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Diagnosis holds the key to 'problem-solving' in cotton cultivation

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Cotton –'the white gold' is one of the few commodity crops that have immense potential to bring sustained prosperity to farmers, traders and nations. Farmers prefer cultivating cotton over several other crops, especially under rain-fed conditions. But, year after year, problems keep cropping up in any of the 80+ cotton growing countries. A long list of dynamic, unending woes, describes the predicament of the cotton farmers in India and all across the globe. Most of the times unpredictable rains, truant-weather, insects, diseases, costly inputs and non-remunerative market, grab headlines.

EXPERT's Column

Dr. K.R. Kranthi

Whenever problems crop up intermittently, the general tendency is to find immediate short term remedies. For example, when mealy bugs appeared in damaging proportions on cotton in India during 2004-2007, there was an immediate demand for insecticides that could kill the insects. Any suggestion other than insecticides was scoffed at. History is replete with such innumerable examples. But, the use of insecticides in many cases led to the resurgence of the same species or resulted in the outbreak of some other insects, most of which would have been insignificant otherwise. Insecticide induced side-effects on ecosystems are not at all uncommon. But, these are rarely noticed by non-experts. From a technical perspective, it is important to reconsider the current 'curative' approach, in the interest of sustainability. Ideally, a proper diagnosis of the root cause of a malady would help in the development of strategies that can prevent the malady itself. This article is an attempt to propose such approaches to find a path towards sustainable cotton production in India.

Issues, Natural Factors, Diagnosis and Solutions

Issues:

1. **Low Yield:** Cotton yields of 500-550 kg lint per hectare place India at 32-33rd rank in the world. The average global yield excluding India is 904 kg lint per hectare. It is a matter of concern that the yields of irrigated cotton in India are 1.5-2 fold less than the yields in rain-fed conditions of many other countries.

2. **Chemicals for Biotic Stress Management:** The number of insecticide applications on cotton per season is amongst the highest in the world. Insect resistance to insecticides is highest in India. Insecticide usage on cotton is probably the most intensive and extensive in India compared to many major cotton growing countries across the globe.

Photograph: Dr. Kranthi

Damage caused by pink bollworm larva

Insects: Cotton crop is generally believed to be a haven of insects. Over the past 40 years, the crop in India suffered the most due to insect attacks. A range of insects such as aphids, jassids, whiteflies, mealy bugs, thrips, armyworms, hairy caterpillars, semi-loopers, Spodoptera, American bollworm, pink bollworm, spotted bollworm, etc. have been ravaging cotton time and again.

Diseases: Though there are a few diseases that are problematic in cotton, the cotton leaf curl virus is most dreaded, because like many viral diseases it cannot be cured. The disease is confined to North India and Pakistan.

Weeds: Cotton crop is most adversely affected due to weeds during the first 60-70 days of the crop. Therefore it is important that the crop is kept free of weeds during this period.

3. **Bollworm Resistance to BT Cotton:** Bollworms are adapting to Bt-cotton. The damage by 'BG-II resistant' pink bollworms in Gujarat was significant in 2014 and 2015 and is expected to continue in the years to come.

4. **High Fertilizer Usage:** Fertilizer usage on cotton is amongst the highest in the world. The crop is responding less to fertilizer usage due to declining soil health.

5. **Rising Costs and Declining Profit Margins:** Data from the Ministry of Agriculture shows that over the past 10 years, from 2002 to 2012, the cost of cultivation increased 3-fold. Seed cost increased 3.7-fold, labour cost increased 4.2-fold, fertilizer cost per hectare increased 4.6-fold and insecticide costs per hectare doubled over the past 5 years. The net profit plummeted to Rs. 1758 per hectare, which is almost equivalent to the general range of profits obtained prior to 2004.

6. **Fibre Quality:** In recent times, over the past 10 years, there has been a significant improvement in fibre quality in India. However, issues with declining micronaire and variable length and reduction in strength in second and subsequent pickings, are causing concerns.

