

# IMPACT OF VARIATION IN RAINFALL ON AGRICULTURE ECONOMY AND ROLE OF DISTRICT AGRICULTURE DEPARTMENT- A CASE STUDY OF RAWALPINDI

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## Abstract

*Rainfall is the most important climatic component though; the notion patterns are moving in new directions due to climate change setting globally. Pakistan is an agriculture country in which the crop manufacturing is enormously depending on rainfall, even though in most parts of country inadequate rainfall and its usefulness for agriculture is similarly decreasing because of variable nature. As far as climate change is concern Pothowar plateau of northern Punjab, is certainly one of highly vulnerable area of Pakistan as agriculture and livelihoods of the inhabitants is closely dependent to rainfall. Climate change has induced severe affects in Pothowar Plateau by adjustments in precipitation patterns and frequency. The research has conducted for "Rawalpindi Region" in Pothowar area, which has considerable rainfall variations growing its influences on agriculture economy generated from*

*the place. This study focused on affects of variation in rainfall on agriculture economy and the overall performance of district agriculture department in district Rawalpindi.*

**Key words:** Agriculture economy, variation in rainfall, climate change

## I.INTRODUCTION

With growing climate change and clean evidences of observed changes in climate in the course of 20th century, an increasing emphasis on food safety and its regional affects has come to forefront in the world. Where, Pakistan experiences severe climate events like premature and heavy rain fall in hilly regions inflicting massive harm to the crops and belongings of farmers. Keeping in view the significance of agriculture to the economy and rural livelihoods, the value of climate change adaptation techniques is essential. In this regard several departments are

functioning at national, provincial and district level to address the issue from diminutive to large stage. Role of such departments is an attempt to bring the country elsewhere from climatic crises which carrying out agriculture and farmers relying on it for livelihood. Furthermore, agriculture sector's contribution into industrial segment is also a great development concern. Rainfall variation is a direct threat to agriculture and indirect to the industry as well which is an anticipated obvious loss in national income of Pakistan. These factors have straight penalty to the food security and livelihood of several people belongs to the agriculture sector. The whole process from sowing the seed to having the food in platter goes through with multiple stages of climate variations which are more to be known and faced by farmers and related departments. In this mode provincial government of Pakistan have policy implementations through its established departments at district levels. District Agriculture Department in each district is designed to tackle all associated issues and challenges face by local farming community. It also runs to create impact fullness of policies with the incorporation of local demands according to the agriculture needs of the area. Therefore the study in script the variations of rainfall in context of agriculture economy and its adaptation strategies opt by farmers through facilitation of relevant department.

## BACKGROUND

Changes in the climate have been going on for a long period of time and until ongoing in present century. The vast majority of this progression was normally happening like on account of ice-ages and after that post-cold period. The present-day isn't the first run through carbon dioxide levels in the air have been

high. Beginning with the industrial revolution of the nineteenth century until today, changes in the climate has been for the most part the aftereffect of human action by 95% conviction as indicated by the Intergovernmental Panel on Climate Change or IPCC. The modern upheaval implied a move from human work to apparatus, and kick started the time of ignition motors – including the car – and, accordingly, the exorbitant consuming of petroleum derivatives.

Over the previous century, human exercises have discharged a lot of carbon dioxide and other warmth holding ozone harming substances into the climate, which thusly makes the worldwide surface temperature rise. (IPPC, 2007)

Environmental change is caused by the consuming of non-renewable energy sources, deforestation (since trees and plants normally store CO<sub>2</sub>), rural practices (cultivate creatures discharge methane gas, and nitrous oxide is found in manufactured composts), arrive utilize changes, contamination, and so on. (Shirin, 2005)

These practices discharge GHGs into the air at unsustainable rates and are driving common cycles to over-burden and outperform a limit which at that point brings about changes to our atmosphere. (Larun & Urdal(2001). Our lives are clearly associated with the atmosphere and nature. Earth is a shut framework; loaded with interweaving cycles that require adjusting we are reliant on it however it isn't subject to us.

