Department of Vegetable Science
ASPEE College of Horticulture,
Navsari Agricultural University,
Navsari – 396 450 (Gujarat)

ACTIVITIES AND ACHIEVEMENTS

ACADEMIC ACTIVITIES:

List of Courses offered by the Department for Under Graduate Programme

B. Sc. (Hons.) Horticulture				
SN	**Sem.**	**Course No.**	**Title of Course**	**Credit hrs**
1	I	VEG. 1.1	Tropical and Sub-tropical Vegetable Crops	3(2+1)
2	III	VEG. 3.2	Temperate Vegetable Crops	2(1+1)
3	III	VEG. 3.3	Protected Cultivation and Precision farming	3(2+1)
4	IV	VEG. 4.4	Spices and Condiments	3(2+1)
5	V	VEG 5.5	Potato and Tuber crops	2 (1+1)
6	V	VEG. 5.6	Breeding of Vegetable, Tuber and Spice Crops	3(2+1)
7	VI	VEG. 6.7	Seed Production of Vegetable, Tuber and Spice Crops	3(2+1)
			Sub Total (A)	**19 (12+7)**
STUDENT READY-I: Experiential Learning Programme				
1	VII	HWE: 7.1	Protected Cultivation of High Valued Horticultural Crops	**10 (0+10)**
2		HWE:7.1.1	Production of High Valued Crops	6(0+6)
3		HWE:7.1.2	Packaging and Marketing of High Valued Horticultural Crops	4(0+4)
4		HWE: 7.2	Commercial Production of Horticultural Planting Materials	**10 (0+10)**
5		HWE: 7.2.1	Propagation and Production Propagules	6(0+6)
6		HWE: 7.2.2	Packaging and Marketing of Planting Materials	4(0+4)
			Sub Total (B)	**20 (0 +20)**
STUDENT READY-II: Rural Horticultural Work Experience				
1	VIII	RHWE. 8.2	Educational Tour	2 (0+2)
			Sub Total (C)	**2 (0+2)**
			Total (A+B+C)	**41 (12+29)**

List of Courses offered by the Department for Post Graduate Programme (As per BSMA Committee)

M. Sc. Horticulture				
SN	**Sem.**	**Course No.**	**Title of Course**	**Credit hrs**
1	Odd	VSC 501*	Production of Cool Season Vegetable Crops	3 (2+1)
2	Even	VSC 502*	Production of Warm Season Vegetable Crops	3(2+1)
3	Odd	VSC 503*	Growth and Development of Vegetable Crops	3(2+1)
4	Odd	VSC 504*	Principles of Vegetable Breeding	3(2+1)
5	Even	VSC 505	Breeding of Self Pollinated Vegetable Crops	3(2+1)
6	Even	VSC 506	Breeding of Cross Pollinated Vegetable Crops	3(2+1)

7	Odd	VSC 507	Protected Cultivation of Vegetable Crops	3(2+1)
8	Even	VSC 508	Seed Production of Vegetable Crops	2(1+1)
9	Odd	VSC 509	Production of Underutilized Vegetable Crops	3(2+1)
10	Even	VSC 510	Systematics of Vegetable Crops	2(1+1)
11	Odd	VSC 511	Organic Vegetable Production	2(1+1)
12	Even	VSC 512	Production of Spices Crops	3(2+1)
13	Odd	VSC 513	Processing of Vegetable Crops	2(1+1)
14	Odd	VSC 514	Postharvest Management of Vegetable Crops	3(2+1)
15	Even/Odd	VSC 591	Seminar	1(0+1)
16	Even/Odd	VSC 599	Research	30(0+30)
			Sub Total (A)	**69(24+45)**

**Compulsory among major courses*

List of Courses offered by the Department for Ph. D. Programme (As per BSMA Committee)

Ph.D. Horticulture				
SN	**Sem.**	**Course No.**	**Title of Course**	**Credit hrs**
1	Odd	VSC 601**	Recent Trends in Vegetable Production	3 (3+0)
2	Even	VSC 602**	Advances in Breeding of Vegetable Crops	3 (3+0)
3	Odd	VSC 603	Abiotic Stress Management in Vegetable Crops	3 (2+1)
4	Even	VSC 604	Seed Certification, Processing and Storage of Vegetable Crops	3 (2+1)
5	Odd	VSC 605	Breeding for Special Traits in Vegetable Crops	2 (2+0)
6	Even	VSC 606	Biodiversity and Conservation of Vegetable Crops	3 (2+1)
7	Odd	VSC 607	Biotechnological Approaches in Vegetable Crops	3 (2+1)
8	Even	VSC 608	Advanced Laboratory Techniques for Vegetable Crops	3 (1+2)
7	Even/ Odd	VSC 691	Seminar - I	1 (0+1)
8	Even/ Odd	VSC 692	Seminar - II	1 (0+1)
9	Even/ Odd	VSC 699	Research	75 (0+75)
			Sub Total (A)	**100 (17+83)**

***Compulsory a mong major courses*

Practical Manuals Published

SN	Course No.	Title of the Course	Academic Year
1.	VEG 2.1	Tropical and Subtropical Vegetables	2011-12
2.	VEG 3.2	Temperate Vegetables	2011-12 & 2015-16
3.	VEG 5.5	Potato and Tuber Crops	2011-12 & 2015-16
4.	VEG 4.3	Spices and Condiments	2013-14
5.	VEG 5.4	Breeding of Vegetable, Tuber and Spice Crops	2013-14
6.	VSC 506	Systematics of Vegetable Crops	2017-18
7.	B.Sc. 2.5	Principals of Plant Breeding	2017-18
8.	VEG 3.3	Precision Farming and Protected Cultivation	2018-19

9.	VEG 3.3	Precision Farming and Protected Cultivation (Study Material)	2018-19
10.	BSC 1.2	Principles of Genetics and Cytogenetics (Study Material)	2018-19
11.	BSC 2.5	Principles of Plant Breeding	2018-19
12.	BSC 2.5	Principles of Plant Breeding (Study Material)	2018-19
13.	VSC 505	Seed Production Technology of Vegetable Crops	2018-19

Activities under ELP

	Protected Cultivation of Hi-Value Horticultural Crops		Commercial Production of Horticultural Crops	
Year	Students	Revenue Generated (Rs)	Students	Revenue Generated (Rs)
2011-12	13	96974	13	Project Sanctioned
2012-13	12	92745	13	299665
2013-14	11	44009	12	65561
2014-15	21	74511	25	16828
2015-16	24	54205	26	95787
2016-17	25	94160	25	55320
2017-18	28	126662	06	107427
2018-19	19	201645	19	223755
2019-20	20	189235	20	312492
2020-21	27	60680	25	107150
2021-22	46	275090	47	151960
2022-23	45	232900	47	354794

