



Tendency in the Transformation of Agricultural Land into Non-Agriculture: some selected areas in Bangladesh

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Abstract

The survey was conducted in the aim of estimation annual conversion of agricultural land to non-agriculture and consequent loss of crop production during ten year period of 2001 to 2010; to investigate into the present pattern of non-agricultural uses of the converted land; and suggest suitable policy measures towards protection of farm land in the country. Three upazila from Mymensingh district namely Mymensinghsadar, Bhaluka and Fulbaria and Narshindisada, Belabo and Polashupazila of Narshindi district were the local of the study. Data were collected from 18. 01.12 to 10.03.12. The respondent were the household head. The total sample size was 180 of which 20 from each upazila. The data indicated that conversion of agricultural land with respect to total land owned in the year 2001 in the surveyed villages during the study period amounts to 4.23 percent or 0.42 percent per year. Information regarding non-agricultural uses of converted land indicates that more than half (55 percent) of the converted local was used in housing predominantly in urban villages (53 percent) as expected. The next two important uses were in the construction of roads and business enterprises covering 11 and 8 percent respectively. Non-reported area of use was also substantial (18 percent). The share of such land was the largest in rural villages (20 percent). Among different residential status of the households, the second most important utilization in peri-urban villages was road construction covering 21 percent of its converted land. The respondents have put forward some suggestions for arresting the current rate of land conversion. Their recommendations include the following agriculture should made more profitable and attractive (50 percent); special tax should be imposed on conversion of land (29 percent), and interestingly, area wise ceiling may be fixed for non-agricultural uses of land (9 percent) and tax exemption may be offered for commercial farms and the agro-based industries scored same (9 percent).

Keywords: Conversion, Trends, Agricultural land, Non-agricultural land, and Bangladesh

Introduction

Crop agriculture contributes 13.44 percent GDP in Bangladesh's economy cultivating 8.52 million hectare land that has to feed 160 million people (MOA, 2014 and BBS, 2011).

<http://www.moa.gov.bd/statistics/bag.htm>

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With the growth of a country's economy, agricultural land is usually transferred to non-agriculture as the demand for non-farm products and services increases. This is specially so when the country's population and its per capita income rise. Transfer of farm land to non-agriculture is also needed for expansion of housing facilities in both rural and urban localities. Such transfer is also evidenced in building infrastructures such as roads, markets, educational institutions, electricity and industrial establishments, etc. We are not aware of the extent of conversion of farm land for non-agricultural uses in Bangladesh and consequent production losses in agriculture.

Agriculture plays a major role in the livelihoods of rural households, in securing national food self-sufficiency and in the country's overall economic development. Reportedly, over the last 30-40 years, the availability of agricultural land has been declining at the rate of 1% per year. If this is true, at least one quarter of the country's agricultural land has been lost over the last 30-40 years. In a densely populated country such as Bangladesh, which is already experiencing high pressure on its natural resource base, a decline in the availability of agricultural land could have devastating consequences on the country's ability to sustainably achieve and maintain self-sufficiency targets, as well as in guaranteeing the food security of households with agriculturally based livelihoods. Although the 1% figure is widely quoted, reliable and scientifically based data quantifying the extent of fertile and arable agricultural land that is currently available in the country, and if and how this has changed over time, is not available. Proxy data available from the Bangladesh Bureau of Statistics, shows that between 1985-86 and 2006-07, the net cropped area decreased by 11% (i.e. from 8770 to 7800 thousand hectares) which represents an annual average decline by about 0.5%. The lack of accurate information on the pattern and magnitude of change in land availability undermines the ability to take action since policy makers are unable to determine if and what actions are needed and where they are most needed.

Through the analysis of remote sensing imagery, and by referring to other secondary sources such as a land use database created in late 1980s to identify the types of land (agricultural, forest, urban and rural settlements, ponds, rivers, other water bodies, industrial etc.) available in different locations of the country, this research will quantify changes in availability and in the geographical distribution of arable agricultural land and the implications of this on food security.

