

THE ROLE OF PRE-DISPOSING ENVIRONMENTAL FACTORS IN AGRICULTURAL LAND CONVERSION IN DISTRICT MALAKAND KHYBERPUKHTUNKHWA PAKISTAN

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Abstract

The present study deals with the role of pre-disposing environmental factors in agricultural land conversion. A quantitative research design was adopted to portray information from a sample of 375 households through simple random sampling technique. At univariate level analysis simple frequencies and percentages distributions was applied and at Multivariate analysis Chi-square and Tau-c (T^c) tests was adopted to found the association between the study variables. The results indicated that a high proportion of 61.1% of the respondents agreed that due to low agricultural productivity farmers enforce to convert their land for other purposes. Similarly, 18.4% negated the statement and 20.5% were indecisive. Additionally, high proportion 48.0% of the respondents were agreed that scarcity of natural resources is the driving force for land conversion followed by 32.8% of the respondents were deny about it. Additionally, a high proportion 77.6% of the respondents accepts that the growth in population creates immense pressure on agricultural land conversion. Furthermore, the result also show that majority 231 (61.6%) of the population were agreed that climate change and inadequate irrigation facilities are responsible for less productivity and land use change. Likewise, 150 (40.0%) of the population agreed that tradition nature of farming is responsible for low productivity and agricultural land loss. Additionally, a high proportion 162 (43.2%) of the respondents were of the view that infertility of the agricultural land is responsible for low productivity and agricultural land loss. Ample viable conversion policies with appropriate implementation mechanism and proper planning for safeguarding and increase the land production are the major study recommendations.

Keywords; Pre-disposing, environmental policies, Agriculture Land, Conversion, Pakistan

INTRODUCTION

Pakistan is an agricultural country out of the total area of 79.6 million hectares the cultivated area is covered 22.1 million hectares. Moreover, the remaining area is contained densely populated forests and rangelands. Similarly, the remaining area which is consisting of 23.3 million hectares constitutes cropped area. Whereas, 4.6 million hectares of the total area covered by forest. However, approximately out of 20.645 Billion acres agricultural land, 4,626 million acres is still unfertile and behind the cultivation whereas 16.19 million lower than farming in KPK. Generally, for housing, food production and human livelihood as a whole area considered significant aspect. Therefore, agricultural land is the most important and the backbone of economy of a country and at the same time it provides ample economic and social assistances to its inhabitants. Furthermore, transition of land is linked with various constructive and destructive consequences for humans and environment as well. Sociologically, transaction of land is important to produce food, feed and fiber for human use and it's also provides shelter for its habitants. While, environmentally, transition of land regulate a couple of environmental aftermath, such aftermaths consists of carbon emissions and loss of habitat for biodiversity with land clearing, soil degradation, erosion, overgrazing and other indefensible practices.

Land use for farming, livestock and production of crops for human being usually through systematic use as known as Agricultural land. In more general it is also known as farmland or even crop land. Agriculture and agro base industries are considered as main stream profession of Pakistan, where the sector provides more than seventy percent of employment to local public of the country.

Further, it has the greatest contribution to national Gross Domestic Product (18.9 %); also contribute more than 44 percent to export of the country. In simple, agricultural sector play a pivotal role in development of national economy. It is a major source of production and export realizing significance of the agricultural land, play pivotal role in the development of the national economy. Growth of the sector is most crucial particularly in reduction of poverty and providing employment opportunities in rural areas of the country. In rural areas the farmers and general public usually depends on agriculture production and subsistence for fulfillment of basic lives needs. Therefore the development of the agricultural land is considered higher than non-agricultural sectors. (GoP, 2018).

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LITERATURE REVIEW

Diverse forces in the land market are the result of low productivity and land fragmentation. The different characteristics and nature of fringe areas are likely potential, clay varieties length and size as well as legal and policy status factors. Agriculture land diversification is closely related to soil fertility. It is a general observation that lands close to water sources are mostly high fertile than those away from water sources. While the establishment of commercial markets, towns, and industries are usually associated with manmade privileges. Such privileges have a role in deciding the site for cover and housing growth. The plane area always bears high market price than the hilly and rough area. Besides, the planned lands always full the sellers towards further development and commercialization. Moreover, the area near urban and cities are at constant risk of conversion to land fragmentation. Also, the size and shape of the area are the most influential factors, and larger is always preferred for marketing and commercialization. Thus, the development of housing and industrial sectors mostly transfers the urban fringe from prime farmland to new residential and industrial areas (Azadi, 2011).

