

# RESEARCH ACCOMPLISHMENTS AND RECOMMENDATIONS

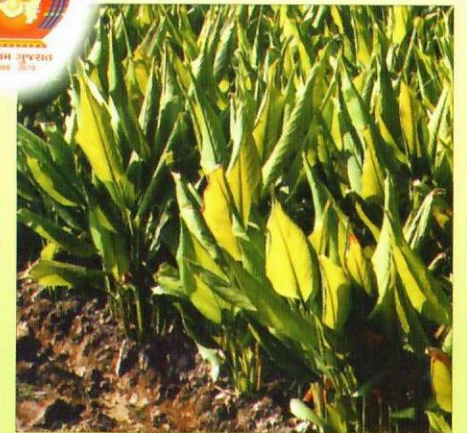
2010



NAVSARI AGRICULTURAL UNIVERSITY

DIRECTORATE OF RESEARCH  
**NAVSARI AGRICULTURAL UNIVERSITY**

NAVSARI - 396 450 (GUJARAT)



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**NAVARSARI AGRICULTURAL UNIVERSITY**  
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### **MESSAGE**



Navsari Agricultural University, which caters to the Agricultural needs of seven districts of south Gujarat came into existence on May 1<sup>st</sup> 2004. University scientists with the state of art infrastructure facilities and trained man power are not only preparing the qualified and competent man power for the future needs but also evolving technologies to suit the changing climatic and social needs of the masses of the region. The thrust of the University is to provide cost effective technologies and maximization of benefits to the marginal and poor farmers of the Agrco climatic situation.

Research Accomplishments and Recommendations published by the Directorate of Research is the gist of series of studies conducted in the Research farms of the University spread over whole of South Gujarat and after rigorous discussions in various research committees. The recommendations are ready to be used by farmers and scientific community. I congratulate the Director of Research and his whole team to bring out this booklet giving these recommendations in such a succinet and nice manner. I am sure, this will serve as a ready reference for the officials of line Department, scientists, students and planners.

**Navsari**  
**February 08, 2011**

**( A.R. Pathak )**  
**Vice-Chancellor**



## RESUME

The meetings of different Sub-committees of Agricultural Research Council of NAU were held during February-April, 2010 to discuss the proposals of the recommendations to the farmers and to formulate new research programmes. The Joint Agresco of Navsari Agricultural University was held on 9 April, 2010 wherein proposed recommendations were presented by the concerned Convener/Scientist and after thorough discussion, the recommendations for farming community were finalized.

The details of different Sub-committees, conveners and dates of meeting held are as under :

Sr. No.	Name of the Sub-committee	Name of the Convener	Meeting held on
1.	Crop Improvement	Dr. B.D. Jadhav	19-20 March, 2010
2.	Natural Resource Management	Dr. R.G. Patil	6-7 April, 2010
3.	Horticulture & Agro-forestry	Dr. N.S. Patil	3-4 March, 2010
4.	Plant Protection	Dr. M.B. Patel	3-4 March, 2010
5.	Agricultural Engineering	Prof. S.P. Shukla	19-20 March, 2010



6.	Basic Science	Dr. V. Kumar/ Dr. S.R. Patel	6-7 April, 2010
7.	Social Science	Dr. R.D. Pandya	16-17 Feb., 2010
8.	Animal Science & Fisheries	Dr. V.B. Kharadi	16-17 Feb., 2010

The recommendations for farmers and scientific communities were approved in the Sixth Combined Joint Agresco meeting of SAUs held at JAU, Junagadh during 20-22 April, 2010.

