



**NAVSARI AGRICULTURAL UNIVERSITY**  
Eru Char Rasta, Navsari- 396450  
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**DIRECTORATE OF RESEARCH**  
**NAVSARI AGRICULTURAL UNIVERSITY**  
**NAVSARI - 396 450 (GUJARAT)**

# RESEARCH ACCOMPLISHMENTS AND RECOMMENDATIONS - 2017





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## MESSAGE

Navsari Agricultural University was established on 1st May, 2004 and since then it has been imparting tripartite activities *viz.* education, research and extension in agricultural and allied science. As per the mandate of SAUs, the university undertakes research based on the feedback from farmers of seven districts of South Gujarat. To support research, NAU has strong research setup in terms of 25 research stations/ centres at 15 locations of South Gujarat. Further, NAU has constituted 10 Research Sub-Committees to review, monitor and supervise research work annually and thereafter, approved research outline and progress is scrutinized at state level amongst the experts of all 4 SAUs before taking recommendations/ technologies for benefitting farmers.

I am delighted to note that the University is going to publish “Research Accomplishments and Recommendations-2017” to put forth the informative publication containing need based recommendations/ technologies developed by scientists of different sub-committees for the farming community as well as scientific community. I appreciate the efforts of scientists of NAU, Navsari and congratulate them for bringing useful recommendations for benefitting farming community.

I heartily congratulate Dr. S. R. Chaudhary, I/C Director of Research and Dean P.G. Studies, N.A.U., Navsari and his team for nicely compiling and publishing this booklet.



**(C. J. Dangaria)**  
Vice- Chancellor  
Navsari



## FOREWORD

It is a matter of great pleasure for me to put forth the “Research Accomplishments and Recommendations-2017”. It contains information on new technologies developed by the scientists of various Research Sub-Committees of Navsari Agricultural University for benefit of farming as well as scientific community. These all technologies were critically discussed and approved in the 13<sup>th</sup> Combined Joint AGRESCO meeting held at Sardar Krushinagar Dantiwada Agricultural University, Dantiwada during 05-07 April, 2017. I am sure that this booklet will help to boost the progress in agriculture and allied sector.

I congratulate all the scientists who directly or indirectly contributed in developing of new technologies for the benefit of farming and scientific community. I am also thankful to all the conveners of various sub-committees of Agricultural Research Council of Navsari Agricultural University.

I am highly indebted to Dr. C. J. Dangaria, Hon'ble Vice Chancellor of Navsari Agricultural University, Navsari for his constant guidance and useful inputs in improving the research outcome of NAU. I am also thankful to all technical staff of Directorate of Research for compilation of farmer centric booklet.



**(S. R. Chaudhary)**  
**Director of Research &**  
**Dean Faculty of P.G. Studies, Navsari**

# Research Resume

The research work carried out in different fields of agricultural sciences during the year 2016-17 has been very well discussed by different AGRESCO sub-committees of Navsari Agricultural University, Navsari for bringing out useful and beneficial recommendations for farmers and scientific community. Finally, 54 and 41 recommendations for farmers and scientific communities, respectively were approved in the 13<sup>th</sup> Combined Joint AGRESCO meeting of SAUs and Kamdhenu University held at SDAU, Saradar Krushi Nagar during on 05-07 April, 2017.

In the Crop Improvement group, total 9 high yielding varieties/hybrids were identified for release from NAU including 4 from cotton, 1 each from rice, sugarcane, indian bean, mung bean and sweet potato (endorsement).

Location specific and economically viable production technologies were recommended by NRM group that covered various aspects like high density planting, intercropping, cultural practices, nutrient management and micro irrigation in different crops.

In the pursuit of increasing fruits, vegetables, flower and forest tree production, recommendations emerged out were nutrients management, propagation technique, fertigation method, effect of bio fertilizers, value addition of different products, intercropping, drying techniques of flower in the horticulture & forestry group.

The achievements of plant protection group include control of disease and pest, bio efficacy and residue analysis of different pesticides etc.

Design for development of box for packaging of mango, preparation of banana powder, dehydration of chili etc. has been recommended by argil. eng. group of NAU for the benefit of farmers.

Clinical studies on neurological disorders in canines, development of burfi utilizing watermelon, effect of fenugreek supplementation on milk yield and strategies to mitigate the impact of climate change have been recommended by animal production and fisheries / animal health group for achieving better growth and more economical returns.

The details of different sub-committees, conveners, date of meeting held and number of approved recommendations for farmers and scientific communities are as under.

Sr. No.	Name of the Sub-Committees	Name of Convener	date of meeting	No. of Recommendations	
				Farmers	Scientific community
1.	Crop Improvement	Dr. B. G. Solanki	15-16/03/2017	9	0
2.	Natural Resource Management	Dr. V. P. Usdadiya	01-02/03/2017	19	5
3.	Plant Protection	Dr. S. P. Saxena	09-10/02/2017	6	19
4.	Horticulture	Dr. D. K. Sharma	20-21/02/2017	8	3
5.	Forestry	Dr. Manmohan J. R. Dobriyal	23/02/2017	4	2
6.	Agri. Engineering	Dr. S. H. Sengar	03/02/2017	4	2
7.	Basic Science	Dr. H. D. Bhimani	31/01/2017	0	7
8.	Social Science	Dr. J. J. Makadia	13/02/2017	0	0
9.	Animal Production and Fisheries Science	Dr. Sandhya S. Chaudhary	23/01/2017	3	2
10.	Animal Health	Dr. V. S. Dabas	24/01/2017	1	1
11.	Joint AGRESCO		22/03/2017	-	-
12.	Combined Joint AGRESCO		05-07/04/2017	-	-
<b>Total</b>				<b>54</b>	<b>41</b>

# Recommendations for Farmers

## CROP IMPROVEMENT

### 1. Cotton: Gujarat Navsari Cotton -26 (G.N.Cot.-26)

The Hirsutum cotton genotype G.N.Cot.-26 (GBHV-170) had recorded 1640 kg/ha seed cotton yield, which was 22.4 and 40.2 % higher than G.Cot.16 and NH 615, respectively in rainfed condition. It was found resistant to Bacterial Leaf Blight. This genotype recorded lower population of sucking pests as well as bollworm. It is recommended for cultivation in rainfed areas of South Gujarat.



(Research Scientist (Cotton), MCRS, NAU, Surat)

### 2. Cotton : Gujarat Navsari Cotton -29 (G.N.Cot.-29)

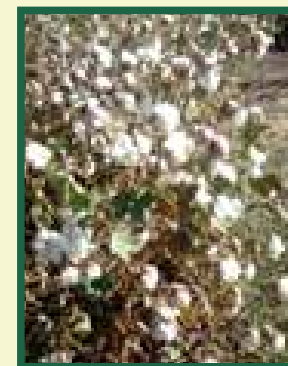
The Arboreum cotton variety variety G.N.Cot.-29 (GBav-106) had recorded 1493 kg/ha seed cotton yield, which was 16.2 % higher than G.Cot.-19 under rainfed condition. It had below ETL population of sucking pests. It is recommended for cultivation in rainfed area of South Gujarat.



(Research Scientist (Cotton), MCRS, NAU, Surat)

### 3. Cotton : Gujarat Navsari Cotton -32 (G.N.Cot.-32)

The Hirsutum cotton genotype G.N.Cot.-32 (GISV-267) recorded 2201 kg/ha seed cotton yield, which was 104.0, 33.6, 19.9, 23.7, 25.8 and 40.7 % higher than G.Cot.-10, G.Cot.-16, G.Cot.-18, G.Cot.-20, G.N.Cot.-22 and LRA-5166, respectively under irrigated condition. It possesses higher boll weight (4.7 g) compared to checks. It was found moderately resistant for Bacterial Leaf Blight and had lower population of sucking pests as well as bollworms. It is recommended for cultivation in irrigated areas of Gujarat.



(Research Scientist (Cotton), MCRS, NAU, Surat)

#### 4. Cotton : Gujarat Navsari Cotton Hybrid -18 (G.N.Cot.Hy-18)

The Hirsutum hybrid G.N.Cot.Hy-18 (GSHH-2759) recorded 2355 kg/ha seed cotton yield, which was 22.3, 24.4 and 15.2 % higher than checks G.Cot.Hy-10, G.Cot.Hy-12 and G.N.Cot.Hy-14, respectively under irrigated conditions across South Gujarat Zone-II and North Gujarat Zone-IV. It is resistant to the Bacterial Leaf Blight. Sucking pests infestation and damage to open boll and locule damage by bollworms complex was found below ETL. It is recommended for irrigated areas of South and North Gujarat.



