A Sociological Analysis of Constraining Factors of Development in Agriculture Sector of Pakistan

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ABSTRACT:

Agriculture sector is the backbone of Pakistan's economy accounting over 70% of the export revenues and more than 50% labor force. In last few decades, the productivity growth in agriculture sector of Pakistan is dilapidated due to disproportionate use of fertilizers and inappropriate technological progress. Agriculture is the largest sector accounting almost 21% GDP of Pakistan. This paper scrutinizes the impacts of these miscellaneous constraining factors on agriculture productivity of Pakistan. Farmers have to countenance staid challenges that have negative impact on per acre yield of their farms. These factors comprise of sky-scraping prices of inputs, disproportionate burden of loans on farmers, land degradation, scarcity of irrigated water, inadequate provision of appropriate infrastructural facilities and low quality of raw materials. A sample of N=365 respondents (farmers) was interviewed through multistage sampling technique. A non-parametric test (Chi-square) was applied on the data to evaluate the results of the empirical observations. In view of that the researcher instigate through this research that inadequate provision of credit facilities, usage of obsolete agriculture methods on farms and various environmental constraints (such as loss of biodiversity, land degradation and climatic fluctuations) are the major causes of low agriculture productivity in Pakistan. On the basis of these findings the researcher concluded that soil salinity, water logging, attack of pesticides, soil erosion and low quality of seeds are the foremost confronts that are faced by the farmers pertaining to their agriculture productivity in Pakistan. Thus farm management practices, amendments in agriculture reforms as well as provision of passable financial and water resources to the farmers are the salient policy implications that can cope with various constraining factors in agriculture sector of Pakistan.

Key words: Productivity, credit, soil salinity, water logging, land degradation, pesticides, infrastructure, raw materials and farm management practices.

INTRODUCTION:

Agriculture is a precedence area that deals with various dilemmas of unemployment, sustainability and poverty alleviation. Agriculture policies focus on provision of sustainable food security, increasing agriculture productivity, import substitution and income diversification. Agriculture is the foremost source of livelihood for more than 80% of rural households (Faruqee, 1999). Enhancing agriculture contributions continue to encourage the relocation of rural labor, elevate the level of consumption of rural residents, encourage exports and increase farmers income so that national economy develops rapidly and orderly. In developing countries agriculture sector is the salient prerequisite for sustainable development process. A well established agriculture sector can enhance food security, generate important economic linkages in development process and diminish the food prices. Therefore the reduction in food prices is advantageous for the poor in developing countries who spend a significant amount of their income on food (Ingco and Nash, 2004). There are two major crops ("Rabi" and "Kharif") in Pakistan that accounted for 82% of the value added major crops (such as wheat, rice and sugarcane). Agriculture sector can be divided into five major subsectors (1) Major crops (2) Minor crops (3) Fisheries (4) Livestock and (5) Forestry. Percentage growth in agriculture sector was 51% in 1960's, 2.4% in 1970's, 5.4% in 1980's, 4.4% in 1990's and 3.2% in era of 2000's. (Economic Survey of Pakistan, 2010). The agriculture growth in 2011 is estimated to be 1.2% as compared to 0.6% in 2009-2010 (Highlights for Economic Survey of Pakistan, 2010-2011).

Crop production	2009-2010	2010-2011
Cotton production	12913 thousand bales	11460 thousand bales
Crop production has decreased to 11.3% in 2011 as compared to the previous years.		
Wheat production	23311 thousand tones	24214 thousand tons
Wheat production has increased to 3.9% in 2011 as compared to the previous years.		
Rice production	6883 thousand tons	4823 thousand tons
Rice production has decreased to 29.9% in 2011 as compared to the previous years.		
Sugarcane production	49.4 million tons	55.3 million tons
Sugarcane production has increased to 12% in 2011 as compared to the previous years.		
Gram production	562 thousand tons	523 thousand tons
Gram production has decreased to 6.9% in 2011 as compared to the previous years.		
Maize production	3262 thousand tons	3341 thousand tons
Maize production has increased to 2.4% in 2011 as compared to the previous years.		

Agriculture plays a salient role in external balances. The export of raw agriculture commodities such as rice and cotton contributed to about 30-40% of the export products for Pakistan. Agriculture development is the major prerequisite for economic development in Pakistan. In underdeveloped countries agriculture growth is uncomplicatedly interrelated with economic stability (Kemal, et al. 2002). Sustainability in agriculture growth is obligatory condition for rural growth, poverty reduction and availability of employment opportunities. Hence labor force grows at about the pace of two million per year. Thus 2/3 of the population of Pakistan is residing in rural areas and is engaged in agriculture sector (Weidemann Associated, 2009). There are many indicators that determine the high or low agriculture yield and they comprise of education of the farmers, agriculture finance, availability of inputs, soil fertility, infrastructure development, irrigated land as well as various water and soil related issues (Evenson, 2009). During next 50 years the global demand for food will be doubled therefore the agriculture sector should be stronger enough so that it can face the challenges related with agriculture and rural development (Tilman, et al. 2002).

Agriculture sector has to face serious constraints that hamper their development process. These constraints comprise of scarcity of freshwater, salinity of soil, water logging, use of poor quality groundwater and high prices of inputs (such as water, seeds and nutrients) (Mangisoni, 2006). Over and above low water availability, ineffective support services, poor quality seeds, inappropriate production technology, shortage of irrigated water and inadequate provision of credit facilities are the staid challenges faced by the farmers in agriculture setup of Pakistan. Other impediments related to low agriculture productivity comprise of climate variability and sedimentation in large resources. In addition to this inappropriate irrigation patterns also lead towards low land productivity. Water logging is also the foremost factor that reduces the crop productivity. The major reason is that the drainage system is inadequate and the salts are accumulated in the roots of the crops. Thus patterns of unequal land ownership by the government and lack of political will to make adequate reforms engage the farmers in the vicious cycle of poverty. Thus improper crop management activities, overdependence on public sector agriculture marketing and trade liberalization are the major factors that lowers the per acre yield of crops (The World Bank, 2006).

