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Technology Innovations and Strategies to Boost Cotton Productivity

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EXPERT'S Column



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comprised of four mini-missions on (1) research, (2) technology transfer (3) modernisation of marketing (4) upgrading of ginning and processing establishments. Driving on the game changing Bt cotton technology introduced in 2002, the country witnessed significant jump in cotton area, productivity and production. About 246 market yards were modernized and 859 G&P factories were upgraded.

Now the biggest challenge is stagnation/decline in average cotton productivity (<450 kg lint/ha) mainly due to increasing frequency of extreme weather events impacting adversely cotton production in the 67% rainfed area; pest and disease outbreaks (pink bollworm, whitefly, cotton leaf curl virus and boll rot) in irrigated tracts (33% area). New initiatives, strategies and innovative technologies are needed for a vibrant cotton supply and value chain in the country.

Cotton is the major cash crop of India and contributes 60% of the fibre used in the domestic textile industry. Cotton supports the livelihood of nearly 6 million farmers and another 40-50 million people engaged in cotton processing and trade. India leads globally in cotton area (-13 million hectares, 40% share) and is the second largest consumer of cotton in the world (5.29 million metric tonnes, 22.2% share). A small quantity (0.51 million MT) is exported but ELS cotton is imported which accounts for 10% of its consumption.

Earlier, Government of India supported the Technology Mission on Cotton (TMC) during the first decade (2000-01 to Dec., 2010) which

Need For New Initiatives and Partnerships

Public-private partnerships (PPP) in the areas of (1) collaborative research to generate new seed technologies, scaling-up tailored agronomy and ushering contamination-free quality cotton through modernised processing is the need of

the hour. Launch of a cotton technology mission in PPP mode is warranted. Globally there is no released GM product that is still effective against pink bollworm. Collaborative research for development of novel transgenic technology effective against pink bollworm with a proven history of biosafety is contemplated. Also, in the near future, genome editing approach to develop 'gene drive' technology for male sterility has the potential to reduce resistant pink bollworm populations substantially and prevent loss in yield and fibre quality.

Developing Varieties with Higher Ginning Percentage (GP)

Indian cotton is characterised by low ginning % (per cent of fibre weight in seed-cotton) which is currently about 33%. compared to varieties in other cotton growing countries that have higher productivity due to higher GP (38 to 44%). For example, processing of 1000-kg seed-cotton yields 330 kg fibre compared to –380 to 440 kg fibre in other countries. Thus, the fibre yield is low. Development and popularisation of cultivars with high GP will boost cotton productivity in India and pave way for lint-based markets benefiting farmers. Every 3% increase in GP will boost seed cotton yield by 9%. Every 1% increase in GP will boost lint yield by 25 kg/ha.

Tapping the Potential of Artificial Intelligence

AI is fast emerging as a disruptive technology. ICAR-CICR tapped the potential of AI by developing and deploying a solution for monitoring of pink bollworm moth arrivals into cotton fields. The AI pheromone trap is useful for real time monitoring of pink bollworm. This technology was field deployed for the first-time in Punjab at 18 locations in 3 districts in the ongoing season. The solar powered AI trap takes the image of the adult moths attracted to the sex pheromone lure and get trapped on the sticky liner of the trap. The image is transmitted at set intervals to a cloud server where a machine learning (ML) algorithm identifies and counts the trapped adult moths. Farmers, extension workers and advisors can access and visualize the real time data on their mobile. Pest alert and advisory is issued by various modes whenever trap catches cross the economic threshold level (ETL). The technology is scalable and useful for monitoring the dreaded pink bollworm by



deploying AI pheromone traps in a grid pattern in all cotton growing areas. Access to monitoring data will enable informed spray decisions by farmers for timely management, reduce pesticide use and costs, increase yield and profitability.

