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Disruptive Technologies to Foster Cotton Industry

GUEST COLUMN

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Dr. Brijender Mohan Vithal has a Ph.D. Agric (Plant Breeding-Cotton) from Punjab Agriculture University (PAU) Ludhiana. He has been associated with cotton R&D activities for more than three decades. He has worked as a Senior Cotton Breeder with PAU, GM Production / Executive Director with National Seeds Corporation and Director, DOCD, Ministry of Agriculture (MOA). He was Officer on Special Duties (OSD) to look after activities related with Tech Mission on Cotton (TMC) in CCI Ltd during its pre-launch period. He joined CCI Ltd - TMC Cell (MMIII & IV) during 1999 and continued working there till the end of the TMC Project in December 2010. He is still associated with cotton through agencies like ISCI.

In India, annually more than 65 lakh farmers cultivate cotton on an area of more than 100 lakh hectares, the largest in the world; in more than 10 States, mostly under rain fed conditions. As per estimates available, more than 60 million people depend on cotton for their livelihood. India's share in global cotton production is a whopping, around 25 per cent; a matter of pride.

Indian cotton production received a big boost from 130 lakh bales in 2002 to 370 lakh bales in 2017 with the introduction of Bt cotton. Increased cotton availability helped Indian cotton exports to flourish and reach $8 billion last year.

Today, India is top producer and second largest exporter of cotton. However, India is considered to be at a disadvantage when it comes to its resources for farm production because it gets an annual rainfall of about 650 mm only. Still more important is its erratic behavior. In Maharashtra, about 97% cotton is cultivated under rain fed conditions while in states like Punjab and Haryana; it is cultivated 100% under irrigated conditions.

Cotton has been successfully used as a multiple purpose crop in three ways: edible oil for human consumption, de-oiled cake as an animal feed and lint (kapas) for fibre.

Cotton seed industry forms about 20 per cent of the total seed industry in India. The cotton seed industry has played a pivotal role by continuously investing in research, developing new hybrids and introducing Bt cotton technology. This industry has played an important role in making available required quantities of quality cotton to Indian textile industry. In India, the cost of cotton seed is less than 5 per cent of the revenue a cotton farmer generates, which is very affordable for him as compared cotton growers in other parts of the world.

Cotton Output May Crimp Textile Industry:

- The Indian textile industry is predominantly cotton based as almost 75 per cent of the spun yarn in the country is being produced from cotton. Availability of good quality cotton throughout the year at an internationally competitive price is very essential to achieve a sustained growth rate in the textile industry. The textile industry is a huge beneficiary of the Bt technology-led spurt in cotton production. Since 2000, the size of the textile industry grew six times to approximately Rs.10 lakh crore; the exports more than tripled to Rs. 2.5 lakh crore and spun yarn production almost doubled during this period.

- India has become largest exporter of cotton yarn in the world, taking advantage of the production boost in home grown cotton. Thus, cotton has been the engine of growth for the Indian textile industry. According to South Indian Mills Federation (SIMA), Indian cotton textile value chain has the potential to achieve 12 per cent Compound Annual Growth Rate (CAGR) as against 6 per cent CAGR achieved so far.

- For this growth, the textile industry projects their cotton requirement at 570 lakh bales on the conservative side and 940 lakh bales on the aggressive side by 2028. While there is potential still to improve the productivity of cotton and support aggressive growth of our textile industry, it requires infusion of next level of technologies and agronomic practices.

A Review Present Scenario

- To reach this level of increase in yields, we need to strategically introduce next generation traits like Bt3, Bt4, herbicide tolerance, water and nitrogen use efficiency, high density planting pattern, mechanical harvesting system, etc. For machine picking we need sym-podia type of cotton cultivars while most of cotton cultivated in India is mono-podia type. Thus, varieties having sym-podia type of plants are needed to be developed through cotton seed research.

- Currently there is a freeze on the flow of new technologies into cotton seed, because the technology providers are completely discouraged with the price control on Genetically Modified (GM) seeds, the confusion on the Intellectual Property (IP) situation of traits and the hostile environment that is prevailing in the country towards using modern science technology in seed.

