

## **EXTENSION STRATEGIES FOR COTTON OUTREACH PROGRAMME**

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Cotton is one of the major fibre crops of global significance, which is, cultivated in tropical and subtropical regions of more than 80 countries. There are approximately, 20 million cotton farmers world wide. World cotton area during 2006-07 is estimated at 324 lakh hectares, up by 2, 10,000 ha from the previous season. Production of cotton is also estimated at 25.3 m tones, 3 per cent higher than last season crop. During the year the Indian cotton scenario with 9.132 m ha area under cotton and 270 lakh bales production looks brighter than other countries in the world and the year was a record year with the exports touching a high of 52 lakh bales. Both the accelerated transfer of technology due to the sustained and joint research and developmental efforts by private sector agencies and the state/central institutions and the phenomenal spread of Bt cotton hybrids seem to be the main contributory factors for the break through achieved in cotton production (AICCIP, 2006-07). The introduction of Bt cotton as a milestone in the history of cotton improvement has thrown up open new challenges for cotton extension. In order to survive in this era of economic liberalization and gene revolution, attaining excellent extension strategies is inevitable. This paper makes an attempt to review the laurels and letdowns of past cotton extension programmes and suggest innovative strategies for sustainable cotton production in the country.

### **Cotton Extension Programmes in the Country**

It is more often seen that the results of cotton research do not reach the farmers in tie. Often, it is observed that the extension efforts are handicapped due to inadequate interaction with the research efforts and non-availability of latest technological information for ready transfer. It is essential that the developments that benefit the producer and consumer is translated into action, quick enough to meet the growing challenges of the future. It is also vital to understand the socio-economic implications of new technologies and understand the constraints limiting the transfer of technology. The Indian Council of Agricultural Research (ICAR) has always underlined the importance of Scientist- Farmer linkage for the effective transfer of latest agricultural technologies. Towards this goal, several programmes viz., Lab to Land Programme, Operational Research Project (ORP), Front Line Demonstrations (FLD), Integrated Pest Management (IPM), Integrated Resistance Management (IRM), Institute Village Linkage Programme (IVLP), Intensive Cotton Development Programme (ICDP), Farmers Field Schools (FFS) etc., have been launched and are being implemented with the active cooperation of the ICAR Institutes, State Agricultural Universities and Extension personnel of the State Department of Agriculture. These programmes ensured not only the quick dispersal of technologies by linking the Scientists, extension personnel and the farmers but also help scientists to get a feed back on the response of farmers to the latest technologies (FLD report, 1998). The three major cotton extension programmes which are currently prevailing in the cotton sector now are explained below.



### **Front Line Demonstrations on Cotton:**

The programme “Front Line Demonstration on cotton” has been performing better than all other cotton extension programmes prevailing in the country. It was started in 1996-97 for disseminating the recent cotton production technologies with the following objectives.

1. To demonstrate the usefulness of the latest improved crop production and protection technologies to the farmers as well as extension workers with a view to reduce the time gap between technology generation and its adoption.
2. To enable scientists obtain direct feed back from cotton farmers and suitably reorient their research programmes and develop appropriate technology packages.
3. To create effective linkage among scientists, Extension Personnel and Farmers.

Since 1996 the All India Coordinated Cotton Improvement Project (AICCIP) acts as nodal agency for conducting the cotton front line demonstration programme in the country. Funding for FLDs was from Intensive Cotton Development Programme (ICDP) that was later changed to Technology Mission on Cotton (TMC) under Mini Mission II. The Project Coordinator (Cotton) coordinates and monitors the implementation of the FLD programme with headquarters at the Central Institute for Cotton Research, Regional Station, Coimbatore. The FLDs are organized through eleven main centres and sixteen sub centres of the AICCIP network spread over ten cotton growing states besides CICR, Nagpur and its regional stations. The number of FLDs conducted so far is provided in table 1.

