



Success story of the implementation of Project on Insecticide Resistance Management : Dissemination of Pink Bollworm Management Strategies

Funded by

Department of Agriculture & Farmers Welfare (Crops & PHMF Division)

Ministry of Agriculture & Farmers Welfare, Krishi Bhavan, New Delhi

Under centrally sponsored scheme on National Food Security and Nutrition Mission- Commercial Crops



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Implementing Agency

ICAR-CENTRAL INSTITUTE FOR COTTON RESEARCH

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FOREWORD

Cotton is the backbone of India's agricultural economy and a vital source of natural fiber, oil, and animal feed. While India proudly holds the largest cotton-growing area in the world covering approximately 11.48 million hectares, the sector faces a persistent paradox: despite our dominance in acreage and a second-place ranking in global production, productivity remains hampered by a complex array of biotic and abiotic stresses.

Among these challenges, the resurgence of Pink Bollworm (*Pectinophora gossypiella*) has emerged as a formidable threat to the livelihood of millions. The introduction of Bt cotton (Bollgard and Bollgard II) initially served as a landmark achievement, effectively suppressing major pests and revolutionizing Indian cotton farming. However, the biological landscape is ever evolving. Since 2014, the development of resistance to *Cry* genes in Pink Bollworm populations has marked a significant technological breakdown, leading to widespread outbreaks that have impacted more than 11 million hectares cotton acreage across central and southern India.

The crisis is no longer regional. In direct response to this escalating threat, the Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers' Welfare, Government of India, approved the project: "Insecticide Resistance Management (IRM): Dissemination of Pink Bollworm Management Strategies" in 2018 and continued until March 2026. This initiative serves as a critical intervention designed to translate laboratory research into field-level management strategies for Bt cotton, deploy a window-based approach targeting the crop from sowing to harvest, to combat the pest effectively and educate and empower farmers, researchers, and industry stakeholders to mitigate resistance and protect the future of Indian cotton.

This document outlines the strategic framework and the collective efforts undertaken to safeguard our cotton crops. It is our hope that through the dissemination of these IRM strategies, we can restore productivity, ensure farmer prosperity, and maintain India's standing in the global cotton market.

A handwritten signature in black ink, appearing to read 'V. N. Waghmare', written in a cursive style.

V. N. Waghmare



EXECUTIVE SUMMARY

Recently, Pink bollworm (*Pectinophora gossypiella*) emerged as a major threat to cotton production in India following the development of resistance to Bt cotton, causing severe yield losses and increased pesticide dependence. To address this issue, a nationwide Insecticide Resistance Management - Dissemination of pink bollworm management strategies (IRM-PBW) project was implemented across major cotton-growing states of India through a coordinated network of ICAR institutes, State Agricultural Universities, and KVKs. The project was led by ICAR-CICR, Nagpur as the Nodal institute for implementation and monitoring of project activities.

The project promoted an integrated pest management strategy based on pest monitoring, cultural and biological control tactics, need-based insecticide use, and resistance management practices. Over multiple seasons of implementation (2018-2026), the program demonstrated consistent and measurable impact. Key achievements of the project include:

1. Reduction in pink bollworm infestation by 33–43%
2. Reduction in pesticide usage by 35–45%
3. Increase in cotton yield by 15–25%
4. Benefit–cost ratio improved up to 2.33
5. Increased awareness and capacity building of stakeholders about pink bollworm IPM
6. Adoption of IPM practices by thousands of farmers across 11 major cotton growing states

The project boosted farmer confidence in sustainable cotton production, reduced indiscriminate chemical pesticide use, and delayed resistance development in pink bollworm populations. It stands as India's first large-scale coordinated resistance management program for a major cotton pest and provides a scalable model for managing emerging pest challenges under changing climatic and production systems.

The IRM-PBW initiative demonstrates that science-based integrated pest management can effectively control resistance-driven pest outbreaks while improving farmer income and environmental safety. This success story offers a blueprint for future national pest management programs in cotton and other crops.

C O N T E N T S

● Background	01
● Operational Area of the Project	06
● IPM-Technological Interventions and Critical Inputs	07
● Achievements	08
● Reduction in Pesticide Usage	09
● Outcome of the Project specially in terms of Reduction in Infestation of PBW	09
● Selected Success Stories of Farmers	11
- Central Zone - Maharashtra, Gujarat, Madhya Pradesh	12
- South Zone - Telangana, Andhara Pradesh, Karnataka, Tamilnadu	38
- North Zone - Punjab, Haryana, Rajsthan	50
● Glimpse of Activities	53



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Background

Cotton stands as a vital source of natural fiber, supplemented by valuable byproducts such as oil and animal feed extracted from its seeds. In the expansive agricultural landscape of India, cotton cultivation spans approximately 11.48 million hectares, encompassing nearly one-third of the global cotton-growing area. Despite India's dominance in acreage, ranking first globally, and its second position in production, the country struggles with remarkably low cotton productivity, a challenge attributed to a numerous of biotic and abiotic stresses. Among these stresses, biotic factors, including pests and diseases, play a significant role in impeding cotton productivity. Sucking pests and bollworms emerge as challenging adversaries across all three cotton-growing zones. Depending on the genotype, season, and management practices, these pests can trigger substantial yield losses ranging from 20% to 50%.

The widespread adoption of Bt cotton hybrids initially containing a single gene (Cry1Ac) Bollgard in 2002 and followed by hybrids with dual-gene (Cry1Ac + Cry2Ab) Bollgard II in 2006, marked a paradigm shift in Indian agriculture, now covering over 95% of the cultivation area. While this transition initially decimated bollworm populations and shifted the pest landscape toward sucking pests, the success was short-lived for one species. Despite the initial effective control of Cotton bollworm (*Helicoverpa armigera* Hubner), Spotted bollworm (*Earias* spp), and Pink bollworm (*Pectinophora gossypiella* Saunders), the latter began showing resistance to Cry1Ac in Gujarat as early as 2008. From 2014 onwards, high incidences of pink bollworm were recorded in all the samples collected from central and south India, including those from BG II indicating resistance development to both the genes employed in BG-II.

The development of dual-gene resistance served as a critical wake-up call for farmers, researchers, policy makers, and the seed industry. As the first and only genetically engineered technology approved in India, Bt cotton's susceptibility to the pink bollworm marked a significant technological breakdown. While resistance was first noted in Gujarat and parts of South India in 2015, the 2017-18 season saw a massive outbreak across Maharashtra, Telangana, Andhra Pradesh, Karnataka, Gujarat, and Madhya Pradesh, impacting nearly 11 million hectares. During this period, infestation levels fluctuated between 8% and 92%, with the highest severity recorded in Telangana and Andhra Pradesh. Beyond direct yield losses of 10–30%, approximately 40% of the seed cotton suffered from quality deterioration. Maharashtra, with its 4.2 million hectares of cultivation, was the most severely affected. Over the past decade, the pink bollworm resurgence in central and south India has evolved into a formidable threat to farmers' livelihoods and the national economy.

Initially, the north zone reported no pink bollworm incidence on BG-II genotypes for over a decade. However, infestations exceeding the economic threshold level emerged during 2018–19 and 2019–20 in Haryana and Punjab, specifically near ginning and oil extraction units. Investigations revealed that

these units had procured cotton seeds from central and south India, where pink bollworm had already developed resistance to BG-II technology. Resistance monitoring confirmed that these northern populations lacked larval diapause and exhibited resistance levels identical to central and southern strains, confirming the threat was introduced via seed transport. Consequently, pink bollworm has evolved into a nationwide threat across all three cotton-growing regions. While the Cotton bollworm and Spotted bollworm remain effectively suppressed due to their diverse alternate hosts and continued susceptibility to Cry proteins, the pink bollworm crisis demands management initiatives. Failure to address this could have led to catastrophic yield losses, farmer distress, and a destabilizing effect on the Indian textile industry and national economy.

Considering the prevalent pink bollworm infestation across all three cotton-growing regions of India, Department of Agriculture & Farmers Welfare (Division of Crops and Post-harvest Management of Foodgrain), Ministry of Agriculture & Farmers' Welfare, Government of India has approved a project on "Insecticide Resistance Management (IRM): Dissemination of Pink Bollworm Management Strategies" (IRM-PBW) in 2018-19 and since then continuing. The primary aim of this project is to disseminate pink bollworm management strategies tailored for Bt cotton cultivation. Through the integration of various approaches targeting different growth stages of the cotton crop, the project endeavours to combat this economically significant pest.

Participation ICAR-CICR & 11 SAUs



ICAR-CICR Nagpur



PJTAU Hyderabad



VNMAU Parbhani



JAU Junagadh



UAS Raichur



UAS Dharwad



PDKV Akola



RSKW Gwalior



ANGRAU Guntur



MPKV Rahuri



NAVSARI AGRICULTURAL UNIVERSITY

NAU Navsari



PAU Ludhiana

Principal Investigator

Dr V. S. Nagrare, Principal Scientist, ICAR-CICR, Nagpur

Project implementation institution/ SAUs/ATARIs/KVKs, CoPIs with their duration

Sr. No.	State / Name of Institute / University	District in which project implemented	Name of district Coordinator / Co-PI, Duration and Affiliation
	Maharashtra		
1.	ICAR-CICR, Nagpur	Chandrapur	Dr Vinia Gotmare (2018-19), Dr V. Chinna Babu Naik (2018-19 to 2022-23), Dr Dipak Nagrale (2019-20 to 2020-21, 2024-25), Dr Prabhulinga T. (2022-23 to 2023-24), Dr. Shivaji Thube (2023-24 to 2024-25), ICAR-CICR, Nagpur
		Wardha	Dr S. P. Gawande (2018-19 to 2024-25), Dr Rachna Pande (2021-22 to 2024-25), ICAR-CICR Nagpur
		Amravati	Dr B. B. Fand (2018-19 to 2024-25), Dr Neelkanth Hiremani (2021-22 to 2024-25), ICAR-CICR, Nagpur
		Nagpur	Dr S.S. Patil (2018-19 to 2023-24), Dr Dipak Nagrale (2021-22 to 2023-24), ICAR-CICR, Nagpur
		Voice messages	Dr S. M. Wasnik (2018-19 to 2021-22), Dr J. H. Meshram (2022-23 to 2024-25), ICAR-CICR, Nagpur
2.	Dr PDKV, Akola	Akola	Dr P.W. Nemade (2018-19 to 2020-21) Dr P.P. Patil (2020-21 to 2024-25), Dr PDKV, Akola
		Buldhana	Dr Surendra Deshmukh (2018-19 to 2023-24), Dr PDKV, Akola
		Yavatmal	Dr P. N. Magar (2018-19 to 2024-25), KVK, Yavatmal
		Washim	Dr V. V. Deshmukh (2018-19)
3.	VNMKV, Parbhani	Nanded	Dr S. M. Telang (2018-19 to 2020-21), Dr B. V. Bhede (2021-22 to 2024-25), Nanded
		Parbhani	Dr P. B. Kedar (2018-19 to 2020-21), Dr D. D. Patait (2020-21 to 2024-25), CRS VNMKV, Parbhani
		Jalna	Dr S. D. Bantewad (2018-19), Dr S. K. Patil (2019-20 to 2020-21), Dr D. S. Mutkule (2021-22 to 2024-25), ARSB Adnapur, Jalna
4.	MPKV,Rahuri	Jalgaon	Dr H.S. Baheti (2018-19 to 2024-25), KVK, Jalgaon

