

# SPRAWLING HOUSING SCHEMES AND LOSS OF FARMLAND: A CASE OF BAHAWALPUR CITY, PAKISTAN

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**ABSTRACT:** *The main objective of the present study was to examine the socio-physical factors that causing the rapid conversion of farmland in account of private housing schemes in Bahawalpur City and recommends some remedial measures to curb this issue in a practical way. Total 24 housing colonies were randomly selected as sample sites in a detailed field survey and 120 respondents were selected for interview using random stratified sampling. Primary data about the physical conditions of the colonies and socio-economic characteristics of respondents was gathered through a semi-structured interview with face to face meetings. SPSS 16 was employed to execute statistical operations for data analysis. Descriptive statistics and Pearson correlation were applied to find out the relationship between certain variables. Findings revealed that respondents' socio-economic characteristics and physical conditions of housing colonies highly did matter in the conversion of farmland in Bahawalpur. The majority of the housing schemes were newly built up and notify that the trend of farmland conversion is recently accelerated. Moreover, statistics indicate highly positive correlation among various variables. To curb this problematic issue the study recommends various measures for concerned authorities.*

**Key words:** Socio-Physical Factors, Private Housing Schemes, Conversion of Farmland, Bahawalpur City.

## 1. INTRODUCTION

During the last few decades, tremendous increase in population raises the demands of food, fiber, fuel and housing worldwide particularly in developing countries including Pakistan. The enhancing demands of housing resulted in the proliferation of a number of private housing schemes mostly established on fringing farmland around the urban centers and resultantly farmland rapidly being converted to these residential colonies. Although, price of land on these housing schemes is very high and beyond the purchasing power of a common man yet high class community intends to purchase land for residential purposes and some time for investment to earn a reasonable profit. Unfortunately, this trend is now turning a menace and engulfing pure farmland throughout the country. Urban development that took place infringing rural areas usually increases the value of farmland and enhances the opportunity for future industrial, commercial and residential development works [1]. Because most of the development has been taking place along with agricultural land close to urban fringe [2]. Therefore, the conversion of farmland on the urban fringe is an irreparable loss [3].

Usually, urban residential development highly took place on the urban fringe that have large quantities of farmland has attracted by commuting distance of urban areas [4]. Farmland conversion is not driven by low farm returns rather it is fastened by urban-agricultural periphery effects and along with population growth this factor clearly dominates the conversion process [5]. The key reasons of this urban expansion are improved communication systems and wide ownership of motorcars that has enabled people to move out of the cities and enabling to commute to work in remote areas and made possible the wide dispersion of people [6]. Haphazard, irregular and rapid urbanization are the leading reasons of the loss of farmland and creates socio-economic implications on peri-urban areas [7]. Unplanned urbanization in the form of housing colonies highly reduced agricultural land and productivity [8]. Massive increase in population and development are the most