The FLDs are conducted for transfer of improved cotton production technologies, IPM and demonstration on farm implements. The main emphasis of the demonstrations includes enhancing the production of cotton in low productivity areas / problematic areas. For that, a list of beneficiaries and their plot numbers will be selected in consultation with local Agricultural Officers. A Bench mark survey will be conducted before taking up the trial which includes information on the crops and cropping system of the area, inter cropping, the average yields of cotton and the local practices adopted in terms of irrigation, use of fertilizer, plant protection and information on the cost of production for the area as a whole. An impact analysis after the harvest will be carried out in the light of reduction in insecticide use, reduction in cost of cultivation, awareness of modern technology etc.,

### **Impact of Front Line Demonstration in Cotton:**

The demonstration of high yielding varieties and hybrids suited for various agro-climatic conditions, Integrated Nutrient Management (INM) practices, IPM strategies, use of bio-fertilizers and bio-pesticides, efficient water management techniques like drip irrigation, use of compatible intercrops conducted in various FLDs through the cotton growing tracts of the country have helped the farmers to reduce pesticide input significantly and make cotton production more profitable. It has been recorded over years that there has been yield increase over the check to the



tune of 20 to 35 per cent in most of the technologies demonstrate the cost benefit ratio hovering around 1:1.99 to 1:3.30 respectively. A number of Kisan melas have also been conducted in several villages creating awareness among the farmers. The significant productivity increases shown in FLD plots shows that there is a good scope to increase national lint productivity by practicing recommendations of the research institutions who have done on-farm demonstrations.

### **Farmers Field Schools on Cotton:**

Farmers Field Schools on cotton is another effective cotton extension programme functioning in the country. FFS is a participatory approach to adult education adopted by the Indian Government since the 1990s, towards the achievement of an ecologically sound, profitable and socially sustainable small scale farming. FFSs were conceptualized between the 1970s and 1980s and first implemented in Indonesia in 1989 to deal with the widespread pest outbreaks in rice that threatened the security of Indonesia's basic food supplies.

FFS is a network of progressive farmers of 8-10 sodic villages located in a radius of 5 kms, willing to offer extension services amongst the fellow farmers. The group is guided by the bye-laws framed by the Management committees. To increase the representation of poor, marginalized and women farmers, 2/3<sup>rd</sup> positions are reserved for poor, marginal farmers in FFS management committee, out of which 1/3<sup>rd</sup> is reserved for women farmers so that their voices are heard and their interests are addressed. Membership fees are charged for availing the services of FFS. The focus of FFSs was, and still is, on learning through discovery, experimentation and group or community actions. FFSs thus have social goals beyond mere changes in pest management techniques that seek to promote the empowerment of farmers by building human and social capital. Farmers are no longer positioned as receivers of already developed technological packages, but as field experts, who collaborate with the extension staff to find solutions relevant to the local realities. FFS programmes emphasize farmers' ownership, partnership and group collaboration. The structural and operational mechanism of FFS is given in figure 1.

During the past two decades, FFSs have been held for a large number of crops including cotton, tea, coffee, cacao, pepper, vegetables, small grains and legumes. The FFS model has been extended to several other topics such as livestock production, forestry, nutrition and health (HIV prevention). In total, thirty developing countries in the world are currently experimenting with and implementing the FFS approach.

### **Impact of FFS on cotton farming:**

Studies showed that the adoption of IPM by FFS has very significantly reduced the current overuse of pesticides and is expected to mitigate the serious consequences that the heavy use of pesticides has caused on people's health, biodiversity and water quality in India. The strong correlation between knowledge level and reduction in pesticide use proved that a skill-oriented, knowledge intensive and hands-on education approach, as used during FFSs, is an efficient system to deliver the complex IPM principles to farmers. The FFS approach focuses on the



importance to judge the necessity for plant protection interventions on the basis of actual field needs, which is essential to achieve a more sustainable agriculture. Substituting pesticides with bio-control agents or other technologies such as biotech cotton is unlikely to become a definitive solution to sustain agricultural productivity, if these new technologies are not paired with educational programmes.

### **Contract Farming:**

Nowadays cotton production system has been experiencing major changes which are mainly driven by recent developments in farmers' preferences and attitudes, cotton technological improvements, bio-safety and related regulations. The advanced cotton sector is considered a chain of interrelated activities from input suppliers to consumers, while the traditional agribusiness has been considered only as activities beyond the farm-gate. Recently, however, considerable close cooperation-coordination has been observed between agricultural production and agribusiness. One of the widely used vertical ways of coordination is contract farming. To reduce the load on central and state level procurement system, to increase the private sector investment in cotton production and to promote processing and value addition the contract farming approach was introduced in cotton sector. In this approach, the farmer is contracted to plant the contractor's cotton variety /hybrid on his land. He has to harvest and deliver to the contractor, a quantum of kapas, based upon anticipated yield and contracted average at a pre-agreed price. Towards these ends the contractor supplies the farmers selected inputs at cost. The Super Spinning mills, Tamil Nadu, the Appachi Cotton Mills, Tamil Nadu, CITI-Cotton Development Research Association (CITI-CDRA) and Royal Classic Mills, Tamil Nadu are some of the leading contract agencies in cotton contract farming.