(Research Scientist (Cotton), MCRS, NAU, Surat)

#### 5. Rice: Gujarat Navsari Rice -7 (GNR-7)

The rice culture, NVSR-6128 (5740 kg/ha) performed very well in South Gujarat where it exhibited overall 13.0 %, 22.8 % and 12.4 % grain yield superiority with easy threshability over the checks GNR-2, GR-11 and GAR-13, respectively. It has short slender grain, high productive tillers and number of grains per panicle with good quality characters. NVSR-6128 is moderately resistant against bacterial leaf blight, grain discoloration and sheath rot. It showed tolerant to pest like BPH and moderate resistance against stem borer, leaf folder and sheath mite. Rice variety NVSR-6128 (GNR-7) recommended for normal rice growing areas of South Gujarat.



(Assoc. Res. Scientist, MRRS, NAU, Navsari)

#### 6. Sugarcane: Gujarat Navsari Sugarcane-10 (GNS-10)

Sugarcane variety GNS -10 had average yield 143.17 t/ha which was 24.29 %, 30.31 % and 13.03 % higher than Co 86032, CoN 04131 and CoN 05071, respectively. Average sugar yield in this variety is 18.36 t/ha which is 22.02 %, 38.13 % and 28.11 % higher than Co 86032, CoN 04131 and CoN 05071, respectively. GNS -10 was non lodging and non-flowering cane. Sugarcane variety (CoN 13073) GNS-10 recommended for sugarcane growing areas of South Gujarat.



(Research scientist, MSRS, NAU, Navsari)

## 7. Indian bean: Gujarat Navsari Indian Bean-22 (GNIB-22)

Indian bean culture NIBD-14-01 (4507 kg/ha) exhibited 39.4 % and 6.9 % higher green pod yield over check varieties, GNIB-21 and GP-1, respectively. The proposed variety was found to have good quality for marketable as well as cooking traits. It has higher sugar and higher test weight against GNIB-21. The proposed culture is recommended for late kharif & late rabi season in South Gujarat.



(Assoc.Res.Sci., P&CRS, NAU, Navsari)

## 8. Mung bean: Gujarat Navsari Mungbean-6 (GNM-6)

The performance of Mung bean culture NMK-15-12 (971 kg/ha) in overall kharif and summer seasons trials in whole Gujarat was found promising where it had recorded 11.1 %, 11.7 % and 13.7 % increase over in yield against check varieties Meha, GM-4 and GAM-5, respectively. The proposed variety is bold seeded and found to have good quality for marketable as well as cooking traits. It had also exhibited resistance against MYMV disease. It is recommended for cultivation in kharif and summer seasons in Gujarat.



(Assoc.Res.Sci., P&CRS, NAU, Navsari)

## 9. Sweet Potato: Bhukanti (Endorsement)

Sweet potato variety Bhukanti had recorded 23.32 t/ha tuber yield which was 95.64 and 83.97 % higher than national check Gouri and Local check, respectively. This clone is rich in  $\beta$ -carotene content compared to national check Gouri and Local check. Infection of Major diseases of Sweet potato was not observed. This clone may be useful as combating food in nutritional crises for backward areas. The variety Bhukanti is recommended for cultivation for the farmers of Gujarat region as “Bhukanti”.



(Professor, Vegetable Sci., ACHF, NAU, Navsari)



## 1. Evaluating effect of banana pseudostem enriched sap (Foliar Spray) on hirsutum cotton

The farmers of South Gujarat heavy rainfall zone and South Gujarat, growing Bt. Cotton are recommended to apply 240 N kg/ha along with either foliar spray of banana pseudostem enriched sap @ 1.0 % concentration or  $\text{KNO}_3$  @ 3% for getting higher seed cotton yield and net returns. They should follow the following schedule of sprays:

- ↪ First at peak squaring
- ↪ Second at 20 days after first spray (Flower opening)
- ↪ Third at 20 days after 2nd spray (at boll formation) stages



(Research Scientist, SWMRU, NAU, Navsari)

## 2. Effect of different colour shade nets on biomass yield and quality of fenugreek, coriander and garlic

The farmers of South Gujarat heavy rainfall zone growing garlic, fenugreek and coriander for leafy vegetable purpose during summer season (April to May) under shade net house are advised to prefer red or green-black shade nets having 50% shading for getting higher fresh biomass yield and net return.



(Research Scientist, SWMRU, NAU, Navsari)

## 3. Comparative study of different sleeving materials in banana

The drip irrigated banana growing farmers of South Gujarat heavy rainfall zone are advised to cover their fully emerged fruit bunch with either 16 micron plastics (transparent or blue plastic) or PP non-woven film to minimize bacteria and fungus for better quality of fruits.



(Research Scientist, SWMRU, NAU, Navsari)

#### 4. Effect of irrigation and variety on fodder sugar beet grown under coastal salt affected soils

The farmers of coastal salt affected areas of South Gujarat heavy rainfall zone are advised to grow fodder sugar beet *var.* JK Kuber (paired row: 20 cm x 40 cm (2 row) x 60 cm, bed width: 60 cm, furrow top width: 40 cm) during rabi season and apply 13 irrigations in which first irrigation just after sowing, second irrigation at 10 DAS and remaining 11 irrigations at an interval of 10 to 12 days. By adopting these practices, farmers can get higher fresh biomass yield and net returns.



(Research Scientist, SWMRU, NAU, Navsari)

#### 5. Evaluation of rice based crop sequence under aerobic and transplanted method of cultivation in South Gujarat condition

The rice growing farmers of South Gujarat heavy rainfall zone are advised to adopt transplanting method for variety GNR 3. They also advised to grow greengram (CO 4) in rabi season for getting higher net returns in rice based crop sequence.



(Research Scientist, SWMRU, NAU, Navsari)

#### 6. Effect of Fe on rice varieties under South Gujarat conditions

The transplanted rice growing farmers of South Gujarat heavy rainfall zone are advised to grow iron rich variety GNR-4, which gives higher yield and net return. Further they are advised to spray 1% banana pseudostem enriched sap at tillering for increasing iron content in rice grain of variety GNR-4 and GAR-13 through bio fortification of iron.



(Research Scientist, SWMRU, NAU, Navsari)

#### 7. Spacing and nutrient management for pigeon pea cv. GT-102 during rabi season

Farmers of south Gujarat heavy rainfall zone, growing pigeon pea (GT 102) during rabi season are advised to sow the crop at 60 x 20 cm spacing and apply 10 t/ha FYM along with recommended dose of fertilizers i.e. 25:50:00 kg N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O/ha as basal for getting higher yield and net return.



(Associate Research Scientist, P&CRS, NAU, Navsari)

### 8. Evaluation of drip fertigation on rabi castor productivity

Farmers of south Gujarat heavy rainfall zone growing irrigated castor during rabi season are advised apply irrigation through drip system at 0.8 Epan and 75% RDN (90:25 kg N:P<sub>2</sub>O<sub>5</sub>/ha) fertilizer. They should apply full dose of phosphorus (25 kg P<sub>2</sub>O<sub>5</sub>/ha) and 30 kg/ha nitrogen as basal and remaining dose of nitrogen through fertigation in 5 equal splits (12 kg nitrogen /ha) at an interval of 9 days starting from 30 days after sowing for getting higher seed yield and net return with gives 25 per cent saving of nitrogen.



#### Details of drip system

1	Lateral spacing	:	1.2 m
2	Dripper spacing	:	0.6 m
3	Dripper discharge	:	4 liter per hour
4	Operating pressure	:	1.2 kg/cm <sup>2</sup>
5	Operating frequency	:	3 days interval
6	Operating time	:	Oct. to Feb.- 1.40 hr and Mar. to April.- 2.0 hr.

(Associate Research Scientist, P&CRS, NAU, Navsari)

### 9. Response of different varieties of finger millet (Nagli) to integrated nutrient management under rainfed condition

The farmers of South Gujarat heavy rain fall zone growing finger millet variety GN 5 during kharif season are recommended to fertilize the crop with 75% RDF (30:15:00 kg NPK/ha) and vermicompost 2 t/ha for getting higher yield and net return.



(Associate Research Scientist, HMRS, NAU, Waghai)

### 10. Response of little millet (Vari) to nitrogen and phosphorus levels under rainfed condition

The farmers of South Gujarat heavy rain fall zone growing little millet (GV 2) during kharif season are advised to grow the crop with application of 20 kg N/ha and 20 kg P<sub>2</sub>O<sub>5</sub>/ha for getting higher yield and net income.



