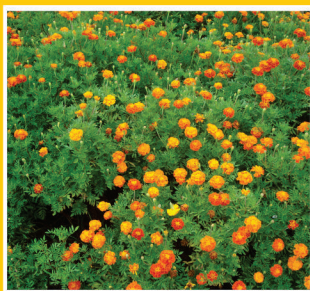


RESEARCH ACCOMPLISHMENTS AND RECOMMENDATIONS

2015



NAVSARI AGRICULTURE UNIVERSITY

DIRECTORATE OF RESEARCH
NAVSARI AGRICULTURAL UNIVERSITY
NAVSARI - 396 450 (GUJARAT)

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MESSAGE

It gives me an immense pleasure to mention that the publication entitled “Research Accomplishments and Recommendations-2015” provides the latest technologies or recommendations for farmers and scientific community developed by scientists of Navsari Agricultural University, Navsari during the year 2015. Compilation of these technologies in the form of a booklet would serve as a ready source of information to guide the extension agencies, scientists, students and farmers of the region. I congratulate to Dr. A. N. Sabalpara, Director of Research and Dean P.G. Studies, N.A.U., Navsari and his team for compiling and bring out this booklet giving these recommendations in such a succinct and nice manner. I also congratulate all the scientists for their contribution in the field of their specialization.

I do not hesitate to say that this compendium will be a valuable asset to scientific community as well as progressive farmers and entrepreneurs.

Navsari

(C. J. Dangaria)

Vice- Chancellor



Navsari Agricultural University
Navsari - 396 450

FOREWORD

I feel immense pleasure to put forth the latest edition of “Research Accomplishments and Recommendations - 2015” containing the latest technologies in agriculture and its allied field developed by the scientists of different faculties of this University for farming as well as scientific community of the state. I congratulate all the scientists who directly or indirectly involved in generating the new economically viable production technologies for various field crop and horticulture crops as well as in the field of agricultural engineering, post harvest and veterinary science. I am also thankful to all the conveners of respective sub-committee of Agricultural Research Council of Navsari Agricultural University and staff members of Directorate of Research, N.A.U., Navsari for preparation of this booklet.

I am highly indebted to Dr. C. J. Dangaria, Hon’ble Vice Chancellor of Navsari Agricultural University, Navsari for his constant guidance and support provided for bringing out this publication.

I hope that this booklet will be highly useful for those associated with agriculture and its allied fields. The technologies developed will definitely help to improve the agricultural production and welfare of the farming community of the state.

Navsari

(A. N. Sabalpara)
Director of Research & Dean
Faculty of P.G. Studies

RESEARCH RESUME

The research work carried out in different fields of agricultural sciences during the year 2014-15 has been very well discussed by different AGRESCO sub-committees of Navsari Agricultural University, Navsari for bring out useful and beneficial recommendations for farmers and scientific community. Finally, 31 and 48 recommendations for farmers and scientific communities, respectively were approved in the 11th Combined Joint AGRESCO meeting of SAUs held at AAU, Anand during on 7-9 April, 2015.

Location specific and economically viable production technologies were recommended by NRM group that covered various aspects like intercropping in *rabi* sorghum; cultural practices for sugarcane and pigeon pea; nutrient management for castor and wheat; water management in pigeon pea and annatto.

In the pursuit of increasing fruits, vegetables and flower production, recommendations emerged out were nutrients management in banana, mango, little gourd and brinjal, organic manures for organic cultivation of garlic, staking system for greater yam, sowing time for marigold, varietal assessment of mango and standardization of techniques for preparation of herbal *gulal*, banana central core jam and banana puree.

The achievements of plant protection group include control of *Helicoverpa armigera* in tomato, insecticidal control of mango hopper and thrips, banana rust thrips, sapota seed borer, management of powdery mildew in niger and residue analysis of many insecticides in pods of Indian bean and *ubadia* prepared from Indian bean.

Design of funnel shaped cooked stove developed by Navsari Agricultural University is recommended to rural artisans, manufacturers and general public.

Supplementation of garlic bulb for surti goat, treatment for sugarcane baggases used as fodder for animal during scarcity of fodder, optimum salinity level for rearing of banana shrimp and schedules and dosages of oral prophylactic treatment regimen for surti buffaloes to reduce post-partum oestrus and service period were 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. M. R. Naik	4 & 5-3-2015	-	-
2.	Natural Resource Management	Dr. J. G. Patel	16 & 17-3-2015	7	8
3.	Horticulture and Agro-forestry	Dr. B. R. Parmar	10 & 11-3-2015	17	6
4.	Plant Protection	Dr. Z. P. Patel	26 & 27-2-2015	2	21
5.	Agril. Engineering	Dr. N. M. Shah	23-2-2015	1	1
6.	Basic Science	Dr. R. M. Patel	19-2-2015	-	3
7.	Social Science	Dr. Narendrasingh	18-2-2015	-	3
8.	Animal Production and Fisheries Science	Dr. V. B. Kharadi	12-2-2015	3	2
9.	Animal Health	Dr. R. M. Patel	13-2-2015	1	4
10.	Joint AGRESCO		23-3-2015	-	-
Total				31	48

Recommendations for Farmers

I NATURAL RESOURCE MANAGEMENT

[A] Cropping system

1. Intercropping in *rabi* sorghum var. BP-53 under conserved soil moisture condition

Farmers of south Gujarat agro-climatic zone - II growing *grain* sorghum var. BP 53 under conserved moisture during *rabi* season, are advised to adopt paired row sowing of sorghum (45x20 cm -75 cm) with intercrop of greengram var. Co 4 for achieving higher yield and net return.



(Asstt. Res. Scientist, Agril. Res. Station, NAU, Tanchha,)

[B] Cultural practices

1. Plant geometry in relation to mechanization in sugarcane (plant and *ratoon* crop)

Sugarcane growers of south Gujarat heavy rainfall agro-climatic zone -I are recommended to grow sugarcane variety Co.N. 05071 with 120 cm normal row spacing for securing higher production and net return under mechanized cultivation.



(Res. Scientist, Main Sugarcane Research Station, NAU, Navsari)

2. Response of pigeonpea to different sowing methods and organic sources (*cv. Vaishali*)

The farmers of south Gujarat heavy rainfall agro-climatic zone-I growing pigeonpea *cv. Vaishali* under organic farming are advised to sow the crop at 90 cm x 20

cm and apply 12.5 kg N/ha from bio-compost and 12.5 kg N/ha from NADEP compost for getting higher yield and net return.

