



# Agricultural Engineering Department

Agricultural Engineering is the important part of agriculture to enhance the productivity and to improve the life style of human as well as enrich the economic growth of the country. The department of Agricultural Engineering of N.M College takes its foot print in the year 1965 with the immense responsibility taken by Dr. L.G. Thakkar followed by DR. R.S. Ram, DR. P.M Maheta, DR. M. Malik, DR. A.K. Bhattacharya, DR. M. Malik, Prof. S.P. Shukla, Prof. A.L. Chalodia and since walk along with other branches of N.M college with conveying all the activities by Dr. G G Radadia and his staff. To Keep the goal of transfer improve technology and modern implements from lab to land to swell the knowledge among the field level farmers who are the real hero of the country to improve food security, as well as to born new mind by trend the students to create the mild stone for the society, the department was started its journey since till date.

## TEACHING:-

### U.G. Courses .....

Sr. no.	Course no.	Semester	Title of the Course and credit	
1	Maths. 1.1	First	Bio-Mathematics	2(2+0)
2	Ag. Engg. 2.1	Second	Fundamentals of Soil, Water and Conservation Engineering	3(2+1)
3	Ag. Met. 2.1	Second	Agricultural Meteorology	3(2+1)
4	Ag. Engg. 3.2	Third	Farm Power and Machinery	2(1+1)
5	Ag. Engg. 5.2	Fifth	Protected Cultivation and Post Harvest Technology	2(1+1)
6	Ag. Engg. 6.3	Sixth	Renewable Energy	2(1+1)
7	Ag. Met. 8.2.	Eight	Remote Sensing, GIS and Land use planning	3(1+2)
Total				17(10+7)

## P.G. Courses .....

Sr. no.	Course No.	AGRICULTURAL METEOROLOGY	
1	AGM-501	Fundamentals of Meteorology and Climatology	3(2+1)
2	AGM-502	Fundamentals of Agricultural Meteorology	3(2+1)
3	AGM-503	Micrometeorology	3(2+1)
4	AGM-504	Agro-meteorological measurements and instrumentation	3(1+2)
5	AGM-506	Crop weather models	3(1+2)
6	AGM-508	Principles of remote sensing and its applications in agriculture	3(2+1)
7	AGM-602	Weather forecasting	3(2+1)
8	AGM-591	Masters seminar	1(0+1)
Total			22(12+10)

## Research Schemes (Plan) of the department .....

1. Research and Development of Agricultural Implements for Black Soil of South Gujarat
2. Establishment of Agro-Meteorological Cell at Agriculture College.
3. Research on Tillage Technology for rice and sugarcane production in South Gujarat
4. Establishment of Agricultural Engineering Polytechnic College under Vanbandhu Kalyan Yojna
5. Gramin Krishi Mausam Seva (GKMS)
6. Forecasting Agricultural output using Space, Agrometeorology and land based observations (FASAL)

## On-going research.....

1. Determining feasibility of an on farm reservoir for rice based cropping system in south Gujarat under climatic change scenario
2. Evaluation of the laser leveled land leveling technology on crop yield, water use productivity & growth of Banana crop in South Gujarat.
3. Influence of land configuration on productivity of Sorghum (Sorghum bicolor L.) Crop in Vertisol of South Gujarat
4. Effect of tillage practices on sugarcane production

## 5. Testing and Modification of sugarcane planter

### Extension activity .....

#### Extension activities by the staff of the department:-

- Arrange farmers trainings & farmers seminars
- Publication of popular article in Gujarati, hindi & English.
- Arrangement of seminar related to farm mechanization and climate change
- Krushi Mela & KrushiMahotsav Programme
- Exhibitions related to farm instruments
- Agro-climatic information & news letter services for seven districts
- Working as assistant administrative officer
- Participating hostel checking squad committee
- Active participation in anti ragging squad committee
- All staff are actively participating in Student advisor committee
- Staff effectively participated in University women- harassment cell
- Published weather bulletins



#### Publication by the Department

- ✚ Research papers published :- 60 (national and international journals),
- ✚ Manuals :- 5
- ✚ Book :-1, Pamphlet :-1
- ✚ Popular articles :-150
- ✚ Leaflets :-5
- ✚ News letter or weather bulletins :-300.



