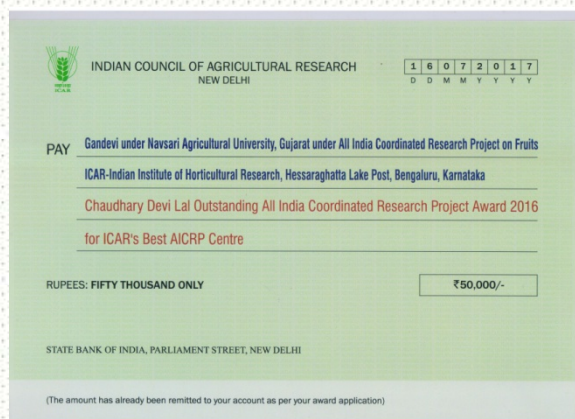


## ACHIEVEMENTS

### A. Silent Achievements of Staff and Centre:

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



- Gandevi centre is awarded as “Best Centre” of ICAR-AICRP (Fruits) for 2022 in ICAR-AICRP (Fruits) in 10<sup>th</sup> Group Discussion Meeting of AICRP on Fruits held in virtual mode during 28<sup>th</sup> February to 3<sup>rd</sup> March, 2023.



- **Gandevi centre** is awarded as **“Best Centre” of ICAR-AICRP (Fruits)** for 2021 as well as **Award of Excellence** for Linking Technology Development and Transfer for 2021 in ICAR-AICRP (Fruits) in 9<sup>th</sup> Group Discussion Meeting of AICRP on Fruits held in virtual mode during 8<sup>th</sup> to 11<sup>th</sup> March, 2022.



- **Gandevi centre** is awarded as **“Best Centre” of ICAR-AICRP (Fruits)** for 2020 in 8<sup>th</sup> Group Discussion Meeting of AICRP on Fruits held in virtual mode during 3<sup>rd</sup> to 6<sup>th</sup> March, 2021.



- **Gandevi centre** is awarded as **“Best Centre” of ICAR-AICRP (Fruits)** for 2015-16 in 3<sup>rd</sup> Group Discussion Meeting of AICRP on Fruits held at PAU, Ludhiana (Punjab) during 3<sup>rd</sup> to 6<sup>th</sup> March, 2016.



- Fruit Research Station, NAU, **Gandevi ranked 3<sup>rd</sup> position in the performance of ICAR-AICRP (Fruits)** in 7<sup>th</sup> Group Discussion Meeting of AICRP on Fruits held at PAU, Ludhiana (Punjab) during 16<sup>th</sup> to 19<sup>th</sup> January, 2020.
- Fruit Research Station, NAU, **Gandevi ranked 2<sup>nd</sup> position in the performance of ICAR-AICRP (Fruits)** in 2<sup>nd</sup> Group Discussion Meeting of AICRP on Fruits held at MPUAT, Udaipur (Rajasthan) during 26<sup>th</sup> February to 1<sup>st</sup> March, 2015.
- Fruit Research Station, NAU, **Gandevi ranked 3<sup>rd</sup> position in the performance of ICAR-AICRP (Fruits)** in 1<sup>st</sup> Group Discussion Meeting of AICRP on Fruits held at Dr. BSKKV, Dapoli (Maharashtra) during on 22<sup>nd</sup> to 25<sup>th</sup> January, 2014.
- **“National Consultation Meeting on Sapota”** was jointly organized by ICAR-AICRP on Fruits and Navsari Agricultural University on September 29, 2015 at Swami Vivekanand Hall, ASPEE, College of Hort. and Fore., NAU, Navsari. 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 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. A total of 100 delegates from the SAU-based and the ICAR-institute-based centres of AICRP, research scholars, progressive farmers, SHGs and presidents of the growers associations participated.



- Book on **“Sapota Cultivation”** prepared and released during 18<sup>th</sup> Group Discussion meeting of AICRP (TF) and 9<sup>th</sup> University Convocation.
- Technical Booklet entitled **“Insect Pests of Sapota in India - Monograph”** released during 6<sup>th</sup> Group Discussion Meeting of ICAR-AICRP on Fruits held at AAU, Jorhat (Assam) from 14<sup>th</sup> to 16<sup>th</sup> Feb., 2019.

