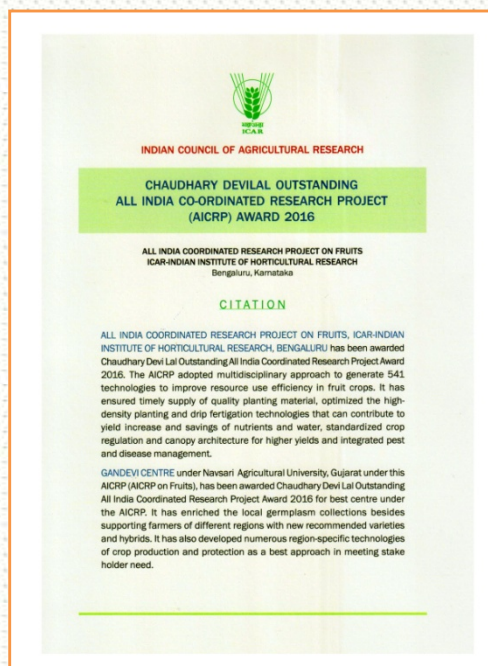


ACHIEVEMENTS

AWARDS AND RECOGNITIONS

Achievements of Centre:

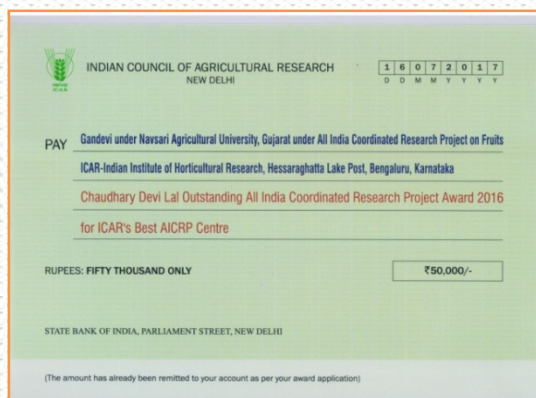
- Conferred ICAR “Chaudhary Devi Lal Outstanding All India Coordinated Research Project Award 2016” under ICAR-AICRP (Fruits) programme as “Best Centre” on ICAR Foundation Day.



Citation

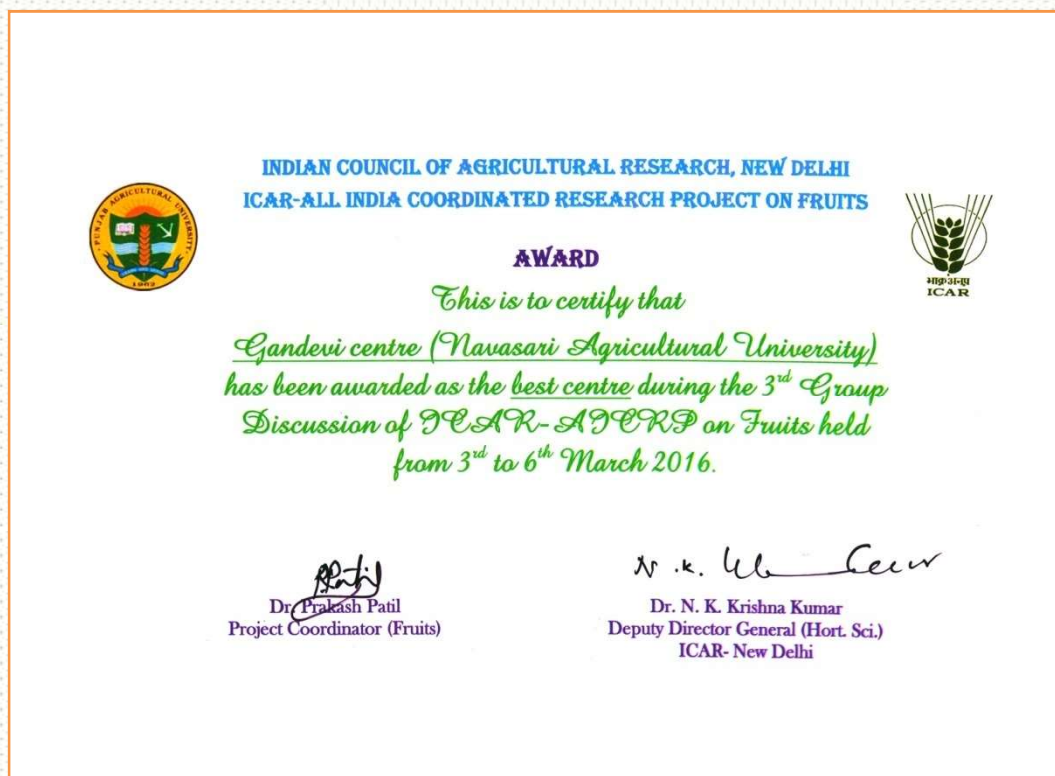


Award Ceremony



Cash Price

- Awarded as “**Best Centre**” of ICAR-AICRP (Fruits) for 2016 in 3rd Group Discussion Meeting of ICAR-AICRP (Fruits) held at PAU, Ludhiana (Punjab) during 3rd to 6th March, 2016.



Certificate



Dr. N. K. Krishna Kumar, DDG (Hort. Sci.), ICAR, New Delhi and Dr. Prakash Patil, Project Coordinator, ICAR-AICRP on Fruits, IIHR, Bengaluru awarding 'BEST CENTRE AWARD 2016'

- Awarded as “**Best Centre**” of ICAR-AICRP (Fruits) for 2020 in 8th Group Discussion Meeting of ICAR-AICRP (Fruits) held in Virtual Mode during 3rd to 6th March, 2021.



Certificate

- Recognized as “**Award of Excellence**” for ‘**Linking Technology Development and Transfer for 2021**’ in 9th Group Discussion Meeting of ICAR-AICRP (Fruits) held in Virtual Mode during 8th to 11th March, 2022.



Certificate

- Awarded as “**Best Centre**” of ICAR-AICRP (Fruits) for 2021 in 9th Group Discussion Meeting of ICAR-AICRP (Fruits) held in Virtual Mode during 8th to 11th March, 2022.



Certificate



Dr. Z. P. Patel, Hon'ble Vice-Chancellor, NAU, Navsari congratulating the team for “Best Centre Award 2021” and “Award of Excellence”

- Awarded as **“Best Centre” of ICAR-AICRP (Fruits) for 2022** in 10th Group Discussion Meeting of ICAR-AICRP (Fruits) held in Virtual Mode during 28th February to 3rd March, 2023.



Certificate



Dr. Z. P. Patel, Hon'ble Vice-Chancellor, NAU, Navsari along with Dr. T. R. Ahlawat, Director of Research and Dr. V. R. Naik, ADR congratulating the team for 'BEST CENTRE AWARD 2022'

- **Gandevi centre** received **"First Position for Outstanding Performance in the Year 2022-23"** in ICAR-AICRP (Fruits) during 11th Group Discussion Meeting of ICAR-All India Coordinated Research Project on Fruits held at NAU, Navsari (Gujarat) during 22nd to 25th January, 2024.



Certificate



Dr. Sanjay Kumar Singh, DDG (Hort. Sci.), ICAR, New Delhi; Dr. Prakash Patil, Project Coordinator, ICAR-IIHR, Bengaluru and Dr. T. R. Ahlawat, NAU, Navsari awarding 'First Position Performance Award 2022-23'

- **Gandevi centre** conferred “**Second Position for Excellent Performance in 2022-24 under ICAR-AICRP (Fruits)**” during 12th Group Discussion Meeting of ICAR-All India Coordinated Research Project on Fruits held at Bihar Agricultural University, Sabour (Bihar) during 11th to 14th February, 2025.