### **Impact of Contract farming:**

Cotton researchers are of the firm opinion that contract farming is the answer to the problems faced by the cotton mill sector and the farming community. The contract farming system could effectively establish a link between the consuming industry and the supplier of the produce, the researchers contended. Through contract farming, the integrated cotton crop management practices could be propagated much faster, and it is the only answer to increase and sustain productivity and quality of cotton. Spread of spurious seeds and other agro inputs can be checked as these are inputs supplied by the mill which is interested in the success of the crop.

### **Changing Perspectives and emerging issues in Cotton:**

The country's agricultural sector is facing serious challenges posed by the degradation of natural resources viz., deforestation, salinity, soil erosion, water contamination and depletion. The agricultural extension services of the country have been ineffective at reversing these negative trends, but are now in the process of reorienting their development strategies towards supporting farmers' empowerment. Similarly the cotton sector is also facing changing atmosphere to cope up and challenges to meet out. Among the various changes in cotton sector, the three major are discussed below in this article.



### **Changing scenario:**

Combined efforts of millions of cotton farmers, talented scientists and technology providers, dynamic seed production industry in the private sector and field extension agencies and favourable weather conditions made the national cotton production to touch a new record of 270 lakh bales in 2006-07 as compared to 26 lakh bales produced in 1947-48 at the time of independence. Official projections have been made to achieve 275 lakh bales by the end of the 11<sup>th</sup> five year plan in 2011-2012.

### **Changing Need:**

Normally Extra Long Staple (ELS) cotton varieties are used for producing fine and super fined counts of yarn. This category of yarn is the mainstay of the handloom industry for weaving the traditional Indian apparel of muslin, sarees, dhotis etc., They are also used for knitting high-end varieties of garments, worn close to the skin and kids-wear. There is a steady growth for the products manufactured out of fine and superfine varieties both in the local and export markets. ELS have therefore assumed considerable need and economic significance in the cotton production scenario. The current level of production of ELS cotton is 5.0 lakh bales in 2006-07 against the requirement of 9.0 lakh bales. In 2011-2012 we need 15-20 lakh bales of ELS cotton. The textile mills are therefore, compelled at present to import ELS cotton from countries viz., USA, Egypt, Sudan and CIS countries to meet their need. It costs around Rs.1300 crores to import five lakh bales of ELS cotton at present.

### **Changing Technology:**

Bt cotton is an attractive alternative and novel technology for controlling the bollworms in cotton. The area under this Bt cotton increased phenomenally from a few thousand acres in 2002 to more than 3.25 million acres in 2005 and it is estimated to be more than 8.6 million acres in 2006. This tremendous adoption rate of the technology could be due to the relative advantage of the technology and marketing efforts of seed companies. However, based on recent trends, it is expected that there will be resistance against Bt cotton and other biotech crops by farming community and other stakeholders in near future. This resistance is due to the belief on negative implications of the technology despite it has been proved of its safety through bio-safety experiments beyond doubt. In the scenario of increasing total population and decreasing farming population, the challenge of meeting out the future food and fibre demand is only feasible through use of biotech crops. Realizing the importance, the Government of India, in its agricultural Research and Development thrusts in the XI Five Year Plan, stressed the development of transgenic crops to increase total food production. The emerging importance of and resistance against biotech crops forced the present extension system to come out with feasible strategies to educate the farming community.

### **Extension Strategies to foster cotton production in the country:**

In order to survive in the current changing scenario of cotton sector, attaining excellent relevant and effective extension strategies is inevitable for sustainable cotton production in the country. On the basis of the analysis of issues, problems,



opportunities of threats, a relevant and feasible model (Figure 2) has been worked out for carrying out the extension activities.

The future cotton extension programmes must have the different innovations in extension viz., cyber extension, market led extension, environmental extension and farmer led extension. Along with improving the productivity and income of the existing cotton growers, it must organize the clients, strengthen the linkage between various stakeholders in cotton and provide genuine information for forthcoming policies and programmes.

