Technologies Developed

Recommendations

1. Crop improvement

1. Pigeonpea

1) Gujarat Tur-102 (GT-102)

This variety has been developed through selection from farmer's field at Hansot (Dist. Bharuch). It gives an average yield of 1595 kg/ha during *Rabi season* showing yield advantage of 47.8% and 16.5% over BDN-2 and C-11, respectively. Seeds are bold and white. This variety is suitable for vegetable as well as grain purpose, having good *Dal* recovery and tolerance to sterility mosaic. The GT-102 is recommended for *Rabi* cultivation in south Gujarat for irrigated as well as conserved moisture condition. (Releasing year: 2006)

2) Vaishali (BSMR-853)

The variety registered 18.43% and 10.91% higher yield over the check, BDN-2 in south Gujarat and the whole state, respectively. It possessed desirable seed colour and bold seeds. It exhibited high degree of resistance to SMD, wilt diseases and low infestation of major pests. The variety is recommended for endorsement for the entire state of Gujarat. (Releasing year: 2007)

3) Gujarat Navsari Pigeonpea-2 (GNP-2)

Pigeonpea variety GNP-2 (BP-06-33) is the first dual purpose (grain and vegetable) variety in the state. This variety recorded green pod yield of 3394 kg/ha which was 19.5 %, 47.8 % and 16.0 % higher than checks GT-1, AVPP-1 and Vaishali, respectively. Similarly it gave grain yield of 1255 kg/ha which was 17.2%, 49.5% and 20.9% higher than checks GT-1, AVPP-1 and Vaishali, respectively. It is moderately tolerant for pod fly and pod borer and moderately resistant to wilt and SMD. The genotype is with indeterminate growth habit having dark green foliage. The pods are green in colour with 4 to 5 grains with prominent constriction compared to GT-1. GNP-2 is recommended for *Kharif* pigeonpea cultivating areas of South and North Gujarat. (Releasing year: 2016)

4) Gujarat Tur-104 (GT-104)

The average yield of pigeonpea variety NPMK-15-05 (GT-104) is 1890 kg/ha. It exhibited overall yield advantage of 21.9 %, 21.2 %, 12.5 % and 27.6 % over the checks Vaishali, GJP-1, AGT-2 and BDN–2, respectively. The variety GT-104 matures within 160-170 days (medium group) with semi spreading in nature, having red flower colour, long pod, 5-7 seeds per pod and cream seed colour. It has high yield potential and resistant against SMD. The pigeonpea variety GT-104 recommended for *Kharif* season in Gujarat. (Releasing year: 2018)

5) Gujarat Tur- 105 (GT-105 : JANKI)

The average yield of pigeonpea variety NPEK-15-14 (GT-105 : JANKI) is 1829 kg/ha. It exhibited overall yield advantage of 14.8%, 13.6%, 27.5% and 17.8% over the checks GT-101, GT-103, UPAS-120 and P-992, respectively. The variety GT-105 (JANKI) matures within 135-145 days (Early group) with spreading in nature, having yellow flower colour, straight green pod, 3-5 seeds per pod and cream seed colour. It has high yield potential and resistant against SMD. The pigeonpea variety GT-105 (JANKI) is recommended for *Kharif season* in Gujarat. (Releasing year: 2019)

2. Mung bean

1) Gujarat Black Mung-1 (GBM-1)

This variety giving 930 kg/ha yield showed 27.75% yield advantage over Co-4. It is a short duration, medium tall variety having black coloured bold seeds, moderately resistant to MYMV, powdery mildew and macrophomina blight diseases and suitable for *Rabi* cultivation under conserved moisture condition. This variety is recommended for south Gujarat region. (Releasing year: 2008)

2) Gujarat Mung bean-6 (GM-6)

The performance of Mung bean NMK-15-12 (971 kg/ha) in overall *Kharif* and summer seasons trials in whole Gujarat was found promising where it had recorded 11.1 %, 11.7 % and 13.7 % increase over in yield against check varieties Meha, GM-4 and GAM-5, respectively. The proposed variety is bold seeded and found to have good quality for marketable as well as cooking traits. It had also exhibited resistance against MYMV disease. It is recommended for cultivation in *Kharif* and summer seasons in Gujarat. (Releasing year: 2017)

3) Gujarat Mung bean-7 (GM-7)