In the National Food Policy Plan of Action (2008-2015), and in other national policy frameworks including the National Agricultural Policy (1999), the National Land Use Policy (2001) and the Actionable Policy Brief (2006), the Government of Bangladesh (GoB) has committed itself to taking action to preserve the use of fertile and arable agricultural land for agricultural purposes. Scientifically based data on changes in the availability and quality of agricultural land, including changes in structure and geographical distribution, will be used to support agricultural land use planning vis-à-vis other relevant sectors of the economy. However, the results of the research would aware the policy makers to introduce appropriate policy and implement those at the earliest possible time to arrest misuse of valuable productive lands.

Objectives of the project:

The present study has been initiated with the objective of assessing the loss of farm land to non-agriculture during the ten year period of 2001-2010 and identify the factors affecting such conversion of land and also investigate into the current pattern of non-agricultural uses. To be more specific, the main objectives of the study are to: estimate annual conversion of agricultural land to non-agriculture and consequent loss of crop production during the ten year period of 2001 to 2010;



investigate into the present pattern of non-agricultural uses of the converted land; and suggest suitable policy measures towards protection of farm land in the country.

Review of Literature:

Some past literature regarding conversion of agricultural land across the world are discussed below:

Rahman (2012) described -- one-third of the country's farmland has disappeared in the last 30 years because of unplanned urbanisation and transfer of lands to other uses, such as human settlements, brick kilns and industries. According to experts, this loss of farmland could have serious repercussions for agricultural production, particularly rice, the staple of Bangladesh. Bangladesh had 9 million hectares of farmland in 1980, which has come down to about 6 million hectares in 2012, experts said. The country's current population growth rate is 1.42 per cent, with 15.05 crore total population, while agricultural land decreases by 1 per cent annually, officials statistics show.

Islam (2011) described -- a growing human population, urban and industrial growth, along with wayward rivers, are cultivable land in Bangladesh that could cause widespread hunger and undo anti-poverty efforts, warn land use experts. The country has lost more than 1 million hectares of arable land in over a decade on which Bangladesh could have grown an extra 1.5 million tones of food grain every year, according to government statistics.

WB (2011) indicated -- another challenge is rapidly shrinking land base. While the country's population is growing at the rate of 1.6 percent per year, demographic pressures and increased urbanization have caused cultivated area to decline at a rate of 1 percent per year. As cropping intensity has approached its limit (about 175 percent now), growth will need to come from intensification of cereal production, diversification into high-value crop and non-crop activities, and value addition in the agro-processing sector, including storage, processing and marketing. This will require reforming the agricultural research and extension systems, and financial and other regulations. Land administration and security issues also need to be addressed.

Gandhi (2011) described -- since the mid 90s, Indian and foreign companies, governments, trusts, and others have been rapidly building businesses—colleges, factories, flats, offices, plants—on land purchased primarily from poor farmers. Consequently, the farmland in India is vanishing at an alarming rate. A case in point is the allocation of 186 hectares (460 acres) of land by the Gujarat government purchased or leased, at an undeclared price, by the Ford Motor Company of America



who will build a new automobile manufacturing factory in 2012. While it is heartening that people will find work at the Ford factory and in ancillary industries, it is disheartening in that farmers have lost their livelihoods and the plow land has been reduced. An analysis of the following data, provided by the Directorate of Economics and Statistics, the Ministry of Agricultural, India, indicates two disturbing trends. Both the net area sown and the availability of grains have been diminishing.

Brecorder (2011) described -- it is a matter of great concern for the agriculture sector to feed the ever growing population of the country due to diminishing agriculture land, traditional way of farming and climate changes as the land is only 0.13ha per capita while it was 0.42ha per capita in 1961. This was stated by University of Agriculture Vice Chancellor, Professor DrIqrar Ahmed Khan while addressing the 19th convocation of the institution at Iqbal Auditorium in the presence of nominee of chancellor-ship of the University and Punjab Governor, Sardar Muhammad Latif Khan Khosa. Professor DrIqrar said that agricultural land is decreasing manifold because of industrialisation and housing societies, adding that in 1972, it was 0.29ha per capita, in 1981 it was 0.24 ha per capita and in 2020 it would reduce to 0.11, showing a grim picture of the situation. But, he said, the positive side of the coin is that the production of major crops has increased many times owing to increase in per acre production and endeavour on the part of the agriculture scientists. It can be calculated from the fact that since the inception of the country, wheat production has boosted up to seven times, rice production goes up to 13 times, cotton 12 times, sugarcane eight times, potato 116 times, citrus 191 times and guava 220 times, he maintained. The VC pointed out that in 1947, Pakistan had only nine flour mills, zero rice mill and two sugar mills but now, the country has 915 flour, 494 mills and 82 sugar mills. He said in 1947, country had 14 ginning factories and two textile mills but now the figure has risen up to 12,000 and 521 respectively.