### Recommendations approved for Farmers and Scientific Community

Sr. No.	Discipline	No. of Recommendations	
		Farmers	Scientific community
1.	Crop Improvement	3	-
2.	Natural Resource Management	12	5
3.	Horticulture & Agro-forestry	1	-
4.	Plant Protection	6	2
5.	Agricultural Engineering	1	-
Total ...		23	7

Navsari  
February 07, 2011



( H.C. Pathak )  
Director of Research

## Recommendations for Farmers

### I CROP IMPROVEMENT

#### 1. Rice : GN Rice-2 (NVSR-6029)



GN Rice-2 is fine grain, high yielding (4678 kg/ha) salt tolerant variety, revealing 23 and 11% higher yield over GR-11 and Dandi, respectively. It also showed 12% yield advantage (5310 kg/ha) over GR-11 under favourable conditions. Among the major pests, it is resistant to stem borer and BPH, whereas moderately resistant to leaf folder. It is resistant to BLB and false smut and moderately resistant to grain discoloration. Grain quality is comparable with GR-11. The variety is recommended for cultivation in the salt affected soils of South Gujarat Heavy Rainfall Zone (AES-IV).

#### 2. Cotton : GN Cot-25 (GBhv-226)

Medium staple deshi cotton variety, GN Cot-25 (GBhv-226) registered 63.0%, 57.3% and 18.0% higher seed cotton yield (1500 kg/ha) over Digvijay, G.Cot-17 and G.Cot-23, respectively. The variety also recorded 69.5%, 61.8% and 18.4% higher lint yield than the corresponding checks (Digvijay,





G.Cot-17 and G.Cot-23). Pest reaction showed lower incidence of aphids and jassids but slightly higher incidence of whitefly and thrips when compared with G.Cot-23. It is free from bacterial blight, alternaria, grey mildew and wilt diseases. The fiber quality of the variety is at par with check variety G.Cot-23. This variety is recommended for cultivation in rainfed cotton growing tract of the state.

### 3. Turmeric : GN Turmeric-1 (NVST-37)



Turmeric variety, GN Turmeric-1 gave 21.5% and 16.4% higher rhizome yield (33.6 t/ha) than Sughandham and Kesar, respectively. This is a fibreless variety having more number of fingers and broad dark green foliage. The variety possesses red orange colour powder having better recovery on dry weight basis (83.9%), higher curcumin (2.84%) and oleoresin (8.68%) contents. It is resistant to rhizome rot disease. This variety is recommended for cultivation in South Gujarat Heavy Rainfall Zone.

## II NATURAL RESOURCE MANAGEMENT

### [A] Cropping systems

#### 1. Yield performance of fodder sorghum, maize and cowpea under sole and intercropping systems



The farmers of South Gujarat Heavy Rainfall Zone (AES-III) are advised to follow fodder sorghum + cowpea intercropping system in 2:1 row ratio at 30 cm row spacing to obtain higher green fodder yield and net income. The system also utilizes the land resource efficiently.

### [B] Cultural practices

#### 1. Comparative performance of different methods of paddy cultivation

The farmers of South Gujarat Heavy Rainfall Zone (AES-III) growing *kharif* paddy are advised to adopt sprouted seed method or SIRA technology for realizing higher yield and net profit.





### Savant's Integrated Rice Agrotechnology (SIRA)

- Seedling should be raised by applying black-gray ash of rice husk @ 0.5-1.5 kg/m<sup>2</sup>.
- Paddy straw (2 t/ha) and green gliricidia leaves (5 t/ha) should be incorporated into soil before transplanting.
- Square planting of rice seedling (15 x 15 x 25 cm).
- Fertilizers (57 kg N + 29 kg P<sub>2</sub>O<sub>5</sub>/ha) should be applied through Urea-DAP (60:40) briquettes (2.7 g briquette) to be placed in every four hill square at 7 to 10 cm soil depth on the same day of transplanting.

### 2. Comparative evaluation of different sowing methods of paddy and its residual effect on gram in South Gujarat

The farmers of South Gujarat Agro-climatic Zone (AES-III) following paddy (*khariif*)-gram (*rabi*) sequence are advised to adopt earlier recommended practices for transplanted paddy cultivation (puddling, transplanting of 25-30 days old 2-3 seedlings/hill at a spacing of 20 cm x 15 cm) to realize higher net profit on sequence basis as compared to farmers practice.

