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REGULAR ARTICLE

CHALLENGES FACED BY FARMERS IN CROP MANAGEMENT PRACTICES UNDER ENVIRONMENTAL AND SOIL DEGRADATION

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ABSTRACT

Crop farming is the key source of revenue (12%) as well as livelihood (45%) generation in Pakistan. Although it is the mainstay of national rural economy, there are certain factors impede its actual potential. Environment and soil degradation are the most significant among these factors. Therefore, it is dire need to mitigate their adverse impact on crop management to combat the food insecurity. The present study was conducted in mix cropping zone of Punjab. Through multistage sampling technique 120 farmers were selected and data were collected through interview schedule and focus group discussion. Psychoanalysis of data revealed that among environmental factors the rain variation has the most adverse effect on crop management followed by flood, temperature variation and hailstorm respectively. Qualitative data illustrated that from last few year's variation in time and frequency of rainfall become fashion of the day due to usage of huge amount of ammunition in successive operations against terrorism and deforestation. The data showed that soil is degraded mainly by loss of fertility followed by water logging, erosion and salinity. The focus group discussions concluded that due to bulging of population, the cropping intensity increases which deplete the needed nutrients in the soil. Although farmers apply the fertilizers, application without soil testing is all in vain in-spite of increasing the cost of production. Therefore, it is recommended that strengthen the weather forecasting department and use all kinds of media to update the farmers about upcoming weather conditions.

Keywords: Crop Management, Climate Change

INTRODUCTION

There are certain factors restrict the agriculture to substantial level in Pakistan. In spite of these challenges it is not only major GDP share holder (21%) but also biggest source of employment generation (46%). Agriculture sector consists of two sub sectors i.e. crop (44.6%) and livestock (55.4%) sector. There are two major cropping seasons i.e. Rabi and Kharif in Pakistan. The cultivation and crops differ from each other in both seasons [1]. On the basis of climatic, soil, water, crops, vegetations and other agricultural factors Pakistan is divided into ten agro-climatic zones. Punjab consists of 44% Indus basin delta. On the base of crops cultivation and cropping pattern it is classified into four zones; arid, rice, mix and cotton. Mix cropping zone is defined as where no crop is cultivated over more than 50% of the cropping area. It consists of central Punjab districts [2].

There are three parts of agriculture i.e. research, extension and agriculturists that are reliant. [3]. The agricultural extension services are available to combat these impediments by using all means to reduce the communication gap between research and farming wings. It propagates the first hand research packages to farmers who transfer it into functional knowledge. Alongside the dissemination of innovations, it also provides feedback to research wing about existing problems of farming community [4]. Almost 70% population is directly or indirectly engaged with agriculture. Development in agriculture is synonyms to wellbeing of this agrarian people. For development of agriculture need of the hour is to strengthen the extension wing therefore, it disseminates the latest technologies in a very convincing way that farmer forego its traditional practices and also collect their site specific problems. Research wing should conduct research on these site specific problems [5]. The Govt. of country is very sensitive about hampering of these factors therefore; during last six decades various agricultural extension approaches were launched to curb these constraints i.e. V-AID, BDS, IRDP, TandV system, FFS, Decentralized Extension and Hub program.

Methodology

Study area

Punjab province was selected as study area. It was classified into arid, rice, cotton and mix cropping zones on the basis of cropping system. Mix cropping zone was selected as research area because it is versatile combination of all individual environmental conditions of

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province. It consists of all central Punjab districts with Faisalabad as a central hub. Therefore, research was conducted in Faisalabad.

Sampling procedure and selection of study respondents

Faisalabad consisted of six tehsils: Faisalabad City, Faisalabad Sadar, Chak Jhumra, Samundri, Jaranwala, and Tandlianwala. Out of these six tehsils, Faisalabad sadar and Jaranwala were selected at random and from each tehsil, 60 respondents thus making sample size 120 respondents.

Research Instrument for data collection

Interview schedule and focused group discussions were used a research tool. The interview schedule was pre-tested before final data collection. The reliability and validity of research instrument was also checked. Further, respondents were personally interviewed for the accurate acquisition of data. Five point scale (v. low, low, medium, high and v. high) was used for the assessment of effectiveness.

Data analysis

Collected data were analyzed through computer software Statistical Package for Social Sciences (SPSS) for drawing conclusions and recommendations. Mean value and standard deviation were also computed for the better understanding.