Novel Attractants for Monitoring and Trapping Insect Pests

Microbial volatile organic compound formulations have been developed as insect attractants and patented by ICAR-CICR. These attractant formulations are to be used in combination with yellow sticky traps for monitoring and mass trapping of a variety of sucking insect pests of cotton such as whitefly, jassids, thrips and aphids. Molecules have been identified for attracting beneficial insects into cotton fields to bring down harmful insect populations in an eco-friendly manner.



Remote Sensing Applications in Cotton Farming

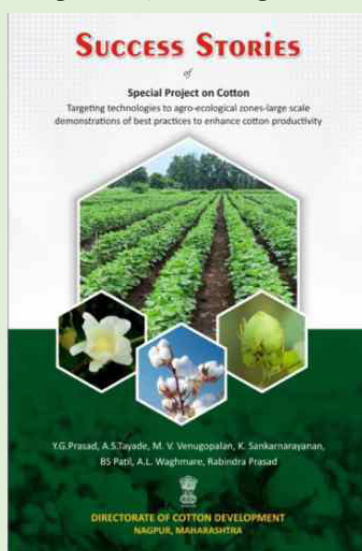
Remote sensing can provide accurate and reliable information to guide crop health

management in many crops including cotton. The main applications of remote sensing include crop area estimation, crop growth monitoring and yield estimation, monitoring soil, moisture and nutrient status, precision nutrient and weed management using variable rate technology, crop damage/disaster monitoring, etc. Use of satellite imagery to detect weeds using custom algorithms has been demonstrated to be cost effective, reduce herbicide use by 70-80% and GHG emissions by 60 kg CO₂e/ha in large farm holdings in Australia.

Promote 5 'G' Concept in Cotton Production



It is estimated that adoption of new agronomy in nearly 4 million ha (~25% area) can boost average cotton productivity in rainfed areas. The approach is targeting technologies to agro-ecology. Match Genotypes (short duration, compact and sucking pest tolerant) to Geography (soil type of farms and water availability) with suitable Geometry (row to row and plant to plant spacing as per soil type), use Growth regulators to boost harvest index (retain more bolls by regulating vegetative growth) for significant Gain in yield/ha and net returns on investment. Several compact hybrids with market preferred traits for yield and fibre have been identified based on suitability for high density planting system (HDPS). Large scale demonstrations under the special project on cotton



on HDPS in light soils and closer planting in medium soils in 8 states significant yield gain during 2023-24 season. Analysis indicated yield increase above 20% in 72% of farmers' fields in Akola district, while the yield range shifted to a higher level of more than 9 q seed cotton/ha in 78% farmers' fields under HDPS compared to only 8% by farmers adopting conventional practice.

Switch From Pilots to Saturation Mode

Scale-up high density planting system (HDPS) and closer spacing (CS) technologies in saturation mode at district level for visible impact. The technology is to be expanded to cover the potential area in identified districts which is suitable for HDPS or CS technology. Partnerships among stakeholders can make this a reality. This will eventually pave way for mechanical harvesting of cotton in view of increasing labour cost for picking and also resolve contamination issue. However, introduction of effective chemical defoliants will make it possible to reduce trash content in seed cotton and in lint by equipping ginneries with pre- and post-cleaners.

Way Forward

As area under cotton is giving way to other competing crops in several states and competition from manmade fibre is on the rise, increasing cotton productivity is the top priority for meeting the domestic demand and export opportunities. While novel seed technologies can reduce losses due to pests and disease outbreaks, adoption of climate resilient technologies can ensure stability in production. Scaling up of HDPS promoting the '5G concept' will certainly boost productivity in the short run and eventually pave way for mechanization of cotton production and harvesting in the medium term. In this context, partnership among stakeholders is even more critical in addressing the mounting challenges faced by the cotton sector.

