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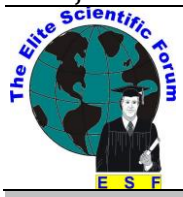

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RESEARCH ARTICLE

Changing Land Ownership Patterns and Agricultural Activities in the Context of Urban Expansion in Faisalabad, Pakistan

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ABSTRACT

Agricultural lands encroached by urban settlements come out with extensive cost for social and economic life of local residents, particularly in urban fringes. This study compares the changes in agricultural activities, in context of urban expansion during last decade, with special attention to land ownership patterns. A face to face survey was conducted to collect related information from the farm households in three communities at rural-urban interface of Faisalabad city, Punjab, Pakistan. The results indicated a considerable change in the size of landholding during the period 2006-2015 as majority of the farmers (48.9%) owned up to 5 acres, previously while now majority of farmers (53.9%) own less than 2 acres of land. This change was found mainly due to sale of land for housing schemes (56.9%) and division of land due to inheritance (17.8%). During the past decade, the number of land owners shifted from 96.7% to 80.6% with a considerable rise in number of tenants, share croppers and landless farmers. Despite reduced landholding size, crop farming continues to be significant source of subsistence as (88.30%) respondents still adopted agricultural farming as their current source of income but they are pushed to adopt non-farm sources of income (67.70-%) as well. Patterns of crop selection remained almost same but the crop production is less mainly due to shortage of canal water (35.60-%) and reduction in landholding size (28.90%) and farmers are restricted to subsistence farming only (91.60%). An Integrated and holistic land use planning and management is required with land users placed at center in order to improve the livelihoods of the peri-urban dwellers.

INTRODUCTION

World is rapidly turning to be "urbanized" and it is anticipated that, future population growth until 2050 will be immersed in cities. This expansion of cities is very common in Sub-Saharan Africa and Asia (UN, 2014; McGee, 2010). It is estimated that urban population growth is expanding by over 45 million in a year, and it results in the loss of productive farmlands of more than 10 square km per day (Dahiya, 2012). In response to globalization of economic activities, decentralization and movement outside the boundaries of large cities was emerged, thus altering the livelihood strategies of rural areas, where livelihoods depend on farming (Allen, 2003; Simon et al., 2008; Narain, 2009). A large number of migrant work force is attracted by peri-urbanization that abruptly alters their economic activity to manufacturing and services instead of farming. Such changes are mainly evident in south East Asia, where agrarian communities are rapidly converting into urban patterns (Leaf, 2002). Infrastructure development in these areas involves the transformation of productive agricultural land into residential colonies, highways and shopping malls and a changing mix of rural and urban features. In this transformation, the residents of peri-urban areas are mostly affected whose livelihoods were mainly dependent of agricultural practices due to the scarcity of land for farming. The conversion of agricultural land into residential colonies has resulted in lessening the size of cropland, which make them vulnerable to poverty and food insecurity at household level (Minghong et al., 2013; Francis et al., 2012; Naab, 2013). The landlessness is the inevitable result of the rapid urban growth and has dramatic impacts on peri-urban zones (Mahmood, 2000), and this reduction in the critical mass of cultivable land badly affect the

economic survival of local agricultural economies (Wu, 2008). In the traditional agrarian communities like Pakistan, land remains a major source of earnings for livelihood. But recent trends of rapid urban growth, including industrialization and rapid population growth bring about fundamental changes in the traditional agricultural land uses in all major cities of Pakistan. The proportion of population residing in urban areas has shifted from 58.74 million to 69.87 million during 2008-2013 (NIPS, 2013). To settle the rapidly growing population of Pakistan, man-made urban and sub-urban zones are consuming rural landscape, and what is worse, a majority of this landscape is prime farmland. The food production is adversely affected by such trends and a direct impact is the crowding out of peri-urban agriculture that is a main supplier of food to the people of urban areas, as in the city of Lahore, a significantly decreased crop production was observed from 1987 to 2008 mainly due to reduced arable land (Rajan, 2008). Further, in Lahore district 94% of the total area was under agricultural use in 1972, but in 2010 it reduced to 29.5% (Zaman, 2012). In Mardan city of KPK, the built-up area has been doubled from 30% of the total city area in 1990 to over 63% in 2010, thereby has doubled the impervious surfaces (Yar et al., 2016). This loss of agricultural land directly affects the livelihoods of those associated with agriculture. The present study was aimed to examine the relationship between rapid urban expansion and change in agricultural activities of farmers along the rural–urban interface of Faisalabad, Pakistan with special attention to land ownership patterns.

MATERIALS AND METHODS

Faisalabad is the not only the industrial hub of Pakistan but also famous for its most fertile agricultural land, thus contributing towards the national economy. Due to natural increase and heavy rural-urban migration, the city is growing haphazardly and during 1980-2010, total expansion of 44% in built up areas and 32% decrease in open/non-built up area was observed (Bhalli et al., 2012). To examine the implication of this urban expansion on agricultural activities, three peri-urban communities were selected randomly from the city of Faisalabad. The study was conducted to investigate the following research questions: i) what is the pattern of land ownership in the current scenario of urban expansion? ii) What are the major reasons for the change in land ownership patterns in peri-urban communities? iii) What are the changing patterns of agricultural practices in response to land use changes in peri-urban communities?