The average yield of Mung bean variety NMK-15-08 (GM-7) is 1063 kg/ha. It exhibited overall yield advantage of 23.3 %, 6.4 %, 33.8 % and 26.2 % in *Kharif* season and 12.2 %, 50.3 %, 22.7% and 12.1 % in summer season over the check varieties Meha, GM-4, GAM-5 and GM-6, respectively. It matures within 75-80 days (medium group), having indeterminate in growth habit with medium seed size and shiny green seed colour. It has high yield potential and resistant against MYMV disease. The variety GM-7 is recommended for *Kharif* as well as summer seasons of Gujarat. (Releasing year: 2018)

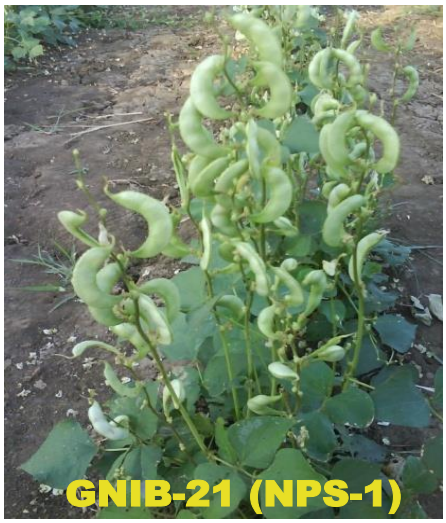
3. Indian bean

1) Gujarat Wal-2 (GW-2)

The proposed variety NW-104 recorded 23.81% and 40.7% higher seed yields as compared to the checks, Gujarat Wal-1 and NW 125-36, respectively. It matured 15 and 25 days earlier than Gujarat Wal-1 and NW-125-36, respectively. Its plant type is erect with synchronous maturity and possesses white seed, higher *dal* recovery, less cooking time as compared to checks. The culture exhibited less incidence of diseases and pests. The variety is recommended for commercial cultivation in south Gujarat heavy rainfall zone under rainfed condition. (Releasing year: 2007)

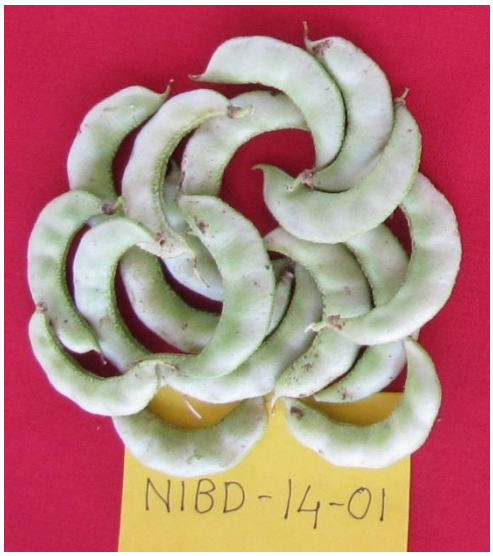
2) Gujarat Navsari Indian bean-21 (GNIB-21)

The variety of Indian bean is developed from cross of Arka Jay x Katargam. It recorded 10.08 % higher green pod yield over Katargam. It recorded near about 4 t/ha green pod yield at even closer distance due to its erect nature. On large scale demonstration on farmer's field it has given 53 % higher green pod yield over check under productive management. This variety is approved for release in south Gujarat heavy rainfall zone. (Releasing year: 2014)



3) Gujarat Navsari Indian Bean-22 (GNIB-22)

Indian beanNIBD-14-01 (4507 kg/ha) exhibited 39.4 % and 6.9 % higher green pod yield over check varieties, GNIB-21 and GP-1, respectively. The proposed variety was found to have good quality for marketable as well as cooking traits. It has higher sugar and higher test weight against GNIB-21. The proposed culture is recommended for late *Kharif* & late *Rabi* season in south Gujarat. (Releasing year: 2017)



4. Urdbean

1) Gujarat Urdbean-3 (GU-3: ANJANI)

The average yield of Urdbean variety NUK-15-09 (GU-3 **:** ANJANI) is 934 kg/ha. It exhibited overall yield advantage of 11.1 % and 15.9 % over the check varieties GU-1 and T-9, respectively. It matures within 95-100 days (medium group), having indeterminate in growth habit with medium seed size and shiny black seed colour. It has high yield potential and resistant against YMV disease. The variety GU-3 is recommended for *Kharif* as well as summer seasons of south & middle Gujarat. (Releasing year: 2019)

