

Assessment of Varietal Preferences of Chickpea in Gujarat

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Introduction

Gujarat produces more than 1,22,000 t of chickpea from an area spanning about 1,53,000 ha. Chickpea yield is about 800 kg ha⁻¹, higher than the national average of 700 kg ha⁻¹. The crop accounts for about 13% of the total pulse area and contributes more than 14% to total pulse production in Gujarat. It ranks second after pigeonpea in area and production.

During the past two decades, a limited number of improved chickpea varieties have been released in Gujarat by the State Varietal Release Committee and the National Varietal Release Committee. ICCV 1 was released as ICC 4 in the early 1980s, and its adoption pattern is yet to be examined. This study attempts to assess the adoption of different chickpea varieties in Gujarat and identify farmers' preferences for different varietal traits.

Background and Data

Chickpea covered an area of about 77,000 ha with a production of 63,000 t in 1970. The area covered improved marginally in the 1980s, yet

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Table 2. Characteristics of sample farmers.

Characteristics	Ahmedabad	Jamnagar	Junagadh	Panchmahals	All
Irrigated area (%)	10.66	62.87	20.02	63.43	18.06
Chickpea area (%)	29.82	22.28	16.48	44.16	28.25

This gave a sample of 240 farmers. Data was collected through personal interviews of farmers in each village during Feb-Apr 1996.

The farmers of Jamnagar and Panchmahals had better irrigation facilities (63%) compared to those in the other two districts (Table 2). The share of chickpea in the total landholding ranged between 16.48% (Junagadh) and 44.16% (Panchmahals), with an overall average of 28.25%.

The crops grown before chickpea are divided into three main heads: cereal-based, legume-based, and cash crop-based. Table 3 shows that sorghum-chickpea was followed by 52% of the farmers and cotton-chickpea by 48% in Ahmedabad district. Maize-chickpea and paddy-chickpea were adopted by 40% and 60% of the farmers in Panchmahals, respectively. Almost all the sample farmers in Jamnagar adopted groundnut-chickpea. In Junagadh district, groundnut-chickpea (50%), cotton-chickpea (2%), and fallow-chickpea (33%) rotations were practised. Aggregated data showed that cereal-based chickpea was followed by 38%, legume-based chickpea by 37%, cotton-based chickpea by 12%, and fallow-chickpea by 8% of the farmers.

Table 3. Crops grown before chickpea (%).

Cropping system		Ahmeda- bad	Jam- nagar ¹	Juna- gadh ¹	Panch- mahals	All
Cereal-based	Sorghum-chickpea	52				13
	Maize-chickpea				40	10
	Paddy-chickpea				60	15
Legume-based	Groundnut-chickpea		97	50		37
Cash crop- based	Cotton-chickpea	48		2		12
Others	Fallow-chickpea			33		8

¹ Three percent of the farmers in Jamnagar and 15% in Junagadh district did not respond.

Adoption of Improved Varieties

Research on ICCC 4 was initiated in 1973-74. It was first identified in 1982 and released in 1983 for cultivation in Gujarat by the State Varietal Release Committee. On-farm trials were conducted during 1985.

Rating was done to determine the traits most preferred by the farmers. These included grain quality, biotic and abiotic constraints, marketing, seed quality, risk, and agronomic practices. Table 4 reveals the districtwise share of different cultivars in total chickpea acreage from 1992 to 1995. Dahod Yellow was the ruling variety in all the four districts with a share of about 97%. Chaffa was cultivated on a very limited area by the farmers of Ahmedabad district. ICCC 4 is finding its niche in Jamnagar district; its share in total acreage was estimated to be more than 20%. The groundnut-chickpea cropping system and better irrigation facilities might have accelerated the adoption of ICCC 4 in Jamnagar district, where farmers started cultivating it in 1986 (Table 5). The percentage of farmers adopting it increased from 1.67 in 1986 to 5 in 1987 and to more than 8 in 1991.

Information on sources of chickpea seed is very useful for follow-up action and to determine the extent of adoption. The seed sources in this study included own seed, seed shops, other farmers, and research institutes. It is apparent (Table 6) that a majority of the farmers (>79%) were using their own seed. Seed shops ranked second with more than 14% of the farmers, followed by fellow farmers (>3%) as the source of seed. The role of research institutions in seed distribution was limited. In Panchmahals district, all the farmers had sown their own seed. Of course, for the past 3-4 years, KRIBHCO, a voluntary organization, has started seed multiplication and distribution of improved chickpea varieties in the tribal area of Panchmahals. These are expected to be widely preferred and adopted by the tribal farmers.