RESULTS AND DISCUSSION

It is aforementioned that Pakistani agriculture is substantial mainly due to constraints of environmental and soil degradation. Climatic uncertainty is a global issue but adversely affects the developing countries like Pakistan. The global warming, unlimited use of pesticides, deforestation and depletion of ozone layer are the major causing agents of climatic changes. A rise of 0.58 C temperature of the globe was recorded in last two decades. It is order of the day to adjust or refurbish agriculture with changing climate. Soil degradation problems are very rigorous. Total land is 79.6 million hectares while only 33 m hec is cultivatable and out of it merely 20 m hec. is cultivated. Salinity, erosion and water logging are extremely serious problems. Almost 6000-acre land degrades annually. There are some there factors also hamper the crop management i.e. economic, marketing etc. Economic condition of Pakistan is not very well that 60% population falls under poverty line particularly farmers are very poor. They are unable to pluck the fruits of modern agricultural technologies due to less economic recourses and land holding. The last but not least factor marketing is of most vital concern. There are no food chains in country. Most of the farmers are reluctant to adopt new technologies only due to inefficient marketing system. Middle man is the most dangerous pest of farm products. Anyhow, all the human being depends upon agriculture to fulfill their food and nutrition demands. Its share in revenue generation, foreign exchange and employment creation is also very solid. Therefore, development of agriculture can only accomplish the dream of being developed and prosperous nation. The progress of agriculture is fully dependent on accurate dissemination of improved technologies compatible to local climatic, soil, water, economic and marketing conditions. Therefore, it is dire need to educate and train the extension agents so that we may able to harvest the desire goals.

The data given in table illustrate that respondents considered rainfall variation as the most distressing climatic factor and was ranked 1st with mean value of 3.80 while floods were taken as the 2nd devastating climatic constrain which effects not only the standing crops but also soil structure, texture, topography and fertility. Respondents rated drought, temperature fluctuation and frequency of rainfall between low and medium categories with tendency toward medium. The rest of the mentioned climatic factors like hailstorm, precipitation and humidity were low rated elements and were ranked 5th, 6th and 7th respectively. Focused group discussions illustrated that right from inception of 21st century huge amount of ammunition has been using in different wars, different mafias cutting the forests for housing colonies, industries, timber wood etc., urbanization is also at it apex level, rapid industrialization and haphazard use of pesticides play a significant role in climate change. The results of [6] and [7] are partially coinciding with backdrop. They reported that among the climatic factors affect the crop yield are flood ranked 1st with mean value of 3.30 followed by rainfall variation ranked 2nd with mean value 3.11 value, precipitation ranked 3rd with 3.03 mean value while light ranked 9th with mean score of 2.30.

Table 1: Rank order, weighted score and mean values of climatic factors affecting the crop management practices

Factors	Rank order	Weighted score	Mean value	S. D
Rainfall variation	1	456	3.80	0.64
Floods	2	424	3.53	0.66
Drought	3	322	2.68	0.75
Temperature fluctuation	4	307	2.56	0.62
Frequency of rainfall	4	307	2.56	0.64
Hailstorm	5	241	2.00	0.59
Precipitation	6	235	1.95	0.57
Humidity	7	188	1.57	0.63

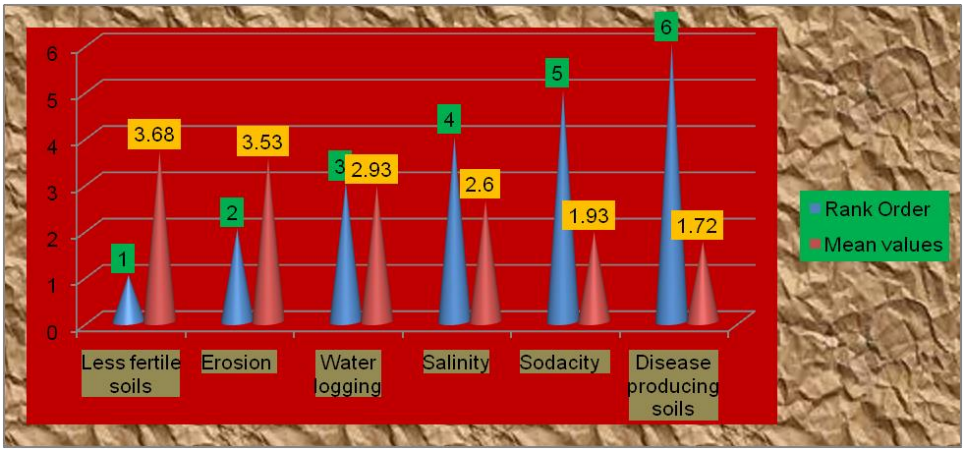

Fig. 1: Rank order and mean values of soil degradation factors affecting the crop management practices