5. Castor

1) Castor: NCH-1 (GNCH-1)

The proposed castor hybrid NCH-1 yielded 2444 kg/ha resulting 21.2%, 46.2% and 44.5% higher seed yield than hybrid checks GCH-7, DCH-519 and DCH-177, respectively. The hybrid NCH-1 having medium plant height and long primary as well as secondary spikes. The hybrid is resistant to wilt disease and tolerant to various larval and sucking pest of castor. The hybrid GNCH-1 is recommended for late-*Kharif* and *Rabi* season in South and Middle Gujarat in irrigated conditions under rice based cropping system. (Releasing year: 2016)

1.2 Crop production

1. The farmers of south Gujarat heavy rainfall zone (AES-III) growing pigeonpea during *kharif* season are advised to apply FYM @ 10 t/ha or Gypsum 3 t/ha and to sow their crop on raised bed (providing 30 cm deep and 25 cm wide furrow after four rows of the crop) along with seed inoculation of *Rhizobium* for getting higher yield. (2004)
2. The farmers of south Gujarat heavy rainfall zone AES-III growing Indian bean after *kharif* paddy under irrigated condition are advised to cultivate G.Wal-1 at a spacing of 60 cm x 15 cm. The sowing should be done preferably up to first November. First irrigation should be given at sowing time and second at flowering stage (75 DAS). (2004)
3. Farmers of south Gujarat agro-climatic zone-II growing Indian bean cv. G.Wal-1 are advised to inoculate the seeds with phosphate solubilizing culture *(Bacillus* sp Navsari isolate) PBN-2 (CBR 1:357) @ 30 g culture/kg seeds containing 10^8 viable cell/g before sowing to save 40 kg P_2O_5/ha and to get higher yield. (2005)
4. The farmers of south Gujarat heavy rainfall zone (AES-III) growing irrigated *Rabi* pigeonpea (Cv. BDN-2) are advised to fertilize the crop @ 18-40-20-20 NPKS kg/ha with sodium molybdate @ 2 kg/ha for realizing higher net profit. (2005)
5. Farmers of south Gujarat agro-climatic zone-II growing gram cv. GG-2 are advised to inoculate seeds with phosphate solubilizing culture *(Bacillus* sp. Navsari isolate) PBN-1 (CBR 1:475) @ 30 g culture/kg seed containing 10^8 viable cells/g before sowing to save 40 kg P_2O_5/ha and to get higher yield. (2005)
6. Under limited water supply in the *Bara* tract of Narmada command area, the farmers growing gram (GG-2) are advised to give one irrigation at branching to get 60% more yield. (2006)
7. The farmers of south Gujarat heavy rainfall agro-climatic zone (AES-III) growing *Rabi* mung (Co-4) are advised to sow their crop around 15th October by keeping a row spacing of 60 cm and fertilizing it @ 20 kg P_2O_5/ha + PSM culture for getting higher yield and net profit. (2006)
8. The farmers of south Gujarat heavy rainfall zone (AES-III) are advised to keep *Rabi* green gram crop weed free by two hand weedings at 20 and 40 days after sowing to obtain higher yield of *Rabi* green gram (Cv. Co-4). (2009)
9. Farmers of south Gujarat heavy rainfall zone (AES-III) growing irrigated castor (GCH-7) during *Rabi* season are advised to follow recommended practices of weed management, fertilizer application and need based plant protection to achieve higher yield and net profit. However, under the situations of resource constraints, the resources should be prioritized in order of 'Weed management > Fertilizer application > Plant protection. (2013)
10. Farmers of south Gujarat heavy rainfall zone (AES-III) growing irrigated castor (GCH-7) during *Rabi* season are advised to sow the crop at 120 cm x 90 cm spacing. (2013)
11. Farmers of south Gujarat heavy rainfall zone (AES-III) growing irrigated castor (GCH 7) during *Rabi* season are advised to apply 120 kg N/ha in three equal splits for

achieving higher seed yield and economic returns. One-third nitrogen should be applied as basal and remaining at 35-40 and 75-80 DAS. Phosphorous and potassium application should be made on soil test basis. (2013)