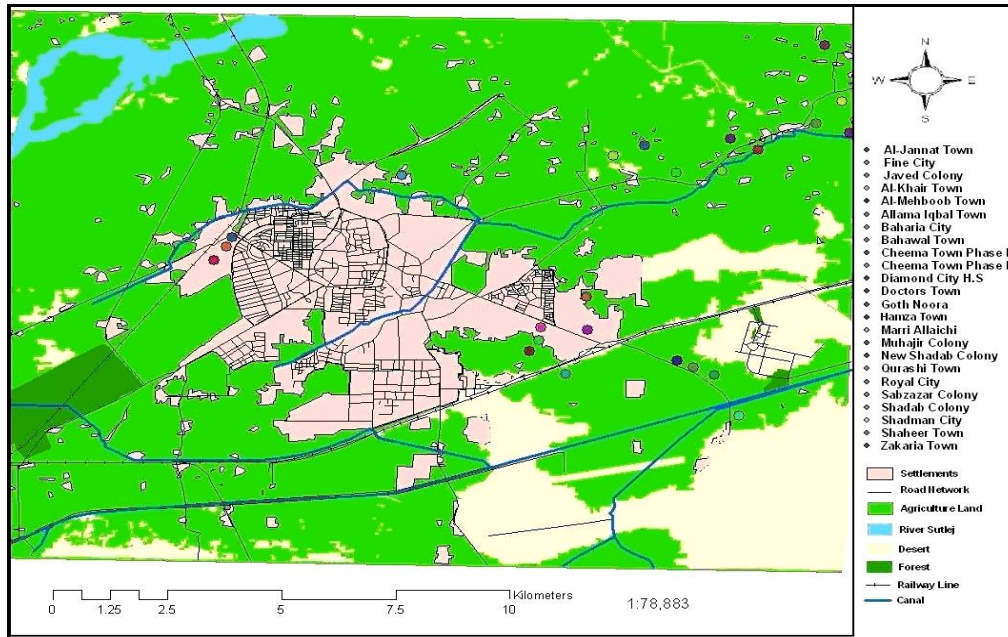
powerful factors in Pakistan that devouring pure farmland on fringing areas [9]. Urban population growth caused by migration inducing urban sprawl that added lots of housing schemes by converting surrounding farmland [10]. Resultantly, scattered low density residential areas are typically observed at the urban fringing farmland adjacent to cities and relevant socio-economic implications [11]. Urban demand for housing needs around city's congestions increased rapidly. Moreover, the falling profitability of farmland production has forced farmers to sale out their land for developmental uses. Such kind of implications has encouraged devolution of property and the extension in private control over the land apparently has led to the decline of rural landscapes [12]. Benefits of rising farmland values and property taxes encourage farmers to sale out farmland for urban developments [1]. Generally it had believed that urban land is more profitable than farmland, so economic growth and commercial development mostly happens on urban land. This trend shoots up the rate of land conversion from agricultural to urban land [13]. Therefore, increase in urban settled land area has occurred on adjacent farmland due to the maximum economic return of land and farmland and open space decreases quickly as an increase came in the surrounding property values [14]. It is perceived that the trend of farmland conversion into housing schemes is now a common fashion in most of the Pakistani cities. Similar kind of situation is witnessing in Bahawalpur where land values are shooting up from the last few years as the trend of conversion of farmland to urban land is become more common and people are often being sale out their farmland due to attractive returning price that is much higher from usual production output. This trend is much more dangerous for preservation of farmland because such trend allows and gives free hand to those developers that are ever seeking out to purchase such farmlands for developing of housing colonies, towns and other urban infrastructures and hence get maximal profit. Previously, few studies already have indicated this trend as an unstoppable and threatening for local

farmland resource sustainability [15,16,17,18, 19]. Therefore, the main objective of the study is to examine the socio-physical factors that causing the rapid conversion of farmland in account of private housing schemes in Bahawalpur city and recommends some remedial measures to curb this issue in a practical way.

## 2. MATERIALS AND METHODS

The study area Bahawalpur city is existed between 71°-41' East longitudes and 29°-20' North latitudes with a mean sea level of

about 384 ft. It is divisional headquarters and the twelfth largest city of Pakistan [20] owned a distinguish place in district regarding to its historic, geographic, physiographic, climatic, demographic and cultural aspects. It is situated on the southern bank of river Sutlej and also considered in Sutlej plain while great Cholistan desert skirting it on its western boundary. The Bahawalpur had the population of 560,588 and covering an area of 2,372 km<sup>2</sup> [21, 22].



**Figure 1: Sample Colonies and Towns in Bahawalpur City**  
Source: Authors (2011)

Recently, Bahawalpur has experienced a fast growth in population and socio-economic activities and shifting from agro-based economy to commercial-based center and having significant land use and land cover change due to establishment of housing schemes. For current study, total 24 housing colonies were randomly selected as sample sites in the result of a detailed field survey in 2011 and 120 respondents were selected for interview using random stratified sampling (Figure 1). The majority of these colonies were established during the last few years. These housing schemes and colonies are located in different directions of the city, mostly on fringing areas indicating the trend of sprawling nature. Primary data about the land parcel or physical conditions of the colonies and socio-economic characteristics of respondents was gathered through a semi-structured interview as a research tool (consisting 30 questions including both open and close ended) from the respondents. The respondents were male by sex and mostly head of households. Beside, deep field observation of the housing colonies was also done. After that, collected information manually arranged and carried out for analysis. Statistical package for social sciences (SPSS) 16.0 was employed to execute statistical operations for data

analysis and interpretation. Descriptive statistics (frequencies and percentages) and Pearson correlation (Bivariate method) were applied to find out the relationship between socio-economic characteristics and physical conditions of the colonies and respondents.