7. **Water and Soil:**

Water: Like for any crop, water is critical for cotton. But, cotton is basically a xerophytic crop. Xerophytic plants are those that can survive with less water. Kozlowski – 2012 in his book 'Additional Woody Plants' writes that 'Cotton plants (Gossypium) are tropical and subtropical xerophytic, perennial shrubs.' Cotton crop needs about 1000 mm water in its cycle. The requirement during early vegetative stage is only 10-15% of the total water requirement of about 1000 mm for the crop. The crop needs 50-60% of the water requirement during flowering period and rest of the water during boll formation stage.

Soil: Medium and heavy texture soils are suitable for cotton cultivation. But, contrary to this common belief, the crop is also cultivated in light soils to obtain high yields. Deep soils with good water holding capacity provide water and nutrients to the crop during flowering and boll formation stage. The crop requires 0.5 to 1.0 kg/ha Nitrogen per day during vegetative phase and 3-4 kg/ha Nitrogen per day during flowering and boll formation stage.

8. **Mismatch of Weather and 'Crop Needs':** Despite the prevalence of ideal weather conditions for cotton in India, the crop suffers because of the long duration of 180-240 days. The 80-

Photograph: Dr. Kranthi

Ladybird beetle

Photograph: Dr. Kranthi

A farmer in Gujarat

90 day window of flowering and 100-140 day window of boll formation get caught in a range of unsuitable weather conditions that lowers the yields significantly. As mentioned above, the flowering and boll formation window also suffers water and nutrient stress.

Weather: Compared to many major cotton growing countries, Indian weather is best suited for cotton. The preferred temperature range for flowering and boll formation is 27 to 32°C with day temperatures higher than 20°C and night temperatures higher than 12°C. Many varieties and hybrids actually perform best under short-day conditions.

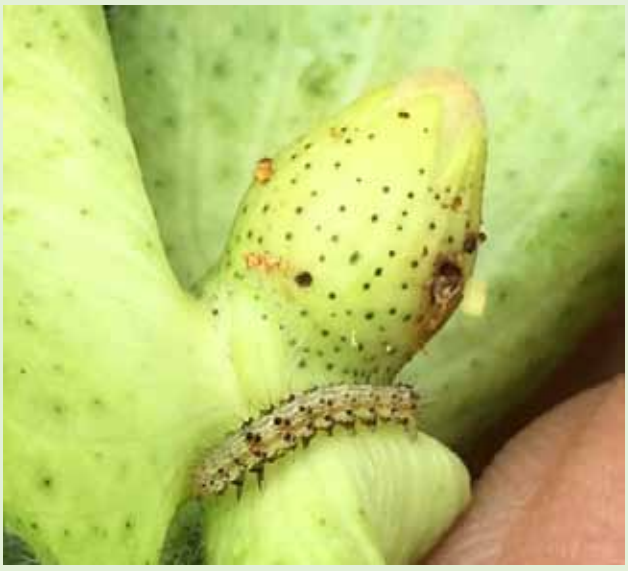
Diagnosis

1. Low yields: Indian yields are low because of low plant density of 11,000 to 16,000 plants per hectare as compared to 111,000 to 222,000 plants per hectare in major cotton growing countries such as China, USA, Brazil, Mexico and Australia. Because of low plant density, each plant is expected to produce a large number of bolls per plant, which takes a longer duration. The long duration extends the flowering and boll formation into a staggered phase which coincides with the late season when moisture and nutrients are not deficient.

2. Water stress and nutrient deficiency during flowering and boll formation is responsible for low yields. Cotton crop in India is of long duration. Flowering starts during the end of monsoon and continues for about 80-90 days after the cessation of monsoon. Under rain-fed conditions in India the crop suffers severe water stress and nutrient deficiency specifically at the flowering and boll formation stage, thereby resulting in low yields.

   For example, Maharashtra and Telangana together cultivate 5.7 million hectares, thus accounting for half of India's cotton area. More than 90% of the area in the two states is under rain-fed conditions. Normal monsoon in the major cotton growing areas of Maharashtra and Telangana starts in June and recedes by early September. Peak flowering and boll formation windows start after September. The crop suffers severe moisture, nutrient and weather stress during flowering and boll formation stage, thus resulting in low yields. The yields are lowest in the two states thus lowering down the average yields of India.