Note:

- Soil application of *Trichoderma* and *Pseudomonas* @ 2.0 kg/ha at the time of sowing.
- Spray alternatively 5% neemsastra and neem oil at 15 days interval starting from flowering.
- Keep 50 bird perchers and 40 pheromone traps (*Helicoverpa*)/ha at equal distance.
- Grow marigold as a trap crop in the field.



(Prof. & Head, Organic Farming Unit, SSAC, ACHF, NAU, Navsari)

[C] Nutrient management

1. Study on levels of nitrogen and intra-row spacing on yield of drip irrigated castor (*rabi*)

The farmers of south Gujarat heavy rainfall agroclimatic zone-I growing drip irrigated castor (GCH 4) during *rabi* season are recommended to sow their crop at 2.4 m x 0.6 m spacing. Further, they are advised to fertilize @ 160:40 NP kg/ha. The entire quantity of P and 10 % N should be applied as basal and remaining 90 % N should be applied through drip system in 10 equal spilt at an interval of 8-10 days starting from 15 DAS to get higher yield and net return.



System details:

Details	Operating time (Alternate days)	
	Month	Minutes
Lateral spacing: 2.40 m	November-December	1 Hrs. 30 min
Dripper spacing : 60 cm	January-February	2 Hrs.
Dripper discharge : 4 lph	March onwards	3 Hrs.
Operating pressure : 1.2 kg/cm ²		

(Research Scientist (Soil & Water), SWMRU, NAU, Navsari)

2. Effect of different organic sources on yield and quality of wheat grown on certified organic farm

The farmers of south Gujarat heavy rainfall agro-climatic zone-I growing wheat (cv. GW 496) organically, are recommended to apply RDN (120 kg N/ha) through biocompost, vermicompost and castor cake in 1:1:1 proportion on equivalent N basis and spray enriched banana pseudostem sap 1% or cow urine 1% at 15, 45 and 60 days after sowing for achieving higher yield, net return with superior quality of grain.



Note:

- Apply common dose of *Azotobacter* (Navsari isolate) biofertilizer @ 2 kg/ha.
- After 15 days of germination, apply three foliar spray of neem based pesticide at monthly interval.

- Maize should be grown as trap crop at the border.
- Sticky trap should be used @ 40 Nos/ha.

(Prof. & Head, Organic Farming Unit, SSAC, ACHF, NAU, Navsari)

[D] Water management

1. Feasibility of drip irrigation in pigeon pea (*rabi*) with and without mulch

The farmers of south Gujarat heavy rainfall agroclimatic zone-I growing pigeonpea (GT 102) during *rabi* season are advised to follow paired row sowing (60x20:120 cm) with drip irrigation at 0.4 PEF and mulching with black plastic (50 μ and 56 % coverage) for getting higher yield and net return with 49 % water saving over surface method of irrigation.



System details:

Details	Operating time (Alternate days)	
	Month	Minutes
Lateral spacing: 1.80 m	January	1 Hrs. 45 min
Dripper spacing : 60 cm	February	2 Hrs.
Dripper discharge : 3 lph	March -April	2 Hrs. 30 min
Operating pressure : 1.2 kg/cm ²		

(Research Scientist (Soil & Water), SWMRU, NAU, Navsari)

2. Effect of irrigation and fertigation levels on growth and yield of annatto (*Bixa orillana* L.)

The farmers of south Gujarat heavy rainfall agroclimatic zone-I intended to plant *Annatto* crop are advised to follow the spacing of 5 m x 5 m, apply RDF (60:40:40 kg NPK/ha/year) and give total 18-22 irrigations by surface method with an interval of 9-12 days during summer and 13-17 days during winter for getting higher yield and net return.

Farmers interested to adopt drip irrigation system with a saving of 75 per cent water and 40 per cent N and K fertilizer, are advised to apply 36:40:24 NPK kg/ha fertilizer. Phosphorus should be applied in ring with half dose before two months of monsoon and remaining half dose after cessation of monsoon. N and K should be applied in 10 equal splits at 10 days interval, of which five splits is to be applied in two months before monsoon and remaining five splits after cessation of monsoon through fertigation.



System details:

Details	Operating time (Alternate days)	
	Month	Minutes
Lateral spacing: 5.0 m	Oct.-Dec.	30 min
No. of drippers/plant : 6	January-March	40 min
Dripper discharge : 8 lph	April- June	50 min
Operating pressure : 1.2 kg/cm ²		

(Research Scientist (Soil & Water), SWMRU, NAU, Navsari)

II HORTICULTURE AND FORESTRY

[A] Fruit crops

1. Effect of post-shooting bunch spray of fertilizers on banana (*Musa paradisiaca* L.) cv. Grand Naine

The farmers of south Gujarat heavy rainfall zone growing banana cv. Grand Naine are advised to apply two spray of 1.5% Sulphate of Potash (SOP) on bunch after complete emergence and 15 days



after first spray to get higher yield with quality fruits. Keep the bunch covered with blue polythene sleeve (18 μ).

(Research Scientist, RHRS, ACHF, NAU, Navsari)

2. Effect of different organics on growth, yield and quality of mango cv. Kesar under high density plantation

The farmers of south Gujarat heavy rainfall zone intend to adopt organic farming in high density plantation (5 m x 5 m) adult mango cv. Kesar are advised to apply N 80 % of RDN from Neem Cake at 11.5 kg/tree (5.22 % nitrogen) with Azotobacter +



PSB (10^8 cfu) 50 ml each /tree in the month of June to get higher yield with quality production. It also improves the soil properties.

(Research Scientist, RHRS, ACHF, NAU, Navsari)

3. Effect of heading back and training on growth, flowering, yield and quality of fruit in old orchard of mango cv. Kesar

The farmers of south Gujarat heavy rainfall zone are advised to head back their high density planted (5 m x 5 m) old mango tree cv. Kesar at 4 to 5 m height from ground level and maintain 6 newly emerged tertiary limbs to get higher yield with quality production.



Note:

1. Rejuvenation should be done after completion of monsoon (in month of October).
2. For rejuvenation slant cut should be made and cut portion should be treated with copper fungicide.
3. Care should be taken for controlling stem borer by frequent visit of rejuvenated orchard.

