

Change of Agricultural Land Use in Residential Land and Its Impact on the Socio-Economic Status of the Farmer in Bahawalpur City

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ABSTRACT

Urban land use change caused by many driving forces that control by various environmental and socio-economic variables. High growth rate of the residential land use creates an immense pressure over agricultural land in the urban fringes and the agricultural land is decreasing in a rapid manner. Research aims to assess the peri-urban and urban land use change in residential land and its impact on socio-economic status of the farmer like how much agricultural land has been grabbed by the residential land use change. Socio-economic impacts of the peri-urban and urban land use land cover change on the life of the farmer. Geographic information system have been used for mapping the spatio-temporal change of urban and peri-urban land in residential land and secondary data collected by the different sources. A questioner was developed to calculate the impact of urban and peri-urban land use change on Socio-economic status of the farmer by survey. So in this way present research helps to highlight the impact of urban and peri-urban land use change on socio-economic status of the farmer. It also elaborates Spatio-temporal loss of agricultural land by residential land use over the 12 year in the Bahawalpur city and its impacts on the farmer.

Keywords: Land use change, agricultural land, satellite images, remote sensing, GIS, Bahawalpur

INTRODUCTION

Agricultural land losses are the impacts of Non-agricultural (Commercial, Economic, Residential and industrial) land uses and rate of urbanization which reduces the highly productive agricultural land in the India (Fazal, 2000). Such type of changes in environment and ecosystem also helps to breakout the disasters of climate change, loss of biodiversity, air pollution, water pollution and soil pollution. Now land use land cover change monitoring and sustaining for production of necessary resources become first important thing of researchers everywhere in the world (Bozkaya et al., 2015). Land use term which refers the pattern of anthropogenic activities of human being on the earth surface like buildings, agriculture and forestry that modifies the earth surface systems like biodiversity, biochemistry and hydrology. Scientists which research on the social life and earth surface management for economic and social purposes have a broad definition of land use in context use of land for many commercial, economic and agricultural activities for private, governmental, ownership and rented stakeholders (Ellis & Pontius 2013). Land use land cover change has very serious direct and indirect consequences on the very necessary safe important resources by the human's anthropogenic activities. Frist of all it have been occurred by cutting and burring the natural vegetation for agricultural activities to manage the land for commercial use. In recent past industrialization has accelerated the human population in urban areas, which made very

high alteration in marginal areas of the urban fringes. Some most important consequences elaborated as under (Foley *et al* 2005). Land use land change reduced the biodiversity very fast on the earth surface. When earth surface altered from primary vegetation to agricultural farm loss of the wild species occur in deforested areas. Scientists also elaborate that in the land use land cover change areas non-native animals, plants and diseases spread out and change the primary biodiversity (Korkmaz *et al.*, 2012). Land use land cover change also accelerates the carbon dioxide emission in atmosphere by the disturbance of soil, vegetation which caused deforestation when agricultural activities causes the discharge of soil carbon by cultivation again and again (Yu *et al.*, 2010). Agricultural activities and population pressure made the earth surface an unusual resource. Scientists expected that the population of the earth will mount at 84percent by 2050, in 2009 increase from 3.4 billion to 6.3 billion in 2050 (Wang *et al.*, 2005). Land use land cover change monitoring, assessing and mapping with geospatial techniques is more accurate and beneficial for researcher to forecasting the urban growth pattern by applying different kinds of analysis (Li *et al.*, 2007).

STUDY AREA

In 1727 century, Bahawalpur State was established by its ruler Amir Sadiq Muhammad Khan with total area 24,830 square kilometers. Bahawalpur is a twelfth largest city of Punjab province of Pakistan. Its boundary attaches in north with Lodhran and Vehari distict, in east with district Bahawalnagar and India, in south India and in west with Rahimyar Khan and Muzafarghar districts. Bahawalpur city lies between the latitude of (29° -21' to 29°-25') North and (71°-36' to 71-46') east. The city of Bahawalpur is the most southern part of the Punjab province of Pakistan and it is almost the central place of the country. Its elevation from the sea level is 152 meters (CDA Bahawalpur, 2014).

