

AGRICULTURAL AND ENVIRONMENTAL CHALLENGES IN CHANGING CLIMATE SCENARIO: STUDY OF AMRITSAR DISTRICT OF PUNJAB

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ABSTRACT

Background: - present paper aims to understand agricultural, environmental problems and extent of climate change observed by farmers prevailing in Amritsar district of Punjab

Methods: - Ajnala block was selected in Amritsar district due to its lowest production of crops. Two villages namely Kotli jimmat singh and Panj garain wala was selected randomly from the villages of the block. Interview schedule tool was used for survey.

Results: - majority of respondents were confronting the problem of overuse of chemical fertilizers, pesticides etc. substantial proportion of respondents were facing health issues due to excessive application of chemicals. Change in temperature and rainfall was mainly observed as change in climate by the respondents.

KEY WORDS: - Climate change, Environmental problems, Amritsar, Punjab.

INTRODUCTION

Farmers are facing agriculture related problems since the inception, change in the climate has exacerbated their complexities. Change in climate bear huge ramifications not only on the production of crops but also on farmers growing these crops. Problems of farming differs with the different ecological conditions. In order to alleviate the farmers problems, it is imperative to identify the problems in the first place that farmers are combating.

This paper attempt to identify the agricultural and environment related problems being faced by the farmers. The area selected produce the lowest yield of wheat and rice and attempt was made to determine the problems encountered by the farmers in this area. Paper strives to analyze the changes in the climate observed by the farmers as with every change in climatic conditions emanates the alterations in the behavior of the crops.

RESEARCH OBJECTIVES

- ❖ To assess the agricultural and environment related problems of the respondents.

- ❖ To estimate change in climate identified by respondents.
- ❖ Gauge the health challenges faced by the respondents.

REVIEW OF LITERATURE

Vasanta¹(2013) in his research paper entitled “Impact of climate change on wheat and rice production: An analysis” tried to assess the effect of climate change on the production of wheat and rice. Author states that with every one-degree Celsius rise in temperature annual production of wheat can reduce upto 6 million tone. Impact of climate change on wheat and rice may vary with the different region. North India will be less impacted by the rise in temperature than other areas. Further, rainfed crops will be more effected by the fluctuations in rainfall than irrigated crops. Author suggested establishing mechanism to increase interaction between farmers and agriculture scientists so that research can integrate with the local requirements of farmers.

Parameswari² (2017) conducted study to understand the problems of female agricultural laborers highlighting the socio-economic conditions, working environment, health of workers and stress related to work using simple random sampling and descriptive research design. Study found that majority of female agricultural laborers were married and belongs to scheduled caste category. Around one-fifth of the laborers had no formal education. Majority of laborers were earning per month meagre 1500 to 2000 rupees only working 7 to 8 hours per day. It was found that approximately half of the workers were satisfied with their work and majority of laborers felt they did not have health problems and those faced health problems mainly reported to encounter headache and injuries at work spot. Author suggested program for women to develop leadership skills. Regularization of hours of work and wage payments. Women should be trained to secure employment other than agriculture.

Ayyogari et al.³ (2014) analyzed the effect of climate change on vegetables. Author states that temperature fluctuations can delay the ripening of fruits and can results in reduction of sweetness in fruits. Prevalence of drought impact the germination of seeds of vegetables. Draught can lead to increased concentration of salt in soil which can further affect reverse osmosis and loss of water from plants. Whereas higher humidity levels favor development and survival of certain pathogens and hence increasing the vulnerabilities of diseases. Therefore, it can be concluded that climate change will have huge impact on production of vegetables and hence can threaten the food security of the nation.

Srivastava et al.⁴ (2015) evaluate the consumption of groundwater whether it is upto optimum level of sustainability, plausible causes for its over-consumption. In Punjab groundwater is mainly augmented from sources such as irrigation flow, seepage of canal water, recharge from tanks, ponds etc. however, rainfall contributes only one-third of the recharge of

ground water in Punjab. Study concluded that groundwater draft in Punjab is much higher than its sustainable limit. Reason for its over exploitation is injudicious use of water resources, over dependence on ground water for irrigation of water intensive crops such as rice. Author suggested reducing subsidy and providing other water saving methods such as System of rice intensification, direct seeded rice etc.

METHODOLOGY

- ❖ **SAMPLING METHOD:** - This study was executed in Amritsar district of Punjab aiming to understand to environment and agricultural related problems faced by the farmers in this area. Ajnala block was selected purposively owing to the lowest production of rice and wheat in this block. Further two villages were selected randomly from the block namely Kotli jimmat singh and Panj garain wala. Sample of 5 households from Kotli jimmat singh and 50 households from Panj garain wala was selected randomly on the basis of proportion of population.
- ❖ **RESPONDENTS:** - respondents for the study are the households which derive income predominately from agriculture. Head of the households were interviewed using interview schedule.
- ❖ **METHOD OF DATA COLLECTION:** - the present study is an empirical research based on survey method. Data was collected from primary sources using interview schedule tool. Interview schedule was constructed keeping in mind research objectives.