Cetificate



Dr. Prakash Patil, Project Coordinator, ICAR-IIHR, Bengaluru, Dr. P.C. Tripathi, HQ-Hort. Sci., ICAR, New Delhi and Dr. Subash Chander, ICAR Invitees awarding ' Second Position Performance Award 2023-24'



Dr. Z. P. Patel, Hon'ble Vice-Chancellor, NAU, Navsari along with Dr. Lalit Mahatama, Associate Director of Research congratulating the team for 'Performance Award 2023-24'

- **Gandevi centre conferred “First Position for outstanding Performance in the Year 2024-25” in ICAR-AICRP (Fruits) during 13th Group Discussion Meeting of ICAR-All India Coordinated Research Project on Fruits held at G. B. Pant University of Agriculture and Technology, Pantnagar (Uttarakhand) during 09th to 12th February, 2026.**



Cetificate



Dr. V. B. Patel, ADG (F&PC), ICAR, New Delhi and Dr. Prakash Patil, Project Coordinator, ICAR-AICRP (Fruits), IIHR, Bengaluru awarding 'First Position for outstanding Performance 2024-25'

Milestone of Faculty:



Dr. Z. P. PATEL
VICE CHANCELLOR
NAVSARI AGRICULTURAL UNIVERSITY
NAVSARI – 396 450, GUJARAT

Dr. Z. P. Patel, Hon'ble Vice Chancellor, Navsari Agricultural University, Navsari had started his service in AICRP (Tropical Fruits) as Jr. Entomologist on July, 1990 at Gandevi. During his tenure, he surveyed and collected the different insect pest species of banana and sapota and their natural enemies got identified from CIE, London, UK first time in the region. As a landmark, he firstly reported an exotic pest, sapota seed borer (*Trymalitis margarias* Meyrick) from Dahanu area of Maharashtra in year 2000 under AICRP (TF) survey work. Also, first time reported midrib folder (leaf folder), *Banisia myrsusales elearalis* (Walker) damaging the leaves of *Khirnee*, a rootstocks (*Manilkara hexandra*) of sapota in nursery in South Gujarat area. As well, he noted the incidence of pseudostem weevil in banana first time in South Gujarat.

He had first time prepared pest calendar in banana and sapota based on status of insect pests of different regions of India. The design was appreciated at National level and is an outlook for new researchers. He had promoted as Associate Research Scientist (Ento.) during 1997 and later selected as professor in 2008. In AICRP (TF) scheme, he had served about 18 years, nearly half of University service and achieved the utmost position as Vice Chancellor, NAU, Navsari in October, 2020. During his term, he had recommended plant protection technology for bud boring pests of sapota, which was mostly adopted by growers in Gujarat.

He popularized eco-friendly and low cost fruit fly management technology of "NAUROJI STONEHOUSE FRUIT FLY TRAP" in fruit crops. The successful interventions of this technology was highlighted in 'INCENTIVISING AGRICULTURE RKVY INITIATIVES' published by Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India during 2012 for benefitting farmers community.





Integrated Pest Management for Higher Fruit Production

Background & Objectives

Three districts of South Gujarat: Surat, Navsari and Valsad are leaders in horticulture. These are also part of an agri-export zone for fruits and vegetables. But, the life of these fruit-farmers was made miserable by tiny fruit fly. Fruit fly is a major pest of mango, sapota and cucurbits. Intensity of damage recorded was as high as over 30 percent in mango and sapota, and between 20-40 percent in cucurbitaceous vegetables. Fruit flies cause heavy damage in terms of quality and quantity to the farmers every year. Insecticidal sprays, though they control infestation a little bit, are not only uneconomical but they leave residual effect much above tolerance limit, affecting adversely the prospects of export of such fruits and vegetables.

Fruit flies are a modern-day pestilence which ravage production. These flies, moreover, are good fliers and therefore their spread is extensive. Hence, area wide adoption of management strategy is required. Male Annihilation Technique (MAT), an Integrated Pest Management Technique (IPM), which uses sexual lures to capture males of fruit flies and kill them, is the only way to control growth and spread of fruit flies. This however, requires a Community approach for implementation.

Navsari Agriculture University designed, developed and commercialized an eco-friendly, economical and easily adoptable fruit fly trap popularly known as "Nauroji-Stonehouse Fruit Fly Trap". The trap uses Methyl Eugenol and Cuelures as par pheromones well-known for fruit

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Incentivising
Agriculture
RKVY Initiatives

flies. In this trap, plywood blocks are soaked in the solution of lures + solvent + insecticide. Such traps remain effective for 5 to 6 months, which cover the entire fruiting period in mangos, sapota as well as cucurbitaceous vegetables and no recharge is necessary. It is eco-friendly, economical and easily adoptable.

It was decided to adopt this technology and spread it in the Surat-Navsari-Valsad belt for controlling and managing the fruit fly problem. It was also recognised that wide area adoption would help in developing this zone as a Pest Free Area (PFA). The project was taken up under RKVY.

Intervention

Nauroji-Stonehouse Fruits Fly Traps are prepared in food quality Testing Laboratory, NAU Navsari. Six talukas viz., Gandevi, Chikhali, Valsad, Pardi, Dharampiur and Kaprada of Navsari and Valsad districts were selected for the purpose. A block of orchards in each village in each Taluka was selected for first year implementation. Other blocks were selected during the following years.

In the selected blocks, farmers of all categories were covered. Traps were distributed to the farmers taking into account their area of plantation of mango, sapota and cucurbitaceous vegetables. Farmers' meetings were organised at village level to educate them regarding biology of fruit fly, nature of damage, technology for its management, installation of traps etc. They were educated by delivering lectures using LCD projector, display of flex banner, booklet and actual demonstration of the traps. To generate awareness of technology, 93 farmer's group training meets were scheduled. During group meetings scientific information of fruit flies emphasizing the life cycle of the pest, host range, damage symptoms, severity of damage and control methods to combat the pest in eco-friendly manner were covered. Gram Panchayats, Village level co-operative societies



and milk collecting centres collaborated in organising meetings, preparing lists of farmers, disbursement of traps etc.

With all this training and awareness, Farmers themselves installed the traps in their fields. Fruit fly population was also recorded at fortnightly intervals during the fruiting period in randomly selected orchards. The percent damage of fruits was worked out from orchards where traps were installed as well as uninstalled orchards. The level of damage in treated and untreated orchards was compared to know the actual impact of technology.

In all, 209 villages in 6 talukas of two districts were selected as target area during 2009 and 2010. The project was implemented in about 6814 ha area comprising of 6367 ha of fruit orchards and 447 ha of melon orchards of 15339 farmers of all categories. 1,10,640 traps were distributed to the farmers in the targeted villages for mango, sapota and cucurbitaceous vegetables.

Farmers were also educated on maintaining sanitation in the orchard. The fallen/damaged fruits in the orchards were collected

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Preparation of Fruit Fly Trap



Supervision



Plywood blocks in trays



Preparation of chemical mixture



Blocks soaking in chemical (24 Hrs)



Blocks ready to install in traps



Sealing of blocks



Nailing & Threading



Heap of soaked blocks



Labels of trap



Ready fruit fly trap



Trapped fruit flies

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RKVY Initiatives

by the farmers and buried in the pits with application of methyl parathion dust to minimize further multiplication of fruit flies. About 6000 booklets were disbursed to the farmers while 500 flex banners were displayed in the target villages. Data on fruit fly catches and infestation were recorded regularly in the target area.

