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Sustainable Cotton Production

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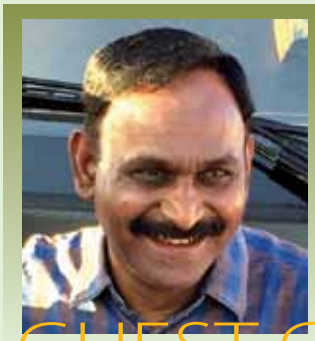
Dr. M. V. Venugopalan, Principal Scientist (Agronomy) and Head, PME unit, CICR, did his Ph.D in Agronomy from the Indian Agricultural Research Institute, New Delhi and has almost two decades of experience in land resource management.



GUEST COLUMN

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Sustainability means 'meeting today's needs without compromising the future'. To achieve sustainability, primarily all efforts need to be oriented towards profitable farming without harming the ecology, environment and the society. Many technological interventions, especially chemicals such as fertilizers and pesticides have the potential to enhance agricultural productivity, but can have undesirable effects on soil, water, air, flora-fauna, non-target organisms, biodiversity, ecosystems and the overall environment to the point of devastation. The term sustainability can easily conflict with developmental aspects of cash crops such as cotton, where profits are the prime movers and the environment is of theoretical importance.

Across the globe, cotton is considered mainly as a fibre crop and thus subjected to indiscriminate usage of fertilizers and pesticides in pursuit of high yields and profits. It is widely accepted that chemical intensive agriculture disrupts ecology and environment. Due to intensive use of chemicals over several decades, soils in many parts of the globe have become less productive. Soil ecology in many countries has been disrupted and damaged to the point that agriculture is not possible now without adding larger quantities of chemical fertilizers and continuous use of pesticides that are needed to control pests which increase due to nutrient imbalances in the crop. It is in this context that the term sustainability loses its meaning. Are we aiming to meet today's needs by retaining the status-quo of the current unhealthy ecology, environment and production systems, or, do we have plans to restore the ecology and environment to ensure that the soils, air and water become healthier and agriculture becomes more profitable?

Needless to mention, in the context of a healthier ecology, it is imperative that plans are made to re-invigorate soil health and eco-systems to move away from chemical-farming to the greatest extent possible without compromising on productivity.

From a global agricultural perspective, cotton is an important crop. It is cultivated in about 30-35 million hectares (2.2% of the global arable land) with a production of 20 to 25 million tones of fibre. In 2015-16, the global cotton area was 30.49 million hectares with a production of 20.99 million tons worth about US$ 50 billion. The crop provides employment and livelihood to more than 250 million persons. It is important that the crop receives adequate attention for sustainability of production systems to ensure a healthier environment and sustainable livelihood for industries and population dependent on the commodity.

Compared to synthetic alternatives, cotton is renewable and bio-degradable and hence is the most sustainable raw material for the textile industry. Sustainable cotton production on the other hand, refers to growing cotton in an economically and environmentally benign and ethically responsive manner. In practice, this amounts to adoption of those production techniques that do not harm the environment (or those that invigorate the environment), provide fair treatment to farm labourers and farm animals and engages in those activities to support and sustain the livelihood of local communities.

According to FAO, sustainability has four dimensions- economic, environmental, social and political. Specific issues with reference to cotton production, include water management, pest management, seed production, soil management, bio-diversity, climate change (GHG emission and carbon capture), economic performance, poverty reduction, risk aversion, gender issues, social equity, etc. Sustainability is normally analysed in its temporal (past, present and future) and spatial (farm, village, region, nation) context. It is also assessed in relative terms over time (past versus present) or between comparable commodities (cotton versus jute or polyester) or production system (conventional versus organic cotton production system, chemical versus integrated pest management, irrigated versus rainfed, mechanised versus labour intensive, hybrid versus varieties).

The key components of successful cotton production are good seeds that can be nurtured to grow healthy on good soil with adequate water and nutrients as per the plant needs. Climatic elements, weeds, pathogens, insects, nematodes and vertebrate pests can pose constant threats all through the season. The need for specific selective chemicals, if at all, will eventually depend on how well the ecology and ecosystems are managed at the farm and regional level.

