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Long Live SwaDesi Cotton

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The views expressed in this column are his own and not that of Cotton Association of India)

King Charles VII ascended the throne in 1422 to chants of 'The king is dead, long live the king', after his father King Charles VI died. It will not be long, before a similar resonance echoes in India when someone would say 'The Desi cotton is dead, long live Desi Cotton'.

Indians succeeded where the British failed to knock off Desi cotton

Two cotton species *Gossypium arboreum* and *Gossypium herbaceum* evolved in India millions of years ago and are commonly referred as Desi cotton species. *Gossypium arboreum* is under commercial cultivation only in India and Pakistan. It is interesting to know that the British introduced American cotton species *Gossypium hirsutum* into India in 1790 and tried hard for 150 years to replace the Indian Desi cotton species with American cotton. They didn't succeed. In 1947, when the British left India, at least 97.0% of India's cotton area was under Desi cotton varieties. Now, 66 years after independence, in 2013, 97% of India's area is under American cotton and less than 3% is under Desi cotton varieties. In 1992, the area under Desi cotton in India was more than 40.0% and even just ten years ago it was still about 30.0%. Today

it is a pity that less than 1.0% of India's area may be under the once celebrated Indian 'king cotton' Desi species *Gossypium arboreum*. In 1947, 23 lakh bales comprising of 67% medium staple and 33% short staple cotton from 97% Desi cotton varieties (65% *G. arboreum* and 32% *G. herbaceum*) were produced from 43 lakh hectares. During partition, the cotton mills remained in India and the regions that were suitable for American cotton went to Pakistan. Therefore efforts were intensified by Indian scientists to produce American cotton that suited the mills.

It is a bitter fact that historically, for thousands of years the finest fabrics, man has ever known, were woven from the Desi species *G. arboreum*. But, soon after independence, Indian scientists declared the Desi fibres as 'inferior' and 'coarse' and focused maximum efforts on improvement of American cotton in India. Strangely, the British failed but we Indians succeeded in pushing Desi cotton varieties to the verge of elimination from commercial cultivation in India.

EXPERT'S Column



Dr K.R. Kranthi

Why did the British try hard to displace the Desi with American cotton in India?

The world's finest cotton cloth from *G. arboreum* fibre was produced in India traditionally for more than 5000 years. Indian cotton fabric, Calico and Dhaka muslin cotton were the main exports to Britain for about 100 years before the British enforced a ban in 1721. Subsequently, in efforts to manufacture their own cotton fabric in Britain, the British invented mechanized spinning frames and introduced ginning machines during the late 1700s. It is interesting that visual evidence of the use of roller type cotton gins, such as the one patented by Eli Whitney, can be

traced back to the fifth century paintings of single-roller gins in the Ajanta caves (Cave No 1) in India. The spinning mills of Lancashire and Manchester in Britain were basically designed for American cotton fibre of medium staple length and good strength and raw fibre was imported from America. The fibre generally produced by many Desi cotton varieties was short and coarse and was not considered ideal for the mechanized spinning industry. The American Revolutionary War during 1775-83 caused shortage of raw cotton exports to England and the British started planning for alternative sources of American cotton. In 1790 they introduced American cotton var Bourbon G. hirsutum, punctatum race from Malta and Mauritius into Bombay and Madras Provinces of India. The British also set up spinning mills in Calcutta (1814), Bharuch (1843) and Mumbai (1854) to exploit cheap Indian labour. India was the second largest cotton producer in the world after America and the British exploited India as an alternative option to cultivate American cotton to cater to their textile mills. By 1862, some American cotton varieties acclimatized to Indian conditions and were able to grow in Dharwad, Hubli, Kanpur, Punjab and Madras Presidency. The American cotton fibre was being used by the local mills.

By 1850, India accounted for 1/6th of all textile exports from Britain and became the largest importer, ironically, from being the largest exporter in the world. The import of British cloth into India continued unabated into the 20th century. Gandhiji understood the implications and protested the British fabric imports and stressed on the need to conserve and revive the native varieties and the native spinning and handloom technology of India. He made the cotton spinning wheel a symbol of the Swadesi movement.