BAE (2010) indicated -- since the early beginnings of civilization, humans have sought to develop the science of agriculture. In our post-modern society, we are faced with ever Shrinking Agricultural Lands. This is due in part to our quest to expand outward from the urban core, in so doing,



creating suburban jungles. This suburbia greatly competes with agriculture for the “prime” real-estate. Agricultural producers have greatly increased productivity and access to affordable food. So too has the suburban developer sought to increase their profit through retail space and single family homesteads. Should this trend of current development continue, food prices and availability will become a significant issue. Due to forcing agricultural into “mass production”, we will likely see increased overhead cost and less variety in what is available to the consumer. This literature review will provide insight into the reasons for the current trend of suburban sprawl and its long term effects on the agricultural industry. Potential solutions for mitigating these issues will also be discussed.

Brandman Associates (2008) identified -- farm and grazing lands in California decreased by nearly 267 square miles between 2002 and 2004 as documented by the Farmland Mapping and Monitoring Program (FMMP). Both higher urbanization and a larger share for urban lands for the inland countries are the main cause of this decrease. Urbanization in the San Joaquin Valley increased by 10 percent compared with the 2002 update. Housing is the largest component of new urban acreage, with developments ranging from small infill sites to planned community units of 600 acres or more. Commodity markets and other factors impact land management decisions, causing shifts both in and out of irrigated agricultural uses. Conversion from grasslands to orchards, vineyards, and specialty crops were frequent in the late 1990s and early 2000s, but slowed significantly between 2002 and 2004. Exhibit 4 shows land use change in Kings County from rural to urban between 1984 and 2004 as reported by the California Department of Conservation. The map shows a substantial amount of conversion to urban uses, especially in the areas surrounding Hanford, Lemoore, and Corcoran. The exhibit also shows the conversion of agricultural lands to “Ag Ponding Recharge” areas which are not considered urban use. In addition, the hatched areas on the map represent future growth areas and include the Primary Spheres and Urban Growth Boundaries. (Please see Section 1.3 for a detailed discussion of future growth areas.) According to the California Department of Conservation Division of Land Resource Protection, farmland conversions in Kings County from 2004-2006 resulted in the net acre loss of Important Farmland totaling 12,677 acres. Of these acres lost, 681 acres were converted to Urban and Built-Up Land, and 2,306 acres were converted to Other Land. The loss of Important Farmland to Other Land was due primarily



to more detailed delineation of portions of the Tule River Canal, Kings River Canal, and Middle Branch Cross Creek/Lewis Ditch.

USDA (2007) illustrated the total number of acres, of all kinds, in agriculture in Washington has diminished over the years. During the 10 years between 1997 and 2007, the Census of Agriculture reported a loss of approximately 678,606 acres in agriculture in Washington, dropping from 15,778,606 in 1997, 1 acres to 15,318,008 acres in 2002, and then to approximately 15,100,000 acres in 2007.² This was a loss of about 4.3% over those 10 years.

Nancy Hofmann (2005) summarized -- by 2001, about one-half of Canada's urbanized land was located on dependable agricultural land. Between 1951 and 2001, the supply of dependable agricultural land declined by 4 percent, while the demand for cultivated land increased by 20 percent.

Samuel et.al. (2004) described, since the mid-1980s, the conversion of land to nonagricultural use in China has been arguably the most widespread in the country's history, and in no region has the process been more intense than in China's coastal provinces. Among the more important factors that have contributed to the conversion of land to nonagricultural use are rural-urban migration, rapid economic growth, and increased investments in roads. A study of Landsat photographs of one south Jiangsu region reveals that because rural settlements are scattered and use a large amount of land and because urbanization and industrialization have occurred in a decentralized fashion, the shift in land use has not been restricted to a few major cities but has been widely dispersed. The article concludes by arguing that while the conversion of land to nonagricultural use in the coastal provinces is bound to continue, its pace will be slower than in the recent past.