Intensive Cotton Farming In India

Hybrid cotton responds to fertilizers, especially nitrogen and grows rapidly with hybrid vigour. The luxuriant hybrid crop becomes a good host for sap-sucking insect pests, thus necessitating insecticide use. Use of insecticides in the initial stages of cotton crop severely disrupts ecology which comprises of naturally occurring parasitoids and predators on insect pests. Systemic (trans-located into the plant) insecticides such as those belonging to the organophosphate (OP) and neonicotinoid groups are recommended for sap-sucking pest control. These insecticides extend the vegetative stage and delay flowering and fruiting by 1-2 weeks and sometimes more depending on the extent of application. A combination of nitrogenous fertilizers plus systemic insecticides, coupled with hybrid vigour convert short duration varieties into long duration. The crop extends into a long vulnerable window of flowering and fruiting. A longer flowering and fruiting window not only makes the crop vulnerable to insect pests and diseases, but also causes moisture and nutrient stress during the reproductive phase thus causing yield losses.

Side Effects Of Technological Interventions

With the increase in cultivation of American cotton hybrids after 1980, mostly in Andhra Pradesh and Gujarat, insecticide usage extended to 25-30 spray applications during the season. This was unprecedented in any part of the world. It is only now that countries such as Brazil are resorting to a large number of chemical sprays. Such intensive chemical usage leads towards high levels of un-sustainability. In retrospect, the main factor that may have triggered the progressive dependence of chemical intensive cotton farming, more so in irrigated parts of the country, was "Long duration American cotton varieties and hybrids which had a longer vulnerable window for sap-sucking pests and bollworms". Pink bollworm is a late season pest and occurs mainly during November-January in long duration cotton. Cotton harvested by the end of November is hardly affected with pink bollworm damage.

(To be continued)

Courtesy : Cotton India 2016-17

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

CAI Organises Seminar on FX Risk Management

Foreign exchange fluctuations play an all important role in international trades. The currency markets are always fraught with risk, and the inherent volatility of the currencies exposes businesses to unpredictability and sometime solvency risks, if not managed well. Thus, special skill and attention is required so that the businesses are equipped and prepared to safeguard against this risk.

With a view to help the CAI's Members to understand this subject better and to devise a more efficient mechanism to mange FX Risk in their day-to-day business, the Cotton Association of India organised a Seminar on 'FX Risk Management – Your Insurance against Volatility',on May 19, 2017 at the CAI premises.

While the faculty for the 'FX Risk Management – Your Insurance against Volatility', was Shri. Shreyans Shah, Head, Mumbai Sales, Edelweiss the faculty for the topic 'Insurance Value Proposition' was Shri. Yashesh Sampat, Head- Associations and Affinity, Edelweiss.

Shri. Udayan Thakkar, Vice President, CAI, welcomed the faculty members. The Seminar was well attended, and much appreciated by CAI members.

Shri. Udayan Thakkar, Vice President, CAI, gives the welcome address.

Shri. Shreyans Shah, Head, Mumbai Sales, Edelweiss.

Shri. Samir Shah presents a bouquet to Shri. Shreyans Shah.

Shri. Pankaj Mepani presents a bouquet to Shri. Yashesh Sampat, Head-Associations and Affinity, Edelweiss.

The audience includes Shri. Nayan Mirani, President CAI.

COTAAP Corner

For April-May 2017

In April, most of the field were prepared for sowing of the upcoming kharif season. Fortunately, the pink boll worm attack last year was not so severe as to cause economic damage to cotton crop in the Jalgaon belt. However, since the pest has an ability to be dormant for almost two years and attack again when favourable conditions are available; farmers as well as extension agencies must always be on alert to avoid or manage its attack in the coming season. Crop rotation, clean cultivation, deep ploughing, etc. are some of the measures suggested by COTAAP to the farmers, to ensure better soil health.