- Technical Booklet (*Gujarati*) entitled **“Cultivation Practices and Integrated Insect Pests and Diseases Management in Sapota”**. (શીકુની ખેતી પદ્ધતી અને તેમાં રોગ-જીવાતનું સંકલિત નિયંત્રણ). *Pub.*: ICAR-AICRP (Fruits), Fruits Research Station, NAU, Gandevi during 10<sup>th</sup> Group Discussion Meeting of AICRP on Fruits held in virtual mode during 28<sup>th</sup> February to 3<sup>rd</sup> March, 2023.
- **A. N. Patel; A. R. Patel and T. R. Ahir awarded with 1<sup>st</sup> Rank in Best Poster presentation** in National seminar on “Role of Organic Farming in Climate Resilient and Sustainable Agriculture” held at ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari during 9<sup>th</sup> & 10<sup>th</sup> January, 2014.
- **K. D. Bisane; B. M. Naik and A. N. Patel awarded with 2<sup>nd</sup> Rank in Best Poster presentation** in National seminar on “Role of Organic Farming in Climate Resilient and Sustainable Agriculture” held at ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari during 9<sup>th</sup> & 10<sup>th</sup> January, 2014.
- **K. D. Bisane awarded with 2<sup>nd</sup> Rank in Best Oral presentation** in National Symposium on “Sustainable Management of Pests and Diseases in Augmenting Food and Nutritional Security” held at NAU, Navsari during 22<sup>nd</sup> to 24<sup>th</sup> January, 2019.
- **K. D. Bisane 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 24<sup>th</sup> to 27<sup>th</sup> July, 2019.
- **K. D. Bisane** recognized as **“Zonal Councillor (West Zone)”** in **“Pest Management in Horticultural Ecosystem”** Journal published by ‘AAPMHE’, ICAR-Indian Institute of Horticultural Research (IIHR), Bengaluru since 2015.
- **K. D. Bisane** honored with **“Fellow of the Society for Bio-control Advancement”** by Society for Bio-control Advancement, National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru during 2014.
- **K. D. Bisane** honored with **“Fellow of Entomological Society of India”** by Entomological Society of India, Indian Agricultural Research Institute (IARI), New Delhi during 2013.
- **Dr. K. D. Bisane** (Jr. Entomologist) conferred **“Young Scientist Award 2020”** in the 2<sup>nd</sup> National Conference on “Recent Scientific Advances in Agricultural and Environmental Sciences” organized by Dr. B. Vasantharaj David Foundation, Chennai – 600125 on 5<sup>th</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 **3<sup>rd</sup> Rank in Best Poster presentation** in ‘2<sup>nd</sup> Indian Horticulture Summit-2022’ organized by Society for Horticultural Research and Development (SHRD) at NAU, Navsari (Gujarat) during 27<sup>th</sup> to 29<sup>th</sup> 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 (Maharashtra) during 28<sup>th</sup> to 31<sup>st</sup> May, 2023.

**B. Research Achievements:****For Farmers' Community**

S. N.	Year	Recommendations	Technology provider
<b>HORTICULTURE</b>			
<b>Banana</b>			
1.	1992	The farmers of south Gujarat heavy rainfall region growing banana cv. Basrai under clay loam soils are recommended to apply a basal dose of 5 kg FYM and 90 kg P <sub>2</sub> O <sub>5</sub> per plant in pits while planting. Per plant 200 g potash also should be applied. Potash and 200 g N/plant should be applied in three equal splits at 90 DAP, 120 DAP and 150 DAP. These give better quality fruits of 63.84 t/ha.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
2.	1992	The farmers of South Gujarat heavy rainfall region growing banana cv. Basrai under clay loam soils are recommended to apply 200 g N/plant. Nitrogen and 200 g K <sub>2</sub> O/plant should be applied in three equal splits at 90 DAP, 120 DAP and 150 DAP. A basal dose of 5 kg FYM and 90 g P <sub>2</sub> O <sub>5</sub> /plant should be applied in pits while planting. These give the highest fruit yield of 62.95 t/ha.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
3.	1994	In heavy rainfall area of south Gujarat region, the farmers are advised to grow banana cv. Basrai in clay loam soils. The crop should be planted in paired rows at 1.0 x 1.2 x 2.0 m. This gives the maximum (87.17 t/ha) fruit yield and net profit.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
4.	1997	Farmers of south Gujarat heavy rainfall zone growing banana cv. Basrai under clay loam soils are advised to apply 200 g nitrogen per plant. Of which, 25 per cent nitrogen ( <i>i.e.</i> 50 g N/plant) should be applied in form of FYM, in addition to 5 kg FYM applied in pit. Apply 90 g phosphorous and 200 g potash per plant. This gives maximum yield as well as higher CBR.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
5.	1997	Farmers of south Gujarat heavy rainfall zone, Agro-ecological situation-III growing banana crop cv. Basrai under clay loam soils are advised to keep the field weed free entire period or for first nine months of planting for getting higher yield.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
6.	2000	The farmers of south Gujarat heavy rainfall zone growing banana cv. Basrai under clay loam soils are recommended to apply 150 g nitrogen per plant through drip method in three equal split at 90,120 and 150 days after planting which save 25 per cent nitrogen and gives maximum yield as well as higher cost benefit ratio.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
7.	2001	The optimum time for planting Basrai variety of banana in South Gujarat heavy rainfall zone of south Gujarat is middle of June but planting up to 15 <sup>th</sup> August does not cause any significant reduction in yield.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
8.	2002	The farmers of South Gujarat heavy rainfall zone growing banana cv. Basrai are advised to protect the banana bunch by covering it with blue polythene (200 gauges) after complete opening of the bunch; the lower end should be kept open. It protects the bunches during cold winter and produces blemish less fruits.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
9.	2002	The farmers of South Gujarat heavy rainfall zone growing banana under clay loam soils are recommended to apply 150 g N per plant through drip in the form of urea at 90,120 and 150 days after planting. The total phosphorus (67.5g P <sub>2</sub> O <sub>5</sub> ) should be applied at	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]