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## II. SIGNIFICANCE OF THE STUDY

The understanding that variation in rainfall have on people is what climatic conditions they faces during agriculture practices and how they react to it. The district agriculture department staff and all associated farming community gets bother while not receive spell of rainfall for crop yield happened due to various natural and unnatural reasons. The whole of system encounters disturbance and loss due to such situation which mainly affects the economy. Is society is aware of what is happening in responsible departments to cope with this issue? Does the performance of relevant department is as satisfactory to the farmers? It is because of so many issues and unasked questions of people which are set out to carry this study. The findings will be an input to the understanding of the perceived influence that variation in rainfall has on agriculture economy.

## III. OBJECTIVES

- To view the stairs/steps taken by District Agriculture Department to reduce effects of rainfall
- To examine the consequences of variable rainfall on agriculture economy of district contributing to industry

- To know local farmers view on performance of District Agriculture Department- Rawalpindi

## IV. REVIEW OF THE LITERATURE

The existing literature on rainfall variability is packed with bundle of research work and narrative reports by different social scientists, metrologists and economists from research departments, policy maker institutes and academia. Such work is creating a strong link with the rainfall variability and its effects on agriculture economy and related components. Whereas, literature has been reviewed for all the essentials of study which includes, variable rainfall, agriculture economy and farmer's agriculture practices, and other socio economic effects of rainfall all under the theme of climate change.

According to (IPCC, 2007) The Fourth Assessment report of Inter Governmental Panel on Climate Change it is indicated that the earth's temperature has risen drastically this transformation in temperature added variability in rainfall. Many evidences show that precipitation also reveals long time exchange in lots of places of the world. Many arid areas had been changed into semiarid and vice versa. Pakistan is ranked as 12<sup>th</sup> extremely bare country to climate change by World Bank. Hike temperatures, intense rains, droughts and decline in production in agricultural sector are anticipated in Pakistan due to climate change. Pakistan is carrying the impacts of climate variability without knowing the reasons behind. IPCC report also mentions that rains will increase in the northern areas of Pakistan. The recent floods in Pakistan are a cause of abundant and asymmetrical rain fall patterns.

According to another report of Task Force on Climate Change (2010) in Pakistan, the country is uncovered to a number of natural disasters, along with cyclones, floods, drought, excessive rainfall, and earthquakes. In the final couple of a long time there was boom in the prevalence, frequency, and depth of intense climatic events: approximately 40% of the human beings of Pakistan are especially prone to common multiple failures with variations in rainfall styles, storms, floods and droughts.

Likewise, global climate models (GCMs) projects discloses incredible alterations to local and globally averaged precipitation and air temperature, such changes are likely have allied influences on groundwater boost. A researcher speculates that the rainfall sample, river flows, and sea degrees everywhere in the world would be affected with the climate change in coming era. Remarkable modifications in the climate may also seriously have an effect on the agricultural yield over the subsequent hundred years.

In addition to it Fischer et al. (2016) study illustrates that agriculture and food security can be influenced by change in climate for some reasons, for example, the precipitation dissemination and the accessibility of capital, water, biodiversity, land, and worldwide natural resources. This may expand questions on the natural way of life running from homestead to famers and result in exchange flow, and in the long run influence the worldwide economy, sustenance security, and the ability to feed 9 billion individuals by 2050. International Institute for Applied System Analysis (IIASA) demonstrated that water system prerequisites at the local and worldwide level may influence the climatic conditions which include agrarian water taking, and future socioeconomics.

Kaiser & Drennen, (1993) places interest to the importance of climate change into agriculture which narrates that agriculture is an economic activity noticeably based on climatic state of affairs. Changing climate has alarmed the productiveness of agriculture zone making it prone both economically and physically. Productivity is affected through a numeral of climate change factors along with rainfall pattern, temperature rise, adjustments in sowing and harvesting dates, water accessibility and land suitability.

