

Elite varieties

If vegetable breeders breed from only adapted elite material and their aim is only for the short run, narrow germplasm based result, thus increasing the potential for genetic vulnerability, a certain amount of long-ranged breeding should be aimed for increasing genetic diversity. All the entries are being tested under AICRP (Vegetables) programme mentioned in workshop proceeding and available with SAU'S and ICAR based institutions like IARI, IHR, VPKAS as well as NBPGR.

(B) Development of varieties and hybrids

After the initiation of systematic, broad based and comprehensive breeding programmes at various ICAR based institutes and State Agriculture Universities a number of high yielding promising materials were developed. With quick multilocation testing facility available after the establishment of All India Coordinated Vegetable Improvement Project in 1970-71 and as a result of evaluating the promising breeding material developed at various research centres under multilocation testing programme of this project, a fast progress was witnessed in varietal improvement. As a result the AICRP (VC) has made strides in development and production of vegetables in a very short span of time. In four decades project has developed 477 varieties and 24 major vegetables crops have been identified for cultivation in different climatic zones. Among these, 280 are high yielding open pollinated, 149 are hybrids and 48 are resistant to diseases. Since 2008 the Project Directorate on Onion & Garlic organizes a separate workshop and hence varieties developed of onion and garlic have not been included after 2008 in the list.

Table 14: Number of Varieties and Hybrids developed under AICRP-VC (1971-2014)

Crops	Varietal	Hybrids	Resistant	Total
Brinjal	48	39	8	95
Tomato	42	38	7	87
Chilli	25	15	-	40
Capsicum	1	5	-	6
Pea	28	-	13	41
Okra	-	13	17	30
Onion	25	-	-	25
Garlic	10	-	-	10
Cauliflower	16	7	-	23
Cabbage	1	9	-	10
Carrot	3	1	-	4
Cowpea	12	-	-	12
Dolichos bean	5	-	-	5
French bean	10	-	-	10
Kele	1	-	-	1
Muskmelon	10	2	3	15
Water melon	3	2	-	5
Ash gourd	6	2	-	8
Bitter gourd	6	4	-	10
Bottle gourd	9	5	-	14
Cucumber	3	4	-	7
Pumpkin	7	1*	-	8
Ridge gourd	3	2	-	5
Sponge gourd	6	-	-	6
Total	280	149	48	477

*This pumpkin hybrid identified during XV workshop, 1996 under varietal trial

Table 15: Zone-wise Number of Varieties and Hybrids developed under AICRP -Vegetable Crops (1971- 2014)

Agro-climatic zone	States	O.P.	Hybrids	Resistant	Total
I. Humid Western Himalayan Region	Jammu & Kashmir (J&K) , Himachal Pradesh and Uttarakhand	47	25	8	80
II. Humid Bengal - Assam Basin	West Bengal and Assam	12	10	4	26
III. Humid Eastern Himalayan and Bay Islands	Sikkim, Meghalaya, Manipur, Nagaland, Mizoram, Tripura, Arunachal Pradesh and Andaman & Nicobar Islands	4			4
IV. Sub-Humid Sutlej Ganga Alluvial Plain	Punjab, U.P., Bihar and Jharkhand	120	82	15	217
V. Sub- Humid to Humid Eastern and South Eastern Uplands	Chhatisgarh, Odisha and Andhra Pradesh.	37	19	12	68
VI. Arid Western Plain	Rajasthan, Gujarat, Haryana and Delhi	78	35	6	119
VII. Semi Arid Lava Plateaux and Central High Lands	Madhya Pradesh, Maharashtra and Goa	100	51	13	164
VIII. Humid to Semi - Arid Western Ghats and Karnataka Plateaux	Karnataka, Tamil Nadu, Kerala and Pondicherry	60	21	12	93
All zones		45	16	8	69