Course No.	Name of Model	No. of Students trained
HWE 7.1	Protected Cultivation of High Valued Horticultural Crops	45
HWE7.2.1	Propagation and production of propagules	47



Photograph of the activities (in which students actively participated)

Number of students awarded degree since commencement of PG programme in the Department

M.Sc. Horticulture	Ph. D. Horticulture
113	23

PG students enrolled in Doctoral Programme (2022-23)

SN	Name & registration Number of Student	Name of Major Guide	Year of enrollment
1	GANVIT JAYDEEPKUMAR MOHANBHAI 1020222002	Dr. S. S. Masaye	2022-23
2	HARSH HATHI 1020222003	Dr. N. K. Patel	2022-23
3	MALVIYA AMIT VANRAJBHAI (IN -SERVICE) 1020222005	Dr. S. Y. Patel	2022-23
ICAR Students enrolled			
1	MALLIKARJUNA K N 1020222009	Dr. V. K. Parmar	2022-23

PG students enrolled in Master Programme (2022-23)

SN	Name & registration Number of Student	Name of Major Guide	Year of enrollment
1	DODIYA PARTH KALABHAI 2020222001	Dr. J. M. Vashi	2022-23
2	PATEL PARTH MAYURBHAI 2020222008	Dr. V.K. Parmar	2022-23
3	PATEL YASHTRIBHUVANBHAI 2020222014	Dr.N.B. Patel	2022-23
4	SINDHAV KINJALBA JAYPALSINH 2020222018	Dr. J. M. Vashi	2022-23

ICAR Students enrolled			
1	BISWAJIT BEHERA (ICAR) 2020222028	Dr. MangaldeepSarkar	2022-23

Post Graduate Students who have cleared NET in the Discipline ofVegetableScience

SN	Name	Year
1.	Yogesh Auti	2011-12
2.	Manoj Agrawal	2012-13
3.	Chaudhari Bhaveshkumar Natvarlal	2012-13
4.	More Sanket Jijabrao	2012-13
5.	Chanda Harish	2013-14
6.	Nanaware Prashantkumar Raghunath	2013-14
7.	Eragamreddy Eswara Prasad Reddy	2013-14
8.	ramuK ardneraN	2014-15
9.	Rathod Hetal Rajeshkumar	2014-15
10.	Devulkar Nilesh Gajanan	2014-15
11.	Jethava Bhaskar Arvindbhai	2014-15
12.	Bhavna Mali	2014-15
13.	Patel Krishna Dhirajlal	2014-15
14.	Patel HimaniBiharilal	2015-16
15.	Panchal Bhakti Bharatkumar	2015-16
16.	KalariyaVijaysinhDhanjibhai	2015-16
17.	Akhilesh Kumar	2015-16
18.	Patel Priyankakumari Naradbhai	2015-16
19.	Vaghashiya Jaysukh M.	2015-16
20.	Jay Narayan Tiwari	2015-16
21.	Ankit Gadhiya	2015-16
22.	Pintu Sankhla	2015-16
23.	Vashi J. M.	2015-16
24.	Golakiya Prayagbhai Dineshbhai	2016-17
25.	Sheth Sachin Gautamkumar	2016-17
26.	Navya K	2016-17
27.	Nikki Bharti	2016-17
28.	Sagar Raj Nayak	2016-17
29.	Amit Malviya	2016-17
30.	Varsha Chaudhari	2016-17
31.	Utsav Patel	2016-17
32.	Karamshi Desai	2016-17
33.	Hitesh Vasava	2016-17
34.	NiteshJadav	2016-17
35.	Dipt Patel	2016-17
36.	Bijal Solanki	2016-17
37.	Ananya K. Chandran	2016-17
38.	Punna Samatha Sree	2018-19

39.	Narasimhamurthy P N	2018-19
40.	Avisha Ram Budhani	2018-19
41.	Goswami Rahulpuri Ashokpuri	2018-19
42.	Hira lChaudhari	2018-19
43.	Patel Anjali	2018-19
44.	Mahesha K. N.	2019-20
45.	Gamit Upmakumari Chunilal	2019-20
46.	Vaghela Kalpeshbhai Shivabhai	2019-20
47.	Adarsh Guddadamath	2019-20
48.	Parmar Manishkumar Narsinhbhai	2019-20
49.	Goswami Mayurgiri Jagdishgiri	2019-20
50.	Patel Jesalben Rajeshbhai	2019-20
51.	Monu Kumari	2019-20
52.	Bhatt Zalakben Kartikkumar	2019-20

Medalist Students of the Department

Sr. No.	Name of student	Year
	Vice Chancellor Gold Medal B. Sc. (Hons.) Horticulture	
1.	Rathod Hetal Rajeshkumar	2011-12
2.	Gadhiya Ankitkumar Devrajbhai	2012-13
	ASPEE Foundation Gold Plated Silver Medal	
1.	Patel Himani Biharilal	2012-13
	Late Shri Bhulabhai Karshanji Patel Gold Plated Bronze Medal	
1.	Patel Himani Biharilal	2012-13
	ASPEE Foundation Gold Plated Silver Medal M. Sc. Horticulture	
1.	More Sanket Jijabrao	2012-13
2.	Patel Himani Biharilal	2015-16
3.	Shah Smit Bhartiben	2020-21
4.	Champaneri Dushyant Dipakkumar	2021-22
5.	Umme Fiza	2022-23
	ASPEE Foundation Gold Plated Silver Medal for Ph. D. Horticulture	
1.	More Sanket Jijabrao	2015-16
2.	Patel Himani Biharilal	2018-19
3.	Ganta Koteswara Rao	2020-21
	Kalptaru Gold Plated Silver Medal	
1.	Mandaliya Jaydeep Vinubhai	2022-23
	Agricultural Research Services	
1.	More Sanket Jijabrao	2015-16

Avisha Ram Budhani

Patel Himani Biharilal

Gadhiya AnkitkumarDevrajbhai

More Sanket Jijabrao

Shah Smit Bhartiben

Ganta Koteswara Rao

Mandaliya Jaydeep Vinubhai

Exposure Visit of PG Students

Visit to processing plant at Lachhakadi

Visit to field of ponted gourd grower at Vansda

2016-17

Group meeting with farmers of Bhadli Village, Ta. Dantiwada

Visit to Potato cold storage unit at Bhadli Village, Ta. Dantiwada

2017-18

Net house cultivation of tannia by Shri Satishbhai Gordhanbhai Patel, a progressive farmer of of village Pankhala, Taluka Sagbara, District Narmada

High-tech nursery raising by ShriJayeshbhaiNathubhai Patel and his wife Smt. HeenabenJayeshbhai Patel, Village Bharadia, TalukaValia, District Bharuch

