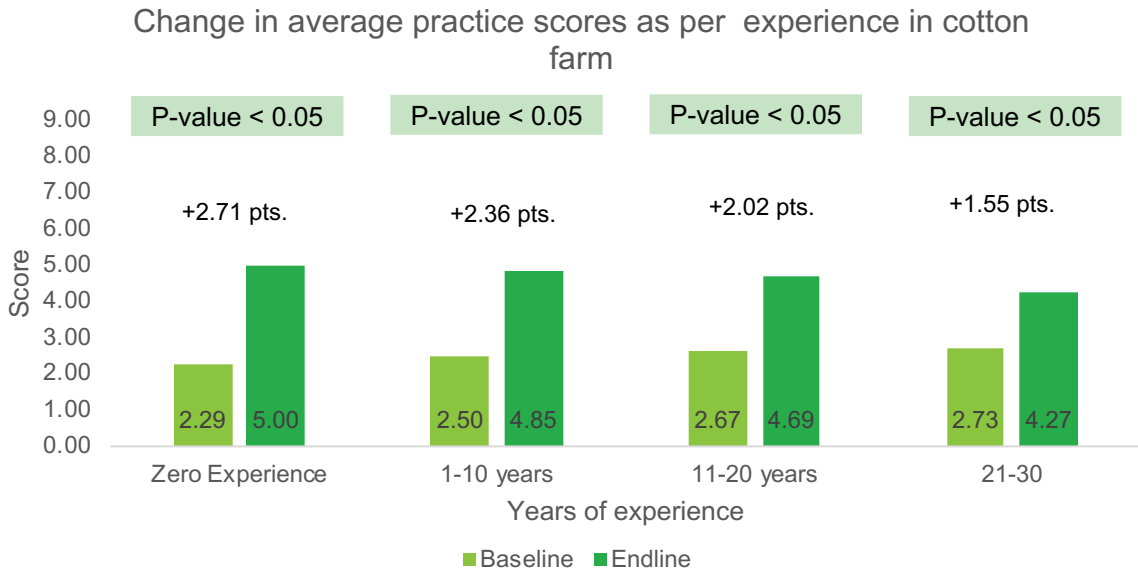
The p-value signifies that the change in score is statistically significant and is not owing to usual improvements in adoption.

There is a 56% rise in co-farmers scoring between 4-6 points on adoption of good agronomic practices.



At baseline, 1% co-farmers had a score that was above 4 points. At end-line, 57% scored between 4-6 points and 6% scored 6+ points, showing substantial movement.

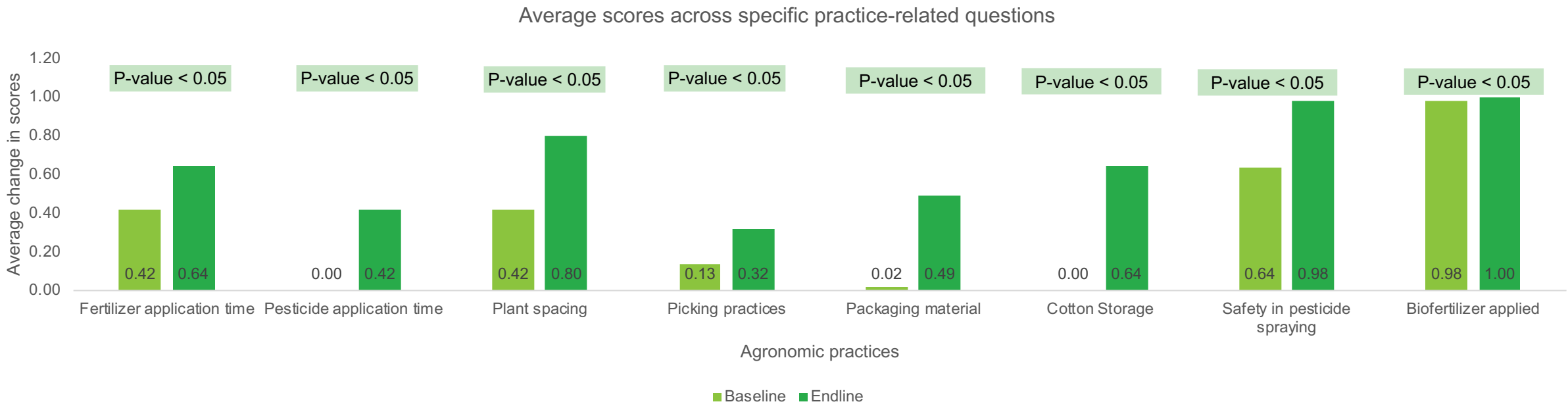
Improvements in adoption of agronomic practices have been reported across co-farmers, regardless of their years of experience in farming.



The shift in adoption of practices has been most significant for co-farmers who have zero years of experience in cotton farming. However, across all ranges, the shift in adoption denotes statistical significance (that is, it can to some degree be attributed to the interventions).

Source: Pilot baseline/end-line data; N=500

At end-line, co-farmers report better adoption of various BCI / CICR-recommended cultivation practices



The end-line analysis suggests that co-farmers have begun to adopt BCI / CICR recommended agronomic practices after the pilot:

- 42% co-farmers report applying pesticides only when it is needed, something almost no co-farmers were doing before the pilot
- 80% co-farmers report following correct plant spacing of 3x1.5 ft and 4x2 ft. (in case they use drip irrigation) as against 42% co-farmers at baseline
- 50% co-farmers as against none at baseline are packing cotton in cotton bags; 64% co-farmers as against none at baseline are storing cotton in a dry, designated area

This corroborates with the findings from the IDH-Sattva 2019 gender analysis report which suggested that inclusion of women in cotton programmes will improve cultivation practices.

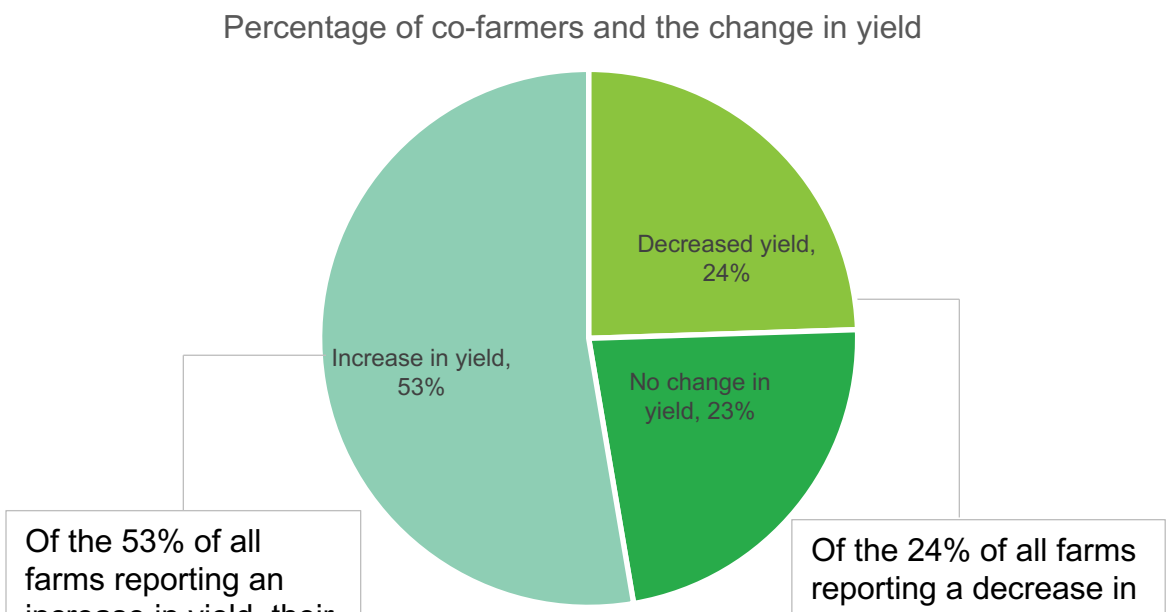
Additionally, the increase in the agronomic practices is statistically significant i.e. this increase is not just by chance alone, but can be attributed to external factors (in this, the intervention being one such external factor). Regular agronomic trainings in the pilot and exposure to demo plots within the vicinity have contributed to significant changes in how cotton is sowed, tended to, harvested and processed.

Source: Pilot baseline/end-line data; N=500

Pilot impact: Change in economic indicators

At end-line, co-farmers have also reported an increase in the yield per acre

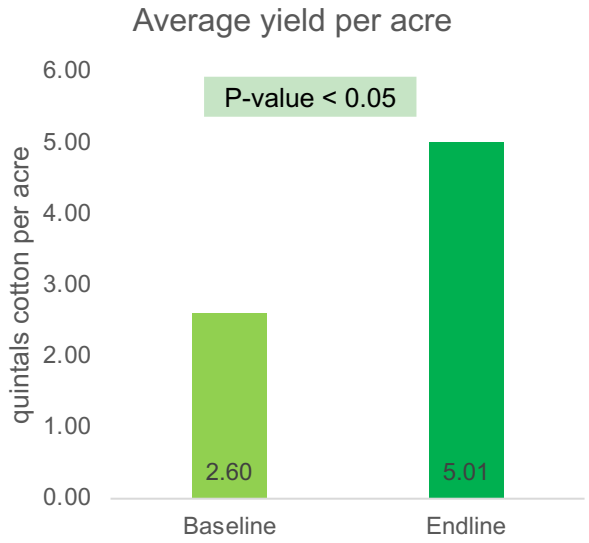
At end-line, 53% of co-farmer households experienced an increase in yield per acre on their farms, while 24% farms saw a decrease in yield and 23% farms experienced no change in yield.



Of the 53% of all farms reporting an increase in yield, their average output increased by 175 kg per hectare.

Of the 24% of all farms reporting a decrease in yield, their output on average decreased by 208 kg per hectare.

There is a statistically significant increase in the yield per acre from an average of 260 kg/hectare to average of 501 kg/hectare, i.e. this increase is not random and is caused due to an external factor.