- Many companies have either scaled down or closed down their technology development centers in India or have deferred their plans.

1. The Impact

What will happen if this situation continues in textile and cotton sector during the next 10 years and we do not take immediate action to de-bottleneck the problems associated with cotton industry in India? Here is an over view of the issue:

a. The technologies currently used in cotton will lose their effectiveness over a period of time and the farmers will have to go back to heavy use of chemical pesticides to control the dreaded bollworms. This will increase the cost of cotton production and will make it uncompetitive.

b. Cotton yields may stagnate or decline in future, thus threatening the prominent position that India holds today in the global cotton markets. Increasing cost and scarcity of labour in the next 10 years may further hamper the weeds management and picking of cotton thus, affecting economics of its cultivation. The cost of picking cotton has already touched 10 per cent of the revenue an Indian cotton farmer generates, which may go up further due to scarcity of labour.

c. The textile industry will be a big loser. If the cotton production stagnates, the textile industry will lose $330 billion business opportunity in the global markets for which it needs 940 lakh bales of cotton production by 2028. This can jeopardise the commercial prospects, employment generation and export potential of this huge industry. It can lead to a huge increase in imports of cotton at increased cost. This situation points to bleak prospects for the farmers and consumers in India.

d. The states which dominate textile manufacturing – Tamil Nadu, Andhra Pradesh, Maharashtra, Gujarat, Madhya Pradesh and Haryana –may see a huge loss of economic opportunity during the next 10

years. The states which dominate cotton crop cultivation — Punjab, Haryana, Rajasthan, (NZ); Maharashtra, Gujarat, Madhya Pradesh, Odessa (CZ) and Andhra Pradesh, Telangana, Karnataka and Tamil Nadu (SZ) —may also lose heavily in terms of farmers' welfare and rural prosperity.

2. Time for Review

A comprehensive review needs to be held by involving the Ministries of Agriculture and Textiles; the states that grow cotton and the states that manufacture textiles. Huge investments are required in technology and agronomic practices of cotton production to aid the textile industry. It is time for the governments to take the right strategic decisions and not sacrifice the future interests of the textile and cotton sectors.

Disruptive Technologies - The Future of Cotton

Innovation and technology are common words in agriculture. We have experienced a multitude of both over the last decades and even centuries. From the replacement of the bullocks with tractors, to inorganic fertilizers, hybridization, GM crops, no-till, fancy and sophisticated farm equipment like self-propelled sprayers and combines equipped with advanced telematics took more than 40 years for full adoption. But the trend in technology advancement in agriculture especially cotton, has not experienced the "scale" change that has happened in some other industries, like communication and entertainment. In innovation circles they speak of "disruptive technologies or change", where the change is so monumental as to fundamentally change and realign the industry.

In agriculture, despite all the amazing technologies that have come to bear on the industry, we have not seen this disruption in scale. New tractors, planters, sprayers, tillage implements and others have been getting bigger over time, but not at an unreasonable pace - there just hasn't been the "wow" factor.

a. Disruptive Technology

A disruptive technology is one that displaces an established technology and shakes up the industry or a ground-breaking product that creates a completely new industry.

New technology can be separated into two categories: sustaining and disruptive. Sustaining technology relies on incremental improvements to an already established technology while disruptive technology lacks refinement, often has performance problems because it is new, appeals to a limited audience and may not yet have a proven practical application.

b. Digital Agriculture

Digital agriculture is the use of new and advanced technologies, integrated into one system, to enable farmers and other stakeholders within the agriculture value chain to improve production.

Under the traditional system, most of today's farmers make decisions such as how much fertilizer to apply, based on a combination of rough measurements, experience and recommendations from the experts. Once a course of action is decided, it is implemented but the results are normally not seen until harvest time. In contrast, a digital agriculture system gathers data more frequently and accurately, often combined with external sources (such as weather information). The resulting combined data is analyzed and interpreted so the farmer can make more informed and appropriate decisions. These decisions can then be quickly implemented with greater accuracy through robotics and advanced machinery, and farmers can get real-time feedback on the impact of their actions.