#### Participation in Seminar, Workshop, Symposium, Conference and Training

The faculty members of the department got the opportunity to participate in:-

- Seminars : 35
- Workshops: 25



- Symposia : 5
- Conferences : 20
- Training : 12

## Recommendation:-

<b>Recommendations by A. L. Chalodia (ENGINEERING)</b>				
Sr. No	Title of Experiment	RECOMMENDATION	Agresc o No.	Year
1.	<b>Study of water requirement under each and alternative furrow method of irrigation for cabbage using low discharge solar photovoltaic system</b>	<b>It is recommended that cabbage crop can be grown by 15 to 20 meter long furrow applying 5 cm depth of water at 8 days interval using low discharge solar photo-voltaic pumping system at 3 to 5 m lift</b>	25	1994
2.	<b>Study on suitability of low discharge solar photo-voltaic pumping system for cowpea</b>	<b>It is recommended that 15 to 20 m long furrow can be used to grow summer cowpea by applying water at 7 days interval till it reaches to the down stream end of each furrow (50 mm depth) using solar photo-voltaic pumping system. (Capacity 50,000 lit/day at 3 to 5 m total head)</b>	27	1996
3.	<b>Study on adaptability of low discharge solar photo-voltaic pumping system for gram</b>	<b>It is recommended 2.5 X 2.25 m check basin can be used to grow rabi gram by applying 40 mm depth of water at 20 days interval using low discharge solar photo-voltaic pumping system</b>	29	1998
4.	<b>Study on drip irrigation method for ridge gourd</b>	<b>The farmers of South Gujarat heavy rainfall zone III are advised to adopt drip irrigation system for summer turia variety jaipuri (Ridge guard). The crop can be grown by applying water for 5 hours at 2 days interval using 4 lit/hr capacity on line dripper fitted at one meter distance with two meter lateral spacing under heavy black soil. So, as to save about 21 per cent water with 34 per cent higher yield, which result in about 55 per cent higher net income as compare to the surface irrigation method</b>	29	1999
5.	<b>Study on sprinkler irrigation method for Rabi sorghum</b>	<b>The farmers of South Gujarat heavy rainfall zone III are advised to sorghum during rabi with 7 irrigation on 1, 10, 25, 40, 80 and 100 days after of sowing. The required irrigation depth can be given by operating sprinkler systems for 3.5, 1.75, 2.75, 2.75, 4.5, 4.5 and 4.5 hrs, respectively. The method can give 28</b>	29	1999

		per cent more yield and 61 per cent higher net income as compare to surface method. (The application losses can be reduced by using 0.90 m rises for first four irrigation, 1.35 m for fifth irrigation and 1.80 m for sixth and seventh irrigations. Sprinkler spacing of 12 m x 12 m with 2.5 kg/sq.cm. operating pressure.)		
6.	Design and development of paddy transplanter	It is recommended that the developed manually operated 6-row paddy transplanter having capacity 0.38 ha/day costing Rs. 7500/- and giving Rs. 1480 per hectare saving in transplanting cost should be released for benefit of farmers	32	2002
7.	Irrigation of new Mango Plantation through Oozy pipes by low head solar pumping system	The farmers of South Gujarat agro climatic zone (AES-III) growing mango (Kesar) new plantation are advised to adopt Oozy pipes irrigation system at 0.9 PEF for achieving better growth. The pipes (16 mm ID) should be placed 2 m away from trunk around the tree at 20 cm below ground level and operated at 0.4 kg/cm <sup>2</sup> . During establishment stage of mango i.e. 1, 2 and 3 years, apply water of 36, 140 and 160 liters on every alternate day, respectively. During stage of mango 4, 5 and 6 <sup>th</sup> years age, apply water 156, 160 and 200 liters on every alternate day, respectively.	4(NAU )	2009
8.	Study of effect of drainage on banana production in South Gujarat	Farmers of South Gujarat Heavy Rainfall Zone (AES-III), growing banana cv. Grand Naine with surface method of irrigation are advised to follow 45cm deep open drainage system(bottom width 15cm,top width105cm) spaced 12 m apart with 1:1 drain side slope to achieve higher yield and maximum net return.	12(NAU)	2015
9.	Effect of laser leveling on crop water requirement and growth of castor crop	Farmers of South Gujarat Heavy Rainfall Zone (AES-III), growing irrigated castor (GCH-7) during rabi season are advised to adopt laser land leveling technique to provide 0.045 per cent longitudinal slope to castor field for getting higher castor yield, net return and water saving.	12(NAU)	2015
<b>Recommendations by Neeraj Kumar (Meteorology )</b>				
10	Analysis of rainfall variability and trends using 112 years of rainfall data	It is recommended that the Navsari and Bharuch region of south Gujarat is highly sensitive for south west monsoon rainfall.		2015