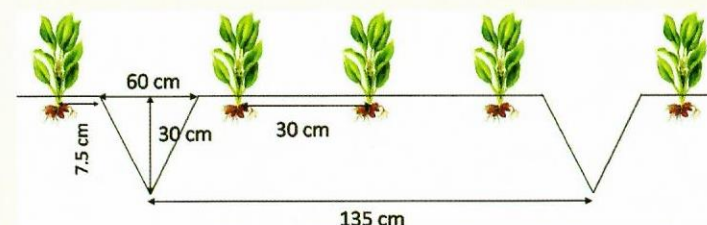
(Confirmation of earlier recommendation)

### 3. Agronomic evaluation of Bt Cotton hybrid (RCH-2) under varied crop geometry and NP levels

The farmers of South Gujarat Zone growing Bt cotton (RCH-2) under irrigated conditions are advised to sow the crop at 120 cm x 45 cm spacing and fertilize @ 240 kg N/ha in three equal splits i.e. 50% as basal, 25% at branching and 25% at squaring to obtain higher yield and net profit. If the available P status is marginal to deficient, farmers are advised to apply P<sub>2</sub>O<sub>5</sub> @ 40 kg/ha as basal.

### 4. Effect of land configuration and soil conditioners on yield of turmeric

The farmers of South Gujarat Heavy Rainfall Zone (AES-III) growing turmeric in clay soil are advised to apply PM based bio-compost @ 25 t/ha as soil conditioner at the time of land preparation in addition to RDF (60:60:60 NPK kg/ha) and plant three rows of turmeric on raised bed, prepared by opening 60 cm wide and 30 cm deep furrows 135 cm apart to obtain higher rhizome yield and net realization.



### 5. Seed production potential of oat as influenced by time of cutting and nitrogen application



The farmers of South Gujarat Heavy Rainfall Zone (AES-III) growing oat for seed purpose are advised to avoid green fodder cutting for securing higher seed yield and net income. The crop should be fertilized with 120 kg N/ha in three equal splits i.e. at basal, 30 and 45 DAS. Phosphorus @ 30 kg/ha should also be applied as basal.



## [C] Nutrient management

### 1. Integrated nutrient management in palmarosa



The farmers of AES-III of South Gujarat Heavy Rainfall Zone growing palmarosa are advised to fertilize the crop with 15 t FYM, 150 kg N and 60 kg  $P_2O_5$ /ha/year to achieve higher oil yield and net profit. The phosphorus should be applied as basal, while N should be applied in three equal splits i.e. 50 kg N as basal and 50 kg N

after each cutting. The potassium application should be made on soil test basis.

### 2. Foliar application of $KNO_3$ to increase the yield and quality of hybrid cotton

The farmers of South Gujarat Zone growing cotton (G.Cot.Hy-10) under irrigated conditions are advised to apply spray of 3%  $KNO_3$  at squaring, flowering and boll development stages besides RDN (240 kg/ha) for getting higher seed cotton yield and net profit.

### 3. Phosphorus management in *rabi* lucerne and its residual effect on succeeding *kharif* fodder Sorghum grown under different fertility levels

The farmers of South Gujarat Heavy Rainfall Zone (AES-III) growing lucerne-fodder sorghum in sequence are advised to fertilize lucerne with 50 kg  $P_2O_5$ /ha through SSP along with VAM @ 2 kg/ha. The succeeding fodder

sorghum should be fertilized with 50 per cent of recommended dose (40 kg N + 20 kg  $P_2O_5$ /ha) to obtain higher fodder yields and net profit.

## [C] Water management

### 1. Study on drip layout with different dripper discharge rates in onion grown on clay soil

The farmers of South Gujarat Heavy Rainfall Zone growing onion after *kharif* paddy are advised to adopt drip method of irrigation to obtain higher bulb yield and net profit over conventional method of irrigation.