Why is Desi Cotton Majestic?

The Desi cotton species survived vagaries of nature for millions of years in India and have thus evolved to tolerate and resist a wide range of diseases, insect pests, drought, water-logging, salinity, and many adverse environment conditions. The Desi species are immune to many diseases including the dreaded cotton leaf curl virus. They grow well in marginal soils and sub-optimal regions. It is interesting to note that unlike the American cotton species *G. hirsutum* and the Egyptian species *G. barbadense* which struggle for years to adapt to new environment and are highly susceptible to many insect pests, diseases and drought, the two Indian Desi species are so sturdy

and robust that they acclimatize fast and grow easily in any continent, as was experienced in Australia, Africa, Russia, China and America. The Desi species are good yielders and require least chemical inputs such as fertilizers and pesticides to obtain similar or better yields as compared to the American cotton.

Indians were known for their supreme mastery over spinning and weaving.

India was known to produce the finest cotton fabrics ever known to mankind.

Archeological evidence indicates that cotton has been in use in India for more than 5000 years. Excavations carried out during the 1920's at Mohenjodaro in the Indus valley revealed silver vessels of 3000 BC containing well preserved cotton fabrics made from *G. arboreum*, thus providing evidence of highly sophisticated textile craftsmanship. History is replete with the Indian dominance in world textile trade.

In the 1st century AD, the Roman

historian calculated that the annual cotton fabric trade between India and Rome was worth 100 million sesterces (equal then to Rs 1.5 crores). Pliny lamented that India was draining Rome of her gold. The yarn spun from fibre of *Gossypium arboreum* was the finest of 345-356 counts and the fabric made was used by the royals. Poets described the fabric as Ab-i-rawa or running water, Beft-hawa or woven air or cloud and shab-nam or evening dew. Marco Polo, the Venetian traveller, (13th Century) wrote 'The coast of Coromandel produces the finest and most beautiful cottons that are to be found in any part of the world...The Indian Calicoes (from Calicut) are so fine you can hardly feel them in your hand and the thread when spun is scarce discernible..' Netaji Subhash Chandra Bose, (1938) quotes 'Suleiman the Arab traveller wrote in the 9th century that cotton fabrics in Rahmi (now, Bangladesh) are so fine and delicate that they pass through a signet ring'.

The Dhaka Muslins were famous all over the world. The East India Company traded the beautiful cotton 'Calico' from 1640 and 'Dacca' muslin cloth from 1666 to Britain and all parts of the globe. India was the world's largest exporter of cotton textiles. The British Parliament passed the 1721 AD act prohibiting Calicoes and import of cotton textiles from India, so that their domestic wool industry could be protected from a total collapse. Ironically, the domestic Indian craftsmanship is now on the verge of extinction, and there is not even a whimper in the country. Unbelievable but true, but an amazing fact is that, even now Andhra Khadi work women spin 100 counts yarn with *Gossypium arboreum* coarse fibre of 15 mm length, which would otherwise yield only 12s counts yarn in machine spinning.



How can we revive the glory of Desi cotton....

It may not be easy to accept the opinion instantaneously, but with some good thinking, it would not be difficult either to propose that 'India's cotton future lies in Desi cotton'. The recent challenges of ever-increasing cost of chemical inputs and labour scarcity have been pushing cotton cultivation towards un-sustainability and marginalized profits. The current American cotton hybrid systems that predominate more than 95.0% of the cotton area in India, do not fall in the category of sustainable approaches. These hybrids are expensive to cultivate, input intensive and run the constant risks of collapsing under high sensitivity to biotic and abiotic stresses. What is imminently needed for India is a vision based policy to plan towards sustainable profits. Desi cotton provides the answers for sustainability. But good thinking and planning are necessary. Two aspects strengthen Desi cotton. One is improvement of fibre traits. The second aspect relates to the exploitation of the existing traits for specialized purposes such as absorbent cotton and ancillary uses, for which Desi cotton is the best and other species cannot serve the purpose.