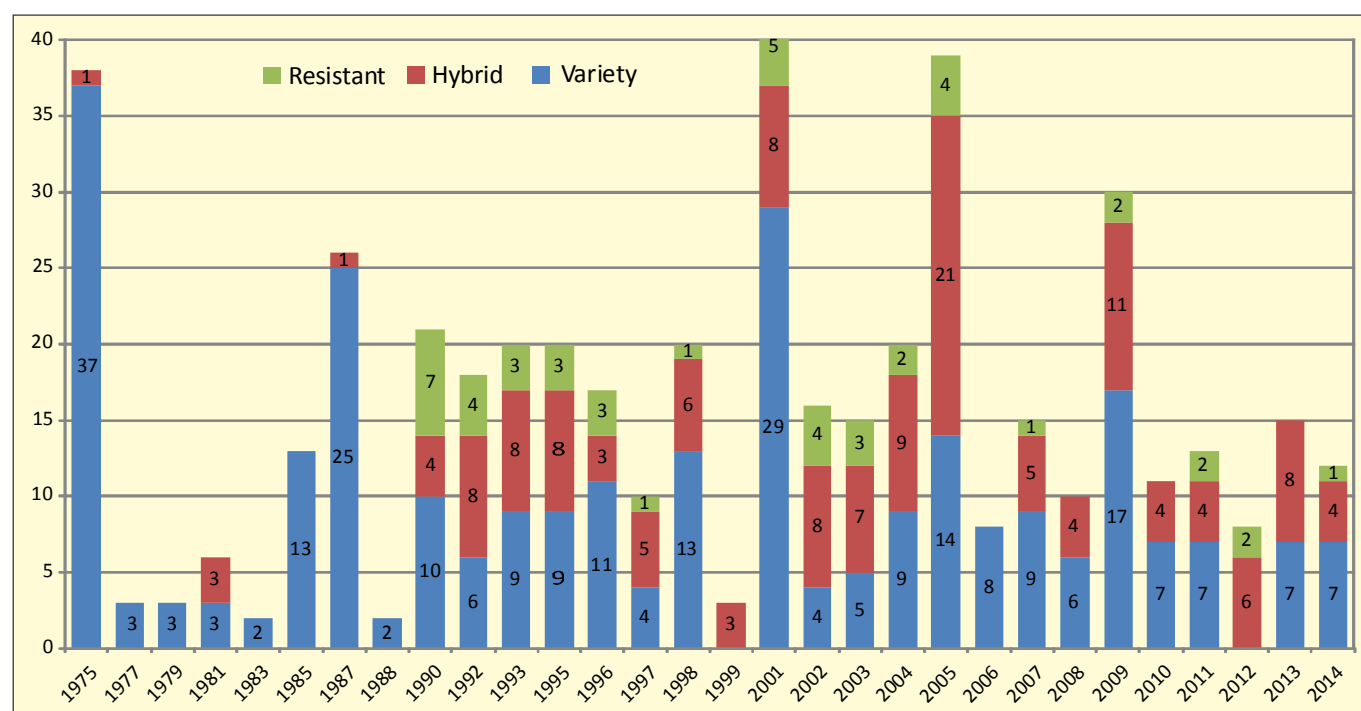


Fig. 10: Number of varieties/ hybrids identified in subsequent years (1971-2014)

The health and well-being of the growing population are largely dependent on the ability of the agricultural industry to raise high yielding crops. High yielding varieties played a vital role in enabling poor farmers to increase dramatically the size of their harvest. With the change in food pattern, inclusion of vegetable as an essential part of the diet, increased the vegetable demand simultaneously. To cater to the need for growing demand of vegetables more potential varieties need to be evolved. Under the aegis of AICRP (VC) a series of varieties have been developed to suit the various cropping patterns and abiotic and biotic stresses.

The Indian Agricultural Research Institute, New Delhi; Indian Institute of Vegetable Research, Varanasi; Indian Institute of Horticultural Research, Bangalore and Punjab Agriculture University, Ludhaina played major role in development of new open pollinated varieties and hybrids. Few varieties developed by these institutes in sixty's and seventy's are still popular among the farmers. IARI Regional Station, Katrain played a major role in development of the temperate vegetable varieties.

Table 16: Number of Varieties developed by Main centres (1971-2014)

S.N.	Centres	Varietal	Hybrids	Resistant	Total
1.	IIVR, Varanasi	Brinjal (1), Tomato (4), Chilli (3), Pea (4), Cauliflower(2), Carrot(4), Dolichos (1), French Bean(1), Mush M.(1), Ash gourd (2) and Sponge gourd(1)	Tomato (2), Brinjal (2), Chilli (2), Okra (4)	Tomato (2), Pea (1), Okra (7)	44
2.	TNAU, Coimbatore	Brinjal (1), Tomato (1), Chilli (1)* *Chilli developed from Kovilpatti	Brinjal(1)		4
3.	IIHR, Bangalore	Tomato (2), Chilli (2), Onion (2), Cowpea (2), French Bean (3), Musk Melon (2), Water Melon (1), Pumpkin (2), Ridge gourd (1)	Brinjal (3), Tomato (3), Chilli(2), Watermelon(1)	Brinjal (1), Tomato (2), Okra (2), Pea(1)	32
4.	IARI (RS), Katrain	Pea (1), Cauliflower (4), Cabbage (1), Kale (1)	Brinjal (1), Tomato (1), Capsicum (2), Cabbage (3)	Pea (1)	15
5.	PAU, Ludhiana	Brinjal (4), Tomato (7), Pea (4), Onion (6), Cauliflower (1), Cowpea (1), Musk Melon (1), Bottle gourd(1)	Brinjal (5)	Okra (1)	31
6.	IARI, New Delhi	Brinjal (8), Tomato (4), Pea (3), Onion (5), Cauliflower (6), Carrot (2), Cowpea (1), Musk Melon (2), Water Melon (1), Ash gourd (2), Bottle gourd (2), Pumpkin (1), Sponge gourd (1), Bitter gourd (1)	Brinjal (4), Tomato (4), Cauliflower (4), Musk Melon (1), Bitter gourd (1), Ashgourd (2), Pumpkin (1)	Musk Melon (3)	59
7.	MPKV, Rahuri	Chilli (3), Onion (3), Bitter gourd (1)	Brinjal (1), Bitter gourd(1)		9
8.	BAC, Sabour	Brinjal (2), Garlic (1), Cauliflower (1)			4
	Sub Total				198

Among the sub centres GBPUA&T, Pantnagar (26), NDUAA&T, Faizabad(22), CSAUA&T, Kanpur (17), OUA&T, Bhubaneswar (14), CCS HAU Hisar(13) have contributed a significant number of varieties and hybrids for their respective regions.

