

Project: HORIZONTAL DEVELOPMENT OF COTTON IN KP AND BALOCHISTAN THROUGH CAPACITY BUILDING UNDER PM EMERGENCY PROGRAM

Objectives

1. To Strengthen the Farm Service Centers in KP and AED in Balochistan in provision of Cotton Production Technology for community based utilization
2. To create linkage between input suppliers and local businessmen for persistent supply of pesticides, seed, and fertilizers used for cotton
3. Provision of research based support for seed of high yielding cotton varieties suitable for local environment
4. Monitoring and capacity building of farmers and field staff of Agri. Department in Pest Management and nutritional deficiencies
5. Monitoring and determination of insecticide resistance in PBW and WF in different areas
6. To demonstrate the performance of Boll Picking Machine for the management of PBW
7. Establishing Model Cotton Ginning factory in KP and Balochistan to bridge the marketing issues.
8. To establish cotton clinics and provision of technical backstopping in new areas of cotton
9. Strengthen Cotton Research system in Balochistan through institution capacity building of CRS Lesbela

Description:

Presently, only 1% of total cotton is produced in KP and Balochistan provinces. The area in major cotton producing province Punjab is declining significantly and available area which can be brought under cotton is in KP and Balochistan. Although, in KP, cotton area has declined from 35000 acres to 10,000 acres because of overwhelming sugar industry installation in the area. However new irrigation project of Gomal Zam has created over 220,000 acres of irrigated land and out of that 50% can be potentially brought under cotton by arranging capacity building programs, provision of inputs and resolving marketing issues. In Balochistan, cotton is cultivated on an area of 93,000 acres and is not further expanding because of non-existence of ginning factories and marketing issues. Though the region is a proven potential of organic cotton production.

Cotton being highly technical crop, due to large number of attacking pests and diseases, requires an aggressive capacity building campaign and well supportive R&D facility for complaint handling and technical backstopping.

Recent issues of Whitefly and Pink Bollworm would require vigilance and special training on management of these pests. The sweet potato whitefly, *Bemisia tabaci* (Gennadius) (Homoptera: Aleyrodidae), is among insect pest species of greatest economic significance in cotton production in Pakistan. Whitefly is usually a serious pest during the vegetative growth stage. Whitefly adults and nymphs suck plant sap and transmit various plant pathogens including the begomo viruses such as the cotton leaf curl virus. Cotton leaf curl disease is endemic throughout Pakistan and in western India and is attributed to *B. tabaci* infestations. In addition, feeding damage reduces plant vigour and lint yield, and honeydew deposition can lead to significant reductions in lint quality owing to stickiness and discoloration from the growth of sooty molds.

Pink bollworm, *Pectinophora gossypiella* (PBW) re-emerged as a serious threat to cotton after about a period of 15 years. Losses due to PBW infestations smeared out an estimated US\$1.2 billion (Rs. 187 billion) in annual cotton production (in monetary terms) in 2015/16. If the PBW is not managed properly and in a timely manner, it will entail a catastrophic crisis for 1.3 million cotton farmers in the country.

In Pakistan farmers rely exclusively on chemicals to control insect pests. More than 80% of the pesticides valuing US \$300 million are used to manage cotton pests in Pakistan. Due to sole and non-judicious use of insecticides, whitefly has developed resistance to conventional insecticides (e.g. organophosphate, carbamate and pyrethroids) as well as to neonicotinoid and insect growth regulator (IGRs). Resistance in PBW has not been investigated in Pakistan until now, but if confirmed it would pose further threats to the sustainability of current pest management practices. This situation is threatening to cotton industry and also the national economy. So there is a need to develop a strategic plan for its timely and effective management. Of the management approaches, as practiced in eastern Australia and some Middle-Eastern countries, are to develop and implement strategies for deploying insecticides more rationally in combination with other control tactics. Such strategies, however, require substantial laboratory and field research to formulate, and considerable cooperation by researchers, policy-makers, industrialists and advisors to implement successfully.

Justification:

Cotton is considered as lifeline of the economy of Pakistan but its production is hovering around 13 million bales for the last 2 decades with a declining trend in area under cotton, primarily because cotton area in Punjab is competing with sugarcane, maize and rice. New potential area for horizontal expansion of cotton in KP and Baluchistan has not been fully explored. With the commencement of new irrigation projects, these provinces have good potential to get more than 0.9 million additional acres under cotton. Additionally, provincial governments may also be approached to discourage un-necessary expansion of sugar industry in their province to efficiently utilize the precious resource—water.