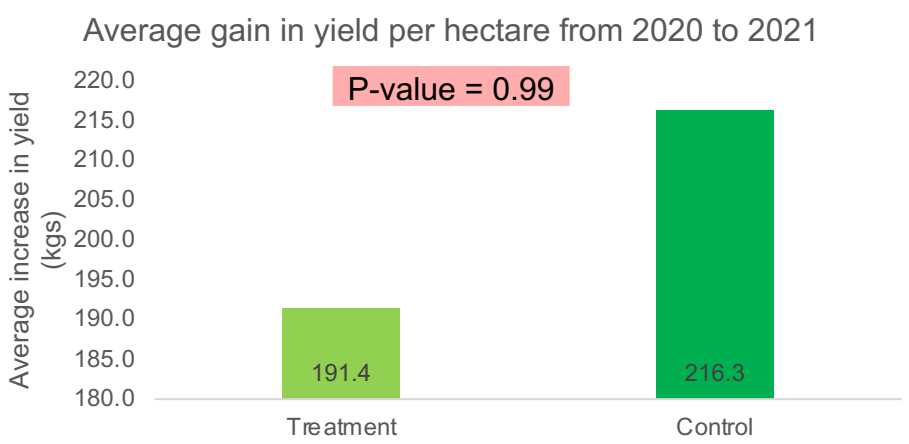


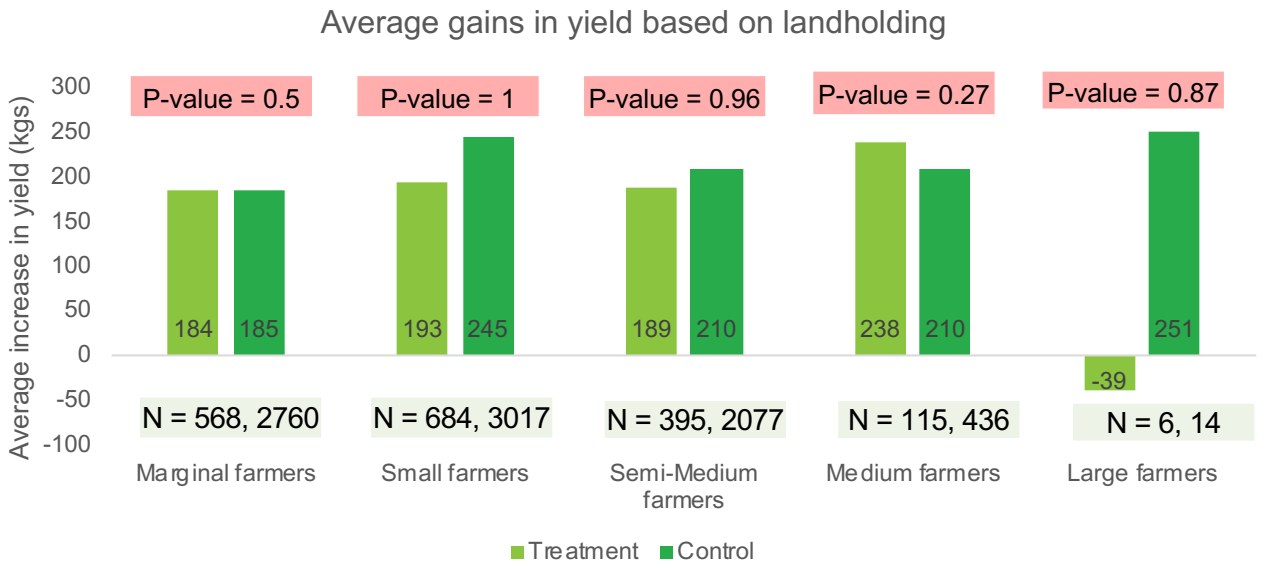
While the increase in yield has been caused by an external factor, in order to isolate whether this change has been due to the pilot intervention, comparison has to be made between farms that participated in the pilot and those that did not.

Source: Pilot baseline/end-line data; N=500

However, this increase in yield was observed across all households, including non-co-farmer households; thus, the increase cannot be attributed to the pilot programme

Apart from studying the change in economic indicators between baseline and end-line data, Sattva also conducted a difference-in-difference analysis of BCI data collected from co-farmer households. This analysis was done on data collected from two groups, namely the treatment group which included co-farmer households and a control group, which included non-co-farmer households. The analysis was primarily done on 'change in yield of farmers' across treatment and comparison groups.





- Overall it was found that yield has increased from 2019-20 to 2020-21 for all farmers.
- Additionally, there is no statistically significant change in yield seen by either treatment or comparison households.
- This denotes that the change in yield is likely due to factors other than the pilot intervention. For example, improved seed quality, increase in rainfall etc.

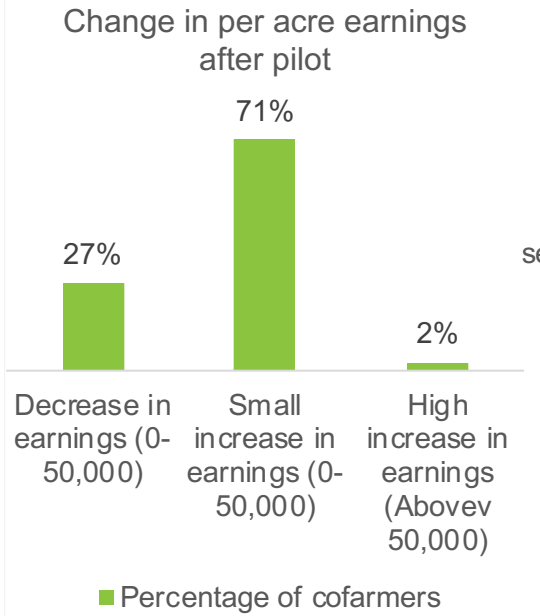
Key learning / reflection from the pilot: Economic outcomes may take longer to change

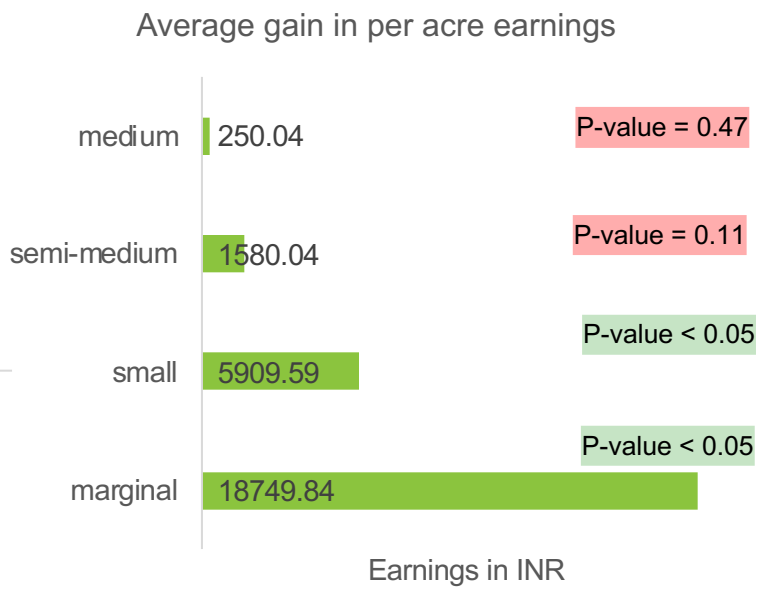
- This change cannot be observed over one season and will require a longer-term intervention

Source: BCI data collected by Lupin; N = 1768 for treatment group and N = 7738 for comparison group

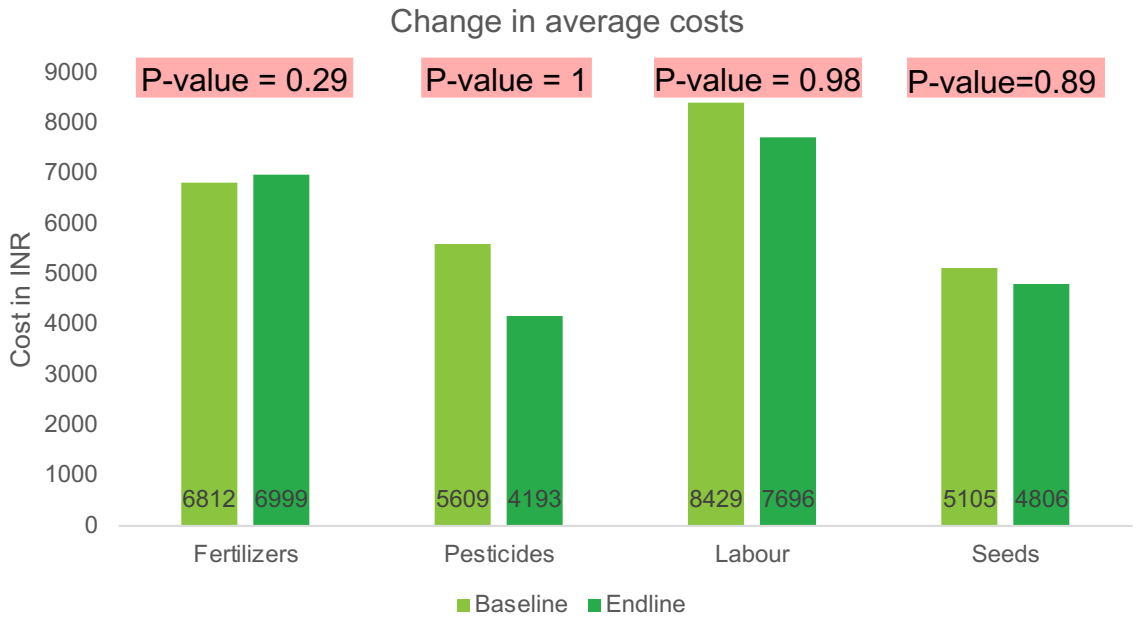
No significant change seen in earnings or costs incurred

71% of farms experienced increase in earnings within INR 0-50,000 per acre. However, only the earnings of marginal and small farms saw a statistically significant increase after the pilot.