Source: Cotton Pulse 2024, Aurangabad

(The views expressed in this column are of the author and not that of Cotton Association of India)

CAI Pegs its Latest Cotton Pressing Estimate for 2023-24 Season at 325.29 Lakh Bales

Cotton Association of India (CAI) has released its latest estimate of cotton pressing numbers for the season 2023-24 beginning from 1st October 2023. At the CAI Crop Committee meeting held on 14th October 2024, the all India total cotton pressing numbers for the 2023-24 season have been arrived at 325.29 lakh bales of 170 kgs. each (equivalent to 341.35 lakh running bales of 162 kgs. each) as against its previous estimate of 323.02 lakh bales of 170 kgs. each (equivalent

to 338.97 lakh running bales of 162 kgs. each). Based on input received from the members of all cotton growing state associations and other trade sources, the CAI Crop Committee has arrived at the cotton pressing numbers for 2023-24 season and also drew cotton balance sheet as on 30th September 2024. The state-wise break-up of the cotton pressing numbers and balance sheet for the season with the corresponding data for the previous crop year are given below.

CAI's Cotton Pressing Estimate for the Seasons 2023-24 and 2022-23

(in lakh bales of 170 kg.)

State	Indian Cotton pressing Estimate*				Pressed Cotton Bales as on 30th September 2024	
	2023-24		2022-23		2023-24	
	In running b/s of 162 Kgs. each	In lakh b/s of 170 Kgs. each	In running b/s of 162 Kgs. each	In lakh b/s of 170 Kgs. each	In running b/s of 162 Kgs. each	In lakh b/s of 170 Kgs. each
Punjab	3.83	3.65	2.89	2.75	3.83	3.65
Haryana	13.96	13.30	11.54	11.00	13.96	13.30
Upper Rajasthan	16.23	15.47	18.89	18.00	16.23	15.47
Lower Rajasthan	13.85	13.20	11.81	11.25	13.85	13.20
Total North Zone	47.87	45.62	45.12	43.00	47.87	45.62
Gujarat	94.97	90.50	99.07	94.41	94.97	90.50
Maharashtra	95.02	90.55	84.70	80.71	95.02	90.55
Madhya Pradesh	19.94	19.00	20.46	19.50	19.94	19.00
Total Central Zone	209.93	200.05	204.23	194.62	209.93	200.05
Telangana	36.73	35.00	32.01	30.50	36.73	35.00
Andhra Pradesh	13.64	13.00	17.21	16.40	13.64	13.00
Karnataka	22.67	21.60	23.61	22.50	22.67	21.60
Tamil Nadu	4.46	4.25	5.72	5.45	4.46	4.25
Total South Zone	77.50	73.85	78.55	74.85	77.50	73.85
Orissa	3.96	3.77	3.60	3.43	3.96	3.77
Others	2.10	2.00	3.15	3.00	2.10	2.00
Total	341.35	325.29	334.65	318.90	341.35	325.29

* Including loose

The total cotton supply estimated by the CAI Crop Committee till end of the cotton season 2023-24 i.e. upto 30th September 2024 is 371.69 lakh bales of 170 kgs. each (equivalent to 390.05 lakh running bales of 162 kgs. each) which is more by 3.37 lakh bales than its previous estimate of 368.32 lakh bales of 170 kgs. each (equivalent to 368.52 lakh running bales of 162 kgs. each). The estimated total cotton supply consists of the opening stock of 28.90 lakh bales of 170 kgs. each (equivalent to 30.33 lakh running bales of 162 kgs. each) at the beginning of the 2023-24 cotton season on 1st October 2023, cotton pressing numbers estimated for the season at 325.29 lakh bales of 170 kgs. each and the imports for the season estimated at 17.50 lakh bales of 170 kgs. each (equivalent to 18.36 lakh running bales of 162 kgs. each). The cotton imports now estimated for the season are more by 1.10 lakh bales than estimated previously.

