

## 8) TECHNOLOGIES DEVELOPED

### (A) Crop Improvement

The station has contributed in release of following varieties/hybrids of different crops.

Sr	Crop	Year	Variety
(1)	Cotton	Before 2004	G.Cot-16
		Before 2004	G.Cot Hy-6
		Before 2004	G.Cot Hy-8
		Before 2004	G.Cot Hy-10
		Before 2004	G.Cot-23
		2004	G.Cot Hy-12
		2006	G.Cot-20
		2010	G.Cot-25
		2012	G.Cot Hy-6 (BG II)
		2012	G.Cot Hy-8 (BG II)
		2013	GN Cot-22
		2017	GN Cot Hy-18
		2017	GN Cot-26, GN Cot-32
		2019	G.Cot-34, G.Cot-36
		2020	G.Cot-40, G.Cot-42
		2021	GN Cot-27
		2023	G. Cot.-31 (Narmada Gold)
(2)	Sorghum	Before 2004	GJ-38
		2008	GJ-42
		2013	CSV-21F
		2016	GNJ-1
		2018	Phule Revathi
		2018	GFS-6
		2020	GJ-44 (Madhu), CSV-46F (Tapi Chari)
		2021	GJ-101 (Madhu Moti)
		2022	GNJ-1 (Endorsement )
		2023	GJ-102 (Surat Goti)
(3)	Pigeonpea	2007	Vaishali
		2018	GT-104
		2019	GT-105
(4)	Rice	2014	Purna
(5)	Dill seed	2014	GAVD-1
(6)	Indian bean (Papdi)	2014	GNIB-21
		2017	GNIB-22
(7)	Green gram	2017	GM-6
		2018	GM-7
(8)	Niger	2015	GNN-1
(9)	Black gram	2019	GU-3
(10)	Bakamlimdi (Melia Dubia)	2018	GNMD-1

(11)	Soybean	2019	Phule Agrani (KDS-344)
(12)	Sunhemp	2022	GNSUN-1
(13)	Turmeric	2021	GNT-3
(14)	Mango gingr	2020	GNMG-1
		2021	GNMG-2
(15)	Cowpea	2022	G.veg.Cowpea-9
(16)	Coriender	2023	GM-4 (Supriya)

## **(B) Recommendation of Technology**

The station has recommended following technology in different crops of the region.

### **I. Cotton Research Sub-Station (B.H. 12009/00):**

#### **(1) Spacing and fertilizer management in G.Cot-11**

Variety G.Cot-11 should be grown at 90 cm x 60 cm spacing with the application of 80 kg N/ha. Of the nitrogen 50% should be given as basal dose and the remaining in two equal splits at an interval of one month from basal dressing under irrigated condition of Achhalia. Application of phosphorus was not advantageous.

(1984)

#### **(2) Fertilizer and Spacing management for hybrid cotton**

Variety G.Cot.Hy-6 should be grown at 90 cm x 30 cm spacing with the application of 160 kg N/ha in four equal instalments at monthly interval commencing from sowing under irrigated conditions. Application of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O was not found advantageous.

(1984)

### **Soil and Water Management Unit, NARP Phase II (B.H. 12091/03):**

#### **(1) Mulch and irrigation on Pigeonpea.**

The farmers of AES-I of South Gujarat Zone growing *khari* pigeonpea are advised to give 2 - 3 irrigations at monthly interval after cessation of the monsoon. They are also advised to follow mulching practice with grass @ 5 t/ha (about 21 per cent more yield) or follow intercultivation at 30 - 40 days interval after cessation of monsoon (13% more yield). Though plastic mulch can increase the yield by 34%, it is not economically viable at present. During the years of extended monsoon they need not give either irrigation or adopt mulching.

(1995)

#### **(2) Irrigation and mulch on cotton**

The farmers of AES I of South Gujarat Zone cultivating cotton (G.Cot-11) are advised to give 2 - 3 irrigations to the crop after cessation of monsoon at monthly interval. They are advised either to mulch the crop with grass (@ 5 t/ha) immediately after cessation of monsoon (46% more yield than no mulching) or adopt interculturing at monthly interval (35% more yield). Though black plastic mulch can increase the yield by about 58 per cent it is not found economically viable at present.

(1995)

#### **(3) Mulch & methods of planting in Brinjal.**

The farmers of AES I of South Gujarat Zone, cultivating brinjal as *khari* crop, are advised to follow mulching either with grass (5 t/ha) or black plastic film (50 micron , 80% coverage) to get about 50% and 36% more returns, respectively

(1995)

#### **(4) Irrigation and mulch in Chilli**

The chillies growing farmers of South Gujarat Zone are advised to give 4 irrigations to their *khari* crop after cessation of monsoon. They are also advised to mulch their crop with dried grass @ 6 t/ha to get about 18 per cent more yield and 21 per cent more income. Under conditions of non-availability of dried grass they can mulch with black plastic (50 micron) to get about 19 per cent more yield and 7 % more income.

