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Factors affecting sustainable cotton initiative effectiveness among rural masses: inductive study to explore supporting factors

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Abstract

Cotton is the major cash crop of Pakistan as country is fourth producer as well 3rd ranked consumer of the world. Farmers' livelihoods are heavily dependent upon cotton production. However, in the wake of increased production and profit excessive application of pesticides and active ingredients has endangered the human life and environment. In this regard, Sustainable Cotton Initiative was started by WWF to guide farmers to use précised practices for environment protection. Despite of extensive potential of project outcome still found sluggish. Present study highlighted the major factors Poor socio-economic conditions of farmers, lack of financial resources, inadequate trainings, sluggish interest, less production, small land holdings, and less profit affecting effectiveness of SCI. despite of experience in farming still production level was found lower which is pertinent to several other factors like inadequate education, small landholding and sluggish understanding of supportive factors. it is recommended that effective interventions to create income opportunities, controlling cost of production, facilitation by WWF staff, establishment of stable market followed by training opportunities for the resource poor farmers will not only enhance farmers interest but also will improve the profits.

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Introduction

Pakistan occupies fourth position in production of raw cotton and ranks third in world consumption. In 1947, production of cotton was only 1.23 million bales, whereas production of 14.6 million bales was achieved in 2004-05, followed by the second largest crop of 13,026 million bales in 2012-13 (Govt. of Pakistan, 2013). The national average yield of raw cotton in the country is, however, low to meet the level attained in other major cotton producing countries. The average yield of cotton in the country was 769 kg/ha during the year 2012-13 as against Australia (1982 kg/ha), Turkey (1289 kg/ha), Brazil (1124 kg/h), China (1119 kg/h) and Greece (1040 kg/h). There also exists a huge difference between the yield obtained by progressive and ordinary farmers, which is supposed to be one of the main reasons of low overall yield of cotton in the country (Government of Pakistan, 2011).

The bulk of cotton growers in Pakistan comprises of smallholders whose life is adversely affected by numerous social and economic problems which threaten their livelihoods security. The situation becomes more severe when these problems are combined with lack of access to credit facilities, lack of information and lack of extension services (WWF-Pakistan, 2007). Cotton is one of the most input intensive agricultural products that require relatively more inputs especially water and chemicals that adversely affect human and animals and cause health hazards. These chemicals are a big threat for land, water and worldwide biodiversity.

The application of 75% of total imported pesticides on cotton crop creates major disturbances in ecosystem and is a serious risk for the health of rural people (PAPA, 2009). As a result of this excessive use of agro-chemicals, the amount of greenhouse gases in the atmosphere is increasing day by day. Increased exploitation of fresh water results in reduction of freshwater reservoirs and it also adversely affect the freshwater biodiversity and the services that rivers provide (Makhdom *et al.*, 2012).

IKEA and WWF-Pakistan identified cotton production as major threat to the environment and social welfare due to indiscriminate use of fresh water and agro-chemicals (pesticides and fertilizers) which have adverse impact on human health and livelihood (WWF, 2011). As part of its Global Conservation Programme, WWF aims to help make cotton cultivation part of a sustainable industry so as to make its production environment friendly and to reduce its impacts on priority ecosystems. BMPs are practices which optimize the three pillars of sustainability: social responsibility, environmental integrity and economic viability by marrying together the financial requirements of agriculture, such as high yield, with environmental and social concerns, such as water and pesticide use.

The main objective of the learner groups (LGs) approach is to create a deeper understanding of the important interactions of agro-ecosystems as well as on sustainable farming and ultimately that leads to reduction of chemical pesticide use (Berg, *et al.*, 2004). Present study is an attempt to document the factors hindering the effectiveness of sustainable cotton initiative in Pakistan. Study was based upon following objectives:

- To explore socio-economic condition of respondents
- To investigate the factors affecting sustainable cotton initiative penetration and effectiveness among rural masses
- To highlight the supportive factors for future development

Materials and methods

Study Area

All the learner groups (LGs) formed by WWF-Pakistan for PSCI in the Punjab served as universe of the study. WWF-Pakistan had launched Pakistan sustainable cotton initiative in five cotton growing districts of Punjab, namely Bahawalpur, Rahim Yar Khan, Toba Tek Singh, Lodharan, and Kahnewal.