(Research Scientist, RHRS, ACHF, NAU, Navsari)

4. Varietal trial in mango

The farmers of south Gujarat growing mango are advised to grow varieties Alphonso, Sonpari, Kesar and Banglora for higher production with good economic return. However, Malgoa, Mankurad, Fernandin, Bombay Green and Kishen Bhog are not economical under south Gujarat condition. Varieties Alphonso and Sonpari gave higher TSS.

(Research Scientist, AES, NAU, Paria)

5. Nutrient requirement under high density planting in banana cv. Grand Naine

The farmers of south Gujarat heavy rainfall zone (AES-III) growing banana cv. Grand Naine are advised to plant three (3) suckers/hill (in triangle fashion at 30 cm.) at 2x3 m (7x10



feet) spacing and apply 75 per cent recommended dose of fertilizers *i.e.* 225:67.5:150 N:P₂O₅:K₂O g/plant) for getting higher yield with higher net return. 10 kg FYM and 67.50 g P₂O₅/plant should be apply at planting, while 225 g N and 150 g K₂O/plant should be applied in three equal splits at 90, 120 and 150 days after planting.

(Assc. Res. Scientist, FRS, NAU, Gandevi)

6. Fertigation studies in banana cv. Grand Naine

The farmers of south Gujarat heavy rainfall zone (AES-III) growing banana cv. Grand Naine and using drip irrigation system are advised to apply 75 per cent recommended dose of N and K₂O



fertilizers *i.e.* 225 g N and 150 g K₂O/plant through drip at 15 days interval during the various growth stage as under for getting higher yield with higher net profit with 25 % saving of N and K₂O and 22 per cent saving of irrigation water.

Sr No	Growth stages	N and K ₂ O g/plant		No. of split
		N	K ₂ O	
1	During 3 and 4 month	67.5	30	4
2	During 5 and 6 month	112.5	60	4
3	During 7 month to flowering	45	48	2
4	Post shooting	00	12	1

10 kg FYM and 90 g P₂O₅ should be applied in pit at planting. The drip system should be operated for 90 minutes in winter and 150 minutes in summer everyday having two drippers of 4 lph spaced at 30 cm either side of pseudostem.

(*Assc. Res. Scientist, FRS, NAU, Gandevi*)

[B] Vegetable crops

1. Integrated Nutrient Management in Little gourd

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



Basal dose: Apply 10 t/ha well decomposed FYM, 25 kg N/ha through Bio compost on equivalent N basis alongwith 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.

(*Res. Scientist, Veg. Sci, ACHF, NAU, Navsari*)

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

The farmers of south Gujarat heavy rainfall agro-climatic zone (AES III) intend to grow brinjal variety *Surti Ravaiya* (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 :

- *Trichoderma viride* (Navsari isolate) 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.

(Res. Scientist, Veg. Sci, ACHF, NAU , Navsari)

3. Response of seed sowing on germination, growth, flowering and yield of spine gourd (*Momordica dioica* Linn.) cv. Local

The farmers of south Gujarat heavy rainfall agro-climatic zone (AES-II and 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.

(Res. Scientist, Veg. Sci, ACHF, NAU, Navsari)

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

The farmers of south Gujarat heavy rainfall agro-climatic 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 tonnes of FYM and 120:90:120 kg NPK/ha to obtain higher yield and net return.

(Asstt. Res. Sci, AICRP on Tuber crops, ACHF, NAU, Navsari)

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 100



kg N/ha (recommended dose) 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.

(Professor, NRM,ACHF, NAU, Navsari)

[C] Flower crops

1. Study of year round flower production in French marigold and its growth and development in relation to weather

The farmers of south Gujarat heavy rainfall zone-I (AES-III) cultivating marigold are advised to transplant seedlings of French marigold cv. Sparky Mix in first week of July to first week of August for higher flower production, better quality and economic return.



(Professor, Floriculture Department, ACHF, NAU, Navsari)

2. Study of year round flower production in African marigold and its growth and development in relation to weather

The farmers of south Gujarat heavy rainfall zone-I (AES-III) cultivating marigold are advised to transplant seedlings of African marigold cv. Pusa Narangi Gaiinda in first week of July to first week of August for higher flower production, better quality and economic return.



(Professor, Floriculture Department, ACHF, NAU, Navsari)

[D] Post Harvest Technology

1. Standardization of colour extraction technique from Palash (*Butea monosperma* L.) flowers for preparing herbal gulal

It is recommended that, the Palash (*Butea monosperma*) flower could be used for colour material extract using 50% methanol water based v/v solution at 60 °C temperature and 4 h process time. The



extracted dye can be used for production of herbal 'gulal'.

(Professor, PHT, ACHF, NAU, Navsari)

2. Standardization of Technology for Processing of Banana Central Core Jam

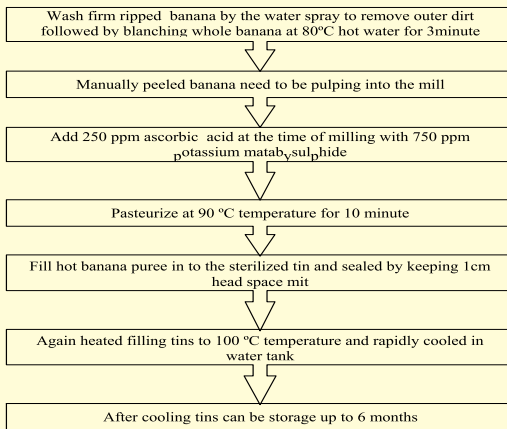
The processors and house wives are recommended to prepare banana pseudostem central core jam by replacing up to 50% fruits (mango, guava, papaya, pineapple) with central core. However, mix fruit jam with central core is most acceptable combination which not only reduce the production cost but also increase the fibre content of the jam without affecting jam quality.



(Res. Scientist, SWMRU, NAU, Navsari)

3. Optimization of level of temperature and KMS in processing of banana puree' from ripe banana at pilot scale

Processors are recommended to make banana puree with following below procedure:



(Res. Scientist, SWM, NAU, Navsari)

[E] Forestry

1. Growth and yield of Tannia (*Xanthosoma sagittifolium* L. Schott.) as affected by different pruning intensities of tree crops

The farmers of south Gujarat heavy rainfall zone (AES- III) growing *Terminalia arjuna*- Arjun Sadad, *Mitragyna parvifolia* -Kalam and *Adina cordifolia*- Haldu at 10 X 2.5 m spacing and



growing Tannia as an intercrop are advised to remove side branches up to 1/3 height of trees from ground level which is helpful in maximum utilization of land with additional income.