The project involved an investment of ₹ 7.86 crores funded through RKVY.

Outcome

By installing the fruit fly traps in a wide area it was possible to successfully bring down the infestation level to 3 to 4 percent, which meant 85 percent control of the pest. Using this technology, the fruit fly damage in mango orchards minimised to 3.06 (0 to 4) percent and the damage in untreated orchards was 30.34 (30 to 35) percent. Thus, more than 85.0 percent damage due to fruit fly was reduced which resulted in increase of 27.27 percent yield.

Moreover, being an eco friendly approach, it was possible to certify the produce as organic. Thus, the quality of a large quantity of fruits and vegetables improved making them suitable for export. Low expenditure incurred on the control of fruit fly could motivate the growers and possibly enhance the sustainability of the technology demonstrated. The area wide adoption of fruit fly traps could effectively kill the male flies and thereby check further multiplication without disturbing the ecosystem. If such technology is adopted for a considerable time it would definitely be helpful in recognizing the area as PFA (Pest Free Area) and ultimately it will help boosting the export trade.

About 15339 farmers of all categories as well as free riders of six talukas in two districts could save about ₹ 35 crores every year by controlling fruit flies in mango, sapota and cucurbitaceous vegetables. The quality of the products, increase in production and goodwill generated in terms of healthy production ultimately benefited the farmers adopting this technology. Area wide control strategy is not known in our country. Therefore, farmers could also ascertain the actual benefits of adopting such technology which will further motivate them in future.

The effectiveness of low cost IPM technology in controlling infestation of fruit fly disseminated through the RKVY project has brought tremendous behavioral changes in the attitude of fruits and vegetable farmers. Now farmers have adopted this technology which has resulted in export oriented organic production of fruits and vegetables.

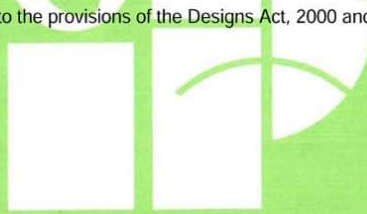
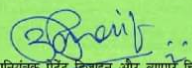
In terms of cost-benefit analysis, an estimated benefit of ₹ 81,840/ha is achieved by spending merely ₹ 350/ha. Thus, implementation of fruit fly technology in over 6000 ha of mango could have benefited the farmers to the tune of about ₹ 49 crore, while in case of cucurbitaceous vegetables, the fruit fly damage was minimised up to 2.5 to 4.6 percent by using the technology while the damage was 19 to 32 (30.50) percent in untreated fields. Thus, more than 85.0 percent damage due to fruit fly was reduced resulting in yield increase of 27 percent. Ultimately an estimated benefit of ₹ 26,250/ha in bitter gourd and ₹ 39,350/ha in bottle gourd was attained by spending only ₹ 550/ha. Thus, implementation of fruit fly technology in over 447 ha of cucurbitaceous vegetables crops benefited the farmers to the tune of ₹ 1 crore.



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Agriculture
RKVY Initiatives

The "NAUROJI STONEHOUSE FRUIT FLY TRAP" ergonomically designed, prepared and commissioned by Dr. Z. P. Patel during his service at Fruit Research Station, Gandevi was registered by the Controller General of Patents, Designs & Trade Marks, Patent Office, Government of India in pursuance of and subject to the provisions of the Design Act, 2000 and the Designs Rules, 2001.

		ORIGINAL
		मूल/No : 131367
		
भारत सरकार GOVERNMENT OF INDIA पेटेंट कार्यालय THE PATENT OFFICE डिजाइन के पंजीकरण का प्रमाणपत्र CERTIFICATE OF REGISTRATION OF DESIGN		
डिजाइन सं. / Design No.	:	366004-001
तारीख / Date	:	13/06/2022
पारस्परिकता तारीख / Reciprocity Date*	:	
देश / Country	:	
प्रमाणित किया जाता है कि संलग्न प्रति में वर्णित डिजाइन जो FRUIT FLY TRAP से संबंधित है, का पंजीकरण, श्रेणी 22-06 में Navsari Agricultural University के नाम में उपर्युक्त संख्या और तारीख में कर लिया गया है। Certified that the design of which a copy is annexed hereto has been registered as of the number and date given above in class 22-06 in respect of the application of such design to FRUIT FLY TRAP in the name of Navsari Agricultural University. डिजाइन अधिनियम, 2000 तथा डिजाइन नियम, 2001 के अध्याधीन प्रावधानों के अनुसरण में। In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.		
		
INTELLECTUAL PROPERTY INDIA PATENTS DESIGNS TRADE MARKS GEOGRAPHICAL INDICATIONS		
निर्गमन की तारीख/Date of Issue : 20/03/2023	 महानियंत्रक पेटेंट डिजाइन और व्यापार चिह्न Controller General of Patents, Designs and Trade Marks	
पारस्परिकता तारीख (यदि कोई हो) जिसकी अनुमति देश के नाम पर की गई है। डिजाइन का सत्ताधिकार पंजीकरण की तारीख से दस वर्षों के लिए होगा जिसका विस्तार, अधिनियम एवं नियम के निबंधनों के अधीन, पाँच वर्षों की अतिरिक्त अवधि के लिए किया जा सकेगा। इस प्रमाण पत्र का उपयोग विधिक कार्यवाहियों अथवा विदेश में पंजीकरण प्राप्त करने के लिए नहीं हो सकता है। *The reciprocity date (if any) which has been allowed and the name of the country. Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years. This Certificate is not for use in legal proceedings or for obtaining registration abroad.		

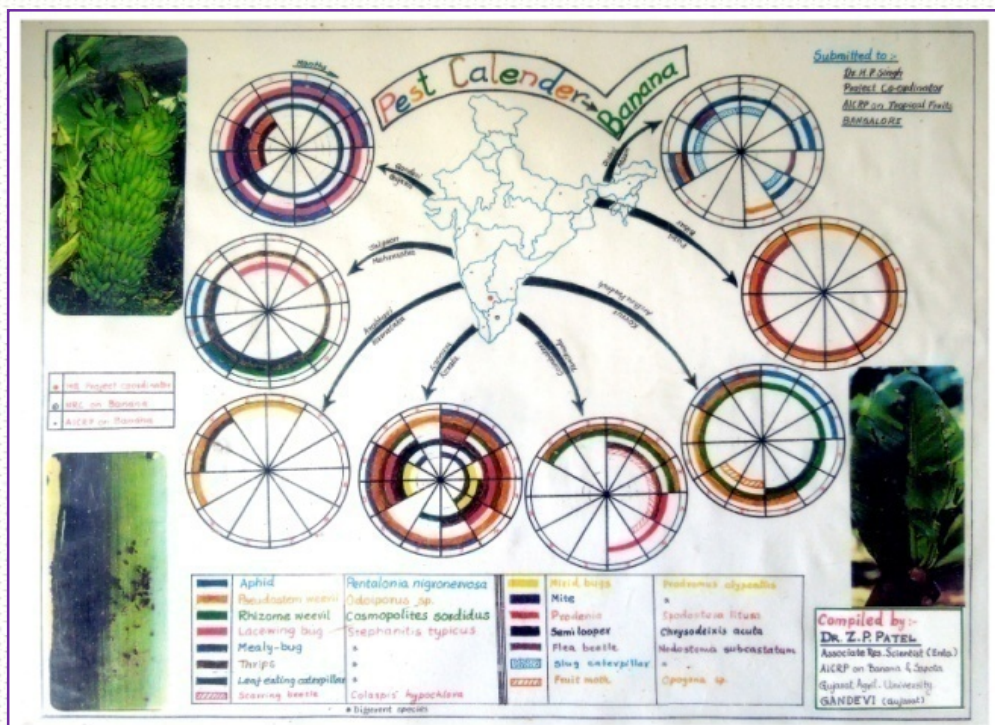
Achievement of Faculties:

- **Dr. Z. P. Patel** [Associate Research Scientist (Ento.)] conferred “**Sardar Patel Agricultural Research Award**” (cash prize of Rs. 50,000/-), first in the discipline of Plant Protection by Govt. of Gujarat for his work on ‘Contribution in Sapota Entomology Advancement of Its Knowledge and Farmers’ Adoption’ by Shri. Keshubhai Patel, Hon. Chief Minister of Gujarat at Gandhinagar on 6th June, 2000.
- **Dr. Z. P. Patel**, [Professor (Ento.)] conferred “**Federation of Gujarat Industries Award**” by Govt. of Gujarat for his work by Shri. Narendrabhai Modi, Hon. Chief Minister of Gujarat at Gandhinagar during 2012.
- **K. D. Bisane** (Jr. Entomologist) honored with “**Fellow of Entomological Society of India**” by Entomological Society of India, Indian Agricultural Research Institute (IARI), New Delhi during 2013.
- **K. D. Bisane** (Jr. Entomologist) honored with “**Fellow of the Society for Bio-control Advancement**” by Society for Bio-control Advancement, ICAR-National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru during 2014.
- **A. N. Patel; A. R. Patel and T. R. Ahir** conferred **1st Rank in Poster presentation** in National seminar on “Role of Organic Farming in Climate Resilient and Sustainable Agriculture” held at ASPEE College of Horticulture and Forestry, NAU, Navsari during 9th -10th January, 2014.
- **K. D. Bisane, B. M. Naik and A. N. Patel** conferred **2nd Rank in Poster presentation** in National seminar on “Role of Organic Farming in Climate Resilient and Sustainable Agriculture” held at ASPEE College of Horticulture and Forestry, NAU, Navsari during 9th -10th January, 2014.
- **K. D. Bisane** (Jr. Entomologist) recognized as “**Zonal Councillor (West Zone)**” in “**Pest Management in Horticultural Ecosystem**” Journal published by ‘Association for Advancement of Pest Management in Horticultural Ecosystem (AAPMHE)’, ICAR-Indian Institute of Horticultural Research (IIHR), Bengaluru since 2015.
- **K. D. Bisane** (Jr. Entomologist) conferred “**Young Scientist Award**” from Bioved Research Institute of Agriculture, Technology & Science (BRIATS), Allahabad in 2016.
- **K. D. Bisane** (Jr. Entomologist) conferred with **2nd Rank in Oral presentation** in National Symposium on “Sustainable Management of Pests and Diseases in Augmenting Food and Nutritional Security” held at NAU, Navsari during 22nd to 24th January, 2019.
- **K. D. Bisane** (Jr. Entomologist) awarded with **Best Oral presentation** in International Conference on “Plant Protection in Horticulture (ICPPH-2019) - Advances and Challenges” held at ICAR-IIHR, Bengaluru- 560089 (Karnataka) during 24th to 27th July, 2019.
- **Dr. K. D. Bisane** (Jr. Entomologist) conferred “**Young Scientist Award 2020**” in the 2nd National Conference on “Recent Scientific Advances in Agricultural and Environmental Sciences” organized by Dr. B. Vasantharaj David Foundation, Chennai on 5th December, 2020.
- **Dr. Pravin Kumar Modi** (Jr. Horticulturist) conferred “**Young Researcher Award 2020**” by Institute of Scholar (InSc).
- **Dr. Ankur P. Patel** (Horticulturist) conferred “**Best Horticulturist Award**” on the occasion of 1st International Conference GIRISDA- 2022 jointly organized by Guru Kashi University, Talwadi Sabo, Punjab and Just Agriculture – The Magazine.
- **Dr. Pravin Kumar Modi** (Jr. Horticulturist) conferred “**Dr. H. B. Singh Award**” on the occasion of 1st International Conference GIRISDA- 2022 jointly organized by Guru Kashi University, Talwadi Sabo, Punjab and Just Agriculture – The Magazine.

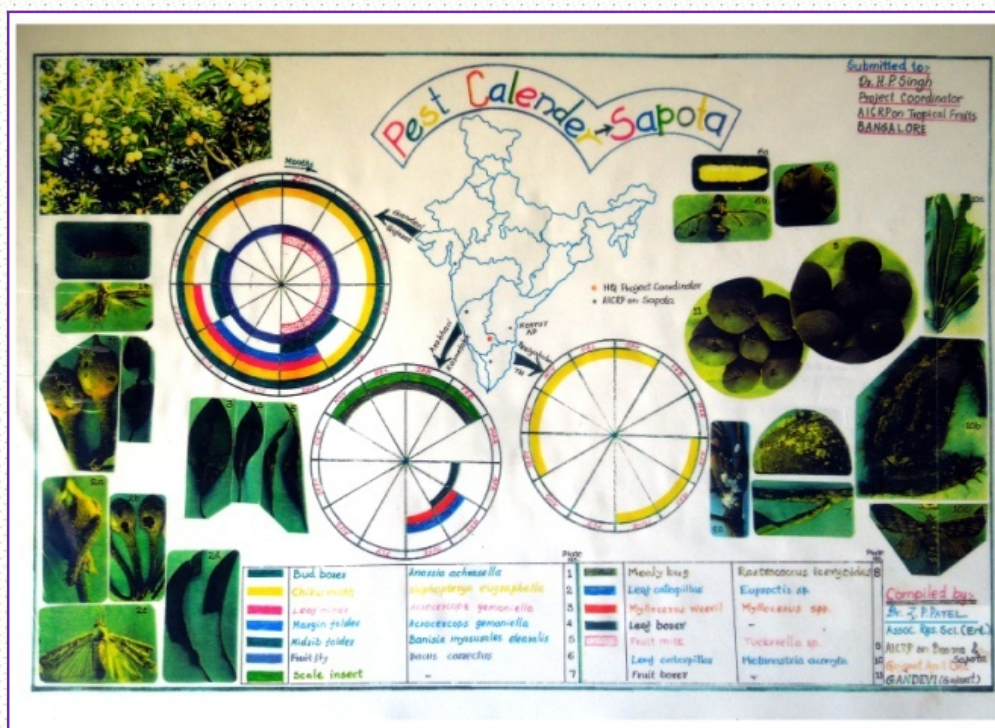
- K. R. Solanki and **Dr. K. D. Bisane** conferred **3rd Rank in Poster presentation** in ‘2nd Indian Horticulture Summit-2022’ organized by Society for Horticultural Research and Development (SHRD) at NAU, Navsari (Gujarat) during 27th to 29th April, 2022.
- **Dr. P. K. Modi, Dr. K. D. Bisane, Dr. A. P. Patel and Dr. Prakash Patil** awarded with **Best Oral presentation** in Global Conference on “Precision Horticulture for Improved Livelihood, Nutrition and Environmental Services” held at JISL, Jalgaon (M.S.) during 28th to 31st May, 2023.
- **Dr. K. D. Bisane** awarded with **3rd Rank in Oral presentation** in International Conference on “Next-Gen Preparedness for Food Security and Environmental Sustainability” held at AAU, Jorhat (Assam) during 22nd to 24th November, 2023.
- **Dr. K. D. Bisane** awarded with **Best Oral presentation** in International Conference on “Plant Protection in Horticulture (ICPPH-2024): Advances and Challenges” held at AAPMHE at ICAR-IIHR, Bengaluru (Karnataka) during 25th to 27th September, 2024.
- **Dr. K. D. Bisane** awarded with **3rd Best Oral presentation** in 11th Indian Horticulture Congress – 2025 and International meet on Horticulture for Inclusive, Equitable and Sustainable Growth organized by IAHS, New Delhi at University of Agricultural Sciences, Bengaluru (Karnataka) during 6th to 9th November, 2025.