There is no statistically significant difference in costs before and after the pilot i.e. no external factor has contributed to a large change and any change observed is what would be expected under normal circumstances



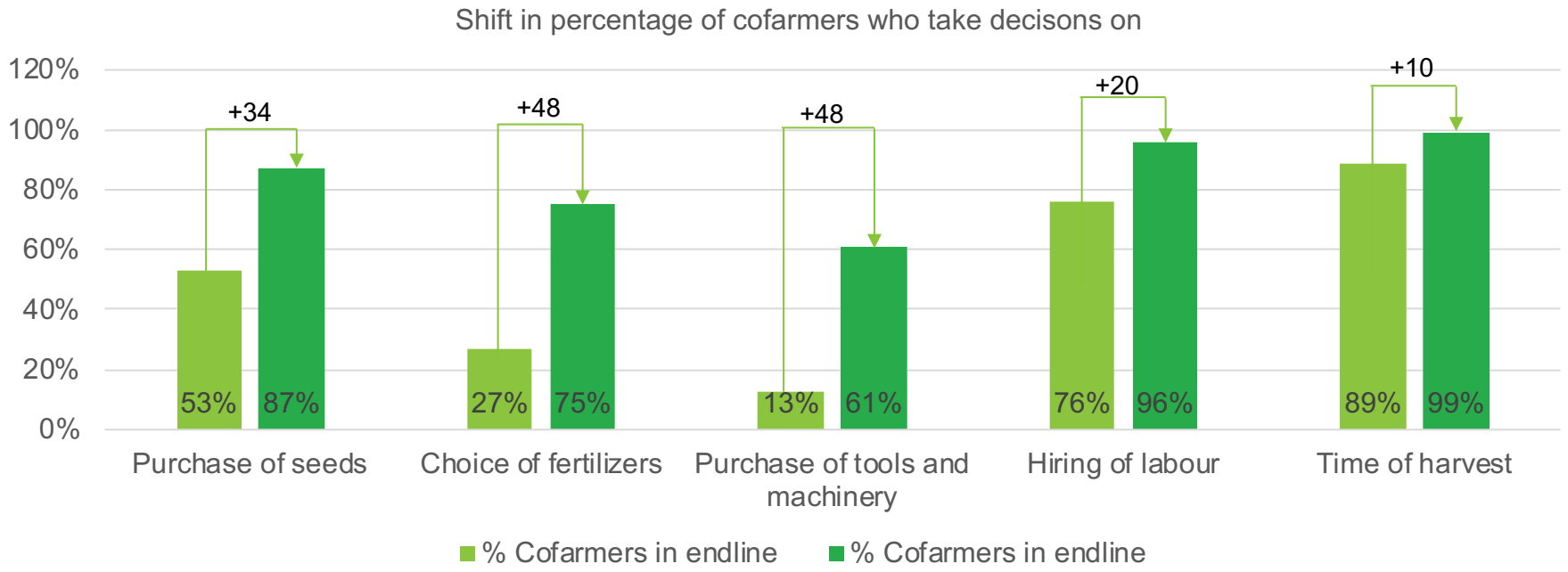
Key learning / reflection from the pilot: Economic outcomes may take longer to change

- The monetary effects of adoption of good agronomic practices would be visible only over a period of time and cannot be observed over one season.
- Similarly, behavioral changes that lead to reduced costs take longer to adapt and to result in substantial outcomes.

Source: Pilot baseline/end-line data; N=500

Pilot impact: Change in social indicators (as reported by co-farmers)

After the pilot, a higher percentage of co-farmers are participating in taking decisions



- An increasing percentage of co-farmers reported participating in all types of decisions on their farms.
- This is expected to be because of the combination of agronomic training, life skills training and gender sensitisation training.

Source: Pilot baseline/end-line data; N=500

Co-farmers have grown increasingly confident in taking decisions on the farm; this are still nervous in doing market negotiations

29% co-farmers in baseline as against only 5% in endline are confident in choosing cotton seeds, but 41% co-farmers still feel nervous in doing so.

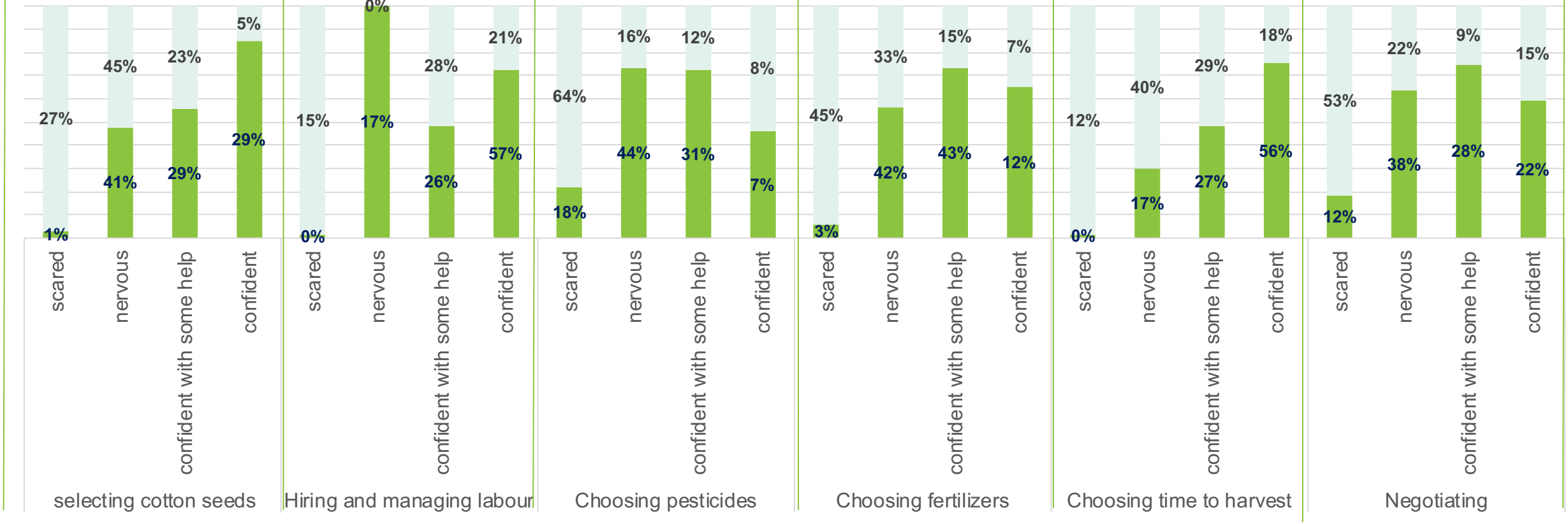
57% co-farmers are comfortable hiring and managing labour. No co-farmer surveyed after pilot is scared of managing labour.

Large shift observed in farmers from being scared to becoming confident in choosing which pesticides to use on the farm.

Large shift observed in farmers from being scared to somewhat confident in choosing the correct fertilizers for the farm.

An increasing number of farmers are becoming comfortable, with more than half being confident about harvest decisions.

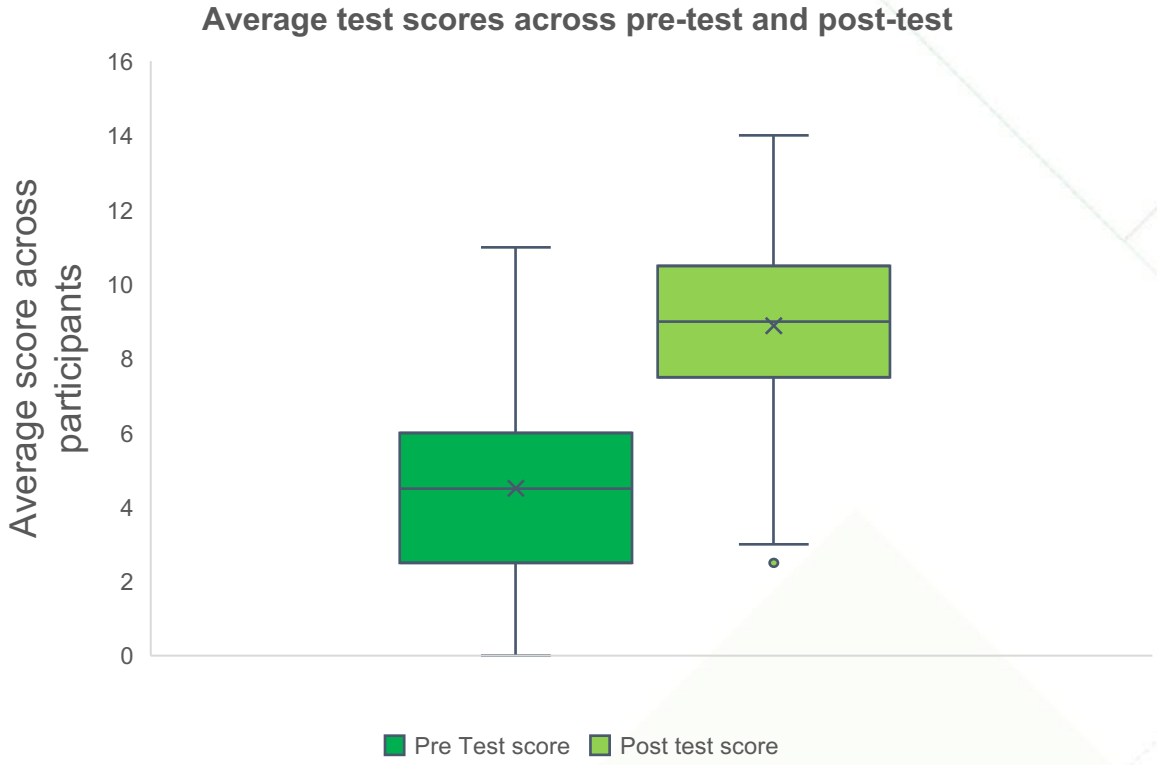
While a large number of farmers are no longer scared of negotiations, 66% farmers still need to build confidence in negotiating in the market.



