Cotton: Challenges before Farmers and Farm-dependent livelihoods

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Cotton cultivation is intensive in Gulbarga, Davangere, Raichur and Haveri districts of Karnataka. The State accounted for 6.55 per cent of cotton area (4.66 lakh hectares) and 7.02 per cent of the cotton production (10.15 lakh bales) in the country in 2007. However, cotton production is defined by global and national cotton production and prices. With increase in prices, there is an expectation among farmers and thus increase in the cotton area.

According to International Cotton Advisory Committee (ICAC), global cotton production is expected to be 27.4 million tons in 2011/12 – a rise of 12%. In 2009-10, it was 21.9 million tons and has increased to 24.5 million tons in 20010-11. However, in comparison, increase in production is relatively small considering the doubling of prices experienced in 2010/11. Even cotton production will increase, more than the demand in 2011/12, but high prices and competition from chemical fibers are expected to limit growth in mill use to 3%. Limited resources (including land, seeds, water, and equipment) and competition from food crops are preventing cotton area from rising further in 2011/12.

India has the largest cotton acreage in the world, and cotton is the dominant fibre in the Indian textile industry. Most of the cotton used in India is grown locally, even though the low quantum of imports have started registering significant growth during the last few years. Despite recent market setbacks, cotton continues to play a significant role in the rural economy of semi-arid regions in India, influencing the livelihoods of an estimated 20 million people.

The advent of mechanisation during the nineteenth and twentieth century, and the continuing decline of the household industry saw both growers and weavers becoming the clients of the intermediary spinning mills. This dependency coupled with "green revolution" initiatives (seventies) witnessed the accentuation of input-intensive cultivation practices. On top of this, the liberalisation of the Indian economy and the opening up of domestic markets in line with multilateral trade dialogue during the late nineties have seen intensified competition that has brought in its aftermath debilitating environmental, economic and social impacts. Members of two primary producer communities in this supply chain – cotton growers and handloom weavers – have been committing suicides (mostly reported in Andhra Pradesh and Karnataka) with women engaged in these two occupations getting further marginalized.

In India, cotton accounts for 70% of total fiber consumption in textile sector and within the handloom sector, cotton dominates as the primary input and accounts for nearly 83% of the total handloom cloth production. Cotton is cultivated on 5% cultivable land, but consumes 54% of total pesticides used in agriculture. India is the one of the largest producers of cotton. It also has the largest concentration of handlooms. Together, these cotton farmers and handloom weavers form a part of what may be called the 'primary cotton-textile supply chain'.

However, the current scenario in cotton-handloom supply chain in India is very bleak. Cotton farmers are hit by:

1. Rising cost of production, fluctuating market prices for cotton, decreasing or stagnant yields occasioned by possible deterioration of the quality/productivity of soil as a natural resource due to incessant use of chemicals and pests that are increasingly resistant to chemical dosage;

2. Inability to manage water resources effectively and the symptoms observed of depleting groundwater;

3. Deterioration in genetic purity of the multitude of cotton varieties and hybrid seeds;

4. Inability to compete in global markets that reflect depressed prices due to significantly large subsidy to cotton farmers by western countries;

The key issues in cotton growing households are:

1. **Increased expenses on Pesticides:** During the last five years, the farmers reported an increased incidence of pest attacks in cotton. While new pesticides were tried out including *Avant* from 2000 onwards, new pests seem to have appeared. Added to this was a situation of rising prices for pesticides in the market. The rainfall failure during 2001-2002 had compounded this situation leading to loss of crops. While the NPM demonstrations and experimentation was being taken up in small patches, the farmers continued to gamble in chemically-treated cotton during the last two years. This year, the acreage under Cotton had been significantly reduced. In most cases, the pesticides are bought on credit, as any savings with the farmer would have been expended at the time of preparation for the crop. Credit from local money lenders or traders at exorbitant interest rates (24 – 36 percent annually) compound the issue further. While the larger farmers employ labour for spraying, the marginal farmers tend to involve household members in preparing the admixture.
2. **Credit Needs:** The successive rainfall failures during 2001 and 2002 have impacted the financial situation of the farming households. Most of the households have resorted to borrowings and sale/pledge of available fixed assets. The credit needs are highest during July to September, and the repayment is usually carried out during January- March. For the household, the kharif season is a season of financial stress. Food insecurity was not mentioned. The borrowing reported by the farmers varied from Rs. 6,000 to Rs. 38,000 during the last one year.
3. **Fluctuation in Cotton Fortunes:** The farmers opt for growing cotton due to the possibility of windfall returns. But the market prices have kept fluctuating. In 2001, and 2002, lower prices were compounded by losses (due to pests and low rainfall) and higher input costs (pesticides). In 2003, when acreage was reduced, prices have been firm and yield good. The calculation is to gamble and invest with the realization that once in three years the probability of striking it rich is high. In the years when yields were low or when prices fell, the household earned less than the minimum labour wage for own-labour expended in cultivation. This is accentuated by the high costs of inputs (as a ratio of investments) and the reported lack of safeguards on quality/reliability with no recompense in event of failure.