c. New Technologies

The technologies presently being used like Sensors, Communication networks, Unmanned Aviation Systems (UAS), Artificial Intelligence (AI), Robotics and other advanced machinery, often draws on the principles of the Internet of Things (IoT). Each one of these brings something valuable to farming from data collection, through management and processing, as well as guidance and direction. This integrated system offers new insights that enhance the ability to make decisions and subsequently implement them.

d. The Potential

Digital agriculture has the potential to make agriculture more productive and consistent and to use time and resources more efficiently. This brings critical advantages for farmers and wider social benefits around the world. It also enables organisations to share information across traditional industry boundaries to open up new disruptive opportunities.

e. The Barriers

Digital agriculture has the potential to transform the way we produce the world's food feed and fibre but there are some barriers too:

- the approach is still very new,
- costs are high and
- details of the long-term benefits are rarely available.

Thus, to secure its widespread adoption, it will require collaboration and consensus across the value chain on how to overcome these challenges.

Having seized, the need for tapping the tremendous potential of disruptive technology in agriculture, it was considered necessary to create a platform in India too for advocating, creating, applying and sharing the new knowledge for the benefit of our farming sector.

Consortium of Researchers for Disruptive Technologies in Agriculture (CDTA)

In February this year (2019), various news portals in India carried an article on the creation of a consortium in partnership with three leading institutions in the country that will advocate and push for the application of disruptive technologies in agriculture, with the aim of making farming an "assured" activity.

The platform, the Consortium of Researchers for Disruptive Technologies in Agriculture (CDTA), is a joint venture of the academic-cum-research scientists of IIITMK, Thiruvananthapuram, GB Pant University of Agricultural Sciences and Technology, Pant Nagar (Uttarkhand) and Indian Institute Space Technology. Dr. R. Jaishanker (Associate Professor, Ecological Informatics, C V Raman Laboratory of Ecological Informatics, IIITM-Kerala), Prof. Ajeet Singh Nain (Head, Department of Agro-Meteorology, GB Pant University of Agricultural Sciences and Technology, (Uttarakhand) and Dr. V. K. Dadhwal (Director, Indian Institute of Space Science and Technology, Thiruvananthapuram, are the lead role players of the initiative.

a. Proposed Activities of CDTA

- They are currently engaged in integrating crop simulation models on Cloud, which will help to deliver specific advisories to farmers and constitute the first step towards 'Assured Agriculture'.

- The team will advocate and implement application of technologies like Artificial Intelligence (AI), Data Analytics (DA), Internet of Things (IoT), Cloud Computing (CC), Aerospace Observation and Miniaturised Sensors in the agriculture domain.

- They together present the untapped potential to overcome challenges facing Indian agriculture and to transform it from an Uncertain to Assured one.

- Assured agriculture represents a scenario where individual farmers are guided at every stage of crop growth and are provided with timely advisories and physical or fiscal assistance, to ensure beneficial returns for investment; without compromising on biological diversity in the immediate vicinity.

- Obviously, CDTA may like to create a platform for the massive adoption of digital technology in India's farming sector, which will disrupt the traditional way of growing crops and value-adding, however, without disregarding the basics for efficient production like using high-yielding cultivars, healthy soil, mechanisation, and availability of water.

- Also, CDTA will be a platform to share knowledge, practices, and training on disruptive technologies to scientists and researchers, focusing on agriculture.

The creation of CDTA is a major development and step for India in its aspirations to become an agricultural powerhouse and to make its farming sector more resilient to the effects of climate change. India has made big strides in agriculture in coming up with science-based solutions and making them available to smallholder farmers and stakeholders.

The CTDA is a proactive move by India to take its agriculture sector to the next level.

b. How to forward the issue

Given below is the possible way to proceed further:

i. Create the Platform

Indian agriculture faces numerous challenges today ranging from dwindling water and soil resources, extreme weather events, low level of mechanisation, and limited access to more profitable markets. Under these circumstances, CDTA's priority should be to take the lead in

advocating and pushing for the adoption of disruptive technologies in agriculture. Looking towards the crimping condition of cotton industry in India, CDTA should give a special preference to this crop.

The consortium CDTA, including leading State Universities in Agriculture (SAUs) can initially push for the need to conduct new research for development and advocate policies and push for legislation with the aim of creating a platform for disruptive technology adoption in all crops cultivation with a priority to cotton and enter into strategic partnerships to achieve their goals.