Source: Pilot baseline/end-line data; N=500

Pilot impact: Change in social indicators (as reported by male farmers)

The average test score for male farmers increased from 4.5 points at pre-test to 8.9 points at post-test (out of a total score of 15 points), suggesting a considerable shift in knowledge through the training

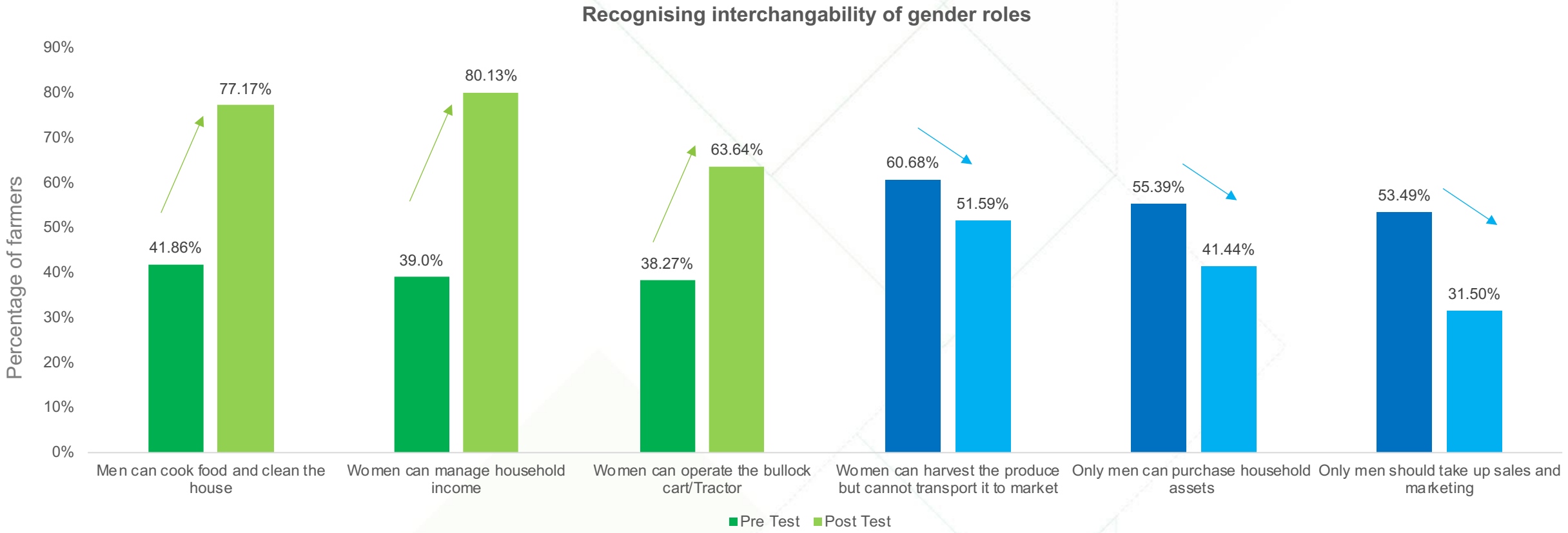


Score range	Pre-test (% of total farmers falling in the score range)	Post-test (% of total farmers falling in the score range)
0-5	59.0%	8.7%
6-10	30.2%	68.1%
11-15	0.2%	21.8%

- Overall, the training demonstrated a shift in knowledge with the average score increasing from 4.5 at pre-test to 8.9 at post-test.
- Additionally, the lowest pre-test score was 0 which moved up to 2.5 in the post-test while highest pre-test score was 11, which moved up to 14 in the post-test.

- While majority farmers scored less than 5 points during the pre-test, there was a significant shift to 6+ points during the post-test.
- Farmers scoring 11-15 points increased by 20%+.

There was an average ~25% increase in male farmers who recognise that roles of men and women can be interchanged, including traditionally male roles such as visiting the market and managing income

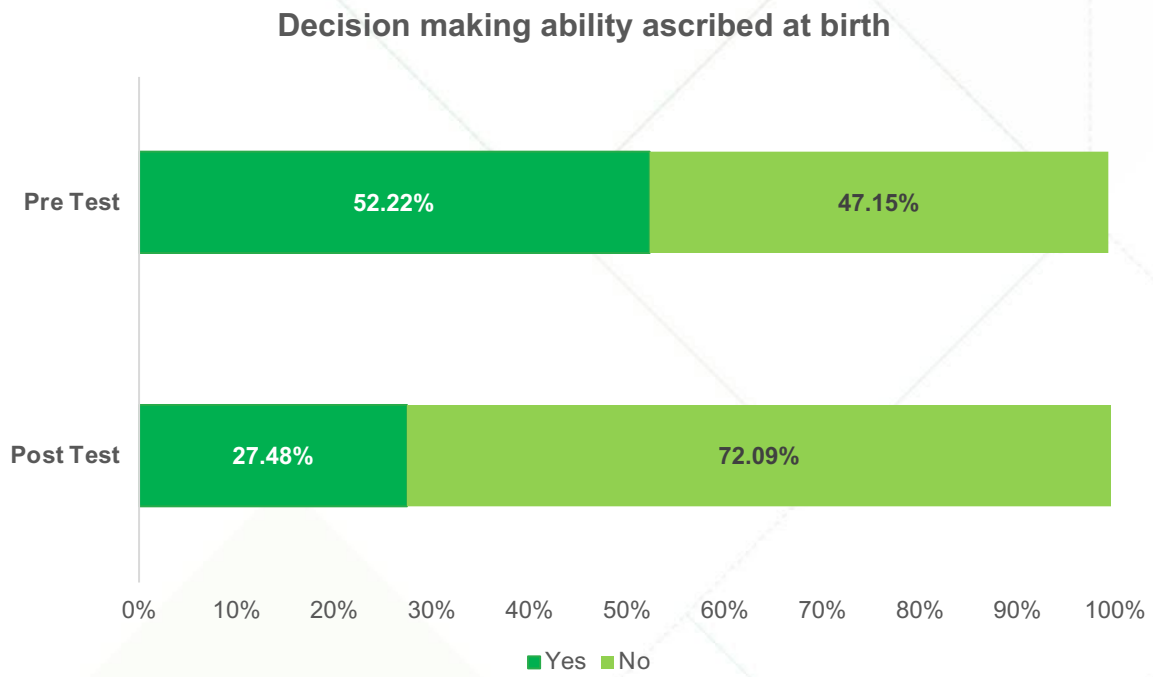


- Male farmers were tested to gauge their understanding of the interchangeability of gender roles. There was emphasis on roles that have traditionally been associated with either men or women, both within the household and on the farm.
- The test results found that an increasing number of participants were able to identify the interchangeability between the roles that are typically taken on by either men or women.
- The modules hypothesize that bringing about this change in knowledge is a key step towards driving gender equity on the cotton farm.

Expected increasing trend

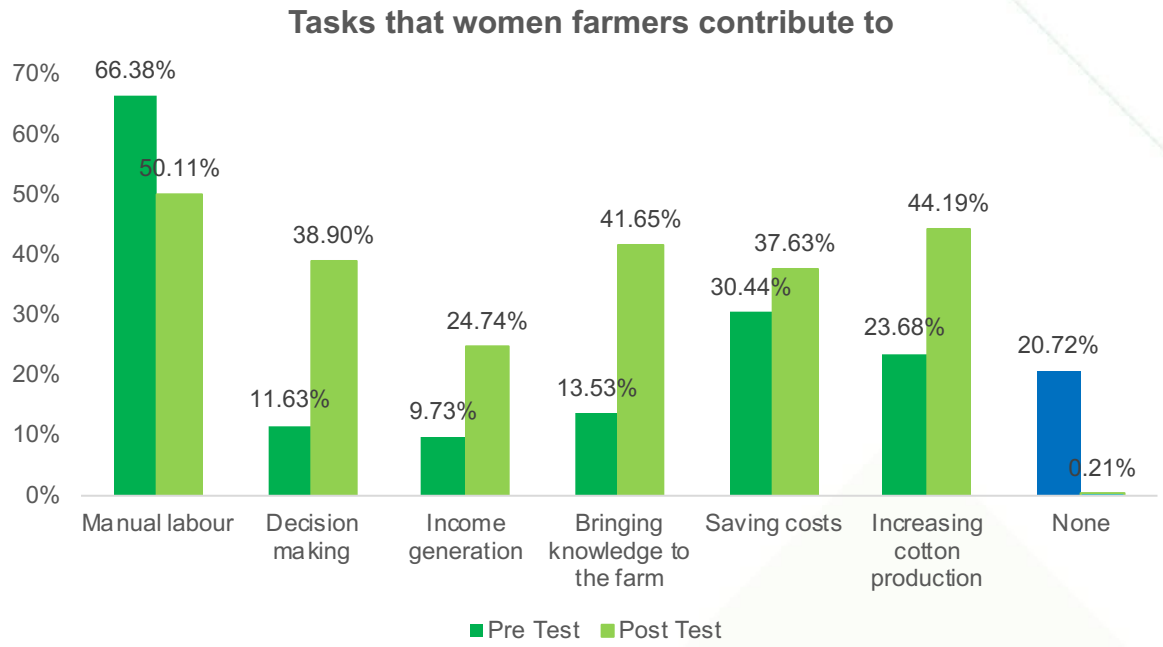
Expected decreasing trend

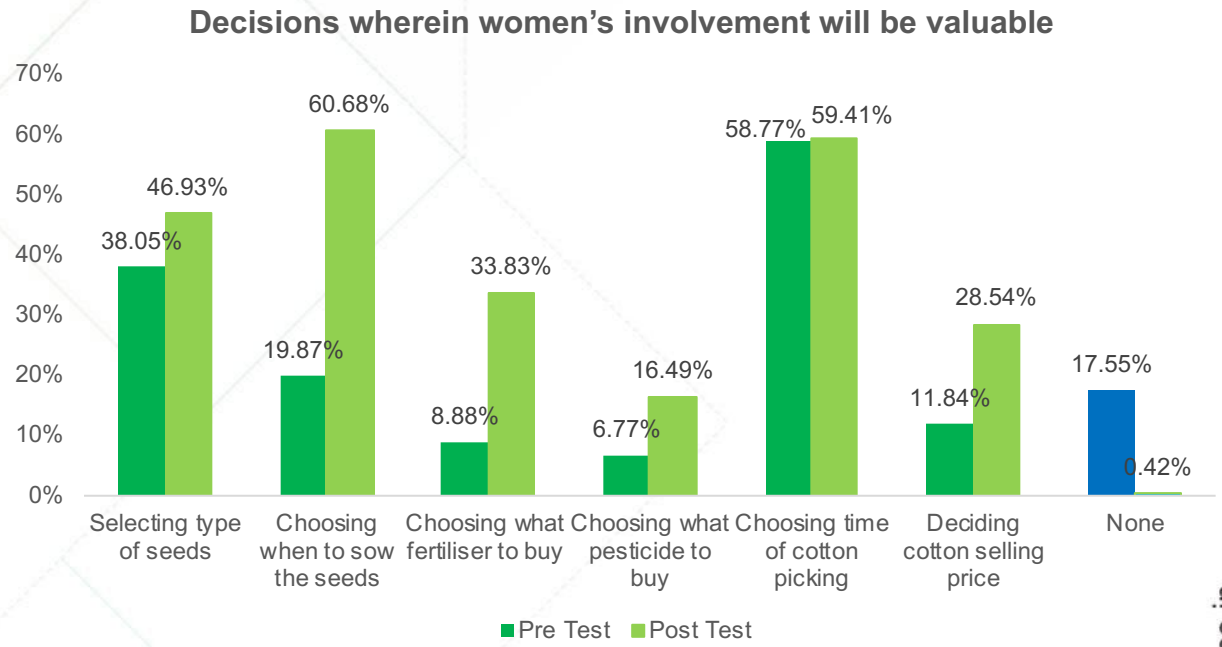
An additional 25% male farmers understand that decision making abilities are not gender dependant



- Male farmers were tested to evaluate whether they believed that decision-making abilities are ascribed.
- Farmers who understand that decision making abilities are not ascribed increased from 47% at pre-test to 72% at post-test.
- Feedback from the trainers revealed that participants had various queries regarding whether men and women have equal capabilities to work on the farm. Greater emphasis must be paid to resolving such doubts that arise during the training.