Pest Calendar:

- **Dr. Z. P. Patel** [Associate Research Scientist (Ento.)] had first time prepared pest calendar in banana and sapota based on status of insect pests of different regions of India. The copy of pest calendars was submitted to Dr. H. P. Singh, Project Coordinator, AICRP on Tropical fruits, Bangalore (Karnataka).

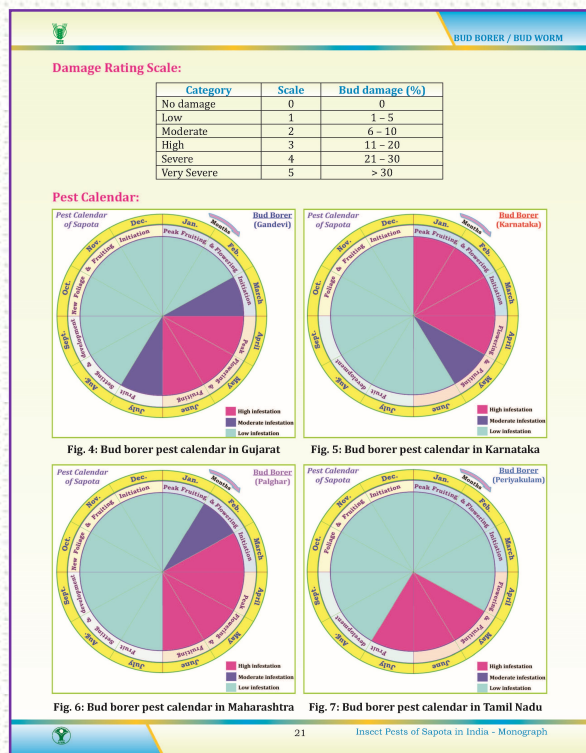


Banana Pest Calendar

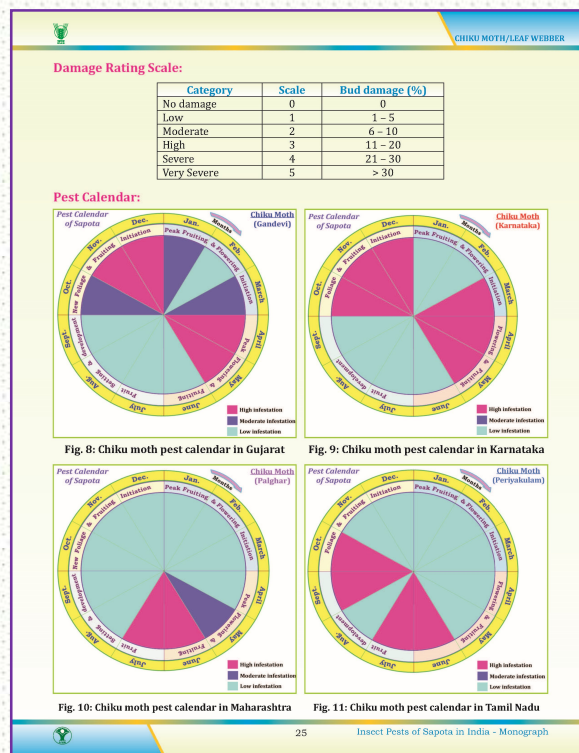


Sapota Pest Calendar

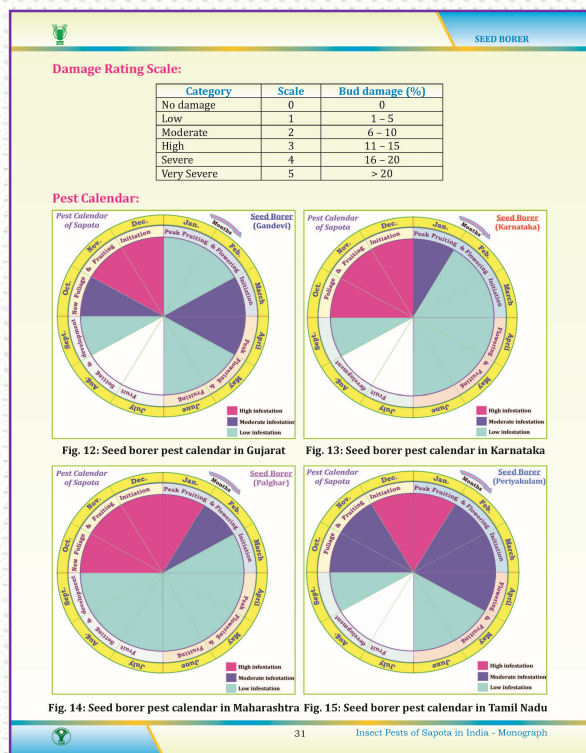
- **Dr. K. D. Bisane** (Jr. Entomologist) had modified pest calendar as pest-wise in sapota based on infestation level of major insect pests of various states of India. The design was included in *Insect Pests of Sapota in India – Monograph* published by ICAR-AICRP (Fruits), ICAR-IIHR, Bengaluru during 2018.



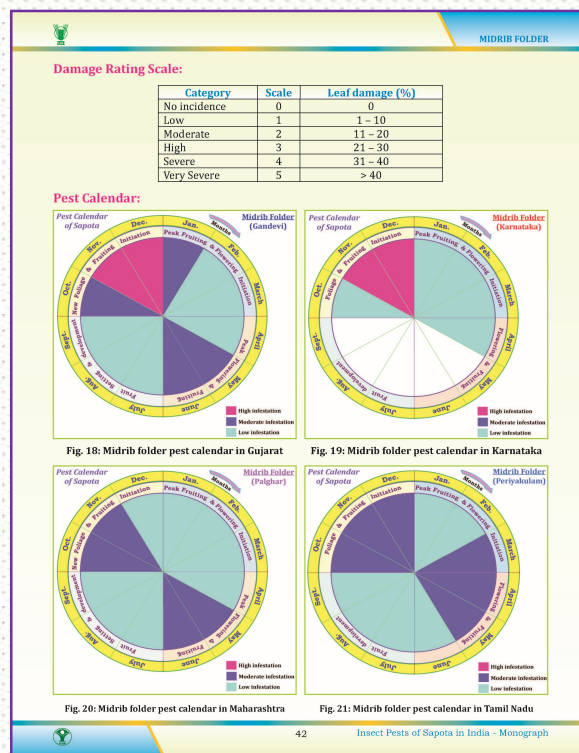
Bud borer Pest Calendar



Chiku moth Pest Calendar



Seed borer Pest Calendar



Midrib folder Pest Calendar

NOTEWORTHY ACHIEVEMENT OF GANDEVI

Coconut cv. Gandevi Selection

It is hybrid of cross between Tall x Dwarf cultivar recommended for South Gujarat region. It is famous for kernel and nut water taste with moderate height tree (1967)



Nut



Kernal (Copra)