3. Acute insect pest damage is because of the long duration of 180-240 day crop. The long 80-90 days flowering window and 100-140 days window of boll formation in India leads to continuous influx of insects. In all the major cotton growing countries, the crop is of short duration at 150-160 days and in any case would be terminated before 180 days. Since the crop is under high density each plant is expected to produce only 7-10 bolls per plant, the flowering window is about 20-30 days and has less problem with the American bollworms



Photograph: Dr. Kranthi

American bollworm larva

making it easier for pest management. Pink bollworm is a late season pest and occurs mainly on the crop after the 180 days duration. Thus short duration crops escape the pink bollworm because they are harvested before the occurrence of the pest.

4. Late sown crop is more vulnerable to the whiteflies, jassids, mealybugs thrips, boll worms and CLCuD. Yields are low in late sown crop because all the tender stages of the crop coincide with the peak infestation of insect pests.

5. Human interventions cause insect pests and diseases. Long duration hybrids need more nutrients and water. Excessive application of water and nutrients, especially urea, leads to more foliage and attracts sucking pests. Sucking pests necessitate application of the recommended groups of insecticides such as 'organophosphate' and 'neonicotinoid' insecticides. Application of these insecticides lead to staggered flowering and delayed maturity, thus leading to more insects and more insecticide usage. It is an established fact that the whiteflies, aphids and American bollworm problems were because of a combination of factors such as long duration American cotton hybrids + repeated application of synthetic pyrethroids. Apart from these, indiscriminate use of insecticides causes pest resurgence, resistance, residues and ecological disruption apart from the toxicity to non-target organisms.

6. Mono-cropping aggravates insect pests, diseases and causes nutrient deficiencies. Cotton as a sole crop year after year in the same land leads to insect pest and diseases. In many parts of India, cotton is cultivated round the year from June to May. Insect pests such as mealy bugs and pink bollworms thrive in repeated cycles and cause havoc to cotton sown in the region.

Solutions:

1. Cotton varieties
   a. Short duration of 150 days
   b. Compact short statured -suitable for high density
   c. Resistance to sap-sucking pests and CLCuD

2. Early or timely sowing, especially in rain-fed regions

3. Avoidance of excessive urea, organophosphates and neonicotinoid insecticides

4. Integrated pest management and insecticide resistance management tools for efficient pest management would help in reducing chemical inputs.

5. Intercropping with legume crops such as soybean, green gram, black gram or cowpea for nitrogen fixation and IPM (integrated pest management)

6. Desi species Gossypium arboreum and Gossypium herbaceum are robust and are ideally suited for tough conditions with low inputs. Short duration Desi varieties under high density planting can provide high yields with low inputs in rainfed farming.

Short duration varieties sown in time with onset of monsoon, under high density planting will be able to get proper soil moisture and nutrients. Such varieties will have a narrow flowering window of 20-30 days that would possibly enable the crop to escape the American bollworms. Soil moisture would also be available adequately during the short flowering and boll formation window for the 7-9 developing bolls per plant. With available soil moisture, the plants are able to absorb available nutrients. Under high density planting of 1.6 to 2.0 lakh plants per hectare, 7-9 bolls per plant result in high yields in a short time. Weather conditions of 27 to 32 oC with day temperatures higher than 20oC and night temperatures higher than 12oC are prevalent during the monsoon and the immediate period after cessation of monsoon, which coincides with the 20-30 days flowering and 60-90 day boll formation phase. Boll bursting is synchronous in high density planting. With the availability of adequate soil moisture and nutrients the fibre quality is uniform and good. Intercropping with short duration legumes provides adequate nitrogen exactly at the flowering and boll formation stage. Legume intercropping provides a wide range of beneficial natural enemies that assist in IPM, thereby reducing the need for insecticides. Cultivation of legume intercrops in between rows in high density systems or in crop rotation reduces the need for repeated weeding and can assist in conservation agriculture.

Questions and Answers

1. *Why are the yields low in India? Can the yields be enhanced from the current Indian average of 500 kg/ha to the world average (excluding India) of 904 kg/ha?*

   Yields are low in India because of low plant density and long duration. High yields can

be obtained through short duration varieties planted in high density.