## 3. RESULTS AND DISCUSSION

### Year of Establishment of Colony:

Table 1 clarifies that most of the sample colonies were newly built-up like 3 (12.5%) colonies were established during 1954-1960, only one (4.2%) colony was established during 1961-1970, while 2 (8.3%) colonies each were established during 1971-1980 and 1981-2000 respectively. On the other hand, 16 (66.7%) colonies were inaugurated during the decade of 2001-2011 on fertile peripheral agricultural lands. These results clarify that most of the residential development took place during the period of 2001-2011 that is highly significant. This also illustrates that few years back the trend of establishment of new colonies was very limited and remained just inner parts of the city. This is possibly because of low population pressure and limited private transport means and road network.

**Table-1. Physical Conditions of the Colonies and Towns**

Land Parcel Information (N=24)								
Year of Establishment			Total Area (acres)			Price of the Land Per Marla (PKR)		
Years	Freq.	%age	Area	Freq.	%age	Price	Freq.	%age
1954-1960	3	12.5	3-9	9	37.5	45,000-85,000	6	25
1961-1970	1	4.2	10-16	8	33.4	120,000-135,000	7	29.1
1971-1980	2	8.3	17-27	3	12.5	140,000-185,000	4	16.6
1981-2000	2	8.3	35-50	2	8.3	200,000-250,000	4	16.6
2001-2011	16	66.7	53-75	2	8.3	275,000-300,000	3	12.5
	24	100		24	100		24	100
Before Establishment Type of Landuse			Landuse of Surrounding Area					
Land Use	Freq.	%age	Land Use	Freq.	%age			
Farmland	18	75	Farmland	22	91.6			
Adjacent colony	5	20.8	Partial farmland	1	4.2			
Vacant plot	1	4.2	Fallow-land	1	4.2			
	24	100		24	100			

Source: Authors Field Survey (2011)

**Total Area (Acres) of Colony:** The area and length of housing colony is equally important in the assurance of provision of different modern facilities and services and consequently the amount of converted farmland. Table 1 depicts that 9 (37.5%) colonies covered area within 3-9 acres, 8 (33.4%) covered area within 10-16 acres, 3 (12.5%) covered area within 17-27 acres, while, 2 (8.3%) colonies each covered area within 35-50 and same 2 (8.3%) colonies covered area within 53-75 acres. These 24 colonies totally converted 442 acres of precious farmland. Moreover, newly established colonies have comprised a comparatively vast amount of farmland because they were well planned, mapped and insured all modern facilities and services of life as Shadman city had highest size of 53 acres of previously pure cultivated land. In contrast, settlements originated few decades ago (i.e. Marri Allaichi, Goth Noora, Javed colony etc.) were typically small in area and have less number of facilities

**Price of the Land per Marla (PKR):** Price of land per Marla is also very important in terms of available facilities, location and vicinity of colony, people purchasing power, etc. Indeed, increasing need for farmland to non-farm uses have fragmented the agricultural land base and has rising up land values [23]. Great anomaly was found about the land prices in different colonies. Table 1 shows that in 6 (25%) colonies price of land per Marla was 45,000-85,000 PKR, while in 7 (29.1%)

colonies the price of per Marla land was 120,000-135,000 PKR, in 4 (16.6%) colonies price of land per Marla found between 140,000-185,000 PKR, similarly in other 4 (16.6%) colonies price of land per Marla was found 200,000-250,000 PKR whereas remaining 3 (12.5%) colonies classified as most expensive in terms of price of land per Marla that was 275,000-300,000 PKR. These results evidences that land prices of new housing colonies, flying on much high rate. However, financial conditions and purchasing power of the people is also gradually improving and becoming one of the most significant determinants of farmland conversion in Bahawalpur city. Table 2 displays the correlation between price of land and per month income of respondents. The P-value implies a highly positive relation and advocates that higher prices of land per Marla can only afford people those have a strong financial background.