	<p><b>over Navsari and Bharuch region</b></p>	<p>An increase of 304.64 mm in rainfall have been noticed for Navsari district during the study period of 112 years as against the normal rainfall of 1517.90 mm and 39.98 mm decline for Bharuch was noticed during the study period against the normal rainfall of 972.10 mm. Time series model based on Croxten <i>et al.</i>, (1988) revealed the future increase in rainfall for both stations. Mode analysis shows that under class interval of 1400 to 1599 has highest number of events of rainfall i.e. 21 out of 112 years of Navsari region and for Bharuch region 32 events of rainfall were found under interval 800 to 999.</p> <p>At Navsari the intensity of occurrence of moderate and mild droughts were about once in 3.6 years. While, severe excess, moderate excess and mild excess rainfall years were found once in 11.2, 7.0 and 4.6 years, respectively.</p> <p>At Bharuch the severe, moderate and mild droughts were occurred once in 18.6, 7.4 and 2.9 years, respectively. While, severe excess, moderate excess and mild excess rainfall cases were observed once in 16.0, 7.4 and 3.6 years, respectively.</p>		
11	<p><b>Markov Chain and Incomplete Gamma distribution analysis of weekly rainfall for Navsari Region</b></p>	<p>It is recommended that the Markov Chain Model based on data for past 34 years (1980-2013). July month is more rain producing month as compare to others months that is about 20-30 % of total rainfall. Similarly the weeks 24<sup>th</sup> to 36<sup>th</sup> (11 June to 9 September) received more rainfall then other weeks. The probability of occurrence of wet week (Wx) at 40.0 mm rainfall was highest during 27 (2 to 8 July), 29 (16 to 22 July) and 32 (6 to 12 August) standard meteorological weeks. Probability of occurrence of wet week (Wx) at 60.0 mm rainfall was more in SMW 27 (2 to 8 July), 29 (16 to 22 July) and 30 (23 to 29 July). The occurrence of probability of wet week (Wx) at 80.0 mm rainfall was highest during 27 (2 to 8 July), 29 (16 to 22 July) and 30 (23 to 29 July). SMW. Probability of wet week (Wx) at 100.0 mm rainfall was high during 28 (9 to 15 July), 29 (16 to 22 July) and 30 (23 to 29 July) standard meteorological weeks. The incomplete gamma probability</p>		2015

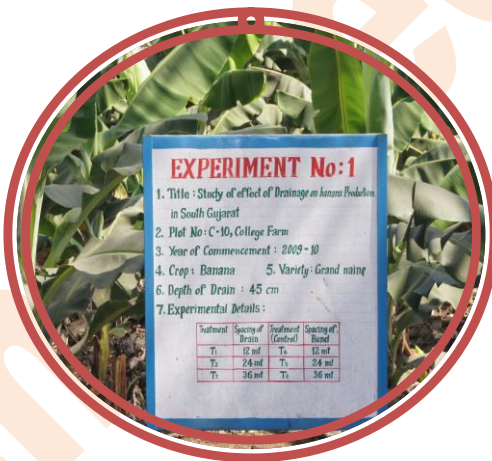


		distribution for weekly rainfall shows that there was 90 % probability of getting an assured rainfall of at least 1025.6 mm and 50 % probability of getting 1523.6 mm at Navsari region.		
12	Analysis of climatic variability at Navsari and Bharuch region	It is recommended on the basis of past years analysis of data, the bright sunshine hours were in decreasing trend while relative humidity was in increasing trend for both stations. Similarly during same period maximum and minimum temperature showed increasing tendency. The average decadal minimum temperature for Navsari region during decades 1980-1990, 91-2000 and 2001-11 were 19.67, 20.84 and 21.73 °C, respectively, as well as for Bharuch region average minimum temperature during past two decades were 20.97 and 21.55 °C, respectively. The 32 years trend analysis shows significantly increasing trend in minimum temperature at the rate of 0.10°C per year at Navsari and at Bharuch based on past 22 years trend analysis shows significantly increasing trend at the rate of 0.04°C per year. The likely cause for increase in minimum temperature is global warming.		2015

### Future Trust:-

- The budding agricultural scenario integrate with agricultural engineering would be knowledge intensive requiring greater congruence among productivity, sustainability, profitability and equity for sustainable agricultural development, which will justify effective management to yoke knowledge and information from various sources for better farming and improved livelihood and to achieve conduit among farmers, agricultural scientists, extensionists and policy makers.
- Devising cost effective methods of resource conservation and reclamation as well as Enhancing fertilizer, water and other input use efficiency through monetary and nonmonetary measures to the benefit of farmer community, which augment the nation economy.

## Photo gallery:-



AGRICULTURAL METEOROLOGICAL CENTER  
DEPT. OF AGRICULTURAL ENGINEERING  
NMCA, NAU, NAVSARI

WEATHER CONDITIONS  
DATE: 04.04.2012

	CURRENT	NORMAL
MAX. TEMP (°C)	34.50	35.40
MINI. TEMP (°C)	23.40	20.80
RAIN FALL (MM)	00.00	00.10
RELAT. HUMIDITY (%)	71.50	63.40
WIND SPEED (KM/HR)	06.80	04.00
SUNSHINE HOURS (HR)	08.90	09.00
EVAPORATION (MM)	01.30	











*Automatic weather station*



*Agro - Meteorological observatory*



*Paddy Thresher*



*Sugarcane Transplanter*



**Testing of different sugarcane planter**



**Testing of different sugarcane planter**

**Sugarcane planter**





**Laser land leveling**