Dehusked nut



Matured Tree of cv. Gandevi Selection

Sr. No.	Characteristics	Value / Feature
1.	Tree height (m)	15-20
2.	Tree girth (cm)	120-130
3.	Fruit length (cm)	19-20
4.	Fruit girth (cm)	15-16
5.	Fruit weight (kg)	2.0-2.1
6.	Nut water content (ml)	550-600
7.	Fruiting initiation (years)	6-7
8.	Kernal (Copra) weight (g/fruit)	180-200
9.	Fruit yield (nut/tree/year)	100-120
10.	Fruit shape	Oblong with triangle
11.	Quality of coconut water and kernel	Firm texture and sweet flavour

Use of *Rayan/Khiranee* as rootstock

Innovation of *Rayan/Khiranee* as rootstock (approx. 2^{1/2} years) for propagation of sapota seedlings in India first time from this centre

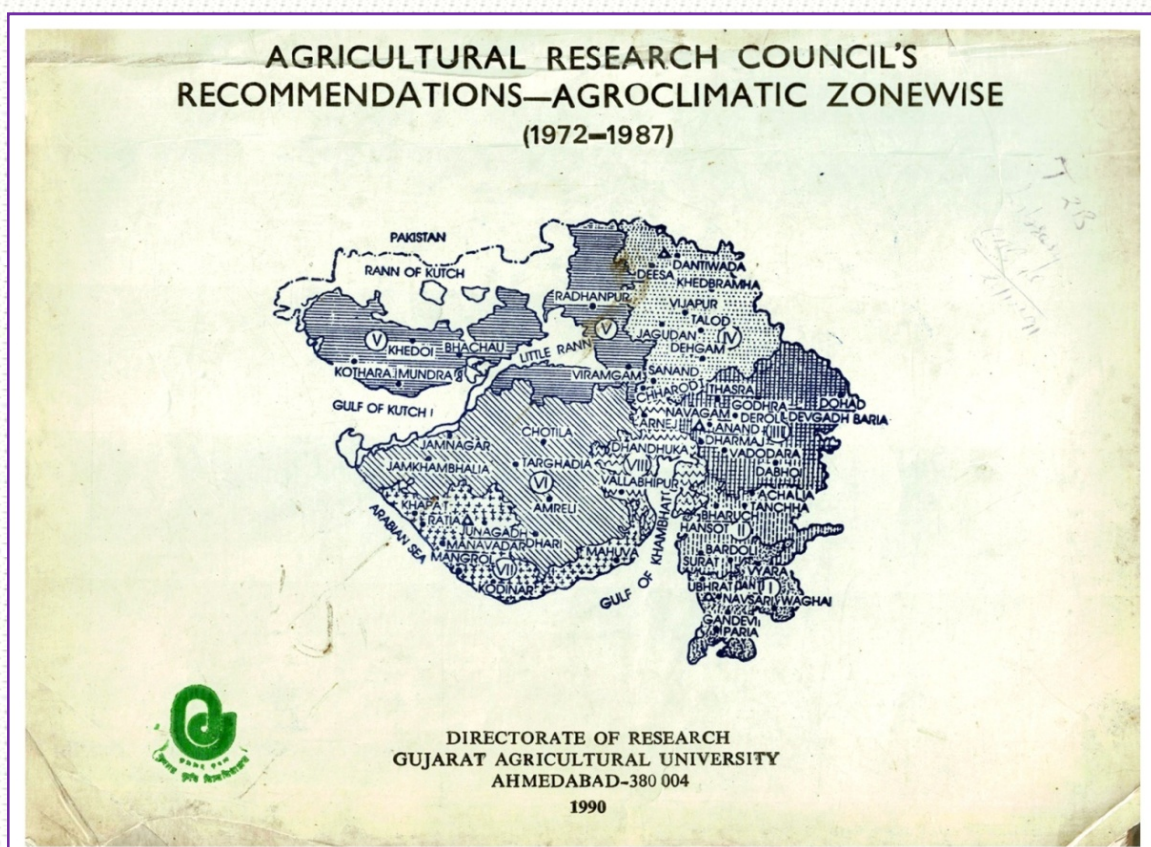
(GAU- 1977- Proposer: Dr. R. S. Amin).



Seedlings of *Rayan/Khiranee* as rootstock



Inarch grafting with *Rayan/Khiranee* as rootstock



1	2	3	4	5	6	7	8
VI. Plant Pathology							
For the control of mango diseases, a schedule comprising four sprayings viz., Copper Oxychloride 0.2% + Zineb 0.2%, after the completion of heavy showers of rain, Wettable sulphur 0.2% before initiation of flowering. Carben-dazim 0.03% immediately after pea sized fruit formation and Zineb 0.2% before maturation of stone, is recommended.	XIV	1984	College of Agriculture, Junagadh and Farmer's fields at Vantali	-do-	Net ICBR 1 : 2.10. Improved the yield by 91%, i.e., 15 kg/ha.		The pathogen of anthracnose attacks leaves, twigs, inflorescence and fruits. One of the reasons for dropping of flowers and small fruits is this disease. Leaves are dried and shrivelled due to the blight of mango.
II. CHIKU							
I. Grafting							
Root-stock-cum-fertilizer trial studies revealed that chiku grafted on Rayan is better as compared to chiku grafted on chiku and chiku gottle. Application of cumulative dose of NPK, each @ 68g every year per tree, gave the highest yield under South Gujarat conditions.	VI	1977	Fruit Research Station, Gandevi	Zone-I, South Gujarat	Increased yield		The recommendation is adopted by the cultivators of the State.

Documents of Rayan/Khiranee as rootstock

Banana cv. Gandevi Selection

It found superior in respect of productivity than Grand Naine as well as both these varieties were found similar on the basis of per day production

(ICAR-AICRP on Fruits- 2003 - Proposer: Dr. C. B. Patel and associates)



Banana Bunch cv. Gandevi Selection

Sr. No.	Characteristics	Average value
1.	Plant height (m)	19.05
2.	Stem girth (cm)	80.80
3.	No. of leaves	26.50
4.	Flowering (shooting) days	380.0
5.	Maturity days	510.0
6.	Bunch length (cm)	78.0
7.	Bunch girth (cm)	110.0
8.	No. of hands/bunch	12.50
9.	No. of figures/bunch	302.5
10.	Finger length (cm)	21.50
11.	Finger girth (cm)	12.20
12.	Bunch weight (kg/plant)	35.0
13.	Yield (t/ha)	96.27
14.	Productivity ((t/day)	0.21
15.	TSS	19.0
16.	Pulp skin ratio	3.0
17.	Weigh loss due to ripening (%)	16.0
18.	Ripening days	10.0

Gujarat Sapota-1 (Gandevi Murabba)

- The genotype Gandevi Murabba was collected from Valsad district in the year 1991 as local collection and planted at Fruit Research Station, Gandevi in 1993.
- After fruiting, the genotype was selected on the basis of yield performance with quality traits over Kalipatti.