Exposure visit of B.Sc. (Horti) 3rd Semester students to Centre of Excellence for Protected Cultivation and Precision Farming on Vegetables, Vadrad

Exposure visit of B.Sc. (Horti) 7thSemester students to Centre of Excellence for Protected Cultivation and Precision Farming on Vegetables,Vadrad

RESEARCH ACTIVITIES

Focus Areas

1. Development of HYV/hybrids in mandate vegetable crops for stable production to minimize yield gap between zone, area and soil type.
2. Research on underutilized and unutilized vegetables.
3. Development of variety (s) for export purpose.
4. Cultivation of exotic unusual vegetables.
5. Research on biotic and abiotic stress management.
6. Research on perennial vegetable crops.
7. Hi-tech nursery raising and Protected cultivation of vegetable crops.
8. Organic farming.
9. Development of improved and sustainable technologies under changing climate.
10. Vegetable processing, storage and transportation.
11. Seed production technology.
12. Opening new vistas of research on Vegetable Grafting and microgreens- New generation smart food etc.
13. Transfer of technology.

Research Schemes in Operation

SN	Title of Research Project	Year of Commencement& Budget Head	PI & Co-PI	Funding Agency
1	Research in vegetable crops under protected conditions-Phase-II	2012-13 12017	Dr. N.B. Patel	Development Charges
2	Research and Development in Vegetable Crops (12013 Merged)	2012-13 12021	Dr. A.I. Patel	Development Charges
3	AICRP on Tuber Crops	1994-95 (Waghai) 2006 (Navsari) 2006-3	Dr. Himani B. Patel	ICAR
4	AICRP on Vegetable Crops Voluntary Centre	2010-11 2058	Dr. J.M. Vashi	ICAR
5	Vegetable grafting to mitigate biotic and abiotic stresses in vegetable crops	2019-20 14054	Dr. N.B. Patel, Dr. P.R. Patel Mr. KirtiBardhan& Dr. A.R. Kaswala	RKVY
6	Revolving Fund	2020-21 9510-N- 93	Dr. N.K. Patel	RF

Objectives of the schemes

1. Research in Vegetable Crops under Protected Conditions Phase-II (BH: 12017)

Objectives:

- To identify cultivars ideal for protected cultivation.
- To standardize the Production technology for vegetable crops under protected conditions.
- To train and demonstrate farmers in developed technologies.

2. Research and Development in Vegetable Crops (BH: 12021)

Objectives:

- To develop high yielding varieties/hybrids with resistant to pest and diseases in vegetable crops.
- To develop production technology in different vegetable crops.
- Quality seed/planting material production of varieties/hybrids.

3. AICRP on Tuber Crops (BH: 2006-3)

Objectives:

- Collection of germplasm of tuber crops from different region of the country particularly from the tribal/hilly areas and maintaining them as field gene bank
- Evaluation of germplasm for economically important traits including high yield, starch, carotene, short duration, tolerance/resistance to biotic and abiotic stress and sharing of promising entries among the centers
- Carrying out regional/location specific research to identify improved high yielding varieties suitable to different agro-climatic conditions
- Standardization of suitable agro-techniques and cropping systems for improved varieties of different tuber crops in different regions, so as to enhance the productivity
- Evolve suitable and effective management tactics for major pests and disease of tuber crops
- Popularize and create awareness on the importance and nutritional aspects of major tuber crops

- Production and supply of quality planting materials of major tuber crops in liaison with State Agri/Horti. Departments and voluntary agencies like KVKs/NGOs

4. AICRP on Vegetable Crops (BH: 2058)

Objectives:

- Evaluation of different varieties and hybrids against biotic and abiotic stress in different vegetable crops.

5. Vegetable grafting to mitigate biotic and abiotic stresses in vegetable crops

Objectives:

- To screen and identify potential rootstocks against biotic and abiotic stresses in vegetable crops.
- To use resistant/tolerant rootstocks for commercial production of vegetable grafts.
- To impart training and develop entrepreneurship among greenhouse vegetable growers and students as well as youth.
- To generate an additional income by sale of grafts of important greenhouse vegetable crops

Overview of Research Trials

Pointed gourd

INM in Little gourd

Organic Brinjal

LSVTCow pea

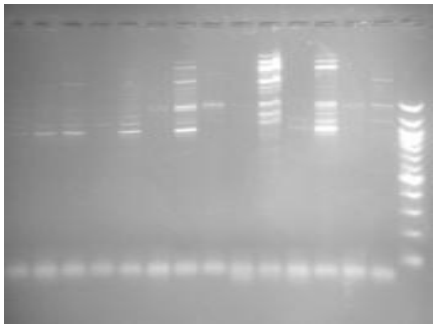
LSVT Indian bean

LSVT Onion

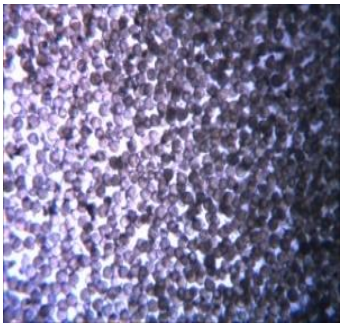
Pre. Hybrid Trial

NBRH-14-01in LSHT

NTH-15-13 in LSHT



Restorer Identification in chilli



Fertility verification in CMS based chilli hybrids

NCH -1603 in PHT

Minisett Technique for EFY

Secondary Nursery for sweet potato

Live staking in Greater Yam

Cultivar Bhukanti in MLT

Organic cultivation of EFY

MLT on Cassava

AVT-I(Det. type)

AVT-II (Indet. type)

IET (Cherry tomato)

AVT-I (Chilli)

IET- Brinjal(Round)

YVMV resistant AVT-I (Okra)



Training and pruning in capsicum under protected conditions



Training and pruning in tomato under protected conditions



Training and pruning in cucumber under protected conditions



Training and afrtificial polination in muskmelon under protected conditions





Use of pruned shoots for multiplication in cucumber and tomato:
A new Apprroach to reduce cost of cultivation

Grafting brinjal and tomato onto wild rootstock against biotic and abiotic stresses

Homestead utility of Microgreens for nutritional Security: Tomorrow's Technology

: ResearchRecommendations:

A) Crop improvement: Varietal Development

1. Little Gourd: GNLG-1 (2012)

It recorded 15.6 tones/ha fruit yield with yield advantage of 32.9 % over local check. It produced more number of fruits per vine in addition to its better quality. In disease and pest reaction, it is also found superior with respect to disease *viz.*, anthracnose, powdery mildew and vine borer as compared to local check.

2. Pointed Gourd: GNPG-1 (2014)

This variety was selection from local germplasm. It has recorded 47.13 % higher fruit yield (15.11 t/ha) over the local variety. The variety has long, light green fruit with fair whitish strip.