2. *Why are the insect pest problems so acute on cotton in India unlike in other countries?*
Insect pest problems are very acute in India because of the long duration of the crop and the long flowering and boll formation window.

3. *Why does the Indian farmer resort to highest number of insecticide applications prior to Bt-cotton and now despite Bt-cotton?*
Excessive application of urea in hybrids leads to luxuriant vegetation and a long flowering window which attract insects over a long period of time. The continuous stream of insects on the long duration hybrids necessitates insecticide applications that disrupt ecosystems and lead to the need for repeated insecticide applications. Insecticides were used mostly for bollworm control prior to Bt-cotton. The area under hybrids increased from 38% in 2002 to 95% in 2012. Because of long duration, the hybrids are more vulnerable to a wide range of insects. While bollworms were being effectively controlled by Bt, sap-sucking insects needed insecticide applications. Thus far more than 1600 Bt-hybrids have been approved in India. Most of these are susceptible to sap-sucking insects. Thus farmers have been using insecticides on sucking pests now and also against the pink bollworm which developed resistance to Bt-cotton in some parts of the country.

4. *Are insecticides and GM (genetic modification) the only reliable technologies for insect pest management? Without the use of chemicals or (GM) technologies, is it possible to prevent insects from causing economic damage?*
Many countries circumvent the need for chemicals and GM crops by using short duration cotton varieties. Turkey and Uzbekistan are good examples.

5. *Why did the fertilizer usage increase so significantly in recent years?*
Cotton crop is not responding positively to chemical fertilizers due to deterioration in soil health and the poor organic carbon content. Chemical fertilizer usage increased with the increase of Bt cotton hybrid area.

6. *Without irrigation, is it possible to ensure that the crop gets adequate water during the crucial stage of flowering and boll formation stage?*
Short duration crop with early maturity has flowering and boll formation stages that are adequately covered by the monsoon regimen. Therefore there wold be no separate need to irrigate the crop at the crucial stage.

7 *Without fertilizer application, is it possible to ensure that the crop gets adequate nitrogen during flowering and boll formation stage?*
Legume intercrops, FYM, vermi-compost and bio-fertilizer application can provide the short duration varieties adequate amount of nutrients for a healthy crop and high yields. There may be less need for chemical fertilizers with improvement in soil health due to the intercrops and reduction in the use of chemical application.

8 *Is it possible to ensure that the crop gets the desirable weather conditions during flowering and boll formation?*
Early sowing of short duration cotton in half of India's rainfed cotton which is in the two states of Maharashtra and Telangana, helps in creating a match between desirable weather and flowering and boll formation.

9 *Without herbicide usage, which are the other technologies to prevent weed damage?*
Intercrops, high density and conservation agriculture can help in minimizing weeds.

10. *Can we prevent the CLCuD (Cotton leaf curl virus disease) in north India with simple strategies?*
The best solution to the CLCuD is early sowing in April with varieties tolerant to whiteflies and the CLCuD. Desi cotton varieties are immune to the CLCuD and highly tolerant to whiteflies.

Conclusion

Simple solutions can provide major relief. Short duration cotton varieties sown early in high density with legumes either as intercrops or in crop rotation in high density planting systems can help in IPM, escape almost all insect pests and obtain water and legume-fixed-nitrogen during the critical flowering and boll formation window. Thus high yields can be obtained from low input agriculture.