Population

For present study two purposively selected Districts namely Toba Tek Singh and Bahwalpur were selected

because they have maximum concentration of LGs and registered farmers under Sustainable Cotton Initiative. Population of the present research consists of all LGs who are participating in the Sustainable Cotton Initiative in the selected districts.

Sample Selection

From each of the selected district, one tehsil was selected randomly. From each selected tehsil 10 Learning Groups (LGs) were selected randomly. One LG usually contains about 30 farmers, from each LG 20 farmers were selected randomly; thereby making a sample size of 400 respondents.

Data Collection

The research evolved combine quantitative and qualitative methods (triangulation) of data collection as advocated by livelihoods researchers (Ellis, 2000, DFID, 2001). Quantitative Data were collected through structured questionnaire. Questionnaire was administered face to face with farmers. The instrument was pretested initially on 20 cotton growers other than sample. Final changes were incorporated after pretesting. Validity was checked through face validity with the help of experts from University of Agriculture Faisalabad, Pakistan. Qualitative data were collected to elucidate the quantitative data and to obtain the holistic understanding of the problem. Key informants and focus group interviews were undertaken to gather direct quotations from key informants about their experiences, opinions, feelings and knowledge. The key informants in the study include trainers at LG, project staff, progressive farmers etc.

Data Analysis

Quantitative data were analyzed by using statistical package for social sciences (SPSS) and qualitative data were analyzed through content analysis technique.

Results and discussion

The data illustrated in Table 1 disclosed that vast majority of farmers (76%) was able to read and write. These people can be stated as literate. But still a decent number (24%) of respondents were illiterate who can get more farming problems in the field rather than literate farmers.

Literate can get more benefit than illiterate as they can use print media for information acquisitions and foster adaptations of innovations. Okunade (2007) and Jensen *et al.* (2009) described positive or negative connection of age with information acquisition from media.

Data depicted further described that majority of the farmers were owner of their land where they were practicing major as well as minor crops to support their livelihoods. Further, about 15% of the farmers were owner-cum-tenant followed by the 5% tenants. These tenants were cultivating different crops by borrowing lands from fellow farmers. Actually, these farmers were landless. Respondents were directly associated with farming and considering the significance of land farmers were asked to depict their farm size that they possess.

Findings revealed the supremacy of small farmer as greater than half of the respondents were small farmers owning land less than 12.5 acres. Such scenario is also clear picture of small farmers' dominancy around the corner of globe. About one further (25.3%) respondents had land of greater than 16 acres, the maximum land in the area. Marginally lower than one fourth respondents (22.5%) were holding land size of 11-16 acres. One fifth respondents (19.5%) were found with less than 5 acres of land. Generally these are the farmers who need desperate care and efforts from the system. During informal discussion farmers exposed their stunted income from farming. In this context farmers were inquired about their major income sources.

Respondents revealed their major income sources and findings are highlighted in Table 1. It appeared from the results, farmers were relying on farming for income generation directly or indirectly. For instance, crop farming and livestock farming, both were found in practice. Overwhelming majority of respondents (88.3%) argued farming + livestock as major income source all together. Slightly greater than one tenth respondents were relying on farming only for income generation. During informal discussion farmers revealed livestock one of the prime income sources.

Table 1. Demographic characteristics of farmers.

Demographic attributes	%
Age	
>30	21
31-40	38
41-50	34
51+	7
Education	
Illiterate	24
Literate	76
Land Ownership	
Owner	80
Tenant	5
Owner-cum-tenant	15
Farm Size	
>5	19.5
6-10	33
11-15	22.3
16+	25.3
Income Source	
Farming	11.5
Farming+Livestock	88.3
Other	0.3
Cotton Farming Experience	
>10	25
11-20	43.8
21+	31.3
Type of House	
Kacha (Mud)	2.5
Pucca (Bricked/cement)	56.3
Kacha -Pucca	41.3
Receive any training before joining the SCI.	
Yes	35.8
No	64.3

Therefore, extended number of respondents was found engaged in livestock farming parallel to crop farming. In rural areas substantial population stick up with farming and rarely rely upon other sources like private business and public or private sector job. For instance, illiteracy, availability of lands and capital famine may be reasons of higher adoption of farming for income. Findings also revealed negligible contribution (0.3%) of other sources in income generation to support livelihoods.