Discontinuous development pattern is considered another factor causing urban sprawl. Commercial uses which are more productive than residential uses are the most suitable example of discontinuous development in the region. Residential and commercial uses land has a strong association and most commercial development depends on residential development. Initially, their residential development took place in the area and slowly commercial uses become started remunerative because of the extensive demand for goods and services (Wadhwa, 2018). Along with this, land fragmentation has also been rooted in building construction activities in a particular area. The construction of either real estate or physical development holds significance in fluency on land fragmentations. And these permanent construction activities result in the rapid loss of fertile agricultural land (Fazal, 2000). A very recent example is China where a majority of agricultural area had converted into urban sprawl during the country's economic development phase. During the process of industrial growth and mechanization, nearly 4.2 million hectares of cultivable land have been diverted for commercial purposes (Li Xiubin, 2011). Similarly, In Tamil Nadu in Madurai District, the speedy industrialization boomed agricultural land fragmentation and real estate in the

region. Similarly, several illegal constructions have been made in agricultural areas where farmland has been drastically converted to housing societies in the majority areas of the city in Brazil. The numerical data of the district office reveals a downturn of 1.47 hectares to 1.35 hectares lacks in from year to 2000 to 2011 (Sundar, 2013). Thus land fragmentation due to inheritance and low productivity of land leads to the conversion of agricultural land.

RESEARCH METHODOLOGY

Sampling procedure and Sample Size

Sample is a smaller set of data selected from larger population through multiple ways. Scientifically, it is the representative of sub set of whole study population whereas; sampling is the way samples are carried out (Sekaran, 2003). According to the official record of KP Bureau of Statistics, 2017, District Malakand comprises a total of 12,932 households. According to Sekaran, a sample of “375” suffices from a total number of “12,932” households (Sekaran, 2003). Moreover, the sample size was allocated to each UCs as per the population of the UCs through proportional allocation formula (S. M. Chaudhry, 2009). Proportional allocation of sample size is given in Table 1. *Proportional allocation formula for the determination of sample size;*

$$n_i = \frac{n}{N_i} \times N_i$$

n = denoted sample size.

N = used for total number of household.

N_i = N_i signify household in each Union Council.

n_i = villages size from each UC's.

Table 1; Sample size for each Tehsil in district Malakand, KPK

Tehsil Name	UC Name	Households	Sample Size
Swat Ranizai (Batkheela)	Khar	2478	72
	Upper Batkhela	3344	97
	Dargai	4478	130
Sama Ranizai (Dargai)	Ghari Usmani Khail	2632	76
Total		12932	375

Source- KPK Bureau of statistics 2017

Measurement of variable

The scale for the variable private interventions comprised of seven items and positive response on four or more than four items was consider as private interventions prolonged.

Indexation

In research, indexation is a method of quantifying rule, mainly in attitudinal when dealing with attitudinal account especially in the measurement of two items into a set of single variable. In simple, the linking of two different variables into single set of concepts is known as indexation (Nichnais, 1992 and smith, 1981).

Analysis of Data

The SPSS package was used at Uni-variate level to determine the frequency and percentage distribution of the respondents, similarly, for Bi-Variate analysis, Chi-square and Tau-c (T^c) test was applied to assess the association between two variables and for Multi-Variate analysis would be used to control background variables.



RESULTS & DISCUSSIONS

1.1 Gender of the respondents

Patriarchy prevails for centuries everywhere in KhyberpukhtunKhwa. Most of the cases pre-dominate roles and primary roles of political leadership, moral authority, social privilege, and control of property are controlled by men. In the study area, it may affect many aspects of women's life. Besides this, Men dominancy from the home, where the head of the household is considered man and spread over the entire community (Riley, 2006).