There are many environmental constraints that lower the agriculture productivity. These challenges comprise of 1) Land degradation 2) Lack of water availability 3) Loss of biodiversity and 4) Climatic changes (Nuffield Council in Bioethics, 2004). These factors are called negative externalities as their cost is not included in market prices (Pretty, 2001). Thus land degradation, illiteracy of farmers and non access of farmers to inputs are the most important factors that lower the agriculture productivity. Poverty is one of the major factors that adversely affect the access of farmers to modern technology (Ayalneh and Hagedorn, 2002). In addition to this lack of development of new storage facilities, managerial drawbacks, institutional flaws, economic scarcity, decline in shortage of existing reservoirs, rise in energy prices, illiteracy of farmers and health problems related with farmers are the noteworthy constraining factors that lowers the per acre yield in Pakistan (Malik, 2005)**.**

Financial stress on the farmers increased in last few years due to pervasive use of mechanization, fertilizers and improved seeds (Iqbal, et al. 2003). The income level of small farmers is very low therefore they have no savings and they have to acquire loans for their productive activities on farms. Usually small farmers are suffering from

poverty and cannot afford the basic prices of inputs. Consequently these farmers have to take loans from banks, shopkeepers or commission agents and thus they suffer from poverty due to higher rate of interest on these loans (Bashir, et al. 2010). These loans are provided by Zarai Taraqiati Bank, NRSP, Agriculture Development Bank of Pakistan and Commercial Banks etc. Problems addressed by the farmers (who take some loan from institutional source) are: 1) High interest rate on loans 2) Lack of publicity related with prerequisite of loan from bank 3) Bad attitude of bank officials 4) Improper guidance of loans and 5) Provision of less loan from bank than required by the farmers (GOP, 2009).

In Pakistan the soil is deficient in various macronutrients like nitrogen and phosphorous. Increasing deficiencies of potassium and macronutrients like zinc, boron and iron has also been noted. The imbalanced use of fertilizers along with poor management is the major factor affecting the use of fertilizers. By and large the chemical fertilizers are very inefficient (Khan, et al. 2002). The major reason behind this issue is that the sprayed chemicals are mostly washed away from the surface of the plant and split on the surface of the soil (Zafar and Malik, 2003). In Pakistan the soil efficiency is low due to mismanagement of agriculture structure and unbalanced use of fertilizers. In addition to this high temperature and various microbial acidities also contribute to low productivity of agriculture land. The agriculture productivity can be increased by the use of modern technology and enhancement in existing technology (Zia-ur- Rehman, et al. 2012). Otherwise the use of pesticides and fertilizers are becoming obsolete in the future. Agriculture yield can be amplified due to improved seed, higher use of chemical fertilizers and improved water management practices. Improved seeds which is the major input availability is the most important prerequisite for high agriculture production because these seeds lower the deteriorating impacts of droughts, salinity and various diseases of crops (Government of Pakistan, 2003).

Other factors that lower the land productivity are stresses like droughts, high temperature, attack of pests, poor quality of seed production, limited variety of seed for every crop, increasing cost of fertilizers and pesticides, adverse effects of fertilizers on health of farmers, inadequate provision of microcredit to farmers on easy conditions and limited conduction of agriculture research (Bashir, et al. 2010). Even though surface water availability is harmless for irrigation but extensive use of chemical fertilizers, pesticides and fungicides is polluting the surface and ground water (Ahmad, 2008). These factors are affecting the crop productivity, nutritional quality of soil, crop tolerance and resistance against pests. Soil salinity decreases the capacity of seed to produce high per acre yield. Salinity has negative impacts on crop production especially in arid and semi arid soils. Thus salinity increases the salt stress among various crops (such as wheat, barley, rice etc) and thus reduces per acre yield of Pakistan.

LITERATURE REVIEW:

Chaudhry (1986) concluded that there is an affirmative relation between mechanization and agriculture output. Biological and chemical changes in technology are known as "Seed Fertilizer Revolution." Although there is a rapid increase in use of tube wells, tractors and other technological equipments but still the farmers are using outdated technological methods. Although there is momentous use of contemporary agriculture techniques such as 1) Tube wells 2) Tractors 3) Hand operated sprays 4) Tractor driven drills 5) Tractor driven blades and 6) Thrashers but still the per acre yield of Pakistan is not adequate. Mechanization can also augment the area of cultivated land usage. This cultivated land encompasses of desolate land also. The usage of modern agriculture technology such as tractor can substitute the tenets that work on daily wages on these farms. Consequently the improvement in mechanization such as tractor-tube well technology can increase the per acre yield.

Pretty (2001) demonstrated that inadequate poverty rights to farmers, illiteracy of farmers, non-access of farmers to inputs, unawareness of farmers and land degradation are the major constraining factors in agriculture sector of Pakistan. Despite these challenges the agriculture sector has to face some environmental challenges that have negative impact on crop productivity (especially wheat and cotton production). These challenges comprise of loss of biodiversity, unpredictable climatic changes, declining genetic variability in agriculture sector, land degradation and inadequate water availability. These factors are called negative externalities as they are non-market effects. Nevertheless use of modern agriculture technology will result in positive externalities such as existence of natural capital, strengthening social capital and development of human skills. These positive externalities results in sustainable agriculture development of Pakistan.

Iqbal (2002) concluded that mechanization in agriculture development has several advantages that can increase per acre yield of crops. On the other hand it also creates some disadvantages especially when it creates unemployment among the workers. Due to mechanization labor force is replaced by the machines. Particularly the use of tractor and tube wells has increased the crop production per acre (especially in case of wheat crop) but on the other hand it has also substituted workers related to their fields. Thus there must be some substitute for these workers and the government must plan some strategy that can replace those workers in some other economic task.

Akram (2008) concluded that microcredit is necessitated by the farmers for gratifying various rationales in agriculture sector. Farmers need microcredit for the purpose of buying assorted tools for harvesting and divergent sorts of fertilizers. In addition to this in the era of income fluctuation this microcredit is needed to run the family of a farmer. Thus microcredit can strengthen the rural economy through agriculture development. This microcredit is financed by various institutional and non-institutional sources. The internal credit encompasses of household decision of the farmer to have adequate access to microcredit. Conversely those farmers who have no saving will go towards microcredit. There are countless factors that have noteworthy impact on access to microcredit and they comprises of education of the farmers, health conditions of the farmers, land owned by the farmers and distance of farmer's house to formal credit bank. There are many channels that help in access to loans and they are friends, relatives, professional money lenders, merchants and commercial agents etc. There are numerous rationales that are fulfilled by the farmers after taking loans (that have an access to food, clothing, harvesting machines, tube wells, tractors and threshers etc). On the other hand there are numerous factors that have an impact on the use of microcredit and they are distance of the bank, interest rate of the bank, time lag between application and loan issue as well as purpose of the loan etc.