(Associate Research Scientist, HMRS, NAU, Waghai)

## 11. Refinement of sowing dates for kharif grain sorghum varieties/ promising lines under changing climate of South Gujarat



The farmers of South Gujarat Zone are advised to sow sorghum during onset of monsoon or within 15 days after onset of monsoon for getting higher yield and net return which also avoid the incidence of shoot fly and stem borer.

(Research Scientist, MSRS, NAU, Surat)

## 12. Real time nitrogen management through leaf colour chart in rice cultivar

The farmers South Gujarat heavy rainfall zone are advised to fertilize the rice crop with 100 kg N/ha along with 30 kg P<sub>2</sub>O<sub>5</sub>/ha + 5 t biocompost as per the leaf colour chart panel number four (2/5 N basal + other two doses through leaf colour chart) for getting higher yield and net return.



(Professor & Head, Dept. of Agronomy, NMCA, NAU, Navsari)

## 13. Impact of different summer green manures on succeeding kharif paddy under integrated nutrient management

The farmers of South Gujarat heavy rainfall zone growing kharif transplanted paddy are advised to adopt practice of preceding green manuring with dhaincha (fertilized 20:40:00 kg NPK/ha) and apply 75% RDF (75:22.5:00 kg NPK /ha) for succeeding paddy crop for getting higher yield and net return which can save 25 % fertilizer.



(Professor & Head, Dept. of Agronomy, NMCA, NAU, Navsari)

## 14. Weed management in sugarcane var. Co 99004 under south Gujarat condition

The sugarcane growers of South Gujarat heavy rainfall zone are advised to manage the weeds by hand weeding at 30, 60 and 90 days after planting and interculturing at 45 and 90 DAP for securing higher yield and net return.

(Professor & Head, Dept. of Agronomy, NMCA, NAU, Navsari)

## 15. Integrated weed management in rabi sorghum (*Sorghum bicolor* L.) under south Gujarat condition



The farmers of South Gujarat heavy rainfall zone growing rabi sorghum are advised to adopt two interculturing and hand weeding at 20 and 40 DAS for effective weed management, realizing higher grain and net return.

(Professor & Head, Dept. of Agronomy, NMCA, NAU, Navsari)

## 16. Weed and nitrogen management in aerobic rice

The farmers of South Gujarat heavy rainfall zone are advised to apply 120 kg N/ha in three splits (40% N as basal, 40% at tillering and 20% at panicle



initiation) and 30 kg P<sub>2</sub>O<sub>5</sub>/ha as basal along with two hand weeding at 20 and 40 DAS for getting higher yield and net return with efficient weed management in aerobic rice under crisis of labour and adverse condition due to continuous rainfall, farmers are advise to control weed by spraying of pretilachlor @ 0.75 kg/ha as pre emergence and bispyribac sodium salt @ 0.05 kg/ha as post emergence after 20 DAS along with 120 kg N/ha in three splits (40% N as

basal, 40% at tillering and 20% at panicle initiation).

(Professor & Head, Dept. of Agronomy, NMCA, NAU, Navsari)

## 17. Study of critical period of crop-weed competition in cotton under rainfed condition of South Gujarat

The farmers of South Gujarat zone are advised to keep the cotton field weed free up to 80 days after sowing for getting lower weed competition index and profitable seed cotton yield.



(Professor, Dept. of Agronomy, CoA, NAU, Bharuch)

## 18. Fertilizer management in rabi black moong under conserved soil moisture condition



Farmers of South Gujarat zone growing rabi Black moong (GBM-1) under conserved moisture are advised to apply 1 t/ha vermicompost + 50% of recommended dose of fertilizer (10:20:0 kg N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O/ha) or 1 t/ha vermicompost + 50% of recommended dose of fertilizer with

biofertilizers (Rhizobium + PSB 10 ml/kg) for achieving higher seed yield and net return.

(Asstt. Research Scientist, ARS, NAU, Tanchha)

## 19. Agronomic requirement of cotton varieties for high density planting systems under irrigated conditions



The farmers of South Gujarat zone are recommended to grow cotton variety suitable for high density planting system (HDPS) at spacing adopted should be 60 x 15 cm with application of 225 kg N/ ha in five equal splits at 30, 60, 75, 90 and 105 DAS for getting higher seed cotton yield and net return.

(Research Scientist, MCRS, NAU, Surat)

## PLANT PROTECTION

### A. Agricultural Entomology

#### 1. Chemical Control of carnation mite, *Tetranychus urticae* under polyhouse condition

The carnation growers of south Gujarat are advised to apply three sprays of Propargite 57 EC 0.1% (17.5 ml/10 litre of water) for the effective management of two spotted red spider mite and to harvest higher number of marketable flowers under polyhouse. The first spray should be given at appearance of spider mite and remaining sprays at 15 days interval.

##### As per CIBRC Format:

Year	Crop	Pest	Pesticide with Formulation	Doses			Waiting period (days)	Remark Residue
				Quantity of Formulation	Conc. (%)	Dilution in water		
2017	Carnation	Red spider mite	Propargite 57 EC	500 ml	0.1%	500 lit.	7	BDL

(Professor & Head, Dept. of Entomology, NMCA, NAU, Navsari)

#### 2. Bioefficacy of some pesticides against red spider mite, *Tetranychus urticae* (Koch) infesting brinjal



The farmers of south Gujarat growing brinjal are advised to apply two sprays of Fenazaquin 10 EC @ 0.01% (10 ml/10 lit of water) for the effective control of red spider mite. The first spray should be given at the time of appearance of red spider mite and second spray at 15 days interval.

##### As per CIBRC Format:

Year	Crop	Pest	Pesticide with Formulation	Doses			Waiting period (days)	Remark Residue
				Quantity of Formulation	Conc. (%)	Dilution in water		
2017	Brinjal	Red spider mite	Fenazaquin 10 EC	500 ml.	0.01	500 liter	10	BDL

(Professor & Head, Dept. of Entomology, NMCA, NAU, Navsari)

#### 3. Role of antibiotics in mulberry silkworm *Bombyx mori* L. rearing

The mulberry silkworm rearing farmers are advised to dip the chopped mulberry leaves for five minutes in the aqueous solution of chloramphenicol 500 mg (Chloramphenicol palmitate) 0.05 per cent (5g/10 liter water) and dried at room temperature then fed to the fifth instar larvae (immediately after fourth moult) once a day as a last feeding during evening time found suitable and exhibited the highest effective rate of rearing with maximum denier and minimum renditta of mulberry silkworm.



(Professor & Head, Dept. of Entomology, NMCA, NAU, Navsari)

#### 4. Role of antibiotics in eri silkworm, *Samia cynthia ricini* Hutt rearing

The eri silkworm rearing farmers are advised to dip the castor leaves for five minutes in the aqueous solution of streptomycin (Streptocycline SP) 0.05 per cent (5 g/10liter water) and dried at room temperature then fed to the fifth instar larvae (immediately after fourth moult) once a day as a last feeding during evening time found suitable and exhibited the highest effective rate of rearing of eri silkworm.



(Professor & Head, Dept. of Entomology, NMCA, NAU, Navsari)

#### 5. Bio-efficacy of insecticides against rice stem borer, *Scirpophaga spp*

The Paddy growers of south Gujarat are advised to apply two sprays of flubendiamide 20 WG @ 0.005% (2.5 gm/10 litre) or chlorantraniliprole 18.5 SC @ 0.006% (3 ml/10 litre) first at the appearance of pest and second at 15 days after the first application for effective control of rice stem borer.

##### As per CIBRC Format

Year	Crop	Pest	Pesticide with Formulation	Doses			Waiting period (days)	Remark Residue
				Quantity of Formulation	Conc. (%)	Dilution in water		
2017	Rice	Stem borer	Flubendiamide 20 WG	125 gm	0.005	500 L	30	Below BDL (Grain)
			Chlorantraniliprole 18.5 SC	150 ml	0.006	500 L	47	Below BDL (Grain)



(Asso. Res. Sci. (Ento.), MRRS, NAU, Navsari)

## 6. Bio-efficacy of Selected Insecticides against Pink Bollworm in Bt cotton

Cotton farmers of south Gujarat cultivating Bt cotton in Agro-climatic zone II are advised to control pink bollworm by two sprayings of any one of the following insecticide, first spray at 75 days after sowing and second after 15 days of the first spray for effective control of pink bollworm.