While "digitisation" is gradually finding its way into agriculture, especially in developed countries, there is still no large-scale disruption on how things are generally done in the cotton sector. Of course, the current digital technologies in agriculture can become disruptive in nature.

ii. Identified Digital Technologies

Eight digital technologies that can transform agriculture, have already been identified which may become disruptive in the future: 3D printing, robots, drones, sensors, AI, augmented reality, virtual reality and block chain.

Block chain deserves special recognition here because it is relatively new and its application is still unheard of in the agriculture sector. Block chain can be defined as a growing list of records that form blocks, which are linked and secured while using cryptography, essentially creating an incorruptible record of transactions.

So without waste of any time, CTDA should make disruptive technologies gradually take root in Indian agriculture, especially in cotton, so that in another decade or so, the way we farm will almost entirely be different from today.

iii. Primary Mandates

Primary mandates of the platform should be to challenge all stakeholders like smallholder farmers, local government units, ICAR Institutions, / State Agricultural Universities and private companies, Trade Organsations, and the Industrial sector, (cotton producers and textiles industry) to open their minds and start using digital tools to enhance agriculture and agribusiness. The effort should be a sustaining one and must lead to disruptions on how agriculture is generally conducted in India. And it is not an impossible dream. It can be done.

How Technology Results in Smart and Sustainable Farming in Advanced Countries

Advanced Technology and the Internet of Things (IoT) have made its way into the lives and businesses of farmers, in some countries. According to the U.S. Farmers and Ranchers Alliance (USFRA), technology is about more than better and faster. This translates into how food and fibre are raised and the role of technology is being played on their farms. Agriculture can bridge the gap between the acceptance of innovation that is a part of consumers' everyday lives with the technology - and the insights it delivers - being used daily on today's farms. Here is an overview and quick look at how technology results in smart and sustainable farming in advanced countries:-

- Farmers are using technology - moisture sensors, drones, smart irrigation, terrain contour mapping, self-driving and GPS enabled tractors - to produce food more sustainably.

- In such advanced countries, even cotton farmers are making use of technologies like smart drones, Precision Farming Technology, Infrared sensors, Automated Disease Detection Technology, etc.

- According to the "Future of Agriculture" in The Economist, farms are being changed to be more technologically efficient when it comes to growing food and fibre to be both, sustainable and profitable.

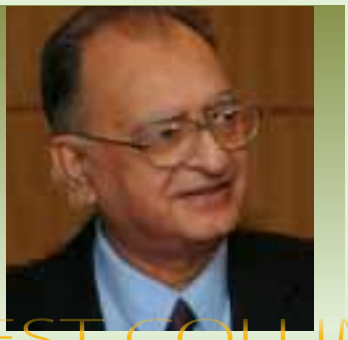
- Investment in Ag-Tech companies continues to increase. Today's farms are using a heady mix of data, math, hardware and software, sensors and analysis to go beyond what the eye can see.

- Technology like multispectral analysis, lets a farmer see which crops are doing well by looking at how the plants absorb or reflect different wave lengths of sunlight.

More information on scope of disruptive technologies in Indian agriculture may be discussed separately.

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

Cotton - Pride of India



GUEST COLUMN

Shri. Prem Malik
Former President, CITI

Shri. Prem Malik has more than five decades of experience in the Textiles and Clothing industry at the top management level. He is a Director on the Board of many companies like Indocount Industries Ltd., Ginni International Ltd., GTN Textiles Ltd., etc. In the past, he was Chairman of Confederation of Indian Textile Industry, Cotton Textile Export Promotion Council, Bombay Textile Research Association and Vice-Chairman of The Synthetic & Rayon Textiles Export Promotion Council.

He was also a Director of the Cotton Association of India. He is the ex-CEO of Mafatlal Industries Ltd. and Bombay Dyeing Manufacturing Co. Ltd.

The Textile and Apparel Industry in India is a pioneer industry contributing 4% to country's GDP and 12% of the country exports. The textile industry is the second largest employer after agriculture. Most of the textile industry is in the rural and semi urban sector and provides large employment to women.