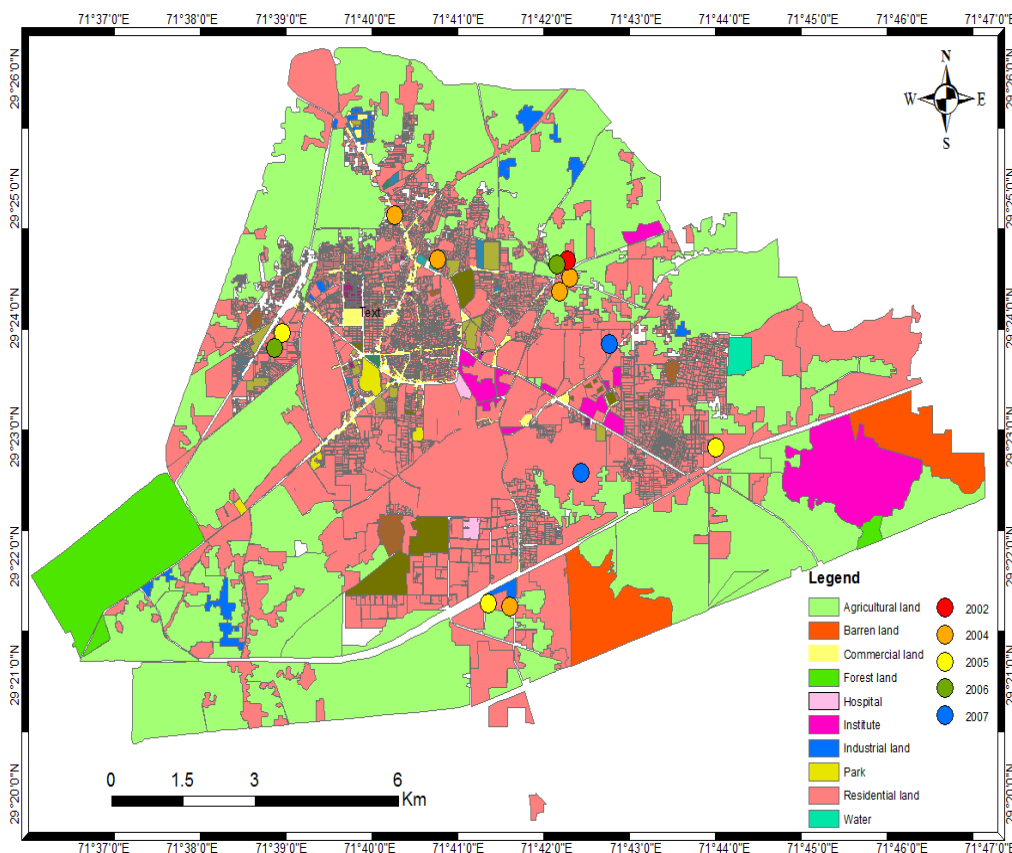


Figure 1. Residential land use change in 2002 – 2007

METHODOLOGY

This research focused on last 12 years (2002 to 2013) data of the agricultural land use change in residential land. The primary data was collected by using a structured questioner from the farmer and GPS used to get absolute location points of the colonies. The secondary data were collected from the TMA office Bahawalpur in the form of Colonies Name, year of establishment and Area of the colony. After collecting the primary data through questioner were tabulate in SPSS software and chi-squire value was got from the comparison between many questions and comparison of data shows in the form of graphs and tables. Secondary data collected from the TMA office about the residential colonies were divided in two time spans first 2002 to 2007 and the second was 2008 to 2013. GIS techniques were used; first step is Geo referencing and digitized the map of study area Bahawalpur City. Locate and label the GPS points of residential colonies of Bahawalpur City. Different GIS techniques were applied to make the maps of the two time spans which show the location of the residential colonies spatial and temporal distribution. Yearly comparison of the agricultural land grabbed by the residential colonies was showed in the form of graphs.

RESULTS AND DISCUSSIONS

The data collected through structured questionnaire and from Govt. offices arranged in table 1 which shows the names of colonies, year of establishment from 2002 to 2007.