3. Brinjal: GNRB 1 (Gujarat Navsari Round Brinjal 1) [2016]

GNRB 1 (Gujarat Navsari Round Brinjal 1) Variety registered 23 % fruit yield superiority over GJB-3 and GOB-1. Calyx is medium size, spineless and purple in colour. Fruits are round, dark purple in colour and have purple green leaves. GNRB-1 had low incidence of little leaf disease reaction (3.90 %) and shoot borer (3.35 %) GNRB-1 is recommended for general cultivation in brinjal growing areas of South Gujarat.

Varieties Endorsed: Sweet Potato: C-71, Cross-4, Bhu Kanti

C-71 (1994-95)

Bhukanti (2017-18)

4. Tomato: GT 7

Tomato genotype NTL-12-01 (301.0 q/ha) performed well under South Middle and North Gujarat regions where, it exhibited overall 28.47, 26.54 and 25.82 % increased fruit yield over standard checks *viz;* JT-3 (234.3 q/ha), AT-3 (226.8 q/ha) and DVRT-2 (228.1 q/ha), respectively. The genotype showed less damage by fruit borer, whitefly as well as leaf miner as compared to standard checks. The genotype NTL 12-01 is recommended for cultivation of farmers of South, North and Middle Gujarat regions as GT 7.

Release proposal for okra variety NOL-17-05[PurnaRakshak]

Okra growing farmers of south Gujarat region are advised for cultivation of okra variety NOL-17-05 (GNO-1: PurnaRakshak). The average fruit yield of okra variety NOL-17-05 (GNO-1: PurnaRakshak) is 12.72 t/ha. It exhibited overall yield advantages of 10.70 %, 13.52 % and 12.59 % in *Kharif* season over the check varieties GAO-5, PusaSawani and GO-6, respectively. It matures within 89-112 days (medium group), having good in fruit size and plant structure. It has high yield potential and moderately resistant against YVMV, Powdery mildew, ELCV disease as well as moderately resistant against pod borer, jassid and whitefly.

B) Production Technology:

Year: 1985

1. **Standardization of fertilizer dose and spacing in tapioca:**

The tapioca variety H165 should be planted in first week of April at 90 cm x 90 cm spacing. The crop should be manured at the rate of 12.5 tons FYM/ha as basal while land preparation and fertilized at the rate of 75:75:75 kg/ha N: $P_2O_5K_2O$ for higher production of tubers. The fertilizers are to be applied in two equal splits viz. first half at the time of planting and the remaining half at two months after planting.

Year: 1990-91

1. **Standardization of fertilizer dose in cabbage:**

The maximum production in cabbage var. Pride of India could be obtainedthrough application of 75 kg N/ha in two equal splits. The first half of N should be applied at the time of transplanting and the second half at 30 days after transplanting.

2. **Standardization of seed production technology in cauliflower cv. Early Kunwari:**

Different methods for production of cauliflower seeds var. Early Kunwari were tried and the seed to seed method involving raising nursery during last week of August and transplanting during last week of September was found best. Further, maximum seed production (517 kg/ha) could be obtained by applying 120 kg N/ha in two equal splits *viz.* first at transplanting and second one month after transplanting.

Year: 1992-93

1. **Sprinkler irrigation in cabbage:**

The crop of cabbage could be irrigated through sprinkler at 11 to 14 days interval keeping 5 cm depth. The sprinklers should be operated at 2.75 kg/cm^2pressure with an application rate of about 1.67 cm/hr for about 3 hours.

2. **Sprinkler irrigation in cow pea:**

The crop of cowpea cv. PusaPhalguni could be irrigated through sprinkler at 9 to 10 days interval up to March and 7 to 8 days interval during April and May keeping 5 cm depth. The sprinklers should be operated at 2.75 kg/cm^2 pressure with an application rate of about 1.67 cm/hr for about 3 hours.

Year: 1993-94

1. **Standardization of fertilizer dose in cauliflower cv. PusaDeepali :**

The winter crop of cauliflower cv. PusaDeepali should be fertilized at the rate of 40:40 kg N:P_2O_5 per hectare as basal dose followed by an application of 40 kg N/ha at 30 days after T.P.

2. **Sprinkler irrigation in cauliflower:**

The crop of cauliflower could be irrigated through sprinkler at 11 to 14 daysinterval keeping 5 cm depth. The sprinklers should be operated at 2.5 kg/cm^2pressure for about three hours.

3. **Standardization of sowing time, spacing and fertilizer dose in Indian Bean for summer planting**

Indian bean cv. Kapasi should be sown in the third week of May at distance of 60 cm between the rows and 30 cm within the row for higher production of green pods. The

crop need 60 kg N/ha to be applied in two equal splits; *viz.* first half as basal and the remaining half at 20 days after sowing.

Year: 1995-96

1. **Standardization of fertilizer doses for okra cultivation:**

The Okra crop cv. ParbhaniKranti should be fertilized at rate of 150 kg N/ha in two equal splits. The first half dose of nitrogen (75 kg/ha) and full dose of Pand K each @ 50 kg/ha should be applied as a basal and the remaining 75 kg N/ha should be applied at 45 days after sowing.

2. **Sprinkler irrigation in okra:**

The crop of okra could be irrigated through sprinkler. Under enough water availability, the sprinkler system should be operated for three hours at ten days interval. Under limited water availability conditions, the system should be operated for three hours at 18 days interval. The sprinklers should be operated at 2.75 kg/cm^2.

Year: 1997

1. **Standardization of fertilizer doses for okra cultivation:**

The okra crop cv. ParbhaniKranti should be fertilized at the rate of 20 t/ha with seasoned press mud 15 days prior to sowing and 75 kg N/ha in three equal splits each at sowing and 30 and 60 days after sowing.

2. **Standardization of fertilizer doses for onion cultivation:**

The maximum production in onion cv. Pusa Red could be obtained throughapplication of 125 kg N/ha in two equal splits. The first half dose of nitrogen (62.5 kg/ha) and full dose of P and K each @ 50 kg/ha should be applied as a basal and the remaining half dose of nitrogen should be applied at 30 days after transplanting.

Year: 1998

1. **Standardization of fertilizer doses for cabbage cultivation:**

The cabbage crop cv. Golden Acre should be fertilized at the rate of 200 kgN/ha in two equal splits. The first half dose of nitrogen (100 kg N/ha) and full dose of K @ 50 kg/ha should be applied as a basal and the remaining 100 kg N/ha should be applied at 30 days after transplanting.

2. **Standardization of fertilizer doses and spacing for capsicumcultivation:**

The crop of capsicum cv. California Wonder should be transplanted at adistance of 45 x 20 cm spacing. The crop should be fertilized at the rate of 120:50:50 kg/ha NPK for higher production. The first half dose of nitrogen (60 kg/ha) should be applied as basal along with P and K each at 50 kg/ha while transplanting and the remaining half does of nitrogen to be applied at 30 days after transplanting.