The industry size is approximately $120 billion ($80 billion domestic and $40 billion in exports). The industry is multi fibre and it is predominantly strong in cotton textile and apparel for exports, while man-made fibres have a predominant share in the domestic market.

The industry is still relatively small and has tremendous potential to grow from the current level of approximately $120 billion to $350 billion in the next 7-8 years, if proper policy initiatives are taken both by the governments at the Central and State level and by the industry.

Our current per capita consumption is low i.e. little over 4 kgs against other countries like China where the per capita consumption is 13 kgs and above. The domestic sale in China is close to approximately $300 billion and their exports are close to approximately $280 billion, while our current size is approx $120 billion.

The Indian textile and clothing industry has all the ingredients in terms of raw material, skilled man power and expertise of decades in textile manufacturing and marketing, but our development has been slow due to inconsistent and inequitable policies in the past, because of which the industry lost the opportunity to grow at the space that was required in the 80's and 90's. It is heartening to note that very progressive and proactive steps have now been taken both at the Central and State level for the encouragement and establishment of new capacities and capabilities. However, if we have to double our world trade share from current 5% to 10% in the international market and to meet with the growing consumer aspirations in terms of lifestyle both for Ready to Wear and Ready to Use for domestic and institutional consumption, we have to modify our policies in a such a way, that the current industry is sustained and expansion takes places from new textile units but with equitable operational policies.

The new industry should be given capital subsidy and interest subvention.

The existing units and the new units should have equitable benefits in terms of power cost reimbursement, water availability skill support, additional employment base incentives and reimbursement of all embedded Central and States taxes.

Capital subsidy should also be available for modernisation and extension of spinning mills at the same levels as for the new units. Modernisation of existing units is paramount to improve quality, productivity and sustain employment.

The following suggestions may be further taken into considerations for development of the industry.

- Availability of quality raw material. Man-made fibres and filaments are available in terms of quality parameters, but cotton fibre has a lot of issues in terms of contamination, low availability of good quality of extra long staple cotton. Mini-Missions I & II helped tremendously but Mini – Missions III is required to improve cotton handling practices, eliminate contamination, gradation and marking of bales. Suitable rules and regulations necessary to avoid mixing of cottons.

- To improve yield of cotton per hectare from current 480 kgs. to 1000 kgs., which will improve income of farmers and making available of additional fibre for future intended growth.

- Encourage man-made fibres and filaments by a neutral fibre policy, as natural fibres will not be able to meet the total requirement of raw material despite improvement in yield, as land availability will not increase.

- State Governments should have a collaborative approach and provide incentives in such a manner that the existing industry survives and new industry is established. One should not be at the cost of the other.

- Infrastructure bottlenecks in water, power and road transportations need to be removed to become internationally competitive. Cross subsidy in power should be reimbursed.

- All embedded taxes paid on manufacturing of textile and apparel should be totally rebated by both Central and States to make exports competitive.

- Availability of working capital at international interest rates key to competitiveness.

- Executing Free Trade and Regional Trade Agreement on equitable basis for growth of international business.

- Industry has to become more market oriented and have to develop capacities and capability for those HS lines where our competitors are enjoying market share and we have little or no market share. This will require emphasis on market research, product and design development. The focus has to shift to aggressive marketing to improve market share and profitability of the industry without which industry will not be able to attract capital either from the market or from the financial institution.

The future of the textile and apparel industry is bright especially in the domestic market to meet with the growing purchasing power and change in life style of the consumers and in the international market if we are able to redesign our policies to stay competitive in the market place.

Courtesy : Cotton India 2018 (Domestic)

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USDA Pegs Down its Indian Cotton Crop Estimate for 2018-19 Season by 20 Lakh Bales to 325 Lakh Bales

The United States Department of Agriculture (USDA) which had estimated the Indian Cotton Crop estimate for the 2018-19 crop year at 345 lakh bales of 170 kgs each have now reduced their latest estimate by 20 lakh bales to 325 lakh bales of 170 kgs each.

The USDA have made this reduction in their latest estimate, which has been released on 10th May 2019 after extensive deliberations with the Cotton Association of India and also after considering all aspects and the prevailing situation in India.