Table 1. Detail of the colonies built in 2002 – 2007

<i>No</i>	<i>Name of the Colonies</i>	<i>Year</i>	<i>Area in Acre</i>	<i>Statuses</i>
1	Alama Iqbal Colony	2002	20	Unapproved
2	Rehman Garden Colony I	2004	18	Approved
3	Gulshan Colony	2004	3.5	Approved
4	Atif Aziz Town	2004	8	Unapproved
5	Harrm Garden	2004	5	Unapproved
6	Usman Bin Afaan	2004	5	Unapproved
7	Rehman Garden Colony II	2005	9.56	Approved
8	Cheema Town Colony I	2005	7	Unapproved
9	Gulshan Iqbal Colony	2005	25	Unapproved
10	Cheema Town Colony II	2006	9	Unapproved
11	Faisal Bagh Colony	2006	20	Unapproved
12	Khalid and Asif Twon	2007	12	Unapproved
13	New Shadab colony	2007	9	Unapproved

Figure 2 shows the yearly agricultural land use change into the residential land in the first time span 2002 to 2007. 20 Acre agricultural land was grabbed in 2002, 39.5 Acre agricultural land was grabbed in 2004, 41.56 Acre agricultural land was grabbed in 2005, 29 Acre agricultural land was grabbed in 2006 and 21 Acre agricultural lands grabbed in 2007 by the residential colonies. So, collectively 151.06 Acre agricultural lands grabbed by the residential land in 2002 to 2007.

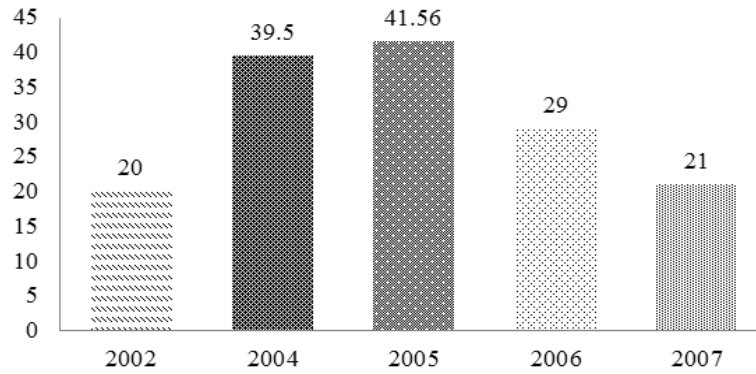


Figure 2. Total Agricultural land grabbed by residential land from 2002 to 2007

Table 2. Detail of the colonies built in 2008 - 2013

No	Name of the Colonies	Year	Area in Acres	Statuses
1	Royal City Colony	2008	20	Unapproved
2	Darbar Mahal Colony	2008	8	Unapproved
3	Alkhair Town	2008	3	Unapproved
4	Paradise City Colony	2008	8	Unapproved
5	Khayaban Housing Colony	2010	43	Unapproved
6	Paragon Colony	2011	12.37	Approved
7	Yousaf Garden Colony	2011	11	Approved
8	Abdullah City Colony	2011	12	Unapproved
9	Bahawal City Colony	2011	25	Unapproved
10	Zakria Colony	2011	5	Unapproved
11	Diamond Town Colony	2011	6	Unapproved
12	Al- Mehboob Colony	2011	7	Approved
13	Al- Momeen Garden Colony	2011	10	Approved
14	Canal Garden Colony	2012	45.53	Approved
15	Shadman Colony I	2012	10	Approved
16	Amman Socity Colony	2012	12.03	Approved
17	New Gulstan-E-Johar Colony	2012	9.5	Approved
18	Garden Town Colony	2012	12.51	Unapproved
19	Canal Villas Colony	2012	2.62	Approved
20	Al- Majeed Paragon City	2012	2.9	Approved
21	Model Avenue Colony	2012	96.38	Approved
22	Bagdad City Land Colony	2012	7.54	Unapproved
23	Un-Named Colony	2012	6.1	Unapproved
24	Shadman City Colony Ii	2013	10	Approved
25	Ajwah Garden Colony	2013	11.6	Approved
26	Satlujh Valley Colony	2013	5.55	Approved