(Principal, College of Forestry, ACHF, NAU, Navsari)

III PLANT PROTECTION

[A] Agricultural Entomology

1. Bio-efficacy of some insecticides and neem products against *Helicoverpa armigera* (Hubner) on tomato

For effective control of tomato fruit borer, farmers of south Gujarat (AES III) are advised to apply two sprays of flubendiamide 20 WDG, 2.5 g/10 litre or chlorantraniliprole 18.5 SC, 3.0 ml/10 litre, first at the time of flowering and second at 15 days after first spray for obtaining higher yield and better return. Further, the residue content of these insecticides remained below MRL in tomato fruits after three days.

Recommendation for PHI as per CIB guidelines:

Year	Crop	Pest	Pesticide with formulation	Dose			Waiting period (days)
				Quantity of formulation	Conc. (%)	Dilution in water	
2015	Tomato	Fruit borer	Flubendiamide 20 WDG	25 g a.i./ha	0.005%	500 L	3
2015	Tomato	Fruit borer	Chlorantraniliprole 18.5 % SC	30 g a.i./ha	0.006%	500 L	3

(Asstt. Prof. (Ento.), Polytechnic (Horti.), NAU, Navsari)

2. Residues and dissipation of deltamethrin 2.8 EC in okra

The okra growers of south Gujarat heavy rainfall agro-climatic zone (AES III) are advised to observe one day pre harvest interval after the last spray of deltamethrin 2.8 EC when applied at 0.028% (10 ml in 10 litre water).

Recommendation for PHI as per CIB guidelines:

Year	Crop	Pest /Diseases	Pesticide with formulation	Doses			Waiting Period (days)
				Quantity of formulation	Conc. (%)	Dilution in water	
2015	Okra	Fruit borer, shoot borer and jassid.	Deltamethrin 2.8 EC	11.2 g a.i./ha	0.028 %	400 L	1.0

(Asstt. Prof., (Pesticide Residue), FQTL, NAU, Navsari)

IV AGRICULTURAL ENGINEERING

1. Design, development and evaluation of biomass based cook stove

Design of funnel shaped cooked stove developed by Navsari Agricultural University is recommended to rural artisans, manufacturers and general public for community cooking of 60-



70 number of meal using dry wood branches, which can reduce the fuel consumption by 3.97 kg/hr with average thermal efficiency of 20.19 % as compared to three bricks cooking chulha system.

(Principal, CAET, Dediapada)

V ANIMAL PRODUCTION AND FISHERIES

1. Study on banana shrimp growth under different water salinity levels

The farmers of coastal area of Gujarat undertaking brackish water shrimp culture are recommended to maintain pond water salinity of 30 to 40 parts per thousand (ppt) for better growth and economic returns in banana shrimp rearing.

(Res. Sci., Coastal Soil Salinity Res. Station, NAU, Danti)

2. In vitro evaluation of sugarcane bagasse treated with different level of urea and moisture

During the fodder scarcity, the farmers are recommended to treat 100 kg sugarcane bagasse with 3.5 kg urea in 40 liters of water and ensile it for three weeks to improve its crude protein content and digestibility.

(Prof. & Head, Dept. of Ani. Nutri., Vet. College, NAU, Navsari)

3. Evaluation of phytogetic feed additive supplementation on growth performance, nutrient utilization, anti-oxidants and health status of Surti kids

The Surti goat keepers are recommended to supplement garlic bulb (12 gram or 8-10 cloves/day) to the growing kids (5-6 months) for two months to achieve better growth rate and profit.

(Prof. & Head, Dept. of Ani. Nutri., Vet. College, NAU, Navsari)

VI ANIMAL HEALTH

1. Effect of polyherbal ecboic, minerals and vitamins supplementation as a prophylactic treatment regimen at time of calving on reproductive performance in Surti buffaloes

Day	Dosage of prophylactic treatment regimen
Day of calving	Commercially available 200 ml of polyherbal ecboic preparation + 200 ml oral calcium preparation with energy boosters + 10 ml Vit. A, D, E with selenium and biotin
2 nd to 5 th day	Commercially available 100 ml of polyherbal ecboic preparation + 100 ml oral calcium preparation with energy boosters + 10 ml Vit. A, D, E with selenium and biotin
6 th to 10 th day	Commercially available 100 ml oral calcium preparation with energy boosters + 10 ml Vit. A, D, E with selenium and biotin

The dairy farmers are advised to initiate the following oral prophylactic treatment regimen within 3 hrs of calving in Surti buffaloes for better economic benefits as it had significant effect to reduce post-partum oestrus and service period.

(Res. Sci. & Head, LRS, NAU, Navsari)

Recommendations for Scientific Community

I NATURAL RESOURCE MANAGEMENT

1. Impact of application of inorganic and organic inputs under rice (*kharif*)-rice (summer) crop sequence on water stable aggregates and aggregates associated organic carbon

Under south Gujarat heavy rainfall agroclimatic zone-I, last three years study on soil quality in an experiment on rice (*kharif*) - rice (summer) crop sequence with inorganic fertilizer in combination with various organic manures like FYM, castor cake, pressmud, poultry manure which was being carried out since 1996, it has been observed that application of pressmud @ 5 t ha⁻¹ + ½ recommended dose of NPK to *kharif* and summer rice is superior for maintaining higher content of macro-aggregates, higher aggregates mean weight diameter, better soil organic carbon and lower soil bulk density. Moreover, application of pressmud @ 5 t ha⁻¹ + ½ recommended dose of NPK to *kharif* rice has been found superior for storing higher quantum of organic carbon in micro-aggregates.

(Res. Scientist, Soil Science Department, NAU, Navsari)

2. Evaluating potential of different cropping systems with and without tillage, mulch and fertilizer level for soil organic carbon pool in relation to crop yield in soils of south Gujarat

Under south Gujarat heavy rainfall agro-climatic zone-I, last three years study on soil quality in an experiment with paddy- green manure- summer groundnut , paddy - rabi castor- continue and paddy- sorghum- green gram crop sequence under two type of tillage, mulch and fertilizer which has been carried out

since 2009, it has been observed that paddy - castor – continue sequence with residue incorporation and 25% higher dose of RDF under minimum tillage (no puddling, only planking) system is superior for maintaining good soil quality in respect to maintenance of higher organic carbon status and lower soil bulk density. However, for maintaining higher overall content of macro- aggregates and aggregates mean weight diameter, it was observed that either of the tillage or cropping systems with higher dose of fertilizer and mulch application would be helpful.