Feedback forms have been filled by field assistants through personal interviews. The information will be analysed to evaluate effectiveness of the extension activities and to get remarks and suggestions from the beneficiary farmers.

Technology Know-How Corner: High Density Plantation System:

High Plant population per hectare is a well established agronomic technique practiced in several leading cotton producing countries like USA, Australia, Brazil and China for achieving high crop yield. Plant population varies from 55000 to 250000 plants per hectare based on soil and climatic factors in the respective country.

Indigenous varieties of cotton are mostly erect growing and required low spacing. While the hybrid strains have a spreading habit and required long spacing. The farmers' tendency was to give extra spacing between the plants, so that the plants grow taller and broader. Though individual plants looked healthy and full of flush, it affected plant population and ultimately lowered the productivity. So scientists suggested decreasing the space from 5 x 3 ft. to 5 x 1ft. or 4 x 1.5 ft. This way, root systems and stems tend to absorb more nutrition and water, resulting in maximum productivity. This technique is called 'High Density Plantation System' i.e. HDPs. Considering the spreading habit of the hybrids and highly fertile soils, plant growth regulators are used for lowering the spacing. COTAAP has promoted HDPs in cotton. Most of the farmers in Chopda region have scientifically adopted the technology. The benefits of HDPs include increasing the yield as well as facilitating harvesting in minimum pickings. This should be considered as a step towards mechanisation of cotton picking. Decrease in duration of the crop also avoids the spread of certain diseases and pests like pink boll worm from season to season.

The Aim of Cotton Season 2017-18 - Priority to Marginal Farmers

Farmers with small land holding (less than 2 ha land) have various limitations in adopting new technology. With the aim of reaching the maximum number of marginal farmers, Shri. Pradeepbhai Gujarathi, Trustee, COTAAP, has formulated a strategy for identifying marginal farmers and bringing them under COTAAP's extension services. Appropriate timely guidance, input support and technology know-how will enable minimum risk and maximum return to such farmers. This will make a significant impact on the lives of these marginal farmers.

Shri. Pradeepbhai Gujarathi chairs a COTAAP coordinaton committee meeting.

Soil Fertility Analysis : A Research cum Extension Project

The soils in Maharashtra, especially the black cotton soil, is rich in nutrients but has other problems like high pH, hardness, poor drainage, etc. Farmers sow cotton repeatedly on the same piece of land, causing deficiency of certain nutrients resulting in decreasing yield levels. To overcome this problem, COTAAP has collected soil samples from fields and analysed them at subsidised rates. But it has been observed that most of the farmers couldn't understand the terminology in the test report and how to overcome the problems of soil if indicated. So from this year, COTAAP has adopted an entire village-. Ghadvel. COTAAP has launched an innovative project in this village to test soil samples from all the fields. The reports are handed over to the farmers so that they can individually

Inauguration of soil testing project at Ghadvel village.

Dr. Ravankar giving advice to farmers in Ghadvel

know the problems and get them solved under the guidance of COTAAP experts. This will also avoid unnecessary use of chemical fertilizers. A special training program was organised with our soil scientist Dr.H.N.Ravankar. Soil analysis reports were distributed during the training and all parameters were explained with examples. Group as well as individual advice was given by Dr. Ravankar.

Findings with discussion of this research cum extension project are stated below.

Fertility Index :

Fertility of soil refers to the ability of the soil to support plant growth i.e. to provide plant habitat and results in sustained and consistent yields of high quality. Ability of the soil to supply essential elements is the prime requirement for a fertile soil. Nitrogen (N), Phosphorus (P) and Potash (K) are the major nutrients contributing to the health of the crop plants. In the present study, analysis of N,P and K showed the following results:

Fertility Index of the sample soils:

	Nitrogen (N)	Phosphorus (P)	Potash (K)
Fertility Index found	1.41	0.99	3.00
Remark	Medium	Low	Very High

Soil samples being taken from a farm

In short, the sample soils were medium in 'N' content, low in 'P' content and very high in 'K' content. It indicates a deficiency of 'P' in most of the soils. 'P' is necessary for initial root growth, translocation of food and nutrients in plant body, storage of energy and transfer of genetic characters from generation to generation. When the soils are deficient in 'P', all plant activities related to 'P' are affected resulting in poor growth and decreased production.