**Before Establishment Type of Landuse of Colony:** Table 1 clearly depicts and evidenced that before the establishment, colonies predominantly occupied by farmland particularly new ones as it is mentioned earlier. Total 18 (75%) colonies were previously occupied by prime farmland. While, 5 (20.8%) were adjoined with surrounding colonies and only one (4.2%) colony (Al-Khair town) was consisted vacant plots. The results justify that these colonies have occupied a huge amount of prime farmland before converted into housing schemes and town

**Table 2: Correlation between Price of Land and Per Month Income**

		Price of land per Marla	Per month income (PKR)
Price of land per Marla	Pearson Correlation	1	.606 <sup>**</sup>
	Sig. (2-tailed)		.002
	N	120	120
Per month income (PKR)	Pearson Correlation	.606 <sup>**</sup>	1
	Sig. (2-tailed)	.002	
	N	120	120

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Computed from Surveyed Data

**Table 3: Socio-Economic Characteristics of Respondents**

Per Month Income (PKR)			Main Occupation		
Income	Freq.	% age	Occupation	Freq.	% age
<10,000	11	9.2	Labourer	9	7.5
20,000-30,000	36	30	Self business	49	40.8
40,000-50,000	42	35	Private job	35	29.2
>50,000	31	25.8	Govt. job	27	22.5
	120	100		120	100
Household Size			Area of House (Marla)		
Size	Freq.	% age	Area	Freq.	% age
1-3	24	20	3-5	28	23.3
4-6	56	46.7	6-8	45	37.5
7-9	27	22.5	9-10	26	21.7
>10	13	10.3	>11	21	17.5
	120	100		120	100

Source: Authors Field Survey (2011)

**Table 4: Correlation between Respondents' Financial Condition and Per Month Income**

		Financial condition	Per month Income (PKR)
Financial condition	Pearson Correlation	1	.566*
	Sig. (2-tailed)		.004
	N	120	120
Per month income (PKR)	Pearson Correlation	.566*	1
	Sig. (2-tailed)	.004	
	N	120	120

\*. Correlation is significant at the 0.05 level (2-tailed).

Source: Computed from Surveyed Data

**Landuse of Surrounding Area of Colony:** Surrounding landuse of the colonies mostly consist agricultural land. Table 1 magnifies that total 22 (91.6%) out of 24 colonies were comprised with farmland and remaining 2 (4.2%) colonies each were consisted partial farmland and fallow-land respectively. These facts also cautionary that the rest of the adjacent agricultural lands surrounded by these colonies were on great risk to convert and merge in these newly started housing colonies. As it is found that proximity to developed land is much more helpful to a new colony to become inhabited quickly [25]. In reality, these colonies have the tendency to spread outward into productive farmland.

**Per Month Income (PKR):** Income of people could be considered a cardinal element of the trend of farmland abuse worldwide. The increase in people income boosts the consumption of farmland and enhances the value of land [24]. Table 3 displays the monthly income of respondents in study sites and also manifest significant deviations as 11 (9.2%) respondents have earned <10,000 PKR per month mostly were the residents of less developed colonies (i.e. Goth Noora, Javed colony, etc.) while 36 (30%) respondents of different colonies have monthly income ranges from 20,000-30,000 PKR. These were the middle class people by income level. The highest 42 (35%) respondents have monthly income varies from 40,000-50,000 PKR mostly the residents of well developed colonies of Royal city, Fine city, Doctors town etc. Whereas 31 (25.8%) respondents of Sabzazar colony, Cheema town phase I and Allama Iqbal town have highest income of >50,000 PKR per month. Table 4 also verifies a high positive relation between

respondent's financial condition and their per month income. These results again have been demonstrated that more than 70% prosperous respondents have been purchased costly plots in new modern housing colonies on higher price.