(Res. Scientist, Soil Science Department, NAU, Navsari)

3. Survey of nitrate (NO_3^-) levels and heavy metals in different vegetables available in Navsari market

The levels of nitrate and heavy metals were found in vegetables within safe limit as prescribed by Food Safety and Standards Authority of India and World Health Organization, (WHO). Handle and cook vegetables properly i.e. keep vegetables under refrigeration if they are not being cooked immediately; blanch high-nitrate vegetables in water and discard the cooking water before consumption.

(Prof. and Head, SSAC, NMCA, Navsari)

4. Analysis of rainfall variability and trends using 112 years of rainfall data over Navsari and Bharuch region

Rainfall analysis of 112 years rainfall data revealed that Navsari and Bharuch have shown increase trend in annual rainfall. At Navsari, rainfall is increasing @ 1.4 mm per year while at Bharuch, it is increasing @ 0.10 mm per year.

(Agril. Meteorology Cell, NMCA, NAU, Navsari)

5. Markov Chain and Incomplete Gamma distribution analysis of weekly rainfall for Navsari Region

The probability analysis of rainfall of Navsari revealed that Navsari get 1025.6 mm rainfall at 90 % probability. There is high probability (> 50 %) of getting sufficient weekly rainfall (40-80 mm) during 27-30 standard meteorological weeks (July 2 to 29).

(Agril. Meteorology Cell, NMCA, NAU, Navsari)

6. Analysis of climatic variability at Navsari and Bharuch region

Climatic trend analysis of Navsari and Bharuch stations revealed that maximum and minimum temperature are increasing @ 0.02 to 0.1 °C per year. While bright sunshine hour is decreasing @ 0.04 to 0.05 hours per year.

(Agril. Meteorology Cell, NMCA, NAU, Navsari)

7. Evaluation of different extractants and methods for the determination of P and K from soils

The soil analysts are suggested to use AB-DTPA as multi-nutrient extractants and ICP-MS as quantifying instrument to get accurate, precise, rapid and predictable results for P and K analysis in soil.

(Prof. and Head, F.Q.TL., NAU, Navsari)

8. Non Destructive Analysis of Protein, Fibre and Oil in Rice, Pigeon Pea and Soybean by NIR Analyzer

Considering the cost and time of analysis and safety, the laboratory analysts are suggested to use Near Infra-Red analyzer for the accurate and rapid estimation of protein,

oil and fiber content from rice, soybean and pigeon pea over routine methods *i.e.* Folin-Lowry method, Soxhlet method and Gravimetric method, when the samples are homogenous in nature.

(Prof. and Head, F.Q.T.L., NAU, Navsari)

II PLANT PROTECTION

[A] Agricultural Entomology

1. Residues of some insecticides in/on Indian bean pods

Following foliar application of thiamethoxam 25 WG (35 g a.i. /ha), novaluron 10 EC (33.5 g a.i. /ha), indoxacarb 14.5 SC (60 g a.i. /ha), spinosad 45 SC (75 g a.i. /ha), acetamiprid 20 SP (20 g a.i. /ha) and flubendiamide 39.35 SC (50 g a.i. /ha), PHI of 7 days was observed while, imidacloprid 17.8 SL (25 g a.i. /ha) it was ten days in Indian bean pods.

(Assoc. Prof. (Ento), Dept. of Ento., ACHF, NAU, Navsari).

2. Status of residues of insecticides in/on Indian bean after *Ubadia* preparation

The residues of imidacloprid 17.8 SL (25 g a.i. /ha), thiamethoxam 25 WG (35 g a.i. /ha), novaluron 10 EC (33.5 g a.i. /ha), indoxacarb 14.5 SC (60 g a.i. /ha), spinosad 45 SC (75 g a.i. /ha), acetamiprid 20 SP (20 g a.i. /ha) and flubendiamide 39.35 SC (50 g a.i. /ha) were observed below detectable level in *Ubadia* prepared from Indian bean.

(Assoc. Prof. (Ento), Dept. of Ento., ACHF, NAU, Navsari)

3. Integrated pest management in mango

IPM package consisting of first spray of spinosad 45 SC, 0.004%, 0.88 ml/10 litre water at panicle emergence stage followed by second spray with thiamethoxam 25

WG, 0.008%, 3.2 g/10 litre water at 21 days after first spray and third need based spray of Azadirachtin 1 EC, 30 ml /10 litre of water found effective for the management of mango hopper and thrips.

(Asstt. Res. Sci.(Ento), AES., Paria)

4. Management of banana rust thrips, *Chaetanophthrips signipennis*

For effective control of rust thrips in banana, inject the bud with one ml solution of 0.6 ml imidacloprid 17.8 SL (2 ml solution of 5 ml azadirachtin 10000 ppm mixed in one lit of water) at the time of emergence of flower (upright position).

(Asstt.Res.Scientist (Ento.), FRS., NAU, Gandevi)

5. Management of sapota seed borer *Trymalitis margarias* Meyrick

Sapota growers of south Gujarat heavy rainfall zone-I AES-III are advised to apply three sprays of profenophos 50 EC, 15 ml or novaluron 10 EC, 5 ml per 10 litre water at 20 days interval from October for effective management of seed borer.

(Asstt.Res.Scientist (Ento.), FRS., NAU, Gandevi)

6. Survey of natural enemies and occurrence of indigenous egg parasitoid, *Trichogramma* spp. using *Corcyra* egg cards in different vegetable crops

The activity of egg parasitoid, *Trichogramma* spp. found in Indian bean, cowpea, chilli, okra and tomato ecosystem while in brinjal ecosystem it did not appear under south Gujarat condition.

(Prof. and Head, Dept. of Ento., NMCA., Navsari)

7. Screening of carnation cultivars for the resistance to *Tetranychus urticae* Koch

Under the polyhouse conditions the carnation variety Domingo was highly tolerant to spider mite attack, while variety Famosa and Cherry Solar were medium tolerant and Gaudina and Garuda were tolerant whereas the variety Rubisco was highly susceptible to spider mite attack.