Findings further infer that almost half (43.8%) of the growers were having experience of 11-20 years followed by 31.3% growers possessing experience of 21 years plus. General assumption implies these growers of medium aged. Representation of young growers could be stated sluggish as only 25% growers were possessing experience of less than 10 years. Farmers were asked to explore the type of house where they are staying with families. Pucca (Bricked/

cemented) type of house appeared more prominent as reported by greater than half of the respondents (56.3%) followed by the 41.3% respondents staying in Kacha-Pucca houses. One tenth respondents documented possession of Kacha (Mud) house. Possessing "Kacha house" entails weaker economic condition of farmers.

Farmers were further asked to express their trainings if they have ever obtained from any firm other than WWF. About 35.8% farmers had been the part of trainings before joining sustainable cotton initiative. During informal discussion, farmers expressed their views that various pesticide companies and extension field staff had been the prime source for their trainings. Technically such types of services are denoted as Agricultural Extension Outreach program. Greater than half (64.3%) farmers negate the questions. These grower had never been the part of any training prior. Joining SCI was the maiden training activity being joined. Farmers who had been the part of training before joining SCI were asked to explore the source organization of exerted trainings

Table 2a. What is the extent of hindering factor in the adoption of recommended sustainable cotton production practices as recommended by WWF?

Factors	Not at all		Some extent		Moderate extent		High extent		V. high extent	
	no.	%	no.	%	no.	%	no.	%	no.	%
Lack of financial resources	5	1.25	0	0.00	11	2.75	114	28.50	270	67.50
Lack of training	5	1.25	0	0.00	21	5.25	129	32.25	245	61.25
Lack of interest	8	2.00	0	0.00	36	9.00	97	24.25	259	64.75
Lack of knowledge	5	1.25	9	2.25	22	5.50	138	34.50	226	56.50
Less production	5	1.25	5	1.25	50	12.50	121	30.25	219	54.75
Lack of labor	5	1.25	12	3.00	60	15.00	95	23.75	228	57.00
Small land holding	5	1.25	4	1.00	33	8.25	104	26.00	254	63.50
Lack of time	24	6.00	32	8.00	54	13.50	71	17.75	219	54.75
Less profit	5	1.25	2	0.50	38	9.50	101	25.25	254	63.50

Table 2b. Mean, standard error (SE), standard deviation (SD) and coefficient of variation (CV%) regarding the extent of hindering factor in the adoption of recommended sustainable cotton production practices as recommended by WWF.

	Mean	SE	SD	CV (%)
Lack of financial resources	4.61	0.033	0.666	14.45
Lack of training	4.52	0.036	0.711	15.73
Lack of interest	4.50	0.041	0.820	18.22
Lack of knowledge	4.43	0.040	0.801	18.09
Less production	4.36	0.042	0.841	19.29
Lack of labor	4.32	0.046	0.922	21.34
Small land holding	4.50	0.040	0.792	17.61
Lack of time	4.07	0.062	1.241	30.48
Less profit	4.49	0.039	0.788	17.55

Data plotted in table 2a highlights that fair majority (67.5%, 61.25%, 64.75%, 56.50%, 54.75%, 57%, 63, 5%, 54, 75%, 63.50%) of the respondents told that lack of financial resources, lack of training, lack of interest, lack of knowledge, lack of production, lack of labor, small land holding, lack of time and less profit respectively had hindered adoption of recommended practices to high extent followed by negligible number (1.25%) of the respondents was not with this view. Various researchers had reported inadequate knowledge, low yield, inadequate financial resources and high cost of inputs as major factors affecting adoption of recommended production process of cotton (Ferrigno, 2004).

Farmers remained unable to get desired production which puts the, onto the darkness of poverty as farmers heavily rely on cotton cultivation for their mainstay. Mishra (2006b) documented similar view claiming farmers indebted due to low yields. Resultantly, farmers remain unable to invest in their farm. Jama and Pizarro (2008); Poulton *et al.* (2006) claimed cash/financial constraints as critical for farmers and credit facilities could be the alternative strategy (Singla *et al.*, 2012). Carlos *et al.* (2002) described that in Pakistan yield depends upon price of cotton, price of competing crops, fertilizer rates, rainfall intensity and time of cotton picking; most of the enlisted thing are unpredictable in Pakistan especially prices.

Sinzogan *et al.* (2004) also reported the problems of Low prices of produce, late payments, pest damage and increased input cost among farmers. In another study, Nadeem *et al.* (2014) literacy, inadequate adoption of protection measures, fertilizers, land preparation issues are problems affecting cotton productivity. Fertilizers, water and certified seeds were reported as scarce elements for farmers by Chaudhary and Khan (2009) depicting them as factor affecting productivity of cotton. Pakistani cotton growers are experiencing rising cost of production while less output and return.