Table 17: Number of Varieties developed by Sub centres(1971-2014)

S.N.	Centres	Varietal	Hybrids	Resistant	Total
1.	Parbhani			Okra (1)	1
2.	Bhubaneswar	Brinjal (3), Tomato (4), Chilli(2)		Brinjal (4), Tomato(1)	14
3.	Dharwad				
4.	Durgapura	Musk Melon (1), Water melon (1)	Musk Melon (1)		3
5.	Faizabad	Brinjal (2), Tomato (3), Pea (3), Cowpea (2), Musk Melon (1), Bitter gourd (3), Bottle gourd(2)	Brinjal (2), Bottle gourd(1)	Pea (2), Okra (1)	22
6.	Hisar	Brinjal (3), Tomato (3), Pea (2), Onion (1)	Okra (1)	Okra (3)	13
7.	Hyderabad	Brinjal (1)	Ridge gourd (1)		2
8.	Jabalpur	Brinjal (3), Chilli (1)		Pea (2)	6
9.	Jorhat				
10.	Junagadh	Garlic(1), Sponge gourd (1)	Brinjal (1), Okra (3)	Okra (2)	8
11.	Kalyanpur	Brinjal (5), Tomato(4), Ash gourd (1), Bitter gourd(1), Sponge gourd(1)	Tomato (2), Chilli(1)	Pea (2)	17
12.	Kalyani		Brinjal(1), Tomato (2)		3
13.	Lam	Chilli (7)			7
14.	Pantnagar	Brinjal (5), Tomato (3), Chilli (2), Pea (2), Cauliflower (2), French Bean (1), Ash gourd (1), Bitter gourd (1), Bottle gourd (2), Cucumber (1), Ridge gourd (1), Sponge gourd(1)	Bottle gourd (2), Cucumber (2)		26
15.	Raipur				
16.	Solan				
17.	Srinagar	Chilli (1), Carrot (1)			2
18.	Velliankkara	Bitter gourd (2), Pumpkin (2)		Brinjal (1), Tomato (2)	7
19.	Pasighat				
20.	Pusa				
21.	Bhubaneswar (RS), IIHR				
	Sub Total				131

The contribution of non funded Institutes/Organisations in development of varieties and hybrids are not the least. Significant number of new varieties and hybrids in almost all the major crops have been developed by these. Among the voluntary centres specifically the HARP, Ranchi (24), AAU, Anand (10), VPKAS, Almora (12) contributed number of varieties in all the major vegetable crops.

Table 18: Number of Varieties developed by Voluntary centres (1971-2014)

S.N.	Centres	Varietal	Hybrids	Resistant	Total
1.	Akola	Brinjal (1), Chilli (1), Onion (1), Dolichos (1)			4
2.	Anand	Brinjal (3), Tomato (1), Chilli (2), Musk Melon (1)	Brinjal (3)		10
3.	Almora, VPKAS	Brinjal(1), Tomato (1), Pea (5), Onion (1), Garlic (1), French bean (1)		Pea (2)	12
4.	Barapani	Tomato (1)			1
5.	Gwalior	Tomato (1), Pea (3)			4
6.	Nasik (NHRDF)	Onion (4), Garlic (5)			9
7.	NBPGR	Tomato (2), Muskmelon(1)			3
8.	Navsari				
9.	NRC Onion & Garlic	Onion (2), Garlic (1)			3
10.	Palampur			Pea (2)	2
11.	Pithoragarh (DIBER)	Brinjal (1), Garlic (1), Capsicum (1), Tomato (1)	Capsicum (1)		5
12.	Ranchi (ICAR-ICER)	Brinjal (4), Pea (1), Cowpea (2), Dolichos (2), French Bean (4), Cucumber (2), Pumpkin (1), Ridge gourd (1), Sponge gourd (1)	Brinjal (3), Tomato (2)	Brinjal (1)	24
13.	Ranichauari		Capsicum (1)		1
	Sub Total				78

Role of the private companies in the development of vegetables new hybrids are not the least. Private companies are placing more and more emphasis on the development of hybrids to exploit heterosis, and to combine multiple disease and stress resistance, but also for economic purposes to ensure growers must purchase seed for each planting. Private seed companies are mainly interested in the breeding and production of vegetable seed with a high commercial value. Private companies strived more and more to bring hybrid seeds onto the market. Worldwide the share of hybrid seed is increasing at a fast pace of 8 to 10% annually.

Table 19: Number of Varieties developed by Pvt. Companies (1971-2014)

S.N.	Centres	Varietal	Hybrids	Resistant	Total
1	Ankur	Cowpea (1)	Brinjal (3), Tomato (5), Chilli (2), Okra(1)		12
2	Beejo Sheetal		Brinjal (1), Tomato (3), Chilli (2), Cabbage (1)		7
3	Century		Cucumber (1)		1
4	J.K. Seeds		Tomato (1)		1
5	Krishidhan		Bottle gourd (1), Tomato (1)		2
6	Mahyco		Brinjal (2), Tomato (1), Cabbage (1), Carrot (1), Watermelon(1)		6

S.N.	Centres	Varietal	Hybrids	Resistant	Total
7	Nath Seeds		Tomato (2), Cabbage (2)		4
8	Nirmal		Chilli (1), Bitter gourd (1)		2
9	Novartis		Tomato (2), Cabbage (1)		3
10	Nun Hems		Tomato (1)		1
11	Nuziveedu		Okra (1), Tomato (2), Bottle gourd (1)		4
12	Pandey beej		Brinjal (1)		1
13	Sandoz		Chilli (1)		1
14	Seminis		Brinjal (1)		1
15	Sungro		Tomato (1), Chilli(1), Cauliflower (1), Ash gourd (1), Ridge gourd (1)		5
16	Syngenta		Brinjal (1), Tomato (3), Chilli (1), Capsicum (2), Okra (2), Cauliflower (2), Cucumber(1)		12
17	Tokita		Cabbage (1)		1
18	VNR		Brinjal (4), Chilli (2)		6
	Sub total				70