12. Farmers of south Gujarat heavy rainfall zone (AES-III) growing irrigated castor (GCH 7) during *Rabi* season on soil having medium to high status of available sulphur need not to apply sulphur as it was not found beneficial. (2013)
13. The farmers of AES-III of south Gujarat heavy rainfall zone growing *Rabi* greengram (Co-4) in *kyari* land are advised to adopt raised bed system of sowing and fertilize the crop as per recommended dose (20-40-0 N-P_2O_5-K_2O kg/ha) for obtaining higher yield and net return. (2014)
14. Farmers of South Gujarat Heavy Rainfall Agro climatic Zone(AES-III), growing greengram *(*Co 4) during *Rabi* season, are recommended to sow the crop at 45 cm x 10 cm spacing and apply 20-40 kg NP/ha as basal for getting higher yield and net return. (2016)
15. Farmers of south Gujarat heavy rainfall zone, growing pigeonpea (GT102) during *Rabi* season are advised to sow the crop at 60 x 20 cm spacing and apply 10 t/ha FYM along with recommended dose of fertilizers *i.e*. 25:50:00 kg N:P_2O_5:K_2O/ha as basal for getting higher yield and net return.(2017)
16. Farmers of south Gujarat heavy rainfall zone growing irrigated castor during *Rabi* season are advised to apply irrigation through drip system at 0.8 Epan and 75% RDN (90:25 kg N:P_2O_5/ha) fertilizer. They should apply full dose of phosphorus (25 kg P_2O_5/ha) and 30 kg/ha nitrogen as basal and remaining dose of nitrogen through fertigation in 5 equal splits (12 kg nitrogen /ha) at an interval of 9 days starting from 30 days after sowing for getting higher seed yield and net return which gives 25 per cent saving of nitrogen. (2017)

<u>Details of drip system</u>

1	Lateral spacing	:	1.2 m
2	Dripper spacing	:	0.6 m
3	Dripper discharge	:	4 liter per hour
4	Operating pressure	:	1.2 kg/cm^2
5	Operating frequency	:	3 days interval
6	Operating time	:	Oct. to Feb.- 1.40 hr and Mar. to April.- 2.0 hr.

17. The farmers of South Gujarat Heavy Rainfall Agro-climatic Zone, growing *Rabi* vegetable Indian bean (GNIB 21) are recommended to apply 4 irrigations of 50 mm depth at sowing, branching, flowering and after first picking. The crop is to be fertilized with 40 kg N/ha as basal dose for achieving profitable yield. (2018)
18. The farmers of South Gujarat Heavy Rainfall Agro-climatic Zone growing vegetable Indian bean (var. GNIB-21) during *Rabi* season are recommended to apply either 20-40-00 N-P_2O_5-K_2O kg/ha as basal or 5 t/ha FYM at the time of land preparation to

plant crop and 20-30-00 N-P_2O_5-K_2O kg/ha to ratoon crop after harvest of plant crop for getting higher yield and net return. (2020)

19. The farmers of South Gujarat Heavy Rainfall Agro-climatic Zone growing castor (GNCH-1) during *Rabi* season are recommended to sow the crop in last week of October at 150 cm x 90 cm spacing and intercrop (1:1) vegetable Indian bean (var. GNIB-21) for obtaining higher yield and net return. (2020)

1.3 Plant protection (For Scientific community)

1. Mungbean entries viz., NKM-15-08, NKM-15-12, NKM-15-05, NKM-15-13, NKM15-14 and NKM-15-15 were found highly resistant against mungbean yellow mosaic disease in South Gujarat Heavy Rainfall Zone under natural condition. (2020)
2. Urdbean entries viz., NUK-15-02, NUK-15-06 & NUK-15-10 were found highly resistant and NUK-15-09 was found resistant against mungbean yellow mosaic disease in South Gujarat Heavy Rainfall Zone under natural condition. (2020)
3. Cowpea entries viz., NCK-15-08, NCK-15-09, NCK-15-11, NCK-15-12, NCK-15-02 & NCK-15-04 were found highly resistant and NCK-15-07 was found resistant against yellow mosaic disease in South Gujarat Heavy Rainfall Zone under natural condition. (2020)
4. Indian bean entries *viz.,* NIBD-14-01 was found highly resistant against yellow mosaic disease. While, NIBD-14-01, NIBD-14-02, NIBD-14-03 & NIBD-14-06 were found moderately resistant against powdery mildew disease in South Gujarat Heavy Rainfall Zone under natural condition. (2020)