Sr. No.	State / Name of Institute / University	District in which project implemented	Name of district Coordinator / Co-PI, Duration and Affiliation
Gujarat			
5.	NAU, Navsari	Bharuch	Dr H. R. Desai (2018-19 to 2024-25), Dr R.D. Patel (2018-19 to 2024-25), MCRS NAU, Surat
6.	JAU, Junagadh	Junagadh	Dr M. V. Varia (2018-19 to 2024-25), CRS JAU, Junagarh
Madhya Pradesh			
7.	RVSKVV, Gwalior	Khandwa	Dr S. K. Parsai (2018-19 to 2024-25)
Karnataka			
8.	UAS, Dharwad	Dharwad	Dr S. S. Udikeri (2018-19 to 2020-21), Dr S. V. Hugar (2018-19 to 2020-21), Dr S. B. Patil (2020-21 to 2021-22) Dr Poornima M (2021-22 to 2024-25), ARS Dharwad
9.	UAS, Raichur	Raichur	Dr. A. G. Sreenivas (2018-19 to 2024-25), College of Agriculture, UAS, Raichur, Dr S. G. Hanchinal (2018-19 to 2024-25), MARSUAS, Raichur
Telangana			
10.	PITSAU, Hyderabad	Adilabad	Dr K. Raja Shekhar (2018-19 to 2023-24), Dr. B. Ram Prasad (2023-24 to 2024-25), ARS Adilabad
Andhra Pradesh			
11.	ANGRAU, Guntur	Guntur	Dr NVVS Durga Prasad (2018-19 to 2020-21), Dr G. Annie Diana Grace (2020-21 to 2023-24), Dr L Rajesh Chaudary (2024-25) RARS Lam, Guntur
		Kurnool	Dr Siva Rama Krishna (2018-19 to 2024-25), Dr Y Srujana (2020-21 to 2021-22), Dr J. Manjunath (2021-22), RARS, Nandyal
12.	Punjab		
	PAU Ludhiana	Bathinda	Dr Jasjinder Kaur (2024-25), Dr Jasreet Kaur (2024-25), RRS, Bathinda
Tamil Nadu			
	ICAR-CICR RS Coimbatore	Coimbatore	Dr K. Rameash (2018-19 to 2024-25), Dr. K. Shankarganesh (2022-23 to 2024-25), ICAR-CICR, Coimbatore
Haryana			
	CICR RS Sirsa	Sirsa	Dr Rishi Kumar (2019-20 to 2024-25), Dr S. K. Sain (2022-23 to 2023-24), ICAR-ICAR RS, Sirsa
Rajasthan			
	CICR RS Sirsa	Sriganganagar	Dr S. K. Sain (2024-25), ICAR-ICAR RS, Sirsa

Project implemented through ATARIs and affiliated KVKs on 25 acres area during 2022-23

Name of ATARI	State	Name of KVK	Affiliation	District	Name of Coordinator
ATARI, Ludhiana	Punjab	KVK. Bathinda	PAU	Bathinda	Dr. Gurdeep Singh
		KVK. Mansa	PAU	Mansa	Dr. Ranvir Singh
		KVK, Muktsar	PAU	Muktsar	Dr N. S. Dhaliwal
ATARI, Jodhpur	Rajasthan	KVK, Hanumangarh	NGO	Hanumangarh	Dr. Anoop Kumar
	Haryana	KVK, Hisar	CCSHAU	Hisar	Dr Narendra Kumar
ATARI, Pune	Maharashtra	KVK, Beed	VNMKV	Beed	Dr. B.B. Gaikwad
		KVK, Aurangabad	VNMKV	Aurangabad	Dr B L Pisure
		KVK, Nandurbar	NGO	Nandurbar	Dr. Padmakar Kunde
	Gujarat	KVK, Narmada	NAU	Narmada	Dr. Hiteshkumar Jadav
		KVK, Amreli	JAU	Amreli	Dr. N.S.Joshi
ATARI, Hyderabad	Andhra Pradesh	KVK, Prakasam	ANGRAU	Prakasam (Darsi)	Dr.N.V.V.S. Durga Prasad
		KVK Anantapur	ANGRAU	Anantpur (Reddy Palli)	Dr. Banka Kanda Kishore Reddy
	Telangana	KVK, Mancherial	PJTAU	Mancherial	Dr. M. Rajeshwar Naik
		KVK, Karimnagar	NGO	Karimnagar	Dr D. Srinivas Reddy
		KVK, Khammam	PJTAU	Khammam	Dr. J Hemantha Kumar
		KVK, Nagarkurnool	PJTAU	Nagarkurnool	Dr. Prabhakar Reddy
ATARI, Kolkata	Odisha	KVK, Kalahandi	OUAT	Kalahandi	Dr. Jyoti Rekha Mallick
ATARI, Bengaluru	Karnataka	KVK, Bidar	UAS (R)	Bidar	Dr. Sunilkumar N M
		KVK, Kalaburagi	UAS (R)	Kalaburagi	Dr Zaheer Ahamed B
		KVK, Vijayapura	UAS(D)	Vijayapura	Dr Shivalingappa Hotkar

Operational area of the project

Since the inception of project in 2018-19, the implementation program has demonstrated a steady and strategic footprint across India's cotton-growing regions. For the first four years (2018–2022), the initiative maintained a consistent reach across 8 states (initially 7), covering 21 districts and 1,050 acres annually. The program saw a significant peak in the 2022-23 cycle, expanding its impact to 11 states and 41 districts, reaching a record 1,550 farmers. While there was a slight consolidation in 2023-24, the current 2024-25 period shows renewed growth, operating across 10 states and 21 districts. This latest phase covers 1,258 acres, reflecting an increased land-to-farmer ratio and a continued commitment to mitigating pink bollworm impact through widespread farmer engagement (Table 1).

Table 1. Operational Area (States, Districts, Villages, Area, Number of Farmers)

Year	No. of states	District	Villages	Farmers	Area in ac
2018-19	7	21	105	1050	1050
2019-20	8	21	105	1050	1050
2020-21	8	21	105	1050	1050
2021-22	8	21	105	1050	1050
2022-23	11	41	125	1550	1550
2023-24	8	15	76	900	900
2024-25	10	21	89	1060	1258

Pink bollworm management strategies devised by ICAR-CICR

- Timely sowing of short to medium duration Bt-cotton hybrids and Bt- cotton varieties
- Installation of pheromone traps in the field for monitoring moth activity as well as near gineries to trap post season emergence of PBW adults
- Use of neem-based pesticides
- Crop inspection at squaring and flowering stage of the crop for presence of PBW larvae within the flowers and removal and destruction of rosette flowers
- Release of biocontrol agent egg parasitoid *Trichogrammatoidea bactrae*
- At boll development stage, green boll sampling by plucking 20 green bolls per acre to assess ETL (at least two bolls i.e. 10% having white or pink larvae/ exit holes), with the damage crossing ETL, recommended to apply low to moderately hazardous insecticides
- Strictly avoid spraying pyrethroids before 120 days of crop age or any insecticide mixtures at any time to prevent sucking pests' outbreaks
- Not to store infested or stained cotton in godowns
- Averting crop extension beyond time
- Timely termination of crop to break crop cycle
- Clean up fields of residual stalks and partially opened bolls

IPM-Technological interventions and critical inputs

Plant stage and Operation	Recommendations per acre
45-60 DAS	
Monitoring	Install pheromone traps @ 2/acre for monitoring pink bollworm moth activity at 45 DAS in 60 IPM fields and 10 NIPM fields
Biopesticide	Spray neem-based pesticide @ 1L/ ac at 50-60 DAS
61-90 DAS	
Pesticide against sucking pests	Spray Flonicamid 50WG @ 80g/ac Or Dinotefuran 20SG @ 60g/ac Or Diafenthiuron 50% SC 200g /ac or Imidacloprid 17.8%SL @ 60ml/ha Or Tolfenpyrod 15%EC @400ml/ac Or Fenpyroximate 5%EC @ 300ml/ac (need-based application at ETL)
Monitoring of pink bollworm infestation at flowering stage	Monitoring of crop at squaring and flowering stages for the presence of PBW larvae within flowers (presence of Rosette flowers) on randomly selected plants. Remove and destroy rosette flowers.
Monitoring and pesticide application against pink bollworm	At ETL, spray Emamectin benzoate 5SG @ 100g/ac Or Indoxacarb 14.5 SC @ 200ml/ac Or Profenofos 50 EC @ 600 ml/ac Or Chlorpyrifos 20% EC @ 500 ml/ac.
91-120 DAS	
Biocontrol	Release of the egg parasitoid <i>T.bactrae</i> @ 60,000 eggs /ac
Pesticide	Spray Emamectin benzoate 5SG @ 100 g/ ac Or Indoxacarb 14.5 SC @ 200 ml/ac Or Profenofos 50 EC @ 600 ml/ac Or Chlorpyrifos 20 % EC @ 500 ml/ac Or Fipronil 5%EC @ 800ml/ac
121 DAS	
Pesticide Spray	Cypermethrin 10% EC @ 250-300 ml/ac Or Cypermethrin 25% EC @ 80-110 ml/ac Or Lambda cyhalothrin 5%EC @ 200 ml/ac Or Deltamethrin 2.8 EC @ 200 ml/ac Or Fenpropathrin 10% EC @ 300-400 ml/ac Or Alphacypermethrin 10% EC @ 110-120 ml/ac

Mating Disruption Technology (MDT) - Technological interventions and critical inputs

Duration & operation	Recommendations
45-60 DAS	
Monitoring	Install pheromone traps @ 2/ac for monitoring pink bollworm moth activity at 45 DAS
Mating disruption technology	SPLAT @ 500g/ ac Or PB Rope L @ 160/ac. Delivery/application as per standard instructions.

Duration & operation	Recommendations
61-120 DAS	
Pesticide against sucking pests	Spray Flonicamid 50WG @ 80g/ac Or Dinotefuran 20SG @ 60g/ac Or Diafenthiuron 50% SC 200g /ac Or Imidacloprid 17.8%SL @ 60ml/ha Or Tolfenpyrod 15%EC @400ml/ac Or Fenpyroximate 5%EC @ 300ml/ac (need-based application at ETL)
Monitoring of pink bollworm infestation at flowering stage	Monitoring of crop at squaring and flowering stages for the presence of PBW larvae within flowers (presence of Rosette flowers) on randomly selected plants. Remove and destroy rosette flowers.
Monitoring and pesticide application against pink bollworm	At boll formation stage, inspect the presence and damage of PBW by plucking 20 green bolls from different plants randomly (one boll per plant).
121 DAS	
Need based Pesticide spray	Cypermethrin 10% EC @ 250-300 ml/ac Or Cypermethrin 25% EC @ 80-110 ml/ac Or Lambda cyhalothrin 5%EC @ 200 ml/ac Or Deltamethrin 2.8 EC @ 200 ml/ac Or Fenpropathrin 10% EC @ 300-400 ml/ac Or Alphacypermethrin 10% EC @ 110-120 ml/ac

Achievements

During 2018-19, after dissemination of pink bollworm strategy, the number of sprays used to control sucking pests and bollworms were less compared in IPM demonstrations with that of NIPM (Non-IPM) fields, it was observed that the number of sprays for the control of cotton pest during season came down to an average of 5.02 in IPM field as compared to the average of 6.98 sprays in NIPM fields. During 2019-20, IPM fields received average 4.94 sprays as compared to 7.66 sprays in NIPM fields. During 2020-21, IPM fields received average 5.19 sprays as compared to 8.07 sprays in NIPM fields. In the year 2021-22, IPM fields received average 5.18 sprays as compared to 8.20 sprays in NIPM fields. In the year 2022-23, IPM fields received average 5.12 sprays as compared to 7.91 sprays in NIPM fields. In the year 2023-24, IPM fields received average 5.82 sprays as compared to 8.37 sprays in NIPM fields. Similarly in the year 2024-25, IPM fields received average 5.54 sprays as compared to 8.38 sprays in NIPM fields. Comparatively more seed cotton was harvested from IPM than NIPM fields i.e. 2190 vs 1820 kg/ha in 2018-19, 2049 vs 1715 kg/ha in 2019-20, 1881 vs 1585 kg/ha in 2020-21, 1901 vs 1607 kg/ha in 2021-22, 1908 vs 1615 kg/ha in 2023-24, 1971 vs 1671 kg/ha during 2023-24 and 2079 vs 1705 kg/ha during 2024-25. Reduced number of sprays resulted in saving on the cost of additional insecticide requirement and the cost of labour for spraying, thus increasing in the margin of profit to the cotton farmers. Overall benefit cost ratio 2.16:1, 2:1, 1.89:1, 2.24:1, 2.33:1, 1.91:1 and 2.14:1 was realized during 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and 2024-25 respectively (Table 2).