Yohannes (2002) indicated -- with dynamic economic and social changes, increasing pressure is exerted on natural resources management. Agricultural land resources particularly face growing pressure of conversion to non-agricultural uses from population and development demands for land. The continual conversion of agricultural land may have implications in terms of the loss of



prime farmland, irreversible landscape changes, deteriorating environmental quality, and interference with rural lifestyles. This study models urban sprawl on agricultural land in a growth equilibrium modeling approach where the population-employment simultaneous equations system is estimated using two-stages-least-squares while changes in agricultural land is estimated using OLS on West Virginia data. Results of the study indicate that population and employment growth induce reallocation of agricultural lands, with population accounting for a significant pressure on agricultural land conversion. Poor agricultural performance and urban adjacency significantly induces conversion and facilitates sprawl at urban fringes. Results also indicate that Federal and NGOs land conservation programs significantly reduce changes in agricultural land density.

Barbier (2001) describe In developing economies, especially those without oil and natural gas reserves, the most important source of natural wealth is agricultural land. In these economies, the agricultural land base is expanding rapidly through conversion of forests, wetlands and other natural habitat.

López (1998) identifies most of Sub-Saharan Africa, parts of East and South East Asia and the tropical forests of South America as regions with "abundant land" and open-access resource conditions that are prone to agricultural expansion. Widespread land and resource conversion is occurring in many of these areas, mainly due to the high degree of integration of rural areas with the national and international economy as well as population pressures. Agricultural land expansion in many tropical regions is also spurred by the poor intensification of agriculture in many tropical developing countries, where use of irrigation and fertilizer is low.

Methodology:

The study was conducted in two purposively selected district of Bangladesh. The selected District were Mymensingh and Narsingdi. The reasons for selecting the study were is the variation of the localities on geographical point of view within the District and the importance of these District on agricultural point of view as compared to other District. The two districts were purposively selected as the study area as well as three upazilas have been selected from each district and three categories of samplings area has been selected naming urban village, peri-urban villlage and remoty village.



All household heads of Mymensingadar, Bhaluka, Fulbaria under Mymensingh district as well as Narshindisadar, Belabo under Narshindi district were the population of the study. A good number of respondents as owner of HL, MHL and LL, were selected following random sampling technique from those study area. Data were collected from 18.01.12 to 10.03.12. Each household head were the population of the study. The total sample was 180, 20 from each upazila. Random sampling procedure was followed during the study (Table 1).

Table 1. Selected Study Villages by Upazila in 2012

District	Urban Village (Upazila Headquarter)	Peri-urban Village (down town of upazila)	Rural Area (Union Parisad)	Total Household will be Interviewed (N= 180)
Mymensingh	Mymensingh Sadar (Khagdohar Muktagacha)	Sutiakhali Bhubokhali	Char-Iswardi Iswardia	20
	Bhaluka (Medila Kathalia)	Varaduba Dhamsur	Dakatia Kachina	20
	Fulbaria (Jorbaria Andariapara)	Ashim Deokhola	Naogao Kalibazar	20
Narshindi	Narshindi Sadar (Velanagar Brammandi)	Baghata Birampur	Najarpur Nabipur	20
	Belabo (Matiapara Tekpara)	Char belabo Amlabo	Binnabait Meratali	20
	Polash (Polash Paiksha)	Santanpara Charsindur	Kadirchar Noakanda	20

The researcher was employ adequate care in selecting personal, economic, social and psychological factors of the rural community, considering the availability of time and resources, reviewing relevant literature and discussing relevant expert, the researcher selected the variables for the study. Variables such as respondents' family size, education level and annual family income were described following standard procedure.

Annual conversion of agricultural land into non-agriculture and consequent loss of crop production was determined using standard procedure and duly described the present pattern of non-agricultural uses of the converted land.

The respondents were asked to put suggestions regarding suitable policy measures towards protection of farm land in the country.



In order to collect relevant information two interview schedules were prepared (one for collecting data from individual respondents and another for collecting data from study area) carefully keeping the objectives of the study in mind (Annexure A & B). The interview schedule contained both open and closed form of questions to obtain information regarding agricultural land availability. Appropriate scales were developed for computing suitable scores. The draft interview schedule was prepared in Bengali and it was pre-tested among farmers in the whole sample area before preparing the final version for collecting the data for the main study. The pretest was helpful in identifying faulty questions and statements in the draft schedule.