Table 1.1 Percentage and frequency distribution of the respondents based on their gender

Gender	Frequency	Percent
Male	262	69.9
Female	113	30.1
Total	375	100.0

Source: Field Survey, 2022

Table shows the frequency and percentage distribution of the respondents based on their gender. Most of the respondents i.e. 69.9% were male and 30.1% were female. Gender is the major determinant in the division of labor, especially in rural areas. The male gender is allocated masculine outdoor jobs whereas females are considered to work indoor activities also perform outdoor tasks in rural areas. Representations of both genders ensure diversity in views on variables in hand.

1.2 Age of the Respondents

Table 1.2 designates the percentage distribution and frequency of the respondents based on age. The greater number of the respondents i.e. (50.1%) belongs to the group aged 20-30 years. Likewise, 30.1 of the respondents fell under the group of 31-40 years. Similarly, 9.9% of the respondents were from the group 41-50 years of age, and 9.9% of the respondents were from the age group 51 years and above.

Table 1.2 Percentage and frequency distribution of the respondents based on age

Age (Years)	Frequency	Percent
20-30	188	50.1
31-40	113	30.1
41-50	37	9.9
51 & Above	37	9.9
Total	375	100.0

Source:Field Survey: 2022

1.3 Educational status of the respondents

The development and progress of a nation rely on the education of the people generally. That is why education plays a pivotal role in the way of development and social awareness. Education becomes a man's rational thinker. Education helps to make a person rational and critical thinker for taking the right direction in decision making. It's also helpful in establishing effective skillful communication which can improve the community relationship, sense of belonging as well as awareness regarding rapid agricultural land loss.

Table showed the respondent's educational status. The majority i.e. 70.4% of the respondents were literate. Besides, 29.6% of the respondents were found illiterate. These findings are similar national census where a major chunk of the population is literate. This high level of education is probably due to localized awareness of the people about the importance of education.

Table 1.3Percentage and frequency distribution of the respondents based on their education

Education status	Frequency	Percent
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Literate	264	70.4
Illiterate	111	29.6
Total	375	100.0

Source:Field Survey: 2022

1.4 Association between Pre-Disposing Environmental Factors and Loss of Agricultural Land

Results in the table no (4.3.3) revealed that the association between low agricultural productivity farmers enforce to convert their land for other purpose with loss of agricultural land found highly significant ($P= 0.000$) and positive ($T^c = 0.259$). Likewise, the association between scarcity of natural resources is the driving force for land conversion with loss of agricultural land found highly significant ($P= 0.000$) and positive ($T^c = 0.079$). It has been observed that in developing countries of the world due to decreased in agricultural productivity and lack of rains and infertility of soils farmers were used to convert their land for non-agricultural purposes leading by agricultural land loss. Additionally, soil infertility, lack of rains and due to decrease in productivity was natural phenomena; consequently it put pressure on local community to convert their land which caused land conversion. These results are supported by, Verburg, (2013) stated that due to lack of raining, and scarcity of natural resources leads towards land conversion, as a result the study finding correlated with the finding of Verburg (2013) due to cultural variance, commitment with agricultural profession was consider as a cause for land conversion in the study region.

Similarly, the association between growth in population creates immense pressure on land conversion with loss of agricultural land found highly significant ($P = 0.000$) and positive ($T^c = 0.091$). Moreover, the association between climate change and inadequate irrigation facilities are responsible for less productivity with loss of agricultural land was found significant ($P= 0.000$) and positive ($T^c = 0.080$). The results further highlighted that association between traditional nature of farming is responsible for low productivity with loss of agricultural land found highly significant ($P= 0.000$) and positive ($T^c = 0.075$). Besides, results also revealed that the association between infertility of agricultural land is responsible for low productivity with loss of agricultural land found significant ($P= 0.000$) and positive ($T^c = 0.140$). In the above results it is concluded that in many areas of the world a huge number of people living in a specific area put pressure on agricultural land as well as due to changing environmental condition caused agricultural land loss. these results are in line with the findings of, a number of field research conducted on causes and consequences of land conversion finds strong correlation between the factors of low productivity, scarcity of natural resources, rapid growth in population, climate change with land conversion. In this regards Van Vliet (2015), identified that more than 66% of their research respondents considered land conversion as a result of high population growth, lack of irrigation facilities and low agricultural productions were prominent factor for agricultural land loss.