## V. METHDOLOGY

This study was conducted to analyze the impact of variation in rainfall on agriculture economy and role of district agriculture department in Rawalpindi. The analytical study was carried out in the employed members of district agriculture department Rawalpindi and local farmers of the area. Employers of department are chosen according to the availability and time while farmers are selected from three Tehsils of Rawalpindi included Chakwal, Rawat and Muree. In present study the universe was district Rawalpindi twin to the capital of Pakistan, Islamabad. The study was conducted in Rawalpindi. It is comprised of urban and rural both. According to administrative subdivisions of Rawalpindi the district is divided into seven Tehsils:

1. Gujar Khan
2. Kahuta
3. Kallar Syedan
4. Kotli Sattian
5. Murree
6. Rawalpindi
7. Taxila

According to the census of Pakistan, Rawalpindi is considered as highly urbanized city. The population was estimated to be 4.5 million in 2010. The main tribes of the district are the Rajputs, Syed, Khattar, Dar, Gakhars, Janjuas, Awans, Gujjars, Jats, Kassar, Sheikh, Abbasi, Khawaja, Bhatti, Chauhan, Mir, Butt, Mughals, Qureshis, Arain and Sattis. The data has collected in two parts. The part A includes 20 respondents from the district agriculture department. While, part B includes 60 farmers from three Tehsils of Rawalpindi. Data from farmers has collected through simple random sampling technique. For the present study the method use for collection of the data was a questionnaire. Researcher constructed a questionnaire for the data collection of the related subject. The questionnaire is formulated on the base on services of district agriculture department provided to farmers in rainfall variation. The qualitative method was used due to the nature of the study. It deliberately gives up on quantity in order to reach a depth in analysis of the object study. Interview and case study method were used for the present research as well as for data collection. Interview guide as a tool of data collection has following advantages.

Interview is used for the present study because the respondents have different perspectives. Interview schedule has the flexibility to understand real feelings of the respondents.

Interview schedule the researcher has face-to-face interaction and is able to read the face expression of the respondents and could interpret results easily.

## **V. RESULT AND MAJOR FINDINGS**

### **PART (A)**

- Majority of respondents (50%) from district agriculture department shows that Wheat is the most effected crop from variation in rainfall
- Majority of respondents (40%) shows that the main effect of variation in rainfall on agriculture is low productivity
- Majority of respondents (45%) marked urbanization as the main cause of variation in rainfall
- Majority of respondents (75%) from department shows that rainfall variation has largely affected the agriculture since last seven years
- Majority of respondents (40%) shows that harvesting is the most effecting step of cropping due to variation in rainfall
- Majority of respondents (35%) marked that use of water conservation techniques are suggested to the farmers under extreme changes in rainfall
- Majority of respondents (55%) of respondents revealed that SMS is used to deliver climate change information to the community
- Majority of respondents (65%) respondents revealed that local demands of farmers are incorporated in polices
- Majority of respondents (70%) shows that agriculture is more income generating from District Level
- Majority of respondents (90%) shows that livestock is more income generating at national level
- Majority of respondents (50%) revealed that the government funds are utilized for

Capacity building programs for farmers & employs

- Majority of respondents (35%) shows that the main effect of variation in rainfall to industrial sector is less manufacturing Food insecurity.

### **PART (B)**

- Majority of farmers (60%) shows district agriculture department is most relied source for getting information
- Majority of farmers (58%) shows that seed are distributed in time by district agriculture department
- Majority of farmers (65%) shows that marketing of crops is taken place with support of district agriculture department
- Majority of farmers (86.7%) shows that proper space is provided by department to store the crops
- Majority of farmers (50%) marked that livestock as best provided service by District Agriculture Department as Rainfall adaptation
- Majority of farmers (85%) marked that 1-20% of yield has increased by support of District Agriculture Department
- Majority of farmers (93%) marked that 21-40% of livestock yield has increased by support of District Agriculture Department
- Majority of farmers (93%) revealed that they have no language barriers while interacting with district agriculture department staff