Phillip, et al. (2009) concluded that agriculture development can be associated with economic development process. But there are countless challenges faced by the small farmers in agriculture sector. These constraints are obstructing the process of development in agriculture sector. These constraining factors that are accountable for low agriculture production comprises of:

(1) Usage of superseded technology for land cultivation and inability of farmers to use mechanization in their fields (like tube wells, tractors and modern harvesters etc).

(2) Low availability and low quality of raw materials that have serious deteriorating impacts on per acre yield of crops.

(3) Low quality of fertilizers, pesticides and fungicides that are applied on various types of crops and their after effects are low quality of crops.

(4) Inadequate research conducted on assorted aspects of agriculture field due to lack of funds and negative intrusion from government especially related with various aspects of agriculture reforms.

(5) Illiteracy and poverty of the farmers are also the constraining factors that have serious deteriorating impacts on crop production. Thus poverty of the farmers also becomes hurdle in usage of mechanization as a modern agriculture technique.

(6) Low access of farmers to credit loans or high rate of interest on loans results in engaging the farmers in vicious cycle of poverty.

Economic Survey of Pakistan (2010) concluded that the productivity ratio in agriculture sector has been constantly declining in last three decades. The dilemma of low agriculture yield per acre is due to abundant reasons and the foremost reasons among them are inadequate irrigation water, pervasive use of fertilizers and low quality pesticides. Mechanization is also an imperative factor that ensures food security but the usage of mechanization is not so widespread. The foremost factors behind farmers preference for the usage of obsolete technology in agriculture sector are their illiteracy and poverty. On the other hand the poor management of water resources is also the most momentous factor that has negative impact on crop productivity. In view of that poor infrastructure of dams and short of other water reservoirs are the major determinants of water shortage. Therefore onslaught of flood and scarce water shortage are the major factors that have negative impact on crop productivity of Pakistan.

Year	Number of tube wells	Number of tractors
1990-1991	339840	13841
1991-1992	355840	10077
1992-1993	374099	16628
1993-1994	444179	15129
1994-1995	463463	17063
1995-1996	485650	16218
1996-1997	506824	10121
1997-1998	531259	14242
1998-1999	563226	26885
1999-2000	609775	35038
2000-2001	659278	32553
2001-2002	707273	24311
2002-2003	768962	27101
2003-2004	950144	36059
2004-2005	984294	44095
2005-2006	999569	49642
2006-2007	931306	54431
2007-2008	921221	53598
2008-2009	921229	60561
2009-2010	921229	69245
Economic Survey of Pakistan, 2010.		

Shehbaz, et al. (2010) concluded that in mountain regions the land productivity is the serious issue especially in underdeveloped countries. These constraining factors include harsh weather, remoteness, scattered population and undeveloped infrastructure etc. The major crops are wheat, maize and various types of vegetables. On the other hand land degradation, soil erosion, limited infrastructure and inadequate market facilities are the major constraining factors in agriculture sector of Pakistan. Thus small land holding, usage of superseded technology on farms and restricted access to bank loans are the foremost challenges faced by the small farmers pertaining to low agriculture productivity on their land. Thus the foremost pace should be taken by the government and it should give special attention to these regions so that small farmers can earn their livelihoods by working on these fields. The people in mountain regions have to face serious constraining factors predominantly related with harsh climate therefore they cannot grow their crops for the commercial purposes. Even sometimes poverty of farmers, inadequate facilities of loans, low quality fertilizers usage, weed challenges and natural disasters (such as flood, earthquake, famines and landscaping etc) dispossesses the farmers to grow these crops even for sustenance purpose.

Khan, et al. (2011) analyzed that mechanization plays an imperative role in food production and advancement of rural economies but unfortunately rural farmers are using obsolete agriculture technology on the wider scale. They are unaware of the fact that mechanization can increase the productivity of land and decrease the cost of productivity. The major reason for usage of obsolete technology is their poverty. On the other hand these farmers assumed that mechanization will substitute their labor and engage them in different sectors of employment. One of the greatest drawbacks of mechanization is that it needs capital and therefore it is not accessible to small farmers. If land holdings are fragmented then mechanization cannot be achieved through overall advantages.

PURPOSE OF THE STUDY:

In last few decades agriculture sector with the help of modern technology has revealed significant improvement resulting in progressive growth of many crops. Modern agriculture not only involves farmers but also scientists for the

rationale of attaining high productivity in agriculture sector. Although numerous researches divulge the importance of agriculture sector and various factors that lowers its effectiveness. But the researcher focused on combining all the factors that are playing a pivotal role in diminishing the agriculture yield of Pakistan. Nevertheless agriculture sector is facing many impediments like poor economic conditions, small size of land holding, minimal usage of mechanization, high interest rate on loans, limited provision of microfinance facility to the small farmers, illiteracy of the farmers and derisory infrastructure for irrigation facility etc. This paper scrutinizes assorted factors that are impeding the structural modifications due to miscellaneous constraining factors in agriculture sector of Pakistan. The underlying principle behind this paper is to endow with an empirical conceptual framework for major constraining factors in agriculture sector that lowers the per acre yield. The researcher addressed the following questions in this research:

1. How agriculture development is the foremost prerequisite for rural development?
2. What are the foremost socio-economic constraints that lower the agriculture productivity of Pakistan?
3. What are the major environmental challenges faced by the farmers in agriculture sector of Pakistan?
4. What are the salient impediments narrated with water issues and soil degradation in agriculture sector of Pakistan?
5. What are the major policy implications to cope with these challenges?

METHODOLOGY:

In most of the developing countries (including Pakistan) agriculture is the main source of intensification of various sectors of economy. In Pakistan, 50% labour force is employed in agriculture sector. With the improved growth in agriculture sector the surplus labor force can be easily absorbed in small and large scale industries. The improved growth in agriculture sector endow with raw materials to manufacturing industries. This paper investigates the major constraining factors facing by Pakistan in past and present epoch and put forward various strategies that facilitate the sustainable agriculture development in Pakistan.