Table 3. What are the supportive factors you perceive in adoption of sustainable cotton?.

Supportive factors	Yes		No	
	no.	%	no.	%
Less input cost (Supportive factors)	219	54.75	181	45.25
Facilitation by WWF staff (Supportive factors)	386	96.50	14	3.50
Unproblematic marketing (Supportive factors)	351	87.75	49	12.25
More profit (Supportive factors)	108	27.00	292	73.00
Training opportunity (Supportive factors)	348	87.00	52	13.00
More yield of cotton (Supportive factors)	138	34.50	262	65.50
Support from other farmers of L.G. (Supportive factors)	327	81.75	73	18.25
Water saving (Supportive factors)	277	69.25	123	30.75

It is highlighted in table 3 that more than half (54.75%) of the respondents interpreted that less input cost would be a supportive factor and less than (45.25%) of the respondents said that it would not. Overwhelming majority (96.5%) of the majority was with the view that facilitation by the WWF staff would be supportive. Huge majority (87.75%) of the respondents said that unproblematic marketing would be supportive but small number (12.25%) of the respondents gave response in no. majority (73%) of the respondents reported that more profit would not be supportive but slightly more than quarter (27%) of the respondents gave positive response in this aspect. Huge majority (87%) of the respondents told that training opportunities would be good for sustainable cotton but small number (13%) of the respondents said that it would not be supportive.

Huge majority (65.5%) of the respondents said that more yield of the cotton would be good for sustainable cotton. Whereas huge majority (81.75%) of the respondents said that support from other farmers of L.G would be supportive. While fair majority (69.25%) of the respondents was with the view that water saving would be supportive but less than one- third (30.75%) of the respondents would not be supportive. Generally it can be said in the light of findings, it is essential to embark these supportive factors. Kossou *et al.* (2004) reported his aim that technological innovations can uplift the socio-technical system for farmers. For example, innovations regarding pests management needs to be entirely based on the concerns and perspectives of cotton growers (Richards, 2001). Collaborative researches can help in making the aim of farmers uplift easier (Rolling *et al.*, 2004).

In previous section low yield and less profit has been recorded as militating factors. Recent policies, financial resources socioeconomic position of farmers, education and poor marketing could be the supportive elements. Therefore, production is needed to be linked with stable market and farmers are required to link with facilitators. It has been seen due to lack of resources farmers remained unable to adopt the recommendations and farmers usually modify the recommendations while other leave cotton farming. Development of appropriate value chain is mandatory to support cotton farming (Röling and Richard, 2002). Conventional process can be transformed into experiential learning for making complex innovations easier (Leeuwis & Van Den Ban, 2004). IPM and Farmers Field Schools are leading examples referring experiential learning (Van DeFliert, 1993). Generally it can be said on the basis of analysis that above mentioned factors are supportive indeed and needed to be promoted through extensive work and interventions.

Conclusion and recommendations

It is concluded on the basis of study that majority of the farmers is small farmers with nominal educational level. Land holding possessed was small followed by the farming through tenants and owner-cum-tenants.

Farming was the prime income source along with livestock farming which was basically alternative source to manage sudden risks. Almost half of the farmers were having experience in between 11-20 years. Unfortunately productivity of these farmers is still beyond the potential. Moreover, livelihood scenario of the farmers is meager even living in the poverty cycle. This is evident from their houses prepared from mud.

Sustainable cotton initiative took the command and played significant role in cotton farmers' uplift documenting multifold merits. However, effectiveness was also found lower than expectations. Poor socio-economic conditions of farmers, lack of financial resources, inadequate trainings, sluggish interest, and inadequate knowledge, less production, less labour, small land holdings, lack of time and less profit were the major factors affecting effectiveness. Poor socio economic conditions of farmers don't allow them to go for innovative practices adoption. Major supportive areas for farmers appeared less input cost, facilitation by WWF staff to farmers, stable marketing, extended profitability, increased production and water saving for future. Study concluded that sustainable cotton initiative and other firms must initiate worked to raise farmers income to strengthen their adaptive capacities and in this regard cost control programs, facilitation by WWf staff to farmers, connecting farmers with marketing for more profits followed by the training opportunities to conserve resources and increased production. This is directly and indirectly major strength to farmers' socio-economic condition.

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