An additional 21% farmers were cognizant of women's contribution to increasing cotton production, an additional 15% recognised women's contribution to income generation, and an additional ~17% farmers found women's involvement in key decisions on the farm to be valuable





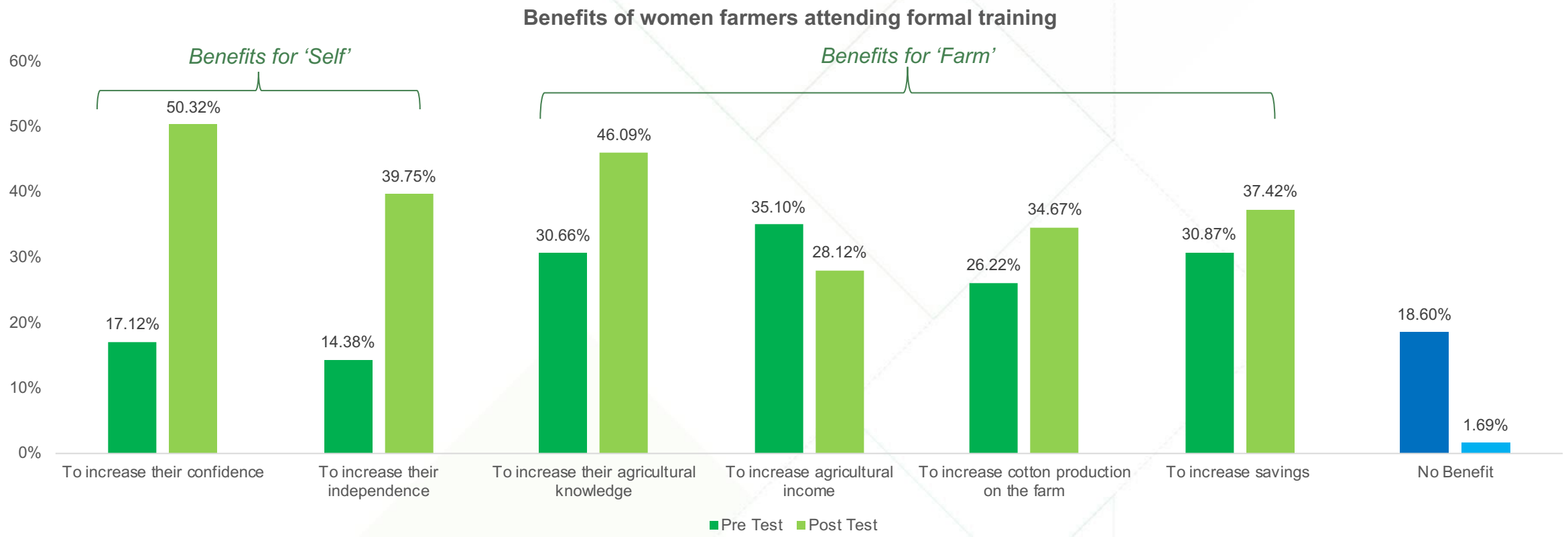
- At pre-test, farmers primarily associated women with 'manual labour'. However, this trend shifted to farmers recognizing women's contribution across income generation, knowledge addition, cost savings, increased production and decision making, denoting a shift in perspective towards the contributions of women farmers
- Number of farmers who believe co-farmers contribute to 'nothing' decreased from 20% to 0%

- On average, an additional ~17% farmers see value in involving co-farmers in various decisions such as seed selection, time of sowing, fertilizer purchase, and selling price of cotton.
- Number of farmers who believe co-farmers involvement is not valuable in any decision decreased from 17% to 0%.

Expected increasing trend

Expected decreasing trend

There is a positive shift amongst male farmers recognising the benefits of formal training for women; although average increase in number of farmers who see formal training beneficial for 'self' is 29% while beneficial for the 'farm' is only 6%

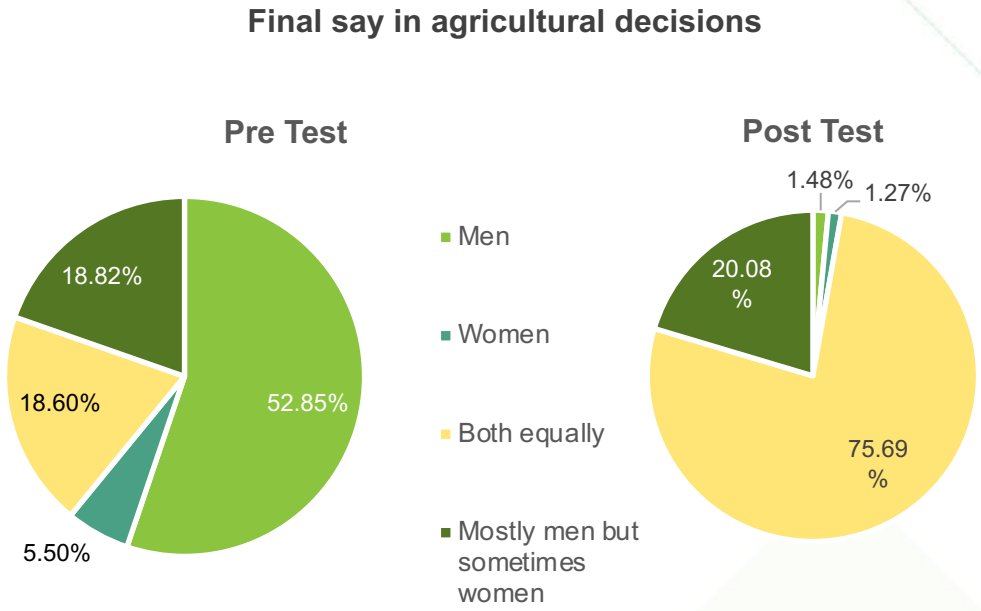


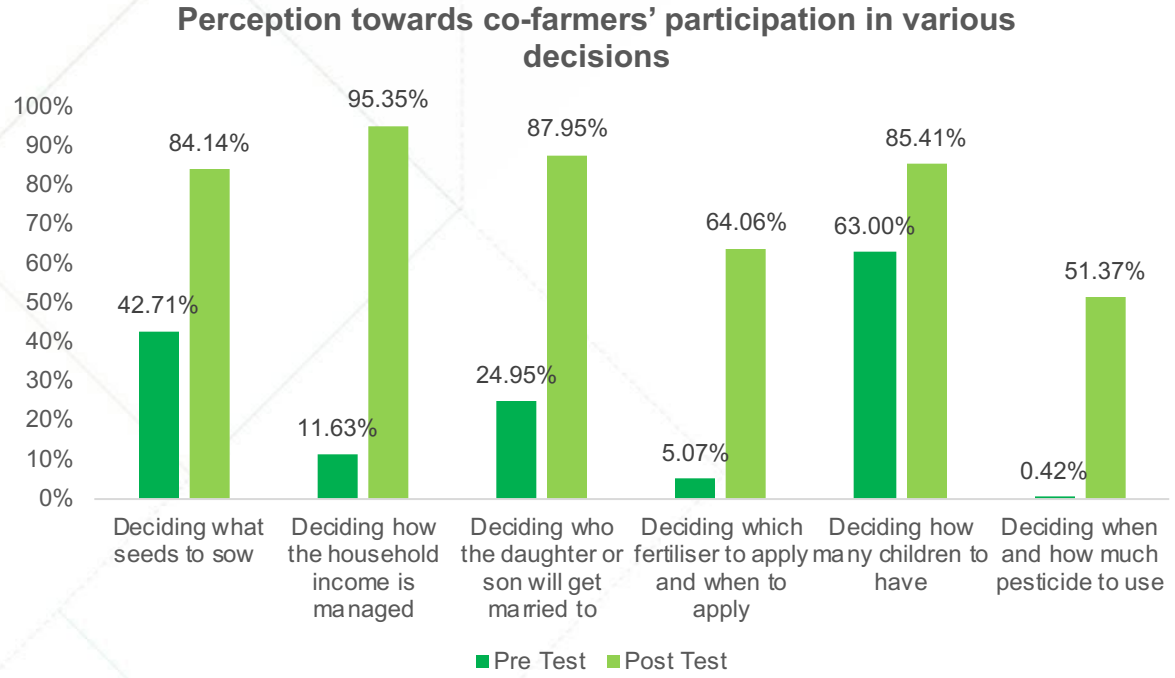
- Overall, there was a positive shift in farmers acknowledging the benefits of training for women farmers. However, even at post-test, male farmers were most likely to identify 'increase in confidence' as a key benefit of training. There was a relatively lower increase in farmers recognizing increase in agricultural knowledge, increase in cotton production and increase in savings as benefits of training.
- Going forward, there is a need to lay greater emphasis on the economic benefits of training for women farmers.

Expected increasing trend

Expected decreasing trend

75% male farmers now believe women farmers should have an equal say in decision making and 53% additional male farmers, on average, intend on including co-farmers in various decisions





- Number of male farmers who believe 'men and women should have an equal say in decision making' increased from 18% to 75%.
- Number of male farmers who believe 'men should have the final say in decision making' decreased from 52% to 1.2%.

- On an average 53% additional farmers believe women's participation in various household and farm decisions will be valuable.
- Highest positive increase was observed in household decisions, particularly 'deciding how the household income is managed' (84% increase) followed by 'deciding who the children will get married to' (63%). However, even farm-related decisions saw a positive increase.