Collected data was analyzed with the help of SPSS computer package program.

Result and Discussion

4. Socio-economic Characteristics of the Sample Households

Characteristics were selected on the basis of the objectives of the study. Past review literature were investigated considering the selection of characteristics.

4.1 Size of the family, Educational level, Annual family income and average land area owned

The average size of the family in the study areas was 4.9 (table 2 & 3), which is equal with the national average of 4.9 in 2010 (BBS 2010). The largest family size (5.4) was found in rural area as expected. The average size of the educational level was 3.3 which is slight higher than national average (2.6) in 2010 (Ref.). The highest average educational level was found at urban area, while the lowest level of education (2.7) was found in rural area (table 2). In addition, The average annual family income of the study area was 142.76, which slightly higher than national average family income. The highest average family income (150.25) was recorded in urban area, while the lowest average family income (132.75) was recorded in rural area (table 2). Data presented in table 3 revealed that the average land area owned by the all households was 1.63 acre.

Table 2 Average size of the household

Characteristics	Measuring unit	Urban	Peri-urban	Rural	Total Average
Family size	Number	4.5	4.8	5.4	4.9 (BBS 2010 4.9)
Educational Level	Class attended	3.8	3.5	2.7	3.3 (Nat.2.6)
Annual family Income ('000 Tk.)	('000 Tk.)	150.25	145.28	132.75	142.76 (Nat.139.4)

Table 3 Average Land Area Owned and the Family size by Land Ownership Size of Households

Land Ownership size	Area Owned (acre)	Family Size (no)
Landless	0.23	4.7
Marginal	0.55	4.8
Small	1.66	5.6
Medium	3.20	5.8



Large	6.12	5.5
All Households	1.63	4.9

Source: Field Survey, 2012

Note: Landless upto 0.5 acre; Marginal 0.51 to 1.0 acres, small 1.01 acres to 2.5 acres; Medium 2.51 acres to 5.0 acres, and Large – 5.01 acres and above.

4.2 Occupational Distribution

Data placed in table 3 indicates that the highest percentage of people engaged in crop agriculture as their occupation; the figure was around 37 percent. Also, in rural area, an overwhelming majority (57.2 percent) respondents' occupation was crop agriculture but the phenomenon was little bit different in urban area, where people engaged in agriculture were about 18 percent but it is higher in service occupation; the figure was around 26 percent in urban area representing whole Bangladesh scenario.

Table 3 Occupational Distribution of Household Heads by Residence (*Percent*)

Principal Occupation	Urban	Peri-urban	Rural	Total Average
Crop Agriculture	15.7	36.8	57.2	36.6
Non crop-agriculture	7.6	12.5	7.3	9.13
Labourer	18.5	15.6	12.5	15.5
Transport	5.8	4.7	1.8	4.1
Trading	14.5	12.0	7.4	11.3
Service	25.6	9.5	4.5	13.2
House work	0.8	1.5	2.4	1.57
Industry	0.7	1.3	0.5	0.83
Old age	6.3	4.6	5.0	5.3
Retired	4.5	1.5	1.4	2.47
Total	100	100	100	100

Source: Field Survey, 2011-12

Agricultural Land Converted to Non-Agriculture:

Amount of Land Converted

The current survey estimated that during the ten years study period of 2001 to 2010, 13.6 acres of agricultural land was converted to non-agriculture (Table 4). In such conversion, 91 landowners i.e. 51 percent of interviewed households were involved (Table 5). Land converters during the period were maximum in urban village (18 percent) and the lowest in peri-urban village. Conversion of agricultural land with respect to total land owned in the year 2001 in the surveyed villages during the study period amounts to 4.23 percent or 0.42 percent per year (Table 4). The annual rate of conversion varies from 0.20 to 0.60 percent in peri-urban and urban village respectively (Table 4). The present estimate is lower than the previous figure of about one percent, often quoted.