Though very few in number the Indian scientists who worked on Desi cotton, actually excelled in improving fibre traits of Desi species to make them equivalent to that of American cotton, while retaining the inherent robustness. AKA 8401, PA 183, PA 255 are some of the prominent varieties with superior medium staple of 27-28 mm. In South Zone, K 8, K 9, K10 and K 11 expressed 24-25 mm staple length. Improvement in North Zone was focused mainly on yield with LD 230, DS 5, LD 123, RG 18 and HD 107 yielding 20-26 Q/ha and LD327 with higher yield of 29-30 Q/ha at significantly low cost of production. The fibre of these varieties can spin up to 30-40 counts, which is equivalent to the American cottons.

For purposes other than textiles, Desi cottons can be an ideal and excellent source. Jaydhar is an excellent example of a *Gossypium herbaceum* variety that withstood at least four decades of commercial cultivation and is still going steady. There are several other varieties all of which can provide fibre for cushions, mattresses etc.

One application that perfectly suits *G. arboreum* cotton is the manufacture of 'absorbent cotton'. Inherently many *G. arboreum* varieties naturally produce high yields of non-spinnable short staple, coarse, high water absorbing fibre with low ash content. These traits comprise ideal requirements for the manufacture of absorbent cotton. Because of the robust nature, the Desi cottons can be easily adapted to organic conditions and with the recently available technologies it is possible to manufacture 'Organically produced -organically processed' Absorbent cotton, which in

all likelihood would be ideally suited for medical purposes and would have great prospects for domestic markets and also huge demand for exports, especially in countries where any pesticide trace is resented.

Currently, comber noil (short fibres waste of spinning mills) is generally utilized for absorbent cotton all over the world. However this is significantly inferior to the Desi short staple cotton for absorbent purposes. If Desi cotton is used, the domestic demand in India itself is estimated to be at least 3.4 lakh M tonnes (20 lakh bales) per year. Besides the Indian market, there is enormous export potential too. Japan, USA and EU countries import absorbent cotton from India with specific standards. It is estimated that the demand for absorbent cotton is growing at the rate of 10 percent per annum across the world. Based on the growth rate, it is estimated that within the next 5 years, 30-35 lakh bales will be required to fulfill the domestic market and more would be needed to plan for the export market.

Several Desi varieties such as Lohit, LD-133, RG-8, LD-327, DS-21, LD-491, HD 107 and HD-11 have fibre quality parameters ideally suited for absorbent surgical cotton. Recently, a variety, Phule Dhanwantarya was developed by MPKV Rahuri, which has good yield along with excellent fibre properties required for absorbent cotton.

India has the advantage of having the world's highest number of 1900 *G. arboreum* genotypes in the CICR germplasm bank. Needless to state that since India is the centre of origin for the species, the prospects of cultivation is high in any part of the country under any adversity. Because of the low cost of production, suitability for marginal soils and the possibility of obtaining high yields through sound technological back-up, there is immense scope for the promotion of Desi cotton varieties for sustainable cotton farming in the country.

One aspect that has not been addressed is that of development of spinning units for Desi cotton fibres. Spinning machinery should be developed to suit Desi cotton fibre traits, so that even short fibres can result in yarn that is of equivalent quality of the high count hand-spun yarn. It is heartwarming to note that some outstanding innovations in spinning technologies are being made by Indian scientists. Mr Kannan Laxminarayan an engineer from IIT Chennai invented the micro-spinning machine, which can spin Desi cotton more efficiently into higher count yarn. This could just be the beginning for a resurgent India to pave the way towards technological sovereignty with the spinning of Desi fibres on Desi machines.

It is for sure that, if India has to move towards sustainable cotton cultivation, Desi cotton provides the answers not just for sustainability but for a vision towards India's global leadership that can happen through focused efforts and sound planning.