1. Indoxacarb 15.8 EC @ 0.0079% (5 ml/10 lit. of water) or
2. Emamectin benzoate 5 SG @ 0.0025% (5 g/10 lit. of water) or
3. Spinosad 45 SC @ 0.014% (3 ml/10 lit. of water)

### AS PER CIB GUIDELINES:

Year	Crop	Pest/Disease	Pesticide with formulation	Doses			Waiting Period (days)*	Remark/Residue
				Quantity of formulation	Conc. (%)	Dilution in water		
2017	Cotton	Pink bollworm	Indoxacarb 15.8 EC	39.5 ml	0.0079%	500 L	14	
			Emamectin benzoate 5 SG	12.5 g	0.0025%	500 L	10	
			Spinosad 45 SC	67.5 ml	0.014%	500 L	10	

(Note: Approved and merged with AAU recommendation No. 13.3.1.3)  
(Asso. Res. Sci. (Ento.), MCRS, NAU, Navsari)

## B. PLANT PATHOLOGY: NIL

## HORTICULTURE

### 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.



(HoD, Dept. of Vegetable Sci., ACHF, NAU, Navsari)

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

Farmers cultivating capsicum in naturally ventilated polyhouse (1000 m<sup>2</sup> area) are advised to fertigate the crop with 25: 25: 25 kg NPK (as per the Table given below) along with application of 0.5 kg *Trichoderma viride*, Phosphorous Solubilizing Bacteria (*Bacillus megaterium*), *Azotobactor*, *Pseudomonas*





*fluorescenseach*, 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.

(HoD, Dept. of Vegetable Sci., ACHF, NAU, Navsari)

### 3. Effect of de-leafing and foliar nutrient application for offseason flowering in Spider lily (*Hymenocallis littoralis*)

Farmers of south Gujarat heavy rainfall zone I growing spider lily are advised to cut the leaves in 1<sup>st</sup> week of May and subsequently apply 13-0-45 (NPK) @ 1.5 % (15g/l) through foliar application as first spray when plant attain 30-45 cm height after de-leafing and second spray 15 days after first foliar application along with recommended dose of fertilizers (300:225:200 kg NPK/ha) for getting higher production of flower buds as well net realization.



(HoD, Dept. of Flori.& Landscape Architecture, ACHF, NAU, Navsari)

### 4. Standardization of drying technique in Rose var. Top secret, Gold Strike and Rewine

People interested in cottage industry based on dry flowers are advised to dry roses of variety Top Secret and Gold Strike using silica gel (60-120 mesh size) embedding method (850 g silica for 10 flowers) either with Microwave Oven (900 Watts, 30 L capacity, 1 day –drying time) or under room condition (7 days-drying time) to obtain good quality dry flowers having storage life of about 120 days.

#### Procedure of Drying (Microwave Oven Silica gel Embedding Method)

- Embedding in Silica (850 grams/10 flowers)-glass bowl
- Microwave Oven (900 Watt, 30 liter capacity)
- 2 min. on microwave oven/1 hour cooling (Outside)- 3 times repeat
- 18 hours cooling followed by 1 time repeat
- Taking out of dry flowers



(HoD, Dept. of Flori.& Landscape Architecture, ACHF, NAU, Navsari)

## 5. Development of technology for dehydration of onions rings for adoption at commercial scale

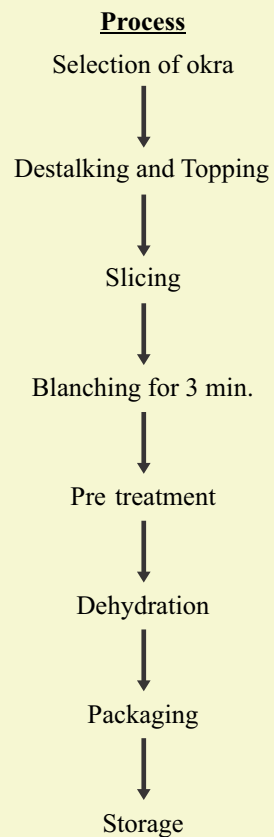
Processors and entrepreneurs are recommended to dehydrate red onions rings by pre-treating onion rings with combination of 2000 ppm potassium meta-bisulphite (KMS) and 500 ppm citric acid for 15 minutes followed by dehydration at 75°C for 2 hours, 70°C for 2 hours, 65°C for 1 hour and 60°C for 8 hours till a final moisture content of 4.8%. Dehydrated red onion rings packed in 400 gauge HDPE bags remain microbiologically safe for 6 months with better quality attributes.



(HoD, Dept. of PHT, ACHF, NAU, Navsari)

## 6. Development of technology for dehydration of okra slices for adoption at commercial scale

Processors and entrepreneurs are recommended to dehydrate okra slices by pre-treating okra slices with combination of 1500 ppm KMS and citric acid @ 500 ppm for 15 minutes followed by dehydration at 75 for 2 hours and 65°C for 10 hours till a final moisture content of 5.2%. Dehydrated okra slices packed in 400 gauge HDPE bags remain microbiologically safe for 6 months with better quality attributes.



(HoD, Dept. of PHT, ACHF, NAU, Navsari)

## 7. Development of technology for dehydration of cauliflower for adoption at commercial scale

Processors and entrepreneurs are recommended to dehydrate cauliflower cut segments by pre-treating cauliflower cut segments with combination of 1500 ppm KMS and 1000 ppm citric acid for 15 minutes. After pre-treatment, the cauliflower cut segments must be dehydrated at 75°C for 2 hours, 70°C for 2 hours, 65°C for 1 hour and 60°C for 7 hours till a final moisture content of 4.9%. The dehydrated cauliflower cut segments packed in 400 gauge HDPE bags remain microbiologically safe for 6 months with better quality attributes.

### Process

Selection of cauliflower



Removal of stock portion  
and rotten portion



Washing



Cut in to small pieces



Blanching for 4 min.



Pretreatment



Dehydration



Packaging



Storage



(HoD, Dept. of PHT, ACHF, NAU, Navsari)

## 8. Effect of hot water dip treatment on the eradication of fruit fly, ripening and quality of mango for export purpose (cvs. Kesar and Alphonso)

Exporters are recommended to give hot water treatment at 50°C for 20 min to eradicate fruit fly infestation in Kesar and Alphonso mango to maintain the export quality fruits.



(HoD, Dept. of PHT, ACHF, NAU, Navsari)

## FORESTRY

### 1. Sustainable Bark Harvesting Techniques in *Terminalia arjuna* (Arjun Sadad)

The farmers of South Gujarat heavy rainfall zone-1 harvesting *Terminalia arjuna* (Arjun Sadad) bark commercially for medicinal purpose are recommended to make incision of 10 cm (h) x 5 cm (w) size in trees having more than 100 cm GBH (Girth at breast height) for higher and sustainable bark yield.



(Assoc. Prof., Dept. SAF, CoFNAU, Navsari)

## 2. Evaluation of Eucalyptus (Nilgiri) Clones for growth and physiological characters

Farmers of south Gujarat heavy rainfall zone-1 are recommended to harvest Eucalyptus (Nilgiri) clone G 283 (at 2 X 2 m spacing) after four years for better biomass production or pulp wood.



(Asstt. Prof. (Tree Improvement), COF, NAU, Navsari)

## 3. Evaluation of carbon sequestration potential of different bamboo species in South Gujarat

The farmers of South Gujarat heavy rainfall zone-I are advised to grow plantation of Bambusa vulgaris (green) for higher biomass and carbon sequestration. The thin walled and long internode bamboo species Schizostachym pergracile and Schizostachym dullooa are recommended for kite industry.



(Asstt. Prof. (Agroforestry), COF, NAU, Navsari)

## 4. Potential and prospects of Minor Forest Products in the Dangs of South Gujarat

The tribal of the Dang of south Gujarat heavy rainfall zone-I are recommended to do collection and marketing of Minor Forest Produces like Mahuda flower, Karamda, Puvad seed, Kadayo gum, Safedmusli, Honey and Bamboo in community groups for getting remunerative price.



(Asstt. Prof. (FPU), COF, NAU, Navsari)

## AGRICULTURAL ENGINEERING

### 1. Effect of Pretreatments on Quality Attributes of Dehydrated Green Chilli Powder

Entrepreneurs/food processors are recommended to prepare green chilli powder by using the process: green chilli pieces (2 cm) blanched in water at standard conditions (90°C for 3 min) followed by pretreatment with 2000 ppm Sodium Metabisulphite solution dipping for 30 min and dried in a tray



dryer at temperature of 60°C for 18 h till final moisture content of 5±1%. The green chilli dried pieces to be grinded and packed in 125 micron HDPE pouch for storage up to 6 months at ambient temperature (26-32°C).