S. N.	Year	Recommendations	Technology provider												
		planting time, while potassium (150 g k <sub>2</sub> O) in three equal splits at 90, 120 and 150 days after planting as soil application for obtaining maximum yield (64.47 t/ha) with CBR.													
10.	2003	The farmers of South Gujarat heavy rainfall zone growing banana under clay loam soils are recommended to plant banana variety Gandevi Selection at 1.2 x 1.5 x 2.4 m spacing in pair row planting method. This planting method (accommodate 4600 plants/ha) gives maximum banana fruit yield (95.59 t/ha) with higher profit.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]												
11.	2003	The farmers of Gujarat State growing banana are advised to grow cv. Gandevi Selection variety of banana.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]												
12.	2004	The farmers of South Gujarat heavy rainfall Zone growing banana cv. Basrai in clay loam soil under high density plantation with paired row planting method are recommended to apply each 150 g Nitrogen and Potassium in form of urea and murate of potash respectively through drip in six equal splits at 15 days interval after 3 month of planting. It gives the higher yield of banana fruits (106.04 t/ha) with CBR. The phosphorous @ 90 g/plant should be applied in pit at the time of planting.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]												
13.	2007	The farmers are advised to plant banana cultivar Grand Naine Tissue plants. It gives highest (57.12 t/ha) yield and net profit with a CBR.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]												
14.	2007	The farmers are advised to plant banana cv. Grand Naine in paired rows at 1.0 x 1.2 x 2.0 m spacing. This gives the highest (113.66 t/ha) fruit yield of banana.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]												
15.	2009	The farmers of South Gujarat heavy rainfall Zone-I, Agri-ecological Situation-III growing banana cv. Grand Naine under clay loam soils are recommended to apply 50 g <i>Azospirillum</i> per plant at two month of planting along with 100 per cent recommended dose of fertilizers (10 kg FYM + 200 g nitrogen + 90 g phosphorus + 200 g potash) to get 16.86 % higher yield over control.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]												
16.	2009	The farmers of South Gujarat heavy rainfall zone-I, Agri Ecological Situation-III growing banana cv. Grand Naine at 1.8 x 1.8 m spacing under clay loam soils are recommended to grow cabbage cv. Golden acre planting at 45 x 30 cm in early growth stage of banana planted in late kharif to get higher income.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]												
17.	2011	<p>The banana (cv. Grand Naine) growers of South Gujarat heavy rainfall area are advised to apply stage-based irrigation through drip system as under for getting higher yield and net profit.</p> <table border="1"> <thead> <tr> <th>Stage</th><th>PEF</th><th>Month</th><th>Operating Time (Min)</th></tr> </thead> <tbody> <tr> <td>Planting to bud initiation</td><td>0.8</td><td>July - Nov.</td><td>140-150 (Except rainy days)</td></tr> <tr> <td>Bud initiation to shooting</td><td>0.6</td><td>Dec. - April</td><td>140-150</td></tr> </tbody> </table>	Stage	PEF	Month	Operating Time (Min)	Planting to bud initiation	0.8	July - Nov.	140-150 (Except rainy days)	Bud initiation to shooting	0.6	Dec. - April	140-150	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
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18.	2011	<p>The banana (cv. Grand Naine) growers of South Gujarat heavy rainfall area are advised to apply irrigation through drip system (70% ER) with the application of 75 per cent recommended dose of nitrogen and 100 per cent recommended dose of each phosphorus and potash for getting higher yield and net profit.</p> <table> <tr> <td colspan="4"><u>System details</u></td></tr> <tr> <td>Lateral spacing</td><td>:</td><td colspan="2">1.8 m</td></tr> <tr> <td>Dripper spacing</td><td>:</td><td colspan="2">0.3 m away from either side of plant (2 dripper)</td></tr> <tr> <td>Dripper discharge</td><td>:</td><td colspan="2">4 LPH</td></tr> <tr> <td>Operating pressure</td><td>:</td><td colspan="2">1.2 kg/ cm<sup>2</sup></td></tr> <tr> <td>Operating time</td><td>:</td><td colspan="2">120-130 minutes during winter and 170-180 minutes during summer</td></tr> <tr> <td>Operating frequency</td><td>:</td><td colspan="2">Alternate day</td></tr> </table>	<u>System details</u>				Lateral spacing	:	1.8 m		Dripper spacing	:	0.3 m away from either side of plant (2 dripper)		Dripper discharge	:	4 LPH		Operating pressure	:	1.2 kg/ cm <sup>2</sup>		Operating time	:	120-130 minutes during winter and 170-180 minutes during summer		Operating frequency	:	Alternate day		ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]				
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19.	2013	<p>The farmers of South Gujarat heavy rainfall zone growing banana cv. Grand Naine in clay loam soils and similar climatic conditions are recommended to apply 80 per cent of the recommended dose nitrogen and potash, i.e. 240 g N and 160 g K<sub>2</sub>O /plant, out of which first installment 96 g N and 40 g K<sub>2</sub>O at 3<sup>rd</sup> month (vegetative stage), second installment 72 g N and 56 g K<sub>2</sub>O at 5<sup>th</sup> month (flower bud initiation stage), third installment 72 g N and 40 g K<sub>2</sub>O at 7<sup>th</sup> month (flowering stage) and fourth installment 0 g N and 24 g K<sub>2</sub>O at 9<sup>th</sup> month (bunch development) after planting. FYM 10 kg/plant and total dose of P<sub>2</sub>O<sub>5</sub> @ 90g/plant should be applied at planting. This gives higher yield with BCR.</p>	ICAR-AICRP (Fruits)																																
20.	2015	<p>The farmers of south Gujarat heavy rainfall zone (AES-III) growing banana cv. Grand Naine are advised to plant three (3) suckers/hill (in triangle fashion at 30 cm.) at 2x3 m (7x10 feet) spacing and apply 75 per cent recommended dose of fertilizers i.e. 225:67.5:150 N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O g/plant for getting higher yield with higher net return. 10 kg FYM and 67.50 g P<sub>2</sub>O<sub>5</sub>/plant should be apply at planting, while 225 g N and 150 g K<sub>2</sub>O/plant should be applied in three equal splits at 90, 120 and 150 days after planting.</p>	ICAR-AICRP (Fruits)																																
21.	2015	<p>The farmers of south Gujarat heavy rainfall zone (AES-III) growing banana cv. Grand Naine and using drip irrigation system are advised to apply 75 per cent recommended dose of N and K<sub>2</sub>O fertilizers i.e. 225 g N and 150 g K<sub>2</sub>O/plant through drip at 15 days</p>	ICAR-AICRP (Fruits)																																