The CAI has reduced its domestic consumption estimate by 4.00 lakh bales to 313.00 lakh bales of 170 kgs. each (equivalent to 328.46 lakh running bales of 162 kgs. each) from its previous estimate of 317.00 lakh bales of 170 kgs. each (equivalent to 332.65 lakh running bales of 162 kgs. each). The exports for the season are estimated at 28.50 lakh bales of 170 kgs. each (equivalent to 29.91 lakh running bales of 162 kgs. each) as against 28.00 lakh bales of 170 kgs. each (equivalent to 29.38 lakh running bales of 162 kgs. each) estimated previously. The exports estimated for the previous cotton season 2022-23 were 15.50 lakh bales of 170 kgs. each (equivalent to 16.27 lakh running bales of 162 kgs. each). The carry-over stock which was earlier estimated at 23.32 lakh bales of 170 kgs. each (equivalent to 24.47 lakh running bales of 162 kgs. each) is now estimated at 30.19 lakh bales of 170 kgs. each (equivalent to 31.68 lakh running bales of 162 kgs. each).

Highlights of Deliberations held by the CAI Crop Committee on 14th October 2024

The Crop Committee of the Cotton Association of India (CAI) held its meeting on Monday, the 14th October 2024, which was attended by 15 members representing various cotton growing regions of the country. The Committee arrived at its final estimate of the cotton pressing numbers for 2023-24 season and drew the estimated cotton balance sheet

based on the data available from various trade sources, upcountry associations and other stakeholders.

The following are the highlights of the deliberations held at this meeting: -

1. Consumption

The cotton consumption for the current crop year 2023-24 is estimated at 313.00 lakh bales of 170 kgs. each (equivalent to 328.46 lakh running bales of 162 kgs. each). The previous year's consumption estimate was 311.00 lakh bales of 170 kgs. each (equivalent to 326.36 lakh running bales of 162 kgs. each).

2. Cotton Pressing

The CAI has increased its estimate of cotton pressing for 2023-24 season to 325.29 lakh bales of 170 kgs. each (equivalent to 341.35 lakh running bales of 162 kgs. each) from its previous estimate of 323.02 lakh bales of 170 kgs. each (equivalent to 338.97 lakh running bales of 162 kgs. each). The changes made in the state-wise cotton pressing estimates compared to those estimated previously are given below: -

(in lakh bales of 170 kgs. each)

State	Increase (+) / Decrease (-)
North	(-) 0.38
Gujarat	(+) 0.50
Maharashtra	(+) 0.55
Madhya Pradesh	(+) 0.50
Karnataka	(+) 1.10
TOTAL	(+) 2.27

3. Imports

The cotton imports for 2023-24 season are estimated at 17.50 lakh bales of 170 kgs. each (equivalent to 18.36 lakh running bales of 162 kgs. each). This imports estimate is higher by 5.00 lakh bales than the import estimate of 12.50 lakh bales of 170 kgs. each (equivalent to 13.12 lakh running bales of 162 kgs. each) for the previous crop year 2022-23 and higher by 1.10 lakh bales than estimated previously.

4. Exports

The Committee estimated cotton exports for the current season at 28.50 lakh bales of 170 kgs.

each (equivalent to 29.91 lakh running bales of 162 kgs. each) which is higher by 0.50 lakh bales of 170 kgs. each estimated previously.

The export estimated for the previous crop year 2022-23 were at 15.50 lakh bales of 170 kgs. each (equivalent to 16.27 lakh running bales of 162 kgs. each).

5. Closing Stock as on 30th September 2024

Closing stock as on 30th September 2024 is estimated by the Committee at 30.19 lakh bales of 170 kgs. each (equivalent to 31.68 lakh running bales of 162 kgs. each).

The Balance Sheet drawn by the Association for 2023-24 and 2022-23 is reproduced below: -

(in lakh bales of 170 kg.)