**Main Occupation:** Majority of the respondents in colonies were belonged to high income class by financial status except some less developed areas like Goth Noora, Javed colony and Hamza town where the inhabitants mainly engaged in minor works. Table 4 portrays the respondents' employee groups as 9 (7.5%) respondents were daily wage labourers involved in building construction, peasantry works, etc. while highest 49 (40.8%) respondents were self businessmen operated in commercial activities, selling and buying goods, shops, hotel industry, farming etc. About 35 (29.2%) were private job holders doing works in different NGOs, banks and other big companies whereas, remaining 27 (22.5%) respondents were Govt. Employees mostly in high scale jobs i.e. doctors, engineers etc. These results evidenced that majority of the respondents in study sites were belonged high income occupations and therefore could be afford and purchase costly plots and built houses in housing schemes. Table 5 also shows the correlation between main occupation and per month income. It depicts a strong positive relationship and proves that high income respondents usually engaged in high earning occupations and been able to purchase very high price plots and houses in new housing schemes.

**Table 5: Correlation between Main Occupation and Per Month Income**

		Main occupation	Per month income (PKR)
Main occupation	Pearson Correlation	1	.437*
	Sig. (2-tailed)		.033
	N	120	120
Per month income (PKR)	Pearson Correlation	.437*	1
	Sig. (2-tailed)	.033	
	N	120	120

\*. Correlation is significant at the 0.05 level (2-tailed).

Source: Computed from Surveyed Data

**Table 6: Correlation between Household Size and Area of the House**

		Household size	Area of the house (Marla)
Household size	Pearson Correlation	1	.645**
	Sig. (2-tailed)		.001
	N	120	120
Area of the house (Marla)	Pearson Correlation	.645**	1
	Sig. (2-tailed)	.001	
	N	120	120

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Computed from Surveyed Data

**Table 7: Correlation between Area of House and Per Month Income**

		Area of house (Marla)	Per month income (PKR)
Area of house (Marla)	Pearson Correlation	1	.414*
	Sig. (2-tailed)		.044
	N	120	120
Per month income (PKR)	Pearson Correlation	.414*	1
	Sig. (2-tailed)	.044	
	N	120	120

\*. Correlation is significant at the 0.05 level (2-tailed).

Source: Computed from Surveyed Data

**Household Size:** The population of the Bahawalpur city is surging rapidly [18]. Therefore, people now rushes outside the main city into fringing farmland where the most of the residential development took place. Household size is important in terms of occupied area of houses in residential colonies. It is also perceived as one of the determinant of new house establishment in housing scheme [26]. Table 3 magnifies that in study sites 24 respondents have household size of 1-3 (20%) members mainly the newly married couples having only one kid. The leading 56 (46.7%) respondents were having 4-6 household members. These were mainly the Govt. and private employees. While 27 (22.5%) respondents having household size of 7-9 members. The majority of this class was involved in self business and can easily afford household expenditures. Remaining 13 (10.3%) respondents were engaged in daily wages jobs i.e. peasantry work, construction of buildings, green grocers and cobblers. These respondents were the residents of less developed colonies of Goth Noora, Javed colony and Muhajir colony. These results proved that household size was an intervene in respondents area of houses as most of the respondents were having 4-6 household members and built new houses to housed their families. Table 6 also verifies the correlation between household size and area

of the house and indicates a strong relationship between these two variables and hence proved that houses that have covered a vast land area mostly housed 6-8 household members.

**Area of House:** Area of house reflects the prosperity level and household size resided in and therefore consider as an important parameter for farmland conversion. In study sites, 28 (23.3%) respondents were housed in 3-5 Marla houses. These were mainly the poor residents of less developed colonies. While 45 (37.5%) respondents were housed in 6-8 Marla houses and mainly were engaged in private jobs, 26 (21.7%) respondents were living in 9-10 Marla houses and majority of these were engaged in high grade Govt. jobs i.e. doctors, professors and administrative officers. Remaining 21 (17.5%) respondents were attached in high earning self businesses and housed in large land covered area (more than 11 Marla) bungalows.

These results make clear that rich people usually resided in large land covered houses and bungalows that also manifest their financial position and status as well. Hence, wealth either it is for the sake of selling or buying does a lot of matter in farmland conversion into housing schemes and urban residential land. Table 7 portrays correlation between area of house (Marla) and per month income. The P-value indicates a strong positive relationship between these variables. It has been true in case of

vast land area covered colonies (i.e. Shadman city, Allama Iqbal town etc.) where high class respondents were resided in big luxurious houses that comprised comparatively vast area. These results suggest that wealth is a very significant factor to build large mansions on farmland at any cost.