(HoD, Dept. of PHT, ACHF, NAU, Navsari)

## 2. Standardization of technology for preparation of unripe banana (*Musa paradisiaca* L.) powder for commercial adoption



Food processors and entrepreneurs are recommended to cut 2 mm thick unripe banana (Grand Naine) slices for dehydration by blanching in water at 70°C for 1 min followed by dipping for 30 min in 1000 ppm Potassium Metabisulphite+2000 ppm Citric Acid solution and dried in a tray dryer at a temperature of 60±2 °C till a final moisture content of 3±1%. The dried unripe banana slices should be grinded into powder and packed in glass jar or Aluminium laminate pouches for storage up to six months at ambient temperature.

(HoD, Dept. of PHT, ACHF, NAU, Navsari)

## 3. Design of Corrugated Fiber Board box for packaging of Kesar mango

Manufactures are recommended to use corrugated fiber board box for 3kg, 5kg and 10 kg to pack Kesar mango fruits packaging having edge crush test value 2.44N/mm, 5.31N/mm and 4.51N/mm respectively prepared from kraft liner paper with B-type flute having less than 12% moisture content with following specifications for safe transport.

Particulars	3kg Box	5kg Box	10kg Box
Type of Box	One piece Interlocking box (OSC)	One-piece tuck in cover/ telescopic box (OSC)	One piece box (RSC)
Compressive Strength of Box, Kgf	105.49	217.30	228.92
Internal Dimension, mm Length x Width x Height	398x256x66	332x256x130	332x256x256



(HoD, Dept. of PHT, ACHF, NAU, Navsari)

## 4. Effect of tillage practices on sugarcane production

Farmers of south Gujarat heavy rainfall zone (AES-III) adopting sugarcane-sugarcane cropping sequence in clayey soils are advised to adopt sub soiling to a depth of 45 cm and at a spacing of 1 m followed by ploughing by cultivator for achieving higher cane yield and net income as compared to normal and deep ploughing.

(Prof. and Head, Dept. of Agril. Engg., NMCA, NAU, Navsari)

## ANIMAL PRODUCTION AND FISHERIES

### 1. Development of burfi utilizing watermelon (*Citrullus lanatus*) rind

It is recommended to use 10% (w/w) watermelon rind in buffalo milk for preparation of watermelon rind burfi with acceptable physicochemical and sensory quality for storage till 20 days at refrigeration temperature ( $7\pm 1^\circ\text{C}$ ).



(Head, Dept. of LPT, College of Veterinary Science, NAU, Navsari)

### 2. Effect of fenugreek (*Trigonella foenum-graecum* L.) supplementation on milk yield and quality in lactating Surti buffaloes

The farmers of South Gujarat are recommended to supplement 125-150g overnight soaked fenugreek seed to the Surti buffaloes during 40-115 days of parturition to improve the milk production (approximately 8%) without any increase in cost of milk (Rs. /litre) production.

(Head, Dept. of Animal Nutrition, College of Veterinary Science, NAU, Navsari)

### 3. Strategies to mitigate the impact of climate change: Effect of 75% green agro-net on production, reproduction and stress parameters in Surti buffaloes

Farmers of South Gujarat region are recommended to use 75% green agro shed-net at 10 feet height to reduce 10-15°C floor temperature of the open paddock between 2-5 PM in hot-dry season (April end to first week of June) and also to reduce heat stress by lowering THI in hot-humid season (mid June to July end) for the comfort of Surti buffaloes



(Head, Dept. of Veterinary Physiology and Biochemistry, College of Veterinary Science, NAU, Navsari)

## ANIMAL HEALTH

### 1. Clinical studies on neurological disorders in canines



In pet dogs, based on incidence (87.50%) of posterior paresis as a result of fall from an elevation on the back due to owner's negligence; it is suggested to be cautious while playing with pets at elevated platforms.

(Head, Dept. of Veterinary Surgery and Radiology, College of Veterinary Science, NAU, Navsari)

### 1. Estimation of Green House Gases (GHGs) emission from paddy fields

The rice grown under SRI method with 100 % RDN through urea retards the emission of CH<sub>4</sub> as well as total GHGs (CH<sub>4</sub> + N<sub>2</sub>O as CO<sub>2</sub> eq.) which increases rice productivity. However, this superiority does not exist with respect to emission of N<sub>2</sub>O. Rice cultivation with normal transplanting and direct seeded methods emitted the CH<sub>4</sub> gas to a greater extent and emission was more pronounced when Farm Yard manure added to the soil. Application of organics alone or in combination with inorganic fertilizers improved the rice yield and soil properties but favoured more emission of GHGs from the rice field.

(Professor, Dept. of NRM, College of Forestry, NAU, Navsari)

### 2. Integrated Weed Management in Castor

Application of pendimethalin 1 kg/ha as pre-emergence + one hand weeding at 40 days after sowing was found effective in irrigated rabi castor (GCH 7) under South Gujarat heavy rainfall zone for profitable yield and effective weed management in irrigated castor (GCH-7). Residue analysis of these herbicides was carried out and were found below detected level in seed and soil.

(Associate Research Scientist, P&CRS, NAU, Navsari)

### 3. Potash status in soil as affected by intensive cropping (paddy- wheat–green gram) under medium and high fertility levels with and without application of potash

Rice-wheat-green gram cropping sequence was found sustainable even after 28 crop cycles without addition of potassium in soil, but there was depletion of about 39 % and 36% of source-K (HNO<sub>3</sub> soluble K) in soil at surface (0.0-22.5 cm) and sub-surface (22.5-45.0 cm) layer, respectively at the end of 28 crop cycles.

#### Recommendation for application of nitrogen fertilizer based on soil available nitrogen

Category	Available nitrogen (kg/ha)	Recommendation
Very low	< 140	Apply 50% more over recommended dose
Low	141 - 280	Apply 25% more over recommended dose
Normal	181 - 420	As per recommended dose
Normally high	421 - 560	As per recommended dose
High	561 - 700	Apply 25% less over recommended dose
Very high	> 700	Apply 50% less over recommended dose

#### Recommendation for application of Phosphorus fertilizer based on soil available Phosphorus

Category	Available phosphorus (kg/ha)	Recommendation
Very low	< 10	Apply 50% more over recommended dose
Low	11 - 20	Apply 25% more over recommended dose
Normal	21 - 30	As per recommended dose
Normally high	31 - 40	As per recommended dose
High	41 - 55	Apply 25% less over recommended dose
Very high	> 55	Apply 50% less over recommended dose

(Professor, Dept. of Agronomy, NMCA, NAU, Navsari)

#### 4. Weed management in sugarcane var. Co 99004 under south Gujarat condition

Apply either metribuzin 1 kg/ha or atrazine 2 kg/ha as pre-emergence followed by one hand weeding and one and interculturing at 60 DAP for effective management of weed in sugarcane.

(Professor, Dept. of Agronomy, NMCA, NAU, Navsari)

#### 5. Integrated weed management in rabi sorghum (*Sorghum bicolor* L.) under south Gujarat condition

Application of atrazine @ 0.5 kg/ha as per-emergence and one interculturing and hand weeding at 20 DAS was found effective for weed management in rabi sorghum.

(Professor, Dept. of Agronomy, NMCA, NAU, Navsari)

## PLANT PROTECTION

#### 1. Survey of ecto-parasitic Varroa mite infesting honey bees (*Aphis* sp.)

The Varroa mite, Varroa destructor was found infesting worker rock bee (*Apis dorsata*) and its infestation was higher during 15<sup>th</sup> to 18<sup>th</sup>, 22<sup>nd</sup> to 26<sup>th</sup>, 37<sup>th</sup> to 40<sup>th</sup> and 47<sup>th</sup> to 49<sup>th</sup> Standard Week.

(Professor, Dept. of Entomology, NMCA, NAU, Navsari)

#### 2. Evaluation of insecticides against pod sucking bug *Clavigralla gibbosa* Spinola in pigeon pea cv. Vaishali

Two sprays of any of the following insecticide at an interval of 15 days commencing at pod formation stage are effective to control pod sucking bugs in pigeon pea.