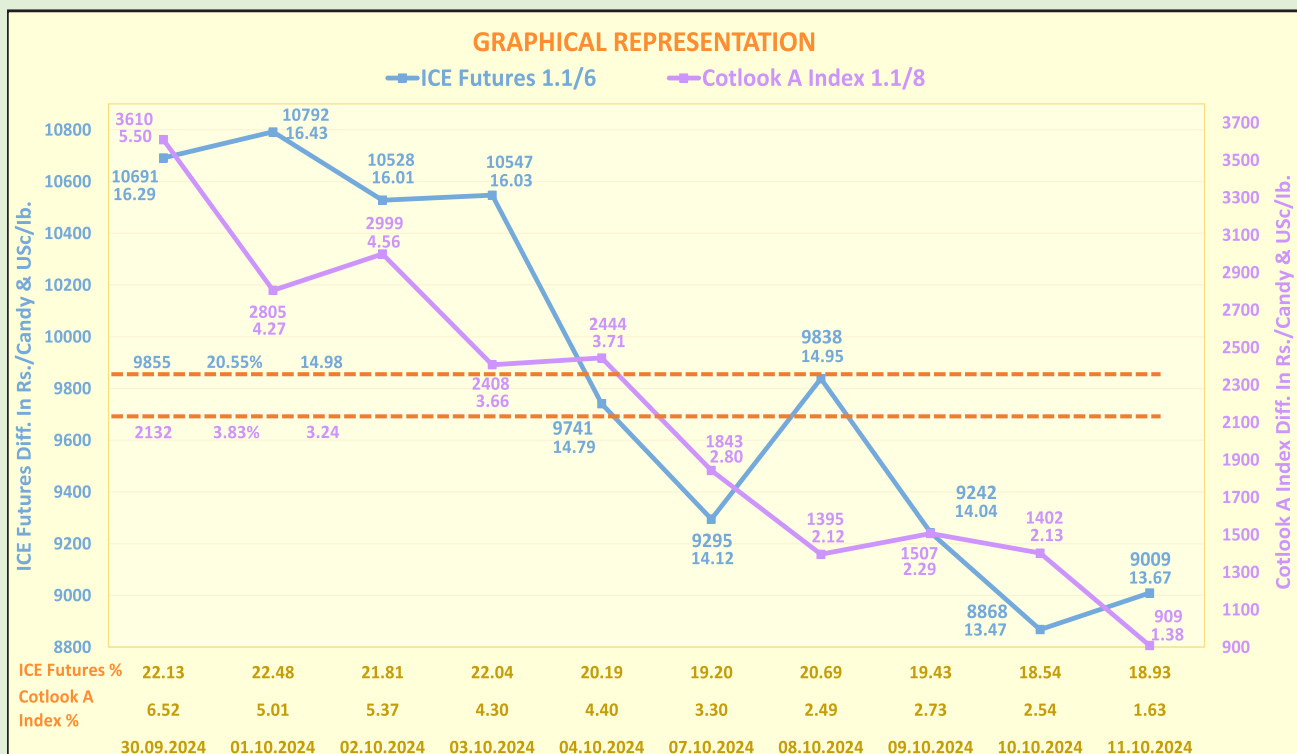
Details	2023-24 (P)	2022-23 (P)
Opening Stock	28.90	24.00
Cotton Pressing	325.29	318.90
Imports	17.50	12.50
Total Supply	371.69	355.40
Non-MSME Consumption	201.00	280.00
MSME Consumption	96.00	15.00
Non-Textile Consumption	16.00	16.00
Total Domestic Demand	313.00	311.00
Available Surplus	58.69	44.40
Exports	28.50	15.50
Closing Stock	30.19	28.90

Balance Sheet of 12 months i.e. from 1.10.2023 to 30.09.2024 for the season 2023-24

Details	In lakh b/s of 170 kg.	In '000 Tons
Opening Stock as on 01.10.2023	28.90	491.30
Arrivals upto 30.09.2024	325.29	5529.93
Imports upto 30.09.2024	17.50	297.50
Total available	371.69	6318.73
Consumption	313.50	5329.50
Export Shipments upto 30.09.2024	28.50	484.50
Stock with Mills	18.00	306.00
Stock with CCI, Maha Fedn., MNCs, Ginners, Traders & Exporters	11.69	198.73
Total	371.69	6318.73

Basis Comparison of ICS 105 with ICE Futures and Cotlook A Index -14th October 2024