Obsolete varieties








Obsolete cultivars are advanced cultivars from the most recent past that have been displaced by a newer release. Often specifically selected older materials appear in the pedigree of a wide variety of releases. Some obsolete varieties are more useful as parents than they were as varieties at the time of their release. Though a large number of varieties has been evaluated and recommended during 1950 to 1970 for cultivation to different states. These varieties were developed mostly by the selection from land races or introduction from abroad based on narrow base genetic materials so that, under present situation these varieties are being discarded due to adoption of new high yielding varieties and hybrids resistant to biotic and abiotic stresses. Based on the breeder seed requirement of last five years, enquiry from the different SAUs and ICAR institutions, breeder seeds of these varieties are not available anywhere in the country (Table 20) which are listed below.








Table 20 : Major varieties from 1950-70, breeder seeds are not available in the country





Tomato	Pusa Red Plum, CO-1, CO-2, Ponderosa, Pritchard, Kalyanpur, Angurlata, Devlin's Choice, Red Cloud, Keckruth, Ageti, Punjab Tropic, HS-102, Murutham, Morglobe, Best of All, Improved Meeruti
Brinjal	Batia, Arka Shirish, Arka Sheel, Black Beauty, T-1, T-2, T-4, Wynad Giant
Chilli (Hot Pepper)	Hot Portugal, Sanauri, Sweet Banana, Chanchal
Chilli (Sweet Pepper)	Chinese Giant, Hungarian, Bull Nose
Okra	P-13, S-13, CO-1, Pusa Makhamali, Vaishali Badhu, Perkins Long Green, Red Bhindi
Peas (Early)	Early Badger, Asauji, Meteor, Giant Early, Alderman
Peas (Mid Season)	New Line Perfection, T-19, Telephone, Thomas Laxton, Jawahar Matar 1,2,3,4, Sylvia
French bean	Giant Stringless, Tendergreen, jamoa
Dolichos bean	Aspergus Black, Aspergus Red, Burpress Stingless, Canadian Red, FrenchYellow, Kaliyanpur T-2
Cowpea	Pusa Rituraj, S-203, S-488
Cauliflower (Early)	Early Bhagat, Pusa Katki, Pusa Katki-7
Cauliflower (Mid)	D-96, Japanese Improved









Landmark Varieties that revolutionized the Vegetable Production in India








Development of a large number of improved varieties and wider adaptability and standardization of their production technologies for various agro-climatic conditions has made it possible to produce vegetables in wider areas and has improved the prospects of their supply tremendously as follows.






Variety	Year	Description	
Tomato			
Pusa Sel-120	1970	Pusa 'Sel-120' during 1970's has made it possible to achieve high yields of quality produce in root-know nematode infested soils.	
Pusa Ruby	1975	Variety is released by IARI, New Delhi. It is an early growing cultivar, suitable for sowing both in spring-summer and autumn-winter seasons. Average yield is 32.5 t/ha. It is suitable for table as well as processing purpose.	
Pusa Early Dwarf	1973	Variety is released by IARI, New Delhi. It is an early ripening cultivar of determinate type, fruits are flattish round, medium large with yellow stem end. Fruits are ready for harvesting 75-80 days after transplanting. Average yield is 35t/ha. It is suitable for table as well as processing purpose.	
CO-1	1968	Variety is released by TNAU, Coimbatore suitable for growing in Southern India. Fruits are round with yellow stem end, determinate and ripen uniformly.	
Sioux	1977	Variety is released by IARI, New Delhi. Variety is suitable for growing in the hills. Fruits are medium large, round with yellow stem end suitable for short distance market.	
Best of All	1975	Variety is released by IARI, New Delhi. Variety is of indeterminate type and suitable for growing in the hills. Fruits are borne in clusters, round, firm with green stem end.	
Marglobe	1978	Variety is released by IARI, New Delhi. Crop matures late in the season. Fruits are large, round smooth, juicy with green stem end. Variety is of indeterminate type and suitable for growing in the hills.	