Soil pH

Soil pH is the indication of acidity or alkalinity. Availability and absorption of all essential plant nutrients depends on appropriate soil pH.

Soil pH required for normal growth and yield of crops is 6.5 to 7.5, but only 3.81% soils were found to have pH value below 7.5.

71.43% soils had pH value between 7.5 to 8.3 and 24.76% soils showed pH value between 8.31 to 9. This means that 25% soils are not suitable for any crop cultivation unless and until reclamation practices are adopted. 71.43% soils can be used for crop cultivation with adoption of certain soil improvement practices and proper crop rotation. Only 3.81% soils are at present in good pH condition, provided all other parameters are in their normal range.

Recommendations by Scientist Dr. H. N. Ravankar & Consultant Dr. R. A. Patil

After observing the soil analysis reports, the following practices have been recommended to maintain soil health and increase production.

1. Organic matter helps to reduce harmful effects of high pH. Farmers should add organic matter like FYM, compost, green manure, molasses, etc. to the soil Vermi-compost is also a good option.

2. Recycling of farm waste is very important. Burning of organic waste should be stopped.

3. Application of Gypsum is very essential to balance the pH. (@ 2 to 2.5 tons per acre). It should be applied 15 days before sowing.

4. While gypsum (Calcium Sulfate) is applied, it reacts with the Sodium Chloride in the soil and forms Sodium Sulfate + Calcium Chloride.

5. Drains should be prepared to remove the dissolved sodium from the field.

6. Among the chemical fertilizers, Ammonium Sulfate is recommended for alkaline soils. It supplies 12 % Sulfur and 20 % Calcium also.

7. Di Ammonium Phosphate (D.A.P.) should be avoided and instead of which, Single Super Phosphate can be used.

8. Since most of soils are deficient in Zink (Z), it should be applied to the soil before sowing.

9. Fertilizers should be used in the quantity which is required to fulfill the deficient nutrient. Blind application should be avoided.

10. Fly Ash is beneficial to soil as it contains almost all necessary plant nutrients and also improves the texture of soil. It is available at no cost at the thermal power stations.

11. Crop rotation is the most important practice to maintain soil health. Deep rooted cotton (Deshi) improves the drainage capacity of soil, resulting in lowering of pH, while leguminous crops add nitrogen and organic matter which is deficient in soil.

12. As a good culture of bacteria is necessary to prepare quality curd, a sufficient count of beneficial micro organisms in soil is necessary to obtain a better yield.

13. Use of beneficial micro organisms like Azoto bacter, Rhizobium, Phosphate solubalising bacteria, Trichoderma, etc. improve the crop yield and maintain soil health. Ready cultures like E.M. Solution, Composting culture, Bio Dynamic Culture, etc. are also available.

14. A total 16 types of nutrients are essential for a plant body. Out of which, Carbon, Hydrogen and Oxygen are available from water and air. 95 % of dry weight of plant is constituted by these 3 nutrients, while 13 nutrients form the remaining 5 %.

15. If any nutrient is deficient or excess in the plant body, it affects absorption and activities of other nutrients also. So each and every nutrient is equally important, only the quantity required is different.

Monthly Average Cotlook A Index from 2011-12onwards

(in US Cents per lb.)

(In Mn. kg)

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
August	114.10	84.40	92.71	74.00	71.82	80.26
September	116.86	84.15	90.09	73.38	68.74	77.86
October	110.61	82.00	89.35	70.34	69.03	78.52
November	104.68	80.87	84.65	67.53	69.22	78.92
December	95.45	83.37	87.49	68.30	70.39	79.50
January	101.11	85.51	90.96	67.35	68.75	82.33
February	100.75	89.71	94.05	69.84	66.57	85.15
March	99.50	94.45	96.95	69.35	68.73	86.78
April	99.94	92.68	94.20	71.70	69.28	87.04
May	88.53	92.70	92.71	72.89	70.28	
June	82.18	93.08	90.90	72.35	74.10	
July	83.97	92.62	83.84	72.35	81.06	

Source: Cotton Outlook

Production & Stock of Spun Yarn (SSI & Non-SSI)

(In Mn. Kgs.)