Research design and universe of the study:

Quantitative research design was used by the researcher to collect the data from rural dwellers of district Muzaffargarh. Quantitative research design was used to investigate the data empirically through a statistical method. In addition to this quantitative research authorized the researcher to investigate and interpret the observation for the purpose of underlying meaning and association of the certain phenomenon (Hunter and Leachey, 2008). The researcher targeted the population of small farmers of district Muzaffargarh. The major underlying principle behind selection of these small farmers is that they can better address various constraining factors that obstruct the process of development in agriculture sector of district Muzzafargarh.

Sampling procedure and sampling technique:

In this technique the researcher selected two tehsils (Muzafargarh and Kot Addu) of district Muzzafargarh out of four tehsils (Muzaffargarh, Ali Pur, Jatoi and Kot Addu) through simple random sampling technique. Afterward the researcher opted 7 union councils from tehsil Muzaffargarh and 5 union councils from tehsil Kot Addu through systematic sampling technique. Hereafter the researcher selected 365 farmers (20-30 respondents on average depending upon the total number of farmers in a particular area) through purposive sampling technique. The major purpose behind this selection was that those farmers were selected that (1) Have less than 5 acres of their own land/or they work on the land of landlord (2) Those small farmers are encountering various types of factors that contribute to their low agriculture productivity (3) Due to various constraining factors the vicious cycle of poverty of these small farmers remains intact (4) Those small farmers have to take loans or other alternatives to fulfill their basic needs. The researcher selected the respondents (farmers) through a systematic proportionate way (larger sample is selected from the larger part of population and smaller sample is selected through smaller part of the population). Then the researcher interviewed the farmers through convenient sampling technique as the researcher had to face difficulties regarding the feudal setup and non-cooperative behavior of the farmers. Due to illiteracy they are unyielding to their point of view and were not ready to admit that these confining factors are responsible for their poverty and low living standards.

Number of Tehsils and Union Councils in district Muzzafargarh		
Muzzafargarh district	Muzafargarh	35 union councils
	Ali Pur	65 union councils
	Jatoi	16 union councils
	Kot Addu	28 union councils
		144 union councils

Tool for data collection:

The researcher used interview schedule as a tool for data collection process. Even though in interview schedule both open and close ended questions were employed but mostly open ended questions were added by the researcher. The major reason was that open ended questions were helpful in getting maximum response rate of the respondent. The researcher focused on questions included in the interview schedule and tried to avoid the preconceived notion and errors in the structure of interview schedule. These errors are known as response effects. The researcher tried to avoid those errors that became problematic in interview such as wordings of the question, order of the questions, format of the questions and the problems in interaction between the respondents and the interviewer. The interviewer premeditated a format for the interview schedule to obtain compelling responses therefore the researcher divided the interview schedule into three parts according to the objectives of the research.

Nature and number of questions in annexure	
Nature of questions	**Number of questions**
Questions related to demographic profile of the respondents	6
Questions related to importance of agriculture sector in development process of Pakistan	11
Questions related with agriculture development as a prerequisite for rural development	8
Questions related to constraining factors (socio-economic, environmental, general as well as other water and soil challenges) that hamper the process of development in agriculture sector of Pakistan	43
Questions related with major remedies that should be adopted to increase the agriculture productivity of Pakistan	4
Total number of questions	**72**

Data analysis procedure:

The researcher applied (a non- parametric test) chi-square test on the collected data. Dependant and independent variables were tested by application of chi-square test on these variables. Data thus collected was analyzed using SPSS version 17. The researcher divided the comprehensive information into number of categories that enabled simple description of the data for various statistical purposes. These categories comprised of demographic characteristics, major value changes and its implications on behavior and life styles (corresponding to

$$X^2 = \sum \frac{(\text{Observed frequencies } - \text{ Expected frequencies})^2}{\text{Expected frequencies}}$$

$$= \sum \frac{(Fo - Fe)^2}{Fe}$$

l to measure the extent of association and To assess the significance of the results ven degree of freedom. The results of the re was larger than the tabulated value as

RESULTS AND DISCUSSION:
Table no. 1
Percentage distribution of respondents with respect to factors due to which agriculture development is considered as a major prerequisite for rural development.

Factors due to which agriculture development is considered as a prerequisite for rural development

Factors related with agriculture and rural development process	Percentage of respondents who agreed on these variables	Percentage of respondents who disagreed on these variables
Economic stability	75.4%	24.6%
Poverty reduction	55%	45%
Enhancing employment opportunities	79.5%	20.5%

Discussion:

Table no.1 depicts that agriculture development is the major prerequisite for rural development process. Thus 75.4% farmers in the above mentioned table argued that rural development can be plausible through economic stability. On the other hand 24.6% farmers disagreed on this stance. On the top of it poverty reduction is also the major factor that contributes to overall rural development process. Consequently enhancing employment opportunities can also play an imperative role in the sustainable rural development process. Thus agriculture is the engine of rural development of any country. Nevertheless agriculture productivity decreases due to numerous reasons like poverty, non-participation of the government and various implementation problems. These factors impede the process of agriculture development which negatively affects the rural development process (Ashley and Maxwell, 2007). Thus it is perceptible from the above mentioned table that 55% farmers agreed that poverty reduction is the major factor that contributes to rural development process. On the other hand 45% respondents (farmers) disagreed that poverty reduction is the major factor that contributes to agriculture and rural development process. The nexus of concentrated power, land ownership, unequal land distribution and state's inability to protect rights of farmers has been a source of low agriculture productivity (Biswanger et al, 2005). There are three factors that contribute positively to increasing agriculture productivity and they include abolition of poverty, development of steadfast relations between government and aid donors as well as long term political commitment to pro-poor strategies by government (Phillip, et al. 2009). Education, land preparation and seed irrigation increases the productivity of crops. Agriculture development is the major contributing factor that enhances the employment opportunities for the farmers. Increase in employment opportunities diminishes the poverty of the farmers. Thus 79.5% farmers agreed that rural development is possible when agriculture sector develops and increase the employment opportunities for the farmers. On the other hand 20.5% respondents (farmers) disagreed on this stance (Bakhsh, et al, 2005). Thus economic stability can be attained by reducing poverty and increasing various employment opportunities.

Table no. 2

Percentage distribution of respondents with respect to major socio-economic constraints in agriculture sector of Pakistan.