Source: TMA, 2013

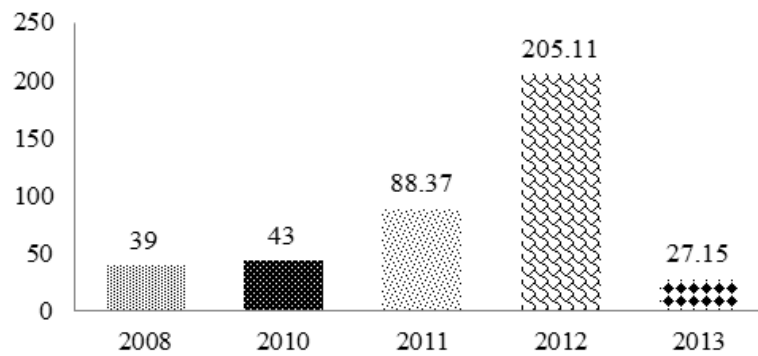


Figure 3. Total agricultural land grabbed by residential land from 2008 to 2013

The figure 4 shows the yearly agricultural land use change in the second time span from 2008 to 2013. If we look at this graph in 2008 39 Acre agricultural land was grabbed, while in 2010 43 Acre agricultural land was grabbed, on the other hand in 2011 88.37 Acre agricultural land was grabbed, in 2012 205.11 Acre agricultural land grabbed and in 2013 27.15 Acre agricultural land grabbed by the residential land use. So, collectively in this time span 402.63 Acre agricultural lands grabbed by the residential land use.

Impact on the Socio-Economic Status of Farmer

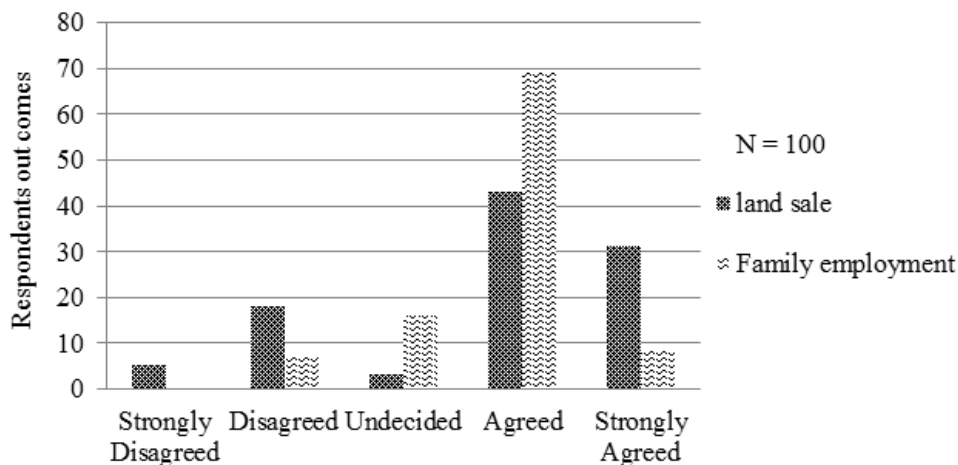


Figure 4. Sale of land and its impacts on family member's employment

Table 3. Chi square results

Cross Tabulation	χ^2	A
Chi square	13.586 ^a	0.476

In this above figure chi-square results are showed with N=100 and the results shows the Alfa value is $\alpha = 0.476$ and chi-square value is $\chi^2 = 13.586$ shows the impacts of the land sale on the family member's employment by land use land cover change. Total level of significance is 5%. Result has been proved that the Alfa value is very small then level of significance. So, sale of land highly impacted the family member's employment.