**Cyber Extension:** Access to knowledge is the major factor most commonly cited by farmers as their major limitations in cotton farming. The widespread availability and convergence of Information and Communication Technologies (ICTs) in India in recent years have led to unprecedented capacity for dissemination of knowledge and information to the rural population. The village centres initiated by the MS Swaminathan Research Foundation (MSSRF) in Pondicherry aims at building a model for the ICTs in meeting the knowledge and information requirement of rural families. Utilizing the ICTs for dissemination of knowledge is inevitable for the future cotton extension programmes.

**Market Led Extension:** The present cotton extension must address the cotton market information along with the production technologies since price is another major constraint in cotton production as cited by many of the farmers. The AGMARKNET has already emerged as sun shine website for farmers to bargain better prices for their produce, and marching ahead towards becoming an e-Commerce and e-Business portal in India. AGMARKNET programme plays a catalytic role for ushering market led agricultural extension in India, highly scalable, planned through bottom-up process, and implemented through active involvement and collaboration of agricultural market committees in India. Evolving this type of development in cotton extension programmes will facilitate sustainable cotton production.

**Environmental Extension:** Consequent indiscriminate use of inputs like fertilizers, plant protection chemicals, growth promoters, herbicides and the recently introduced transgenics in cotton production system have started causing alarms to natural resources viz., soil, water and environment. The overuse of these external inputs threatens the sustainability of natural resources on the one hand and leading to build up pest resistances on the other. Mishandling of some of the farm research outcomes have come in for sharp scrutiny under the environmental concerns. Growing concern for environment is calling for eco-friendly cotton production technologies. Under these circumstances, cotton extension has to reorient itself to address these emerging concerns of natural resource degradation and environmental safety.

**Farmer Led Extension:** The changing scenario in cotton sector forces us to have a clear and more locally controlled and managed extension approach. The approach should promote farmers and other rural people as the principal agents of change in their communities. Such an approach is farmer led extension approach. In this approach, farmers are not only key agents to access services provided by professional



extensionists and researchers, but also make many of the management decisions and do much of the extension works.

**Increasing the productivity:** Even though India crowns the credits of owning first in cotton acreage and second in cotton production at world level, its productivity level is very low. Disseminating novel cotton production technologies evolved by cotton researchers through innovative extension approaches should be the top most agenda of our future cotton extension programmes.

**Organizing the clients:** With globalization there is a major change in the trade in cotton. Selling to multinational companies needs larger quantities of kapas of a standardized quality. This can be done by contract farming and by farmers' organizations. With the increasing power of multinational companies in the markets, it becomes more important that farmers do not deal with them as individuals, but through their own organizations. Cotton extension has to play a catalytic role in mobilization and organization of various cotton farmers' groups depending upon the local need and nature of enterprise.

**Strengthening the linkage:** Building effective linkage among the cotton research (technology development) system, extension (technology transfer) system and client (Technology user) system is a strategic issue in management of cotton sector. Worldwide a great deal of attention is being given to explore the intricacies involved in forging strong functional linkages among the various stakeholders of cotton. The recently experimented approaches in cotton extension viz., IVLP, Strategic Research and Extension Plan (SREP) in Agricultural Technology Management Agency (ATMA) are fairly successful in addressing the issue of R-E-F linkage. However, given the diversity of conditions and contexts prevailing in our cotton sector, linkage issue needs to be looked more as a major issue in cotton extension programmes.

#### **Providing information for policies and programmes:**

In the context of rapidly changing global cotton scenario, cotton extension must emerge as a major policy instrument to address the growing challenges in cotton sector. In addition it should explore and provide information on the researchable problems to the cotton research system and adoptable research solutions to various cotton stakeholders.

#### **Epilogue:**

Worldwide, it is now widely recognized that agricultural extension needs to reform in ways that allow it to fulfill a diverse set of objectives. The emerging paradigm of extension-plus ranges from better linking of farmers to input and output markets, to reducing the vulnerability and enhancing voice of the rural poor, development of micro-enterprises, poverty reduction and environmental conservation and strengthening the farmers' organizations. Cotton extension is no way an exception for this and is being forced to embrace a broadened mandate as cotton farmers find themselves in an even more complex production and market environment, with an expanding need for information and services. Hence, including



the modern extension innovations viz., cyber, market led, environmental and farmer-led extension approaches in our future cotton extension programmes is inevitable.

