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# EXECUTIVE SUMMARY OF IMPACT ASSESSMENT REPORT PROJECT BANDHAN – A KNOT OF PBW PROTECTION

Implementing Partner: South Asia Biotechnology Centre (SABC)



SOULACE CONSULTING PVT. LTD.

# CHAPTER 1

## INTRODUCTION

### BACKGROUND AND NEED OF THE PROGRAM

The Pink Bollworm (*Pectinophora gossypiella*) is a destructive pest that significantly affects cotton crops. The infestation of pink bollworms in cotton fields has been a persistent challenge, particularly in key cotton-growing regions of India. The pest not only reduces cotton yield but also affects the quality of the cotton, which is a vital cash crop in India. There is an urgent need to combat the devastating impact of pink bollworms on cotton production. In response, SABC, supported by the PI Foundation, launched Project Bandhan, an initiative driven by PBKnot technology to tackle the pink bollworm menace.

This project will be implemented during FY 2022-24 in collaboration with various stakeholders, including Krishi Vigyan Kendras (KVKs), state agricultural universities and NGOs such as Ambuja Cement Foundation and AFPRO. The project was implemented in three major cotton production zones:

- North Zone: Haryana, Punjab, and Haryana
- Central Zone: Maharashtra and Gujarat
- South Zone: Andhra Pradesh and Telangana

Activities included on-farm training programs to educate farmers on PBKnot technology and pheromone trap installation. Mega Farmers Melas are organised to demonstrate mating disruption technology and share knowledge about pink bollworm management. Farmers receive essential inputs like Bt cotton hybrids, pheromone traps and PB Rope L for mating disruption.

Project Bandhan aims to eradicate the pink bollworm pest from cotton cultivation hotspots by intensifying the "War on Pink Bollworm" campaign. The initiative seeks to establish strong partnerships with both private and public sector institutions to enhance control measures and engage farmers with resources on pest management in vernacular languages. This multi-faceted strategy not only helps in controlling the pink bollworm but also improves the overall productivity and quality of cotton, thereby enhancing the economic stability of the farming community.

### OBJECTIVES OF THE PROGRAM



To create awareness about innovative mating disruption technology among farmers for managing pink bollworms and optimising farm input utilisation.



To train smallholder farmers, extension officials, agriculture RAWE graduates, and DAESI retailers in adopting new technology for improved crop production.



To assist growers in adopting GAP and IPM-based production systems for effective pest and disease management, ensuring world-class quality produce.



To enhance cotton crop yield.



To promote and implement quality crop production protocols.

### ABOUT PI FOUNDATION

PI Industries, founded in 1947, is a top Indian agrisciences company. The company specialises in the development, manufacturing and distribution of pesticides, herbicides, fungicides, and specialty chemicals. The company operates extensively in India and has a global market in Asia, North America, and Europe. The company ensures the delivery of advanced agricultural solutions that enhance crop productivity and protection.

PI Foundation Trust, a Charitable Trust formed by PI Industries Ltd, was established in 2012. The Foundation focuses on supporting farmers, promoting sustainable farming practices, and enhancing the overall quality of life in rural communities.

## ABOUT SOUTH ASIA BIOTECHNOLOGY CENTRE (SABC)

The South Asia Biotechnology Centre (SABC) is a non-profit organisation established in 2015 with its headquarters in New Delhi. SABC focuses on promoting biotechnology innovations in agriculture to enhance productivity and sustainability.

SABC engages in research and development of integrated pest management (IPM) practices and transfers the technology. The organisation collaborates with multiple stakeholders including farmers, scientists, and agricultural organisations to disseminate knowledge and technologies that improve crop yields and pest management.



## CHAPTER 2

# RESEARCH METHODOLOGY

PI Foundation commissioned SoulAce to assess the impact of its CSR initiative. A descriptive study was conducted to assess the immediate as well as enduring impacts of the project on crop yield, technology-driven crop-management practices, and farmers' satisfaction with the training.



*Village Stakeholder Discussion*

### MIXED METHODS APPROACH

This study utilised a mixed-methods approach, incorporating both qualitative and quantitative research methods. The qualitative component delved into subjective experiences and perspectives, providing a nuanced understanding of beneficiary views. Meanwhile, quantitative methods facilitated the collection and analysis of numerical data, yielding statistical insights and identifying trends. The study's research design was descriptive, aiming to present a detailed situational analysis and exploration of the multi-faceted Project Bandhan using PBKnot technology. Descriptive research is apt for creating an overview, discerning patterns, and grasping the current state of affairs. By integrating both qualitative and quantitative research methodologies within a descriptive framework, the study aimed to deliver a thorough evaluation of the program, elucidating its impact, and suggesting avenues for enhancement. This methodological blend ensured a holistic examination of the subject, lending both depth and breadth to the findings and bolstering the study's credibility.