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

Southern Hemisphere 2015/16 Plantings in Full Swing

Cotton plantings for the Southern Hemisphere in 2015/16 season started in September 2015 and will continue through the start of 2016. Production in the Southern Hemisphere usually accounts for 8 to 10% of total world production, but this share is expected to increase to 11% in 2015/16. Despite low international cotton prices, growers in the Southern Hemisphere may increase planted area by 1% to 2.9 million hectares. Increases in Australia and some countries in Africa will offset losses in South America. After reaching a record yield of 963 kg/ha in 2013/14, the average yield for the countries in the Southern Hemisphere may decline by 3% to 868 kg/ha, while still remaining above the 10-year average of 830 kg/ha. This is due in large part to the declines in the average yield in Australia as well as in some of the smaller producing countries in the Southern Hemisphere. Southern Hemisphere production in 2015/16 is projected down 2% to 2.5 million tons. Cotton area in Australia is projected to more than double to 300,000 hectares, with a greater percentage of cotton being planted on dryland area. Assuming a 27% decrease in the average yield to 1,867 kg/ha, production in Australia is forecast to increase by 11% to 560,000 tons in 2015/16. Brazil on the other hand is expected to decrease area by 4% to 952,000 hectares, and production may reach just under 1.5 million tons. Production in the Northern Hemisphere is estimated at 20.6 million tons in 2015/16. India's production of around 6.2 million tons accounts for around 30% of production in the Northern Hemisphere. Minimum Price Support Operations are under way in India and, as of mid-December, the government has procured about 125,000 tons. China's production is estimated at 5.3 million tons, down 19% from 2014/15 and 35% from the record of 8.1 million tons achieved in 2007/08. After achieving a record of 812 kg/ha last year, the average yield in Pakistan may decrease by 22% to 637 kg/ha due to adverse weather, increased pest pressure from whitefly and pink bollworm, and the high cost of inputs discouraging farmers from better crop management. Production is estimated at 1.7 million tons on an area of 2.7 million hectares. A 13% reduction in harvested area in the United States coupled with lower yields due in part to excessive rains in autumn are expected to lead to a fall in production of 18% to 2.9 million tons.

World cotton mill use will likely remain unchanged from 2014/15 at 24.3 million tons. International cotton prices have remained similar to those registered last season, while polyester prices have continued to fall. After decreasingly steadily since 2010/11, China's mill use was stable at 7.5 million tons in 2014/15, but is projected to decline by 3% to 7.3 million tons in 2015/16. India's mill use is forecast to increase by 3% to 5.5 million tons while Pakistan's may decrease by 12% to 2.2 million tons.

While cotton consumption is expected to overtake production in 2015/16, the global supply of cotton is still abundant. World stocks at the end of 2015/16 are forecast to be 20.6 million tons, 58% of which will be in China. In 2015/16, China's ending stocks are projected to decrease by 7% to 12 million tons while stocks outside of China may decline by 6% to 8.6 million tons.

World imports are projected to decline in 2015/16 by 4% to 7.3 million tons. While imports outside of China are forecast to increase by 6% to 6.1 million tons, this rise will not offset the decline in China's imports, which are expected to decrease by 34% to 1.2 million tons. Due to smaller crops, exports from the United States, Brazil and Uzbekistan are forecast to decline by 9% to 2.2 million tons, by 6% to 803,000 tons, and by 11% to 526,000 tons, respectively. After a significant decline in 2014/15, India's exports may recover by 7% to 976,000 tons.

The ICAC Secretariat sends their best wishes to all in the cotton and other natural fiber industries for the New Year.

Source: ICAC Cotton This Month, January 4, 2016

Show You Care For The Cotton Farmer!

Here is a chance to pay your gratitude to the cotton farmers who face instability and hardships due to uncertainty in cotton yield. It is alarming that while India stands first amongst cotton producing countries, it is amongst the last in cotton yield per acre!

Through the Mumbai Marathon we are raising funds so we can impart training, equipment and enhancers to cotton farmers. This will go a long way in not only ensuring stability for our farmers but also better yield for our country.

Help our farmers, who are the backbone of our economy, to prosper.

Funds raised through Mumbai Marathon will be given to :

COTAAP RESEARCH FOUNDATION which is an NGO that runs 'farmer benefit programs' currently in Chopda, Maharashtra and Raichur, Karnataka.

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You can drop/courier the cheques to Cotton Association of India, Cotton Green office. Please make sure you write your name, contact number and the name of our NGO: COTAAP RESEARCH FOUNDATION on the back of the cheque. You may also simply make online transfer of payments.