4. **Health:** Generally, the farmers spray their own fields using their own sprayers or renting one. Instructions and precautions during spraying depend on what the shop-keeper has told the farmer. Some of the farmers mentioned that breathing problems, dizziness and head-aches were common during the spraying period.
5. **Women's role in Cotton cultivation:** Discussions with household members revealed that the role of women in cotton cultivation was limited to the sowing, weeding and harvesting operations (especially the last two). Unlike food crops and vegetables, where women tended to spend more time in taking care of the field, seed preparation and FYM mixtures, their role in cotton cultivation was limited. Some of the women mentioned that their roles have increased while carrying out NPM cultivation of cotton (especially for preparing the mixtures).

Cotton in Raichur

In Karnataka, Raichur is a cotton town, dependent on the commodity in various ways. This town is a major hub for supply of inputs for production of cotton, including seeds, pesticides and other farm inputs. It is also a major market place for raw cotton and ginned cotton. In 2010, in this district, cotton was cultivated on 18,800 hectares in the rain-fed areas against a target of 6,050 hectares, while 11,000 hectares had been covered in the irrigated belts against a target of 16,350 hectares.

The crop was sown in about 15,200 hectares during 2004-05, 19,300 hectares in 2005-06 and 20,300 hectares in 2006-07. During the kharif season 2007, the crop was cultivated in about 16,000 hectares as against the target of 13,200 hectares set by the Department of Agriculture.

Raichur grows paddy, *jowar* and *bajra* in 1,59,000 hectares, of which 65,600 hectares is classified as dryland and about 77,000 hectares as irrigated land. Further, the programme for cultivation in 2002 has recommended growing of pulses in 33,000 hectares of land, major oil seeds like sunflower in 50,000 hectares of land, groundnut in 35,000 hectares of land and commercial crops like cotton in 10,000 hectares of land. Clearly, the acreage under cotton is growing. This is because of the market prices and market facilities in Raichur town.

In 2010, the average daily arrival of at the township has been put at 2,500 quintals. The farmers also got an average price of Rs.4,039 a quintal, which is stated to be a good rate.

In 2007, the ruling price of hybrid cotton (between Rs. 1,900 to Rs. 2,200 a bale of 170 kg) was above the minimum support price (Rs. 2,050 a bale of 170 kg), as in the following years. In 2008, cotton prices in the Raichur market were quoted around Rs 5,625 a quintal, 69.23 per cent higher than the minimum support price (MSP) of Rs 2,600 fixed by the Government. The MSP fixed this year for cotton is Rs 2,600/quintal for medium staple and Rs 3,000/quintal for long staple cotton. The Domestic and Export Market Intelligence Cell (Demic) established at the Department of Agri-business Management, University of Agricultural Sciences, Dharwad, has forecast the prices of cotton to be around Rs 3,800-4,100/quintal from February to March in Raichur, Ranebennur and Haveri markets. "If the cotton export is allowed for more than 55 lakh bales, prices in the Indian markets are likely to increase," a Demic official said. "Farmers are advised to keenly follow fallow the export performance before taking up marketing decisions," he added.

But there is a big gap between the arrivals and purchases. Lack of participation of the Cotton Corporation of India (CCI) in the procurement has affected the interests of cotton growers. Three years ago, the divisional office of the CCI, which was covering Raichur, Bellary, Sindhanur, Kottur and Adoni, was shifted from in Raichur to Hubli. APMC at Raichur had written to the authorities concerned at the CCI, Hubli, to make arrangements to procure hybrid cotton at the township to safeguard the interests of farmers. Farmers are in distress because of lack of bulk purchase and procurement by unregistered traders. This is impacting on both the APMC and the farmers.