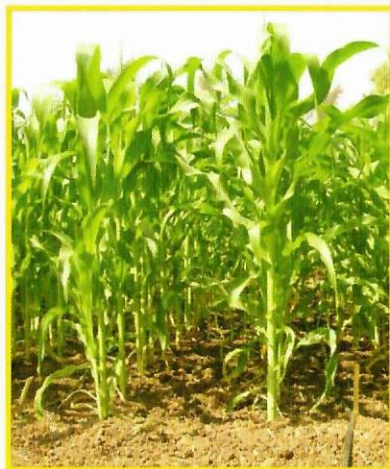
The system details are :

Lateral spacing (cm)	= 80	
Dripper spacing (cm)	= 80	
Dripper discharge (lph)	= 4	8
Operating pressure (kg/cm <sup>2</sup> )	= 1.25	1.25
Operating time		
Jan-Feb	= 40 min	20 min
March	= 50 min	25 min
April	= 1 hr 15 min	40 min
Operating frequency	= Alternate day	Alternate day



## 2. Drip design and fertigation study in sweet corn

The farmers of South Gujarat Heavy Rainfall zone (AES-III) growing sweet corn during *rabi* season are advised to adopt drip method of irrigation along with fertigation of N and K (120:60:60 NPK kg/ha) for getting higher yield and net profit. N and K fertigation should be done in 5 equal splits starting from 30 DAS. Full dose of P should be applied as basal.



The system details are :

Lateral spacing (cm)	= 120
Dripper spacing (cm)	= 100
Dripper discharge (lph)	= 8
Operating pressure (kg/cm <sup>2</sup> )	= 1.25
Operating time	
Dec-Jan	= 50 min
Feb-March	= 65 min
Operating frequency	= Alternate day

### [D] Precision farming

#### 1. Large scale testing of precision farming technologies in papaya

The farmers of South Gujarat growing papaya are recommended to adopt following package of practices for higher fruit yield and net profit besides 40% saving in water.



- 1) Planting : 2.5 m x 2.5 m
- 2) Drip irrigation schedule :  
    Winter : 20-30 l/plant, alternate day  
    Summer : 30-50 l/plant, alternate day  
    System details :
  - Lateral spacing : 2.5 m
  - Drinker spacing : 30 cm away on either side of stem
  - Drinker discharge : 8.0 lph
  - Operating pressure : 1.20 kg/cm<sup>2</sup>
- 3) Fertigation schedule : 200-200-250 g/plant (P as basal, N and K in 14 equal splits at an interval of 15 days starting after 30 days)
- 4) Black plastic mulch : 50 micron, 20 % coverage.

## III HORTICULTURE AND AGRO-FORESTRY

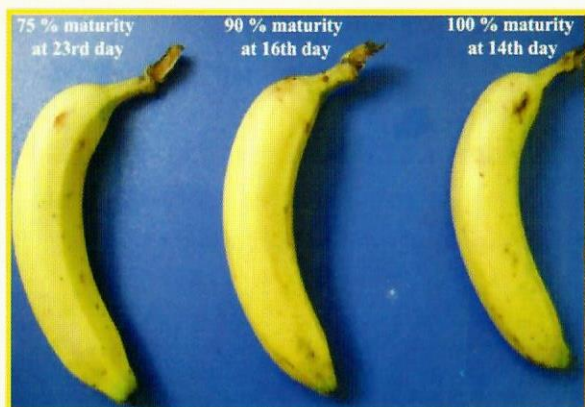
### [A] Fruit crops

#### 1. Effect of maturity and storage temperature on shelf life and quality of banana cv. Grand Nain

The farmers of South Gujarat Heavy Rainfall Zone (AES-III) growing banana cv. Grand Nain under medium black and clay loam soils are recommended to harvest banana (i) at 75% maturity stage (75 days after shooting ) and store the same in cold storage at 12° C for export



purpose (bunch weight will be less up to 19.55% at 75% maturity as compared to 100% maturity), (ii) at 90% maturity stage (90 days after shooting ) and store the same in cold storage at 14° C for distant market (bunch weight will be less up to 10.07% at 90% maturity as compared to 100% maturity), (iii) at 100% maturity stage (100 days after shooting) and store the same in cold storage at 16° C for local market. These treatments increased shelf life of banana fruits for 29.13, 25.17 and 21.00 days in i, ii and iii case, respectively without deterioration in quality.