Table 2. Economic impact of project implementation

Crop Season	Type of field	Average Number of sprays			Yield (kg/ha)	Benefit: cost ratio
		Sucking pests	Bollworm	Total sprays		
2018-19	IPM	2.75	2.27	5.02	2190	2.16:1
	NIPM	3.70	3.28	6.98	1820	
2019-20	IPM	2.53	2.41	4.94	2049	2.0:1
	NIPM)	3.91	3.75	7.66	1715	

Crop Season	Type of field	Average Number of sprays			Yield (kg/ha)	Benefit: cost ratio
		Sucking pests	Bollworm	Total sprays		
2020-21	IPM	2.57	2.62	5.19	1881	1.89:1
	NIPM	3.94	4.13	8.07	1585	
2021-22	IPM	2.56	2.63	5.18	1901	2.24:1
	NIPM	4.04	4.17	8.20	1607	
2022-23	IPM	2.73	2.48	5.12	1908	2.33:1
	NIPM	4.21	3.81	7.91	1615	
2023-24	IPM	2.95	3.08	5.82	1971	1.91:1
	NIPM	4.47	4.17	8.37	1671	
2024-25	IPM	3.06	2.48	5.54	2079	2.14:1
	NIPM	4.63	3.94	8.38	1705	

Reduction in pesticide usage

Obvious difference was recorded in cost and volume of spray during project implementation. Reduction in the number of sprays has direct effect on the reduction in pesticide usage in IPM fields. Reduction in pesticide usage in IPM vs NIPM fields was 46.39% in terms of cost, and 38.96% in terms of volume during 2019-20 while concurrent percent reduction in pesticide usage was 41.03 & 39.33 in 2020-21, 40.70 & 39.38 in 2021-22, 34.63 & 38.13 in 2022-23, 33.4 & 37.4 in 2023-24 and 37.29 & 42.34 in 2024-25, respectively (Table 3).

Table 3. Reduction in pesticide usage in IPM vs NIPM fields

Crop season	Cost of spray (INR)			The volume of spray (L+kg)		
	IPM	NIPM	% Reduction	IPM	NIPM	% Reduction
2019-20	6912	12893	46.39	2.82	4.62	38.96
2020-21	7617	12916	41.03	2.7	4.45	39.33
2021-22	7217	12170	40.70	2.74	4.52	39.38
2022-23	7809	12074	34.63	2.53	4.82	38.13
2023-24	8380	13337	33.4	2.8	4.6	37.4
2024-25	8739	14066	37.29	2.70	4.53	42.34

Outcome of the project especially in terms of reduction in infestation of PBW

The overall pink bollworm reduction in green bolls varying from 33.55% to 43.49% during 2018-19 to 2024-25 (Table 4).

Table 4. Year wise overall pink bollworm reduction in green bolls

Sl. No	Financial Year	Overall pink bollworm reduction in green bolls (%)
1	2018-19	42.75
2	2019-20	43.49
3	2020-21	33.55
4	2021-22	33.77
5	2022-23	35.88
6	2023-24	42.30
7	2024-25	40.07

Pest scouting and outreach activities under the project



Pest scouting



Field visit



Input distribution



Farmers Training workshop



Farmers field training



Field day



Live demonstration



Sensitization workshop



Exhibition



Kisan mela

Selected SUCCESS STORIES of farmers

CENTRAL ZONE

**Maharashtra
Gujarat
Madhya Pradesh**

1. LESS SPRAY, MORE GAIN: IPM changed farmer's perception of cotton farming in Akola district of Maharashtra

Year : 2024-25
Name of farmer : **Shri Umesh Dinkar Pagrut**
Address : Aliyabad, Tal. Akola,
Dist. Akola, State-Maharashtra
Age : 45 years
Education : 12th Class
Landholding : 8 acres
Area under project : 1 acre
Irrigated/ Rainfed : Rainfed
Project implementing center : Cotton Research Station, Dr PDKV Akola
in collaboration with ICAR-CICR, Nagpur



Guidance received :

- Diagnostic field training on identification of pests and their damage symptoms
- IPM practices to be followed for pest control
- Need based recommendations of insecticides

Key IPM practices adopted :

- Use of pheromone traps for monitoring of pink bollworm moth activity
- Removal of rosette flowers to check early season infestation
- Timely crop termination to avoid continued perpetuation of the pest
- ETL-based insecticide applications to rationalize the insecticide use

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2940	2295
2	Additional yield(kg/ha)	645	-
3	Increase in yield (%)	28.1	-
4	Number of sprays/ha	5	7
5	Reduction in pesticide sprays (%)	29	-

Impact of adoption of IPM

By adopting IRM-based pest management practices, Shri Umesh Pagrut achieved nearly 28.1% more cotton yield while reducing pesticide expenditure by over 40%. The visible success of his demonstration plot motivated other neighboring farmers to adopt pheromone trap-based monitoring and need-based spraying. His case exemplifies how scientific pest management can improve farmer income and reduce ecological risk. The project implementation not only boosted the self-confidence of cotton farmer but also transformed his perception towards scientific pest management by building trust in IPM as a reliable, economical, and profitable approach for sustainable cotton farming.

2. Paradigm shift from chemical dependence to scientific decision-based pest management

Year : 2024-25
Name of farmer : **Shri Mahendra Arunrao Kale**
Address : Sanglud, Tal. Akola,
Dist. Akola, State -Maharashtra
Age : 49 years
Education : B.E (Electronics)
Landholding : 4 acres
Area under Project : 1 acre
Irrigated/ Rainfed : Rainfed
Project implementing center : Cotton Research Station, Dr PDKV Akola
in collaboration with ICAR-CICR, Nagpur



Guidance received :

- IPM practices and need-based use of insecticides in management of cotton pests
- Safe use of pesticides

Key IPM practices adopted :

- Pest monitoring and timely decision-making based on diagnostic field surveys
- Need-based spraying instead of calendar-based insecticide application to avoid unnecessary pesticide sprays
- Adoption of scientific pest management practices

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	3015	2265
2	Additional yield (kg/ha)	750	-
3	Increase in yield (%)	33.1	-
4	Number of sprays/ha	4	7
5	Reduction in pesticide sprays (%)	43	-

Impact of adoption of IPM

Shri Mahendra Arunrao Kale achieved nearly 33% higher seed cotton yield from IPM adopted field compared to the field in which he used traditional cotton practices. It has resulted in substantial reduction in expenditure on insecticide sprays through need-based application. The visible success of his demonstration plot proved that judicious use of pesticides does not compromise yield but rather enhances profitability and sustainability. This intervention transformed his perception towards pest management, shifting from routine chemical spraying to scientific decision-based practices under rainfed conditions. Shri. Kale's success story now serves as a motivating example for other farmers of the area to adopt IPM strategies for improved income and reduced pest associated yield losses. His experience underscores the value of combining education with practical farming. His ability to understand and implement the concept of need-based spraying has not only improved his profitability but also highlights the potential for resource optimization and enhanced yields through informed agricultural practices.

3. IPM improved yield and farmer confidence

Year : 2024-25
Name of farmer : **Shri Pundlik Vasudeo Vavre**
Address : Lakhonda, Tal. Akola,
Dist. Akola, State-Maharashtra
Age : 64 years
Education : 8th Class
Landholding : 5 acres
Area under Project : 1 acre
Irrigated/Rainfed : Rainfed
Project implementing center : Cotton Research Station, Dr PDKV Akola
in collaboration with ICAR-CICR, Nagpur



Guidance received :

- Identification of pests and damage symptoms through diagnostic field surveys
- Crop growth window-based IPM practices for pest management
- ETL-based spraying for effective and economical pest control

Key IPM practices adopted :

- Pest monitoring and timely pest control actions
- Adoption of need-based spraying instead of routine, calendar-based applications
- Knowledge on pest and disease symptoms through field visits and on-farm training

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2820	2240
2	Additional yield(kg/ha)	580	-
3	Increase in yield (%)	25.9	-
4	Number of sprays/ha	4	7
5	Reduction in pesticide sprays (%)	43	-

Impact of adoption of IPM

Adoption of IRM-PBW project activities helped Shri Pundlik Vasudeo Vavre to achieve about 26% higher seed cotton yield under rainfed conditions compared to his own traditional cotton farming practices. The successful performance of the IPM demonstration plot clearly proved that scientific and need-based pest management can significantly enhance productivity without increasing production costs. Shri. Vavre's success underscores the effectiveness and accessibility of IPM strategy for all farmers. His experience highlights how the adoption of scientifically sound pest management strategies can lead to tangible increases in productivity, ultimately benefiting the farmer through improved yields. It serves as an encouraging example of how embracing new knowledge can enhance agricultural outcomes, even for those with years of traditional farming experience.

4. Smart management, better returns gained through adoption of IPM

Year	: 2024-25
Name of farmer	: Shri Balaji Devaba Jadhav
Address	: Village - Pimpaldari, Taluka - Loha, Dist - Nanded, State - Maharashtra
Age	: 62 years
Education	: 5th Class
Landholding	: 10 acres
Area under Project	: 1 acre
Irrigated/Rainfed	: Irrigated
Source of Irrigation	: Tube well
Project implementing center	: Cotton Research Station, Nanded (under VNMKV, Parbhani) in collaboration with ICAR-CICR, Nagpur



Guidance received :

- Identification of major cotton insect pests and their damage symptoms
- Important natural enemies of cotton pests
- Information on Economic Threshold Levels (ETL) for decision making on pest control
- Pheromone traps for monitoring pink bollworm
- Need-based and judicious application of insecticides

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm moth emergence patterns
- Field scouting of infestation in rosette flowers and green bolls to assess ETL
- Need-based insecticide application instead of routine spraying
- Awareness and conservation of natural enemies

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	1640	1450
2	Additional yield(kg/ha)	190	-
3	Increase in yield (%)	13.1	-
4	Number of sprays/ha	4	7
5	Reduction in pesticide sprays (%)	43	-

Impact of adoption of IPM

Shri Balaji Devaba Jadhav has been cultivating cotton for over 20 years along with other crops like soybean, redgram, greengram, chickpea, and wheat. In recent years, severe infestation of pink bollworm starting from the flowering stage caused heavy losses and led to indiscriminate use of pesticides, which increased the cost of cultivation and reduced net returns. During cotton growing season of 2024-25, the IRM-PBW project was implemented in his field. By adopting IPM practices, he achieved about 13% higher seed cotton yield (190 kg/ha more) compared to the neighbouring NIPM field. It also resulted in reducing unnecessary pesticide sprays and cost of cultivation. Shri Jadhav gained confidence in IPM technology and plans to adopt it in future seasons for cotton as well as other crops. His success story stands as an example of how awareness, training, and scientific guidance can lead to sustainable and profitable farming.