Economic restraints faced by the farmers in agriculture sector of Pakistan		
Economic constraints in agriculture sector of Pakistan	Percentage of respondents who agreed on these variables	Percentage of respondents who disagreed on these variables
High rate of interest on loans	80.8%	19.2%
Inadequate credit facilities	63%	37%
Lack of capital	74.4%	25.6%
High prices of inputs	70%	30%
Excessive burden of loans on farmers	80.5%	19.5%
High prices of electricity	67%	33%
Social constraints faced by the farmers in agriculture sector of Pakistan		
Social obstructions in agriculture sector of Pakistan	Percentage of respondents who agreed on these variables	Percentage of respondents who disagreed on these variables
Poverty of the farmers	71.4%	28.6%
Lack of awareness	62%	38%
Illiteracy of farmers	44%	56%

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| Health problems of farmers | 68.5% | 31.5% |

Discussion:

Table no.2 depicts the major socio-economic constraints that hamper the process of development in agriculture sector of Pakistan. The most important among them are high rate of interest on loans, inadequate credit facilities, lack of capital, high prices of inputs, excessive burden of loans on farmers and high prices of electricity (Malik, et al. 1991). Pertaining to these economic impediments 80.8% farmers agreed that high rate of interest on loans is the foremost economic impediment that lowers the agriculture productivity. Income from crop harvesting has to suffer from serious impediments and therefore small farmers have to take loans on subsidized rates. On the other hand 19.2% farmers disagreed that high interest rate on loans is the major economic challenge faced by the farmers. They argued that interest rate is affordable but the major problem is that the farmers have inadequate access to credit facilities. Thus 63% respondents (farmers) agreed that derisory credit facilities is the major constraining factor that impedes the process of development in agriculture sector and 37% farmers disagreed on this stance. In Pakistan poor are small farmers and landless laborers whose main source of income is feudal land. On top of it 74.4% respondents agreed that lack of capital is the major challenge faced by the farmers narrated with their profession. As capital is necessitated for every agriculture purpose e.g. technology usage, irrigation facilities and purchase of high quality inputs therefore shortage of capital is the major impediment in agriculture sector of Pakistan. Thus 70% farmers agreed that high prices of inputs is the major obstruction faced by the farmers in agriculture sector of Pakistan. On the other hand 80.5% farmers agreed that excessive burden of loans on farmers is the major financial constraint that dispossesses the farmers to invest more on mechanization and thus lowers the agriculture productivity. Community organizations play an imperative role in mobilizing and organizing farmers and act as facilitators among government, organized communities and USAID (Hussain, 2003). In addition to this NRSP is the largest microfinance institution working in rural and urban areas. The most important target of NRSP is to alleviate poverty and generate income by providing loans or microcredit to the farmers. Farmers need finances for immeasurable rationales (such as for buying pesticides, fertilizers, various other inputs and modern technological tools for their crops) (Diague and Zellar, 2001). These microcredit programs include Zarai Taraqiti Bank Limited (ZTBL), Commercial Banks, NRSP, Federal Bank for Cooperatives (FBC) and various government and semi government institutions. These are the institutional sources. On the other hand Greene (2000) analyzed that the non-institutional sources include friends, relatives, merchants, middleman and money lenders etc. While 19.5% farmers disagreed as they have some surplus money for the future usage and they had no burden of loan. The major reason was that they took loan from the non-institutional source and there was no interest rate on the loans that's why these farmers have no burden of credit (especially from the borrowed loan). As a result 67% farmers agreed that the major constraining factor in agriculture sector that lowers the agriculture productivity is high prices of electricity.

Thus increase in agriculture productivity reduces the rural poverty and plays an imperative role in rural development through three ways: Increasing yields, rising wages and lowering the food prices. Poverty is the major constraining factor that reduces the pace of rural development through low agriculture yield (FAO, 2004). Thus 71.4% respondents agreed that poverty of the farmers is the major challenge that they have to face in agriculture sector while 28.6% disagreed that low socio-economic status of the farmers is the major challenge faced by them in agriculture sector. On the other hand 62% respondents agreed that lack of awareness is the major factor due to which the farmers use obsolete technology in their fields. In addition to this lack of awareness is the major factor in gaining awareness about the techniques to intensify the agriculture productivity among farmers. On the other hand the related and supporting factor is illiteracy of the farmers (44% farmers agreed and 56% disagreed) deprives them to use modern agriculture techniques. Thus health dilemmas of the farmers (Agreed percentage of farmers was 68.5% and disagreed percentage was 31.5%) is also the major constraining factor. Thus use of pesticides and fertilizers without taking obligatory precautions has direct and deteriorating impact on farmers health.

Table no. 3

Percentage distribution of respondents with respect to major environmental constrictions in agriculture sector of Pakistan.

Environmental constraints in agriculture sector of Pakistan		
Environmental impediments in agriculture sector of Pakistan	Percentage of respondents who agreed on these variables	Percentage of respondents who disagreed on these variables
Sudden climatic change	73.9%	26.1%
Loss of biodiversity	54.4%	45.6%
Land degradation	69.9%	30.1%
Natural disasters	56.5%	43.5%
Imbalance of rain	73.5%	26.5%

Discussion:

Table no.3 depicts the major constraints allied to environment. Although environmental constraints are related with some natural disaster or unanticipated climatic changes but they have serious deteriorating impacts on agriculture yield of the farms. In addition to this there are various factors that make degradation of land resources such as inadequate plant nutrients, declining soil fertility, unbalanced fertilizers usage and low efficiency of fertilizers (Anonymous, 2003). In view of that the above mentioned table shows that 73.9% farmers agreed (while 26.1% disagreed) that sudden climatic change is the major factor that lowers the crop productivity. Over and above climatic changes, use of biotechnological methods in crop breeding as well as flood resistant and temperature defiant varieties strongly affect the per acre yield of the crops. On the other hand the equilibrium among various plant and animal species is very necessary for natural balance. But the loss of biodiversity is very harmful for the crop production. Thus 54.4% respondents agreed on this stance. The foremost cause of negative yield fluctuations include draught, flood, water logging and various climatic changes. Many environmental constraints especially low temperature, imbalance rain (Agreed percentage of farmers was 73.5% and disagreed percentage of farmers was 26.5%) and loss of biodiversity are the major factors that lower the agriculture yield (Oram, 1989). Timely and ample quantity of rain is the imperative factor that can increase the productivity of land. Conversely the off-putting results can be acquired by imbalance in rain fall. Over and above 69.9% respondents agreed that land degradation has serious and negative impacts on crop production while 30.1% disagreed on this stance. Therefore certain types of natural disaster [56.5% respondents (farmers) agreed and 43.5% respondents (farmers) disagreed] such as earthquake, flood or land sliding are also the major factors that lower the crop productivity.