S. N.	Year	Recommendations	Technology provider																											
		<p>interval during the various growth stage as under for getting higher yield with higher net profit with 25 % saving of N and K<sub>2</sub>O and 22 per cent saving of irrigation water.</p> <table><tr><th rowspan="2">Sr. No.</th><th rowspan="2">Growth stages</th><th colspan="2">N and K<sub>2</sub>O g/plant</th><th rowspan="2">No. of split</th></tr><tr><th>N</th><th>K<sub>2</sub>O</th></tr><tr><td>1</td><td>During 3 and 4 month</td><td>67.5</td><td>30</td><td>4</td></tr><tr><td>2</td><td>During 5 and 6 month</td><td>112.5</td><td>60</td><td>4</td></tr><tr><td>3</td><td>During 7 month to flowering</td><td>45</td><td>48</td><td>2</td></tr><tr><td>4</td><td>Post shooting</td><td>00</td><td>12</td><td>1</td></tr></table> <p>10 kg FYM and 90 g P<sub>2</sub>O<sub>5</sub> should be applied in pit at planting. The drip system should be operated for 90 minutes in winter and 150 minutes in summer everyday having two drippers of 4 lph spaced at 30 cm either side of pseudostem.</p>	Sr. No.	Growth stages	N and K <sub>2</sub> O g/plant		No. of split	N	K <sub>2</sub> O	1	During 3 and 4 month	67.5	30	4	2	During 5 and 6 month	112.5	60	4	3	During 7 month to flowering	45	48	2	4	Post shooting	00	12	1	
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22.	2016	The farmers of South Gujarat Heavy Rainfall Zone-I (AES-III) growing banana cv. Grand Naine under organic farming are recommended to apply 10 kg FYM and 1.25 kg Neem cake at planting, Bio fertilizers 50 ml each <i>Azospirillum</i> and PSB, and 50 g <i>T. harzianum</i> and 25 g AM at one month after planting, 5 kg Vermicompost after three month of planting and 1.75 kg Wood ash after five month of planting per plant. These gives higher yield with higher net returns.	ICAR-AICRP (Fruits)																											
23.	2016	<p>Banana growing farmers and nurserymen are advised to produce low cost quality planting material through macro propagation technique. This technique saves cost of planting material. A sucker treated with AM and <i>Trichoderma viride</i> @ 30 g/sucker produces maximum 20 plants per sucker within 5-6 months.</p> <p><b>Methodology</b></p> <ul style="list-style-type: none"><li>▪ Selection of good quality suckers weighing 500-1000g.</li><li>▪ Suckers are detopped just above the juncture of the aerial shoot (Decortications).</li><li>▪ Removal of apical meristem to 4 cm depth and 2 cm width (Decapitation).</li><li>▪ 6-8 cross wise cuts given to sucker.</li><li>▪ Sucker placed in net house at 1 x 1 feet distance and covered with sawdust.</li><li>▪ Application of 30g each AM and <i>Trichoderma viride</i> around each sucker.</li><li>▪ Removal of juvenile meristem of primary and secondary buds to produce tertiary buds.</li><li>▪ Plants produced from tertiary buds having 4-5 leaves separated &amp; planted in plastic bag in media containing Red soil:Sand:FYM in ratio of 1:1:1.</li><li>▪ Plants kept in net house for hardening.</li><li>▪ Regular watering by water can during entire procedure.</li></ul>	ICAR-AICRP (Fruits)																											
24.	2019	The Farmers of south Gujarat heavy rainfall zone-I (AES-III) growing banana cv. Grand Naine under drip irrigation are advised to adopt soil test based fertilizer recommendation as per ready reckoner and following below modules for getting targeted yield of banana.	ICAR-AICRP (Fruits)																											