Government Policies

Government policy with regard to cotton is reflected in the following:

1. Technical Mission on Cotton
2. Declaration of Minimum Support Price
3. Procurement of cotton by Cotton Corporation of India
4. Taxes and incentives
5. National Agricultural Policy
6. National Foreign trade Policy
7. National Fibre Policy (draft)

There are various institutions which deal with the production and marketing of cotton, including processing (across the cotton supply chain). This includes the following:

1. Union Ministry of Textiles

This Ministry has the mandate to manage Technical Mission on Cotton. This Mission is primarily to enable research in increasing cotton productivity and develop infrastructure for cotton. It also allocates funds for procurement of cotton, a process which is done through Cotton Corporation of India.

This Ministry is also concerned with other fibres such as silk, jute, wool (natural fibres) and man-made fibres. There are number of institutions which get the support of the Ministry in this regard. These are competing fibres to cotton. This Ministry has released a Draft National Fibre Policy (DNFP) in June, 2010, based on the deliberations of eight sub-groups and a 72-member Working Group.

Recently a Yarn Advisory Board was set up to monitor cotton yarn prices and consumption. This Board prepares a balance sheet of cotton, which gives information on production, consumption, exports, imports and stocks of cotton in the country, periodically. An Organic Cotton Board is also working under this Ministry.

This Ministry responds mostly to the needs and demands of the textile mills and large producers of garments and textiles. A number of industry representatives, including the representatives of their Associations such as FICCI and CITI, do have membership in various committees of the Ministry, including Textile Committee. Textile Committee is mandated to help the needs of modern textile industry, including those dealing with cotton.

2. Union Ministry of Agriculture

The Commission for Agricultural Costs and Prices (CACP), which decides on the Minimum support Price for cotton, and other crops, works under the Ministry of Agriculture. CACP based on information and data collected over the previous years, arrives a Minimum Support Price for cotton. National Agricultural Policy, which seeks to promote "Second Green Revolution" is also prepared by this Ministry.

3. Union Ministry of Commerce

This Ministry has the mandate to implement National Foreign Trade Policy. Under this Policy, every year, cotton imports and exports are regulated. This includes raw cotton, cotton yarn and cotton textiles. However, this regulation is based on inputs from the Ministry of Textiles. Agricultural Products Export Development Authority (APEDA) works under this Ministry. APEDA is the nodal agency for certification process for organic products exported from India, including organic cotton. There are various other export promotion councils, such as Cotton Export Promotion Council, work under this Ministry. These Councils have the mandate to promote and regulate the exports. CEPC deals with cotton textile exports.

4. Ministry of Finance

This Ministry deals with direct and indirect taxes, including those of cotton trade and cotton processing industry. All proposals and decisions with regard to taxes, incentives and subsidies, with regard to cotton, from the Ministry of Textiles, Commerce or Agriculture, have to get the approval of this Ministry.

National Fibre Policy

National Fibre Policy is a necessity for India, given the growing competition in global textile, trade, concomitant changes in the Indian textile sector and growth objectives of Indian economy. However, Indian textile sector is known for its versatility, diversity and horizontal and vertical linkages. No other country has such complete supply chains across so many different fibres. With potential markets, at the domestic and international level, for each of the fibre products, it is indeed a tough context to decide upon the right mix of fibres.

One of the objectives of this draft policy is to increase the competitiveness of Indian textile industry. However, with the growing share of fibre cost in the cost of production, small producers are increasingly finding it difficult to stay competitive. This Policy does not come up with any specific, path-breaking recommendation to reduce cost of cotton as a raw material. In fact, the recommendation to reduce duties on MMF, incentivize MMF production and subsidise

MMF investments would render cotton products incompetitive in the textile market. Cotton fibre supply chains would be severely stressed. Jobs of atleast of 5 crore people would be impacted.

Further, one of the objectives is to devise means to augment remuneration to cotton farmers. However, there is no single recommendation which addresses the chronic problem of small farmers being the biggest losers in the cotton markets. With farmers being the primary producers losing their competitiveness and indebted, the commensurate trends in cotton-based textile production would be stressed as well. However, in the section on organic cotton, there is a mention of providing incentives to farmers for sustaining organic cultivation. But there is no elaboration on the kind of incentives.