SUPPLY AND DISTRIBUTION OF COTTON

January 4, 2016

Seasons begin on August 1 — Million Metric Tons

	2010/11	2011/12	2012/13	2013/14 Est.	2014/15 Est.	2015/16 Proj.
BEGINNING STOCKS						
WORLD TOTAL	**9.362**	**10.219**	**15.256**	**18.037**	**20.11**	**22.03**
China (Mainland)	2.688	2.087	6.181	9.607	12.09	12.85
USA	0.642	0.566	0.729	0.903	0.65	0.98
PRODUCTION						
WORLD TOTAL	**25.450**	**27.846**	**26.719**	**26.282**	**26.23**	**22.89**
India	5.865	6.239	6.205	6.770	6.51	6.24
China (Mainland)	6.400	7.400	7.300	6.929	6.48	5.26
USA	3.942	3.391	3.770	2.811	3.55	2.90
Pakistan	1.948	2.311	2.002	2.076	2.31	1.68
Brazil	1.960	1.877	1.310	1.734	1.55	1.48
Uzbekistan	0.910	0.880	1.000	0.940	0.89	0.86
Others	4.425	5.747	5.132	5.023	4.95	4.49
CONSUMPTION						
WORLD TOTAL	**24.611**	**22.782**	**23.559**	**23.883**	**24.22**	**24.33**
China (Mainland)	9.580	8.635	8.290	7.517	7.52	7.33
India	4.472	4.231	4.762	5.186	5.36	5.52
Pakistan	2.170	2.121	2.216	2.476	2.50	2.21
East Asia	1.833	1.780	2.139	2.312	2.53	2.74
Europe & Turkey	1.550	1.498	1.565	1.615	1.58	1.65
Brazil	0.958	0.897	0.910	0.862	0.80	0.80
USA	0.849	0.718	0.762	0.773	0.78	0.81
CIS	0.577	0.545	0.581	0.614	0.60	0.60
Others	2.621	2.357	2.335	2.528	2.56	2.68
EXPORTS						
WORLD TOTAL	**7.690**	**9.828**	**9.986**	**8.991**	**7.70**	**7.31**
USA	3.130	2.526	2.836	2.293	2.45	2.23
India	1.085	2.159	1.685	2.014	0.91	0.98
Australia	0.545	1.010	1.305	1.037	0.52	0.55
Brazil	0.435	1.043	0.938	0.485	0.85	0.80
CFA Zone	0.476	0.597	0.829	0.974	0.89	1.02
Uzbekistan	0.600	0.550	0.653	0.650	0.59	0.53
IMPORTS						
WORLD TOTAL	**7.749**	**9.784**	**9.606**	**8.670**	**7.61**	**7.31**
China	2.609	5.342	4.426	3.075	1.80	1.18
East Asia	1.826	1.997	2.355	2.355	2.63	2.79
Europe & Turkey	0.973	0.725	0.833	1.082	1.01	0.98
Bangladesh	0.843	0.680	0.631	0.967	0.96	1.04
Pakistan	0.314	0.190	0.411	0.247	0.20	0.25
TRADE IMBALANCE 1/	0.058	-0.044	-0.380	-0.321	-0.10	0.00
STOCKS ADJUSTMENT 2/	-0.041	0.018	0.001	0.000	0.00	0.00
ENDING STOCKS						
WORLD TOTAL	**10.219**	**15.256**	**18.037**	**20.115**	**22.03**	**20.59**
China (Mainland)	2.087	6.181	9.607	12.088	12.85	11.96
USA	0.566	0.729	0.903	0.651	0.98	0.85
ENDING STOCKS/MILL USE (%)						
WORLD-LESS-CHINA (M) 3/	**54**	**64**	**55**	**49**	**55**	**51**
CHINA (MAINLAND) 4/	**22**	**72**	**116**	**161**	**171**	**163**
COTLOOK A INDEX 5/	**164**	**100**	**88**	**91**	**71**	

1/ The inclusion of linters and waste, changes in weight during transit, differences in reporting periods and measurement error account for differences between world imports and exports.
2/ Difference between calculated stocks and actual; amounts for forward seasons are anticipated.
3/ World-less-China's ending stocks divided by World-less-China's mill use, multiplied by 100.
4/ China's ending stocks divided by China's mill use, multiplied by 100.
5/ U.S. Cents per pound
(Source : ICAC Monthly January 4, 2016)