MONTH / YEAR	PRODUCTION				STOCK			
	COTTON	BLENDED	100% N.C.	G. TOTAL	COTTON	BLENDED	100% N.C.	G. TOTAL
2007-08	2948.36	677.11	377.75	4003.22	104.81	43.57	20.59	168.97
2008-09	2896.15	654.89	360.95	3911.99	89.04	33.54	15.03	137.61
2009-10	3078.97	707.31	407.15	4193.43	85.56	25.68	11.41	122.65
2010-11	3489.77	796.47	426.38	4712.62	186.43	48.79	18.00	253.22
2011-12	3126.34	789.29	457.08	4372.72	110.87	42.20	20.44	173.51
2012-13	3582.68	828.19	456.75	4867.61	107.92	40.37	21.38	169.67
2013-14	3928.26	896.19	484.99	5309.45	133.80	51.33	23.40	208.53
2014-15	4054.51	920.20	512.92	5487.64	140.60	48.30	22.48	211.38
2015-16	4137.83	972.50	554.79	5664.93	140.68	49.46	22.99	213.13
2016-17 (P)	4058.95	1034.01	571.08	5664.04	151.56	57.81	26.11	235.47
2015-16 (P)								
April-15	349.38	77.11	44.07	472.51	141.19	51.45	21.33	213.98
May-15	348.14	80.02	44.74	472.90	153.07	52.34	23.79	229.21
June-15	346.72	79.68	45.27	471.66	158.57	55.72	23.93	238.22
July-15	356.36	82.15	47.48	485.98	160.33	61.25	26.62	248.20
Aug.-15	354.67	82.24	49.97	486.88	166.34	63.73	27.88	257.95
Sept.-15	338.53	79.51	45.41	463.45	165.96	62.33	26.16	254.46
Oct.-15	342.12	83.61	47.35	473.08	170.07	64.46	25.69	260.23
Nov.-15	320.06	77.67	43.27	441.01	173.96	61.59	24.17	259.72
Dec.-15	353.31	81.30	49.86	484.31	158.66	58.22	25.34	242.22
Jan.-16	343.98	83.34	46.84	474.26	158.52	57.55	25.10	241.18
Feb.-16	336.55	80.94	43.12	460.60	155.36	52.18	22.81	230.35
Mar.-16	348.01	83.87	46.35	477.03	140.68	49.46	22.99	213.13
2016-17 (P)								
April-16	334.30	80.55	46.49	461.35	127.63	48.99	24.26	200.88
May-16	360.75	85.95	53.50	500.20	132.43	54.79	26.25	213.47
June-16	352.00	89.10	50.87	491.97	130.99	50.84	21.46	203.30
July-16	343.34	88.21	48.26	479.81	135.93	56.50	23.91	216.34
Aug.-16	334.43	91.29	49.75	475.47	155.65	54.65	22.55	232.85
Sept.-16	326.58	88.40	51.75	466.73	153.30	59.84	24.04	237.19
Oct.-16	311.14	83.64	49.21	443.99	167.19	63.89	28.84	259.92
Nov.-16	326.91	84.78	45.31	457.00	166.50	70.87	32.91	270.28
Dec.-16	342.52	84.56	43.75	470.84	164.52	69.37	28.62	262.50
Jan.-17	345.72	86.91	44.75	477.38	146.61	62.16	26.95	235.72
Feb.-17	332.64	84.57	42.22	459.43	156.17	62.14	26.83	245.14
Mar.-17	348.60	86.05	45.22	479.87	151.56	57.81	26.11	235.47