## IV PLANT PROTECTION

### [A] Agricultural Entomology

#### 1. Management of eriophyde mite *Aceria guerreronis* in coconut

Farmers of South Gujarat growing coconut are recommended to adopt the package consisting of application of 50 kg FYM + 5 kg neem cake + 500 g magnesium sulphate + 50 g borax + 500:320:1200 g NPK in two splits/palm/year + crown spraying with azadirachtin 1500 ppm @ 30 ml/10 l of water thrice in a year to harvest

the higher number of healthy nuts and low incidence of eriophyde mite.

#### 2. Supervisory control of Pink bollworm (*Pectinophora gossypiella*) of cotton

Farmers of South Gujarat Agro-climatic Zone-II growing G.Cot.Hy-10 are advised for extended sprays against pink bollworm when pheromone trap catches cross the threshold of 8 male moths/trap for three consecutive nights which aids in reducing its incidence and damage.

#### 3. Evaluation of different insecticides for the control of mealybug (*Phenacoccus solenopsis*) in cotton

For effective management of mealybug (*Phenacoccus solenopsis*) in cotton, farmers of South Gujarat are advised to use imidacloprid 70 WG 0.00375% (0.53 g/10 l) or acetamiprid 20 SP 0.004% (2 g/10 l) or acetamiprid 20 SP 0.004% (2 g/ 10 l) + chlorpyrifos 20 EC 0.05% (25 ml/10 l) at 15 days intervals starting from initiation of the pest for higher yield and better returns.

### [B] Plant Pathology

#### 1. Evaluation of newer fungicides for the management of Sigatoka and Deightoniella leaf spot of banana

Farmers of South Gujarat (AES-III) are advised to spray validomycin 3L (10 ml/10 l) or carbendazim 12 WP + mancozeb 63 WP (10 g/10 l) or copper hydroxide (10 g/10 l) four times at 21 days interval starting after 8 months of planting for effective and economical management of Sigatoka leaf spot and Deightoniella leaf blight diseases of banana.



## 2. Management of grain discoloration in rice

The Paddy growers of South Gujarat Agro-climatic Zone are advised to apply three sprays of carbendazim 12 WP + mancozeb 63 WP 0.11% (15 g/10 l) or hexaconazole 5 EC 0.01% (20 ml/10 l) for effective control of grain discoloration and to harvest higher healthy grains and straw yield. The first spray should be given at boot leaf stage and the remaining two sprays thereafter at 10 days interval.

## 3. Biological control of angular leaf spot of cotton

The farmers of South Gujarat Agro-climatic Zone growing cotton are advised to give seed treatment with *Pseudomonas fluorescens* (Pf-1) @ 10 g/kg seeds + three sprays of *P. fluorescens* 0.2% (20 g/10 l) at 30 days intervals starting from 30 days after sowing for effective and economical management of angular leaf spot disease.

# V AGRICULTURAL ENGINEERING

## 1. Percolation pit for clay soils of South Gujarat



The farmers of coastal areas of South Gujarat are recommended to construct a percolation pit near their bore well, in the available natural depression/monsoon drain.

The pit of size 4.0 m x 3.0 m x 2.0 m (for a field of about 2 ha) along with 200 mm PVC strainer pipe, inserted before digging the pit upto first aquifer (about 12 m depth) for improving the ground water quality. The pipe should be about 0.6 m above ground with cap on top.