Table no. 4

Percentage distribution of respondents with respect to factors related to soil and water constraints in agriculture sector of Pakistan.

Factors related to soil and water constraints in agriculture sector of Pakistan		
Soil and water related obstructions in agriculture sector of Pakistan	Percentage of respondents who agreed on these variables	Percentage of respondents who disagreed on these variables
Poor quality of groundwater	77.7%	22.3%
Shortage of irrigated water	81.4%	18.6%
Inappropriate water drainage	70.8%	29.2%
Scarcity of freshwater	68.3%	31.7%
Lack of dams	77.9%	22.1%
Lack of tube wells	83.5%	16.5%
Illegal pipes	75%	25%
Inappropriate infrastructure of dams	66.7%	33.3%

Soil erosion	74%	26%
Soil moisture stress	84.5%	15.5%
Soil salinity	83%	17%
Water logging	76.5%	23.5%

Discussion:

Table no.4 depicts the major constraints related to soil and water in agriculture sector of Pakistan. Thus 77.7% respondents (farmers) agreed that poor quality of ground water is the major constraint in agriculture sector while 22.3% disagreed on this issue. Thus 81.4% farmers were convinced on the fact that shortage of irrigated water is the major challenge faced by the farmers in agriculture sector. While 18.6% respondents disagreed that shortage of irrigated water is the major challenge faced by the farmers as they have adequate quantity of irrigated water. Shuval (1980) concluded that irrigation is the major factor that increases the crop production. Rainfall fluctuation to a certain extent can be appropriate but to a greater extent rainfall is really damaging to crop production. There are two major locales of land transformation: One is changes that occur on surface (due to various types of irrigated methods) and the other is in-depth changes (that occurs due to salt and water imbalance). Thus irrigated water is necessary for good land productivity and quality of food production but dearth of irrigated water has rigorous deteriorating impact on crop productivity. On the other hand another factor is inappropriate water drainage system. In view of that 70.8% farmers agreed (while 29.2% disagreed) that inappropriate water drainage system is the major factor that has negative impact on water productivity. Alternatively the most noteworthy factor is shortage of dams and inappropriate infrastructure of dams. Thus 77.9% farmers agreed that lack of dams and 66.7% farmers agreed that inappropriate infrastructure of dams are the major constraining factors that are faced by the farmers in agriculture sector of Muzzarargarh (Pakistan). In view of this the above mentioned table shows the disagreed proportion of farmers on two issues [Issue 1 (Lack of dams)=22.1% disagreed on lack of dams and Issue 2 (Inappropriate infrastructure of dams)=33.3% respondents disagreed on inappropriate infrastructure of dams]. On the other hand 83.5% respondents agreed and 16.5% farmers disagreed that lack of tube wells is the major factor that becomes the salient constraint related with water that has negative impact on crop productivity. Over and above 75% farmers agreed that illegal pipes is the major factor that leads towards canal water theft and thus all the crops cannot be irrigated through this. There are various constraining factors related with soil fertility. Despite this salinity of soil and low irrigation efficiency are the major barriers that hamper the process of development in agriculture sector (Halvorson, 1990). Salinity is associated with salts build up in the roots. There are 2 salient reasons for that: 1) Salinity of the soil and 2) Inappropriate water drainage system to prevent salinization in root zone. Accordingly overall 50% of the worlds land is salt affected. Thus the overall water losses in agriculture sector are 60% and canal water losses are 33%. There are various reasons of water unavailability and they include natural shortage of water, non-availability of water, illegal pipes and canal water theft etc. (Smith, et al. 1995). There are numerous constraints in land productivity of Pakistan. They include soil erosion, land fragmentation and irrigation problems. Soil is an indispensible source of crop production. Soil directly and adversely affects the food security. Accordingly crop yield can be affected through mechanization and technological input. Consequently soil erosion decreases per acre yield through several reasons: 1) Topsoil thickness 2) Degrading soil properties and 3) Losses of soil organic nutrients. Basically in soil erosion the top layer of the soil get eroded by heavy rainfall or some natural factor (Salako, et al. 2007). The above cited table shows that 74% respondents agreed that soil erosion is the major constraining factor related with squat agriculture productivity. On the other hand 84.5% respondents agreed that soil moisture stress is the major factor that lowers the crop productivity. This imbalance in soil moisture and humidity has negative impact on soil fertility. Salinity has negative impact on physical and chemical balance of the soil. Consequently it reduces the crop productivity. On the top of it the salinity of soil is the major confront faced by the farmers pertaining to low agriculture productivity. Thus 83% respondents agreed on this stance. On the other hand 76.5% respondents agreed that water logging is the foremost challenge faced by the farmers related to soil and irrigated water. Water logging is mainly due to increase in the level of groundwater, leakage from canals, lack of drainage facilities and inappropriate water distribution networks. Over and above table no.4 demonstrates the disagreed percentage of the farmers on 4 core issues that are related with water problems and those farmers declared that these factors are not responsible for low per acre yield in Pakistan. Issue 1 (Soil erosion)=26% farmers disagreed, Issue 2 (Soil moisture stress)=15.5% respondents disagreed, Issue 3 (Soil salinity)=17% farmers disagreed and Issue 4 (Water logging)=23.5% disagreed.

Table no. 5

Percentage distribution of respondents with respect to general constraints in agriculture sector of Pakistan.