As may be recalled, the CAI's April estimate for the Season 2018-19 has placed the Indian cotton crop at 321 lakh bales of 170 kgs each.

UPCOUNTRY SPOT RATES

(Rs./Qtl)

Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]							Spot Rate (Upcountry) 2018-19 Crop May 2019					
Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	6th	7th	8th	9th	10th	11th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0-7.0	15	11923 (42400)	11782 (41900)	11642 (41400)	11642 (41400)	11642 (41400)	11642 (41400)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0-7.0	15	12063 (42900)	11923 (42400)	11782 (41900)	11782 (41900)	11782 (41900)	11782 (41900)
3	GUJ	ICS-102	Fine	22mm	4.0-6.0	20	9954 (35400)	10011 (35600)	10011 (35600)	9954 (35400)	9870 (35100)	9842 (35000)
4	KAR	ICS-103	Fine	23mm	4.0-5.5	21	11332 (40300)	11248 (40000)	11248 (40000)	11164 (39700)	10967 (39000)	10939 (38900)
5	M/M	ICS-104	Fine	24mm	4.0-5.0	23	11698 (41600)	11698 (41600)	11698 (41600)	11585 (41200)	11529 (41000)	11501 (40900)
6	P/H/R	ICS-202	Fine	26mm	3.5-4.9	26	13104 (46600)	13104 (46600)	13104 (46600)	12991 (46200)	12851 (45700)	12795 (45500)
7	M/M/A	ICS-105	Fine	26mm	3.0-3.4	25	11670 (41500)	11670 (41500)	11670 (41500)	11585 (41200)	11585 (41200)	11529 (41000)
8	M/M/A	ICS-105	Fine	26mm	3.5-4.9	25	11951 (42500)	11951 (42500)	11951 (42500)	11867 (42200)	11867 (42200)	11810 (42000)
9	P/H/R	ICS-105	Fine	27mm	3.5.4.9	26	13244 (47100)	13244 (47100)	13244 (47100)	13104 (46600)	12963 (46100)	12907 (45900)
10	M/M/A	ICS-105	Fine	27mm	3.0-3.4	26	11951 (42500)	11951 (42500)	11951 (42500)	11867 (42200)	11867 (42200)	11810 (42000)
11	M/M/A	ICS-105	Fine	27mm	3.5-4.9	26	12232 (43500)	12232 (43500)	12232 (43500)	12148 (43200)	12148 (43200)	12092 (43000)
12	P/H/R	ICS-105	Fine	28mm	3.5-4.9	27	13273 (47200)	13273 (47200)	13273 (47200)	13160 (46800)	13020 (46300)	12963 (46100)
13	M/M/A	ICS-105	Fine	28mm	3.5-4.9	27	12570 (44700)	12570 (44700)	12570 (44700)	12513 (44500)	12513 (44500)	12457 (44300)
14	GUJ	ICS-105	Fine	28mm	3.5-4.9	27	12682 (45100)	12682 (45100)	12682 (45100)	12598 (44800)	12513 (44500)	12457 (44300)
15	M/M/A/K	ICS-105	Fine	29mm	3.5-4.9	28	12879 (45800)	12879 (45800)	12879 (45800)	12795 (45500)	12738 (45300)	12682 (45100)
16	GUJ	ICS-105	Fine	29mm	3.5-4.9	28	12907 (45900)	12907 (45900)	12907 (45900)	12823 (45600)	12738 (45300)	12682 (45100)
17	M/M/A/K	ICS-105	Fine	30mm	3.5-4.9	29	13244 (47100)	13244 (47100)	13244 (47100)	13244 (47100)	13160 (46800)	13104 (46600)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5-4.9	30	13413 (47700)	13413 (47700)	13413 (47700)	13413 (47700)	13329 (47400)	13273 (47200)
19	A/K/T/O	ICS-106	Fine	32mm	3.5-4.9	31	13694 (48700)	13694 (48700)	13694 (48700)	13694 (48700)	13610 (48400)	13554 (48200)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0-3.8	33	15607 (55500)	15607 (55500)	15466 (55000)	15466 (55000)	15325 (54500)	15325 (54500)

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