5. IPM helped control pink bollworm and enhanced cotton yield

Year : 2024-25
Name of farmer : **Shri Shubhash Pratap Chaudhari**
Address : Village: Avhane, Mandal: Jalgaon,
Dist: Jalgaon, State-Maharashtra
Age : 60 years
Education : 4th Class
Landholding : 4 acres
Area under Project : 1 acre
Irrigated/Rainfed : Rainfed
Source of Irrigation : Borewell
Project implementing center : KVK, Mamurabad, Jalgaon (Under MPKV, Rahuri)
in collaboration with ICAR-CICR, Nagpur



Guidance received :

- Identification of major cotton insect pests and their damage symptoms
- Guidance on Economic Threshold Levels (ETL) for different pests of cotton
- Importance of pheromone traps for monitoring pink bollworm

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm moths
- Regular field scouting to ascertain pest infestation level
- Cultural practices to disrupt pest life cycle: timely crop termination, animal grazing after harvest, crop residue destruction, etc
- Need-based application of insecticides instead of routine spraying

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2120	1350
2	Additional yield(kg/ha)	770	-
3	Increase in yield (%)	57	-
4	Number of sprays/ha	5	6
5	Reduction in pesticide sprays (%)	17	-

Impact of adoption of IPM

Adoption of IPM practices enabled the farmer to effectively manage pink bollworm infestation, resulting in a 770 kg/ha more yield. The adoption witnessed a remarkable 57% yield increase over traditional farmer practice, besides reduced pesticide usage and lower cost of cultivation. This intervention strengthened the farmer's confidence in scientific pest management and demonstrated the economic and environmental benefits of need-based crop protection. His proactive approach and willingness to embrace scientific solutions not only secured his livelihood but also set an example for other farmers in the region. His success story serves as an inspiration for other farmers, demonstrating that innovation and perseverance are the keys to thriving in modern agriculture.

6. IPM holds the key to attract, retain and positively engage rural young in cotton farming

Year	: 2024-25
Name of farmer	: Shri Pushparaj Baviskar
Address	: Village: Dongaon, Mandal: Dharangaon, District: Jalgaon, State-Maharashtra
Age	: 28 years
Education	: BBA
Landholding	: 4.5 acres
Area under Project	: 1 acre
Irrigated/Rainfed	: Irrigated
Source of Irrigation	: Borewell, well
Project implementing center	: KVK, Mamurabad, Jalgaon (Under MPKV, Rahuri) in collaboration with ICAR-CICR, Nagpur



Guidance received :

- Identification of major cotton insect pests and their damage symptoms
- Guidance on Economic Threshold Levels (ETL) for different pests of cotton
- Importance of pheromone traps for monitoring pink bollworm.

Key IPM practices adopted :

- Pest monitoring and timely pest control actions
- Installation of pheromone traps for monitoring pink bollworm moths
- Regular field scouting to ascertain pest infestation level
- Cultural practices to disrupt pest life cycle: timely crop termination, animal grazing after harvest, crop residue destruction, etc
- Need-based application of insecticides instead of routine spraying

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2255	1430
2	Additional yield(kg/ha)	825	-
3	Increase in yield (%)	57.7	-
4	Number of sprays/ha	5	7
5	Reduction in pesticide sprays (%)	29	-

Impact of adoption of IPM

Shri Pushparaj Baviskar, a young and progressive farmer from Dongaon village of Jalgaon district, has been cultivating cotton on his 4.5-acre land with dedication and innovation. During the 2023-24 season, severe infestation of pink bollworm posed a serious threat to his crop and income. With technical guidance under IRM-PBW project, the IPM-managed field recorded a yield of 2255 kg/ha, compared to 1430 kg/ha in the NIPM field, giving a yield advantage of 57.7%. This success story reflects how young farmers, when supported with scientific guidance, can overcome major pest challenges and achieve sustainable and profitable cotton production through modern agricultural practices.

7. Pest confusion for farmer confidence : A mating disruption-led increased cotton productivity

Year : 2024-25
 Name of farmer : **Shri Prakash Sadashiv Raut**
 Address : Village -Rasulabad, Tah. Arvi,
 District - Wardha, State - Maharashtra
 Age : 68 years
 Education : 9th Pass
 Landholding : 7 Acres
 Area under Project : 3 acres
 Irrigated/Rainfed : Irrigated
 Source of Irrigation :
 Project implementing center : ICAR-CICR, Nagpur



Guidance received :

- Identification of cotton insect pests and their damage symptoms
- Pheromone trap-based monitoring
- Role of Special Pheromone Lure Application Technology (SPLAT) in pink bollworm control
- ETL- and need-based insecticide application

Key IPM practices adopted :

- Regular field scouting and pest assessment
- Plucking and destruction of rosette flowers
- Application of SPLAT for pink bollworm management through mating disruption
- Cultural control practices for pink bollworm: timely crop termination, crop residue management, etc.

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	1550	800
2	Additional yield(kg/ha)	750	-
3	Increase in yield (%)	93.7	-
4	Number of sprays/ha	6	14
5	Reduction in pesticide sprays (%)	57	-

Impact of adoption of IPM

Shri Raut, found a path to economical cotton farming through his involvement in IRM-PBW project. Previously, he often found himself navigating a confusing landscape of expensive and numerous pesticides, leading to frequent spraying, around 7-8 times per season. Following the recommendations of of IRM-PBW project, Shri. Raut adopted a more strategic approach, utilizing SPLAT. This not only reduced his plant protection costs but also lowered the number of sprays required. Shri. Raut observed a noticeable reduction in pink bollworm damage and an increase in his cotton yield, achieving 1550 kg/ha as compared to 800 kg/ha in NIPM fields. Adoption of IPM practices resulted in yield advantage of approximately 94% compared to traditional pest management practices, strengthening the farmer's confidence in scientific pest management.

8. IPM empowers young farmers to maximize cotton productivity through resource optimization

Year : 2024-25
Name of farmer : **Shri Sanjay Shinde**
Address : Village - Talegaon Dashasar, Tah - Dhamangaon
Railway, District - Amravati, State - Maharashtra
Age : 29 years
Education : 10th Class
Landholding : 18 Acres
Area under Project : 1 acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Open well
Project implementing center : ICAR-CICR, Nagpur



Guidance received :

- Field diagnostics symptoms of pink bollworm infestation
- Guidance on in-season and off-season cultural practices for pest and disease management in cotton
- ETLs of various cotton pests for deciding the correct stage and timing of pesticide sprays
- Safe handling of pesticides: Use of protective kit, avoiding tank mixtures, adopting label claim use of pesticides

Key IPM practices adopted :

- Installation of pheromone traps @ 2 traps /acre for pink bollworm monitoring
- Preventive spray of neem-based insecticides for deterring oviposition by pink bollworm
- Weekly field visit and inspection for rosette flowers and green boll infestation
- Recommended sprays following window based IPM strategy for cotton pests
- Timely crop termination and crop residue destruction

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2,950	1,888
2	Additional yield(kg/ha)	1,062	-
3	Increase in yield (%)	56.2	-
4	Number of sprays/ha	7	13
5	Reduction in pesticide sprays (%)	46	-

Impact of adoption of IPM

Prior to the IPM intervention, Shri Sanjay Shinde depended mainly on recommendations from local Krishi Seva Kendras, which often led to confusion, higher input costs, and excessive pesticide sprays. During the 2024-25 season, he adopted the scientific recommendations of ICAR-CICR, Nagpur for the first time under IRM-PBW project under the guidance of ICAR-CICR, Nagpur. As a result, his project plot recorded a yield of 2,950 kg/ha, compared to 1,888 kg/ha in the non-IPM field, achieving yield advantage of about 56%. He also observed a noticeable reduction in pink bollworm damage and a significant decrease in plant protection cost. His success story indicates that scientific and cost-effective technologies disseminated properly to the end users can improve productivity, reduce input costs, and gain confidence in sustainable cotton farming practices.

9. IPM empowers young farmers to maximize cotton productivity through resource optimization

Year : 2024-25
 Name of farmer : **Shri Sachin Dudhe**
 Address : Village - Talegaon Dashasar, Tah - Dhamangaon
 Railway, District - Amravati, State - Maharashtra
 Age : 29 years
 Education : 12th Class
 Landholding : 10 Acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : Open well
 Project implementing center : ICAR-CICR, Nagpur



Guidance received :

- Field diagnostics symptoms of pink bollworm infestation
- Guidance on in-season and post-season cultural practices for pest and disease management in cotton
- ETLs of various cotton pests for deciding the correct stage and timing of pesticide sprays
- Use of protective kit, gloves, mask, apron during spraying

Key IPM practices adopted :

- Installation of pheromone traps @ 2 traps per acre for monitoring pink bollworm
- Release of Trichocards @ 60,000 per acre in 3 installments at 15 days interval for biological control of pink bollworm
- Removal of monopodia branches @ 50-55 days of crop age for better crop growth
- Timely crop termination latest by mid-January and destruction of pest infested residues

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2,750	1,888
2	Additional yield(kg/ha)	862	-
3	Increase in yield (%)	45.7	-
4	Number of sprays/ha	7	13
5	Reduction in pesticide sprays (%)	46	-

Impact of adoption of IPM

During the 2024-25 season, Mr Dudhe adopted the use of pheromone traps and Trichocards for pink bollworm management under the IRM-PBW project. He also followed recommendations on HDPS technology and removal of monopodia branches, which contributed to better crop growth and pest regulation. Scientist from ICAR-CICR, Nagpur provided a technical backup to the beneficiary farmer. Adoption of IPM practices resulted in about 46% higher cotton yield with reduced pink bollworm infestation and timely pest management. Rapport building with cotton farmer through regular field visits, training, guidance, input and literature distribution, etc. helped strengthening the farmer's confidence in scientific recommendations in economically suppressing the pest damage and increase the yields.

10. Enhanced cotton productivity through IPM adoption

Year : 2024-25
Name of farmer : **Shri Balaji Pandurang Modak**
Address : Village-Pachgaon, Tah-Warora,
District-Chandrapur, State-Maharashtra
Age : 54 years
Education : Graduate
Landholding : 27 Acres
Area under Project : 1 acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Tubewell
Project implementing center : ICAR-CICR, Nagpur



Guidance received :

- Pheromone traps for pest monitoring
- Application of biocontrol agents (Trichocards, neem-based pesticides)
- Need-based, use of chemical insecticides

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm
- Use of Trichocards @ 60,000 parasitized eggs per acre
- Preventive spray of neem - based pesticides @ 45-50 days after sowing of cotton crop
- Need-based application of recommended insecticides

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	1,870	1,180
2	Additional yield(kg/ha)	690	-
3	Increase in yield (%)	58.5	-
4	Number of sprays/ha	5	10
5	Reduction in pesticide sprays (%)	50	-

Impact of adoption of IPM

Shri. Modak received invaluable guidance from ICAR-CICR scientists under the IRM-PBW project implemented in his one acre of cotton field. Adoption of IPM practices resulted in effective pink bollworm control with 690 kg/ha higher yield than the traditional crop production practices. An incremental yield advantage of 58.5% was realized by the farmer due to IPM practices. The other notable achievements are reduced pesticide use, and improved profitability.