General constraints in agriculture sector of Pakistan		
General stumbling blocks in agriculture sector of Pakistan	Percentage of respondents who agreed on these variables	Percentage of respondents who disagreed on these variables
Attack of pesticides	85.5%	14.5%
Imbalance use of fertilizers	58.5%	41.5%
Poor quality of seeds	65.4%	34.6%
Low quality of raw materials	78%	22%
Shortage of transport	65%	35%
Lack of management	77.4%	22.6%
Usage of obsolete technology	85.9%	14.1%
Inadequate market access to farmers	79.9%	20.1%

Discussion:

Table No.5 depicts various general constraints that are hampering the process of development in agriculture sector of Pakistan. Thus 85.5% respondents (farmers) agreed that attack of pesticides is the major risky factor for crop production. These pesticides can ruin acres of crops in few days. Thus the use of tractor, tube wells, pesticides and fertilizers are changing the overall structure of agriculture sector. As a result the development in agriculture sector increases due to application of various types of pesticides and fertilizers (Malik, 2005). But 14.5% respondents disagreed about attack of pesticides is a core challenge in agriculture sector. Therefore appropriate and high quality pesticides should be applied on the crops. Nevertheless sometimes the farmers use a disproportionate amount of fertilizers to their field so that the crop production can be increased but despite of increasing the crop production these fertilizers decreases its productivity. Accordingly 58.5% respondents (farmers) agreed on this stance and 41.5% disagreed on this issue. The table also depicts that 65.4% respondents agreed that poor quality of seeds have deteriorating impact on roots of the crops and thus lowers per acre yield. On the other hand there are miscellaneous types of raw materials that must be applied on crops to increase its productivity. Thus 78% farmers agreed that low quality of raw materials is also the detrimental factor that lowers the crop production. While 22% disagreed on this stance. Proficient transport system is also the necessary factor that can bring the land productivity to market. Thus the above cited table shows that (65% respondents agreed and 35% disagreed) that when transport system is inappropriate then agriculture yield can be diminished due to inappropriate storage system. And thus the farmers have to sell their product on low cost that pushes them again in the vicious cycle of poverty. Over and above (77.4% farmers agreed and 22.6% disagreed) that lack of management (in terms of market matters, irrigation system and credit loans) is the major challenge faced by the farmers related to agriculture productivity (Zia-ur-Rehman, et al. 2012). Mechanization mostly involves the use of thrashers, tube wells, diggers and tractors etc. Tractors facilitate in increasing the land productivity and post harvesting operation. The use of tractors was increased in 1960's. Conversely 85.9% respondents agreed that usage of superseded technology to their farmers is the major factor that lowers the crop productivity. The major reason is illiteracy of the farmers and their lack of awareness that these farmers are sticked towards traditional farming styles. As a result the farmers are hesitated to use tractor-tube well technology to their farms. The major outcome of lack of mechanization is low agriculture productivity and depletion of time. The farmers are unaware of the fact that mechanization can not only reduce their time but also bring economic stability and employment opportunities to other fields (Rorabacher, 2010). Agriculture mechanization embraces the use of tools, crop production, harvesting, preparation for storage and non-farm processing. It encompasses three main power sources: human, animal, and mechanical (Khan, et al. 2011). On the other hand 79.9% farmers agreed that inadequate market access of farmers is the foremost challenge faced by the farmers in agriculture sector. These farmers are unaware of the market access and other marketing matters therefore they engage some middleman for this purpose. Thus most of the money or productivity share goes towards the middleman and thus land productivity has no impact on increasing the living standard of farmers. While 20.1% farmers disagreed on this stance.

HYPOTHESIS TESTING:

H1: *Social constraints are the foremost factors that lower the agriculture productivity of Pakistan.*

H2: *Environmental constraints are the salient determinants of low per acre yield of crops.*

H3: *Economic constraints are the fundamental challenges faced by the farmers in agriculture sector of Pakistan.*

Issue series	Independent variables	Tabulated value	Calculated value	Degree of freedom (df)	Level of Significance (α)	P- value (p)
Issue 1	Soil salinity	3.84	16.384	1	0.05	0.000
Issue 2	Water logging	5.99	9.662	2	0.05	0.001
Issue 3	Attack of pesticides	36.42	28.926	4	0.05	0.003
Issue 4	Poor quality of seeds	6.63	8.557	1	0.01	0.007
Issue 5	Usage of obsolete technology	3.84	21.568	1	0.05	0.002
Issue 6	Inadequate market access of farmers	11.34	19.664	3	0.01	0.000
Issue 7	Sudden climatic changes	3.84	7.554	1	0.05	0.005
Issue 8	Low quality of raw materials	9.49	11.247	4	0.05	0.008
Issue 9	Lack of water reservoirs	11.34	32.542	3	0.01	0.001
Issue 10	Scarcity of freshwater	16.81	15.456	6	0.01	0.002
Issue 11	Inappropriate water drainage system	7.81	15.851	3	0.05	0.004
Issue 12	Poverty of farmers	13.28	23.154	4	0.01	0.000
Issue 13	Illiteracy of farmers	3.84	3.84	1	0.05	0.000
Issue 14	Land degradation	5.99	5.99	2	0.05	0.006
Issue 15	High rate of interest on loans	3.84	3.84	1	0.05	0.000
Issue 16	High prices of inputs	6.63	6.63	1	0.01	0.002
Issue 17	Inadequate credit facilities	3.84	3.84	1	0.05	0.000

Discussion:

It is evident from the above mentioned table that agriculture sector is facing two major constraints in Pakistan: 1) Resource constraints and 2) Policy constraints. Resource constraints comprise of inappropriate use of land resulting in land degradation [Issue 14= Land degradation (df=2, α=0.05 and p=0.006)], fragmented land concentration, inadequate water drainage system [Issue 11= Inappropriate water drainage system (df=3, α=0.05 and p=0.004)] and inadequate infrastructural facilities such as improper manpower management (Faruqee, 1995). On the other hand the policy level obstructions encompasses of diverse constraints that lower the agriculture productivity. These policies are not appropriate to meet the needs of agriculture sector (Pretty, 2002). There is inconsistency between the role of public and private sector regarding various market activities. Policy making and agriculture sector reforms are not appropriate to meet the necessities of agriculture development demands (Faruqee, 1999).

There are various indicators for crop productivity in Pakistan:

1. Land and water related factors (such as quality of land, quality of water and source of water etc).
2. Climatic factors (such as rainfall and temperature etc).
3. Agronomic factors (such as quality, quantity and timings of input application etc).
4. Socio-economic factors (such as education level of the farmers, health status of the farmers, farm size and availability of credit facilities to the farmers etc).
5. Farm management factors (such as infrastructural facilities and application of modern technology to farms etc) (Hussain and Peera, 2004).