Table 2: Frequency and percentage of farmer's suggestion for crop management practices

Suggestions of the respondents	Frequency	%
Plant breeding and genetics organizations should introduce drought resistant varieties	116	96
Agri. extension agencies have to ensure the availability of such varieties which are compatible with local soil and environment conditions	109	90
All agri. extension groups should launch media campaign to introduce and finance for adoption of diversified farming	104	86
Agri. organizations should launch SMS service about weather forecasting	104	86
Public and private sector should assist farmer in practicing climate smart agriculture	101	84
Agricultural organizations should make mobile soil and water testing labs for testing on village level	79	65
Farmers should grow wind breaks or shelter belts to mitigate the soil erosion and wind pressure	71	59

The fig. 1 highlights the less fertility of soil as the most stressful soil degrading factor with mean value of 3.68. As it may control the efficiency of all applied inputs. The farmers rated all kinds of erosion as the 2nd distorting factor as it also drains out all the accumulated food in the form of nutrients in soil. The respondents rated the water logging and salinity as medium range factor which affect the crop management. These are interrelated because in water logging condition the leached salts come back in the root zone and restrict the plant growth. The sodic and disease producing soils were low rated constraints with 5th and 6th ranks respectively. Respondents rated drought, temperature fluctuation and frequency of rainfall between low and medium categories with tendency toward medium. The rest of the mentioned climatic factors like hailstorm, precipitation and humidity were low rated.

The suggestions of the farmers clearly show that they were not happy with the performance of government and agricultural organizations. A wholesome majority of the respondents suggest that plant breeding and genetics organizations should introduce drought resistant varieties and agri. extension agencies have to ensure the availability of such varieties which are compatible with local soil and environment conditions. Similarly, more than eighty percent of the farmers proposed all agri. extension groups should launch media campaign to introduce and finance for adoption of diversified farming, agri. organizations should launch SMS service about weather forecasting and public and private sector should assist farmer in practicing climate smart agriculture. A simple majority of respondents on farm measures are very significant to mitigate the effect of soil and environmental changes i.e. elements and were ranked 5th, 6th and 7th respectively. The group discussions concluded that due to bulging of population (1998--13 billion, 2014—18billion), the cropping intensity increases which deplete the needed nutrients in the soil. To avoid the posed threat of food insecurity farmers in-discriminately apply pesticide and fertilizers which increases the crop production but also badly degrade the soil, environment and underground water. The farmers who apply the fertilizers and pesticides without soil and water testing is all in vain in-spite of increasing the cost of production. These results are more or less similar to that of [8] reported that soil salinity, water logging and soil erosion are equally responsible for soil degradation followed by experts consultancy, unaware of soil analysis and less supply of water for bleaching of chemicals respectively among the factors affecting the crops.

agricultural organizations should make mobile soil and water testing labs for testing and farmers should grow wind breaks or shelter belts to mitigate the soil erosion and wind pressure.

CONCLUSIONS AND RECOMMENDATIONS

In the light of aforementioned responses of the farmers revealed that crop management depends on soil health and clean environment. The effects of soil and environmental degradation are very vivid in mix cropping zone. These factors limit the practice of advance agricultural practices in region. These factors also significantly reduce the cost benefit ratio of the farmers. As government has installed different research and education institutes and also launched various extension programs to minimize the effects of these constraints. All these are very general in

their nature. Creation of adaptive research farms: the step taken by the government is very effective but there is more need of site specific research. Therefore, it is recommended that research should be problem oriented research and must introduce site specific technologies. It is also recommended that strengthen the weather forecasting department and use all kinds of media to update the farmers about upcoming weather conditions. There is too greater need of modification of extension methodologies which create link between problems of individual farmer and research department.

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