S. N.	Year	Recommendations	Technology provider
		<ul style="list-style-type: none"> <li>10 kg FYM/pit at the time of land preparation.</li> <li>Drip irrigation (80% ER at all stages) system should be operated for 80 minute in winter and 130 minute in summer on alternate day having two drippers of 4lph spaced at 30 cm either side of pseudostem.</li> <li>50% cover of black plastic mulch (100 micron thickness).</li> <li>2% Banana Shakti micro nutrient foliar spray at 3, 4 and 5 month after planting (formulated by NRCB)</li> <li>Bunch spray of 2% SOP (1<sup>st</sup> spray after male bud removal and 2<sup>nd</sup> spray at 30 days after 1<sup>st</sup> spray)</li> <li>Adopt fertilizer dose of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O as per STCR ready reckoner in below table. N and K<sub>2</sub>O applied in three equal split through fertigation at 3, 4 and 5 month after planting, whereas P<sub>2</sub>O<sub>5</sub> as soil application one month after planting.</li> </ul>	
25.	2021	The banana growers are recommended to cultivate banana through macro propagated plants for getting early maturity, higher production and net return as compared to suckers plant.	ICAR-AICRP (Fruits)
<b>Sapota</b>			
26.	1989	The root distribution study taken in grown up sapota tree cv. Kalipatti in south Gujarat condition (Gandevi) on medium black soils revealed that the maximum feeder roots (1.5 mm diameter) are present within the radial distance of 2.0 m from the trunk and up to the depth of 30 cm. Therefore, for efficient utilization of nutrients by sapota tree in south Gujarat, fertilizer may be applied in this zone under the tree and thoroughly mixed in the soil.	ICAR-AICRP (Fruits)
27.	1993	In order to obtain higher fruit yield of sapota from unit area during the formative years (I phase), the farmers of south Gujarat heavy rainfall region are advised to plant chiku grafts of cv. Kalipatti at 5 x 5 m spacing.	ICAR-AICRP (Fruits)
28.	1993	For getting higher percentage of germination from about one month old seeds of rayan, the farmers/nursery men of Gujarat state are advised to soak the seed in one per cent Thiourea for six hours or in dung paste for 24 hours. After treatment, the seeds should be washed and dried in shade before sowing.	ICAR-AICRP (Fruits)
29.	1997	The earlier recommendation for the farmers of south Gujarat heavy rainfall zone for growing sapota cv. Kalipatti at spacing of 5 x 5 m was recommended for high density plantation. Further, the plantation raised at this spacing has been recommended to be continued for 13 years age for getting higher yield per unit area.	ICAR-AICRP (Fruits)
30.	2013	The farmers of South Gujarat heavy rainfall zone having sapota cv. Kalipatti orchard in clay loam soils are recommended to apply 100 per cent recommended dose of fertilizers @ 1000:500:500g NPK/tree/year to adult trees in three splits i.e. 250:500:125g NPK/tree in June, 500:00:250g NPK/tree in August and 250:00:125g NPK/tree during October instead of two equal split i.e. during June and October. FYM @ 100 kg/tree should be applied in June. This gives higher yield of sapota fruits with higher BCR.	ICAR-AICRP (Fruits)
31.	2018	The farmers of South Gujarat heavy rainfall zone having sapota orchard with adult trees of cv. Kalipatti are recommended to apply 100% recommended dose of fertilizer @ 1000:500:500g NPK/tree/year in three split doses i.e. 25% (250:125:125 NPK g/tree) in June along with FYM @100 kg/tree/year, remaining	ICAR-AICRP (Fruits)