Way forward

4 potential pathways for scale have been identified

The previous sections of the report demonstrate positive movement across indicators (except economic indicators).
Given this, Sattva recommends a success-based model for scale up. Potential scale up pathways have been given below:

Pathways* for scaling-up (non-exclusive)
Sourced from IFAD framework that provides high level policy and operational guidance in scaling up, relevant to agronomic programmes

1. Sustaining outcomes in the existing geography

BCI and IDH sustain the impact in the Dhule District with the same number of households

2. Horizontal

BCI and IDH replicate the pilot program in other cotton producing geographies

3. Vertical

BCI and IDH move to a nation-wide expansion involving policy changes at the organization level for gender inclusivity

4. Functional

BCI and IDH can iteratively tweak program design and implementation to adapt to the needs of geography and cotton farming ecosystem

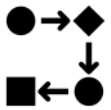
*Retrieved from: https://www.brookings.edu/wp-content/ uploads/2016/06/10_ifad_linn_kharas.pdf

Scaling up is an iterative process and requires taking stock within small intervals to strengthen programme design

A framework to take decisions on scaling-up based on evidence of how outputs and outcomes perform is recommended. This helps define what is desirable for the program over different stages and the ideal pathways based on how the program fares

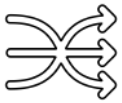
Evidence based decisions:

Setting programmatic goals and year on year targets can provide a precise picture of how the program is performing and what can be done next



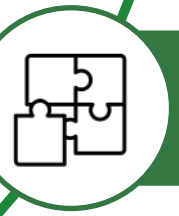
Non-linear pathway:

Different pathways to scale-up can be simultaneously taken For e.g. If the programmatic target is achieved in 80% of geographies where the program is being implemented, vertical and horizontal scale-up can be done simultaneously



Evaluate different scenarios:

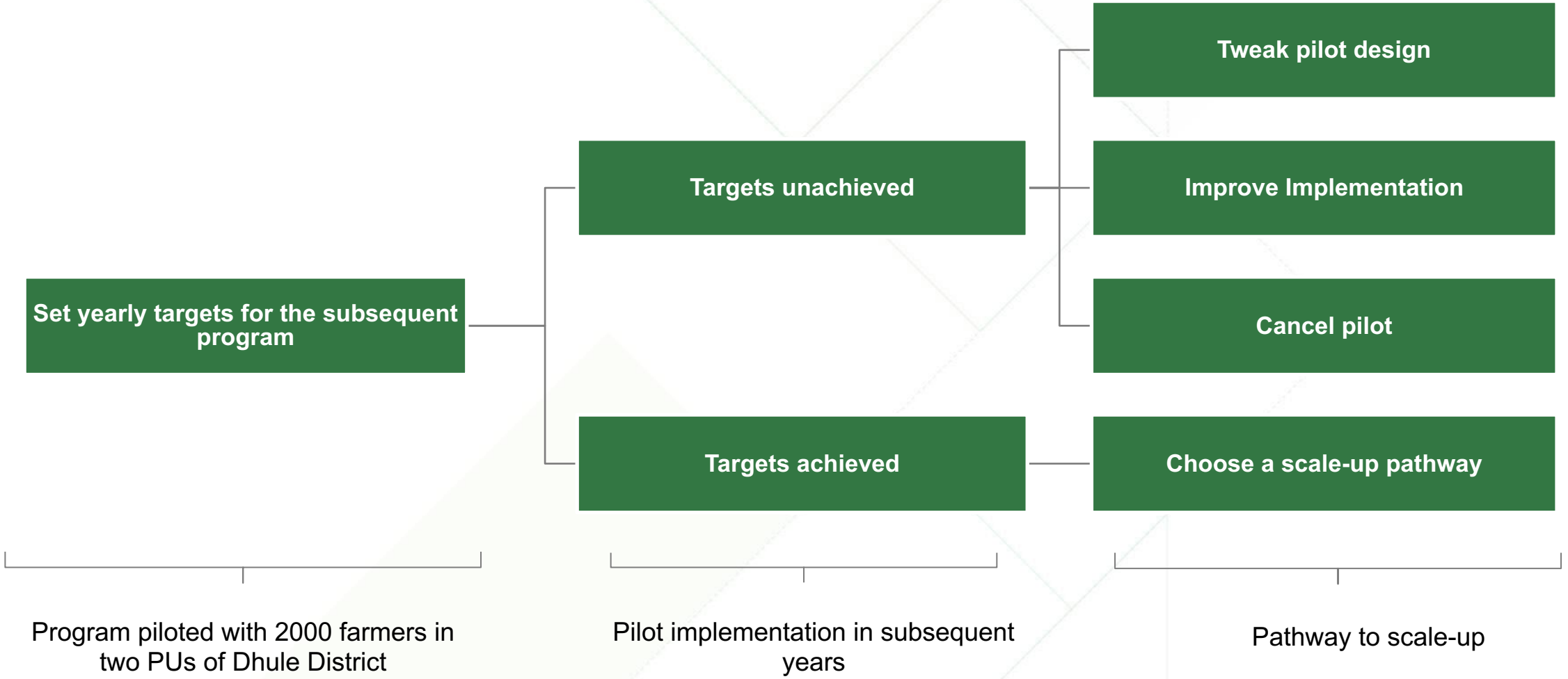
Depending on achievement of goals and targets at every stage of program implementation, different scenarios to scale the pilot can be evaluated



Solutions not force fitted

Although gender disparity is pervasive, its manifestations will differ across different geographies and contexts. Adapting the program by tracking targets and performance i.e. functional scaling ensures that the program is effective at scale

Decision on scale up should be taken based on achievement of defined targets and goals



Depending on the type of yearly targets achieved, the mostly suitable scale-up pathway can be determined (1/2)

Scaling up is an iterative process and can take up any time from 5 to 10 years*

Yearly Targets

BCI and IDH can set yearly targets for the program to achieve. This defines a clear and measurable picture of what success looks like over different stages of scale-up.

Scenario Analysis

The decision to scale-up and pathway choice would depend on achievement of targets along with other factors like budget, availability of implementation partners, socio-economic context.

Scale-up Pathway

The scale-up would either sustain outcomes, improve them or spread them to more BCI farms

Pilot in 2020-21

X% increase in 'Knowledge'

X% increase in 'adoption of agronomic practices'

X% increase in 'Financial Literacy'

Target Achieved:
Make the change sustainable

→ **Sustaining outcomes** by expanding to all BCI farms in Dhule district

Target not achieved:

1. Process analysis (what went wrong, what went well) and rework program design and implementation
2. Cancel scale-up

→ **Functional** Improvement in program design and delivery

Year 2 onward

Additional Y% increase from Year-1 targets

- X% increase in 'Economic Outcomes'
- X% increase in 'Environmental outcomes'
- X% increase in participation in decision making

Target Achieved:
Replicate in similar cotton producing geographies

→ **Horizontal Scale-Up** to new PUs in Maharashtra and other states

Target not achieved:

1. Process analysis and rework program design and implementation
2. No Change

→ **Functional** Contextualization in program design and delivery

*Source: https://www.brookings.edu/wp-content/ uploads/2016/06/10_ifad_linn_kharas.pdf

Depending on the type of yearly targets achieved, the mostly suitable scale-up pathway can be determined (2/2)

Scaling up is an iterative process and can take up any time from 5 to 10 years*

Yearly Targets and Programmatic goals
BCI and IDH can set an ambitious goal for the program, and its achievement can inform policy level changes and enhancement of BCI and cotton trade standards

Scenario Analysis
The decision to scale-up and pathway choice would depend on achievement of the goal-targets along with financial and policy considerations

Scale-up Pathway
The scale-up would either sustain outcomes, improve them or spread them to more BCI farms

Year 3 to Year 5

X% increase in Knowledge, adoption, financial literacy outputs in new states

- Additional Y% increase in Year 2 targets in old geography
- Achievement of programmatic goal in Dhule district

Target Achieved:
Replicate the program to all BCI farms

→ **Horizontal Scale-Up** to all BCI farms

Target not achieved:

1. Process analysis and rework program design and implementation

→ **Functional** Contextualization in program design and delivery

2. No Change

Year 6 to Year 10

Achievement of Programmatic goal

Target Achieved:
Integrate program outcomes to BCI and cotton trade standards

↑ **Vertical Scale-Up** Gender inclusion and agronomic trainings for co-farmers become BCI standards

Target not achieved:

1. Invest another year to Sustain the short and midterm options

Sustaining outcomes in the existing geography

2. Cancel scale-up

In the near-term, Sattva recommends scaling the pilot to all co-farmers in the two present PUs in Dhule district; If successful, replicate to new PUs in Maharashtra and eventually scale to other states

Scale pilot to all farmers of Dhule district, where the pilot was implemented

- With the additional cost of hiring the field facilitators and coordinators the pilot can be scaled to all BCI farms in Dhule district of Maharashtra
- The program can be leaner with low-touch life skills training offered through the demo plots and agronomic trainings

If the program in the two PUs shows improvements in gender, economic and environmental outcomes the pilot can be scaled to more PUs in Maharashtra and other states

- A diagnostic of different geographies would inform how the program can be adapted to the new Pus
- Capacity building of implementation partners can be done through a training of trainers model where capabilities of the existing implementation partner can be leveraged
- An independent, but lean M&E can ensure reliable and consistent measure of how outputs and outcomes of the program are performing

Sattva also recommends keeping the program lean to ensure its adaptability to ecosystems and geographies

The pilot was designed to build capabilities of co-farmers and gender sensitivity in male farmers to make cotton farming inclusive. Based on learnings from the pilot, the following can be considered non-negotiable programme activities for co-farmers:

Agronomic Training and LGs

- **Year I:**
  - Provide basic skills and knowledge of BCI standard agronomic practices
  - Train co-farmers on negotiation skills, financial literacy, time management
- **Year II onward:**
  - Strengthen and reinforce skills
  - Identify positive deviants* and provide other farms the knowhow to replicate them.

Demo Plot

- **Year I:**
  - Demonstrate recommended standard BCI practices in intercropping, integrated pest management, fertilizer and pesticide use, sowing, harvesting and processing of cotton.
  - Provide resources to access market information.
- **Year II onward**
  - Make demo plots a hub for community learning activities and space to innovate

Gender Sensitisation

- **Year I:**
  - Gender sensitization training of male farmers.
  - Involvement of co-farmers in demo-plots.
- **Year II onward:**
  - Refresher trainings for male farmers
  - Learning groups of male farmers used as a forum to discussion inclusion of women and guided interactions between them.

*Positive deviants are those cases in a community who perform much better than other households in outcomes with the same socio-economic-cultural capital

Following factors will need to be evaluated before scaling up

Organisation strategy
Internal organisations decisions by BCI and IDH

Fiscal/financial space

Do BCI and IDH have the required budget to go ahead with the scale up plan?

Policy space

Does the BCI and IDH's organisational policy support the scale up plan? This factor gains most importance during vertical scale up

Socio-cultural-economic context
Context studies such as IDH Maharashtra 2018 should be conducted before entering a new geography

Socio/economic/cultural ecosystem

Is the new expansion area culturally similar to the geography we have worked in till now?