Agriculture contributes to both income growth and poverty diminution in developing countries by generating income and employment in rural areas and providing food at reasonable prices (Ashley and Maxwell, 2007). Thus the agriculture sector is suffering from various factors that lowers the agriculture productivity in Pakistan. They include the social factors like low socioeconomic status of the farmers [Issue 12= Poverty of farmers (df=4, α=0.01 and p=0.000)] and illiteracy of the farmers [Issue 13= Illiteracy of farmers (df=1, α=0.05 and p=0.000)]. In addition to this soil degradation, poor soil management, land fragmentation and inadequate access of farmers to markets [Issue 6= Inadequate market access to farmers (df=3, α=0.01 and p=0.000)] are the core challenges faced by the farmers pertaining to their agriculture productivity. Despite this the other issues that lower the agricultural productivity are as follows:

[Issue 3= Attack of pesticides (df=4, α=0.05 and p=0.003)]
[Issue 4= Poor quality of seeds (df=1, α=0.01 and p=0.007)]
[Issue 8= Low quality of raw materials (df=4, α=0.05 and p=0.008)]
[Issue 9= Lack of water reservoirs (df=3, α=0.01 and p=0.001)]
[Issue 10= Scarcity of freshwater (df=6, α=0.01 and p=0.002)]

Land degradation reduces the agriculture yield per acre especially in dry season. In addition to this increased evaporation leads to scarcity of water. Thus sudden climatic changes [Issue 7= Sudden climatic changes (df=1, α=0.05 and p=0.005)] have larger impact on water reservoirs, ecosystems, biodiversity and soil composition etc. These factors increase or decrease the crop productivity of land (Rorabacher, 2010).

About 90% of the agriculture output depends upon irrigation system of Pakistan. Thus the system suffers from various operational problems such as water logging [Issue 2= Water logging (df=2, α=0.05 and p=0.001)], soil salinity [Issue 1= Soil salinity (df=1, α=0.05 and p=0.000)], canal water theft, insufficient cost recovery and irregular distribution of irrigated water (Khan, et al. 2002). On the other hand the salient challenge faced by the farmers in agriculture sector is that 2/3 of the rural employment is from agriculture sector but only 10% get loan from some institutional source (Shabbir, 1994). The farmers prefer non-institutional sources such as relatives, peer group and middleman due to high rate of interest on loans from institutional sources. The above mentioned table illustrates the foremost economic challenges faced by the farmers in agriculture sector of Pakistan by the application of chi-square and gamma test as shown below:

[Issue 15= High rate of interest on loans (df=1, α=0.05 and p=0.000)]
[Issue 16= High prices of inputs (df=1, α=0.01 and p=0.002)]
[Issue 17= Inadequate credit facilities (df=1, α=0.05 and p=0.000)]

Thus the above cited tables show that high prices of inputs is the major challenge faced by the farmers (as null hypothesis is rejected and alternate/scientific hypothesis is accepted). These inputs include irrigation water, various varieties of seeds, pesticides, fertilizers and various types of traditional and handmade tools for the purpose of sowing and harvesting [Issue 5= Usage of obsolete technology (df=1, α=0.05 and p=0.002)](Mellor, 1994).

CONCLUSION AND POLICY IMPLICATIONS:
Agriculture is the locomotive of rural development in Pakistan. In past agriculture development and rural development were used interchangeably because agriculture development prop up rural development in terms of output, employment, consumption and land usage etc. But agriculture productivity decreases due to several reasons like poverty, non- participation of the government and implementation problems. Agriculture sector is the main source of foreign exchange earnings in Pakistan. The export of cotton, cotton based products and rice etc fetch about 65% of our total export earnings. The nexus of concentrated power, land ownership, unequal land distribution and state's inability to protect rights of farmers has been a source of low agriculture productivity. Despite the fact that agriculture sector has critical importance to growth, exports and food security, it is facing many challenges that lowers its agriculture yield. These impediments include usage of obsolete farming technology, outdated infrastructure, lack of irrigation facilities and water salinity etc. The following policy measures must be

implemented by the government to cope with various challenges that the farmers are facing in agriculture sector of Pakistan.

1.   Improvement in water resources:

Government should improve the water resources for the farmers by making dams and also by improving the infrastructure of existing dams so that maximum water can be accumulated and the availability of water can be ensured.

2.   Improvement in management of financial resources:

Government should provide loans for the farmers so that they can cope easily with the economic impediments of development in agriculture sector. Besides this various financial matters should be handled by the government so that farmers can contribute their efforts to increase the productivity of the land resources.

3.   Improvement in provision of awareness to the farmers:

Government should give proper awareness to the farmers through media so that they can comprehend the importance of using contemporary agriculture technology in order to increase the productivity of land.

4.   Improvement in research work:

More research work should be done in the field of agriculture so that farmers can implicate the results of these researches to amplify their land productivity.

5.   Provision of subsidies:

Government should provide subsidies for the farmers predominantly on purchasing agriculture tools, input usage, provision of microcredit as well as on the cost of diesel and electricity.

6.   Improvement in mechanization:

Government should provide maximum awareness to the farmers about the importance of mechanization in increasing the agriculture yield. In addition to this farmers should not use superseded methods of farming on their land with the intention that they can cope with assorted determinants of low agriculture yield.

7.   Provision of microcredit to the farmers:

Government should provide microcredit to the farmers without any interest rate so that they can exclusively contribute their efforts to invest more on new technological usage.

8.   Strengthening seed production:

Government should make their efforts to reinforce seed production for every type of crop.

9.   Improvement in farm management practices:

   Government should focus on the farm management practices. These practices include the proper management of manpower, input application and various irrigation practices.

10.   Provision of extension services to farmers:

Government should provide up-to-date knowledge to the farmers such as sowing seed dates, timings of input application and diverse factors related with irrigated water.

11.   Equality in provision of integrated services:

Farmers should provide new information, technology, production of inputs and provision of other financial and social services to large number of farmers. In view of that the farmers should provide seed varieties, quality fertilizers, farm equipment and technology to the farmers.

12.   Reformations in existing agriculture policies:

Government should make amendments in agriculture sector reforms and diminish the imposition of taxes on farmers so that they can utilize various financial benefits from these reforms.

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