### ENSURING TRIANGULATION

To enhance the reliability and validity of its findings, the study implemented various triangulation techniques. Data triangulation was achieved by gathering information from diverse sources, including survey methods and key stakeholder interviews among the farmers. This extensive data collection facilitated a comprehensive evaluation of the program's impact.

Methodological triangulation was also employed, utilising a variety of research methods such as surveys and interviews. This approach allowed for cross-verification of information and helped mitigate potential biases. Through these triangulation strategies, the study ensured a robust and dependable analysis, reinforcing the trustworthiness of its findings.

## RESEARCH DESIGN



### Research Design Used

Descriptive research design



### Sampling Technique

Purposive Random Sampling



### Sample Size

54



### Qualitative Methods Used

Key Informant Interview and Testimonials

## OBJECTIVES OF THE STUDY

The primary objectives of the study were to:



To evaluate the impact of pink bollworm infestations on crop production yields after the intervention.



To evaluate the effectiveness of the training and support provided by Project Bandhan in managing pink bollworm infestations.



To measure the changes in cotton production, input costs and profitability after the intervention.



To assess the level of understanding and adoption of new pest management techniques by the farmers.



To identify the challenges faced by the farmers in adopting new technologies introduced by the project.

## KEY STAKEHOLDERS



Farmers



Local village administration



SABC  
Implementing Staff

## STUDY TOOLS

Primary data was collected using the following:



### Structured tool of Interview Schedules:

Questionnaires were prepared for capturing quantitative data, the project details for each of the focus areas were reviewed, and indicators were pre-defined before conducting the surveys.



### Interview Schedules for Key Stakeholders:

A semi-structured questionnaire was developed for key stakeholders. One-on-one discussions were conducted with beneficiaries to prepare case studies.

## ENSURING COMMITMENT TO RESEARCH ETHICS

**ANONYMITY:** Anonymity refers to not revealing the identity of the respondents. This research study strictly sticks to not revealing the identity of respondents unless the same is warranted for the illustration of success stories or case studies.

**CONFIDENTIALITY:** After the research was completed, the study did not reveal which individual respondents answered which question in what manner. The results were revealed only as an aggregate, so no one would be able to single out the identity of a particular respondent. This was required to not break the trust of the respondent by not revealing the individual identity. Research subjects participate in the process only based on the trust that confidentiality is maintained. Hence, the research would not reveal any data regarding the respondents for purposes other than the research study.

**NON-MALEFICENCE:** Research would not lead to harm to the research subjects. This study ensured that the respondents were not harmed in any way.

**JUSTICE:** Justice refers to being fair to all. This research study ensures equal treatment of all its research subjects and no biases or prejudices towards any group based on social stereotypes or stigma associated with being a member of a certain group or class.

## 03. SUMMARY

### PROJECT BACKGROUND

"Project Bandhan - A Knot of PBW Protection," initiated by the South Asia Biotechnology Centre (SABC) with support from the PI Foundation, commenced in June 2022 and spanned three years until 2024. The project aimed to address the devastating impact of pink bollworms on cotton crops in India's cotton belt.

Operating across key cotton-growing zones in India - Haryana, Punjab, Rajasthan, Maharashtra, Gujarat, Andhra Pradesh, and Telangana - the project included comprehensive farmer training programs aimed at promoting the adoption of PBKnot technology for monitoring and managing pest populations.

PBKnot technology is used for managing pests like the pink bollworm in cotton crops. It involves the deployment of pheromone-based mating disruption techniques, where synthetic pheromones are released to interfere with the insects' reproductive behaviour. PBKnot technology effectively reduces pest populations without relying on pesticides. This method is environmentally friendly, promoting sustainable farming practices by minimising chemical use and preserving beneficial insects in the ecosystem.

This report details the implementation efforts of the project and presents findings from a study conducted to validate its outcomes. The study indicates that adopting PBKnot technology improves crop health and reduces losses. Furthermore, the initiative resulted in higher cotton yields and improved quality due to effective pink bollworm management, making a substantial contribution to national agricultural output and advocating for sustainable farming practices. The project's achievements were recognised with the Rural Voice NACOF Award 2023, highlighting its effectiveness and positive impact on the agricultural community.

### PROJECT ACTIVITIES



#### Pre-Planting Activities

- Conducted surveys to monitor pink bollworms (PB).
- Meetings with Village Panchayat and farmers to register them for the project.
- Organised orientation training programs for field staff/field enumerators/village youth on PBKnot dispensers and data collection.
- Supplied PBKnot, Pheromone traps, Tricho-cards, and Biopesticides.
- Hired three experts and six field staff for the implementation of the project. Created knowledge resource materials in Hindi, Gujarati, Punjabi, and Marathi and sent advisories to farmers.