SEASON 2024-2025											
Comparison M/M(P) ICS-105, Grade Fine, Staple 29mm, Mic. 3.7-4.5, Trash 3.5%, Str./GPT 28 with ICE Futures & Cotlook A Index											
Date 2024	1 US \$ = Rs.	CAI Rates Rs./c.	Indian Ctn in USc/lb.	ICE Settlement Futures 1.1/6 Dec.'24 USc/lb.	Difference-ON ICE Futures		%	Cotlook A Index M-1.1/8	Difference-ON Cotlook A Index		%
A	B	C	D	E	USc/lb.	Rs./c	H	I	USc/lb.	Rs./c	L
Cotton Year Week No-02 nd											
07 th Oct	83.97	57700	87.65	73.53	14.12	9295	19.20	84.85	2.80	1843	3.30
08 th Oct	83.94	57400	87.22	72.27	14.95	9838	20.69	85.10	2.12	1395	2.49
09 th Oct	83.96	56800	86.29	72.25	14.04	9242	19.43	84.00	2.29	1507	2.73
10 th Oct	83.97	56700	86.13	72.66	13.47	8868	18.54	84.00	2.13	1402	2.54
11 th Oct	84.06	56600	85.88	72.21	13.67	9009	18.93	84.50	1.38	909	1.63
Weekly Avg.	83.98	57040	86.63	72.58	14.05	9250	19.36	84.49	2.14	1411	2.54
Cotton Year Week No-01 st											
30 th Sep	83.71	59000	89.90	73.61	16.29	10691	22.13	84.40	5.50	3610	6.52
01 st Oct	83.78	58800	89.52	73.09	16.43	10792	22.48	85.25	4.27	2805	5.01
02 nd Oct	83.88	58800	89.41	73.40	16.01	10528	21.81	84.85	4.56	2999	5.37
03 rd Oct	83.92	58400	88.76	72.73	16.03	10547	22.04	85.10	3.66	2408	4.30
04 th Oct	84.01	58000	88.06	73.27	14.79	9741	20.19	84.35	3.71	2444	4.40
Weekly Avg.	83.86	58600	89.13	73.22	15.91	10460	21.73	84.79	4.34	2853	5.12
Total Avg.	83.92	57820	87.88	72.90	14.98	9855	20.55	84.64	3.24	2132	3.83



Note:- Weeks taken as per Cotton Year (October To September).

Values in BLUE Indicates Previous Close Considered due to HOLIDAY's Resp.

2nd Oct 2024 - LOCAL Holiday, CLOSED due to Mahatma Gandhi Jayanti.