(Prof. and Head, Dept. of Ento., NMCA., Navsari)

8. Seasonal incidence of spider mite *Tetranychus urticae* (Koch.) (Tetranychidae: Acarina) infesting carnation under polyhouse conditions

The two spotted red spider mite, *Tetranychus urticae* Koch (Tetranychidae: Acarina) remains active throughout the crop season on carnation with the peak activities during first week of April. A significant positive correlation exist between spider mite population and average temperature whereas a significant negative correlation existed between mite population and average relative humidity under polyhouse conditions on carnation.

(Prof. and Head, Dept. of Ento., NMCA., Navsari)

9. To test out feasibility of mass rearing of *Chrysoperla zastrowi sillemi* (Esben - Petersen) under laboratory conditions

The teared accordance white coloured paper stripes (5 x 2 cm) found the best and feasible alternative method for group rearing of *Chrysoperla zastrowi sillemi* under laboratory conditions.

(Prof. and Head, Dept. of Ento., NMCA., Navsari)

10. Residue and dissipation pattern of bifenthrin, fipronil, chlorpyrifos and imidacloprid in clayey and sandy loam soils and their downward movement and leaching potential

Considering the leaching potential and depth wise distribution and chances of contamination of water, bifenthrin 10 EC, chlorpyrifos 20 EC and fipronil 5 SC should be preferred over imidacloprid 17.8 SL for the control of soil pests in sandy loam and clay soils.

Bifenthrin, chlorpyrifos, fipronil and imidacloprid can be used to control soil pests in sandy loam and clay soils due to their moderate persistency and strong adsorption in the soil.

(Asstt. Prof.(Pesticide Residue), FQTL, Navsari)

11. Screening of sugarcane varieties for early shoot borer resistance

Sugarcane genotypes viz., Co 08008, Co 08020, Co 08001 and 2007 N 469 are found less susceptible to early shoot borer.

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

12. Screening of sugarcane varieties for scale insect resistance

Sugarcane genotypes viz., Co 08008, 2007 N 535, 2007 N 469, CoSnk 08101, Co 08016 and VSI 08122 are found less susceptible to scale insect.

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

[B] Plant Pathology

1. Management of powdery mildew of niger

Two sprays of wettable sulphur 80 WP @ 2.5 g/litre, first

at the disease initiation and second after 15 days found effective for the management of powdery mildew of niger.

(Asstt.Res.Scit.(Patho), Niger Research Station, NAU, Vanarasi)

2. Screening for Resistance to *Fusarium* wilt in tomato varieties

Tomato genotypes viz., NTL-2, NTL-6, NTL-7 and NTL-10 are resistant, while genotype NTL-1, NTL-8, NTL-9, and GT-2 are moderately resistant against tomato *Fusarium* wilt.

(Assoc. Prof. (Pl. Path), Dept. of Pl. Patho., ACHF, NAU., Navsari)

3. Detection of fungal pathogen from forest tree seeds *in vitro*

Alternaria sp, *Aspergillus* sp., *Fusarium* sp, *Trichoderma* sp are found the most frequently associated fungal genera with six forest trees viz., *Tectona grandis* (Teak), *Leucaena leucocephala* (Subabul), *Delonia regia* (Gulmohar), *Acacia mangium* (Mangium), *Adenantha pavonina* (Ratangunj) and *Cassia fistula* (Garmalo) using blotter and agar plate method.

(Assoc. Prof. (Pl. Path), Dept. of Pl. Patho., ACHF, NAU. Navsari)

4. *In vitro* efficacy of isolated probiotic organism

Enterococcus faecium strain LAB1, *Leuconostoc mesenteroides* and *Leuconostoc pseudomesenteroides* shows the antimicrobial properties as well as produce good quality curd. Thus, these strains can be used for probiotic curd preparation.

(Assoc. Prof. (Pesticide Residue), FQTL, NAU, Navsari)

5. Screening of sugarcane varieties for red rot resistance

Sugarcane varieties viz., Co 08008, CoSnk 08101,

PI 08131 and 2007 N 469 are found to be moderately resistant to red rot by plug method.

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

6. Screening of sugarcane varieties for smut resistance

Sugarcane varieties viz., Co 08020, Co Snk 08101, 2007 N 535, 2007 N 469, 2007 N 390 and 2007 N 510 showed resistant reaction. While, Co 08001, VSI 08121 and Co 08016 exhibited moderately resistant reaction against smut disease.

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

7. Studies on mango malformation

The mango variety Himsagar showed consistently higher malformation. Therefore, this variety can be used as a susceptible check for screening of mango germplasm against mango malformation.

(Asso. Prof. (Pl. Path.), AES, NAU, Paria)

8. Bio-efficacy of fungicides against sorghum ergot

Effective and economic management of sorghum ergot can be done with two sprays of hexaconazole 5 SC @ 0.005% at an interval of 15 days commencing from 15 days after emergence of earheads.

(Asstt. Res. Sci. (Pl. Path.), MSRS, NAU, Surat)

9. Bio-efficacy of fungicides against sorghum grain mold

Effective and economic management of grain mold in sorghum is done with three sprays of carbendazim 12% + mancozeb 63% - 75 WP @ 0.2% at an interval of 15 days commencing from 15 days after emergence of earheads.

(Asstt. Res. Sci. (Pl. Path.), MSRS, NAU, Surat)

III HORTICULTURE AND FORESTRY

1. Chemical manipulation for higher yield and quality of banana cv. Grand Naine

Application of 250:90:250 g N:P₂O₅:K₂O/plant and one spray of 10 ppm 2,4-D five days after complete opening of bunch in banana cv. Grand Naine recorded higher productivity, net realization and BCR under drip irrigation system. The significant improvement in physical as well as qualitative properties of fruits was also reported in the said treatment. 10 kg FYM and 90 g P₂O₅ were applied at planting, while N and K₂O each @ 250 g/plant were applied in three equal splits at 90, 120 and 150 days after planting.

(Associate Res. Scientist, FRS, NAU, Gandevi)

2. Study of genetic variability in tamarind (*Tamarindus indica* L.) from South Gujarat

On the basis of overall performance, tamarind genotypes GT-1 and GT-5 were found to be promising among all genotypes for yield and quality parameters, respectively. Whereas, for pulp recovery of above 45 percentage, tamarind genotypes GT-1, GT-2, GT-5, GT-10, GT-11 and GT-12 were found to be promising, so these genotypes may further assessed on different locations after propagating vegetative or may be exploited as potential parents to develop qualitative and high yielding stable genotypes.