Varietywise data on the production of foundation and certified chickpea seeds in Gujarat are presented in Table 7. The share of certified seed production of Chaffa drastically declined from 44% in 1993-94 to 14% in 1994-95. However, consistent production of certified seed of Dahod Yellow variety was noticed in both the years. On the other hand, the production of certified seed of ICCC 4 more than doubled in 1994-95 over the previous year. Its share in total certified seed production which was about 23% in 1993-94,

Table 4. Districtwise share (%) of different chickpea cultivars from 1992-1995.

District	Variety	Extent of adoption			
		1992	1993	1994	1995
Ahmedabad	Chaffa	0.63	0.53	0.85	0.55
	Dahod Yellow ¹	99.37	99.47	99.15	99.45
Jamnagar	ICCC 4 ²	20.63	20.63	24.94	24.61
Junagadh	Dahod Yellow	100.00	100.00	100.00	100.00
Panchmahals	Dahod Yellow	100.00	100.00	100.00	100.00
	Local				
All	Chaffa	0.41	0.38	0.58	0.44
	ICCC 4	1.91	1.71	2.60	1.52
	Dahod Yellow	97.68	97.91	96.82	98.04

¹ Dahod Yellow was the leading variety in the study area.

² ICCC 4 is finding its niche in Jamnagar district.

Table 5. Extent of ICCC 4 adoption by sample farmers in Jamnagar district.

Year	Farmers (%)	Area (acres)
1986	1.67	2
1987	5.00	9
1988	3.33	5
1989	3.33	4
1990	5.00	6
1991	8.34	12

increased to more than 49% in 1994-95, implying that this variety is becoming popular among chickpea growers. The area under ICCC 4 ranged between 3225 and 3767 ha in 1994-95. On the basis of seed sales, the area under it is estimated to be 3767 ha, whereas reconnaissance survey estimates reveal that it was adopted on over 3225 ha. With increased seed production, it is expected that the area under ICCC 4 will further expand.

Farmers' preferences for grain quality traits in chickpea (Table 8) indicate that except in Panchmahals district, majority of the farmers in other districts

Table 6. Farmers' sources (%) of chickpea seed in select districts of Gujarat.

Sources	Ahmedabad	Jamnagar	Junagadh	Panchmahals ¹	All
Own seed	66.67	76.67	73.33	100.00	79.17
Seed shops	33.33	13.33	10.00		14.17
Other farmers			13.33		3.33
Research institutes			3.24		0.83
Others		10.00			2.50

¹ During the past 3-4 years, KRIBHCO has started seed multiplication and distribution of improved chickpea varieties in the tribal areas of Panchmahals district.

preferred bold, yellow-colored, round, desi-type grain with a smooth seed coat. On the other hand, medium-sized, brown-colored, wrinkled, desi type with rough seed coat were the traits most preferred by the tribal farmers of Panchmahals. The preference for small-sized chickpea grain by 45% of the farmers in Jamnagar district could be attributed to its better taste, higher yield, and fewer problems associated with the pod borer.

The most preferred quality trait in chickpea grain was rated by the sample farmers (Table 9). Among the six different quality traits, chickpea type was ranked first by almost all the farmers of Ahmedabad district. Color, size, texture, seed coat, and cooking quality of chickpea grain were ranked in descending order by a majority of the farmers. In Jamnagar district, first preference was given to color, followed by size, texture, seed coat, type, and cooking quality. In Junagadh district, it was color, size, texture, seed coat, cooking quality, and type of chickpea. The most preferred quality traits were type, size, color, texture, seed coat, and cooking quality. At the aggregate level, type of chickpea seemed to be the dominantly preferred trait, followed by size, color, texture, seed coat, and cooking quality.

Chickpea growers' rating of biotic and abiotic constraints (Table 10) revealed that except in Panchmahals district, farmers ranked wilt, insect/pests, drought, and frost in that order. This implies that wilt-insect-resistant, and drought-escaping varieties were preferred by a majority of them. In Panchmahals district, the first rank was assigned to insect/pest, followed by frost, wilt, and drought.

Table 7. Varietywise production of foundation and certified chickpea seeds in Gujarat.

Variety	Foundation seed (t)		Certified seed (t)	
	1993-94	1994-95	1993-94	1994-95
Chaffa	43.10 (12.33 ¹)	214.85 (7.94)	380.40 (44.26)	807.50 (14.09)
Dahod Yellow	79.70 (22.79)	571.50 (21.11)	281.60 (32.76)	1905.20 (33.24)
ICCC 4	226.90 (64.88)	940.40 (34.75)	197.50 (22.98)	2825.25 (49.30)
PG 5		979.80 (36.20)		
Others				193.00 (3.37)
Total	349.70 (100)	2706.55 (100)	859.50 (100)	5730.95 (100)

¹ Figures in parentheses are percentages of the total.