Table 1.4 Association between Pre-Disposing Environmental Factors and Loss of Agricultural Land

Statements	Indexed Dependent Variable	Statistics
Due to Low agricultural productivity farmers enforce to convert their land for other purpose	Loss of Agricultural land	$\chi^2 = 188.790$ $P = 0.000$ $T^c = 0.259$
Scarcity of natural resources is the driving force for land conversion	Loss of Agricultural land	$\chi^2 = 92.504$ $P = 0.000$ $T^c = 0.079$
The growth in population creates immense pressure on land conversion	Loss of Agricultural land	$\chi^2 = 109.555$ $P = 0.000$ $T^c = 0.091$

Climate change and inadequate irrigation facilities are responsible for less productivity and land use change	Loss of Agricultural land	$\chi^2 = 153.467$ P = 0.000 $T^c = 0.080$
Traditional nature of farming is responsible for low productivity and land use change	Loss of Agricultural land	$\chi^2 = 98.878$ P = 0.000 $T^c = 0.075$
Infertility of Agricultural land is responsible for low productivity and land use change	Loss of Agricultural land	$\chi^2 = 191.003$ P = 0.000 $T^c = 0.140$

Field Survey: 2022**1.5 Association between Pre-Disposing Environmental Factors and community perception towards loss of agricultural land while controlling Age**

The below Table No. 4.35 divulged that the association between pre-disposing environmental factors and community perception towards loss of agricultural land in the context of the age of the respondents was found non-significant and positive ($P = 0.000$ & $T^c = 0.297$) for ages 20-30. Likewise, the associations between the beyond variables were found significant and positive ($P = 0.000$ & $T^c = 0.356$) for age (31-40). Furthermore, the association between the proceeding variables of the respondents was found non-significant and positive ($P = 0.009$ & $T^c = 0.300$) for 41-50 age. Moreover, the association between the arranged variables for age 51 & above was found highly significant ($P = 0.000$) and positive ($T^c = 0.388$) for age 51 & above. The significance of the respondents for the entire table was found highly significant ($P = 0.000$) and positive ($T^c = 0.292$) for the above-mentioned age groups. Although, based on T^c Value the associations between agricultural factors i.e. lack of natural resources, agricultural productivity, and loss of agricultural land found a spurious relationship between the dependent and independent variables as the difference in T^c value. In the study area, the land is mostly under the control of heads of families and the perception of the head of the family towards factors that are associated with the loss of agricultural land is more influential as compared to the Youngers. The study results also declared that an increase in age highly influenced the perception of the community towards pre-disposing environmental factors and loss of agricultural land as indicated by an increase in T^c value with an increase in age. These findings linked with the research work of Ramankutty *et al.* (2016) and stated that age is the potential to describe land conversion in the study area, however, this relation was statistically significant among the age group 41-50 of sample respondents. Further, land use decisions are subjective to the characteristics of farmers or land managers, which respond to many internal as well as external factors like socio-economic, political, and institutional settings surrounding the land unit, which are some of the leading factors of land conversion in the area.

Table 1.5 Association between Pre-Disposing Environmental Factors and community perception towards loss of agricultural land while controlling Age

Age	Pre-Disposing Environmental Factor	More Loss of Agriculture land	Moderate Loss of Agriculture land	Less Loss of Agriculture land	Total	Statistics χ^2 (P-Value) T^c	Level of Significance for Entire Table
20-30	More Pre-Disposing Environmental Factors	28 (59.6%)	18 (38.3%)	01 (2.1%)	47 (100%)	$\chi^2 = 290.250$ $P = 0.000$ $T^c = 0.297$	
	Moderate Pre-Disposing Environmental Factors	29 (34.9%)	45 (54.2%)	09 (10.8%)	83 (100%)		
	Less Pre-Disposing	20 (34.5%)	30 (51.7%)	08	58 (100%)		

