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
(2)	Sorghum	Before 2004	GJ-38
		2008	GJ-42
		2013	CSV-21F
		2016	GNJ-1
		2018	Phule Revathi
		2018	GFS-6
(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)	Bakam limdi (Melia Dubia)	2018	GNMD-1
(11)	Soybean	2019	Phule Agrani (KDS-344)

Agronomy

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_2O_5 and K_2O was not found advantageous.

(1984)

NARP Phase II (B.H. 12091/03) Soil and Water Management

(1) Mulch and irrigation on pigeonpea

The farmers of AES-I of South Gujarat Zone growing *kharif* 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.

(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.

(3) Mulch & methods of planting in brinjal

The farmers of AES I of South Gujarat Zone, cultivating brinjal as *kharif* 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

(4) Irrigation and mulch in chilli

The chillies growing farmers of South Gujarat Zone are advised to give 4 irrigations to their *kharif* 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.

(1995)

(1995)

(1995)

(2009)

(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.

(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/cm² 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.

(7) Drip and method of fertigation in brinjal (Surati Ravaiva)

The farmers of AES-I of South Gujarat Zone-II growing brinjal (Surati ravaiya) 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/cm² on alternate day for 1.5 hrs during December to February, 2.5 hrs during March and April and 3.0 hrs 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.

minutes at alternate days

The system details are :

5	
Lateral spacing	= 1.8 m
Dripper spacing	= 1.2 m
Dripper discharge	= 8 lph
Operating pressure	$= 1.2 \text{ kg/cm}^2$
Operating time	= • November to January : 40 to 60
	minutes at alternate days
	• February to harvest : 60 to 100

(2001)

(2000)

(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 KNO3 @ 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 1st 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_2O_5 (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^2
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)

(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 (drilled rice 75-25-00 N-P₂O₅-K₂O kg/ha, gram 25-50-00 N-P₂O₅-K₂O kg/ha, sesame 50-25-40 N-P₂O₅-K₂O 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-P₂O₅-K₂O kg/ha (half N and full dose of P₂O₅ and K₂O 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)