11. IPM adoption boosts cotton yield under rainfed conditions

Year : 2024-25
Name of farmer : **Shri Vikas kisan Kalaskar**
Address : Village -Parsoda, Tah-Warora,
District:-Chandrapur, State-Maharashtra
Age : 56 years
Education : Graduate
Landholding : 11 Acres
Area under Project : 1 acre
Irrigated/Rainfed : Rainfed
Project implementing center : ICAR-CICR, Nagpur



Guidance received :

- Pheromone traps for pest monitoring
- Use of Trichocards, and neem-based pesticides
- Safe handling of pesticides

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm
- Use of Trichocards @ 60,000 parasitized eggs per acre
- Preventive spray of neem-based pesticides @ 45-50 days after sowing of cotton crop
- Need-based application of recommended insecticides

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	1620	1180
2	Additional yield(kg/ha)	440	-
3	Increase in yield (%)	37.3	-
4	Number of sprays/ha	6	10
5	Reduction in pesticide sprays (%)	40	-

Impact of adoption of IPM

Adoption of IPM practices led to a significant improvement in cotton productivity (~37% higher yield) along with reduced cost of cultivation through fewer pesticide sprays. The farmer gained better awareness of timely pest management and safe pesticide use, resulting in enhanced confidence, improved farm profitability, and a positive shift towards sustainable cotton farming practices.

12. Battling pink bollworm with science: A farmer's path to higher cotton yield

Year : 2024-25
 Name of farmer : **Shri Pandurang Sapkale**
 Address : Village: Karanj, Mandal: Jalgaon,
 Dist: Jalgaon, Maharashtra State
 Age : 50 years
 Education : 7th Class
 Landholding : 5 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : Borewell
 Project implementing center : Krushi Vigyan Kendra, Mamurabad, Jalgaon



Guidance received :

- Awareness on pink bollworm management and natural enemies
- Monitoring of pest population using pheromone traps
- Identification of cotton insect pests and their life stages
- Need-based and ETL-based pest management practices
- Regular training, field visits and technical guidance by KVK scientists

Key IPM practices adopted :

- Installation of pheromone traps for monitoring and mass trapping of pink bollworm
- Use of biopesticides and botanical insecticides
- Adoption of cultural practices to break the pest's life cycle
- Regular field scouting and scientific advisory
- Judicious and need-based use of recommended insecticides

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2320	1550
2	Additional yield(kg/ha)	770	-
3	Increase in yield (%)	49.68	-
4	Number of sprays/ha	4	4
5	Reduction in pesticide sprays (%)	0	-

Impact of adoption of IPM

By adopting Integrated Pest Management (IPM) strategies, Shri Pandurang Sapkale successfully managed the pink bollworm infestation and significantly reduced plant protection costs. With continuous guidance from Krushi Vigyan Kendra (KVK), Mamurabad, Jalgaon, he implemented scientific practices such as pheromone trapping, use of biopesticides and cultural control measures. As a result, he achieved a seed cotton yield of 2320 kg/ha, which was 770 kg/ha higher than non-IPM fields, registering a 49.68% increase in yield. This remarkable improvement restored his confidence in cotton cultivation and highlighted the effectiveness of IPM strategies in combating major insect pests.

13. Strengthening adaptive capacity of cotton farmers lead to increased productivity and farmer's income

Year : 2024-25
 Name of farmer : **Shri Dinkar Patil**
 Address : Village: Shelgaon, Mandal: Jalgaon,
 Dist: Jalgaon, Maharashtra State
 Age : 48 years
 Education : 10th Class
 Landholding : 4.5 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : Borewell, Open well
 Project implementing center : Krushi Vigyan Kendra, Mamurabad, Jalgaon



Guidance received :

- Awareness on pink bollworm management and role of natural enemies
- Monitoring of pest population using pheromone traps
- Identification of cotton insect pests and their life stages
- Need-based and ETL-based pest management practices
- Regular training, field visits and technical guidance by KVK scientists

Key IPM practices adopted :

- Key IPM practices adopted
- Installation of pheromone traps for monitoring and mass trapping of pink bollworm
- Use of biopesticides and biological control measures
- Adoption of cultural practices to break the pest's life cycle
- Regular field scouting and scientific advisory
- Judicious and need-based use of recommended insecticides

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2455	1550
2	Additional yield(kg/ha)	905	-
3	Increase in yield (%)	58.39	-
4	Number of sprays/ha	6	6
5	Reduction in pesticide sprays (%)	0	-

Impact of adoption of IPM

By adopting Integrated Pest Management (IPM) strategies, Shri Dinkar Patil successfully managed pink bollworm infestation and substantially reduced plant protection costs. With continuous guidance from Krushi Vigyan Kendra, Mamurabad, Jalgaon, he implemented scientific practices such as pheromone trapping, use of biological control agents, cultural methods and need-based insecticide application. As a result, he achieved a seed cotton yield of 2455 kg/ha, which was 905 kg/ha higher than non-IPM fields, registering a 58.39% increase in yield. This improvement restored his confidence in cotton cultivation and demonstrated the effectiveness of IPM technology.

14. Dissemination of IPM strategies helped in improving yield and reducing cost of cotton production

Year : 2024-25
Name of farmer : **Shri Pandit Nathuram Thorat**
Address : Village : Kahanapur, Ta. Parbhani, Dt. Parbhani
Age : 42 years
Education : 10th Class
Landholding : 5 Acres
Area under Project : 1 acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Borewell
Project implementing centre : Cotton Research Scheme, VNMKV, Parbhani



Guidance received :

- Diagnostic field visits, technical guidance by ICAR-CICR and University scientists
- Identification of insect pests, diseases and their damage symptoms
- Early season monitoring of pink bollworm using pheromone traps and rosette flowers
- ETL-based and need-based insecticide application

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm
- Adoption of ETL-based spray schedule
- Timely crop termination and destruction of crop residues
- Crop rotation with other crops in rabi season to break the pest life cycle

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2750	1813
2	Additional yield(kg/ha)	937	-
3	Increase in yield (%)	51.7	-
4	Number of sprays/ha	4	8
5	Reduction in pesticide sprays (%)	50	-

Impact of adoption of IPM

With timely scientific advisories, Shri Thorat reduced the number of sprays and plant protection costs while achieving effective pest control. As a result, his cotton yield increased significantly by 51.7% compared to non-IPM practices, demonstrating a substantial percentage yield increase (IPM over NIPM) and restoring farmer confidence in sustainable pink bollworm management. Capacity building and increased awareness of farmer about cotton farming is added advantage.

15. Science driven cotton farming : A paradigm shift in productivity and profitability

Year : 2023-24
 Name of farmer : **Shri Shyamsundar Bhutada**
 Address : Village-Majra, Ta & Dist-Wardha
 Age : 30 yrs
 Education : BSc (Agri)
 Landholding : 14 Acre
 Area under Project : 1 Acre
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : borewell
 Project implementing centre : ICAR-CICR, Nagpur



Guidance received :

- Technical guidance on cost-effective management of pink bollworm
- Training on identification of pink bollworm and its life cycle
- Monitoring using pheromone traps and ETL-based decision making
- Safe and need-based use of pesticides
- Advisory on IPM practices for sustainable cotton production

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm
- Release of Trichocards for biological control
- Use of neem-based pesticides and recommended insecticides at ETL
- Regular field scouting and avoidance of indiscriminate sprays

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2100	1700
2	Additional yield(kg/ha)	400	-
3	Increase in yield (%)	23.53	-
4	Number of sprays/ha	4	6
5	Reduction in pesticide sprays (%)	33	-

Impact of adoption of IPM

During 2022-23, Shri Shyamsundar Bhutada suffered severe yield losses due to heavy infestation of pink bollworm, resulting in nearly 50% crop damage. After joining the IRM-PBW project of ICAR-CICR, Nagpur, he adopted scientific IPM practices during 2023-24, including pheromone trap-based monitoring, Trichocard release and need-based neem-based pesticides and insecticide application. As a result, the IPM field recorded a seed cotton yield of 2100 kg/ha compared to 1700 kg/ha under farmer's practice, giving an additional yield of 400 kg/ha with a yield advantage of 23.53%. The number of pesticide sprays was reduced, cultivation cost decreased and profitability increased. The successful outcome strengthened the farmer's confidence in scientific and sustainable cotton pest management.

16. Modern cotton cultivation practices boost yield and enhances farmer profitability

Year : Year :2023-24
Name of farmer : **Shri Sachin Bade**
Address : Kharangna-Morangna, Tahshil & Dist. Wardha
Age : 36 years
Education : Graduate
Landholding : 5 Acres
Area under Project : 1 Acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Borewell
Project implementing centre : ICAR-CICR, Nagpur



Guidance received :

- Identification of pink bollworm and its life stages
- Awareness on IPM strategies
- Monitoring using pheromone traps and ETL-based insecticide application
- Cost-effective and eco-friendly pest management approaches

Key IPM practices adopted :

- Installation of pheromone traps for pink bollworm monitoring
- Regular field scouting and need-based spray application
- Use of Trichocards and neem-based pesticides

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	1950	1600
2	Additional yield(kg/ha)	350	-
3	Increase in yield (%)	21.88	-
4	Number of sprays/ha	4	7
5	Reduction in pesticide sprays (%)	43	-

Impact of adoption of IPM

Shri Sachin Bade of Wardha district faced severe losses in cotton productivity due to increasing infestation of pink bollworm and rising plant protection costs. After joining the IRM-PBW project implemented by ICAR-CICR, Nagpur, he adopted scientific IPM practices such as pheromone trap-based monitoring, identification of pest life stages and need-based insecticide application. As a result, he obtained a seed cotton yield of 1950 kg/ha compared to 1600 kg/ha under farmer's practice, registering an additional yield of 350 kg/ha with a yield advantage of 21.88%. The reduced number of sprays lowered cultivation costs and increased profitability. The successful outcome strengthened his confidence in knowledge-based cotton farming and motivated him to encourage fellow farmers and rural youth to adopt IPM technologies for sustainable pest management.

17. Knowledge-driven farming enhanced the farmer confidence and boosted cotton yield

Year : 2024-25
Name of farmer : **Shri Alpeshbhai Harishbhai Vasava**
Address : Village: Shir, Taluka: Valiya,
District: Bharuch State- Gujarat
Age : 38 years
Education : Graduate
Landholding : 5 Acres
Area under Project : 1 Acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Tube well
Project implementing center : Main Cotton Research Station, Surat (NAU, Navsari)



Guidance received :

- Use of pheromone traps for pink bollworm monitoring
- Use of trichocards and neem-based pesticides
- Pest identification and life-cycle based management
- Timely advisory through field visits and training

Key IPM practices adopted :

- Installation of pheromone traps @ 2 per acre
- Use of Trichocards @ 60,000 parasitized eggs per acre
- Preventive spray of neem-based pesticides @ 45-50 days after sowing of cotton crop
- ETL-based application of recommended insecticides
- Timely crop termination and field sanitation to reduce pest inoculum

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	3202	2347
2	Additional yield(kg/ha)	885	-
3	Increase in yield (%)	38	-
4	Number of sprays/ha	6	8
5	Reduction in pesticide sprays (%)	25	-

Impact of adoption of IPM

Adoption of IPM practices resulted in a substantial yield advantage ($\approx 38\%$ higher yield) compared to traditional practices followed by the farmer. Effective pink bollworm control, reduced crop losses, and improved farmer confidence in scientific and sustainable cotton production were the other notable achievements associated with the project implementation.