(PC, KVK, Waghai, and Assoc. Res. Sci., AES, Paria, NAU)

3. Optimization of Level of TSS and Anti-Caking Agent in Spray Solution for Preparing Powder from Ripe Banana at Pilot Scale

For preparing spray dried banana powder, use 10° Brix spray solution of banana puree after adding 15 %

Maltodextrin as anti-caking agent. Spray should be done by keeping feed flow rate 35.0 kg/hr, feed temperature 70 °C, inlet temperature 170 °C and outlet temperature 100 °C for minimizing the sticking issue of banana puree in the inner chamber of spray drier.

(Res. Scientist, SWMRU, NAU, Navsari)

4. **Rapid multiplication of *Bambusa vulgaris* through in vitro regeneration techniques from juvenile explant**

It is recommend to scientific community and tissue culture industries involved bamboo tissue culture that to get rapid multiplication of *Bamboosa vulgaris L.* through *in vitro* regeneration from juvenile explants using tissue culture technique to use auxiliary bud as explants source and absolute alcohol (100%) for 30 Sec + mercuric chloride (0.1%) for 4 min. for contamination control and maximum establishment. Whereas, for shoot multiplication, culture established on simple MS media followed MS + 1mg/l BAP + 0.25 Kin. However, for rooting it is advice to use MS + 20mg/l IBA which gives highest rooting percentage and for acclimatization FYM + Soil + Cocopeat (1:1:1).

(Principal, College of Forestry, ACHF, NAU, Navsari)

5. **Rapid multiplication of *Dendrocalamus strictus* Nees. through in vitro regeneration techniques from juvenile explant**

It is recommend to scientific community and tissue culture industries involved bamboo tissue culture that to get rapid multiplication of *Dendrocalamus strictus L.* through in vitro regeneration from juvenile explants using tissue culture technique for large scale multiplication of the plantlets in which farmers can get true to type plants with all the advantages of vegetative propagation (clonal propagation). it is recommended to use auxiliary bud as

explants source and absolute alcohol (100%) for 30 Sec + mercuric chloride (0.1%) for 4 min. for contamination control and maximum establishment. Whereas, for culture establishment and for shoot multiplication it is advise to use MS liquid media with 2.0 mg/lit BAP. However, for rooting it is advice to use MS + 1.5mg/l NAA + 3mg/l IBA and for acclimatization it is advice to use FYM+ Soil + Cocopeat (1:1:1).

(Principal, College of Forestry, ACHF, NAU, Navsari)

6. Collection and evaluation of *Mucuna* germplasm from south Gujarat for L-DOPA and protein content

For higher L-DOPA (L-3, 4-dihydroxyphenylalanine) it is advisable to collect *Mucuna* from Valsad, Chikhali, Budhakeshwar village (Navsari Mahuva road), Bardoli and Vyara. Breeders willing to enhance L-DOPA content in *Mucuna pruriens* may incorporate accessions namely 29, 10, 14 and 13 in breeding stock.

(Principal, College of Forestry, ACHF, NAU, Navsari)

IV AGRICULTURAL ENGINEERING

1. Rapid Data Mining approach for improvement in co-operative operations: A case of Amalsad co-operative with special reference to Sapota value chain

The software developed by NAU using Amalsad co-operative with special reference to Sapota value chain case study can be replicated for other co-operative societies of south Gujarat region trading in Sapota.

(Director of IT, NAU, Navsari)

V BASIC SCIENCE

1. Screening of cotton genotypes for water stress tolerance

Cotton entries GSHV-162 and H-1454/12 were

found drought tolerant, whereas RHC-0717 and BS-79 were found drought susceptible based on physiological parameters, yield stability index, drought susceptibility index, root length and yield related factors.

(Research Scientist, MCRS, NAU, Surat)

2. Characterization of pectate lyase in banana

Best stage for maximum recovery of pectate lyase (PEL) enzyme from Grand Naine banana pulp is 4 days after 5% ethrel treatment. Optimum activity of PEL enzyme is obtained in 20mM sodium phosphate buffer at pH 8.5 and temperature 37 °C. PEL enzyme activity was increased by two thiol group chemicals (cystine and cysteine at 5.0 mM concentration) and one metal ion i.e. Mg^{2+} as $MgCl_2$ (0.6 mM concentration), where as phenolics (ferulic acid, caffeic acid, p -Coumaric acid and salicylic acid), reducing agents (ascorbic acid and sodium metabisulphite), thiol groups (β -ME and DTT) and metal ions (Ba^{2+} , Co^{2+} , Cu^{2+} , Fe^{2+} and Zn^{2+}) were identified as inhibitor of PEL enzyme.

(Prof. and Head, Dept. of Pl. Molecular Bio. and Biotech., ACHF, NAU, Navsari)

3. Effect of nano-micronutrients (Zn and Cu) on physiology and stevioside production in stevia

In the micro propagation of stevia, nano particles (< 50 nm) of ZnO (10 μM) and CuO (0.05 μM) can be incorporated in place of $ZnSO_4$ & $CuSO_4$ in the MS medium for getting more number of shoots per culture, higher fresh weight, dry weight & stevioside content (1.40% FW).

(Prof. and Head, Dept. of Pl. Molecular Bio. and Biotech., ACHF, NAU, Navsari)

VI SOCIAL SCIENCE

1. Optimum plot size in banana crop

For obtaining reasonable low C.V. % in Banana crop (cv. Grand Naine) experiment, it is advised to conduct field experiment with net plot size of 4.8 m x 2.4 m i.e. 2 x 2 plants when spacing is 2.4 m x 1.2 m for Navsari conditions.

(Associate Professor (Ag. Stat.), ACHF, NAU, Navsari)

2. Uniformity trial in rainfed pigeon pea

To achieve more precision in field experiment on rainfed pigeon pea (variety GT-1), scientists are advised to conduct their experiment with net plot size of 5.4 m x 4.8 m for AES-V of SGHRZ.

(Associate Professor (Ag. Stat.), CoA, NAU, Bharuch)

3. Data mining approach for improvement in co-operative operations: A case of Amalsad co-operative with especial reference to Sapota value chain

It is recommended to give feedback to respective AGRESKO subcommittee for developing appropriate package of practices to realize better prices of sapota during the months of December and January.