Year: 1999

1. **PGRs application in capsicum:**

The maximum production in capsicum Cv. California Wonder could be obtained through one spray of NAA-10 ppm at flower initiation stage.

Year: 2000

1. **PGRs application in okra:**

The farmers are advised to spray summer Okra Var. ParbhaniKranti with NAA 75 mg/l at 15 and 30 days after sowing to get higher yield of fruit and seed.

2. **Standardization of fertilizer doses and spacing for bottle gourd cultivation:**

The farmers are advised to sow bottle guard cv. Pusa Naveen at 2.0 X 1.0 mdistance and should be fertilized with 50 kg N, 50 kg P_2O_5 and 50 kg K_2O along with 10 ton FYM per hectare as basal dose followed by 50 kg N/hectare at 30 days after sowing.

Year: 2002

1. **Standardization of fertilizer doses and spacing in water melon:**

The farmers of South Gujarat are advised to sow Watermelon cv. Sugar Baby in single row at 2x1 m distance or in paired row at 3.4 x 1 x 0.6 m distance and fertilize it with 150 kg N, 50 kg P and 50 kg K along with 20 t FYM per hectare.

Year: 2007

1. **Standardization of fertilizer doses for brinjal cultivation:**

It is recommended to the peasantry of South Gujarat area, growing brinjal cv."SuartiRavaiya" during *rabi* season, to fertilize their brinjal plant with the combination of 75 % recommended dose of fertilizer (75:28:28 kg N, P_2O_5, K_2O) along with 20 tones of Press-mud/ ha or 10 tones of Bio-compost/ ha, to obtainhigher yield as well as to improve the soil health.

Year: 2011-12

1. **Effect of land configuration, soil conditioner and fertilizer on greater yam:**

The farmers of south Gujarat heavy rainfall zone, AES-III growing greater yam (*Dioscorea alata*L.) cv. Local Round are advised to plant the crop on ridge furrow of 30 cm height at 90x 90 cm distance and fertilize with FYM @ 20 t/ha along with recommended dose of fertilizer @ 80 : 60 : 80 NPK kg/ha. Full dose of FYM, P_2O_5 and half dose of N and K_2O applied at plating then remaining half dose of N and K_2O should be applied in two equal split at 90 and 135 days after planting for getting higher tuber yield and maximum economic return (1: 2.95).

2. **Organic production of elephant foot yam:**

The farmers whowantto grow elephant foot yam organically are advised to apply either Vermicompost @ 5 t/ha +*Azospirillum* @ 5 kg /ha +*Phosphobacteria* 5 kg/ha +ash @ 5 t/ha or FYM @ 10 t/ha +*Azospirillum* @ 5 kg /ha +*Phosphobacteria* 5 kg/ha + ash @ 5 t/ha).

The farmers of South Gujarat intending to grow elephant foot yam (cv. Gajendra) are advised to apply FYM @ 10 t/ha + 80: 60: 100 NPK kg/ha for getting higher net income of Rs. 2.9 lakh and BCR of 2.9.

3. **Effect of different organic manures on growth, yield and quality of yam:**

The farmers whowantto grow greater yam organically are advised to apply 75% N through vermicompost and 25% N through castor cake for getting netincome of Rs. 1.9 lakh and BCR of 2.4.The farmers of South Gujarat intending to grow greater

yam are advised to apply 80-60-80 kg N-P_2O_5-K_2O/ha. For getting higher netincome of Rs. 2.8 lakh and BCR of 2.8.

Year: 2012-13

1. **Effect of different organic manures on growth, yield and quality of organically grown turmeric (*Curcuma longa*):**

The farmers of South Gujarat heavy rainfall zone AES III growing turmeric variety Sugandhum are advised to apply bio compost (1.8% N) or vermi compost (1.2% N) + neem cake (5.1% N) in equal proportion to supply N @ 60 kg/ha for achieving higher rhizome yield with superior quality of turmeric as well as net income. Application of manure in this manner also improves the soil health.

Year: 2013-14

1. **Effect of plant density and sett size on growth and dry matter partitioning of elephant foot yam:**

The farmers of south Gujarat heavy rainfall agro-climatic zone growing elephant foot yam cv. Gajendra are advised to plant elephant foot yam at the distance of 60 cm × 60 cm by using seed corm sett of 250 g weight for obtaining higher BCR. By this way, farmers can obtain higher yield and save the cost of seed corm.

Yield from 250 g seed corm sett

Yield from control sett

2. **Effect of banana pseudostemsap and vermiwashspray on organically grown onion:**

The farmers of South Gujarat heavy rainfall zone (AES III) those whowantsto grow onion cv.Pilipati are advised to apply 125 kg N/ha through 2.4 t/ha biocompost, 0.9 t/ha castor cake and 3.2 t/ha vermicompost in equalproportion of nitrogen along with foliar spray of enrich banana pseudo stem @ 2% spray or 2% spray of banana pseudo stem and enrich banana pseudo stem in the 1:2 ratio to get high net return. Organic manures should be apply at the time of transplanting and one month after transplanting whereas, the liquid manures should be apply at 15 days intervalstartingfrom 15 days after transplanting *i.e.* 15, 30 and 45 days after transplanting.

3. **Feasibility of organicfarming in tomato cv. Junagadh Tomato -3:**

The farmers of South Gujarat heavy rainfall zone (AES III) those whowantto grow organic tomato cv.Junagadh Tomato at 60 cm x 60 cm spacing are advised to apply 75 kg N/ha through 2.1 t/ha biocompost (50%N) + 0.9 t/ha castor cake (50%) or 4.6 t/ha vermicompost (75% N) + 0.4 t/ha neemcack (25% N) in two splits (at the time of transplanting and one month after transplanting) to get higher yield and net profit. Common dose of *Azotobacter*biofertilizers @ 2 kg/ha with organic manures at the time of transplanting. To prevent the pest and disease infestation, foliar spray of vermiwash @ 0.5% and cow urine@ 1% at monthly interval after transplanting is beneficial.

Year: 2014-15

1. Integrated Nutrient Management in Little gourd:

The farmers of South Gujarat heavy rainfall zone AES III cultivating little gourd cv. GNLG-1 are advised to follow INM to fertilize the crop as per the schedule given below to get higher better quality fruits and net realization.

Basal dose: Apply 10 t/ha well decomposed FYM, 25 kgN/ha through Bio compost on equivalent N basis along with 50 kg/ha each of P and K by chemical fertilizer.

Top dressing: Apply 25 kg N/ha in two splits through chemical fertilizer at 30 and 60 days after Planting

Note: 1. In subsequent years, apply fertilizer as above schedule.