18. IRM-PBW project proved a boon for cotton grower

Year : 2024-25
Name of farmer : **Shri Babubhai Chhatrasinh Vasava**
Address : Village: Seval, Taluka: Valiya,
District: Bharuch, State- Gujarat
Age : 60 years
Education : 4th Pass
Landholding : 8 Acres
Area under Project : 1 Acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Open well & Tube well
Project implementation center : Main Cotton Research Station, Surat (NAU, Navsari)



Guidance received :

- Identification of cotton pests, and natural enemies
- Life-cycle based management of pink bollworm
- Use of pheromone traps for pest monitoring
- Judicious use of bio-agents insecticides
- Timely advisory through field visits and training programmes

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm
- Use of recommended IPM input kit for management of sucking pests and pink bollworm
- ETL-based application of insecticides
- Trichocard application

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2619	2273
2	Additional yield(kg/ha)	346	-
3	Increase in yield (%)	15.22	-
4	Number of sprays/ha	6	8
5	Reduction in pesticide sprays (%)	25	-

Impact of adoption of IPM

Adoption of IPM practices by the beneficiary farmer resulted in higher cotton yield ($\approx 15\%$ increase), reduced plant protection cost, fewer pesticide sprays, and improved pest management efficiency. The project enhanced farmer awareness and confidence in scientific and sustainable cotton cultivation. Thus, IRM-PBW project proved to be a boon for the cotton farming enhancing the system productivity and profitability.

19. Pheromone trap-based IPM improved pest management decision making and enhanced the farmer profitability

Year : 2024-25
 Name of farmer : **Shri Arvindbhai Karshanbhai Gondalia**
 Address : Village: Parab Vavdi, Taluka: Bheshan,
 Dist.: Junagadh, State- Gujarat
 Age : 45 years
 Education : 10th Pass
 Landholding : 3 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : Tube well
 Project implementing centre : Main Cotton Research Station, JAU, Junagadh, Gujarat



Guidance received :

- Identification of the cotton pests and their damage symptoms
- Use of pheromone traps for monitoring and management of pink bollworm

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm activity
- Release of trichocards for biological control
- ETL-based and need-based application of recommended insecticides
- Regular pest surveillance with guidance from scientists and field staff
- Adoption of scientific pest management learned through training and demonstration

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2916	2743
2	Additional yield(kg/ha)	173	-
3	Increase in yield (%)	6.3	-
4	Number of sprays/ha	4	7
5	Reduction in pesticide sprays (%)	43	-

Impact of adoption of IPM

Adoption of pheromone trap-based IPM practices resulted in improved pest monitoring, reduced pink bollworm damage, and higher cotton yield (6.3%) than the traditional farmer practice. The project enhanced farmer knowledge, reduced dependence on indiscriminate spraying, and strengthened his trust in scientific farming practices based on research outputs.

20. Adoption of crop growth window-based pest management enhanced cotton productivity in Junagadh district

Year : 2024-25
 Name of farmer : **Savan Girishbhai Trambadia**
 Address : Village: Dungri, Taluka: Vanthali,
 Dist.: Junagadh, State-Gujarat
 Age : 30 years
 Education : B.A.
 Landholding : 3 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : Tube well
 Project implementing centre : Main Cotton Research Station, JAU, Junagadh, Gujarat



Guidance received :

- Pink bollworm identification and management
- New Bt cotton cultivation practices for higher yield

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm activity
- Release of trichocards for biological control
- ETL-based and need-based application of recommended insecticides
- Regular pest surveillance with guidance from scientists and field staff
- Adoption of scientific pest management learned through training and demonstration

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2990	2642
2	Additional yield(kg/ha)	348	-
3	Increase in yield (%)	13.2	-
4	Number of sprays/ha	5	7
5	Reduction in pesticide sprays (%)	29	-

Impact of adoption of IPM

Shri Savan Girishbhai Trambadia, has successfully enhanced his cotton yields by embracing scientific cultivation practices and targeted pest management strategies. Equipped with the knowledge of new cotton cultivation technologies and insect pest management strategies for higher yield, Shri. Trambadia achieved an impressive yield of 2990 kg/ha in the project area, significantly higher than the 2642 kg per hectare compared to NIPM field. Adoption of scientific pest management and improved Bt cotton cultivation practices resulted in about 13% higher yield with better control of pink bollworm.

21. Scientific IPM adoption improved cotton productivity and farmer confidence

Year : 2023-24
 Name of farmer : **Shri Kamleshbhai Raysangbhai Thakor**
 Address : Village: Dadapor, Taluka: Amod,
 Dist.: Bharuch, Stae- Gujarat
 Contact number : 9924311270
 Age : 38 years
 Education : 12th Pass
 Landholding : 5 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : Tube well
 Project implementing centre : Main Cotton Research Station, Surat (NAU, Navsari)



Guidance received :

- Diagnostic field visits, technical guidance by University scientists
- Identification of insect pests, diseases and their damage symptoms
- Monitoring of pink bollworm using pheromone traps and rosette flowers
- Need-based insecticide application

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm
- Window based IPM schedule for cotton pink bollworm and other pests
- Timely crop termination and destruction of crop residues
- Crop rotation with other crops in rabi season to break the pest life cycle

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2799	2563
2	Additional yield(kg/ha)	263	-
3	Increase in yield (%)	9.21	-
4	Number of sprays/ha	7	8
5	Reduction in pesticide sprays (%)	13	-

Impact of adoption of IPM

By adopting IPM strategies, the farmer effectively managed pink bollworm and sucking pests, reduced unnecessary pesticide sprays and achieved a higher yield of 2799 kg/ha compared to 2563 kg/ha in NIPM fields, registering an additional yield of 263 kg/ha. This gave an yield advantage of 9.21% besides strengthening farmer's adaptive capacity towards knowledge-based cotton farming.

22. IRM-PBW Project : A boon for cotton farmers of Gujarat

Year : 2023-24
Name of farmer : **Shri Ajaysinh Tribhovanbhai Padhiyar**
Address : Village: Chaklad, Taluka: Amod,
Dist.: Bharuch, State-Gujrat
Age : 34 years
Education : 10th pass
Landholding : 35 acres
Area under Project : 1 acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Tube well
Project implementing centre : Main Cotton Research Station, Surat (NAU, Navsari)



Guidance received :

- Diagnostic field visits and technical guidance by University scientists
- Identification of pink bollworm and other insect pests and their damage symptoms
- Monitoring of pink bollworm using pheromone traps
- Awareness on life cycle of pink bollworm and its management
- Need-based insecticide application and adoption of improved Bt cotton cultivation practices

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm
- Use of trichocards, neem-based pesticides and recommended insecticides
- Regular field scouting and timely advisory-based interventions
- Adoption of scientific cotton cultivation practices for higher yield

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2766	2582
2	Additional yield(kg/ha)	184	-
3	Increase in yield (%)	7.13	-
4	Number of sprays/ha	7	8
5	Reduction in pesticide sprays (%)	13	-

Impact of adoption of IPM

By adopting IPM strategies under the IRM-PBW project, Shri Ajaysinh Tribhovanbhai Padhiyar effectively managed pink bollworm and sucking pests through scientific monitoring and need-based plant protection measures. The IPM field recorded a seed cotton yield of 2766 kg/ha as compared to 2582 kg/ha under farmer's practice, resulting in an additional yield of 184 kg/ha and a yield advantage of 7.13%. The adoption of IPM also reduced unnecessary pesticide sprays, lowered production costs and strengthened the farmer's confidence towards knowledge-based and sustainable cotton farming.

23. Scientific IPM adoption enhanced cotton productivity and profitability

Year : 2023-24
Name of farmer : **Shri Chandubhai Thakarshi Ardeshta**
Address : Village: Ronaki, Taluka: Manavadar,
Dist.: Junagadh, state- Gujarat
Age : 34 years
Education : 12th Pass
Landholding : 2 acres
Area under Project : 1 acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Tube well
Project implementing centre : Main Cotton Research Station, JAU, Junagadh, Gujarat



Guidance received :

- Identification of cotton insect pests and their damage symptoms
- Monitoring of pink bollworm using pheromone traps
- Awareness on natural enemies and mass trapping techniques
- Scientific and need-based pest management practices

Key IPM practices adopted :

- Installation of pheromone traps for monitoring and mass trapping of pink bollworm
- Use of Trichocards for biological control
- Need-based and judicious use of insecticides
- Regular field scouting and adoption of scientific advisory

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2916	2743
2	Additional yield(kg/ha)	173	-
3	Increase in yield (%)	6.31	-
4	Number of sprays/ha	5	8
5	Reduction in pesticide sprays (%)	38	-

Impact of adoption of IPM

Shri Chandubhai Ardeshta achieved a seed cotton yield of 2916 kg/ha compared to 2743 kg/ha under farmer's practice, recording an additional yield of 173 kg/ha with a yield advantage of 6.31%. The reduction in pesticide use lowered production costs and improved net returns. The success strengthened his confidence in scientific cotton farming and motivated neighbouring farmers to adopt IPM-based pink bollworm management for sustainable cotton production.

24. From Pest Pressure to Prosperity : A Woman Farmer's Success with Scientific IPM in Cotton

Year : 2023-24
Name of farmer : **Smt Varshaben Kishorbhai Patodiya**
Address : Village: Mandva, Taluka: Bheshan,
Dist.: Junagadh, State-Gujarat
Age : 36 years
Education : 10th pass
Landholding : 3 acres
Area under Project : 1 acre
Source of Irrigation : Tube well
Project implementing centre : Main Cotton Research Station, JAU, Junagadh, Gujarat

Guidance received :

- Awareness on natural enemies and mass trapping techniques
- Monitoring of pink bollworm using pheromone traps
- Identification of cotton insect pests and their damage symptoms
- Need-based pest management practices

Key IPM practices adopted :

- Regular field scouting and adoption of scientific advisory
- Installation of pheromone traps for monitoring and mass trapping of pink bollworm
- Use of Trichocards for biological control
- Need-based and judicious use of insecticides

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2990	2642
2	Additional yield(kg/ha)	348	-
3	Increase in yield (%)	13.18	-
4	Number of sprays/ha	6	8
5	Reduction in pesticide sprays (%)	25	-

Impact of adoption of IPM

Smt. Varshaben Kishorbhai Patodiya of Mandva village faced declining profitability in cotton cultivation due to severe infestations of leafhoppers and pink bollworm and rising pesticide costs. Under the IRM-PBW project implemented by CRS, Junagadh Agricultural University, she received hands-on training in pest identification, pheromone trap-based monitoring and scientific IPM practices. By adopting these technologies, she achieved a seed cotton yield of 2990 kg/ha compared to 2642 kg/ha under farmer's practice, registering an additional yield of 348 kg/ha (13.18% increase). The adoption of IPM reduced unnecessary pesticide use, lowered production costs and improved net returns. Her success strengthened confidence in scientific cotton farming and serves as an inspiration for women farmers in the region to adopt IPM for sustainable cotton production.

25. IPM-PBW adoption restored cotton productivity and farmer confidence in Khandwa district

Year : 2024-25
Name of farmer : **Shri Fariyad Khan**
Address : Village: Attar, Mandal: Chegavmakhan,
Dist: Khandwa, State- Madhya Pradesh
Age : 53 years
Education : 10th Class
Landholding : 8 acres
Area under Project : 1 acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Canal
Project implementing centre : B.M. College of Agriculture Khandwa



Guidance received :

- Identification of cotton insect pests and their life stages
- Monitoring of pink bollworm through pheromone traps
- ETL-based application of insecticides
- Cultural practices like rosette flower removal, timely crop termination
- Safe handling and judicious use of pesticides through training and field visits

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm activity
- Release of trichocards for biological control
- ETL-based and need-based application of recommended insecticides
- Regular pest surveillance with guidance from scientists and field staff
- Adoption of scientific pest management learned through training and demonstration

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2100	1400
2	Additional yield(kg/ha)	700	-
3	Increase in yield (%)	50	-
4	Number of sprays/ha	3	9
5	Reduction in pesticide sprays (%)	67	-

Impact of adoption of IPM

Adoption of IPM-PBW strategies resulted in about 50% higher cotton yield, effective control of pink bollworm, and reduced crop losses. The farmer gained practical knowledge on pest identification, ETL-based decision making, and safe pesticide handling, leading to lower production costs and improved crop health. The success of the demonstration plot strengthened his confidence in scientific pest management and encouraged continued adoption of sustainable practices in future seasons.