This draft Policy recommends the following institutions:
a. Yarn Advisory Board
b. MMF Advisory Council
c. Inter-ministerial Board for organic, suven and ELS cotton
d. Technology Mission on Speciality cotton
e. Technology Mission on Technical Textiles
f. Inter-ministerial Task Force on wool

This policy projects a scenario of increasing cotton production and consumption, and yet estimates a surplus. It says 'India will be a cotton surplus nation in the next decade'. However, these statistics have been questioned. Another estimate says that cotton consumption has been rising at 11% per annum, in the post quota regime, and as such cotton consumption is likely to reach 570 lakh bales by 2020. This is at variance with the estimation in this policy of 430 lakh bales by 2020. Probably, this policy is trying to build a case for reduction in policy focus on cotton, in line with the declared objective of changing the ratio between MMF and natural fibres.

Further, cotton seed (availability, prices and quality) is a major issue for the cotton farmers. This is not addressed with the same attention as given for MMF. However, on a positive note, DNFP endorses loans for seed cotton (as in US) and multi-year seed subsidy programme (as in China). However, they should be made explicit programmes.

Importantly, it does not make any effort to link the policies related to cotton and speciality cotton. Further, DNFP has some important recommendations: control of cotton exports, export duty on cotton exports and constitution of a Inter-Ministerial Committee of Secretaries. These recommendations are well received by the cotton-based textile industry, including handlooms, with spinning mills being the exception. Having benefitted hugely by trade liberalization and TUF scheme, spinning mills seem to ignore the national interest in the growth of Indian textile supply chain.

This Policy has not bothered to examine the problems arising out of the GM cotton for the farmer, agricultural fields, ecology, environment and economy. It does not consider Bt cotton and related contamination issues as serious enough. It seems to endorse GM cotton, even though it has identified cotton contamination as one of the factors that needs to be monitored. It does not come up with any suggestion on how organic and GM cotton would co-exist, if at all, given the

Indian conditions. Promoters of this Policy are probably not aware that the science of policy is all about resolving conflicting or contentious issues in growth.

This Policy is biased totally towards MMF in its intent and content. This bias needs to be questioned. Draft National Fibre Policy is clearly opting for MMF and related growth.

A MMF-centric policy would have a negative impact on cotton industry. It would redefine the market shares, in favour of polyester and other man-made fibres. Poor people would increasingly opt for synthetic clothes, while cotton increasingly becomes a choice of the rich. Environmental stress with synthetic production and waste pileup would increase. To counter this, environmental costs have to be loaded onto the unit cost of production of man-made fibre. Presently, this is externalized, which makes it cheaper than any natural fibre.

Given the above, **National Fibre Policy** should include the following:

i. **Reduce cost of production**, especially related to cotton production, which would help the farmers in increasing their returns.
ii. **Promote the growth of cotton** in order to sustain employment, textile growth and environment, in comparison with polyester and other man-made fibres.
v. **Bring out a Textile Fiber Products Identification Act**; its purpose is to protect consumers from mislabeling of cotton fiber content on textile products and from misleading advertising.
vi. **Establish a Natural Fibre Fund**, to support lakhs of livelihoods, using Carbon Development Mechanisms.
vii. Establish cotton fibre /yarn price stability mechanisms

National Budget 2011-12

There is overall reduction in government allocations for three fibres: silk, cotton, jute and wool.

- Budget for Wool Development Board has decreased to Rs.14 crores from Rs.16 crores.
- For Cotton Technology Mission, the budget has decreased drastically from Rs.141 crores to Rs.0 crores (zero)
- For Procurement of cotton by CCI has reduced from Rs.1233 crores (revised) to Rs.200 crores. Last year allocation was Rs.244 crores, and in 2009-10, government has spent about Rs.635 crores.
- For Jute, the budget allocation has been reduced from Rs.104 crores to Rs.83 crores.
- A Technical Mission on Technical Textiles has been established.
- A Yarn Advisory Board has been constituted.

Thus, draft National Fibre Policy seems to be in operation, even before the Central Cabinet and the Parliament have discussed and approved it.

In Perspective

Cotton is a important crop and commodity for Indian farmers. It helps in development of farmers, and also mars their lives, when they do not achieve balance between investment and returns. Across India, cotton farmers have been committing suicides, as and when the market price fluctuates. Higher market price for cotton raises expectations. Yet, there is no guarantee for those expectations.