2. Pruning should be done in month of December.

2. Effect of different organics on growth and yield of brinjal cv. *SurtiRavaiya*(pink):

The farmers of South Gujarat heavy rainfall zone AES III intended to grow brinjal variety SurtiRavaiya (Pink) organically are advised to apply castor cake (4.5 % N ; dry weight basis) in two equal proportion to supply N @ 100 kg/ha for achieving higher yield and net income as well as to improve the soil health.

Apply 4.5 t/ha castor cake in two equal splits at the time of transplanting and one month after transplanting.

Note :

– *Trichodermaviride*should be applied at the rate of 5 kg/ha at the time of transplanting.

– Maize should be grown as trap crop on the border.

– Sticky trap should be used @ 40/ha.

– Tricho card should be used @ 5/ha.

After transplanting apply foliar spray of neem based pesticide and cow urine at monthly intervals.

3. Response of seed sowing on germination, growth, flowering and yield of Spine gourd (*Momordicadioica*Linn.) cv. Local:

The farmers of South Gujarat heavy rainfall zone AES-III interested to grow spine gourd cv. Local through seed are advised to sow five seeds per dibble on raised bed in last week of March and mulch with paddy straw for higher fruit yield.

4. Performance of greater yam (*Dioscorea alata* L.) under different stacking systems:

The farmers of south Gujarat heavy rainfall zone AES III growing greater yam cv. Local Round are advised to plant greater yam at the distance of 90 cm × 90 cm with elephant foot yam cv. Local as a live stacking crop in-between two rows of greater yam at a distance of 90 cm × 90 cm and train the vines of greater yam on the plants of elephant foot yam with application of 15 tonne of FYM and 120:90:120 kg NPK/ha to obtain higher yield and net return.

5. **Effect of rates of castor cake and Banana Pseudostem sap on yield and quality of organically grown Garlic (*Allium sativum*L.):**

The farmers of South Gujarat heavy rainfall zone AES III growing garlic organically are advised to apply recommended 100 kg N/ha through organic manures as per schedule given below to get higher yield and net profit.

• Apply 1.4 t/ha biocompost and 3.3 t/ha vermicompost at the time of sowing and 0.7 t/ha castor cake one month after sowing.

• Apply 2000 lit/ha banana pseudostem sap at 35 and 55 days after sowing

Note:

• Apply common dose of *Azotobacter*biofertilizer @ 2 kg/ha.

• After sowing, apply foliar spray of neem based insecticide and cow urine at monthly interval.

• Maize should be grown as trap crop at the border.

• Sticky trap should be used @ 40/ha.

Year: 2015-16

1. **Standardization of fertigation and methods of training in cucumber under naturally ventilated poly house:**

Train plants to single stem system. Fertigate the crop with 9.0:7.5:7.5 kg NPK along with application of 0.5 kg *Trichodermaviride*, 0.5 litre*Pseudomonasfluorescens*, 2 t FYM or 0.4 t vermicompost and 5.0 kg micro-nutrient (Grade-5) at the time of sowing for higher net returns.

2. **Site specific nutrient management study of Elephant foot Yam**

The soil having deficient N and sufficient P and K then apply 100: 45: 75 NPK kg/ha in two splits. First dose of 50: 45: 37.5 NPK kg/ha at 45 days after planting. Second dose of 50: 00: 37.5 NPK kg/ha one month after application of first dose.

Year: 2016-17

1. Effect of rhizome size on growth and yield of turmeric cv. GNT-1.

The farmers of south Gujarat heavy rainfall zone are advised to plant mother rhizome pieces (10-15 g) of turmeric cv. GNT-1 in pro tray and transplant it after one month in field with minimum quantity of seed rhizomes.

2. Standardization of fertigation and methods of training in capsicum under naturally ventilated polyhouse.

Farmers cultivating capsicum in naturally ventilated polyhouse (1000 m^2 area) are advised to fertigate the crop with 25: 25: 25 kg NPK along with application of 0.5 kg*Trichodermaviride*, Phosphorous Solubilizing Bacteria (*Bacillus megaterium*), Azotobactor, *Pseudomonas fluorescens*each, 0.4 t vermicompost and 5.0 kg micro-nutrients (Grade-5) at the time of planting and train plants to four shoot system for higher net returns.

Year: 2017-18

1. Integrated Nutrient Management in cauliflower (*Brassica oleracea* var. botrytis):

The farmers of South Gujarat Agro climatic Zone-I growing cauliflower are advised to apply 20 kg N + 40 kg P_2O_5 along with 20 t/ha FYM and 5.70 t/ha Bio compost as basal doze. The 20 kg Nitrogen should be applied 30 DAT as top dressing to get higher yield and return.

2. Response of okra to foliar application of Silicon

The farmers of South Gujarat growing summer okra are advised to spray silicon based liquid fertilizer @ 2ml /l (silicon: 0.79% w/v + boron :0.18% w/v- OSAB – Si^+) at 30,45 and 60 DAS to obtain higher yield and net income.

Effect of Foliar application of silicon on okra.

3. Performance of grafted vs. non-grafted brinjal during rainy season under South Gujarat conditions

The farmers of South Gujarat Heavy Rainfall Zone-I (AES-III) are advice to adopt grafting technique using wild species (*Solanumtorvum*) as rootstock and pink and purple *SuratiRavaiya*brinjal as scion for better plant survival during rainy season, better fruit set, comparatively less shoot and fruit borer infestation, extended life span, higher yield and net returns.

4. Comparative performance of different parthenocarpic cultivars of cucumber through vegetative propagation under polyhouse conditions.

Farmers cultivating parthenocarpic cucumber varieties in greenhouse are advised to use newly pruned side shoots of current crop as propagating material for raising of successive crop without paying high price for seedwhich performs equally well to the crop raised from seeds and concurrently, excessive plants generated from pruned side shoots can be sold for additional income.




Year: 2019-20

1. **Effect of different sources of nutrients and fertigation levels on yield and other horticultural traits in tomato under protected culture**

Farmers cultivating tomato in naturally ventilated polyhouse (1000 m^2) are advised to fertigate the crop with 25: 12.50: 12.50 kg NPK (As per the schedule given in table below) through water soluble fertilizers along with application of 0.5 kg *Trichoderma viride* and *Pseudomonas fluorescens* each, 0.5 L Phosphorous Solubilizing Bacteria (*Bacillus megaterium*) & potash mobilizer- *Frateuria aurantia* each, 2 t FYM and 5.0 kg micro-nutrients (Grade V) at the time of transplanting for higher yield as well as net returns.