SOUTH ZONE

**Telangana
Andhra Pradesh
Karnataka
Tamil Nadu**

26. PM-PBW adoption revived profitability of cotton farming under rainfed conditions

Year : 2024-25
 Name of farmer : **Shri Santhosh M Manmi**
 Address : Village: Morab, Dist: Dharwad, State- Karnataka
 Age : 35 years
 Education : 7th Class
 Landholding : 8 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Rainfed
 Project implementing centre : Agricultural Research Station, UAS, Dharwad, Karnataka



Guidance received :

- Identification of cotton insect pests and their life stages
- Monitoring of pink bollworm through pheromone traps
- Cultural practices such as plucking of rosette flowers
- Use of Azadirachtin at flower initiation stage
- ETL-based and need-based application of recommended insecticides
- Regular training and participatory field visits by scientists and technical staff

Key IPM practices adopted :

- Installation of pheromone traps for monitoring pink bollworm
- Spray of Azadirachtin at flower initiation stage
- Regular plucking of rosette flowers
- ETL-based application of recommended insecticides
- Continuous pest surveillance with support from University scientists

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2462	1680
2	Additional yield(kg/ha)	762	-
3	Increase in yield (%)	46.6	-
4	Number of sprays/ha	4	7
5	Reduction in pesticide sprays (%)	43	-

Impact of adoption of IPM

Adoption of IPM-PBW strategies resulted in substantially higher cotton yield (46.6%), reduced number of pesticide sprays, and lower cost of plant protection under rainfed conditions. The project improved the farmer's knowledge of pest identification and ETL-based decision making, strengthened confidence in scientific pest management, and promoted sustainable cotton cultivation practices in the region.

27. Timely guidance and critical input-base strengthened the farmer's decision making for cotton pest management

Year : 2024-25
 Name of farmer : **K. Prabhu**
 Address : Village: Kallur, Talika: Sirvar,
 District: Raichur, State - Karnataka
 Age : 50 years
 Education : Graduate
 Landholding : 12 acres
 Area under Project : 1 Acre
 Source of Irrigation : Borewell, well
 Project implementing center : UAS, Raichur



Guidance received :

- Scientific crop management for higher productivity
- Regular advisory through field visits and interaction with scientists
- Information on need-based and timely plant protection measures

Key practices adopted

- Implementation of crop window based IPM strategy for cotton pest management
- Regular monitoring of pest incidence in the field
- Timely and need-based application of recommended insecticides
- Adoption of improved agronomic and plant protection practices advised by scientists of UAS

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	3405	3280
2	Additional yield(kg/ha)	125	-
3	Increase in yield (%)	3.8	-
4	Number of sprays/ha	10	12
5	Reduction in pesticide sprays (%)	17	-

Impact of adoption of IPM

Adoption of scientific crop and pest management practices resulted in improved cotton yield with better pest control and optimized input use. The experience strengthened the farmer's confidence in expert guidance from agricultural institutions and demonstrated the value of IPM for sustainable and profitable cotton cultivation.

28. From loss to profit : IPM awareness transforms cotton farming in rainfed areas

Year : 2024-25
Name of farmer : **G. Venkataramana**
Address : Ponnari, Tamsi, Adilabad
Age : 48 years
Education : Matriculate
Landholding : 4 acres
Area under Project : 1 acre
Irrigated/Rainfed : Rainfed
Project implementing center : Agricultural Research Station, Adilabad (PJTAU)



Guidance received :

- Identification of cotton insect pests and their life stages
- Monitoring pink bollworm using pheromone traps and destructive boll sampling
- Knowledge on ETLs for various cotton pests
- Technical support through training, field visits, from ARS scientists

Key IPM practices adopted

- Installation of pheromone traps for monitoring pink bollworm
- Spray of neem-based pesticides at flower initiation stage
- Regular plucking of rosette flowers
- ETL-based and need-based application of recommended insecticides

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2125	1750
2	Additional yield(kg/ha)	375	-
3	Increase in yield (%)	21.43	-
4	Number of sprays/ha	6	10
5	Reduction in pesticide sprays (%)	40	-

Impact of adoption of IPM

Mr. G. Venkataramana realised that adoption of IPM-PBW practices resulted in about 21.4% higher cotton yield compared to his own conventional cropping practice he was following for the years. He also found that there has been effective reduction in pink bollworm infestation and plant protection costs. The farmer gained practical knowledge on pest identification, ETL-based decision making, and safe pesticide use, strengthening his capacity building through mass awareness under the project.

29. Dissemination of scientific know-how effectively reduced pink bollworm damage and increased the cotton yield

Year : 2024-25
 Name of farmer : **Shri B. Surendhar Reddy**
 Address : Fouzpur, Jainad, Adilabad, State- Telangana
 Age : 51 years
 Education : Graduation
 Landholding : 7 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Rainfed
 Project implementing center : Agricultural Research Station, Adilabad (PJTAU)



Guidance received :

- Identification of cotton insect pests and their life stages
- Identification of pest damage symptoms like rosette flowers, etc.
- ETLs for various insect pests
- Regular training, field visits, and technical support by ARS scientists

Key IPM practices adopted

- Installation of pheromone traps for monitoring pink bollworm
- Spray of Azadirachtin at 45 days after sowing
- Regular plucking of rosette flowers and inspection of infestation in green bolls
- ETL-based and need-based application of recommended insecticides

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2215	1625
2	Additional yield(kg/ha)	590	-
3	Increase in yield (%)	36.1	-
4	Number of sprays/ha	6	10
5	Reduction in pesticide sprays (%)	40	-

Impact of adoption of IPM

Mr. B. Surendhar Reddy comprehended that adoption of IPM-PBW practices resulted in about 36.31% higher cotton yield compared to his conventional farming practice. He observed a marked reduction in pink bollworm infestation and a decrease in plant protection costs due to fewer and need-based pesticide sprays. The farmer gained practical knowledge on pest identification, ETL-based decision making, and safe use of pesticides, thereby strengthening his capacity through mass awareness and continuous technical support under the project. This success has motivated him and neighbouring farmers to adopt IPM practices for sustainable cotton production in rainfed areas.

30. IPM-led increased productivity, profitability and farmer prosperity

Year : 2024-25
Name of farmer : **Shri Nimmagedda Ravi**
Address : Village: Parimi, Mandal: Tadikonda,
Dist: Guntur, Andhra Pradesh
Age : 44 years
Education : 12th Class
Landholding : 20 acres
Area under Project : 1 acre
Irrigated/Rainfed : Rainfed
Project implementing center : Agricultural Research Station, Lam (ANGRAU)



Guidance received :

- Identification of cotton insect pests and their life stages
- Monitoring of pink bollworm through pheromone trap installation
- ETL-based and need-based application of recommended insecticides
- Regular training, field visits, and technical support by ARS scientists

Key IPM practices adopted

- Installation of pheromone traps @ 2 per acre for monitoring pink bollworm
- Spray of Azadirachtin as preventive measure at flower initiation stage
- Regular plucking of rosette flowers, monitoring green boll infestation
- ETL-based and need-based application of recommended insecticides
- Timely crop termination, destruction of pest infested crop residues, etc.

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	4200	3600
2	Additional yield(kg/ha)	600	-
3	Increase in yield (%)	16.67	-
4	Number of sprays/ha	9	14
5	Reduction in pesticide sprays (%)	36	-

Impact of adoption of IPM

Mr. Nimmagedda Ravi realized that adoption of IPM-PBW practices resulted in about 16.67% higher cotton yield compared to his conventional farming practice. He observed a substantial reduction in pink bollworm infestation and a significant decrease in plant protection costs due to fewer and need-based pesticide sprays. The farmer gained practical knowledge on pest identification, ETL-based decision making, and safe use of pesticides through regular training and field visits under the project. This success story demonstrates how IPM dissemination can transform cotton cultivation into a more profitable and sustainable enterprise in rainfed regions and has motivated neighboring farmers to adopt scientific pest management practices.

31. From pest losses to profitable harvest : IPM dissemination strengthens cotton farming in rainfed areas

Year : 2024-25
 Name of farmer : **Shri D. Venkateswarlu**
 Address : Village: Hussainapuram, Mandal: Orvakal,
 District: Kurnool, Andhra Pradesh
 Age : 52 years
 Education : 10th Class
 Landholding : 5 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Rainfed



Project implementing center: Regional Agricultural Research Station, Nandyal (ANGRAU)

Guidance received :

- Regular training, field visits, and technical support by ARS scientists
- Identification of cotton insect pests and their life stages
- Monitoring of pink bollworm through pheromone trap installation
- ETL-based and need-based application of recommended insecticides

Key IPM practices adopted

- Installation of pheromone traps @ 2 per acre for monitoring pink bollworm
- Spray of Azadirachtin as preventive measure at flower initiation stage
- Regular plucking of rosette flowers, monitoring green boll infestation
- Timely crop termination, destruction of pest infested crop residues, etc.

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	3500	2750
2	Additional yield(kg/ha)	800	-
3	Increase in yield (%)	27.27	-
4	Number of sprays/ha	7	9
5	Reduction in pesticide sprays (%)	22	-

Impact of adoption of IPM

Adoption of IPM-PBW practices resulted in about 27.27% higher cotton yield compared to his conventional farming practice. He observed a substantial reduction in pink bollworm infestation and a decrease in plant protection costs due to fewer and need-based pesticide sprays. The farmer gained practical knowledge on pest identification, ETL-based decision making, and safe use of pesticides through regular training and participatory field visits under the project. This success story clearly demonstrates the impact of IPM dissemination in improving productivity, profitability, and sustainability of cotton cultivation in rainfed areas and serves as a model for neighboring farmers to adopt scientific pest management practices.

32. IPM awareness empowers farmer for higher productivity and sustainable cotton cultivation

Year	: 2024-25
Name of farmer	: Mr. Kalikutty Iyanakutty
Address	: Vellamadai, Annur, Coimbatore, State-Tamil Nadu
Age	: 59 years
Education	: 10th Pass
Landholding	: 2.5 acres
Area under Project	: 1 acre
Irrigated/Rainfed	Irrigated
Source of Irrigation	: Borewell
Project implementing center:	ICAR-CICR, RS, Coimbatore, Tamil Nadu



Guidance received :

- Identification of cotton insect pests and their life stages
- Monitoring of pink bollworm through pheromone trap installation
- ETL-based and need-based application of recommended insecticides
- Regular training, field visits, and technical support by ICAR-CICR scientists

Key IPM practices adopted

- Installation of pheromone traps @ 2 per acre for monitoring pink bollworm
- Spray of neem-based insecticides at 45 DAS
- Regular plucking of rosette flowers, monitoring green boll infestation
- Timely crop termination, destruction of pest infested crop residues, etc.

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2521	1467
2	Additional yield(kg/ha)	1054	-
3	Increase in yield (%)	71.84	-
4	Number of sprays/ha	4	8
5	Reduction in pesticide sprays (%)	50	-

Impact of adoption of IPM

Mr. Kalikutty Iyanakutty got 71.84% higher cotton yield from IPM-demo field compared to his conventional farming practice. Effective monitoring of pink bollworm through pheromone traps and ETL-based insecticide application significantly reduced pest infestation and the number of pesticide sprays. He also observed a considerable reduction in plant protection costs and improved net profit. Through regular training programmes and diagnostic field visits under the IRM-PBW project, the farmer gained practical knowledge on pest identification, beneficial insects, and scientific decision making. His success highlights the importance of IPM awareness and dissemination in achieving sustainable cotton production and serves as a motivating example for other farmers in the region to adopt integrated pest management practices.