UPCOUNTRY SPOT RATES								(Rs./Qtl)					
Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length As per CAI By- laws								Spot Rate (Upcountry) 2023-24 Crop October 2024					
Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Gravimetric Trash	Strength /GPT	7th	8th	9th	10th	11th	12th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0 – 7.0	4%	15	13638 (48500)	13582 (48300)	13582 (48300)	13582 (48300)	13582 (48300)	
2	P/H/R (SG)	ICS-201	Fine	Below 22mm	5.0 – 7.0	4.5%	15	13807 (49100)	13751 (48900)	13751 (48900)	13751 (48900)	13751 (48900)	
3	GUJ	ICS-102	Fine	22mm	4.0 – 6.0	13%	20	11360 (40400)	11079 (39400)	10967 (39000)	10995 (39100)	10995 (39100)	H
4	KAR	ICS-103	Fine	22mm	4.5 – 6.0	6%	21	11895 (42300)	12063 (42900)	12176 (43300)	12232 (43500)	12373 (44000)	
5	M/M (P)	ICS-104	Fine	23mm	4.5 – 7.0	4%	22	14116 (50200)	14116 (50200)	14116 (50200)	14201 (50500)	14201 (50500)	
6	P/H/R (U) (SG)	ICS-202	Fine	27mm	3.5 – 4.9	4.5%	26	15016 (53400)	15016 (53400)	14904 (53000)	14904 (53000)	14819 (52700)	O
7	M/M(P)/SA/TL	ICS-105	Fine	26mm	3.0 – 3.4	4%	25	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	
8	P/H/R(U)	ICS-105	Fine	27mm	3.5 – 4.9	4%	26	15185 (54000)	15185 (54000)	15072 (53600)	15072 (53600)	14988 (53300)	
9	M/M(P)/SA/TL/G	ICS-105	Fine	27mm	3.0 – 3.4	4%	25	14116 (50200)	14060 (50000)	13976 (49700)	13976 (49700)	14032 (49900)	
10	M/M(P)/SA/TL	ICS-105	Fine	27mm	3.5 – 4.9	3.5%	26	15241 (54200)	15185 (54000)	15016 (53400)	14960 (53200)	15016 (53400)	L
11	P/H/R(U)	ICS-105	Fine	28mm	3.5 – 4.9	4%	27	15466 (55000)	15466 (55000)	15353 (54600)	15269 (54300)	15185 (54000)	
12	M/M(P)	ICS-105	Fine	28mm	3.7 – 4.5	3.5%	27	15860 (56400)	15775 (56100)	15607 (55500)	15607 (55500)	15578 (55400)	
13	SA/TL/K	ICS-105	Fine	28mm	3.7 – 4.5	3.5%	27	15916 (56600)	15832 (56300)	15663 (55700)	15663 (55700)	15635 (55600)	I
14	GUJ	ICS-105	Fine	28mm	3.7 – 4.5	3%	27	15944 (56700)	15860 (56400)	15719 (55900)	15663 (55700)	15607 (55500)	
15	R(L)	ICS-105	Fine	29mm	3.7 – 4.5	3.5%	28	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	
16	M/M(P)	ICS-105	Fine	29mm	3.7 – 4.5	3.5%	28	16225 (57700)	16141 (57400)	15972 (56800)	15944 (56700)	15916 (56600)	
17	SA/TL/K	ICS-105	Fine	29mm	3.7 – 4.5	3%	28	16310 (58000)	16225 (57700)	16056 (57100)	16028 (57000)	16000 (56900)	D
18	GUJ	ICS-105	Fine	29mm	3.7 – 4.5	3%	28	16225 (57700)	16141 (57400)	16000 (56900)	15944 (56700)	15888 (56500)	
19	M/M(P)	ICS-105	Fine	30mm	3.7 – 4.5	3%	29	16422 (58400)	16366 (58200)	16197 (57600)	16197 (57600)	16169 (57500)	
20	SA/TL/K/O	ICS-105	Fine	30mm	3.7 – 4.5	3%	29	16478 (58600)	16422 (58400)	16253 (57800)	16253 (57800)	16225 (57700)	A
21	M/M(P)	ICS-105	Fine	31mm	3.7 – 4.5	3%	30	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	
22	SA/TL/K / TN/O	ICS-105	Fine	31mm	3.7 – 4.5	3%	30	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	
23	SA/TL/K/TN/O	ICS-106	Fine	32mm	3.5 – 4.2	3%	31	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	N.A. (N.A.)	
24	M/M(P)	ICS-107	Fine	34mm	2.8 - 3.7	4%	33	24324 (86500)	24324 (86500)	24324 (86500)	24324 (86500)	24324 (86500)	Y
25	K/TN	ICS-107	Fine	34mm	2.8 - 3.7	3.5%	34	24605 (87500)	24886 (88500)	24886 (88500)	24886 (88500)	24886 (88500)	
26	M/M(P)	ICS-107	Fine	35mm	2.8 - 3.7	4%	35	25308 (90000)	25308 (90000)	25308 (90000)	25308 (90000)	25308 (90000)	
27	K/TN	ICS-107	Fine	35mm	2.8 - 3.7	3.5%	35	25870 (92000)	25870 (92000)	25870 (92000)	25870 (92000)	25870 (92000)	

(Note: Figures in bracket indicate prices in Rs./Candy)