Popularization of Cotton in KP Province

After the commencement of Chashma Right Bank Canal (CRBC), over 350,000 acres of land was brought under irrigation. The master plan had allocated only 3-5% land for rice and sugarcane, but in reality over 80% of CRBC command area is under these two crops. It was believed that cotton will be popularized in DI Khan area but for some reasons, the area under cotton decreased drastically over the period. However the sugar industry grown from one sugar mill in early 90s to four in 2017 and two more are under construction.

Gomal Zam irrigation project is another hope for cotton area growth in KP as the water allowance per acre is about 7 times less than CRBC area, hence cultivation of low delta crops like Cotton has to be naturally favored. If efforts and resources are properly mobilized, out of more than 200,000 acres under Gomal Zam project, 50% of area may go under cotton in next few years. PCCC has one research station at DI Khan and that research facility has developed two cotton varieties for DI Khan. But because of non-existence of ginning factories, growers face acute difficulty in marketing their produce and gets lower prices because traders have to sell that cotton either in ginning factories at Mianwali or Tounsa Shareef. Provincial Government is very keen to have their marketing issue resolved and has identified a piece of land for establishing a model ginning factory at DI Khan.

Cotton Popularization in Balochistan:

The main cotton growing districts in Baluchistan are Lasbela, Sibbi, Khuzdar, Kharan, Noshki, Naseerabad etc. The cotton produced in districts like Lasbela, Khuzdar and Kharan is of superior quality because of dry and mild weather and substantial sunshine. The virgin land has lower pest pressure and best suited for value added cotton especially Organic cotton or Better Cotton. Out of afore mentioned six cotton producing districts, only Lasbela has one ginning factory; cotton produced in rest of the districts is being procured by traders and transported to Sindh and Punjab. Because of bright sunshine, less pollution and breezy weather, the cotton produced in Balochistan is of good quality and traded at higher prices in markets of Punjab and Sindh, but unfortunately the benefit of the higher prices is not transferred to growers because of nonexistence of ginning factories in cotton growing area. The middlemen act as financier and supply seed and other inputs to grower and in return buy cotton on Rs. 300-500 discounted price.

Major Activities

Survey of cotton growing areas of Khyber Pakhtunkhwa and Balochistan: To determine the role of different host plants contribution in the population buildup and carryover of whitefly to cotton, surveys will be conducted throughout the year in cotton growing areas of Khyber Pakhtunkhwa and Balochistan following the standard procedure. Data on whitefly population/leaf and its natural enemies will be recorded twice a month, from different host plants. PBW data will be recorded during cotton season through dissection of green bolls and from traps during off season. To see pink bollworm infestation 20 green bolls (14-28 days old) per acre will be collected from different districts of Khyber Pakhtunkhwa and Balochistan. After 3-4 days of storage in laboratories, bolls will be dissected to examine the infestation.

Insecticidal resistance monitoring: Whitefly will be collected from field and attempts will be made to rear it in laboratory for making susceptible population. To monitor whitefly resistance against different insecticides, bioassays will be conducted on field collected (different areas of KP and Balochistan) and laboratory reared populations using leaf dip method.

Susceptible strain of pink bollworm will be generated from the isolines of the low resistant field populations through pair crossing. Susceptible insects will be further reared on artificial diet to get their susceptible generations. Pink bollworm collected from cotton fields in different areas of KP and Balochistan will be bio-assayed and the most resistant strain will be kept as a resistant line for further selection; and insecticides being commonly used against Pink bollworm will be applied to generate highly resistant strain for further biochemical, genetic, binding and fitness cost studies.

Performance of Mechanical boll picker for the management of PBW: Performance of mechanical boll picker for managing pink bollworm in leftover bolls in different districts of Khyber Pakhtunkhwa and Balochistan will be evaluated and demonstrated. For this purpose, prototype machine will be provided to research facilities and Farmers Service Centers for demonstration at farmer's fields. The machine is run after cotton harvesting and this picks the left over bolls which are usually infested by PBW. This way carryover population propagated through cotton sticks stored as fire wood will be checked.

Increased Cotton Production by capacity building, provision of input and management of insect pests: Cotton is highly technical crop to produce and its production technology needs to be demonstrated to growers and hands on practices are needed for the pest identification and management. In addition to that the field staff of agriculture department and social workers of NGOs also needs to be trained for cotton production for technical backstopping. Since cotton is new crop in the area, the farmer have no cotton specific farm machinery. The project aims to provide cotton specific machinery to already established "Farmers Service Centers", Research Facilities, and Social work Organizations working on Agriculture or Agriculture Department for subsidized rental usage. Cotton seed is an important input and successful cotton crop is mainly based on selection of right variety and seed quality. The project aims to provide appropriate cotton varieties to growers at subsidized rates and assure available of cotton related pesticides in the area through PCPA and Crop Life (Associations of Agrochemicals).