(Director of IT, NAU, Navsari)

VII ANIMAL PRODUCTION AND FISHERIES SCIENCE

1. *In vitro* evaluation of sugarcane bagasse treated with different level of urea and moisture

Treatment of sugarcane bagasse at level of 3.5% urea and 40% moisture ensiled for three weeks improves nutritive values, *in vitro* digestibility of dry matter (27.7%) and organic matter (29.9%) and VFA production by 4 units as compared to untreated.

(Prof. & Head, Dept. of Animal Nutrition, Vanbandhu Vet. College, NAU, Navsari)

2. Evaluation of phyto-genic feed additives supplementation on growth performance, nutrient utilization, antioxidants and health status of Surti kids

Supplementation of garlic bulb (2% DMI) to the growing Surti goat kids (5-6 months) for two months improves utilization of protein and fibre with higher retention of nitrogen (0.94 g/d) accompanied by improved feed conversion efficiency (18.29%) and oxidative status

(Prof. & Head, Dept. of Animal Nutrition, Vanbandhu Vet. College, NAU, Navsari)

VIII ANIMAL HEALTH

1. Eco-friendly plastination technology for preservation of biological specimens

Plastinated specimens are odourless, dry and everlasting teaching aids and overcomes the existing formalin embalmed preservation method having various health hazards.

(Prof. & Head, Dept. of Vet. Anatomy, Vanbandhu Vet. College, NAU, Navsari)

2. 1) Studies on pharmacokinetics and pharmacodynamic relationship of Cefquinome in cow calves; 2) Studies on pharmacokinetics and pharmacodynamic relationship of Cefquinome in goats

Based on pharmacokinetics and pharmacodynamics relationships of cefquinome in cattle and goat, it is recommended that a dose of 20 mg/kg repeated at 8 h interval after intravenous and 12 h after intramuscular administration is sufficient to maintain %T>MIC above 60% of dosage interval for bacteria with MIC values <0.4 µg/ml.

(Prof. & Head, Dept. of Vet. Pharmacology & Toxicology, Vanbandhu Veterinary College, NAU, Navsari)

3. Evaluation of gene specific primer sets in the molecular detection of *Anaplasma* organism in bovine

The *msp5* gene primers (forward: 5'-GTG TTC CTG GGG TAC TCC TAT GTG-3' and reverse: 5'-AAG CAT GTG ACC GCT GAC AAA C-3') are useful for specific detection of *Anaplasma marginale* in bovines with 576 bp amplicon using PCR.

(Prof. & Head. Dept. of Vety. Para., Vanbandhu Veterinary College, NAU, Navsari)

4. Ultrasonography, diagnosis and surgical management of abdominal disorders in bovines

- (I) Distended intestinal loops through right flank and collapsed intestinal loops through ventro-lateral abdominal view using 3.5 to 5 MHz convex probe is suggestive of intestinal obstruction, whereas bull's eye appearance using 6-8 MHz trans-rectal probe is confirmatory for diagnosis of intussusceptions in bovines.
- (II) Presence of reticular motility at 5th right inter-costal space (ICS) in advanced pregnant animal is normal but is suspected for diaphragmatic hernia in recently calved animals. Presence of reticular motility at 4th right inter-costal space in advanced pregnant and recently calved animals is confirmatory diagnosis of diaphragmatic hernia on ultrasonography in bovines.

(Prof. & Head. Dept. of Vety. Surgery & Radiology, Vanbandhu Veterinary College, NAU, Navsari)

Note: Novaluron, thiamethoxam, indoxacarb, spinosad, acetamiprid, flubendiamide, and imidacloprid for Indian bean; spinosad for mango; imidacloprid for banana; novaluron and profenofos for sapota; wettable sulphur for niger; hexaconazole and carbendazim for sorghum are not recommended for farmers as per CIB guideline, here these pesticides are recommended only for research purpose to control insects and diseases at present. These may be recommended to farmers after fulfilling pre-requisite by concerned scientist as per CIB guidelines in future.

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NAUROJI SEEDS

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FOR SEED TREATMENT.....	POISON PACKET KEPT INSIDE જીરોને માટે અપાયેલ રૂંધે ઓળખ..... જી નીચેના ટેકા ઉપર.
DO NOT USE FOR FOOD, FEED OR OIL PURPOSE ખાંસ, દવા અને અન્ય ઉપયોગમાં લેવાઈ શકે નથી.	
	<p>CROP : Paddy રૂંધે :</p> <p>VARIETY : રૂંધે :</p> <p>STAGE : Breeder/Foundation રૂંધે : Certified/Labeled</p> <p>LOT NO. : રૂંધે :</p> <p>YEAR : 20 - 20 રૂંધે : 2 00 - 10</p> <p>NET WEIGHT : 2 Kgs. નેટ વજન : ૨ કીગ્રા</p> <p>SALE PRICE (Per 200gms) વેચવાનો દરજી (૨૦૦ ગ્રામ માટે) રૂંધે :</p>
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PADDY-	Jaya, Gurjari, Masuri, GR-3, GR-4, GR-5, GR-7, IR-26, NAUR-1, GMR-2, GMR-3 GI-38, GI-41, CSV-21F,GFS-5
SORGHUM-FINGERMILLET-VARI-	GN-4, GN-5 GV-2
WHEAT-	Lok-1, GW-496
PIGEONPEA-	VAISHALI, GT-1, GT-102
GREENGRAM-	MEHA, Co-4
BLACKGRAM-	GU-1
GROUNDNUT-	GG-6, GG-2
CASTOR-	GC4-7, VP-1
MUGGER-	GN-1, NRS-96
SOYBEAN-	JS-335
COTTON-	G.Cot-23, G.CotN-25
TURMERIC-	NVST-1
CHICKPEA-	GG-2
INDIANBEAN-	G.Wal-1, G.Wal-2

CERTIFICATION VOID WITHOUT TAG AND SEAL અનુમતિ રૂંધે વગર ટેગ અને સીલ વિના પેકેટમાં ઉપયોગ કરવામાં નહીં લેવાય.	
FOR SEED TREATMENT.....	POISON PACKET KEPT INSIDE જીરોને માટે અપાયેલ રૂંધે ઓળખ..... જી નીચેના ટેકા ઉપર.
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	<p>CROP : રૂંધે :</p> <p>VARIETY : રૂંધે :</p> <p>STAGE : રૂંધે : Breeder/Foundation</p> <p>રૂંધે :</p>
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