	Environmental Factors			(13.8%)			
31-40	More Pre-Disposing Environmental Factors	18 (58.1%)	08 (25.8%)	05 (16.1%)	31 (100%)	x ² =208.019 P=0.000 T ^c = 0.356	x ² = 523.311 P = 0.000 T ^c = 0.292
	Moderate Pre-Disposing Environmental Factors	13 (28.3%)	28 (60.9%)	05 (10.9%)	46 (100%)		
	Less Pre-Disposing Environmental Factors	08 (22.2%)	19 (52.8%)	09 (25.0%)	36 (100%)		
41-50	More Pre-Disposing Environmental Factors	01 (20.0%)	02 (40.0%)	02 (40.0%)	05 (100%)	x ² =93.103 P=0.009 T ^c = 0.300	
	Moderate Pre-Disposing Environmental Factors	11 (45.8%)	12 (50.0%)	01 (4.2%)	24 (100%)		
	Less Pre-Disposing Environmental Factors	01 (12.5%)	02 (25.0%)	05 (62.5%)	08 (100%)		
51-Above	More Pre-Disposing Environmental Factors	03 (27.3%)	07 (63.6%)	01 (9.1%)	11 (100%)	x ² =110.793 P=0.000 T ^c = 0.388	
	Moderate Pre-Disposing Environmental Factors	07 (41.2%)	09 (92.9%)	01 (5.9%)	17 (100%)		
	Less Pre-Disposing Environmental Factors	03 (33.3%)	04 (44.4%)	02 (22.2%)	09 (100%)		

Source:Field Survey, 2022

1.6 Association between Pre-Disposing Environmental Factors and community Perception towards loss of agricultural land while controlling Gender

Results in Table No. 4.28 revealed that the influence of pre-disposing environmental factors on perception regarding loss of agricultural land in the context of genders of the respondents shows significant ($P= 0.000$) and positive ($T^c =0.251$) for males. While the association between the aforementioned variables shows highly significant and positive ($P= 0.000$ & $T^c =0.160$). The value of the level of significance for the entire table shows highly significant and positive ($P= 0.000$ & $T^c = 0.224$) for both genders were spurious. It could be inferred that the results that pre-disposing environmental factors influence people's perception towards the loss of agricultural land. The data further, showed that males and females are differently affected by the association of the above two variables. As all over the world and mostly in South Asian countries land is under the control of males and also males are engaged in land management, therefore, males are more influenced as

compared to females. In this connection, agricultural land management strategies are under debate Van der, *et al.* (2018). Furthermore, pre-disposing environmental factors, as well as agricultural biodiversity and land maintenance systems, require large reforms based on local features i.e. succession management of large-scale marginal production land Merckx, *et al.* (2015). The study further stated that market forces i.e. agricultural-related income, non-economic factors such as place attachments, and social capital. Likewise, pre-disposing environmental factors i.e. disaster events, institutional frameworks, and policy have been the impeding causes and some of the factors leading to the loss of agricultural land loss in the study universe Radeloff, *et al.* (2012).

Table 1.6 Association between Pre-Disposing Environmental Factors and community Perception toward loss of agricultural land while controlling Genders

Gender	Pre-Disposing Environmental Factor	More Loss of Agriculture land	Moderate Loss of Agriculture land	Less Loss of Agriculture land	Total	Statistics χ^2 (P-Value) T^c	Level of Significance for Entire Table
Male	More Pre-Disposing Environmental Factors	35 (56.5%)	23 (37.1%)	04 (6.5%)	62 (100%)	$\chi^2=339.116$ $P=0.000$ $T^c = 0.251$	$\chi^2 = 523.211$ $P = 0.000$ $T^c = 0.224$
	Moderate Pre-Disposing Environmental Factors	46 (38.0)	63 (52.1%)	12 (9.9%)	121 (100%)		
	Less Pre-Disposing Environmental Factors	22 (27.8%)	40 (50.6%)	17 (21.5%)	79 (100%)		
Female	More Pre-Disposing Environmental Factors	15 (46.9%)	12 (37.5%)	05 (15.6%)	32 (100%)	$\chi^2=235.236$ $P=0.000$ $T^c = 0.160$	
	Moderate Pre-Disposing Environmental Factors	14 (28.6%)	31 (63.3%)	04 (8.2%)	49 (100%)		
	Less Pre-Disposing Environmental Factors	10 (31.3%)	15 (46.9%)	07 (21.9%)	32 (100%)		

Source:Field Survey, 2022

1.7 Association between Pre-Disposing Environmental Factors and community perception towards loss of agricultural land while controlling Education