COTTON
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presents

Cotton India
2015-16

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UPCOUNTRY SPOT RATES

(Rs./Qtl)

Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	Spot Rate (Upcountry) 2015-16 Crop JANUARY 2016 4th	5th	6th	7th	8th	9th
	Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]											
1	P/H/R	ICS-101	Fine	Below 22mm	5.0-7.0	15	9195 (32700)	9195 (32700)	9139 (32500)	9139 (32500)	9055 (32200)	9055 (32200)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0-7.0	15	9336 (33200)	9336 (33200)	9280 (33000)	9280 (33000)	9195 (32700)	9195 (32700)
3	GUJ	ICS-102	Fine	22mm	4.0-6.0	20	6889 (24500)	6861 (24400)	6749 (24000)	6749 (24000)	6749 (24000)	6749 (24000)
4	KAR	ICS-103	Fine	23mm	4.0-5.5	21	7564 (26900)	7536 (26800)	7480 (26600)	7480 (26600)	7480 (26600)	7480 (26600)
5	M/M	ICS-104	Fine	24mm	4.0-5.0	23	8689 (30900)	8661 (30800)	8605 (30600)	8605 (30600)	8605 (30600)	8605 (30600)
6	P/H/R	ICS-202	Fine	26mm	3.5-4.9	26	9448 (33600)	9392 (33400)	9336 (33200)	9308 (33100)	9280 (33000)	9280 (33000)
7	M/M/A	ICS-105	Fine	26mm	3.0-3.4	25	8239 (29300)	8239 (29300)	8211 (29200)	8211 (29200)	8211 (29200)	8211 (29200)
8	M/M/A	ICS-105	Fine	26mm	3.5-4.9	25	8633 (30700)	8633 (30700)	8605 (30600)	8577 (30500)	8577 (30500)	8577 (30500)
9	P/H/R	ICS-105	Fine	27mm	3.5.4.9	26	9673 (34400)	9617 (34200)	9561 (34000)	9533 (33900)	9505 (33800)	9505 (33800)
10	M/M/A	ICS-105	Fine	27mm	3.0-3.4	26	8492 (30200)	8492 (30200)	8464 (30100)	8464 (30100)	8464 (30100)	8464 (30100)
11	M/M/A	ICS-105	Fine	27mm	3.5-4.9	26	8970 (31900)	8970 (31900)	8942 (31800)	8914 (31700)	8914 (31700)	8914 (31700)
12	P/H/R	ICS-105	Fine	28mm	3.5-4.9	27	9786 (34800)	9729 (34600)	9673 (34400)	9645 (34300)	9617 (34200)	9617 (34200)
13	M/M/A	ICS-105	Fine	28mm	3.5-4.9	27	9336 (33200)	9308 (33100)	9280 (33000)	9251 (32900)	9251 (32900)	9251 (32900)
14	GUJ	ICS-105	Fine	28mm	3.5-4.9	27	9448 (33600)	9420 (33500)	9392 (33400)	9364 (33300)	9364 (33300)	9364 (33300)
15	M/M/A/K	ICS-105	Fine	29mm	3.5-4.9	28	9476 (33700)	9448 (33600)	9420 (33500)	9392 (33400)	9392 (33400)	9392 (33400)
16	GUJ	ICS-105	Fine	29mm	3.5-4.9	28	9533 (33900)	9505 (33800)	9476 (33700)	9448 (33600)	9448 (33600)	9448 (33600)
17	M/M/A/K	ICS-105	Fine	30mm	3.5-4.9	29	9533 (33900)	9505 (33800)	9476 (33700)	9448 (33600)	9448 (33600)	9448 (33600)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5-4.9	30	9645 (34300)	9617 (34200)	9589 (34100)	9561 (34000)	9561 (34000)	9561 (34000)
19	A/K/T/O	ICS-106	Fine	32mm	3.5-4.9	31	10095 (35900)	10067 (35800)	10039 (35700)	10011 (35600)	10011 (35600)	10011 (35600)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0-3.8	33	13498 (48000)	13610 (48400)	13723 (48800)	13835 (49200)	13835 (49200)	13835 (49200)

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