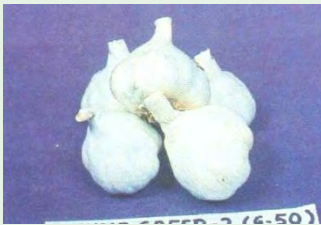

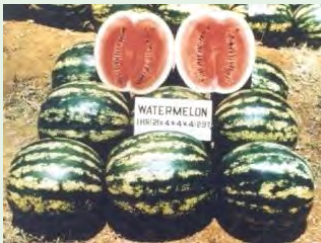

Variety	Year	Description	
Punjab Chhuhara	1979	Variety is released by PAU, Ludhiana. Variety is of determinate type. Fruits are elliptical in shape with yellow stem end. Suitable for processing.	
Arka Vikas (Sel.-22)	1987	Hybrid variety released by IHR, Bangalore. Fruits are oblate, medium large (80-90g) with light green shoulder. Tolerant to heat and moisture stress. Suitable for cultivation in kharif/ rabi both season and matures in 140 days. Average yield is 35-40t/ha.	
Hisar Arun	1990	This variety has been developed through modified pedigree method from a cross (Pusa Early Dwarf x K-1) at HAU, Hisar. It is an early maturing, determinate, dwarf, erect, with cut leaf and synchronized clustered flowering bearing 15-20 fruits. Fruits are round, red, medium, average weight 65-70 g, 4-6 locules with deep red flesh. First picking starts 60-65 days after transplanting. It has yield potential of 170-280 q/ha in 80-85 days of crop duration.	
H-24	1997	It is a determinate variety resistant to TLCV, developed at IIVR. Fruits are medium and red. Yield potential is 380-400 q/ha.	
Chilli			
LCA-235 (Bhasker)	1987	Plants are compact, spreading with dark green leaves and yellow anthers. Fruits are thin, medium-long, thick red with red flesh and 45% seed content, pungent with high oleoresin, suitable for export, good shelf-life and first picking starts at about 30 days after transplanting. Yield (dry chilli) potential is 15-17 q/ha.	
KA-2 (Kashi Anmol)	2005	This variety has been developed by IIVR, Varanasi through the introduction from Sri Lanka. Fruits pendant, attractive green, first picking can be taken 50 days after transplanting. This variety has been recommended for cultivation in agroclimatic zone -IV (Punjab, U.P., Bihar and Jharkhand) and has yield (green chilli) potential of 200-225 q/ha in a crop duration of 130-145 days.	
LCA-353	2007	This variety is suitable for green and dry chilli production as well as for processing and export. This variety has been recommended for cultivation in agroclimatic zone -V (Chhattisgarh, Orissa and A.P.), zone -VIII (Karnataka, Tamil Nadu, Kerala and Pondicherry) and zone -IV (Punjab, U.P., Bihar and Jharkhand) and has yield (dry chilli) potential of 75 q/ha.	






Variety	Year	Description	
Pusa Purple long	1975	Developed by IARI, New Delhi early maturing and long fruited type variety. Fruits are glossy light purple in colour, 25-30 cm long, smooth and tender. Crop matures in 100-110 days. Suitable for spring and autumn planting, average yield is 27.5 t/ha. It is moderately tolerant to shoot borer and little leaf disease.	
Pusa Purple Cluster	1975	Developed by IARI, New Delhi. Early maturing long fruited variety, dark purple in colour and borne in clusters. The crop is ready for picking in 75 days after transplanting. Variety is resistant to little leaf disease under natural conditions.	
Punjab Barsati	1993	Released by PAU, Ludhiana. This variety has a dwarf and erect growth habit devoid of thorns. Fruits are medium, long and purple with average yield 35.5t/ha.	
Arka Keshav (BWR-21)	1990	Released by IIHR, Bangalore. High yielding bacterial wilt resistant variety. Fruits tender, free from bitter principles with seed maturity. Crop is ready for picking in 150 days. Average yield is 43t/ha.	
Punjab Sadabahar	2001	It is developed from PAU, Ludhiana Fruits are long, thin and deep purple in colour. It is tolerant to shoot and fruit borer and suitable for rainy season. It has been recommended for cultivation in agroclimatic zone -IV (Punjab, U.P., Bihar and Jharkhand) and zone- VI (Rajasthan, Gujarat, Haryana and Delhi).	
PBR-129-5 (Pant Samrat)	1981	It is developed through selection from local collection at GBPUAT, Pantnagar. Plants height 80-120 cm, having robust broad leaves with purple green. Fruits have attractive texture. Resistant to phomopsis blight and bacterial wilt under field conditions. Less infestation of shoot & fruit borers and jassids. Good for rainy season. It has been recommended for cultivation in agroclimatic zone -IV (Punjab, U.P., Bihar and Jharkhand).	
Cabbage			
Golden Acre	1976	Early growing variety with small round heads, leaves are light green from outside and dark green from inside. Average head weight is 1-1.5kg harvested in 60-65 days after transplanting. Yield potential is 20-24t/ha.	
Pride of India	1968	It is very popular variety of the country which developed by Suttons Seed, Kolkata in 1968 for cultivation in Plains of Northern India and Southern India. It is early growing variety. Plant similar to Golden Acre, maturity one week later than Golden Acre, head bigger than Golden Acre. Heads can be harvested at 70-80 days after transplanting. Yield potential of this variety is 200-280q/ha.	