(2026 - Proposer: Dr. Ankur P. Patel, Dr. Pravin K. Modi, Dr. K. D. Bisane and associates)



Sapota cv. Gandevi Murabba tree



Sapota cv. Gandevi Murabba fruits

Growth and Yield Characters:

S.N.	Characters	Average value (Range)
1.	Plant height (m)	9.45 (9.10-10.15)
2.	Plant spread N-S (m)	8.90 (7.92-9.25)
3.	Plant spread E-W (m)	9.28 (9.08-9.72)
4.	Trunk height (m)	0.55 (0.50-0.59)
5.	Leaf blade length (cm)	10.90 (10.65-11.20)
6.	Leaf blade width (cm)	3.36 (3.12-3.41)
7.	Flowering duration (Days) [Flower bud initiation to Flower opening]	34.67 (33.00-37.00)
8.	Flowering to maturity (Days)	235.00 (220.00-250.00)
9.	Fruits per plant	1798.61 (1685.00-1873.00)
10.	Average fruit weight (g)	75.34 (68.00-85.00)
11.	Shelf life (Days)	6.50 (6.00-7.00)
12.	Yield (t/ha)	13.32 (12.52 – 13.78)

Morphological Characters:

S.N.	Characters	Details
1.	Tree type	Upright
2.	Tree shape	Spherical
3.	Leaf shape	Oblong lanceolate
4.	Shape of leaf base	Acute
5.	Shape of leaf tip	Acute
6.	Leaf margin	Entire
7.	Petiole length	Small(< 2.0 cm)
8.	Mature leaf colour	Green group (N137B)
9.	Petiole colour	Green group (143A)
10.	Bud colour	Grey brown group (199A)
11.	Fruit shape	Round
12.	Fruit base shape	Inflated
13.	Fruit apex shape	Round
14.	Ridges on fruit surface (Front side)	Present
15.	Ridges on fruit surface (Back side)	Absent
16.	No. of seeds	2.00-3.00
17.	Seed size	Small
18.	Pulp colour	Brownish
19.	Young shoot colour	Light green
20.	Flesh colour near peel	Light green

Biochemical parameters:

S.N.	Characters	Average value
1.	TSS (°B)	22.20
2.	Total Sugar (%)	19.10
3.	Reducing sugars (%)	7.43
4.	Non reducing sugars (%)	11.67
5.	Acidity (%)	0.168
6.	Crude fibre (%)	3.57
7.	Crude Protein (%)	0.49
8.	Total carbohydrate (%)	22.50
9.	Total phenol (%)	0.81
10.	Calcium (mg/100 g)	30.75
11.	Iron content (mg/100 g)	0.80
12.	Fruit firmness (kg/cm ²)	5.04

Infestation of insect-pests and diseases:

S.N.	Name of Insect-Pests	Range
1.	Bud borer	6-47 - 7.37
2.	Chiku moth	7.48 - 9.78
3.	Seed borer	3.29 - 4.88
4.	Wilt	Not observed

National Consultation Meeting on Sapota

The programme was jointly organized by ICAR-AICRP on Fruits, IIHR, Bengaluru and Navsari Agricultural University, Navsari on 29th September, 2015 at ASPEE, College of Horticulture and Forestry, NAU, Navsari aimed in developing a road map involving the various stakeholders including researchers and developmental agencies of sapota. On the occasion, Dr. T. Janakiram, ADG (Hort. Sci. I), ICAR, New Delhi inaugurated the function and Dr. C. J. Dangaria, Vice-Chancellor, NAU was president of the meeting along with Dr. A. N. Sabalpara, Director of Research, NAU, Navsari; Dr. Prakash Patil, Project Coordinator (Fruits), IIHR, Bengaluru and Dr. B. N. Patel, Dean, ACHF, NAU, Navsari. More than 100 delegates from the SAU-based and ICAR-institute based centres of AICRP, research scholars, progressive farmers, policy makers, SHGs and presidents of the growers associations, co-operative societies, self-help groups related to processing and traders were brought together on a common platform during the meet for developing the future road map.

On occasion, Dr. C. J. Dangaria emphasized the problems associated with marketing and processing of sapota, which were the major issues related to sapota cultivation in Gujarat. Dr. Janakiram emphasized the important researchable issues in relation to sapota, such as post-harvest management and use of micronutrients and crop regulation, which are areas yet to be addressed. Dr. Prakash Patil, Project Coordinator (Fruits), gave a brief presentation about the scenario of sapota cultivation in the country and also spoke about the genesis of the consultation meeting. Fruitful interactions were conducted among the stakeholders, scientists and policy makers. An exhibition of the different sapota.



MEMORANDUM OF UNDERSTANDING SIGNED

1. National Agri-Food Biotechnology Institute (NABI), Mohali (Punjab) has made an Agreement on 03-08-2021 with Fruit Research Station, Navsari Agricultural University, Gandevi for "Banana Biofortification and Disease Resistance Project" with five collaborating Institutes namely NABI, National Research Centre on Banana (NRCB), Tiruchirapalli (T.N.); Bhabha Atomic Research Centre (BARC), Mumbai; Indian Institute of Horticultural Research (IIHR), Bengaluru and Tamil Nadu Agriculture University (TNAU), Coimbatore, with support from Biotechnology Industry Research Assistance Council (BIRAC), a Public Sector Enterprise of Department of Biotechnology, Government of India. Under this project, NAU will conduct Event Selection Trials of GE banana events at Gandevi centre and the duration of this Agreement is for a period of three years (2021 to 2024).



Navsari Bhaskar, dated- 16-09-2021

2. MoU of “Banana Macro-propagation Technology” for Transfer of Technology (ToT) has inked on dated 8th October, 2021 with ICAR-NRCB, Tiruchirapalli (T.N.) as Technology Inventor and ICAR-AICRP (Fruits), ICAR-IIHR, Bengaluru as Technology Facilitator and FRS, NAU, Gandevi as Technology Provider (1 no.).



MoU of “Banana Macro-propagation Technology” for Transfer of Technology (ToT) has inked in presence of Dr. S. Uma, Director, ICAR-NRCB, Tiruchirapalli (T.N.)

3. ICAR-AICRP (Fruits), FRS, NAU, Gandevi has signed MoU with eleven (11) farmers and one (1) nursery on dated 18th November, 2021 for production of banana planting material at his farms and commercialization purpose through “Banana Macro-propagation Technology”. The details list of above as given below.

S.N.	Name of the Farmer	Address
1.	Shri. Bhoje Tusharbhay Yeshubhai	At. Post. Tekpada, Taluka: Waghai District: Dang
2.	Shri. Chaudhari Pradipbhay Bhupatsinh	At. Post: Pipalwada, Taluka: Dolvan, Dist: Tapi
3.	Shri. Solanki Anilkumar Kalidasbhay	At. Post: Taraj, Taluka: Palsana, Dist: Surat
4.	Shri. Siyodia Nanubhai Chhabildas	At. Post: Siyod, Taluka: Palsana, Dist: Surat
5.	Shri. Siyodia Ajitbhay Kanjibhai	Taluka: Palsana, Dist: Surat Pin: 394352
6.	Shri. Patel Parth Kishorchandra	At. Post: Lakhanpor, Taluka: Palsana, Dist: Surat
7.	Shri. Chaudhary Ramanbhay Lachhiyabhay	At.: Khutli, Post: Aamdha, Taluka: Kaprada, Dist: Valsad
8.	Shri. Jadhav Babubhai Ramubhai	At.: Khutli, Post: Aamdha, Taluka: Kaprada, Dist: Valsad
9.	Shri. Ojariya Mangalbhay Rupabhay	At.: Khutli, Post: Aamdha, Taluka: Kaprada, Dist: Valsad
10.	Shri. Sureshbhai Chhanabhay Bhorasat	At.: Khutli, Post: Aamdha, Taluka: Kaprada, Dist: Valsad
11.	Shri. Ghulum Chandrakantbhay Mahujiya	At. Ghana, Post: Lavchali, Taluka: Suber, Dist: Dang
12.	Jarvi Nursery, Shri. Jayeshbhay Nathubhai Patel	At. Post: Bharadiya, Taluka: Valiya, Dist: Bharuch



MOU signed with farmers



Field Day at banana Macro-propagated plants orchard



Production of banana Macro-propagated plantlets at farmers field

- Two MoU of "Macro-propagation Technology of Banana" was executed on 29-12-2022 between ICAR-AICRP (Fruits), FRS, NAU, Gandevi and 1. Richa Horticultural Service (Shri. Chandrakant Patel), Vadodara and 2. Muni Seva Ashram (Shri. Vikram Patel), Vadodara for production of banana planting material for commercial use in presence of Dr. Z. P. Patel, Hon'ble Vice-Chancellor, NAU, Navsari and Dr. T. R. Ahlawat, Director of Research.