(1997)

#### **(5) Fertilizer in drilled Paddy**

Farmers of AES-I of South Gujarat Zone-II growing drilled paddy (GR-5) are advised to fertilize their crop with 80 kg N/ha in two equal splits - 50 per cent as basal and remaining 50 per cent at tillering stage. There is no need of phosphorus application in soils rating medium in phosphorus.

(2000)

#### **(6) Drip irrigation in Banana**

Farmers of South Gujarat (AES-I) growing banana (cv. Basarai) at 1.5 x 1.5 m spacing are advised to adopt drip system of irrigation, which when operated at 0.75 PEF gives 14% more yield besides saving 48% water. The system should be laid out with laterals and two dripper of 4 LPH per/plant placed at 150 cm and 45 cm, respectively on either side and operated at a pressure of 1.2 kg/cm<sup>2</sup> on alternate day for 60 minutes during October to January, 110 to 130 minutes during February to March and 180 minutes during April to June.

(2001)

#### **(7) Drip and method of fertigation in Brinjal (SuratiRavaiya).**

The farmers of AES-I of South Gujarat Zone-II growing brinjal (*Suratiravaiya*) during *rabi*/summer are advised to adopt drip irrigation (0.6 PEF) and fertigate the crop with 80 kg N/ha. By doing so, farmers can get 11 % higher yield and 5 % higher net profit along with saving of 36 % water and 20 % of fertilizer N. The crop should be planted in paired row (60 cm x 60 cm x 120 cm). The lateral should be placed at a spacing of 1.8 m and dripper spacing of 0.6 m using dripper of 4 lph capacity. The system should be operated at 1.2 kg/cm<sup>2</sup> on alternate day for 1.5 hrs during December to February, 2.5 hrs during March and April and 3.0 hr there after up to harvesting.

(2004)

#### **(8) Land configuration study in Cotton and Paddy**

The farmers of South Gujarat Agro-climatic Zone-II (AES-I) are recommended to grow cotton (G.Cot.Hy-8) on raised bed of 7.5 m width followed by drilled paddy (GR-5) in 2 m wide and 20 cm deep furrow for getting higher net profit and better land utilization under rainfed situation.

(2006)

#### **(9) Irrigation and planting management of Rabi Castor**

The farmers of South Gujarat Zone-II (AES-I) are advised to grow *rabi* castor in paired row planting (60 cm x 60 cm x 120 cm). They should adopt drip method of irrigation (0.4 PEF) along with mulching with black plastic (56% coverage) for getting higher seed yield and net profit besides 39% saving in water.

The system details are :

Lateral spacing	=	1.8 m
Dripper spacing	=	1.2 m
Dripper discharge	=	8 lph
Operating pressure	=	1.2 kg/cm <sup>2</sup>
Operating time	=	▪ November to January : 40 to 60 minutes at alternate days ▪ February to harvest : 60 to 100 minutes at alternate days

(2009)

**(10) Phosphorus management in Green manuring - Sugarcane crop sequence :**

The farmers of AES-I of South Gujarat (Zone-II) following green manure-sugarcane sequence are advised to apply either pressmud @ 15 t/ha alone or rock phosphate @ 0.5 t/ha + PM @ 10 t/ha prior to green manuring with *dhaincha* for getting 24% higher cane yield and 14% net return as compared to without green manuring. Further, they are recommended to apply 50% RD of P + phosphorous solubilizing bacteria culture (PSB) for getting higher yield and net return.

(2009)

**(11) Banana pseudostem enriched sap spray in Cotton**

The farmers of South Gujarat heavy rainfall 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 % or KNO<sub>3</sub> @ 3% for getting higher seed cotton yield and net return. 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.

(2017)

Issued from experiment “Evaluating the effect of banana pseudo stem enriched sap (foliar spray) on *hirsutum* Cotton.” conducted at Cotton Research Sub-Station, N.A.U., Achhalia during 2013-14 to 2015-16.

**(12) Land configuration and irrigation scheduling in Indian bean**

The farmers of South Gujarat Agro-climatic Zone growing Indian bean during *rabi* season are recommended to grow the crop on broad bed and furrow (top width of bed 90 cm, height 10 cm, distance between two beds 45 cm with distance between two rows 30 cm and within row 15 cm) and apply 6 irrigations of 40 mm depth in which 1<sup>st</sup> irrigation just after sowing and remaining 5 irrigations at an interval of 12 to 15 days. By adopting these practices, it gives higher green pod yield and net return.

(2018)

**(13) Irrigation scheduling through drip and nitrogen management in Cotton**

The farmers of South Gujarat Agro-climatic Zone are recommended to adopt drip irrigation (1.0 PEF) and fertigation of nitrogen (180 kg/ha) in *Bt* cotton for achieving higher yield and net profit. The full dose of P<sub>2</sub>O<sub>5</sub> (40 kg/ha) should be applied as basal, whereas nitrogen should be applied in six equal splits (basal, 30, 60, 75, 90 and 105 days after sowing) through drip system.