RESULTS

Table 1. Distribution of respondents on the basis of various agricultural and environment related problem being faced

<u>Various problems faced*</u>	Ajnala block		
	Kotli jimmat singh	Panj garain wala	Total
AGRICULTURAL PROBLEMS			
Overuse of chemicals such as pesticides and fertilizers	4 (80%)	26 (52%)	30 (54.5%)
Ground water depletion	5 (100%)	24 (48%)	29 (52.7%)
Decreases productivity	4	19	23

	(80%)	(38%)	(41.8%)
Lack of resources	0 (0.0%)	6 (12%)	6 (10.9%)
ENVIRONMENTAL PROBLEMS			
Contamination and depletion of water sources	5 (100%)	21 (42%)	26 (47.3%)
Late onset monsoons and Uneven and unpredictable rainfall	3 (60%)	20 (40%)	23 (41.8%)
Water pollution due to overuse chemical fertilizers etc.	3 (60%)	10 (20%)	13 (23.6%)
Damage from extreme climate like heavy rain fall, hail stones	0 (0.0%)	7 (14%)	7 (12.7%)

*multiple response table

Cursory look at the table shows that among the agricultural problems, overuse of chemical such as pesticides, insecticides is considered as major problem among the respondents as mentioned by 30 (54.5%) respondents. 29 (52.7%) respondents mentioned depletion of ground water as major problem. 23 (41.8%) reported decreased productivity of crops followed by 6 (10.9%) respondents who mention lack of resources as agricultural problems. Among the environmental problems, 26 (47.3%) respondents mention contamination and depletion of water resources followed by 23 (41.8%) respondents who mentioned late onset of monsoons, uneven and unpredictable rainfall as major environmental problems. Water pollution due to overuse of chemical fertilizers etc was felt by 13 (23.6%) respondents. 7 (12.7%) respondents were reported facing damages to crops from extreme climatic conditions like heavy rain fall and hail stones etc. it can be discerned from the table that respondents of this area are mainly facing the challenges due to excessive application of chemical such as synthetic fertilizers, pesticides and insecticides etc and the repercussions of injudicious application of these chemicals like water and soil contamination.

Table 2. Distribution of respondents on the basis of facing health problems

<u>Farmers facing health problems</u>	Ajnala block		
	Kotli jimmat singh	Panj garain wala	Total
Yes	4	43	47

	(80%)	(86%)	(85.5%)
No	1 (20%)	7 (14%)	8 (14.5%)
Total	5 (9.1%)	50 (90.9%)	55 (100%)

Table presents that majority of respondents, that is, 47 (85.5%) were facing health problems. 4 (80%) respondents from Kotli jimmat singh and 43 (86%) respondents from Panj garain wala village reported to have faced health problems. There was similarity of response in both the villages regarding the incidence of health issues as respondents in both the villages admitted facing health challenges in around equal proportions.

Table 3. Distribution of respondents on the basis of causes of health problems

<u>Causes of health problems</u>	Ajnala block		
	Kotli jimmat singh	Panj garain wala	Total
Overuse of chemical fertilizers and pesticides	1 (20%)	23 (46%)	24 (43.6%)
Water and soil pollution	0 (0.0%)	16 (32%)	16 (29.1%)
Climate change	0 (0.0%)	1 (2%)	1 (1.8%)
Over use of chemical fertilizers, pesticides and Water & soil Pollution	3 (60%)	3 (6%)	6 (10.9%)
Total	4 (8.5%)	43 (91.5%)	47 (100%)

Respondents who affirmed facing health problems were inquired about the probable causes of their health problems. 24 (43.6%) mentioned overuse of chemical fertilizers and pesticides as reason of their health problems. 16 (29.1%) respondents mentioned water and soil pollution as the reason. 6 (10.9%) respondents mentioned both overuse of chemicals and water and soil pollution as the reason of their health problems. Respondents in Panj garain wala mentioned overuse of chemical fertilizers in higher proportion, that is, 23 (46%) in comparison to Kotli jimmat singh. 16 (32%) respondents mention water and soil pollution due to injudicious

use of chemicals in Panj garain wala village whereas, none of the respondents mention this as the cause of their health problem.

Table 4. Distribution of respondents on the basis of changes in the climate observed

<u>Changes in climate* observed</u>	Ajnala block		
	Kotli jimmat singh	Panj garain wala	Total
Change in temperature	5 (100%)	50 (100%)	55 (100%)
Change in rainfall pattern	5 (100%)	50 (100%)	55 (100%)
Changes in average yield	1 (20%)	13 (26%)	14 (25.5%)
Change in cropping pattern	2 (40%)	11 (22%)	13 (23.6%)
Increased occurrence of natural calamities	2 (40%)	6 (12%)	8 (14.5%)

*multiple response table

It can be inferred from the table that all the respondents, that is, 55 (100%) felt change in temperature and rainfall pattern. Respondents of both of the villages represented equal proportion of acknowledgement with regard to changes felt in temperature conditions and rainfall patterns. Many of the respondent said that temperature has risen and rainfall has become erratic which impact the growth and production of crops. 14 (25.5%) respondents who felt changes in average yield of the crops on further inquiry most of the respondents mentioned decrease in average yield of the crops and found that soil produce crops only when fertilizers are

applied. 13 (23.6%) respondents reported change in cropping pattern as more farmers are growing rice and wheat and other crops are losing its significance in this area. 8 (14.5%) reported to felt increased occurrence of natural calamities due to climate change. Earlier, the only natural extremities farmers were facing in this area was flood caused by the over flowing of canal but as the climate change farmers are observing changes in rainfall pattern, temperature, humidity conditions which impact the crops productivity.

CONCLUSIONS

Data from the survey brings us to the conclusion that farmers in this area are countering the menace of excessive application of chemical inputs such as fertilizers, pesticides, insecticides etc, depletion of water resources due to injudicious and unsustainable use of water. Majority of respondents were facing health issues and overuse of such chemical was stated as major reason for their health challenges. Preponderance of respondents claimed change in temperature and rainfall in the area.

Pro-active approach of government is required to help farmer combat the climate change. Farmers should be provided with scientific knowledge for growing crops and maintaining the optimum productivity level. Research should be promoted to evolve crops which can resist climate change. There should be convergence between the ongoing research and the regional requirements.

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