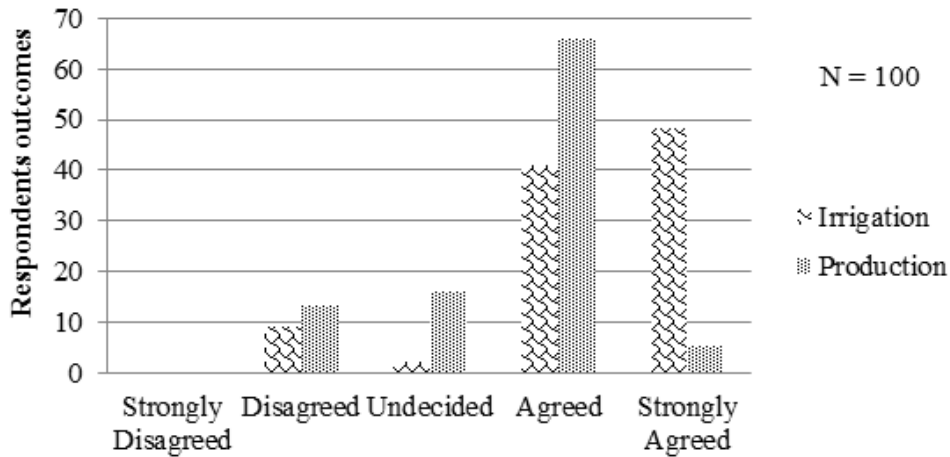


Figure 5. Effects on Irrigation reduces the production rate of crops

Table 4. Chi square results

Cross Tabulation	χ^2	A
Chi square	19.614 ^a	.646

The above showed figure elaborates the results of chi-square with total number of respondents are N=100. In results Alfa value is .646 and chi- square value is $\chi^2=19.614$ shows if land use land cover impacts the irrigation then its impacts on production rate. Total level of significance is 5%. Results have been proved that the Alfa value is high then the level of significance. So, effects on the irrigation cannot reduce the crop production in the study area.

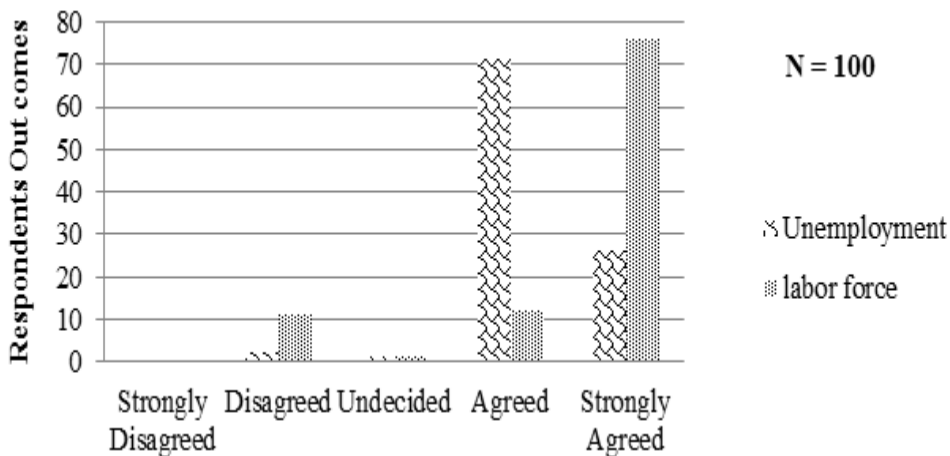


Figure 6. Increase in rate of unemployment and its impacts on labor force

Table 4. Chi square results

Cross Tabulation	χ^2	A
Chi square	8.651 ^a	.027

The above mentioned figure shows the chi-square results of “If land use land cover change increases the rate of unemployment then its impact on labor force”. The total number of the respondents is N=100 and the level of significance is 5%. Results of the chi-square shows

that the chi square value is $\chi^2=8.651$ and the Alfa value is $\alpha=.027$. It is clearly mentioned in the results that Alfa value is very lesser than the level of significance so the increase in the unemployment by land use land cover change has great impacts on the labor force.

CONCLUSION AND RECOMMENDATION

Study reveals that urban and peri-urban land use change grabbed a very use full agricultural land and has a significant impact on the farmer's socio-economic status. As the results show in the first time span in (2002 to 2007) 151.06 Acre agricultural lands has been grabbed and in the second time span (2008 to 2013) 402.63 Acre agricultural land grabbed by the residential land use change in the form of residential colonies. It shows that a very large amount of agricultural land grabbed by the residential land use. More over most of the residential colonies are unapproved from total 39 colonies have been developed in these two time spans and only 16 colonies are approved and 23 colonies are not approved from any governmental institute. On the other hand it has a great impact on the socio-economic status of the farmer results shows that when farmer sale his land to an investor it highly impacts the family employment status and this type of unplanned and unapproved residential land use change made the problem of the irrigation system for the remain agricultural land but the farmer maintain his production rate by using the alternate irrigation methods yet. Such type of agricultural land use change in residential land use has a very significant impact on the labor force which work on the agricultural filed as results shows. Study proved that the use of agricultural land in the residential and other land use has impacts the farmer's socio-economic status. Laws implementation, better planning for land use change, policies against the unplanned and unapproved land use change and farmer assistance laws will reduced such immense impacts on the farmer's status.

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