In many places, a few organizations have come up with different, even organic, methods of production as a solution to these problems being faced by cotton farmers. Lakhs of rupees have been invested in these efforts. Institutions have been built and capacities have been enabled. However, the challenges remain before, principally caused by the advent of Bt Cotton and the direction of government policy towards second green revolution.

Cotton production has problems with regard to access to seed and other pest control materials, cost of labour is increasing, capital availability needs to be sorted out, quality and contamination is a threat. In the process, farmers' confidence in cotton production and supply chain is fluctuating.

Amongst the cotton farmers the key livelihood issues were:

1. Seasonal cash shortages and resort to credit
2. Health issues due to nature of occupation
3. Increasing input costs, stagnating or fluctuating product prices leading to cash shortages in household and indebtedness
4. Perceived lack of control over occupational fortunes
5. Adverse public policies such as National Fibre Policy and draft bills such as Pesticide Management and Seed.

Strategies need to be worked out to sustain cotton farming, which has the promise to deliver results and ensure the independence of small and marginal farmers in pursuit of agriculture.

Objectives

- Review and map existing work and strategies and the status of the impacts on small and marginal farmers.
- Assess public policies, market conditions and future trends in cotton
- Propose and develop strategies or steps that would address current challenges before small and marginal cotton farmers, from political, economic and social milieu

Projected Outcomes

Develop a plan of action to increase awareness on, and interest in, the above issues so as to ensure more farmer-friendly reforms and policies in Indian agriculture.

Thus the recommendations of the workshop should be formulated in such a way as to arrive at a medium to long-term policy instruments to ensure continuation of the confidence of the small and marginal farmers in their livelihoods.

COTTON (From the document of draft National Fibre Policy)

II. The sub-group on cotton has projected cotton production to rise to 483 lakh bales by 2019-20 (assuming yield growth at 4.7% annually) and cotton consumption to increase to 413 lakh bales by 2019-20, with 70 lakh bales being surplus.

III. Given that the production of cotton fibre, as well as MMF fibre and filament yarn is expected to witness a substantial increase in the next 10 years, the installed capacity for value addition under the textile value chain also needs to witness substantial improvement to absorb the expected increase in fibre production. It is estimated that investments worth Rs 176,510 crore will be needed during FY10- FY20 for creating the required capacity along the textile value chain on the basis of estimate of the increased fibre production. The underlying assumptions to arrive at investment estimates are based on CITI‟s Vision for Indian Textile and Clothing Industry 2007-2012, Eleventh 5-Year Plan estimates and inputs from major industry stake-holders, who are members of the sub-group.

Investment requirement till 2020 (Rs cr)

Spinning	63525
Weaving	38485
Knitting	12499
Processing	26695
Garments	35305
Grand total	176510

IV. The sub-group on Cotton has made recommendations for formulation of National Fibre Policy with following broad objectives: (i) the National Fibre Policy should be fibre-neutral, (ii) the fibre policy should accord priority to the cotton fibre value chain in the following order of priority: Farmers, Domestic mills and Other cotton consuming countries, (iii) it should enhance production, sustainability and growth of cotton, (iv) it should target enhanced competitiveness of cotton fibre, as well as ensure most judicious and efficient utilisation of the country‟s strength for sustainable development of all the sub sectors of the cotton economy through backward and forward integration, (v) the cotton economy must be strengthened and its vibrancy improved through an upgraded and a reformed marketing system and through conscious branding of cotton for use, and (vi) an institutional mechanism must be created that will monitor, coordinate and also create a unified platform of all other interests in the lines of the National Cotton Council of the US.

V. Various recommendations made by the sub-group on Cotton, aimed at achieving aforesaid objectives are provided hereunder.

VI. **Enhancing production:** The following recommendations have been made by the members of the sub-group for augmenting cotton production in India:

- An institutional framework could be created for development of cotton fibre. The institution thus established could provide funding and direction for research in a holistic manner.
- Improving irrigation facilities and water harnessing was considered imperative for enhancing production and lowering its dependence on monsoon. It is recommended that the area under irrigation could be increased to 60% from its present level of 38% at national level. Further, drip irrigation system could be adopted for better water management. Drip irrigation system could be adopted in at least of 30-40% of total cotton area.
- Initiatives should be taken to increase awareness among farmers for adoption of rain water harvesting, soil moisture conservation techniques, suitable agronomic practices in order to increase the utilisation of rain water.
- New farming practices could be developed to increase the cotton yield.
- Precision farming was considered important for enhancing cotton productivity. Emphasis could be laid on spreading „precision farming‟ to improve yield per unit area for all areas.
- Measures could be taken to enhance production and supply of „green manure / FYM / compost / vermi-compost‟ in the country to maintain soil productivity at sustainable levels. Green manure / FYM / compost / vermi-compost production and supply has to be taken up at a large scale under organised sector so that it becomes available for all cotton growers.
- Improve extension activities and provide certification facilities with subsidised inputs to cotton farmers to sustain their income levels.
- In field extension, public-private sector partnership projects may be launched on "large area" basis, by ensuring technology inputs and marketing tie-up, so that diversion of cotton area to other competing crops can be minimised.
- National research thrust for the cotton production sector could continue. The focus of the national research on cotton could be laid on increasing the lint productivity through improvement in ginning outturn of varieties / hybrids to 40 – 42% as compared with 34 – 36% of current cultivars.
- On-line pest monitoring system at block level and IPM network to advise the farmers need should be strengthened. Integrated disease and pest management strategies could be implemented vigorously on cluster basis.
- Availability of sufficient quantity of micronutrients as in case of NPK could be ensured. Fertiliser companies could give equal importance to micronutrient manufacturing and marketing.
- The system of transfer of knowledge to farmers through Farmers Field School (FFS) should be continued and it could be taken up in each Gram Panchayat of cotton growing area. Sufficient number of Cotton Masters Trainer needs to be generated through Season Long ToF training to ensure availability of 1 cotton master trainer at each block level.
- Lessons from micro examples of yield improvement and production enhancement programmes run by CAI, CITI, CDRA and SIMA in different states of the countries should be adopted for other regions.

VII. **Enhancing investment along the textile value chain:** Given the significant estimated investments required for the textile value chain, the Technology Upgradation Fund Scheme can continue so that the industry may avail of the benefits under it.

VIII. **Improving quality of cotton fibre:** The focus of the national research on cotton could be on optimising the components of fibre quality parameters to meet the end-use requirements of the spinning sector, which is producing yarn in a wide range of spinning counts. Overall kapas grading is absolutely necessary, and ought to be strengthened. To prevent contamination in cotton fibre, use of white polypropylene bags for packing fertilisers could be replaced by coloured polypropylene bags.

IX. **Improving infrastructure:** The warehousing should be scientific and IT-enabled to develop into dematerialised trading and movement of goods. Pressed cotton also needs to be stationed and warehoused at accessible affordable places. Steps could be taken to improve logistics for transporting cotton, so that cotton fibre can be supplied from surplus to deficient areas in a clean manner.

X. **Export of cotton fibre:** A healthy stock-to-use ratio should be maintained to avoid any distortion in the cotton market. The trade policy for cotton could target exports of surplus cotton, and imports in slots where there may be a deficit in domestic production. There is no need for import duties, and any restriction on imports should be need-based only. Exports of cotton fibre should be monitored on a time-to-time basis in each cotton year to ensure stability in supply as well as prices to domestic mills.

XI. **Improving marketing and branding of cotton:** Creation of a Competing Crops Pricing Index could be explored to ensure judicious allocation of resources in crop patterns. A structured mechanism for promotion of cotton use could be developed to sustain domestic consumption on a long-term basis to maintain the strength of the cotton economy. Pilot projects for marketing of lint by the farmers, instead of kapas at present, could be considered. The role and functions of government agencies involved in marketing of cotton fibre can be looked into and their role towards inclusion of price stability can be reoriented.

XII. **Value addition in the cotton value chain:** Returns on cotton fibre can be enhanced through backward integration of the cotton value chain. The cotton industry can adopt the example of the sugar industry through such activities as de-linting and use of cotton stalks, which present great opportunity with minimal investments. Further, realisation on seed can be improved through more R&D on cotton oil and cotton seeds, especially because the governments across the world are beginning to reduce green house gas emissions. A careful study is recommended to devise a strategy for countering carbon emissions and subsequently a Carbon Emission Reduction Scheme can be framed.

XIII. **Drawing lessons from policies of other cotton producing countries:** Lessons can be drawn from policies in these countries that are pertinent to India and could be suitably adopted. For instance, the independent gradation certification system of total crop existing in the US could be studied and a similar system can be developed after suitable modifications.

Image Courtesy: http://foodfreedom.files.wordpress.com