The table below 4.42 showed that the association between pre-disposing and community perception towards loss of agricultural land in the context of controlling the education of the respondents was found highly significant and positive ($P= 0.000$ & $T^c = 0.249$) for literate. Similarly, the associations between the upstairs variables were found significant and positive ($P=0.000$ & $T^c = 0.164$) for illiterate. The level of significance for the entire table was found highly significant and positive ($P= 0.000$ & $T^c = 0.224$) for both the literate and Illiterate. The associations between pre-disposing environmental factors i.e. decrease in production, lack of irrigation channels; natural hazards, and loss of agricultural land while controlling education have strong relationships based on variation in T^c value. The literate people keenly observed the influence of pre-disposing environmental factors

on the loss of agricultural land as they are well aware of the negative effects of pre-disposing environmental factors on agricultural land. Furthermore, these findings are supported by Asante *et al.* (2019) who stated that in the world especially in developing nation increase in agricultural land led to a decline production of agriculture and producing to grew up unemployment ratio, rural-urban migration, poverty, as well as pressure on agricultural land. In this regard more people, the more need for land for survival and residential uses. Likewise, a study conducted in Ghana, supported that agricultural land production no longer meets the needs of the population Appiah,*et al.* (2019). Doing so, the population of the study also prevails that purchases rice, and wheat, from other states due to natural hazards or lack of agricultural policy leading by land conversion in the study area. The study also pointed out that 56.7% of the male member of society most affected by such kind of land conversion activity, due to their relation with the agricultural profession Asante &Nketiah, (2019).

Table 1.7 Association between Pre-Disposing Environmental Factors and community perception towards loss of agricultural land while controlling Education

Education	Pre-Disposing Environmental Factors	More of Agriculture land	Loss of Agriculture land	Moderate Loss of Agriculture land	Less Loss of Agriculture land	Total	Statistics χ^2 (P-Value) T^c	Level of Significance for Entire Table
Literate	More Pre-Disposing Environmental Factors	37 (56.1%)	21 (31.8%)	08 (12.1%)	66 (100%)	$\chi^2=402.033$ $P=0.000$ $T^c = 0.249$	$\chi^2 =523.311$ $P = 0.000$ $T^c = 0.224$	
	Moderate Pre-Disposing Environmental Factors	43 (35.5%)	65 (53.7%)	13 (10.7%)	121 (100%)			
	Less Pre-Disposing Environmental Factors	17 (21.1%)	39 (50.6%)	21 (27.3%)	77 (100%)			
Illiterate	More Pre-Disposing Environmental Factors	13 (46.4%)	14 (50.0%)	01 (3.6%)	28 (100%)	$\chi^2=172.155$ $P=0.000$ $T^c = 0.164$		
	Moderate Pre-Disposing Environmental Factors	17 (34.7%)	29 (59.2%)	03 (6.1%)	49 (100%)			
	Less Pre-Disposing Environmental Factors	15 (44.1%)	16 (47.1%)	03 (8.8%)	34 (100%)			

Source:Field Survey, 2022

CONCLUSIONS AND RECOMMENDATIONS

In every part of the word agricultural land transformation is on peak. In Pakistan specifically in the target area it has been observed that the agriculture land is transformed rapidly for different purposes. For this purpose the present study was conducted to examine the role of pre-disposing environmental factors in agricultural land conversion. It was concluded from the study findings that the major factors associated with transformation of agricultural land was low productivity of agricultural land, scarcity of natural resources, growth in population create immense pressure on

agricultural land, infertility of agricultural land instead of promoting agricultural activities in the area caused loss of agricultural land. By creating a complete planning law with a sufficient economic framework, adequate productive production policies, provide suitable policies to uplift land conversion, and a proper enforcement mechanism, the commercial conversion of land uses can be made sustainable. A plan should be in place to protect agricultural land. This tactic serves its purpose practically in addition to being written as the law. The fertility of the soil is taken into account in the rule when determining whether a particular piece of land can be transferred or not. Land function transfer practices that are based on practical considerations for industrial or personal necessity, material source, and location of the company, transportation access, human resources, and power plants should not be used; instead, they should be based on factors such as the fertility of the land that should be used for the people.

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