P - Provisional

Source : Office of the Textile Commissioner

UPCOUNTRY SPOT RATES

(Rs./Qtl)

Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	Spot Rate (Upcountry) 2016-17 Crop MAY 2017 15th	16th	17th	18th	19th	20th
	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	10039 (35700)	10039 (35700)	9983 (35500)	9926 (35300)	9926 (35300)	10067 (35800)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0-7.0	15	10320 (36700)	10320 (36700)	10264 (36500)	10208 (36300)	10208 (36300)	10348 (36800)
3	GUJ	ICS-102	Fine	22mm	4.0-6.0	20	8099 (28800)	8099 (28800)	8099 (28800)	8099 (28800)	8099 (28800)	8099 (28800)
4	KAR	ICS-103	Fine	23mm	4.0-5.5	21	9336 (33200)	9336 (33200)	9336 (33200)	9336 (33200)	9336 (33200)	9336 (33200)
5	M/M	ICS-104	Fine	24mm	4.0-5.0	23	10517 (37400)	10517 (37400)	10517 (37400)	10517 (37400)	10517 (37400)	10517 (37400)
6	P/H/R	ICS-202	Fine	26mm	3.5-4.9	26	12429 (44200)	12345 (43900)	12288 (43700)	12204 (43400)	12204 (43400)	12232 (43500)
7	M/M/A	ICS-105	Fine	26mm	3.0-3.4	25	9336 (33200)	9280 (33000)	9251 (32900)	9251 (32900)	9251 (32900)	9251 (32900)
8	M/M/A	ICS-105	Fine	26mm	3.5-4.9	25	9842 (35000)	9786 (34800)	9701 (34500)	9701 (34500)	9701 (34500)	9758 (34700)
9	P/H/R	ICS-105	Fine	27mm	3.5.4.9	26	12598 (44800)	12513 (44500)	12457 (44300)	12373 (44000)	12373 (44000)	12401 (44100)
10	M/M/A	ICS-105	Fine	27mm	3.0-3.4	26	10011 (35600)	9954 (35400)	9842 (35000)	9842 (35000)	9701 (34500)	9758 (34700)
11	M/M/A	ICS-105	Fine	27mm	3.5-4.9	26	10545 (37500)	10489 (37300)	10432 (37100)	10404 (37000)	10404 (37000)	10461 (37200)
12	P/H/R	ICS-105	Fine	28mm	3.5-4.9	27	12654 (45000)	12570 (44700)	12513 (44500)	12429 (44200)	12429 (44200)	12457 (44300)
13	M/M/A	ICS-105	Fine	28mm	3.5-4.9	27	11529 (41000)	11501 (40900)	11501 (40900)	11417 (40600)	11417 (40600)	11445 (40700)
14	GUJ	ICS-105	Fine	28mm	3.5-4.9	27	11614 (41300)	11670 (41500)	11585 (41200)	11529 (41000)	11557 (41100)	11585 (41200)
15	M/M/A/K	ICS-105	Fine	29mm	3.5-4.9	28	11895 (42300)	11867 (42200)	11867 (42200)	11810 (42000)	11838 (42100)	11838 (42100)
16	GUJ	ICS-105	Fine	29mm	3.5-4.9	28	12007 (42700)	12007 (42700)	12007 (42700)	12007 (42700)	12035 (42800)	12035 (42800)
17	M/M/A/K	ICS-105	Fine	30mm	3.5-4.9	29	12176 (43300)	12176 (43300)	12176 (43300)	12176 (43300)	12176 (43300)	12176 (43300)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5-4.9	30	12485 (44400)	12457 (44300)	12457 (44300)	12457 (44300)	12457 (44300)	12457 (44300)
19	A/K/T/O	ICS-106	Fine	32mm	3.5-4.9	31	13020 (46300)	12991 (46200)	12991 (46200)	12991 (46200)	12991 (46200)	12991 (46200)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0-3.8	33	16028 (57000)	16028 (57000)	15747 (56000)	15691 (55800)	15550 (55300)	15466 (55000)

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