S. N.	Year	Recommendations	Technology provider																																			
		25% (250:125: 125 NPK g/tree) in October and 50% (500:250:250 NPK g/tree) in February instead of two equal splits <i>i.e.</i> in June and October. This treatment gives higher fruit yield of sapota with higher net realization in winter season in comparison to summer season.																																				
32.	2018	The farmers of South Gujarat heavy rainfall zone having sapota cv. Kalipatti orchards of more than 30 years old are recommended to prune 1.0 m upper terminal growth once during December for getting gradually higher yield and net returns.	ICAR-AICRP (Fruits)																																			
33.	2020	The Farmers of south Gujarat heavy rainfall zone-I (AES-III) having sapota cv. Kalipatti orchards are recommended to application of FYM 75 kg and 750-375-375 g/tree NPK application in June and October month (Two equal splits), Bio-fertilizers - <i>Azospirillum</i> + PSB @ 40ml/tree application in July, 50 ppm GA <sub>3</sub> spray in November and 0.5% Grade 4 micronutrients spray in December gave higher yield and income.	Research on Fruits (B.H.-5014)																																			
34.	2021	<div> <div> The farmers of South Gujarat having mature trees of sapota cv. Kalipatti are recommended to apply 80% recommended dose of chemical fertilizers (800:400:400 g N: P<sub>2</sub>O<sub>5</sub> :K<sub>2</sub>O/tree) in four splits July, September, November and February month {as per given below table} and 15 kg vermicompost along with Azotobacter 100 ml and PSB 100 ml per tree (108cfu/g) per tree in July and Grade-4 multi micronutrient (0.5%) spray in October month for getting higher yield and net income in winter season. </div> <table> <tr> <th colspan="5">80% recommended dose of chemical fertilizer</th> </tr> <tr> <th>Time and stage of application</th> <th>I Vegetative flush (July)</th> <th>II Fruit set (September)</th> <th>III Fruit growth (November)</th> <th>IV Fruit growth (February)</th> </tr> <tr> <td>N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O (%)</td> <td>32:40:20%</td> <td>16:00:20%</td> <td>16:40-20%</td> <td>16:00:20%</td> </tr> <tr> <td>N:P<sub>2</sub>O<sub>5</sub> :K<sub>2</sub>O g/tree</td> <td>320:200:100</td> <td>160:00:100</td> <td>160:200:100</td> <td>160:00:100</td> </tr> <tr> <td>Urea (g/tree)</td> <td>700</td> <td>350</td> <td>350</td> <td>350</td> </tr> <tr> <td>SSP (g/tree)</td> <td>1250</td> <td>0</td> <td>1250</td> <td>0</td> </tr> <tr> <td>Murate of Potash (g/tree)</td> <td>170</td> <td>170</td> <td>170</td> <td>170</td> </tr> </table> </div>	80% recommended dose of chemical fertilizer					Time and stage of application	I Vegetative flush (July)	II Fruit set (September)	III Fruit growth (November)	IV Fruit growth (February)	N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O (%)	32:40:20%	16:00:20%	16:40-20%	16:00:20%	N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O g/tree	320:200:100	160:00:100	160:200:100	160:00:100	Urea (g/tree)	700	350	350	350	SSP (g/tree)	1250	0	1250	0	Murate of Potash (g/tree)	170	170	170	170	ICAR-AICRP (Fruits)
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Papaya																																						
35.	2022	Farmers of South Gujarat are recommended to cultivate gynodioecious varieties of papaya under insect proof net house (40 mesh) for getting higher yield, net return and good quality fruits. Further, incidence of papaya ring spot virus (PRSV) can be prevented.	ICAR-AICRP (Fruits)																																			