Imidacloprid 17.8 SL @ 0.005 %

Acetamiprid 20 SP @ 0.004%

Thiacloprid 24 SC @ 0.024%

(Asstt. Prof Ento; COA-NARP, NAU, Bharuch)

#### 3. Survey and surveillance of major insect pests of pigeonpea at College Farm, Bharuch as well as Narmada district

The pigeon pea pests were active round the year under Agro climatic zone II, AES V with higher activity period mentioned as under with standard meteorological week (SMW).

Pest	Higher activity period
Aphid	36, 38, 39, 45 and 46 <sup>th</sup> SMW
Jassid	37, 38, 39, 43, 47 and 48 <sup>th</sup> SMW
PSB	49 <sup>th</sup> to 2 <sup>nd</sup> SMW
MBDR	45 <sup>th</sup> SMW
<i>Helicoverpa</i> sp.	47 to 50 <sup>th</sup> SMW
<i>Maruca</i> sp.	48 and 49 <sup>th</sup> SMW
Leaf Roller	41 <sup>st</sup> to 43 <sup>rd</sup> SMW
Percent Pod Borer damage	51 <sup>th</sup> and 1 <sup>st</sup> SMW
Percent Pod fly damage	51 <sup>st</sup> to 2 <sup>nd</sup> SMW

(Asstt. Prof Ento; COA-NARP, NAU, Bharuch)

#### 4. Biochemical changes in sorghum genotypes against shoot fly, *Atherigona soccata*

The genotypes viz., IS 18551, SR 2879 and IS 2205 showed lowest shoot fly oviposition and incidence. Sorghum genotypes (DJ 6514, Swarna, SR 2872 & SR 1904) with high amount of hydrocyanic acid and total soluble sugar showed susceptibility to shoot fly while genotypes (IS 18551, IS 2205, SR 2879 & SR 2812) with high tannin, silica and phenol contents showed moderately resistance to shoot fly.

(Asstt. Prof Ento; ASABI, NAU, Surat)



## **5. Dissipation and Persistence of combi-product of Profenofos 40 % + Cypermethrin 4 % in Sapota and its distribution in edible parts of fruits**

Apply either metribuzin 1 kg/ha or atrazine 2 kg/ha as pre-emergence followed by one hand weeding and one and interculturing at 60 DAP for effective management of weed in sugarcane.

### **A. Waiting period of profenofos and cypermethrin in/on sapota fruits**

Observation of 14 days waiting period provides residue free unripe sapota fruits when pre-mix formulation of profenofos 40% and cypermethrin 4 % EC applied twice at 15 days interval on sapota bearing trees at the rate of 0.044 % (1ml/l) to control the sapota bud borer.

### **B. Distribution pattern of profenofos and cypermethrin in peel and pulp of sapota fruits**

The residues of profenos and cypermethrin were arrested in peel of unripe sapota fruits while trans-peel movement of these residues to pulp was observed in ripe sapota fruit when pre-mix formulation of profenofos 40 % and cypermethrin 4% EC sprayed twice at 15 days interval at the rate of 0.044 % (1ml/l) to control the sapota bud borer on sapota bearing trees.

(Asstt. Res. Scientist (Pesticide residue), FQTL, Navsari)

## **6. Dissipation and persistence of combi-product of chlorpyrifos 50 % + cypermethrin 5 % in sapota and its distribution in edible parts of fruit**

### **A. Waiting period of chlorpyrifos and cypermethrin in/on sapota fruits**

Observation of 4 days waiting period provides residue free unripe sapota fruits when pre-mix formulation of chlorpyrifos 50 % and cypermethrin

5 % EC sprayed twice at the rate of 0.055 % (1ml/l) sprayed twice at 15 days interval on sapota fruit bearing trees to control the sapota bud borer.

### **B. Distribution pattern of profenofos and cypermethrin in peel and pulp of sapota fruits**

The residues of chlorpyrifos and cypermethrin arrested in peel of unripe sapota fruits when pre-mix formulation of chlorpyrifos 50 % and cypermethrin 5% EC sprayed twice at 15 days interval at the rate of 0.055 % (1ml/l) to control the sapota bud borer on sapota bearing trees.

(Asstt. Res. Scientist (Pesticide residue), FQTL, Navsari)

## **7. Screening of sugarcane varieties for early shoot borer resistance**

Sugarcane genotypes *viz.*, CoN 14071, CoN 14072, Co 09007, CoN 14073 and Co 10033 was found less susceptible against early shoot borer.

(Asstt. Res. Sci., Ento; MSRS, NAU, Navsari)

## **8. Screening of recommended varieties for resistance against stem borer of rice**

Rice varieties *viz.*, Dandi, Masuri and Jaya were found to have resistance reaction against rice stem borer and varieties like NAUR-1, GNR-2, 3, Gurjari and GR-5, 7, 8, 10, 104 and Narmada were found to have moderately resistance reaction against rice stem borer under natural field conditions. Whereas varieties GNR-4, GR-4, 6, 9 and 103 have moderately susceptible reactions against stem borer under natural field conditions.

(Assoc. Res. Scientist (Ento.) MRRC, NAU, Navsari)

**9. Evaluation of insecticides against rice gundhi bug, *Leptocorisa acuta* (Thunberg)**

Spray emamectin benzoate 5 WSG 0.015 % or imidacloprid 17.8 SL 0.005 % twice, first at the appearance of pest and second at 15 days after the first application is suggested for the effective control of rice gundhi Bug.

(Assoc. Res. Scientist (Ento.) MRRC, NAU, Navsari)

**10. Screening of *Gossypium hirsutum* cotton genotypes/ varieties against sucking pests under rainfed conditions**

Cotton genotypes/varieties of *Gossypium hirsutum viz.*, GSHV 159, GBHV 170, 177, 180, 183 and NH 615 were found moderately resistant to jassids. However, GSHV 159 and GBHV 170 were found resistant to aphids and thrips. GBHV 180 was found resistant to thrips whereas, GBHV 183 was found resistant to whitefly and mealybug under rainfed conditions.

(Asstt. Res. Scientist (Ento), RCRS, NAU, Bharuch)

**11. Screening of *Gossypium arboreum* cotton genotypes/ varieties against insect pests under rainfed conditions**

Fourteen cotton genotypes/varieties of *Gossypium arboreum viz.*, GBav 106, 107, 111, 123, 124, 125, 128, 131, 133, 135, 136, 137, 138 and G. Cot. 19 were found moderately resistant to jassids under rainfed conditions. GBav 128 and 124 were found resistant and moderately resistant to aphids, thrips, whitefly as well as mealybug, respectively. GBav 135 was found resistant to aphids and thrips. However, GBav 111 and 135 were found resistant to mealybug, while moderately resistant to whitefly. GBav 138 was

found resistant to whitefly and mealybug. Whereas, GBav 123 and 133 were found resistant to mealybug and aphids, respectively. Six genotypes viz., GBav 106, 107, 111, 123, 133 and 136 were found moderately resistant to bollworms.

(Asstt. Res. Scientist (Ento), RCRS, NAU, Bharuch)

**12. Suppression of rice sheath mite, *Steneotarsonemus spinki* Smiley (Acari: Tarsonemidae) infestation by using different acaricides**

The paddy growers of south Gujarat are advised to apply two sprays of fenpyroximate 5 SC @ 0.005% (10 ml/10 litre of water) or difenthiuron 50 WP @ 0.05% (10 g/10 litre of water) or chlorfenapyr 10 SC @ 0.015% (15 ml/10 litre of water) for the effective control of rice sheath mite. The first spray should be given at appearance of sheath mite (at flag leaf stage) and the second spray at 15 days after first spray.

**As per CIBRC Format**

Year	Crop	Pest	Pesticide with Formulation	Doses			Waiting period (days)	Remark Residue
				Quantity of Formulation	Conc. (%)	Dilution in water		
2017	Rice	Sheath mite	Fenpyroximate 5 SC	500 ml	0.005	500	7	BDL (Grain & Straw)
			Diafenthiuron 50 WP	1000 ml	0.05	500	3-7	BDL (Grain & Straw)
			Chlorfenapyr 10 SC	750 ml	0.015	500	5	EU codex 0.02PPM

(Professor, Dept. of Entomology, NMCA, NAU, Navsari)

### 13. Bioefficacy of some pesticides against *Polyphagotarsonemus latus* (Banks) infesting sesamum

The sesamum growers of south Gujarat are advised to apply fenpyroximate 5 SC @ 0.006% (12 ml/ 10 litre of water) at the time of 50 percent flowering for effective control of the yellow mite

#### As per CIBRC Format

Year	Crop	Pest	Pesticide with Formulation	Doses			Waiting period (days)	Remark Residue
				Quantity of Formulation	Conc. (%)	Dilution in water		
2017	Sesamum	Yellow mite	Fenpyroximate	600 ml	0.006	500 lit.	7	BDL

(Professor, Dept. of Entomology, NMCA, NAU, Navsari)

### 14. Mapping the mycogeography of the macromycetes from Dangs

Biodiversity in fleshy fungi exists in Dangs district. A total no. of 192 fleshy fungi was identified. Out of them 171 belong to Basidiomycotina, 15 belonged to Ascomycotina and 6 to Mycetozoa. The no. of edible fleshy fungi was found 70 out of 186. The major genus of edible fungi were Pleurotus, Ganoderma, Agaricus, Lepiota, Auricularia, Termitomyces, Volvariella, Clitocybe, Cantharellus, Fistulina, Calocybe etc. From the study of various morphological characteristics, key to the fleshy fungi of Dangs is generated for the identification purpose.