These communities comprises of 24 villages, out of which six were selected for the study by using simple random sampling technique. A sampling frame of all farmers' households was prepared with the help of Patwari of that village and 180 households (30 from each village) were selected randomly. By using interview schedule, they were interviewed to capture information about the changing patterns of landholdings and agricultural activities in the peri-urban communities. For descriptive analysis, data were analyzed through percentage and mean, while for comparison of agricultural activities and land ownership patterns, paired sample t-test was applied at 5% level of confidence. T-test was used for in depth analysis of change in variables such as crop farming, livestock farming, crop yields, crop consumption at home, crop sale to market, and use of fertilizers.

RESULTS

Table 1 depicts that during the period (2006-2015) a considerable change is found in the size of landholdings and land ownership patterns in the study area. Land owners decreased in number from 96.7% to 80.6%, while landless people increased from 1.1% to 6.1%. Similarly, the number of owner cum tenants and share croppers also increased considerably. The farmers having up to 5 acres of land reduced from 48.9% to 25.6%, while farmers with less than 2.5 acres increased from 20.0% to 53.9%. The small farmers with 12.5 acres decreased from 22.2 to 12.8 and the ratio of large holdings also show almost 50% decline. It is strongly supported by the agriculture census of 2000 & 2010 which shows a significant increase in the small and landless farmers and a reduced number of large landholdings (GOP, 2010).

Table 2 shows that sale of land to housing schemes i.e. 56.1% was the major reason for the change in landholding size along the rural-urban interface. Whereas land divided due to inheritance 17.8% was the second major determinant. The sale of land to industry and for the construction of highways and motorways was not more evident in the study area.

The 2-tailed paired comparison shows that despite significant changes in the size of landholding and land ownership, crop farming ($P<0.045$) is still the major source of income for the farmers in peri-urban areas, with growing adoption of livestock farming ($P<0.018$) as a secondary source. No significant relationship was found between the change in crop selection and urban expansion, as mostly farmers (94.4%) were growing the major crops like wheat, maize and sugarcane along with vegetables (61.7%). However, due to less landholding (28.9%), increased family size (7.8%) and non-availability of water (35.6%), the crop production is declined and farming has shifted mainly from commercial to subsistence farming. A highly significant association was found between the use of fertilizers and

urban expansion as previously only 5.0% respondents excessively used fertilizers and pesticides while now 97.8% respondents used it frequently. In spite of using nutrient rich waste water, the farmers used inorganic fertilizers in excess as they perceive that due to water shortage the soil is getting tough and we need to use fertilizers and pesticides. A significant change was also observed in the use of hired labour and less labour is hired at farms now due to less landholding. The T-value (7.597) shows a highly significant difference (P=0.000) in favor of change in size of land holding after urban growth.

DISCUSSION

Land use changes or modification are in practice for thousands of year to satisfy basic human needs. However, it was never happened in the history at such a rapid rate and extent, as in the recent time, and these intensities of land use changes are exerting unmatched alterations in ecosystems at local, regional and global levels (Serote, 2004; Turner et al., 1995). In Pakistan, land is the chief component of rural economies and poverty in rural areas is engrained in the landlessness, asymmetrical distribution of land, droughts and little human capital (Arif, 2012; World Bank, 2002). The reduced capacity of small farmers to enhance their agricultural outputs due to limited resources including land adds up to their miseries. Islam and Khan (2013) evaluated the land use changes in city of Lahore and found almost 3,016 hectares of prime agricultural land were transformed to urban infrastructure annually at the fringes during the period 1972 to 2010 and farmers are losing their major source of income. (Yar et al., 2016) found that the prime agricultural land in Mardan city of KPK, has shrunk from 1,339 ha (42%) to 1,109 ha (35%) during the period 1990 to 2010. Similar results were found by Pribadi and Pauleit (2015) in Indonesia that loss of agricultural land and skewed distribution of land is resulting from rapid urbanization which is giving rise to the large number of landless farmers. Li (2011) found that in China, farmers are forced to sell their land in response to urbanization process and over the past 20 years, farmers bought off above four million hectares of agricultural land for non-agricultural use, and almost 50 million lost their principal income source.