Variety	Year	Description	
Pusa Mukta	1985	Heads flattish round, medium sized with light green outer leaves, weighing 1.5-2.0 kg each, harvested within 75-80 days after transplanting	
Garden pea			
Arkel	1975	Arkel has revolutionised the production of early peas in all pea growing areas since its introduction. Till date it is a prominent variety.	
Bonneville	1975	A double podded cultivar, plants medium-tall in height and flowers in 55-60days. Pods are light seeded	
Ageta-6	1996	Plants are dwarf (40 cm), erect, vigorous, with green foliage, bear 12-15 pods (one to two pods per bunch), pods contain up to 6 grain and 44.67% shelling. First picking starts about 50 days after seed sowing with 50% of the total yield. Seeds are rich in protein and dry matter. Plants are tolerant to high temperature. Seeds are green, smooth with slight wrinkles. It has yield potential of 60-65 q/ha.	
Azad P-1	1983	It is developed at CSAUA&T, Kanpur. Plant length (80-90) cm; foliage dark green; flowering 40-45 days after sowing, pods are smooth, dark green long (8-10 cm). It has average green pod yield of 180-200 q/ha and seed yield 14-15 q/ha.	
Azad P-3	1993	This is a very popular variety which has been developed at CSAUA&T, Kanpur. Plants are dwarf 65-70 cm, foliage green, branched flower, white, bears 10-15 pods, pods are green, smooth slightly curved at distal end. It has average green pod yield of 200 q/ha & seed yield 15 q/ha.	
Cowpea			
Pusa Komal (L-1552)	1975	This variety has been developed at IARI, New Delhi. It is identified through AICRP-VC in 1983. Flowering take place at 45 DAS, pods are light green, tender, 25-30 cm long. Recommended for the cultivation throughout country for both spring summer and rainy season, more preferably in Uttar Pradesh, Bihar, Punjab, Haryana and M.P. and has yield potential of 100-115 q/ha.	
Arka Garima (Sel-61-B)	1992	This variety has been developed at IIHR, Bangalore. It is identified through AICRP-VC in 1992. Pods are light green, long thick, round, fleshy and stringless. This is tolerant to heat and drought. It has been recommended for cultivation in agroclimatic Zone -VII (M.P. and Maharashtra) and VIII (Karnataka, Tamil Nadu Kerala and Pondicherry). This variety has yield potential of 170-190 q/ha in 90 days of crop duration.	






Variety	Year	Description	
Kashi Kanchan (CP-4)	2007	IIVRCP-4 (Kashi Kanchan): This is a bush type variety, developed at IIVR, Varanasi. Plants are dwarf (50-60 cm height), photo-insensitive and early variety suitable for sowing in both spring-summer (zaid) and rainy seasons (kharif). The pods are dark green, 30-35 cm long, tender, pulpy with less fibre and free from parchment layer. This variety is resistant to golden mosaic virus and <i>Pseudocercospora cruenta</i> . It has been recommended for cultivation in agroclimatic Zone -IV (Punjab, U.P., Bihar and Jharkhand), Zone -V (Chhattisgarh, Orissa and A.P.) and Zone -VII (M.P. and Maharashtra). The yield of green pods is 150-200 q/ha.	
French bean Contender	1965	It is an early, bush type variety bears pink flowers and green pods. Suitable for sowing in hills from April to June and in plains from last week of September to the beginning of October. First picking in 50 days after sowing and has yield potential of 200 q/ha.	
Arka Komal	1987	Arka Komal (SEL-9): Arka Komal has been developed at IHR, Bangalore. It is identified for release and notification through AICRP-VC in 1987. Pods are straight, flat, tender, green with oblong, large and light brown seeds with good keeping and cooking qualities and has yield potential of 180-195 q/ha pod yield and 25-30 q/ha seed yield.	
Cauliflower (Pusa Snowball - 16)	1975	It is a late season variety; developed through Introduction from Holland at IARI, New Delhi and identified through AICRP (VC) in 1975 for cultivation in throughout the country. Plants are erect, leaves long, narrow and bluish green. Curds are medium sized, solid, having attractive white colour. Curds are ready for harvest at 93 days after transplanting. It has yield potential of 250-300q/ha.	
351-4-1 (Pusa Deepali)	1975	The variety was developed at IARI, New Delhi It is an early season (October maturity) variety. Curd compact self blanching, white medium in size and uniform. Curds are well covered by leaves and riceyness is almost absent. Sowing time from end of May to early June and curds are ready for harvest in late October. It is recommended for cultivation throughout country. Average yield of this variety is 170-180 q/ha.	
Okra Pusa Sawani	1969	It has been developed at IARI, New Delhi. It is suitable for cultivating in spring, summer and rainy season. Fruits are dark green, smooth with 5 ridges and about 10-12 cm long at the marketable stage. Crop matures within 50 days from sowing. Average yield is 12-15 t/ha. Susceptible to Yellow Vein Mosaic Virus (YVMV).	
Parbhani Kranti	1990	This variety has been developed at MKV, Parbhani, Maharashtra. Fruits are medium-long with tender smooth surface at marketable stage. Fruits have a good keeping quality. Tolerant to Yellow Vein Mosaic Virus (YVMV). It has been recommended for cultivation throughout the country. Average yield of this variety is 85-115 q/ha in 120 days of crop duration.	