Table 8. Farmers' preferences (%) for chickpea grain quality.

Characteristics	Ahmedabad	Jamnagar	Junagadh	Panchmahals	All
Size					
Bold	100.00	50.00	86.67		59.17
Medium		5.00	10.00	100.00	28.75
Small		45.00	3.33		12.08
Color					
Yellow	100.00	100.00	100.00	18.33	79.58
Brown				81.67	20.42
Texture					
Round	100.00	100.00	100.00	20.00	80.00
Wrinkled				80.00	20.00
Type					
Desi	100.00	96.67	91.67	88.33	94.17
Kabuli		3.33	8.33	11.67	5.83
Seed coat					
Smooth	100.00	51.67		16.67	42.08
Rough		48.33	100.00	83.33	57.92

Table 9. Sample farmers' (%) ranking of quality traits in chickpea in Gujarat.

Traits	Ranking					
	1	2	3	4	5	6
Ahmedabad						
Size			51.67	31.66	16.67	
Color	3.33	85.00	11.67			
Texture		10.00	36.66	51.67	1.67	
Type	96.67	3.33				
Seed coat		1.67		16.67	81.66	
Cooking quality						100.00
Jamnagar						
Size	21.67	48.33	18.33	11.67		
Color	50.00	40.00	6.67	1.66	1.67	
Texture	5.00	6.67	43.33	45.00		
Type	23.33	3.33	18.34	11.67	28.33	15.00
Seed coat		1.67	13.33	30.00	51.67	3.33
Cooking quality					18.33	81.67
Junagadh ¹						
Size	16.67	63.33	13.33	3.33		
Color	75.00	18.33	3.33			
Texture	3.33	10.00	56.67	25.00	1.66	
Type				1.66	30.33	65.00
Seed coat		5.00	23.33	66.67		1.66*
Cooking quality	1.66				65.00	30.00*
Panchmahals						
Size	46.67	50.00	1.67	1.66		
Color	1.67	1.67	55.00	41.66		
Texture		3.33	3.34	20.00	45.00	28.33
Type	50.00	45.00	1.66	1.67		1.67
Seed coat				3.33	46.67	50.60
Cooking quality	1.66		38.33	31.68	8.33	20.00
Overall ²						
Size	21.25	40.42	21.25	12.08	4.17	
Color	32.50	36.25	19.17	10.83	0.42	

Contd.

Table 9— Contd.

Texture	2.08	7.50	35.00	35.42	12.08	7.09
Type	42.50	12.92	5.00	3.75	14.58	20.42
Seed coat		2.08	9.17	29.17	45.00	13.75
Cooking quality	8.34		9.58	7.92	22.92	57.91

¹ In Junagadh district, 3.34% of the farmers did not respond.

² Overall, 0.83% of the farmers did not respond.

Table 10. Chickpea growers' (%) rating of biotic and abiotic constraints.

Constraints	Ranking			
	1	2	3	4
Ahmedabad				
Frost		1.67		98.33
Drought	5.00	5.00	90.00	
Wilt		86.67	11.67	1.66
Insects/pests	8.33	81.66	8.34	1.67
Jamnagar				
Frost	13.33	15.00	20.00	51.67
Drought		1.67	55.00	43.33
Wilt		78.34	18.33	3.33
Insects/pests	8.33	65.00	21.67	5.00
Junagadh				
Frost	25.00	13.33	11.67	50.00
Drought		5.00	65.00	30.00
Wilt	55.00	33.33	3.33	8.34
Insects/pests	20.00	48.34	20.00	11.66
Panchmahals				
Frost	1.67	63.33	26.57	8.33
Drought		30.00	21.67	48.33
Wilt	33.33	6.67	51.66	8.34
Insects/pests	65.00			35.00
Overall				
Frost	10.00	23.33	14.59	52.08
Drought	1.25	10.42	57.91	30.42
Wilt	63.33	17.50	15.00	4.17
Insects/pests	25.42	48.75	12.50	13.33

Conclusions

A majority of the farmers in Gujarat still grow local chickpea varieties, Dahod Yellow being the most popular one. ICCV 4 is slowly finding its niche in Jamnagar district. However, the area under improved chickpea cultivars in the state is negligible. The study revealed that farmers in Gujarat prefer bold, yellow-colored, round, desi-type grains. Wilt- and insect-resistant, drought-escaping varieties were also preferred by a majority of them. It is suggested that large-scale on-farm demonstrations supported by seed production by public sector companies will accelerate the rate of adoption of improved chickpea varieties in Gujarat.