### **SUMMARY**

The purpose of the study was to investigate the impacts of variation in rainfall on agriculture economy and role of district agriculture department Rawalpindi. The research revealed that variations in rainfall have great impact on agriculture economy generated from the area. It also described the functioning of district agriculture department in context of rainfall variation and what possibly has done to deal the issue at farm and official levels. To crack the problem of rainfall variation district agriculture department has made various important which have somehow increase the yield of crops during the year 2010-2017. In last seven year a lot has seen at district level which is far updated from the traditional agriculture practices for instance the one hour agriculture program on Pakistan Television is turned into a short SMS to the farmers which is a guarantee to boost their agriculture capacities. The study explored the main causes of rainfall variation and what does it brought to the yield of crops, considering wheat as the most important crop of the area rainfall has affected the yield with great extent. To reduce this extent early warning systems and adaptation strategies are been introduced to farmers which has improved the agriculture efficiency. Farmer's local demands are as vital to the policies as the policy itself however, it was very essential to know whether their demands are being address by the policy institutes or not. This question has addressed by the research that local demand are being incorporated in the plans, policies and actions by government policy institutes. This is for sure a positive step to mold the agriculture practices according to the need of location. So there remains no more generalize polices. Performance of District agriculture department has also been assessed with the ethical approaches which led the researcher to



know about the evidences of good behavior of department to the farmers. Also the least language barriers among two entities show the success of information deliver to the farmers. Rainfall variation has caused a lot to the agriculture which has checked in industrial perspectives. A decline or boost in agriculture products also affects the industrial manufacturing and so the economic contributions of the industry in overall economy. These economic effects are obvious from the current study outcomes which show the low productivity as the most dominating outcome of rainfall variation which haven't increased yields form agriculture and livestock up to 40%. This is a reflection of extreme climate change effects in form of rainfall variation in area. District agriculture department has seen the most reliable source of information to the farmers and it exhibits the extent of satisfaction as well. Rainfall variation is an immense effect of high urbanization causing industrialization and poor waste management in urban cities. Such issues are an immediate need of policy institutes to address at micro and macro levels for making agriculture as the greatest economy generating factor of country.

## CONCLUSION

Climate change is a notable debate in today's highly urbanized world. The conservation of natural assets from the world has caused the people to suffer the consequences as well. Among all the effects of climate change rainfall has emerged to be the most dominant. Rainfall is the most important component of agriculture production as with adequate water the difference in yield could see. Current study was an addition to examine the variation in rainfall in

agriculture economy which has so far concluded with the great effects of rainfall on agriculture. The variation in rainfall has become the high concern to the policy making institutes and its sub ordinate departments. The role of district agriculture department has its own due significance in the subject matter. This is a cycle of economy generation from local to national level which starts from sowing the seeds and ends up with the national earnings on it. All the entities involve in the process are equally vital to play their role. In this regard staff of district agriculture department has created best of its influence in agriculture of the area. The other side farmers give the impression of gratification to have betterment in crop yield and so to the livelihood. The outcomes are found better than the previous however up to the mark progress is still require with the time which could happen with the more influential policies and plans from district agriculture department.

## RECOMMENDATIONS

The study above encourages having following recommendation for future.

- ❖ Adopt and suggest the climate smart agriculture practices
- ❖ Establish integration with civil society organizations for awareness through public campaigning tool
- ❖ Insure the smart phones available to all farmers so that SMS service become more useful
- ❖ Develop effective training manuals for famers so that maximum interest could gain
- ❖ Invest on new agriculture models and innovative technologies

- ❖ Invest on rain water harvesting and micro irrigation
- ❖ Insure the food security at farmers level as well
- ❖ Invest on food safety campaigns
- ❖ Invest on more effective rainfall precipitation tools and gadgets
- ❖ Make issues of farmers visible through social media
- ❖ Incorporate cross cutting themes
- ❖ Encourage and support evidence base research related to rainfall variation by academia and other research institute.

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