Variety	Year	Description	
Arka Anamika (Sel-10)	1990	This variety has been developed by IIHR Bangalore It is an early maturing and first picking may be done about 55 days after sowing. Its fruits are medium, green, rough, 5-ridged and start after 5-6th node onward. It is YVMV resistant and has yield potential of 115-130 q/ha.	
P-7	1986	It has been developed through back cross method form <i>A. esculentus</i> cv. Pusa Sawani x <i>A. manihot</i> ssp. <i>manihot</i> cv. Ghana. at PAU, Ludhiana. Fruits are medium long 5 ridged, resistant to YVMV. It has average yield 112 q/ha.	
VRO-6	2003	This variety has been developed at IIVR, Varanasi. First flower appears after 36-38 days after sowing on 4th node during rainy season and 3 rd node during summer season. Single plant bears 23-25 fruits of 8-10 cm length. It is resistant to YVMV and OLCV. It has been recommended for cultivation in agroclimatic Zone-IV (Punjab, U.P., Bihar and Jharkhand) and V (Chhattisgarh, Orissa and A.P.) and has yield potential of 190-210 q/ha (rainy season crop) and 130-150 q/ha (summer season crop).	
Onion			
Agrifound Dark Red	1987	This variety has been developed by NHRDF, Nasik. It is identified for release and notification through AICRP-VC in 1987 and notified by CVRC Notification no. 1135(E) dated 01.12.1998. Bulbs are dark red, globular, 4-6 cm in size, moderately pungent with 12-13% of TSS, thin skin with average keeping quality and suitable for cultivation in kharif season. This variety has been recommended for cultivation in agroclimatic Zone -IV (Punjab, U.P., Bihar and Jharkhand) and has yield potential of 375-400 q/ha in 95-100 days of crop duration.	
Agrifound Light Red	1993	This variety has been developed at NHRDF, Nasik, identified for release and notification through AICRP-VC in 1993 & 1995 and notified by CVRC Notification no. 115(E) dated 10.02.1996. Bulbs are light red, globular, tight skin, 4-6 cm in size with 13% of TSS having good keeping quality. Recommended for cultivation during rabi season in agroclimatic Zone -IV (Punjab, U.P., Bihar and Jharkhand),VI (Rajasthan, Gujarat, Haryana and Delhi) and VIII (Karnataka, Tamil Nadu, Kerala and Pondicherry) and has yield potential of 300-325 q/ha in 160-165 days of crop duration.	

Variety	Year	Description
Garlic		
G-323 (Yamuna Safed-4)	2003	<p>This variety has been developed at NHRDF, Karnal, identified for release and notification through AICRP-VC in 2003 and notified by CVRC Notification no. 597(E) dated 25.04.2006. Bulb size index 12-15 cm, clove diameter 1.2-1.25 cm, clove size index 2.5-3.0 cm>, 25-30 cloves per bulb having 40-42% TSS. It has been recommended for cultivation in agroclimatic Zone-VI (Rajasthan, Gujarat, Haryana and Delhi) and has yield potential of 175-200 q/ha.</p>
		
G-50 (Yamuna Safed-2)	1993	<p>This variety has been developed at NHRDF, Nasik. It is identified for release and notification through AICRP-VC in 1993 and notified by CVRC Notification no. 115(E) dated 10.02.1996. G-50. Bulbs are compact, white creamy flesh, 10 bulb weight 160-240 g; T.S.S. 38-40%, dry matter 40-41%, diameter 3.5-4.0 cm, number of cloves 35-40, 0.75-1.0 cm diameter, 1.75-2.5 cm clove size index. It has been recommended for cultivation in agroclimatic Zone -IV (Punjab, U.P., Bihar and Jharkhand) and has yield potential of 150-200 q/ha.</p>
		
Water melon		
Sugar Bbaby	1978	<p>Developed by IARI. The fruit are small in size, round having bluish black and deep pink flesh with small seeds. TSS 11-13%, average weight 3-5kg. The fruits ripen in 80-85 days.</p>
		
Arka Manik	1987	<p>Developed by IIHR, Bangalore. The fruits are round to oval with green rind and dull green stripes. The flesh is deep red, very sweet taste with TSS12-13%. Average fruit weight is 5-6 kg. Resistant to powdery mildew and tolerant to anthracnose disease. Suitable for long distance transportation and storage.</p>
		
Durgapur Meetha	1975	<p>Developed by ARS, Durgapura. This is a late maturing variety, fruits are round rind is thick and light green in colour, flesh sweet and dark red in colour. Good keeping quality. TSS 11%, average fruit weight 6-8 kg. Ready for harvest in 125 days.</p>
		

Variety	Year	Description
Musk melon		
Hara Madhu	1970	<p>This variety is developed at PAU, Ludhiana. Identified for release and notification through AICRP-VC in 1975 and notified by CVRC Notification nos. 2035(E), 440, and 1104 dated 20.02.1970, 21.08.1975, and 23.03.1978, respectively. Fruits are round, tapering towards the stalk with open prominent green sutures with green flesh, thick, very juicy with 12-15% TSS, average fruit weight of 1 kg. It has been recommended for cultivation in agro-climatic zone - IV (Punjab, U.P., Bihar and Jharkhand) and zone - VII (Madhya Pradesh, Maharashtra and Goa). It has yield potential of 130-150 q/ha.</p>
		
Pusa Madhuras (SL- 445)	1975	<p>This variety has been developed at IARI, New Delhi and identified for release and notification through AICRP-VC in 1975. Fruits are roundish-flat, each weighing 1 kg, sparsely netted with pale green stripes, flesh is salmon-orange, juicy with 12-14% TSS. First fruit picking starts 90-95 days after sowing. It has been recommended for cultivation in agro-climatic zone - IV (Punjab, U.P., Bihar and Jharkhand), VI (Rajasthan, Gujarat, Haryana and Delhi), and VIII (Karnataka, Tamil Nadu, Kerala and Pondicherry). It has yield potential of 150- 170 q/ha.</p>
		
Bitter gourd		
Kalyanpur Barahmashi	1983	<p>Kalyanpur Baramasi: This is high creeper, stem, dark green growing villose, fruit long (20-25 cm), thin, dark green and tapering. It is tolerant to mosaic and fruit fly under field condition. First picking starts at 60-65 days after seed sowing. Suitable for growing in rainy season and very much suitable for bower system or support system. It has yield potential of 150-160 q/ha green fruit and seed yield 10.0 -12.5 q/ha.</p>
		