Capacity and Capability
Implementation Partner assessment must be conducted and continued monitoring and evaluation for build the 'learning space'

Partnership space

Are there Implementation Partners with the relevant experience and capability who can be mobilized to join in the effort of scaling up?

Learning space

Do we have the knowledge about what works and doesn't work in scaling up?

Source: Adapted from Hartmann and Linn (2008)

Near-term scale up can be achieved in desirable per farmer costs

Per-farmer costs at larger scale reduce at scale as economies of scale can be leveraged.
However, additional resources are needed to iterate the program and support capacity in implementation partners

Costs		Per-farmer costs (INR)		Total cost (INR)	
Cost heads	Cost Components	1 PU	1 District	1 PU (5000 farmers)	1 District (40000 farmers)
Project iteration and management	Personnel	330	265	16,50,000	1,06,00,000
Capacity Building	Information & Education material	4	4	20000	1,60,000
	Training of trainers	66	13	330000	520000
Program Implementation	Establishing Demo Plots	45	45	225000	1800000
	Gender Sensitization Training	21	21	105000	840000
	Organization of LG trainings on BCI/CICR guidelines	49	48	245000	1920000
Independent M&E	Target Setting (one-time cost)			2,35,000	
	Data collection and reporting	125	37	5,00,000	15,00,000
	Total costs	640	433	3075000	1,73,40,000

Near-term scale up can be achieved in desirable per farmer costs

Per-farmer costs at larger scale reduce at scale as economies of scale can be leveraged.
However, additional resources are needed to iterate the program and support capacity in implementation partners

Costs		Per-farmer costs (EUR)		Total cost (EUR)	
Cost heads	Cost Components	1 PU	1 District	1 PU (5000 farmers)	1 District (40000 farmers)
Project iteration and management	Personnel	3.8	3.1	19,186	123,256
Capacity Building	Information & Education material	0.0	0.0	233	1,860
	Training of trainers	0.8	0.2	3,837	6,047
Program Implementation	Establishing Demo Plots	0.5	0.5	2,616	20,930
	Gender Sensitization Training	0.2	0.2	1,221	9,767
	Organization of LG trainings on BCI/CICR guidelines	0.6	0.6	2,849	22,326
Independent M&E	Target Setting (one-time cost)			2,733	
	Data collection and reporting	1.5	0.4	5,814	17,442
	Total costs	**7**	**5**	**35,756**	**201,628**

I EUR = INR 86

Annexure

Annexure 1 – Evidence generated on the need of the pilot

The Sattva-IDH gender analysis study (2019) found that pre-production tasks in cotton cultivation are dominated by men, with women playing prominent roles in stubble picking and sowing

Task	Uprooting Old Plants	Stubble Picking	Application of Manure	Ploughing	Row Making	Sowing
Gendered Division of Tasks as per Sattva Study	 87% Done by men	 88% Done by women	 79% Done by men	 99% Done by men	 99% Done by men	 89% Done by women
Decision Making	 70% Respondents said that decision making is done by men	 50% Respondents said that decision making is done by both	 61% Respondents said that decision making is done by men	 85% Respondents said that decision making is done by men	 77% Respondents said that decision making is done by men	 55% Respondents said that decision making is done by both

Sources: Sattva-IDH Study (2018)

Women cultivators had greater participation in production and picking activities, particularly from an execution standpoint

Task	Weeding	Fertilizer Application	Fetching Water	Pesticide Application	Picking
Gendered Division of Tasks as per Sattva Study	84% Done by women	74% Done by women	57% Done by women	97% Done by men	94% Done by women
Decision Making	52% Respondents said that decision making is done by both	46% Respondents said that decision making is done by both	85% Respondents said that decision making is done by men	85% Respondents said that decision making is done by men	60% Respondents said that decision making is done by both

Sources: Sattva-IDH Study (2018)

Women cultivators undertake tasks that directly impact the quantity and quality of cotton produced

Sowing

- Low plant population can delay boll maturity and reduce lint yield and boll density
- Inaccuracies in depth of sowing can cause delay in germination

Weeding

- Bad weeds can reduce lint yields between 10% and 40%
- Weeds can affect fiber length, uniformity, strength, or microns, and increase moisture in the bolls

Fertilizer Application

- Delayed application of fertilizers can reduce yield by 10%-40%
- Inefficient fertilizer usage increases cost of production

Picking and Storing

- Unscientific picking causes contamination (dirt, hair, plastic, etc.) and results in reduced quality of cotton and fiber loss
- Cotton with higher grade, staple and strength claims a better price

Sources: Sattva-IDH Study (2018)

Despite their role in cotton production, women cultivators have limited access to resources

Training

33%

of the women cultivators attended any agronomic training in the last two years.

Collectives

50%

of the women cultivators were part of SHGs.
FPO presence was low.

Schemes

15%

of the women cultivators accessed government support.

Land

16%

of the women cultivators had land in their name.

Finance

28%

of the women cultivators took credit from SHGs.

Extension

11%

had ever accessed extension services.

Sources: Sattva-IDH Study (2018)

Moreover social norms impact the way women cultivators engage with the agricultural ecosystem

Gendered Farm Roles

- Tasks done by women are perceived to be ‘lighter’ work
- These tasks are drudgery-prone & time intensive

Income Disparity

- Women cultivators receive lower wages than men
- Women also have reduced control over income earned

Dual Responsibilities

- Women perform time consuming household chores
- The economic value of farm duties goes unmeasured

Unequal Access

- Safety, lack of information and opportunity, and time constraints limit access to markets and productive resources

Annexure 2 – Process / formula used for scoring analysis

Testing the hypothesis: Increase in knowledge score for all areas of enquiry

Null Hypothesis: There is no change in mean scores **Alternate Hypothesis: Endline mean scores have increased**

Methodology to test hypotheses: One-tailed t-test for dependent samples

$\alpha = 0.05$ $degrees\ of\ freedom = N = 499$ **Decision rule: if t >p-value: Reject Null hypothesis**

i.e. if t > 1.6449, there is a statistical significant increase in average knowledge score

Knowledge area	$t = \frac{Mean\ Difference\ in\ knowledge\ score}{std.deviation\ of\ difference\ in\ score / \sqrt{N=499}}$	Conclusion
Benefits of intercropping	$t_{intercropping\ benefits}$ = 3.299 $t_{intercropping\ benefits} > 1.6449$	There is a statistically significant increase in knowledge on benefits of intercropping in cofarmers from baseline to endline
Benefits of soil health testing	$t_{soil\ testing}$= 0.599 $t_{soil\ testing} < 1.6449$	There is no statistically significant change in knowledge on benefits of soil health testing from baseline to endline
Identification of red labelled pesticides like Monocrotophos and Carbendazim	$t_{identifying\ harmful\ pesticides}$ = 9.647 $t_{identifying\ harmful\ pesticides} > 1.6449$	There is a statistically significant increase in the knowledge of red-labelled pesticides in cofarmers from baseline to endline
Decent Work Practices, such as not hiring child labour & equal wages for men and women	$t_{decent\ work\ practices} = 1.998$ $t_{decent\ work\ practices} > 1.6449$	There is a statistically significant increase in the knowledge of decent work practices in cofarmers from baseline to endline
Identification of beneficial insects, such as ladybird beetle, Trichograma, Chrysoperla, Ground beetle	$t_{beneficial\ insects} = 20.921$ $t_{beneficial\ insects} > 1.6449$	There is statistically significant increase in the knowledge of beneficial insects in cofarmers from baseline to endline

Testing the hypothesis: Increase in practices score for all areas of enquiry

Null Hypothesis: There is no change in mean scores **Alternate Hypothesis: Endline mean scores have increased**

Methodology to test hypotheses: One-tailed t-test for dependent samples

$\alpha = 0.05$ $degrees\ of\ freedom = N = 499$ **Decision rule: if t >p-value: Reject Null hypothesis**

i.e. if t > 1.6449, there is a statistical significant increase in average practice scores

	Practice area	$t = \frac{Mean\ Difference\ in\ practice\ score}{std.deviation\ of\ difference\ in\ score / \sqrt{N=499}}$	Conclusion
	Timing of application of fertilizers	$t_{timing\ of\ fertilizer\ application}$ = -0.577 $t_{timing\ of\ fertilizer\ application} < 1.6449$	There is no statistically significant change in the adoption of the practice of applying fertilizer at the time of sowing in cofarmers
	Timing of application of pesticides	$t_{timing\ of\ pesticide\ application}$= 18.867 $t_{timing\ of\ pesticide\ application} > 1.6449$	There is a statistically significant increase in farmers applying of pesticides only on need basis from baseline to endline
	Practices of picking cotton for harvest	$t_{cotton\ picking\ practice}$ = 7.495 $t_{cotton\ picking\ practice} > 1.6449$	There is a statistically significant increase in the good practice of picking cotton top-down from baseline to endline
	Packaging of harvested cotton	$t_{packaging\ material\ pracice} = 20.971$ $t_{packaging\ material\ pracice} > 1.6449$	There is a statistically significant increase in the good practice of packing cotton in cotton bags from baseline to endline
	Storage of cotton	$t_{storage\ of\ cotton} = 29.837$ $t_{storage\ of\ cotton} > 1.6449$	There is statistically significant increase in the practice of storing cotton in a dry designated area from baseline to endline

Testing the hypothesis: Increase in practices score for all areas of enquiry

Null Hypothesis: There is no change in mean scores **Alternate Hypothesis: Endline mean scores have increased**

Methodology to test hypotheses: One-tailed t-test for dependent samples

$\alpha = 0.05$ $degrees\ of\ freedom = N = 499$ **Decision rule: if t >p-value: Reject Null hypothesis**

i.e. if t > 1.6449, there is a statistical significant increase in average practice score

	Practice area	$t = \frac{Mean\ Difference\ in\ practice\ score}{std.deviation\ of\ difference\ in\ score / \sqrt{N=499}}$	Conclusion
	Safety equipment for pesticide spray	$t_{equipment\ for\ pesticide\ spray}$ = 20.153 $t_{equipment\ for\ pesticide\ spray} > 1.6449$	There is a statistically significant increase in use of safety equipments while spraying pesticides from baseline to endline
	Spacing between plants	$t_{plant\ spacing}$= 12.986 $t_{plant\ spacing} > 1.6449$	There is a statistically significant increase in maintaining correct space between cotton plants from baseline to endline
	Fertilizer application method	$t_{fertilizer\ application\ method}$ = -10.390 $t_{fertilizer\ application\ method} < 1.6449$	There is no statistically significant change in adoption of practice to apply fertilizer in circles around the root from baseline to endline
	Use of correct biofertilizers	$t_{biofertilizers\ used} = 3.024$ $t_{biofertilizers\ used} > 1.6449$	There is a statistically significant increase in the practice of using correct biofertilizers from baseline to endline

There is a statistically significant increase in cotton yield per acre after the pilot

Null Hypothesis: No change in average earnings per acre
Alternate hypothesis: Increase in average earnings per acre
$\alpha = 0.05$ $degrees\ of\ freedom = N = 499$
Decision rule: if t >p-value: Reject Null hypothesis

$$t_{cotton\ yield\ per\ acre} = 5.862 > 1.6449$$
$$\therefore Null\ hypothesis\ not\ accepted$$

i.e. There is a statistically significant increase in the per acre earnings after the pilot.