**System details**

Lateral spacing	: 1.2 m
Dripper spacing	: 0.45 m
Dripper discharge	: 4 lph
Operating pressure	: 1.2 kg/cm <sup>2</sup>
Operating frequency	: Every three days interval
Operating time	
September and October	: 1:30 to 2:00 (hrs:min)
November and December	: 1:30 to 1:45 (hrs:min)
January and February	: 1:50 to 2:45 (hrs:min)

(2019)

#### **(14) Residue incorporation and nutrient management in Drilled Rice based sequence cropping**

The farmers of South Gujarat Agro-climatic Zone are recommended to follow drilled rice (*kharif*)-gram (*rabi*)-sesame (summer) sequence, incorporate gram residue in soil before sowing of summer sesame and apply 100% RDF to each crop in sequence (drilledrice75-25-00 N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O kg/ha, gram 25-50-00 N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O kg/ha, sesame50-25-40 N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O kg/ha) for getting higher net return.

(2019)

#### **(15) Response of summer sesame to nutrient management and irrigation scheduling**

The farmers of South Gujarat Agro-climatic Zone growing summer sesame are recommended to give 8 irrigations each of 60 mm depth of which first irrigation should be given at sowing, second at 12-14 days after first irrigation, third and fourth at 10-12 days interval after second irrigation and remaining four irrigations at 8-10 days interval after fourth irrigation and apply 62.5-31.25-50 N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O kg/ha (half N and full dose of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O as basal and remaining half N at 30 DAS) along with 20 kg S/ha as a basal through gypsum for getting higher seed yield and net return.

(2020)

#### **(16) Effect of irrigation scheduling through drip on growth and yield of Turmeric**

The farmers of south Gujarat Agro-climatic zone cultivating drip irrigated turmeric with sugarcane trash mulch (@ 5.0 t/ha) are recommended to schedule drip irrigation at 0.8 PEF. They are further recommended to apply 7.5 t/ha of bio-compost and PSB + *Azotobacter* @ 1.25 lit/ha each along with 30-60-30 kg NPK/ha as a basal and remaining 15-00-30 kg NPK/ha in 9 equal splits through drip system at an interval of 15 days starting after cessation of monsoon.

**Cultural details:** Planting should be carried out at 30 cm x 20 cm spacing on BBF having 90 cm top width (3 rows per bed). BBF should be prepared by keeping 45 cm space between two beds and opening 30 cm deep furrow in it.

#### **Drip system details**

Lateral spacing	: 135 cm (1 lateral per BBF)
Dripper spacing	: 50 cm
Dripper discharge	: 4 Lph
Operating Pressure (kg/cm <sup>2</sup> )	: 1.2
System operation interval	: 2 days

#### **Operating time**

June	2:15 to 2:30 (hrs:min)
July and August	1:10 to 1:15 (hrs:min)
September and October	1:20 to 1:30 (hrs:min)
November, December and January	1:00 to 1:10 (hrs:min)
February	1:30 to 1:45 (hrs:min)
March and April	2:15 to 2:30 (hrs:min)

**Note:** Rainy season drip schedule for dry spells of more than 20 days

(2021)

#### **(17) Sowing dates and spacing on vegetable pigeonpea grown during pre-monsoon**

The farmers of South Gujarat growing vegetable pigeonpea during kharif season are recommended that pre-monsoon sowing of pigeonpea gives comparable yield as that of normal sowing with the onset of monsoon. Further, they are recommended to sow the crop at 180 cm x 45 cm for achieving higher net return and easy cultural operations and picking.

(2022)

**(18) Intercropping of grain legumes in Sorghum**

The farmers of South Gujarat growing sorghum during kharif season are recommended to sow the sorghum + blackgram in 2:1 proportion at 30 cm apart with plant to plant spacing of 15 cm for sorghum and 10 cm for blackgram to achieve higher yield and net return on system basis as well as efficient use of land. They are also advised to apply 33 kg N and 40 kg P<sub>2</sub>O<sub>5</sub> to intercropping system as basal and 27 kg N to sorghum as topdressing 30 days after sowing.

(2022)

**(19) Integrated nitrogen management in *kharif* grain sorghum**

The farmers of South Gujarat growing *Kharif* sorghum are recommended to apply 20 kg N/ha through Neem cake (803 kg/ha) + 20 kg N/ha through Castor cake (463 kg/ha) well mixed with soil during land preparation along with recommended basal application of phosphorus (40 kg P<sub>2</sub>O<sub>5</sub> /ha) and top dressing of 40 kg N/ha through urea at 30 DAS to achieve higher yield and net return.

(2023)