Table 4 Amount of Land Converted During the Period of 10 years From 2001 to 2010 by residence



Residence	Total land Owned in 2001 (acres)	Total land Converted (acres)	Percentage of land Converted in 10 Years	Annual Rate of Conversion (%)	Percentage of land Converted from	
					Crop Land	Non-crop land
Urban Village	110.4	6.54 (18)	5.92	0.59	81.5	18.5
Peri-urban Village	96.26	1.9 (14)	1.97	0.197	91.4	8.6
Rural Village	114.52	5.16 (15)	4.5	0.45	92.7	7.3
All Village	321.12	13.6 (47)	4.23	0.423	90.8	9.2

Land Converted by Possession Status and Residence

According to land ownership size the proportion of land converters generally increases with their size, the average being 51 percent. It indicates lowest land converter group was small land owner (45 percent) and the highest land converter group was large land owner (67 percent). In addition, data placed in table 8 indicates that per year conversion of all households were 0.55 percent.

Table 5 Number of Households Converted Land and The Amount of Land Converted by Land Ownership Size During the Ten Year Period 2001-2010

Land Ownership size	No. of respondents	No. of households Converted	Percent of Households Converted	Percent of all Households Area Converted in 10 years	Percent Share of Total	
					Crop Land	Non-crop land
Landless	32	18	56.25	26.5	92.1	7.9
Marginal	42	20	47.6	5.4	88.6	11.4
Small	40	18	45	5.8	90.6	9.4
Medium	54	27	50	5.6	89.4	10.6
Large	12	8	66.67	2.0	91.5	8.5
All Households	180	91	50.56	5.5	90.5	9.5

Source: Field Survey, 2012

Note: Figures in the parentheses indicate annual rate of conversion.

Land Converted under different Possessions:

During the ten years study period, land was converted to non-agricultural uses under different possession rights other than self-ownership. Some land was sold, some acquired by the government and some was donated. The data shows that the major proportion (43 percent) of the converted was sold while only 33 percent was converted under self ownership, where peri-urban village

dominate covering 49 percent of total converted land (table 7). Land acquired by the government had also significant share (21 percent), mostly observed in urban village (35 percent). It may be noted that conversion after sales was substantially high in rural and in peri-urban, as compared to urban village in this categories. Such analysis by land ownership size indicates that 61 percent of large land owners’ converted land took place under self-ownership, while only 16 percent was in the case of landless category (Table 8). Conversion that occurred after sales of the land was quite high among the medium land owners. Surprisingly, over half of the converted land of the landless households was derived from acquired land. Such share for the large land owners was much more lower (7 percent), indicating that the land poor is more adversely affected by the acquisition of land by the state.

Table 6 Amount of Land Converted by Possession Status and Residence(Percentage)

Residence	Self-owner-ship	Sold	Acquired	Donation	Others
Urban Vil-lage	31.47	30.50	35.40	2.63	-
Peri-urban Village	48.60	35.85	10.40	5.15	-
Rural Village	24.50	55.60	12.40	7.25	0.25
All Areas	32.50	42.70	20.65	4.15	-

Source: Field Survey, 2012

Table 7Amount of Land Converted by Possession Status and the Land Ownership Size (per-centage)

Land Owner-ship size	Self-Owner-ship	sold	Acquired	Donation	Others
Landless	15.85	28.42	53.12	2.61	-
Marginal	45.42	43.56	5.23	5.79	-
Small	30.25	52.42	14.60	2.10	0.63
Medium	32.56	55.82	8.25	3.37	-
Large	60.56	32.75	6.69	-	-
All House-holds	34.15	42.40	17.80	5.20	0.45

Source: Field Survey, 2012

Main Uses of Converted Land and Loss of Agricultural Production:

Non-agricultural uses of converted land information collected indicates that more than half (55 percent) of the converted local was used in housing predominantly in urban villages (53 percent) as expected. The next two important uses were in the construction of roads and business enterprises covering 11 and 8 percent respectively (Table 8). Non-reported area of use was also substantial (18 percent). The share of such land was the largest in rural villages (20 percent). Among different residential status of the households, the second most important utilization in peri-urban villages was road construction covering 21 percent of its converted land.



It is interesting to look at the pattern of non-agricultural uses of the converted land by their possession or ownership status. Converted land under self-ownership was used predominately in housing .

Non-agricultural uses are (also) found different when examined by the land ownership size of households although the housing claimed the maximum share in all the categories. Marginal land owners had the highest proportion (63 percent) in housing while the medium and large owners had the lowest (37 percent) still occupying the maximum proportion (Table 9). In the large ownership size, next to housing, the next largest share (19 percent) claimed by the shop/business establishment but it had the least more among the small land owners. Road construction claimed 15 percent of the medium owners converted land. In the landless group, the third highest proportional share (8 percent) was occupied by education & health organization.