# Recommendations for Scientific Community

## I NATURAL RESOURCE MANAGEMENT

### 1. Studies on soil sodicity in relation to sugarcane grown under South Gujarat condition

- The critical limit of ESP for sugarcane grown on clay soils of South Gujarat is between 4.5 and 6.3. Such soils need gypsum application in conjunction with organics for achieving normal cane yield under South Gujarat condition.
- Soil samples should be collected at the time of sugarcane planting at 0-60 cm depth for appraisal of salinity/sodicity hazards.
- The equation for predicting  $EC_{2.5}$  at tillering stage based on  $EC_{2.5}$  values at the time of planting is  $Y = 0.2138 + 1.0092X$  ( $R^2 = 0.51^*$ ).  
Where, Y =  $EC_{2.5}$  value at tillering stage, X =  $EC_{2.5}$  value at planting.

### 2. Studies on soil sodicity in relation to sugarcane grown under South Gujarat condition

- Variety CoLK 8001 recorded higher cane yield than CoN 03131 under sodic soil situation.





- Increase in sodicity deteriorates soil physical properties (water stable aggregates and hydraulic conductivity) as well as quality parameters of sugarcane viz., juice purity and sucrose content in cane.

### 3. Impact assessment of "Yuva Tribal Juth" training (one month duration) organized by GGRC in collaboration with PFDC

The following conclusions have emerged from the impact assessment study.

- The receptivity of knowledge and extent of adoption was good in the trainees having educational level above SSC.
- Training on micro irrigation systems (MIS) helped in securing jobs to 20 % of the trainees.



### 4. Impact of trainers' training program on knowledge level of trainees

The following conclusions emerged from the impact analysis of trainers' training programme.

- The initial knowledge level of trainees was in the order : drip > fertigation > sprinkler > mulch > green house technology.
- The increase in level of knowledge of trainees after training was in the order of green house > sprinkler > mulch > drip > fertigation.

### 5. Integrated nutrient management in rice-castor (*rabi*) cropping system

Growing dhaincha as green manure crop prior to *kharif* paddy and application of recommended dose of fertilizer to paddy (100:30 NP kg/ha) and castor (80:40 NP kg/ha) gave higher yield of both the crops under south Gujarat heavy rainfall zone. The practice of nutrient management in paddy (*kharif*)-castor (*rabi*) sequence also sustained soil fertility.

## II PLANT PROTECTION

### [A] Agricultural Entomology

#### 1. Crop loss assessment against mango hopper

Mango hopper causes about 66.08% fruit loss which can be avoided by three sprays of recommended insecticides.



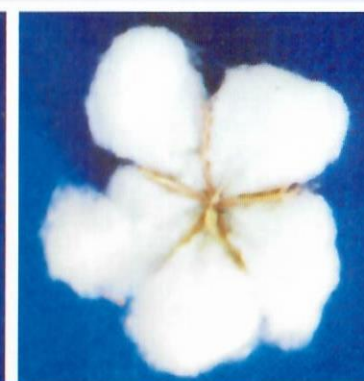
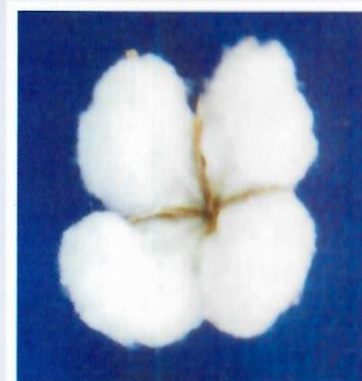


## 2. Impact of major abiotic factors on abundance of rose spider mite

The incidence of two spotted spider mite prevails round the year on rose under South Gujarat conditions. Lower population of mite was recorded during winter season and negligible during monsoon. Mite population increased with the increase of temperature and reached its peak during the month of May.



GN Rice-2



GN Cot-25



GN Turmeric-1