73% of the farms experienced higher per acre earnings after the pilot's implementation. Marginal landholders experienced the most gain in average per acre earnings at Rs. 18749.84.

Null Hypothesis: No change in average yield per acre
Alternate hypothesis: Increase in average yield per acre
$\alpha = 0.05$ $degrees\ of\ freedom = N = 499$
Decision rule: if t >p-value: Reject Null hypothesis

$$t_{cotton\ yield\ per\ acre} = 4.117 > 1.6449$$
$$\therefore Null\ hypothesis\ not\ accepted$$

i.e. There is a statistically significant increase in the per acre cotton yield after the pilot.

51% of the farms had a per acre increase in cotton yield

Difference in differences: Pilot had no impact on increased yield

```
Call:
lm(formula = harevest_per_hectare ~ treated + time + Pilot, data = did)

Residuals:
     Min       1Q   Median       3Q      Max
-1239.05  -189.00   -34.63   133.36  3155.30

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 1146.125      3.523 325.364   <2e-16 ***
treated      -71.445      8.313  -8.594   <2e-16 ***
time         208.244      4.976  41.848   <2e-16 ***
Pilot        -16.021     11.772  -1.361    0.174
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 318.9 on 20003 degrees of freedom
  (4 observations deleted due to missingness)
Multiple R-squared:  0.1015,    Adjusted R-squared:  0.1014
F-statistic: 753.6 on 3 and 20003 DF,  p-value: < 2.2e-16
```

- P-value of the difference in yield caused by pilot intervention is 0.174, not statistically significant.
- There are limited number of independent variables affecting the yield So a low value of R sq, while not ideal, is not surprising.
- This is also apparent when you look at the actual regression and the estimate value of the (Intercept). The intercept is basically the value of your error term in the regression. It's not really an error, but it gives the magnitude of variation in the data that the regression model currently does not capture. In our regression, it is many times higher than the actual observed impact estimate from the treatment terms

There is no statistically significant change in the cost of farming cotton

Null Hypothesis: There is no change in mean scores **Alternate Hypothesis: Endline mean scores have increased**

Methodology to test hypotheses: One-tailed t-test for dependent samples

$\alpha = 0.05$ $degrees\ of\ freedom = N = 499$ **Decision rule: if t >p-value: Reject Null hypothesis**

i.e. if t > 1.6449, there is a statistical significant increase in average practice scores

Practice area	$t = \frac{Mean\ Difference\ in\ practice\ score}{std.deviation\ of\ difference\ in\ score / \sqrt{N=499}}$	Conclusion
Total cost of cultivating and harvesting cotton	$t_{total\ cost}$ = -2.678 $t_{timing\ of\ fertilizer\ application} < 1.6449$	There is no statistically significant change in the total cost of harvesting and cultivating cotton
Fertilizer costs	$t_{timing\ of\ pesticide\ application}$= 0.535 $t_{timing\ of\ pesticide\ application} < 1.6449$	There is no statistically significant change in fertilizer costs borne by farmers from baseline to endline
Pesticide costs	$t_{cotton\ picking\ practice}$ = -5.489 $t_{cotton\ picking\ practice} < 1.6449$	There is no statistically significant change in pesticide costs borne by farmers from baseline to endline
Labour costs	$t_{packaging\ material\ pracice} = -2.278$ $t_{packaging\ material\ pracice} < 1.6449$	There is no statistically significant change in labour costs borne by farmers from baseline to endline
Cotton seeds cost	$t_{storage\ of\ cotton} = -1.244$ $t_{storage\ of\ cotton} < 1.6449$	There is no statistically significant change in cotton seeds' costs borne by farmers from baseline to endline

Annexure 3 – Gender sensitisation training overview

The gender sensitisation training sought to enable male farmers to better understand the economic and social contributions of women farmers and to reduce gender discrimination on the farm

Why gender sensitisation?

- Solving for the challenges faced by women farmers, can lead to business and social outcomes. These are improvements in quality and quantity of cotton produced, increase in incomes, and empowerment of women farmers.
- To achieve these outcomes, there is a need for awareness-raising to sensitize farming communities about the societal value and benefits of increasing the participation of women. This is also key to ensuring the sustainability of interventions with women farmers. (IDH, 2019)

What did the training consist of?

Male farmers where administered a 2-day training (of 3 hours each). The training covered 4 modules, namely:

- Introduction to the term 'gender'; Socialization across the lifecycle
- Gender roles; Gender division of labour and its impact on cotton farming
- Gender relations and its impact on cotton farming
- Access to resources and decision making; Strengthening inclusion of women farmers in decision making

What were farmers evaluated on?

A 13-question pre-test and post-test tool was administered to assess knowledge and attitude changes influenced by the training. This included:

- Ability to understand gender & sex
- Ability to understand interchangeability of gender roles
- Cognizance of women farmers' contribution on the farm
- Impact of access to resources & training by women co-farmers
- Value of women farmers' involvement in decision making

Training Overview

25+ Field facilitators trained through 20+ hours of Training of Trainers (ToT)

2000+ Male farmers trained, across 100 Learning Groups (LGs)

6 Hours of training delivered to each male farmer

473 Farmers evaluated using the pre-test and post-test tool

[1]https://www.idhsustainabletrade.com/uploaded/2019/05/Business-case-for-gender-mainstreaming-in-cotton-in-Maharashtra.pdf

An evaluation framework was developed for measuring outcomes from the sensitisation training; this was developed in alignment with the overall M&E framework used in the BC-GIF co-farmer pilot

This gender sensitisation outcome report was created by analysing pre-test and post-test results, from testing 473 male farmers (~25% of total farmers trained) before and after the training. The test tool used for evaluating the training was developed on the basis of the output and outcome indicators outlined below. The 'Key Output and Outcome Indicators' are the broad objectives envisioned for the gender sensitisation exercise while 'Metrics for Measurement' are the measurable parameters used for the evaluation.

	Key Output and Outcome Indicators	Metric for Measurement
Change in knowledge	❖ Develop an understanding of gender and sex ❖ Develop an understanding of how the roles and responsibilities of women and men are determined on the farm and in the household ❖ Develop an understanding of gender identities	❖ Increase in number of farmers who understand the concept of gender ❖ Increase in number of farmers who can differentiate between sex and gender ❖ Increase in number of farmers who understand that gender roles are interchangeable ❖ Increase in number of male farmers who recognise that gender identities are defined by society and can change
Change in attitude	❖ Change in male farmers' perception of women farmers' economic roles and capabilities ❖ Positive affirmation towards greater access of resources by women farmers ❖ Positive affirmation towards women's involvement in decision making and control over resources	❖ Increase in number of farmers cognizant of women farmers' contribution on the farm ❖ Increase in number of farmers who acknowledge that women farmers require equal access to formal sources of knowledge and formal training ❖ Increase in number of farmers who acknowledge the social and economic benefit of including women farmers in farm-related decisions

5 out of 6 key output and outcome indicators saw positive movement through the gender sensitization training (1/2)

The table below maps the key metrics that were identified to measure achievement of the output and outcome indicators. Additionally, the third column summarizes results against each metric. An output or outcome is considered 'achieved' when the related metrics have seen positive movement.

Key Output and Outcome Indicators	Key Metric	Key Results	Objectives Achieved?
Develop a conceptual understanding of the terms 'sex' and 'gender'	Increase in the number of farmers who can associate 'biological roles' as those that are determined by one's sex	• Farmers who associate 'biological roles' as those that are determined by one's sex increased by an average of 31%	**Yes**
Develop an understanding of gender identities	Increase in the number of male farmers who recognise that gender identities are not permanent and are interchangeable	• Farmers continued to associate men and women with traditional gender identities. For example, farmers continued to associate 'men' with words such as 'rational', 'loud', and 'aggressive'	**No significant progress**
Develop an understanding of the gendered nature of roles and responsibilities on the farm and within the household	Increase in the number of male farmers who understand that gender roles are not permanent and are interchangeable	• There was an average ~25% increase in male farmers who could recognise that roles of men and women can be interchanged, including traditionally male roles such as visiting the market and managing income • Farmers who understand that ability of decision making is not ascribed increased from 47% at pre-test to 72% at post-test.	**Yes**

5 out of the 6 key output and outcome indicators were achieved through the gender sensitization training (2/2)

Key Outputs and Outcome Indicators	Key Metrics	Key Results	Objectives Achieved?
Change in male farmers' perception of women farmers' economic roles and capabilities	• Increase in the number of male farmers cognizant of women's contribution on the farm and in decision making	• An additional 21% farmers were cognizant of women's contribution to increasing cotton production, an additional 15% recognised women's contribution to income generation, and an additional ~17% farmers found women's involvement in key decisions on the farm to be valuable	**Yes**
Positive affirmation towards greater access of resources by women farmers	• Increase in the number of male farmers who acknowledge that women farmers require equal access to formal sources of knowledge and training • Increase in number of farmers who recognise the importance of formal agri-training for women farmers	• Male farmers displayed an enhanced understanding of factors that limit women's contribution on the farm; an additional 23% farmers recognise lack of formal training as a limiting factor while an additional 28% recognise the lack of access by women to markets and extension workers • There is a positive shift amongst male farmers recognising the benefits of formal training for women; although average increase in number of farmers who see formal training beneficial for 'self' is 29% while beneficial for the 'farm' is only 6%	**Yes**
Positive affirmation towards women farmers' involvement in decision making	• Increase in number of male farmers who see the social and economic value in greater inclusion of women in decision making	• 75% male farmers now believe women farmers should have an equal say in decision making • 53% additional male farmers, on average, want to include women farmers in various decisions	**Yes**