**Table 1 – Number of cotton front line demonstrations conducted from 1996-97 to 2006-07 with budget provisions**

Year	Number of demonstrations				Total amount sanctioned (Rs In lakhs)
	North	Central	South	Total	
1996-97	200	170	181	551	15.0
1997-98	275	240	245	760	20.0
1998-99	270	235	255	760	20.0
1999-00	290	265	510	1065	30.5
2000-01	475	725	550	1750	87.5
2001-02	185	375	240	800	39.0
2002-03	115	215	150	480	25.0
2003-04	100	160	90	350	20.0
2004-05	217	495	143	855+55*	100.0
2005-06	277	588	285	1150+16*+20**	60.00
2006-07	250	750	350	1350+21*+23**	72.00

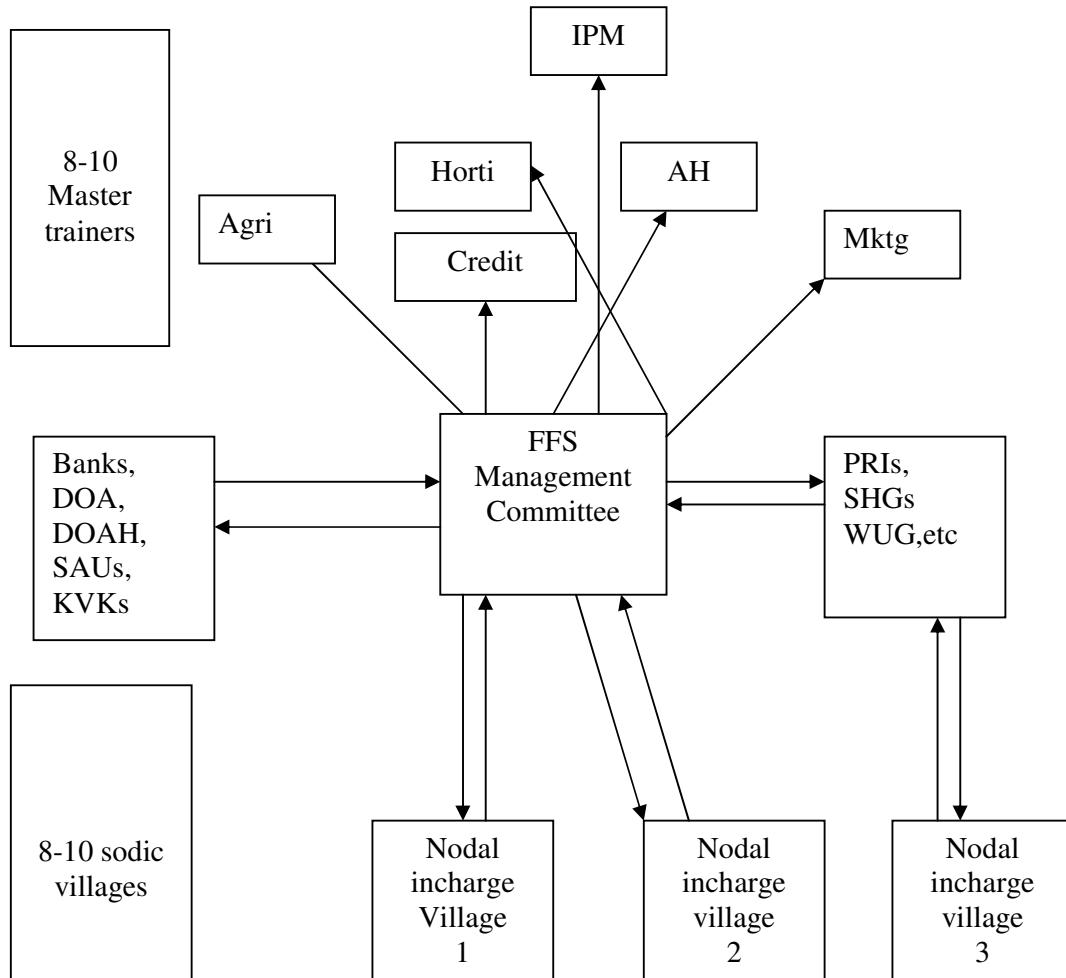
\* - Number of unit demonstrations on farm implements

\*\* - Number of unit demonstrations on Integrated Pest Management





**Figure – 1: Structural and Operational mechanism of FFS**



**Figure - 2 Model for future cotton extension programmes**