2. **Feasibility of tomato cultivation through grafting during rainy season**

The farmers of South Gujarat Heavy Rainfall Zone-I are advised to adopt interspecific grafting of tomato with *Solanum torvum* for better plant survival during rainy season, extended life span, more number of fruits, comparatively less leaf curl

infection, white fly, leaf miner, fruit borer infestation, higher yield and net returns

3. Artificial oscillation for increasing fruit set and performance of tomato in polyhouse under South Gujarat conditions

Farmers cultivating tomato in naturally ventilated polyhouse are advised to vibrate tomato truss with electric pollinator on every 3rd day starting from the day of first flowering for 10 seconds during morning hours between 7.30 am to 9.00 am for better fruit set, higher yield and net returns.

4. Integrated Nutrient Management in cabbage(*Brassica oleracea* var. *capitata*)

The cabbage growing farmers of south Gujarat are advised to grow cabbage under INM system and fertilize their crop with combination of 50% recommended dose of nitrogen (200:00:37.5 NPK kg/ha) along with Bio compost (Nitrogen based) to obtain higher yield and income. Entire quantity of Bio compost and potash as well as half quantity of nitrogen should be applied as basal. Remaining half dose of nitrogen should be applied as top dressing in two equal splits *viz.*, 30and 45 DATP.

5. Validation of organic farming technologies in elephant foot yam

The farmers of South Gujarat Heavy Rainfall Zone, intending to grow elephant foot yam cv. Gajendra organically are recommended to use organic treatment as per below mentioned management:

• Raise green manure of cowpea with 20 kg ha^{-1} seed rate and incorporate it at 45-60 days before planting of elephant foot yam.

• Take organically produced planting material of 500 g weight and treat it with bucket full of cow dung slurry containing 1- 2 kg neem cake and *Trichodermaharzianum* (5 g per kg seed corm) and then dry under shade before planting.

• At the time of planting, apply FYM :neem cake mixture (in 10:1 ratio) @ 36 t ha^{-1} incorporated with *Trichodermaharzianum* @ 2.5 kg per tonne of FYM neem cake mixture along with neem

cake @ 1 t ha-1 in pits.

• Raise green manure cowpea again with 20 kg ha^{-1} seed rate in-between fallow space of elephant foot yam plants and incorporate at 45-60 days in pits along with 3 t ha^{-1} of ash.

Year: 2020-21

1. **Artificial oscillation for increasing fruit set and performance of tomato in polyhouse under South Gujarat conditions**

Farmers cultivating tomato in naturally ventilated polyhouse are recommended to vibrate tomato truss with electric pollinator on every 3rd day starting from the day of first flowering for 10 seconds during morning hours between 7.30 am to 9.00 am for better fruit set, higher yield and net returns.

2. **Standardize the fertilizer dose of drumstick (*Moringa spp*.)**

The farmers of south Gujarat agro climatic zone growing drumstick are recommended to apply 100-75-50 g NKP (217.3 g NCU - 468.7 g SSP - 83.3 g MOP) per tree to obtain higher yield and income. Nitrogen (Neem Coated Urea) apply in four equal splits, first apply at pit preparation (common application of 8 kg FYM enrich with (*Azotobactor*+ *PSB*+ *KMB* (each @ 2ml) in a pit), along with half dose phosphorus (Single Super Phosphate) and potash (Muriate of Potash), second fertilizer application after 30 days after planting; third split application was given after six month interval after pruning along with half dose of phosphorus and potash and fourth split application was given 30 days after pruning.

Application time	Fertilizer	Quantity
First	25 g N_2 37.5 g P_2O_5 25 g K_2O	54.30 g NCU+ 234.35 g SSP + 41.65 g MOP
Second	25 g N_2	54.30 g NCU
Third	25 g N_2 37.5 g P_2O_5 25 g K_2O	54.30 g NCU+ 234.35 g SSP + 41.65 g MOP
Forth	25 g N_2	54.30 g NCU

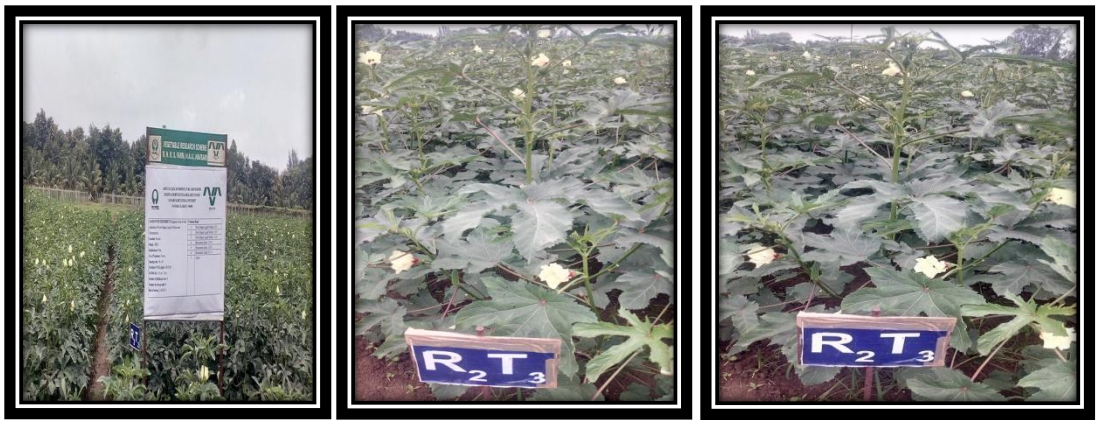
Note: Common application of 8 kg FYM enrich with (*Azotobactor*+ *PSB*+ *KMB* (each @ 2ml) in a pit

3. **Effect of IBA and number of nodes on stem cutting on propagation of little gourd**

The farmers/nurserymen of south Gujarat agro climatic zone are recommended to multiplication of little gourd are recommendation to select one year old little gourd vine cutting with two nodes dipped in 80mg/l IBA solution for 30 minute and put in growing media Soil: FYM: Sand (1:1:1) increases sprouting percentage, vine length, vine diameter, root length, root diameters and survival percentage of little gourd cutting.

4. **Response of okra to foliar application of Novel Organic Liquid Nutrients and Micronutrients**

The okra growing farmers of South Gujarat Agro-Climatic Zone are recommended for foliar application of 1.5 % Novel Organic Liquid Nutrients at 30, 45 & 60 DAS to obtained higher yield of okra.



Year: 2021-22

1. Response of okra to foliar application of Novel Organic Liquid Nutrients and Micronutirents

Farmers of south Gujarat growing *kharif* okra are recommended to apply foliar spray of 1.5 % (150ml/10 litre water) Novel Organic Liquid Nutrients at 30, 45 and 60 DAS along with recommended dose of fertilizer (100-50-50 N-P-K kg/ha) to obtain higher yield and net return.