Pusa Do Mausami	1975	<p>Fruits are dark green, long, medium thick, club shaped with 7-8 continuous ridges, 18 cm long at edible stage, 8-10 fruits weigh one kg. Fruits have continuous ridges as distinguishing morphological character. First picking starts at 55 days after seed sowing. It has yield potential of 200 q/ha.</p>
		
Priya (VK-1)	1992	<p>The variety Priya has been developed at KAU, Vellanikkara and identified for release through AICRP-VC in 1992. Its fruits are long (40 cm), spiny, green with white tinge at the style end. It can be cultivated during January-August and September-December. It has been recommended for cultivation in agroclimatic Zone -II (West Bengal And Assam), Zone -VII (M.P. and Maharashtra) and Zone -VIII (Karnataka, Tamil Nadu and Kerala) and has yield potential of 300-325 q/ha.</p>
		

Variety	Year	Description	
Bottle gourd			
Pusa Summer Prolific Long PSPL	1975	Its vines are vigorous in growth and bears long cylindrical crook necked fruits. First picking starts at 60-65 days after seed sowing. Suitable for both spring-summer and rainy seasons cultivation in north Indian plains. The early summer crop is sown in February and kharif crop is sown in June and early July. It has yield potential of 250-275 q/ha.	
Pusa Naveen	1992	It is free from crook-necked fruits. Its fruits are cylindrical, straight and each weighing 550 g. It is suitable for cultivation in spring-summer and rainy seasons and has yield potential of 350-400 q/ha.	
Pusa Summer Prolific Round (PSPR)	1975	It is vigorous and prolific bearer having green round fruits 15-18 cm in girth. Suitable for cultivation in spring-summer and rainy seasons in north Indian plains. The early summer crop is sown in February and kharif crop is sown in June and early July. First picking starts at 60-65 days after seed sowing. It has yield potential of 250 q/ha.	
Punjab Komal	1975	Early maturing, plants vigorous and light green; stem angular round and hairy; leaves medium, slightly lobed, hairy and rough; fruits bulb shaped, medium oblong, pubescent and light green. First fruit harvest starts at 62 days after seed sowing. It is tolerant to CMV and suitable for growing in hot and dry climate. Average fruit yield of this variety is 500 q/ha.	
Narendra Rashmi (NDBG-1)	2006	It is an early variety and bears bottle shaped attractive fruit with very distinct neck. It takes 60 days to first fruit harvest after seed sowing and 125 to 130 days to seed crop maturity. It has shown moderate tolerance to anthracnose disease during rainy season, recent observations during 2011 and 2012 have revealed that Narendra Rashmi exhibits field resistant against fusarium wilt. Suitable for growing in spring - summer and rainy season. This variety has average fruit yield of 410 q/ha.	
Pumpkin			
Kashi Harit (IVPK-226)	2006	It is short viny, polar circumference of fruit-51-52 cm, equatorial circumference of fruit 52-53 cm, wt 2.13-2.5 kg. Days to first fruit picking (Green fruit) 70-72 days after seed sowing and 80-90 days for seed maturity. It can be grown in summer and rainy season. It has yield potential of 400 q/ha.	

Variety	Year	Description
Narendra Agrim (NDPK-24)	1992	It has short vines, very early maturing, small fruited and highly homogeneous. Fruits are round and dark green. It bears female flowers four days earlier than male flowers and first picking could be taken within 55 days. Green fruits weight is 1.5-2.0 kg and mature fruits are 3-4 kg of weight. Suitable for cultivation in spring/summer season. Yield potential of this variety is 300-400 q/ha. 
Pusa Vishwash	1992	It has vigorous vegetative growth, dark green leaves with white spots including veins. Fruits are brown, spherical each weighing 4-5 kg with thick and golden yellow flesh and has yield potential of 400-425 q/ha in 120 days of crop duration. 
Arka Chandan (IIHR-105-1-1)	1987	It has vigorous vines, hairy stem, green leaves without any pattern. Fruits are round with flat blossom end, each of 2-3 kg weight, green with white patches on rinds (turn brown at maturity), thick flesh, and bright orange firm with plea aroma, rich in carotene content (3331 IU/100g of flesh) and sweet with 8-10 % TSS and this variety has yield potential of 325-350 q/ha in 120 days of crop duration. 
CM-350 (Sooraj)	2001	It has vigorous growth habit and produces medium size globular fruits with orange coloured thick flesh. It is rich in carotene. Average fruit weight is 2-3 kg. and has yield potential of 350-400 q/ha. 
Carrot		
Pusa Kesar	1965	This variety has been developed at the IARI, New Delhi. It has red-coloured roots and self-coloured core. It can tolerate higher temperatures. Suitable for sowing from August - early October. Crop matures in 90-110 days with average yield 30 q/ha. 
Sel -5 (Pusa Yamdagni)	1981	This hybrid has been developed through at IARI, Regional Station, Katrain. It is notified by CVRC Notification no. 10(E) dated 01.01.1988. It combines the earliness of EC-9981 and self-coloured core character of Nantes. Roots are 12-15 cm long, orange, and slightly tapering stumpy to semi-stumpy ending. Tops are medium-sized and quick growing as compared to other temperate varieties. It is high yielder and richer in carotene content. It is recommended for cultivation in agroclimatic Zone -VII (M.P. and Maharashtra) and this has yield potential of 225-260q/ha. 