Table 8 Non-Agricultural uses of Converted Agricultural Land by Residence (Percentage)

Current Use	Urban	Peri-urban	Rural	Total
Shop/Business Enterprise	6.10	5.50	8.5	7.50
Agro-based Industries	4.75	5.25	-	1.65
Education & health Organization	4.80	3.52	1.5	1.85
Construction of Road	5.10	20.50	9.6	10.50
Construction of House	55.32	52.65	51.25	55.10
Mills/factories	-	0.50	-	0.25
Unutilized	-	1.10	2.5	1.25
Public Offices & Utilities	9.45	3.25	6.2	2.50
Brick Fields	4.50	1.50	0.5	1.75
Non Reported	11.98	6.23	19.95	17.65
All Uses	100	100	100	100

Source: Field Survey, 2012

Table 9 Non-Agricultural Uses of Converted Agricultural Land by Land Ownership Size (Percentage)

Current Use	Landless	Marginal	Small	Medium	Large	Total
Shop/Business Enterprise	9.10	7.10	2.50	12.75	18.50	7.50
Agro-based Industries	-	-	2.40	1.80	4.25	1.65



Education & health Organization	7.50	3.20	2.25	6.50	2.15	1.85
Construction of Road	3.12	8.85	10.30	14.92	11.25	10.50
Construction of House	59.63	62.78	61.30	37.07	36.71	55.10
Mills/factories	-	-	1.50	4.26	0.45	0.25
Unutilized	1.25	0.75	0.60	2.75	1.50	1.25
Public Offices & Utilities	2.20	5.25	5.25	2.50	2.68	2.50
Brick Fields	1.75	3.27	2.30	1.80	1.86	1.75
Non Reported	15.45	8.80	11.60	15.65	20.65	17.65
All Uses	100	100	100	100	100	100

Source: Field Survey, 2012

National Production Loss Based on Current Field Survey:

According to the present field survey, production of different crops and vegetables is lost due to conversion of farm land to non-agriculture.

The main crops lost were HYV paddy, local paddy and vegetables; and total annual loss of production was reported to be 22,400 per acre (Table 13). On the basis of annual production losses of Tk. 22,774 per acre the country’s total loss from converted land of 30413 hectares of 75,120 acre i.e. @ 0.42 percent as estimated earlier, stands (22,400 X 75120 =)crore per year.

Table 10 Annual Production Loss Due to Conversion of Crop Land by Type of Crops Grow

Crop Grown	Total Area (acre)	Total Loss of Crops and others (Tk.)	Per Acre loss (Tk.)
HYV paddy	9.5	212,800	22,400
Local paddy	1.65	33,990	20,600
Vegetables	4.35	184,875	42,500
Bamboo Bushes, Nursery & others	0.75	15375	20,500
All Crops and Others	16.25	40,4300	24,880

Source: Field Survey, 2012

Note: Total loss of crops were estimated on the base of per acre yield of different crops on the prevailing market prices at the time of field survey.

Stopping land Transformation: Respondents’ Opinions

Data placed in table 11 revealed that 50 percent of respondents of all areas opined that ‘agriculture should be made more beneficial and commercial’. In addition, 29 percent of respondents of all



areas opined that ‘particular tax to be imposed on transformation of land’. Interestingly, ‘area-wise maximum may be fixed for non-agricultural uses of land’ and ‘tax exemption may be offered for commercial farms and the agro-based industries’ were opined by same number of respondents and the figure was 9 percent .

Table 11 Suggestions for Arresting Conversion of Land by Residential Status(Percentage)

Residential Status of Households	Particular tax to be Imposed	Area-wise Maximum for Non-agril. Uses	Tax Indemnity for Agro-based Industries	Agriculture should be made Beneficial
Metropolitan	35	10	5	46
Urban	26	13	8	56
Peri-urban	30	7	10	48
Rural	26	5	12	50
All Areas	29	9	9	50

Conclusions:

The occupation of maximum respondent in rural areas were crop agriculture but completely different in urban area. Maximum areas were occupied by the crop land even in urban of surveyed area. Large land owners were tend to convert agricultural land in to no agriculture. Perhaps, for increasing demand of housing infrastructure getting more profit then crop cultivation by renting. Respondents were interested to convert their agricultural land. Respondents on the basis of land converted by possession status and residence in all areas were higher portion in sold categories than any other categories. Cultivable land in the surveyed areas were decreasing alarmingly which was threatening for the food security.