Table 1: Distribution of respondents according to patterns of landholdings

Patterns of landholding	In 2006		In 2015	
	Frequency	Percentage	Frequency	Percentage
Land Ownership				
Owner	174	96.7	145	80.6
Owner cum Tenant	9	5.0	40	22.2
Share cropper	18	10.0	35	19.4
Landless	2	1.1	11	6.1
Landholding size				
Less than 2.5 acres	36	20.0	103	57.2
Up to 5 acres	88	48.9	46	25.6
Up to 12.5 acres	40	22.2	23	12.8
Above 15 acres	16	8.9	8	4.4

Table 2: Distribution of respondents according to reason for change in the size of landholding

Reason for change in landholding size	Yes		No		Mean	St. Deviation
	F	% age	F	% age		
Inheritance	32	17.8	148	82.2	1.82	0.383
Sale of land to housing scheme	101	56.1	79	43.9	1.44	0.498
Sale of land to industry	5	2.8	175	97.2	1.97	0.165
Sale of land to motorway/ highway	21	11.7	159	88.3	1.88	0.322

Table 3: Comparison of agricultural activities during the last decade (2006- 2015)

On-farm and Off-farm activities	Mean	St. Deviation	Correlation Co-efficient	T-Value	P-Value
Crop farming	-.022	.148	.571	2.017	.045*
Livestock farming	.056	.312	.799	2.388	.018*
Major Crops Yield	.028	.564	.018	.661	.509ns
Major Crops Consumption at home	.044	.207	.690	2.885	.004**
Crop sale to market	-.339	.498	.407	-9.137	.000**
Use of fertilizers	.928	.260	.035	47.953	.000**
Agri. Labor hired	.144	.580	.647	3.340	.001**
Size of landholding	.589	1.040	.561	7.597	.000**

This rising trend owed mainly to the consuming fertile agricultural lands for the construction of housing colonies. Khaliq and Baloch (2011) explored the relationship between the extent of agricultural land transformation for urban purposes and the speed of manufacturing and production activities in Lahore City. It was found that the past 40 years have encroached 11, 4630 ha of arable land for urban uses and out of which 18% is utilized for different housing schemes. Rukhsana et al., (2010) also conducted a study in the province of KPK, Pakistan and explored that the agricultural productivity decreased due to several housing colonies (30.95%), industrial infrastructure in the area (33.33%) and due to the land pollution created through these industrial units (35.71%). In Mardan city too, it was found by Yar et al., 2016, that the increasing demand for housing and other infrastructure was fulfilled by conversion of fertile agricultural and cultivable waste. The findings of (Naab, 2013) revealed that residential land development coupled with the land acquisition by industry were the chief competitors to agricultural lands in the peri-urban areas of Ghana. (Acheampong and Anokye, 2013; Irwin & Geogeghan, 2001) observed economic gains along with demand for housing as the major reasons for the transformation of land from agriculture to other uses. Due to their economic rationality, land owners anticipate higher returns to opt for non-agricultural activities on their land, further it was supported by Samat et al. (2011) and Mandere et al. (2010) that the urban residents try to buy prime agricultural land as it is available at cheap rates compared to city land.

The use of farm land other than the agriculture, is adversely affecting the livelihoods patterns in these areas, however, the findings of study show that even then majority of the farmers are attached withy agricultural farming as major source of income with off-farm income generating activities. It is supported by Pribadi and Pauleit (2015) that in Indonesian peri-urban areas, there is reduction in the percentage of farmer households in 2011 from 35.6% to 19.4%, but 50% population still involved in both form on-farm and off-farm activities in 2011. The reduction in landholding size, water shortage and other factors contributed to the change of farming system from commercial to subsistence farming with a slight change in crop selection. Ishrat (2014) described that the higher per capita incomes in urban areas of Pakistan create demand for income elastic products such as milk, dairy products, meat, poultry, vegetables, fruits and fish. The returns to the farmers on these products are higher than on cereals such as wheat or rice. Potutan (2000) and Bah et al. (2003) also found that due to urbanization, farming system changed from extensive to intensive, commodities change from staple to more perishable vegetables and dairy farming. The findings of Andreas (2014) favors the results as he concluded that among the smallholders of Peru the decrease of fertile and irrigated agricultural land at the Quechan valley floor results in loss in production capacities and especially threaten subsistence food and income security. Previous studies also explored the declining trends in agricultural productivity and rise of subsistence farming as a result of urban infrastructure development in peri-urban areas (Naab, 2013; Biermann and Boas, 2010; Rukhsana et al., 2010). Less availability of canal water (35.6%) is also a major impact of urban expansion (Raja et al., 2015) and most of farmers i.e. 39.4% used waste water as an alternate source of water. Murtaza et al. (2010) and Ensink et al. (2004) found that in peri-urban areas of Pakistan, due to non-availability of canal water, farmers frequently used wastewater to irrigate vegetables and crops.

Conclusion

Sprawling poses a serious threat to peri-urban dwellers in the city of Faisalabad, who depend on natural resources for survival particularly for the landholding size and land ownership. The number of small farmers and landless farmers is increasing. Due to unprofitable agriculture, farmers are compelled to decide to convert their arable lands from agriculture to urban uses (residential, industrial etc.). This is due to the fact that land owners anticipate the profits they will gain by selling the agricultural land or by using it for non-agricultural purposes higher economic gains are obtained by shifting land uses rather than agriculture. In all major cities of Pakistan land grabbing is at its peak leading to over exploitation of natural resources for instant production. Resultantly, the miseries for large segments of local inhabitants are obvious along with the rapid destruction of valuable ecologies. A concrete land use policy is lacking and a holistic and integrated approach for land use planning and management is required with a central focus on the land users and their benefits.

Authors' Contributions

All the authors contributed equally in designing the study, conducting the survey and preparing this manuscript.

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