Two MoU signed in presence of Dr. Z. P. Patel, Hon'ble Vice-Chancellor and Director of Research, NAU, Navsari



Traning given for production of banana Macro-propagated plantlets

XI Group Discussion of ICAR-All India Coordinated Research Project on Fruits

XI Group Discussion of ICAR-AICRP on was organized at NAU, Navsari on 22nd January, 2023 with presidency of Dr. Z. P. Patel, Hon'ble Vice-Chancellor, NAU, Navsari and Chief Guest as Dr. V.B. Patel, ADG (F&PC), ICAR, New Delhi. In the ceremony, Guest of Honour were Dr. B.M.C. Reddy, ICAR Special Invitee & Former VC, DRYSRHU, Venkataramannagudem and Dr. V. A. Parthasarathy, ICAR Special Invitee & Former Director, ICAR-IISR, Kozikode along with Dr. Prakash Patil, National Organizing Secretary & Project Coordinator (Fruits), ICAR-IIHR, Bengaluru; Dr. Timur R. Ahlawat, Director of Research, NAU, Navsari and Dr. Ankur P. Patel, Local Organizing Secretary & Officer In-Charge, FRS, Gandevi.

The event was organized by Fruits Research Station, NAU, Gandevi. In group meeting, Directors of various Nodal crop Institutes and ICAR, New Delhi along with over 150 delegates from 30 SAU-based centres, 14 ICAR-Institute-based centres, 4 CAU-based centres participated to reviews progress, featuring notable experts recommending production and protection technologies for mandated fruit crops. Also, eight successful beneficiaries across the county of special programme under TSP & SCSP scheme were awarded for their achievements in fruit crops.

The Plenary Ceremony of XI Group Discussion of ICAR-AICRP on Fruits was organized at NAU, Navsari on 25th January, 2024 with presidency of Dr. Sanjay Kumar Singh, DDG (Hort. Sci.), ICAR, New Delhi along with Dr. Prakash Patil, National Organizing Secretary & Project Coordinator (Fruits), ICAR-IIHR, Bengaluru; Dr. Timur R. Ahlawat, Director of Research, NAU, Navsari and Dr. Ankur P. Patel, Local Organizing Secretary & Officer In-Charge, FRS, Gandevi.





Activity under Tribal Sub-Plan under ICAR-AICRP (Fruits)

- **2014-15:** Six (6) demonstrations in Dang district and Five (5) in Valsad district on banana cv. Grand Naine Tissue culture plants.
- **2015-16:** Five (5) demonstrations in Dang district and Nine (9) in Valsad district on banana cv. Grand Naine Tissue culture plants.
- **2016-17:** Three (3) demonstrations in Dang district and Twelve (12) in Valsad district on banana cv. Grand Naine Tissue culture plants.
- **2017-18:** Nine (9) demonstrations in Dang district and Eight (8) in Valsad district on banana cv. Grand Naine tissue culture plants.
- **2018-19:** Six (6) demonstrations in Dang district and Twelve three (23) in Valsad district on banana cv. Grand Naine Tissue culture plants.
- **2019-20:** Thirty (30) demonstrations in Valsad district on banana cv. Grand Naine Tissue culture plants.
- **2020-21:** Seventeen (17) demonstrations in The Dang district on banana cv. Grand Naine Tissue culture plants.
- **2021-22:** Twenty (20) demonstrations in The Dang, Valsad, Surat and Tapi district on banana cv. Grand Naine Tissue culture plants and macro-propagated plants.
- **2022-23:** Thirty (30) demonstrations in The Dang and Tapi districts on banana cv. Grand Naine Tissue culture plants and macro-propagated plants.
- **2023-24:** Ten (10) demonstrations in The Dang, Navsari and Tapi districts on banana cv. Grand Naine Tissue culture plants and macro-propagated plants.
- **2024-25:** Seventeen (17) demonstrations on farmers' field (10 farmers in Valsad + 7 farmers in Tapi district and 1 farmer in The Dangs district) + 1 farmers for value added product.
- **2025-26:** Seventeen (17) demonstrations on farmers' field (9 farmers in Tapi + 08 farmers in Valsad district).

Technology Demonstrated:

- ❖ Tissue culture plants cultivation (Grand Naine).
- ❖ Use of paired row planting method.
- ❖ Stage based application of fertilizers.
- ❖ Drip irrigation and Fertigation practices.
- ❖ Inter-cropping with vegetables.
- ❖ Blue polythene bag for bunch covering.
- ❖ Application of liquid bio-fertilizers, bio-agents and Novel organic liquid nutrient supplied from NAU lab.

Activity under Scheduled caste Sub-Plan under ICAR-AICRP (Fruits)

- **2019-20:** Five (5) demonstrations in Navsari and Surat districts on banana cv. Grand Naine Tissue culture plants.
- **2020-21:** Fourteen (14) demonstrations in Navsari and Surat districts on banana cv. Grand Naine Tissue culture plants (7 in Navsari + 7 in Surat district)

Technology Demonstrated:

- ❖ Tissue culture plants cultivation (Grand Naine).

- ❖ Stage based application of fertilizers.
- ❖ Drip irrigation and Fertigation practices.
- ❖ Inter-cropping with vegetables.
- ❖ Blue polythene bag for bunch covering.
- ❖ Application of bio-agents and Novel organic liquid nutrient supplied from NAU lab.

Activity under Mission for Integrated Development of Horticulture – MIDH

- About 2100 sprouted cutting of Black Pepper cv. Pannur-1 has been prepared for sell every year (2024-25).

Activity under Banana Macropropagation Technique for production of Low cost planting material

- About 6287 Macro plants of banana prepared and sell to the farmers (2025-26).

Nursery Achievement

B. H. 5014				
Sr. No.	Item	2025-26 Target	Achievement	2026-27 Target
1.	Sapota (Approach+Saddle)	1000	945	1200
2.	Mango grafts (Approach+Saddle)	1200	1131	1200
3.	Mango grafts (Soft wood)	--	--	250
4.	Rayan seedlings	1000	800	1200
6.	Mango seedlings	1200	2000	2000
7.	Areca nut Seedlings	100	65	100
8.	Lemon (Air layered)	700	605	700
9.	Misc. Seedlings	2200	2052	2200
B. H. 9510-N-12				
1.	Sapota grafts (Approach+Saddle)	1500	1255	1200
2.	Mango grafts (Approach)	2500	2888	3000
3.	Mango Saddle grafts	500	1129	500
4.	Mango grafts (softwood)	200	88	250
4.	Sapota grafts (softwood)	200	2	250
5.	Banana (Macro-propagated)	4000	3879	6000
6.	Coconut seedlings			
	a) West Coast Tall	3000	1455	3400
	b) (TxD) F2	2000	1141	2000
	c) (DxT) F2	300	100	300
	d) Mahuwa Selection	100	00	00
7.	Rayan seedlings	1700	800	1500
8.	Mango Seedlings	3500	2000	3500
9.	Citrus Seedlings	500	00	300
10.	Black pepper (sprouted cutting)	2500	2623	2500
11.	Papaya grafted plants	100	1057	1000