Provision of Cotton Specific Machinery to Farmer Service Centers or Departments for community to utilize. Five sets of farm machinery for KP and 10 sets for Balochistan will be provided. The sets will include ridge maker, cultivator, tractor mounted sprayer, laser leveler, and rotavator. The machinery will be utilized on rental basis by mobilizing community and will be operated by the community.

Establishing Model Ginning Factories: Marketing of cotton produced in the new area is the major reason for not popularizing in these areas. Cotton in KP used to grow on over 35000 ha but due to non-availability of marketing network and ginning factory, the area drastically declined to less than 10,000 ha. Middlemen or traders of cross boundary ginning factories usually exploit the cotton grower and thus area under this crop declined significantly. Absent of local ginning factory has been identified as core reason of lower return to cotton growers and declining of area under cotton. Private sector is reluctant to invest in ginning factory as the area under cotton is not sufficient to supply enough seed cotton to keep operational a ginning factory, however the area has lots of potential.

Considering all above it is proposed that a ginning factory may be installed in public-private partnership, based on one of the successful model of Faisalabad Garment City or Chilli Processing Plant. The project aims to establish one ginning factory at DI Khan (KP) and 2 at Baluchistan. The factory once established will be auctioned for operation through a committee represented by Provincial Government and Community, growers and Ginners Association. The Govt. will not to bear any operational cost, in fact this will lure new factories in private sector. This model of setting up an infrastructure through Public Funds and rented out to private sector is successfully working in Faisalabad Garment City and Chilly Processing Plant.

Establish Cotton Clinics and provision of technical Back stopping: The cotton growers by addressing their field issues, identification of pest and diseases or nutrition deficiency issues on spot and in order to train them in these areas, the Agriculture Department will establish cotton clinics in prominent places of the cotton area (once in a week). The problem which could not be solved on spot will be brought to laboratory at the Research Station and research based solution will be provided during follow up visit. This activity will provide a technical backstopping of the emerging issues.

Capacity building of the field staff of the Progressive Growers, Agriculture Department, and Social Workers of the NGOs. A successful cotton cultivation depends upon proper crop management, identification of insect pests and diseases, timely management of pests, assessing water and nutrition requirement of the crop. Cotton is more complex crop than other field crops and it requires continuous capacity building of farmers and training of master trainers of Agriculture Department and social mobilizers of the Non-Governmental Organizations and individual social workers in the area. These capacity building programs will be backed by TeleCotton messages and other extension activities to keep the knowledge refreshed.

Area of activities:**Districts of Balochistan:** Lasbela, Khuzdar, Kharan, Noshki, Sibbi, Khichi, Bolan**Districts of KP:** Gomal Zam of Dera Ismail Khan**Set of Farm Implements:**

1. Rotavator
2. Ridger-cum-Bedshaper
3. Boom Sprayer
4. Lazer Leveler
5. High Tine Ridger

Seven sets of farm implements will be distributed to each Farm Service Centers and Cotton Research Station, DI Khan; Whereas, 28 sets of farm implements will be distributed through Agriculture Extension Department and Cotton Research Station at Lasbela and Sibbi. These implements will be provided to cotton growers on rental basis through a local committee to fix rental charges and streamline other operations.

Cotton seed will be provided on 50% charges recoverable at the time of harvesting through a written agreement, whereas other inputs like pesticides will be facilitated to be available on full price. Cotton Ginning Factories will be established through an experienced consultant. The land will be provided by the provincial Government. Provincial Government of KP has already identified two spots for establishment of Ginning Factory and consented that it will be transferred to Federal Government if both parties agrees to establish it. The factory once established will be auctioned on lease on year to year bases through a committee headed by Secretary Agriculture (KP) and represented by Federal Government (NFSR), Grower member, Association (PCGA), PCCC etc. and set terms of reference for leasing out. The income will be used to create a fund for further expansion and maintenance and with a minimum staff of 2-3 officials to maintain the record.

Cotton area and Production in Balochistan

Districts	Area in Acres		Production in Bales	
	2018	2019	2018	2019
Noushki	5,955	6156	5992	6193
Sibi	16,808	15973	17122	16271
Kachi	4,127	4324	4200	4401
Khuzdar	8,340	8377	8505	8543
Kharan	6,311	6351	6707	6749
Lasbela	38,228	38327	41851	41959
BALUCHISTAN	90,936	93800	95806	98726