(Professor, Dept. of Pl. Pathology, NMCA, NAU, Navsari)

### 15. Evaluation of finger millet (*Eleusine coracana* L. Gaertn.) germplasms for resistance to blast disease on the basis of biochemical parameter

The finger millet genotypes/varieties viz; GN-5, GPU-28, GPU-48, KOPN-235, KMR-204 and MR-6 having maximum amount of total phenols were found resistant to the blast disease.

(Asstt. Prof. (Pl. Path.), COA, NAU, Waghai)

### 16. Screening of sugarcane varieties for wilt resistance

Sugarcane varieties/genotypes viz; Co 10005, Co 10006, Co 10027, CoT 10367, Co 09004, Co 09009, Co 10015, Co 10031, CoT 10368, PI 10132, CoN 14071, CoN 14072, CoN 14073 and CoN 14074 showed moderately resistant reaction against wilt disease in sick soil and artificial inoculation.

(Asstt. Res. Scientist (Pl. Path), MSRS, NAU, Navsari)

### 17. Screening of mango germplasm against powdery mildew

Mango accession viz; Ostin, Lily and Sensation are found resistant against powdery mildew whereas, Mankurad and Kishanbhog are highly susceptible.

(Asso. Res. Scientist (Pl. Path), AES, NAU, Paria)

### 18. Efficacy of fungicides and bioagent as seed treatment as well as foliar spray for the control of blast disease of finger millet

Treat the seed of finger millet with *Pseudomonas fluorescence* (108 cfu/ml) @ 10 ml/kg and two sprays of P. fluorescence @ 6ml/l first at initiation of disease and second after 15 days after the first spray for effective management of blast.

(Asstt. Prof. (Pl. Path.), COA, NAU, Waghai)

## 19. Efficacy of fungicides and bioagent as seed treatment as well as foliar spray for the control of blast disease of finger millet

Give seed treatment with carbendazim 50 WP @ 2g/kg seed followed by two sprays of tricyclazole 75 WP @ 6g/10 lit. of water or tebuconazole 25.9 EC @ 10ml/10 lit. First spray be given immediately after the appearance of disease and second 15 days after the first spray for the management of finger millet blast.

### As per CIBRC Format

Year	Crop	Disease	Fungicide with Formulation	Dose			Waiting period (Days)	Remarks Residue
				Quantity of formulation	Conc (%)	Dilution in water		
2017	Finger millet	Blast	Tricyclazole 75 WP	300g	0.045	500	7	BDL
			Tebuconazole 25.9 EC	500ml	0.026	500	7	BDL

(Asstt. Prof. (Pl. Path.), COA, NAU, Waghai)

## HORTICULTURE

### 1. Seasonal influence on nutritional and physiological changes associated with flowering and fruiting behaviors in mango

The nutrient contents viz. nitrogen, potassium, calcium,

magnesium, manganese, iron and zinc in leaves of mango cultivar 'Kesar' and 'Alphonso' were higher during the months of October to January, thereafter the nutrient contents started to decrease and were recorded lower during the months of April to July. Photosynthetic rate and internal CO<sub>2</sub> content of leaves of cultivar 'Kesar' and 'Alphonso' increased significantly during the months of November to March and declined during the months of August–September.

Correlation analysis indicated that nitrogen, potassium, calcium, magnesium, sulphur, manganese, photosynthetic rate and internal CO<sub>2</sub> content of leaves of cultivar 'Kesar' and 'Alphonso' have significant negative correlation with minimum temperature and maximum relative humidity.

(HoD, Dept. of Fruit Science, ACHF, NAU, Navsari)

### 2. Evaluation of parthenocarpic cultivars of cucumber under protected conditions for yield and other horticultural traits

Greenhouse cucumber cultivars Oscar and Valleystar were identified as the highest yielders recording more than 12 tonnes per 1000 m<sup>2</sup> under naturally ventilated polyhouse, which were at par in performance with cvs. RS 03602833, Kian and Multistar. Minor differences in yield of these cultivars in general and variation in seed cost of cultivars in particular other than various variables components of cost contributed towards higher net returns in Oscar. 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.

### Best parthenocarpic cultivars per se for various horticultural traits of cucumber under polyhouse conditions

Trait	Best Parthenocarpic Cultivar (s)
Earliness	RS 03602833, Kian, KUK 9
Vine length (m)	KUK 9
Fruit length (cm)	RS 03602833, KUK 9, Oscar, 52-23, Pruva
Fruit diameter (cm)	Kian, RS 03602833, KUK 9, Oscar
No. of fruits per vine	Multistar, Kian, Valleystar
Av. Fruit weight (g)	Oscar, 52-23
Fruit yield per vine (kg)	Oscar, Valleystar , RS 03602833, Kian, Multistar

(HoD, Dept. of Vegetable Science, ACHF, NAU, Navsari)

### 3. Evaluation of tomato cultivars under NVPH for yield and other horticultural traits

Cultivar Bargad was identified as significantly highest yielder producing 14.90 tonnes per 1000 m<sup>2</sup> with maximum net realization of Rs. 166903 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. *Cv.* Rakshita possessed maximum TSS whereas *cv.* Heemsohna showed higher ascorbic acid, lycopene and pH.

(HoD, Dept. of Vegetable Science, ACHF, NAU, Navsari)

## FORESTRY

### 1. Sustainable Bark Harvesting Techniques in *Terminalia arjuna*

*Terminalia arjuna* (Arjun Sadad) tree having more than 100 cm

GBH (Girth at Breast Height) produced higher bark yield in terms of biomass and more bark recovery. No significant effect of different height (1m, 2m and 3m from the tree) on bark biomass was recorded. Anatomical study showed that wounded (healed) bark of trees produced higher proportion of fibres and biomass than fresh bark. More crystals were seen in fresh bark than healed bark.

(Assoc. Professor, Dept. SAF, CoF, NAU, Navsari)

### 2. Evaluation of *Melia composita* Cav. (Malabar Neem) families for germination traits and growth variation at nursery stage

As per the germination percentage, rate of germination and seedling vigour index, family no. 24, 76, 195, 259, 267 and 270 were performed better than other tested families of *Melia composita* Cav. (Malabar Neem) under nursery condition. It is further, informed to scientific community to test these species in field condition and improved families may be selected for future breeding and tree improvement.

(Asth. Prof. Dept. of FBTI, CoF, Navsari)

## AGRICULTURAL ENGINEERING

### 1. A study on technical feasibility and development of Mobile App for Agricultural Information Dissemination to the farming community

The prototype model of mobile based application developed by Navsari Agricultural University (*Kisan Mitra*) can be used for developing mobile application for agricultural information dissemination to the farming community

(Head, Dept. of ICT, AABMI, NAU, Navsari)

## 2. A study on technical feasibility and development of the KIOSK system for the information dissemination to the farmers

The prototype model of KIOSK application developed by Navsari Agricultural University can be used for agricultural and allied field information dissemination to the farming community.

(Head, Dept. of ICT, AABMI, NAU, Navsari)

## BASIC SCIENCE

### 1. Effect of different cooking conditions on antioxidant properties of some cucurbit vegetables

It is informed to scientific community that bitter gourd contains highest antioxidant activity as compared to cucumber, pumpkin, bottle gourd, pointed gourd and spine gourd. Further, antioxidant activity was remained maximum at cooking for 7 minutes in microwave (900 W) or 10 minutes in pressure cooker (2 whistles).

(Head, Dept. of Soil Sci. & Agri. Chemistry, NMCA, NAU, Navsari)

### 2. Development of EST - SSR marker in chilli

It is informed to scientific community that 25 out of 86 polymorphic markers are present in EST-SSR based primers (3893 EST-SSR) in chilli genotypes.