References:

- BAE 578 2010 Shrinking Agricultural Lands. Downloaded: [http://wikis.lib.ncsu.edu/index.php/BAE 578 2010 Shrinking Agricultural Lands](http://wikis.lib.ncsu.edu/index.php/BAE_578_2010_Shrinking_Agricultural_Lands) (on 25. 07.2012)
- BBS. 2010. Bangladesh Bureau of Statistics. Ministry of Planning. The peoples Republic of Bangladesh.p17.
- Barbier, E.B., and J.C.Burgess. “The Economics of Tropical Deforestation.” *Journal of Economic Surveys* 15(2001):413-432.
- Brecorder. 2011. Concerns voiced over diminishing agriculture land. September 30, 2011. Link:<http://www.brecorder.com/agriculture-a-allied/single/624/183/1236446/>



- G. H. Yohannes. 2002. Growth Equilibrium Modeling of Urban Sprawl on Agricultural Lands in West Virginia. An Unpublished MS thesis submitted to the department of Agricultural and Resource Economics, College of Agriculture, Forestry, and Consumer Sciences at West Virginia University, USA. P.ii
- López, R. “Where Development Can or Cannot Go: The Role of Poverty-Environment Linkages.” Annual Bank Conference on Development Economics 1997, B. Pleskovic and J.E. Stiglitz, eds., pp. 285-306. Washington DC: The World Bank, 1998.
- M. Brandman Associates. September 11, 2008. Agricultural Land Conversion Study Kings County, California. Kings County Government Center Planning Department 1400 W. Lacey Boulevard, Bldg #6 Hanford, CA 93230 559.584.1441 p.18
- M. M. Rahaman. 23 June 2012. One-third of farmlands disappear :Decreases by one per cent every year . Downloaded: <http://www.theindependentbd.com/paper-edition/frontpage/129-frontpage/116999-one-third-of-farmlands-disappear.html>
- Nancy Hofmann, Giuseppe Filoso and Mike Schofield, *Statistics Canada*. (January 2005). The loss of dependable agricultural land in Canada. The Rural Secretariat, Agriculture and Agri-Food Canada. The *Rural and Small Town Canada Analysis Bulletin* is an occasional publication of the Agriculture Division of Statistics Canada. It is available without charge at <http://www.statcan.ca/cgi-bin/downpub/freepub.cgi>. Catalogue no. 21-006-XIE. Vol. 6, No. 1. P.1
- Samuel P. S. Ho and George C. S. Lin. *Converting Land to Nonagricultural Use in China's Coastal Provinces*. Modern China, Vol. 30 No. 1, January 2004 81-112
- T. Islam. 2011. Farm land drowning under water pressure, Downloaded: <http://www.atimes.com/ind-pak/BF14Df02.html>
- USDA. 2007. http://www.farmlandinfo.org/agricultural_statistics/index.cfm?function=statistics_view&stateID=WA. Also see: See USDA Census of Agriculture, 1997 - http://www.nass.usda.gov/census/census92/volume1/wa-47/wa_intro.pdf, 2002 - <http://www.nass.usda.gov/census/census02/volume1/wa/index1.htm>
- V.G. Gandhi. Agricultural Land in India Diminishing. A Popular article. Created on Tuesday, 13 September 2011 19:45. Downloaded from this link: [http://www.patnadaily.com/index.php/vasant-g-gandhi/6036-agricultural-land-in-india-diminishing.html\(25.07.2012\)](http://www.patnadaily.com/index.php/vasant-g-gandhi/6036-agricultural-land-in-india-diminishing.html(25.07.2012))
- World Bank (WB) Report. 2011. Priorities for Agriculture and Rural Development. Downloaded: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/SOUTHASIAEXT/EXTSAREGTOPAGRI/0,,contentMDK:20273763~menuPK:548213~pagePK:34004173~piPK:34003707~theSitePK:452766,00.html>

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