### For Scientific Community

S. N.	Year	Recommendations	Technology provider
<b>HORTICULTURE</b>			
<b>Banana</b>			
1.	2013	Banana cultivar Gandevi Selection has proved higher productivity (97.20 t/ha) than Grand Naine (73.70 t/ha) under South Gujarat agro-climatic condition, however both these varieties are at par with each other on the basis of per day production <i>i.e.</i> 192.60 kg	ICAR-AICRP (Fruits)

S. N.	Year	Recommendations	Technology provider
		(Gandevi selection) and 189.87 kg (Grand Naine), which proves that inspite of longer crop period, Gandevi selection provides almost the same per day production and higher benefit in comparison to cultivar Grand Naine. As price of banana fluctuates on day to day basis, Gandevi Selection is same economically remunerative as Grand Naine.	
2.	2015	Banana cv. Grand Naine using drip irrigation are advised to apply 250:90:250 g N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O/plant and one spray of 10 ppm 2,4-D five days after complete opening of bunch for getting higher yield with standard size of fruits for export quality. 10 kg FYM and 90 g P <sub>2</sub> O <sub>5</sub> should be apply at planting, while N and K <sub>2</sub> O should be applied each @ 250 g per plant in three equal splits at 90, 120 and 150 days after planting.	ICAR-AICRP (Fruits)
<b>Sapota</b>			
3.	2013	The pruning treatments imposed in 20 years old sapota cv. Kalipatti planted at 10X5 m spacing under South Gujarat heavy rainfall zone could not show significant improvement in yield in comparison to conventional spacing (10x10 m). But these pruning treatments in terms of physicochemical properties resulted in significantly higher fruit diameter and pulp skin ratio in treatment heading back of scaffold branches 60 cm away from the point of inter locking. Significantly higher TSS recorded in treatment topping the tree height above 4 <sup>th</sup> tier. The increase in fruit weight also recorded in treatment combination heading back of scaffold branches and topping. Thus pruning treatment has resulted in higher physico-chemical properties.	ICAR-AICRP (Fruits)
<b>PLANT PATHOLOGY</b>			
<b>Banana</b>			
4.	2002	The farmers of South Gujarat are recommended to apply four sprays of either carbendazim @ 1.0 g/lit or propiconazole @ 1.0 ml/lit or thiophanate methyl @ 2.0 g/lit at one month interval after initiation of disease for effective and economic management of sigatoka leaf spot disease in banana.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
5.	2002	The recommendation proposed for farming community as farmers of South Gujarat heavy rainfall Zone growing banana cv. Basrai are advised to follow any one of the management practices either paring and 0.15 % Acephate dip + 1 % B.M. or paring + 0.15 % Acephate dip for 10 min or suckers dip in COC (Blitox @ 5.0 g/lit) for effective and economic management of rhizome rot of banana.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
6.	2014	Farmers of South Gujarat Heavy Rainfall Zone-I growing banana cv. Grand Naine are advised to Plant healthy suckers of banana + Drenching with streptocycline (0.5 g/l) @ 1 l/plant at 15, 60 & 120 days after planting (3 times) + growing of sunhemp up to 40-45 days or up to flowering stage in the interspaces of banana after planting and incorporate into soil + repeated growing of sunhemp crop for 2-3 times in the same interspaces of banana (till 180 days after planting of banana) for effective management of bacterial rhizome rot disease.	ICAR-AICRP (Fruits)
<b>Sapota</b>			
7.	2000	The sapota variety PKM-1 is found less susceptible to the brown leaf spot disease and also give higher yield.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical

S. N.	Year	Recommendations	Technology provider
			Fruits]]
8.	2000	Sapota cv. Kalipatti planted at wider and closer spacing are as equally infested by brown leaf spot disease.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
9.	2006	Farmers of South Gujarat heavy rainfall Zone, Agro ecological situation III growing sapota cv. Kalipatti are advised to give two sprays of either carbendazim 0.1% or mancozeb 0.2% at one month interval after initiation of diseases for effective and economical control of pestalotiopsis leaf spot disease in sapota.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
<b>Papaya</b>			
10.	2014	The farmers of South Gujarat Heavy Rainfall Zone-I, growing papaya are advised to raise the papaya seedlings under Nylon net (40-60 mesh) and spraying of acephate 75 SP 1.5 g/litre of water at 3 days before planting as well as use of two rows of border crop of maize sown 15 days before planting. Apply 1% Neem oil @ 2 ml/lit with acephate 75 SP 1.5 g/litre of water (0.11%; 675 g a.i./ha) at 15 days interval up to 5 month for effective management of papaya ring spot virus disease. PHI for Acephate is 240 days.	ICAR-AICRP (Fruits)
11.	2020	The higher papaya fruits yield and marketable fruits along with minimum infestation of diseases can be obtained in Module I comprising sequential application of different fungicide and micronutrients over Module II comprising standard package of practices and Module III (control).	ICAR-AICRP (Fruits)
<b>ENTOMOLOGY</b>			
<b>Banana</b>			
12.	2015	For effective management of rust thrips in banana, inject the bud with one ml solution of imidacloprid 17.8 SL (0.6 ml/lit water) or 2 ml solution of azadirachtin 10000 ppm (5 ml/lit water) at the time of emergence of flower (30° angle when bud at upright position).	ICAR-AICRP (Fruits)
<b>Sapota</b>			
13.	1998	Farmers of south Gujarat growing sapota (Kalipatti) are advised to apply three sprays either of monocrotophos 0.05% at 15 days interval during peak flowering starting from second fortnight of March for the control of bud boring insects ( <i>Anarsia achrasella</i> and <i>Nephopteryx eugraphella</i> ).	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
14.	1998	Farmers of south Gujarat growing sapota are advised to install six methyl eugenol traps (0.056 ml or 4 drops each of methyl eugenol and contact insecticide to be recharged at weekly interval) per hectare at a height of four feet placed at equal distance in sapota orchard to trap the male fruit flies.	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
15.	2006	Farmers of South Gujarat heavy rainfall Zone growing sapota cv. kalipatti are advised to give two sprays of any one of the following insecticides during peak flowering at 20 days interval for effective control of bud boring insects ( <i>A. achrasella</i> and <i>N. eugraphella</i> ). 1. Lamda-cyhalothrin 0.005% (10 ml in 10 lit of water) 2. A mixture of Profenophos (40%) + Cypermethrin (4%) 0.044 % (10 ml in 10 lit of water) 3. Mixture of Chlorpyriphos (50%) + Cypermethrin (5%) 0.055% (10 ml in 10 lit of water).	ICAR-AICRP (Fruits) [Erstwhile AICRP (Tropical Fruits)]
16.	2015	Sapota growers are advised to apply three sprays of profenophos 50	ICAR-AICRP

S. N.	Year	Recommendations	Technology provider
		EC, 15 ml or novaluron 10 EC, 5 ml per 10 litre water at 20 days interval from October onwards for effective management of seed borer.	(Fruits)
17.	2021	Sequential application of deltamethrin 2.8 EC @ 10 ml/ 10 lit water and <i>Bt</i> powder ( <i>Bacillus thuringiensis</i> var. <i>kurstaki</i> - $1 \times 10^9$ CFU/g) @ 10 g/ 10 lit water at 15 days interval at marble stage of fruit (October onwards) to minimize fruit damage of seed borer ( <i>Trymalitis margaritas</i> Meyrick) in sapota	ICAR-AICRP (Fruits)

### C. Activity under Tribal Sub-Plan under ICAR-AICRP (Fruits) (B.H. 2075):

- **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 Tapi and The Dang districts on banana cv. Grand Naine Tissue culture plants and macro-propagated plants.

### 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.

### **D. Activity under Scheduled caste Sub-Plan under ICAR-AICRP (Fruits) (B.H. 2123):**

- **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.

### **E. Activity under Mission for Integrated Development of Horticulture – MIDH (B.H. 18930-7):**

- About 2500 sprouted cutting of Black Pepper cv. Pannur-1 has been prepared every year.

### **F. Nursery Achievement**

<b>B. H. 5014</b>				
<b>Sr. No.</b>	<b>Item</b>	<b>2021 -2022 Target</b>	<b>Achievement</b>	<b>2022 -2023 Target</b>
1.	Sapota (Approach)	1400	1337	1500
2.	Mango grafts (Approach)	2500	1840	1500
3.	Mango grafts (Soft wood)	00	200	1500
4.	Rayan seedlings	1500	1400	1500
6.	Mango seedlings	2000	2000	5000
7.	Areca nut Seedlings	500	262	500
8.	Misc. Seedlings	3100	1650	4500
<b>B. H. 9510-N-12</b>				
1.	Sapota grafts (Approach)	1400	1308	1500
2.	Mango grafts (Approach)	5500	3834	4000
3.	Mango grafts (softwood)	150	866	4500
4.	Sapota grafts (softwood)	00	250	500
4.	Coconut seedlings			
	a) West Coast Tall	5000	3075	6500
	b) (TxD) F2	3500	2306	2000
	c) (DxT) F2	400	351	800
	d) Mahuwa Selection	150	100	150
5.	Rayan seedlings	1500	1400	1500
6.	Mango Seedlings	6000	6000	6000
7.	Citrus Seedlings	320	328	500
8.	Black pepper (sprouted cutting)	2500	778	2000

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