Sr. No	Primer Id	Expected fragment size (bp)	Observed fragment size range (bp)	Monomorphic/ Polymorphic
1	DiwCA03	280	421-474	Polymorphic
2	DiwCA05	370	378-507	Polymorphic
3	DiwCA08	398	350-540	Polymorphic
4	DiwCA09	398	671-748	Polymorphic
5	DiwCA12	307	310-465	Polymorphic
6	DiwCA17	168	155-325	Polymorphic
7	DiwCA22	166	175-305	Polymorphic
8	DiwCA25	370	284-436	Polymorphic
9	DiwCA27	184	180-260	Polymorphic
10	DiwCA29	254	265-396	Polymorphic
11	DiwCA30	122	110-156	Polymorphic
12	DiwCA32	169	215-232	Polymorphic
13	DiwCA33	297	316-326	Polymorphic
14	DiwCA36	233	228-242	Polymorphic
15	DiwCA41	320	254-495	Polymorphic
16	DiwCA49	394	300-565	Polymorphic
17	DiwCA50	226	200-395	Polymorphic
18	DiwCA62	355	350-601	Polymorphic
19	DiwCA67	226	205-359	Polymorphic

(Head, Dept. of Plant Mol. Bio. and Biotech, ACHF, NAU, Navsari)

20	DiwCA68	174	166-346	Polymorphic
21	DiwCA73	337	302-487	Polymorphic
22	DiwCA75	174	185-325	Polymorphic
23	DiwCA79	227	200-350	Polymorphic
24	DiwCA81	246	250-463	Polymorphic
25	DiwCA83	140	140-265	Polymorphic

### 3. Refinement of sucker tip decontamination technique for mass multiplication of banana through tissue culture

It is informed to scientific community that trimming of banana sucker tip up to 3-4 leaf bases and then treating with lactic acid (0.15 %) + Tween-20 (0.1 %) + commercial bleach (0.8 %) for 30 minutes. Further, trim the sucker tip up to 1-2 leaf bases and then retreat with Sodium chlorite (0.3 %) for 30 minutes. Inoculate these explants aseptically on the culture medium to reduce bacterial and fungal contamination with culture establishment up to 66 per cent.

(Head, Dept. of Plant Mol. Bio. and Biotech, ACHF, NAU, Navsari)

### 4. Development of low cost technology for in vitro mass multiplication of banana

It is informed to scientific community that replacement of laboratory grade sucrose with commercial sugar (30g/l) produced highest no. of shoots. Further, agar (4 g/l) with isabgul (10 g/l) reduces the cost of media and gives better multiplication.

(Head, Dept. of Plant Mol. Bio. and Biotech, ACHF, NAU, Navsari)

### 5. In vitro regeneration protocol for spine gourd (*Momordica dioca Roxb.*)

It is informed to scientific community to use MS medium supplemented with BAP (1.0 mg/l) + NAA (1.0 mg/l) for highest shoot multiplication and ½ MS medium supplemented with IBA (2.0 mg/l) for rooting in spine gourd (*Momordica dioca Roxb.*). The rooted plantlets of 6 cm shoot length be transferred from culture bottles into plastic cups containing mixture of cocopit and sand (1:1). After 21 days of hardening in the green house, these plants are ready for transfer in the soil.

(Head, Dept. of Plant Mol. Bio. and Biotech, ACHF, NAU, Navsari)

### 6. Exploring microbes for their siderophore production and their biocontrol potential

It is informed to scientific community that siderophore producing *Enterobacter ludwigii* TLAB1 and *Pseudomonas aeruginosa* TPA1 can be used in vitro to inhibit the growth of *Colletotrichum sp.*

(Head, Food Quality Testing Laboratory, NAU, Navsari)

### 7. Exploring microbes for exopolysaccharides (EPS) production

It is informed to scientific community that exopolysaccharide produced by bacterial isolate *Klebsiella vericolla* showed non-Newtonian behaviour, therefore, can be used as thickening agent and also possesses antioxidant activity.

(Head, Food Quality Testing Laboratory, NAU, Navsari)

## ANIMAL PRODUCTION AND FISHERIES

### 1. Effect of Body Condition Score on health, production and reproduction performances in Surti buffaloes

The mean body condition score (BCS) of Surti buffaloes estimated at 3.46 (Edmonson *et al.*, 1989) explained variation ( $R^2=0.10$ ) in production traits at par with simplified method of taking single observations of lumbar vertebrae spinous process instead of eight check points with accuracy of 98%.

(Research Scientist, LRS, Veterinary College, NAU, Navsari)

### 2. Effect of Body Condition Score on health, production and reproduction performances in Surti buffaloes

Body condition score in Surti buffaloes estimated (Edmonson *et al.*, 1989) varied up to 19.3% due to seasons warranting usage of -0.44, 0.29 and 0.15 correction factors for summer, rainy and winter season, respectively.

(Research Scientist, LRS, Veterinary College, NAU, Navsari)

## ANIMAL HEALTH

### 1. Evaluation of frozen semen of buffalo, crossbred and indigenous cow bull by Hypo Osmotic Swelling Test and supravital staining technique

Hypo osmotic swelling test and Eosin and Nigrosin staining is recommended to evaluate the sperm head and tail plasma membrane integrity simultaneously on the same slide for laboratories not equipped with sophisticated microscope.

(Professor and Head, Dept. of Veterinary Gynaecology& Obstetrics,  
Veterinary College, NAU, Navsari)

## Varieties developed by Navsari Agricultural University

Crop	No. of Varieties	Details of Varieties
Cotton	13	G.Cot.Hy. 12, G.Cot.20, G.Cot.25, G.Cot.Hy.6 (BG II), G.Cot.Hy.8 (BG II), G.N.Cot.22, G.N.Cot.Hy-14, G. Cot. Hy. 10 BG-II, G. Cot. Hy. 12 BG-II, G.N.Cot.-26, G.N.Cot.-29, G.N.Cot.-32, G.N.Cot.Hy-18.
Rice	9	NAUR-1, GNR-2, GNR-3, GNR-4, PURNA, GNR-5, GNR-6, GNRH-1, GNR-7
Sugarcane	7	GNS-4, GNS-5, GNS-6, GNS-7, GNS-8, GNS-9, GNS-10
Pigeon pea	2	GT-102, GNP-2
Nagli	4	GN-4, GN-5, G.NN-6, GNN-7
Vari	2	GV-2, GNV-3
Sorghum	3	G.Jowar-42, CSV- 21F, GNJ-1
Indian bean	3	G.Wal-2, GNIB-21, GNIB-22
Moong	2	GBM-1, GNM-6
Turmeric	2	GNT-1, GNT-2
Little Gourd	1	GNLG-1
Pointed Gourd	1	GNPG – 1
Castor	1	GNCH-1
Niger	1	GNNig 3
Brinjal	1	GNRB-1
<b>Total</b>	<b>52</b>	

### Endorsement

1. Pigeonpea : Vaishali
2. Sweet potato: Bhukanti
3. Rice: NAUR-1 (Aerobic condition)



**Recommendations for Farming community**

<b>Research sub-committee</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2015-16</b>	<b>2016-17</b>	<b>Total</b>
Crop improvement	1	1	3	4	4	1	3	1	5	4	5	0	14	9	55*
Agronomy & Soil Science	15	6	17	11	13	14	12	16	17	22	8	7	15	19	192
Horticulture & Forestry	2	0	2	5	2	9	1	16	10	5	10	17	18	8	105
Forestry	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Plant Protection	1	7	4	4	5	3	6	3	7	5	10	2	3	6	66
Agril. Engineering	2	0	1	1	0	1	1	1	4	2	5	1	4	4	27
Basic Science	0	2	1	0	0	0	0	1	1	0	1	0	0	0	6
Social Science	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Animal Production	0	0	0	0	0	0	0	2	2	2	2	3	5	3	19
Animal Health	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
<b>Total</b>	<b>21</b>	<b>16</b>	<b>28</b>	<b>25</b>	<b>24</b>	<b>28</b>	<b>23</b>	<b>40</b>	<b>47</b>	<b>40</b>	<b>41</b>	<b>31</b>	<b>60</b>	<b>54</b>	<b>478</b>

\* 3 Endorsed varieties: 1) Rice- NAUR-1, 2) Pigeon pea- Vaishali, 3) Sweet potato- Bhukanti (52+3=55)