33. From pest pressure to farmer's profit : A success of IPM adoption in cotton

Year : 2023-24
 Name of farmer : **Mr. Kalyanasundaram**
 Address : Village: Thottipalayam, Block: Vellamadai,
 District: Coimbatore, State-Tamil Nadu
 Age : 44 years
 Education : 12th pass
 Landholding : 3 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : Borewell
 Project implementing center : ICAR-CICR, RS, Coimbatore, Tamil Nadu



Guidance received :

- Awareness on natural enemies and mass trapping techniques
- Monitoring of pink bollworm using pheromone traps
- Identification of cotton insect pests and their damage symptoms
- Need-based pest management practices

Key IPM practices adopted

- Regular field scouting and adoption of scientific advisory
- Installation of pheromone traps for monitoring and mass trapping of pink bollworm
- Need-based and judicious use of insecticides
- Use of Trichocards for biological control

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2187	1594
2	Additional yield(kg/ha)	593	-
3	Increase in yield (%)	37.20	-
4	Number of sprays/ha	3	8
5	Reduction in pesticide sprays (%)	63	-

Impact of adoption of IPM

Through scientific IPM interventions, Mr. Kalyanasundaram achieved a seed cotton yield of 2187 kg/ha, which was 593 kg/ha higher than farmer's practice, registering a 37.20% increase in yield. The adoption of ETL-based spraying significantly reduced unnecessary pesticide use and lowered cultivation costs, resulting in an improved Benefit-Cost ratio of 1.68:1. His success has made him a role model in the village, motivating fellow farmers to adopt IPM-based cotton cultivation for sustainable pest management and higher profitability.

34. Turning loss into gain: A battle against pink bollworm

Year : 2023-24
Name of farmer : **Shri Naitham Namdev**
Address : Devajiguda, Bela, Adilabad, State - Telangana
Age : 50 years
Education : 5th
Landholding : 7acres
Area under Project : 1 acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Borewell
Project implementing center : Agricultural Research Station, Adilabad (PJ TSAU), Telangana



Guidance received :

- Awareness on natural enemies and mass trapping techniques
- Monitoring of pink bollworm using pheromone traps
- Identification of cotton insect pests and their damage symptoms
- Need-based pest management practices

Key IPM practices adopted

- Regular field scouting and adoption of scientific advisory
- Installation of pheromone traps for monitoring and mass trapping of pink bollworm
- Manual removal of rosette flowers
- Need-based and judicious use of insecticides
- Use of Trichocards for biological control

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2280	1730
2	Additional yield(kg/ha)	550	-
3	Increase in yield (%)	31.79	-
4	Number of sprays/ha	8	9
5	Reduction in pesticide sprays (%)	11	-

Impact of adoption of IPM

By adopting IPM strategies, Shri Naitham Namdev successfully reduced pink bollworm and sucking pest infestation along with a substantial decrease in plant protection costs. He achieved a seed cotton yield of 2280 kg/ha, which was 550 kg/ha higher than non-IPM fields, registering a 31.79% increase in yield. This success restored his confidence in cotton cultivation and demonstrated the effectiveness of scientific pest management. Shri Namdev expressed his gratitude to the scientists and project staff of ARS, Adilabad and the scientists of ICAR-CICR, Nagpur for their continuous guidance and support.

35. IPM Empowers Cotton Farmer in Dharwad

Year : 2024-25
Name of farmer : **Shri Shekaya B. Hiremat**
Address : Village: Mulamuttala,
Dist: Dharwad, Karnataka State
Age : 51 years
Education : 10th Class
Landholding : 5 acres
Area under Project : 1 acre
Irrigated/Rainfed : Irrigated
Source of Irrigation : Borewell
Project implementing center: Agricultural Research Station, Dharwad (UAS Dharwad)



Guidance received :

- Identification of cotton insect pests and their life stages
- Monitoring of pink bollworm using pheromone traps
- Awareness on ETL-based and need-based pest management
- Regular training, field visits and technical guidance by ARS scientists

Key IPM practices adopted

- Installation of pheromone traps for monitoring pink bollworm
- Spraying of Azadirachtin at flower initiation stage
- Regular plucking of rosette flowers
- ETL-based and judicious application of recommended insecticides
- Continuous pest surveillance with scientific advisory

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2668	1762
2	Additional yield(kg/ha)	906	-
3	Increase in yield (%)	51.42	-
4	Number of sprays/ha	5	8
5	Reduction in pesticide sprays (%)	38	-

Impact of adoption of IPM

By adopting IPM strategies, Shri Shekaya B. Hiremat successfully reduced pink bollworm infestation and lowered plant protection costs through need-based pesticide use. He achieved a seed cotton yield of 2668 kg/ha, which was 906 kg/ha higher than non-IPM fields, recording a 51.42% increase in yield. This success restored his confidence in cotton cultivation and highlighted the effectiveness of scientific pest management practices. Shri Hiremat expressed his gratitude to the scientists and project staff of ARS, Dharwad (UAS Dharwad) and the scientists of ICAR-CICR, Nagpur for their continuous guidance and support.

36. Small changes, big gains: IPM revives cotton farming in rainfed areas of Nandyal

Year : 2023-24
 Name of farmer : **Shri P. Chinna Subba Rayudu**
 Address : Village: Thirupadu, Mandal: Gadivemula,
 District: Nandyal, Andhra Pradesh State
 Age : 46 years
 Education : 10th Class
 Landholding : 9.5 acres
 Area under Project : 1 acre
 Irrigated/Rainfed : Rainfed



Project implementing center : Regional Agricultural Research Station, Nandyal (ANGRAU)

Guidance received :

- Identification of cotton insect pests and their life stages
- Monitoring of pink bollworm through pheromone traps
- Awareness on ETL-based and need-based pest management
- Regular training, field visits and technical guidance by RARS scientists

Key IPM practices adopted

- Installation of pheromone traps for monitoring pink bollworm
- Spraying of Azadirachtin at flower initiation stage
- Regular plucking of rosette flowers
- ETL-based and judicious application of recommended insecticides
- Continuous pest surveillance with scientific advisory

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (Kg/ha)	1500	1325
2	Additional yield(Kg/ha)	175	-
3	Increase in yield (%)	13.21	-
4	Number of sprays/ha	6	8
5	Reduction in pesticide sprays (%)	25	-

Impact of adoption of IPM

By adopting IPM strategies, Shri P. Chinna Subba Rayudu successfully reduced pink bollworm infestation and minimized plant protection costs through need-based pesticide application. He achieved a seed cotton yield of 1500 kg/ha, which was 175 kg/ha higher than non-IPM fields, registering a 13.21% increase in yield. This success restored his confidence in cotton cultivation under rainfed conditions and demonstrated the effectiveness of scientific pest management. Shri Rayudu expressed his gratitude to the scientists and project staff of RARS, Nandyal (ANGRAU) and the scientists of ICAR-CICR, Nagpur for their continuous guidance and support.

NORTH ZONE

**Punjab
Haryana
Rajasthan**

37. IPM awareness transforms cotton productivity through scientific pest management

Year : 2024-25
 Name of farmer : **Shri Sardar Nadhain Singh**
 Address : Village: Jassi pauwali,
 Dist: Bathinda, State: Punjab
 Age : 67 Years
 Education : 7th class
 Landholding : 6 acres
 Area under Project : 5 acres
 Irrigated/Rainfed : Irrigated
 Source of Irrigation : Tube well + Canal
 Project implementing centre : Regional Research Station, PAU, Bathinda, Punjab



Guidance received :

- Identification of cotton insect pests and their damage symptoms
- Early season monitoring of pink bollworm using pheromone traps and rosette flowers
- ETL-based and need-based insecticide application
- Regular field visits, technical guidance, and motivation by RRS scientists

Key IPM practices adopted

- Installation of pheromone traps for monitoring pink bollworm
- Adoption of ETL-based spray schedule
- Timely crop termination and destruction of crop residues
- Crop rotation with other crops in rabi season to break the pest life cycle

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	1540	1200
2	Additional yield(kg/ha)	340	-
3	Increase in yield (%)	28.33	-
4	Number of sprays/ha	4	6
5	Reduction in pesticide sprays (%)	33	-

Impact of adoption of IPM

Shri Sardar Nidhain Singh experienced a major turnaround in cotton production after adopting IPM-PBW practices under the IRM-PBW project. Earlier, severe pink bollworm infestation caused nearly 60% crop loss, leading to high cultivation costs and poor profit margins. With scientific guidance from RRS, Bathinda, and the adoption of pheromone trap-based monitoring and ETL-based pesticide application, pink bollworm infestation was effectively reduced. The farmer achieved 1540 kg/ha yield, which was 28.33% higher than the NIPM field (1200 kg/ha). Along with yield improvement, he reduced pesticide sprays by two rounds and achieved 59.68% reduction in plant protection cost, resulting in a favourable B:C ratio of 2.67:1. This success story highlights the strong impact of IPM awareness and dissemination in improving cotton productivity, reducing input costs, and promoting sustainable pest management practices among farmers in Punjab.

38. Dissemination of IPM technologies restored farmer's confidence and enhanced cotton productivity

Year : 2024-25
 Name of farmer : **Shri Gurveer Singh**
 Address : Banwali, Dist. Sriganganagar, State- Rajasthan
 Age : 58
 Education : 5th Class
 Landholding : 40 acres
 Area under Project : 23.8 acre
 Irrigated/ Rainfed : Irrigated
 Source of Irrigation : Canal
 Project implementing center : ICAR-CICR, RS, Sirsa & ARS, Sriganganagar



Guidance received :

- Identification of insect pests, diseases and their damage symptoms
- Early season monitoring of pink bollworm using pheromone traps and rosette flowers
- ETL-based and need-based insecticide application
- Diagnostic field visits, technical guidance by ICAR-CICR and University scientists

Key IPM practices adopted

- Installation of pheromone traps for monitoring pink bollworm
- Adoption of ETL-based spray schedule
- Matting Disruption Technology (MDT)
- Crop rotation with other crops in rabi season to break the pest life cycle

Major achievements

S.N.	Parameter	IPM practice	NIPM/ Farmer's practice
1	Seed cotton yield (kg/ha)	2735	1767
2	Additional yield(kg/ha)	970	-
3	Increase in yield (%)	54.87	-
4	Number of sprays/ha	5	8
5	Reduction in pesticide sprays (%)	38	-

Impact of adoption of IPM

Shri Gurveer Singh, a progressive farmer from Banwali village of Sriganganagar district, had been experiencing declining Bt cotton yields for the last 2-3 years due to severe pink bollworm infestation, leading to increased cultivation costs and reduced profits. During 2024-25, through his participation in the IRM-PBW project and scientific guidance from ICAR-CICR Regional Station, Sirsa and ARS, Sriganganagar, he adopted pheromone trap-based monitoring, use of MDT and ETL-based pesticide application. The adoption of IPM practices resulted in a seed cotton yield of 2735 kg/ha, which was 54.87% higher than the NIPM field (1767 kg/ha). In addition, he achieved a reduction of three pesticide sprays and 28.05% lower plant protection cost. This success story highlights the strong impact of IPM dissemination in improving cotton productivity, reducing input costs, and promoting sustainable pest management in the cotton belt of Rajasthan.



Glimpse of activities

Diagnostic field visits



Input Distribution



Sensitization workshop



Farmers field training



TV/ Radio/ Youtube Programs



Kisan Mela





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