#### Planting Activities

- Organise on-field training programs on CAP and TPM protocols and regularly inspect fields.
- Popularise and promote IPM-based management practices, including distribution of PPE kits, yellow/blue sticky traps, and Neem oil; provided intensive training for farmers on PBKnot technology.
- Distributed and tagged PBKnot traps and installed pheromone traps.
- Organise visits for scientists in PBW field demonstration clusters.
- Organised farmers' melas in each cluster to showcase and popularise the POP of PBKnots.
- Collected data throughout the crop stages.



## Post-Planting and Harvesting Activities

- Organised village-level meetings to educate farmers on timely crop termination.
- Established value chain partnerships and installed pheromone traps at market yards and ginneries for mass trapping of PB.
- Publication of a peer-reviewed research paper on PBKnot mating disruption-based scientific data.

### PROJECT DETAILS



#### Implementation year

FY 2022-24



#### Assessment year

FY 2024-25



#### Implementing Partner

South Asia Biotechnology Centre (SABC)



#### Beneficiaries

20,000 Farmers Directly and 2,00,000 Farmers Indirectly (from MoU 2022-23)



#### Project location

Maharashtra, Gujarat, Rajasthan, Haryana, Punjab, Andhra Pradesh, and Telangana



#### SDG Goals



### DESIGN SNAPSHOT



#### Project Name

Project Bandhan – A Knot of PBW Protection



#### Research Design

Descriptive research design



#### Sampling Methodology

Purposive Random Sampling



#### Sample Size

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FARMER INTERACTION

# Key Outcomes



Trained 10,235 farmers and agriculture graduates on new technologies and pest management strategies.



Implemented GAP and IPM systems, resulting in an average yield increase:

- North Zone: 24.42% increase in yield per acre
- Central Zone: 26.02% increase in yield per acre
- South Zone: 21.81% increase in yield per acre



Covered 1,160 acres under improved production protocols. Achieved an average yield of:

- North Zone: 5.24 quintals per acre
- Central Zone: 6.61 quintals per acre
- South Zone: 8.16 quintals per acre



Increased income per season per acre:

- North Zone: INR 25,000
- Central Zone: INR 27,000
- South Zone: INR 27,000



Conducted 49 farmer meetings, farm fairs, and training programs (7 per month).



Organised 19 demonstrations and 466 field visits throughout the season.



Engaged farmers in 11 sensitisation drives to promote best practices.



Reduced the Cost of Cultivation (COC) per acre by:

- North Zone: 25%
- Central Zone: 21%
- South Zone: 22%



Benefited 1,700 women farmers.

# Key Impacts



Empowered and trained farmers and agriculture graduates with knowledge and skills to manage pests effectively and increase agricultural income.



Increased awareness and adoption of PBKnot technology and modern farming practices among farmers, leading to improved pest management and crop productivity.



Improved Crop Yield and Quality with the implementation of GAP and Integrated Pest IPM systems.



Reduced reliance on chemical pesticides through the promotion of non-chemical alternatives and sustainable farming practices.



Increased income per acre for farmers in targeted regions, thereby improving livelihoods and economic resilience within farming communities.



Fostered community engagement and built local capacity in modern agricultural techniques.



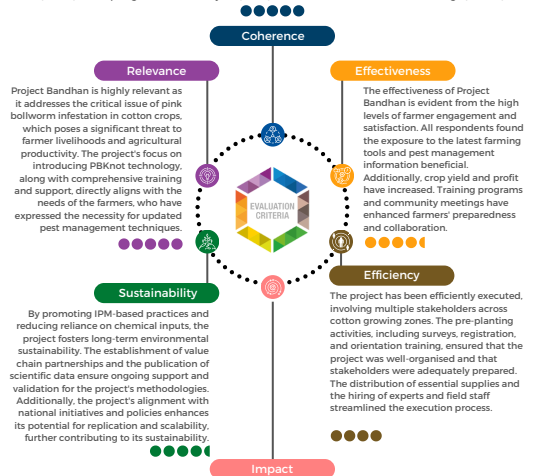
## 04. OECD FRAMEWORK

The project aligns with several Sustainable Development Goals (SDGs):



Additionally, the project complements national initiatives such as:

Make in India, National Food Security Mission (NFSM), National Mission for Sustainable Agriculture (NMSA), Paramparagat Krishi Vikas Yojana (PKVY), National Action Plan on Climate Change (NAPCC)



The impact of Project Bandhan is substantial at multiple levels. Individually, farmers have improved their pest management skills and agricultural productivity along with reduced input costs. Community-level benefits include enhanced social cohesion on pest management techniques. Nationally, the project supports various initiatives and promotes sustainable agricultural practices, contributing to broader economic and agricultural goals.



Relevance



Coherence



Effectiveness



Efficiency



Impact



Sustainability