#### 4. CONCLUSION AND SUGGESTIONS

The phenomena of farmland conversion due to the housing schemes establishment is now taking place at alarming pace and converted prime farmland on fringing areas of many urban centers worldwide including Bahawalpur city. Findings of the study revealed that respondents' socio-economic characteristics and physical conditions of housing colonies highly matter in the conversion of farmland in Bahawalpur. Majority of the housing schemes were newly built up as 16 (66.7%) out of 24 colonies were originated during the period of 2001-2011 notify that the trend of farmland conversion is recently accelerated. Most of these colonies covered land area varies from 3-9 acres and 10-16 acres. Great anomaly was found about the land prices in different colonies as in 6 (25%) colonies price of land per Marla was 45,000-85,000 PKR whereas 3 (12.5%) colonies classified as most expensive in terms of price of land per Marla that was 275,000-300,000 PKR. Price variations indicated significant rise with passing time. Total 18 (75%) colonies were previously occupied by prime farmland and 22 (91.6%) out of 24 colonies were still comprised with farmland that is also on great risk to merge in these colonies due to sprawling nature. Most of the respondents in these colonies were ranked as rich and more than 70% were earned 40,000 to above 50,000 PKR. Among these, 49 (40.8%) respondents were self businessmen engaged in commercial activities, selling and buying goods, shops, hotel industry, farming etc. The household size of leading 56 (46.7%) respondents was 4-6 members. Majority of 45 (37.5%) respondents were housed in 6-8 Marla houses and mainly were engaged in Govt. and private jobs. Beside, highly positive correlation was found between certain variables viz. price of land and per month income, main occupation and per month income, household size and area of the house and area of the house and per month income showed strong association. Hence, it is concluded that wealth is most powerful driver of farmland conversion into housing schemes in fringing areas of Bahawalpur city.

To curb this problematic issue, the protection of farmland must be the top priority of district concerned agencies. Thus, to conserve the limited farmland resource and bring efficiency in land use the following suggestions were made;

1. Master plan of city should be prepared in such a way that use of urban land can be made more efficient.
2. Horizontal expansion of housing schemes on prime farmland should be restricted.
3. Strict rules and regulation and sanction towards developers should be made in practice.
4. TMA city should be imposed strict taxation and charge on the conversion of prime farmland. Decision makers of district government should be devised effective long term policies to protect farmland conversion into other un-necessary uses.
5. District government should be provided incentives and subsidies to farmland owners to avoid farmland conversion.
6. Urban land should be managed by dividing the land into

various sectors and zones suitable for different uses.

7. Vertical development of houses, plazas etc. should be encouraged where possible.

8. TMA city and other concerned authorities should be commenced public awareness campaign to save farmland by irregular constructions for long term basis.