2. Effect of sowing dates and spacing on off season okra

Farmers of south Gujarat are recommended to cultivate off season okra by sowing in 2nd week of October with spacing of 45 cm x 10 cm to obtain higher profit.

3. Effects of boron and molybdenum on nodulation, growth and yield of cowpea (*Vigna unguiculata*L. Walp.).

Farmers of south Gujarat growing summer cowpea are recommended to give seed treatment of molybdenum @ 2mg/l (Ammonium molybdate @2.40 mg/l) for 24 hours prior to sowing followed by foliar spray of boron @ 4mg/l (Boric acid @ 22.88 mg/l)at 30, 45 and 60 DAS to obtain higher pod yield. Moreover, seed treatment of molybdenum @ 4 mg/l increases nodulation.




For Scientific Community

Year: 2016-17

1. **Evaluation of parthenocarpic cultivars of cucumber under protectedconditions for yield and other horticultural traits:**

   Greenhouse cucumber cultivars Oscar and Valleystar were identified as the highest yielders under naturally ventilated polyhouse, which were at par in performance with cvs. RS 03602833, Kian and Multistar. Evaluation of cucumber cultivars for various sensory parameters by heterogeneous panel of evaluators revealed highest overall score in cv. Multistar statistically at par with KUK-9 and 52-23.

2. **Evaluation of tomato cultivars under NVPH for yield and other horticultural traits.**

   Cultivar Bargad was identified as significantly highest yielder with maximum net realization in naturally ventilated polyhouse. Higher number of fruits per plant and minimum occurrence of blossom end rot were observed as major contributing traits towards yield.

Year: 2019-20

1. **Effect of different light sources on growth and quality of microgreens.**

   - Based on the performance of different microgreens for growth parameters like days to first harvest, leaf area (cm^2), fresh weight and quality parameters *viz*., ascorbic acid, *β*-carotene, N, P, K, Ca content, total antioxidant activity and overall acceptability under different light sources, electroluminescent light is recommended for growing microgreens inside growing chamber/chamber/room.
   - Fenugreek microgreens displayed significantly maximum ascorbic acid, N, Ca content; while beet root and red cabbage revealed maximum *β*-carotene, K content and antioxidant activity. Based on sensory evaluation, highest score for overall acceptability was obtained by Amaranth microgreens, which was followed by beet root and red cabbage microgreens.

2. Integrated weed management in elephant foot yam

The farmers of south Gujarat Heavy Rainfall Zone, growing elephant foot yam cv. Gajendra are advised to spray post emergence herbicide- Glyphosate 41 % S. L. 1 kg a.i./ha at 30, 60 and 90 DAP in-between row space for better weed management with higher net profit and BCR.

Production of planting material (2022-23)

Year: 2022-23
:Seed:
Brinjal: GNRB-1 (2.5 kg)
Tomato: GT-7 (5.5 kg)
:Planting material:
EFY: Gajendra (0.015 tonnes)
Sweet potato: 5050 -vine cuttings (C-71) and 1500- vine cuttings (Bhu Kanti)
Greater yam: 0.375- tonnes (Hemlata)
Tannia: 52 kg (Local)
Little gourd: GNLG-1 (2903 plants)
Pointed gourd: GNPG-1 (602: 39 Female Plants: Male Plants)

EXTENSION SERVICES

- Participation of faculty in *Krushi Mahotsava* Programme of GoG
- Participation in *Krishi Mahotsava*- a flagship programme of GoG.
- Diagnostic visits at farmers' fields.
- Organizing vegetable exhibition-cum-competition, Farmers' training, *shibir* etc.
- Dissemination of technology through publications.
- TV telecast and radio talks on various aspects of vegetable crops.
- "*Mera Gaon Mera Gaurav*" programme related activities.

TRANSFER OF TECHNOLOGY (ToT)

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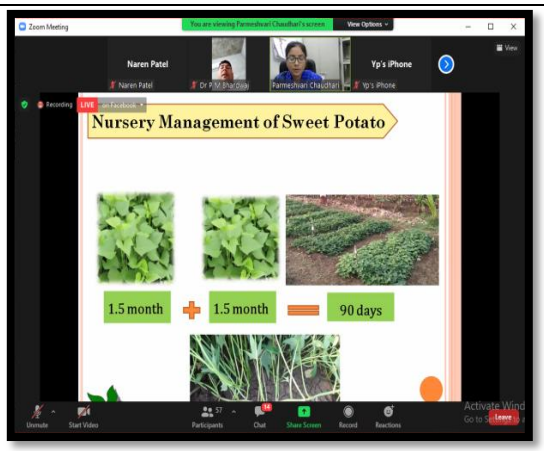
<td> 
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<td>Given lecture in three Days online workshop on Horticulture Nurseries: Scope and Technology during 31/05/2022 to 02/06/2022 on the topic of “Tuber Crop Nursery”</td>
<td>Sweet Potato Pak Parisanvadorganized on 1/10/2022 and distributed the ‘C-71’ sweet potato vine cuttings (150 vine cuttings) to the each farmers. Total 146 participants were present among which 78 farmers (61 men and 17 women), 40 students and other staff members.</td>
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<td>Given Phone in Live Programme from Krishidarshan-Doordarshan-DD Girnar channel on 18/11/2022 on the topic of “Kandmulpaakomaavashyakkhetikaryo” also uploaded on YouTube channel of DD Girnar.</td>
<td>Information given to the 32 students of 6th semester of Sheth B. R. Polytechnic in Horticulture, Sardarkrushinagar, Dantiwada Agricultural University, Jagudan on Tuber Crops on 20/3/2023.</td>
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<td>One day training cum value addition programme& kit distribution to SC Farmers on 12/10/2022</td>
<td>One day training cum value addition programme& kit distribution to SC Farmers on 23/03/2023</td>
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Infrastructure Available

Department

- Well equipped laboratories (2).
  1) Leaf Area Meter-1
  2) Hot Air Oven-2
  3) Fruit Firmness Tester-1
  4) pH tester (Portable)-1
  5) EC Meter-1
  6) Pyranometer-1
  7) Temperature & Humidity Data Logger-2
  8) Digital Vernier Caliper-2
  9) BOD Incubator-1
  10) Electronic Microscope-10
- Canon copier.
- Wi-Fi facility.
- Naturally Ventilated Polyhouse and Net House for EPL activities.

Farm

- Experimental Area: 5.0 ha
- Naturally Ventilated Polyhouses: 03 (Departmental Research)
- Naturally Ventilated Polyhouse: 01 (ELP Activity)
- Net House: 01 (ELP Activity)
- Tuber storage Godown: 01
- Borewell: 01

Dignitaries Visit: Glimpses

Farm visit by Hon'ble Vice Chancellor Dr.Z. P. Patel Sir

Farm visit by Dr. Alka Singh, Principal & Dean, ACH, NAU, Navsari