#### REFERENCES

- [1] Barnard, C, Urbanization affects a large share of farmland. *Rural Conditions and Trends*, **10**(20): 57-63 (2000).
- [2] Deng, F. F. and Huang, Y. Uneven land reform and urban sprawl in China: The case of Beijing. *Progress in Planning*, **61**: 211-236 (2004).
- [3] Freshwater, D. Farmland conversion: The spatial dimension of agricultural and land-use policies. Discussion report, *Organisation for Economic Co-Operation and Development (OECD)*, (2009).
- [4] Roe, B., Irwin, E. G. and Morrow-Jones, H. A. The effects of farmland, farmland preservation, and other neighborhood amenities on housing values and residential growth. *Land Economics*, **80**(1): 55-75 (2004).
- [5] Kuminoff, N. V. and Sumner, D. A. What drives farmland conversion: Farm returns versus urban factors? In: *Annual Meeting of the American Agricultural Economic Association*, Chicago, USA, August 5-8, 2001 (2001b).
- [6] Mason, M. K. Has urbanization caused a loss to agricultural land? Retrieved October 16, 2010 from: <http://www.moyak.com/papers/urbanization-agriculture.html> (2010).
- [7] Bolca, M., Turkyilmaz, B., Kurucu, Y., Altinbas, U., Esetlili, M. T. and Gulgun, B. Determination of impact of urbanization on agricultural land and wetland land use in Balçovas' delta by remote sensing and GIS technique. *Environmental Monitoring and Assessment*, **131**(1-3): 09-419 (2007).
- [8] Javed, R., Shaikat, F. and Jabeen, I. Urbanization and loss of agricultural land and productivity (a case study of selected villages from Peshawar and Nowshera). *PUTAJ Humanities and Social Sciences*, **17**: (2010).
- [9] Din, I. and Samiullah, Impacts of Peshawar city on land use and cropping pattern in the urban fringe: A case study of Chughalpur, Peshawar. *Pakistan Journal of Geography*, **XV**(1 & 2): 21-33 (2005).
- [10] Ghaffar, A. Assessing urban sprawl in Lahore by using RS/ GIS techniques. *Pakistan Geographical Review*, **61**(2): 99-102 (2006).
- [11] Schultink, G. Land use planning and open space preservation: Economic impacts of low-density urbanization and urban sprawl. *Journal of Civil, Environmental and Architectural Engineering*, **3**(1): 15-39 (2009).
- [12] Wasilewski, A. and Krukowskil, K. Land conversion for suburban housing: A study of urbanization around Warsaw and Olsztyn, Poland. *Environmental Management*, **34**(2): 291-303 (2004).
- [13] Skinner, M. W., Kuhn, R. G. and Joseph, A. E. Agricultural land protection in China: A case study of local governance in Zhejiang province. *Land Use Policy*, **18**(4): 329-340 (2001).
- [14] Fausold, C. and Lilieholm, R. J. The economic value of

- open space: A review and synthesis. *Environmental Management*, **23**(3): 307-320 (1999).
- [15] Khan, A. A. Dilemma of farmland conversion in Pakistan. *Journal of Social Science & Humanities*, **7**: 83-90 (2000).
- [16] Yasmeen, S. *Land transformation from agriculture to residential areas: Case study of Bahawalpur*. Master's thesis, Department of Geography, The Islamia University of Bahawalpur, Bahawalpur, Pakistan (2009).
- [17] Malik, M. *Landuse/ landcover changes using satellite remote sensing: A case study of Bahawalpur district*. Master's thesis, Department of Geography, The Islamia University of Bahawalpur, Bahawalpur, Pakistan (2009).
- [18] Mohsin, M. *Urban Growth and Conversion of Farmland in Bahawalpur City, Pakistan: Causes, Rates and Remedies*. LAMBERT Academic Publishing, Saarbrücken, Germany, 2014.
- [19] Mohsin, M., F., Jamal, A. A. Khan and F. Ajmal, Transformation of fertile agricultural soil into housing schemes: A case of Bahawalpur city, Punjab, Pakistan. *International Review of Social Sciences and Humanities*, **6**(2): 141-156 (2014).
- [20] Govt. of Pakistan. *Economic Survey of Pakistan 2011-12*. Ministry of Finance, Government of Pakistan, Islamabad, Pakistan (2012).
- [21] Govt. of Punjab. *Punjab Development Statistics 2012*. Bureau of Statistics, Government of Punjab, Lahore, Pakistan (2012).
- [22] TMA Bahawalpur City. Bahawalpur city. Retrieved November 22, 2010 from: [www.tmabwpcity.com/home](http://www.tmabwpcity.com/home) (2011).
- [23] Mojica, M. N. and Bukenya, J. O. Causes and trends of land conversion: A study of urbanization in north Alabama. In: *Southern Agricultural Economics Association's Annual Meeting*, Orlando, Florida, February 5-8, 2006 (2006).
- [24] Xiaoyun, L., Yinyin, C., Daolinm Z. and Anlu, Z. Agricultural land loss in China's urbanization process. *Ecological Economy*, **2**(1): 32-41 (2006).
- [25] Anjum, A. G. and Hameed, R. Dynamic of colonization of peripheral housing scheme policy options in case of Lahore. *Pakistan Journal of Engineering & Applied Sciences*, **1**: 24-30 (2007).
- [26] Irham, and Sudirman, S. Farmland conversion and sustainable city: A case of Yogyakarta, Indonesia. In: *International Workshop on Sustainable City Region*, INNA Grand Beach Hotel, February 23-24, pp.42-49 (2009).