

An Analysis on Influencing Factors of Rural Housing and Settlement Pattern in Rajshahi, Bangladesh

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Abstract: Bangladesh is a country with natural resources though it is the densely populated country having numerous numbers of villages and in which 93.51% of the total areas are comprised of rural areas. In rural settlements, the fundamental changes are authentically an outcome of the transformation of urbanization and various factors are associated with the emblematical changes of this settlement. The objective of the study is to determine and analyze the most operative factors beneath the changing housing condition and settlement pattern, which illustrates the socio-economic characteristics in the rural area. The study conducted in Dhaminkaur and KhordKaur villages of Baghmara Upazila, Rajshahi with the help of Participatory Rural Appraisal (PRA) tools i.e. key informants' interview, transect walk and direct observation throughout the study area. Household questionnaire survey was conducted by random sampling of 102 households during July 2016 to August 2016. Geographic Information System (GIS) has been applied to see the decadal change in settlement pattern in the year between 2003- 2016. According to the study, a significant change has noticed in the housing settlement pattern in the last 13 years. Influential factors behind the housing condition and reason for changing condition have been identified. Main reason for changing conditions are: increase in income and migration rate, variation in income source, and Reduction of joint family. The application of "weighted index method" in the research shows the value of the average condition of the household is 13.67 which indicates the housing condition in the study area is Moderate. Basically, the research demonstrates the most influential factors which affect the changing condition and settlement pattern in rural housing to achieve the better quality of life in Rural Neighborhoods.

Keywords: Rural Housing, Settlement Pattern, Operative Factors, Sustainable Rural Development

1. Introduction

Bangladesh is a country with a number of natural and other resources which is one of the densely populated countries of the world. About 93.51% of the total area of Bangladesh is the rural area and the rural population is 81.27% of the total population [1]. About 80% people live in rural settlements and 86% of the dwelling unit is located rural areas in our country. The study based on two basic criteria which are housing condition and settlement pattern. In that case, the housing condition of these rural space are by different types of the housing structure, dwelling type, roof, and wall and floor materials, number of rooms and tenancy of housing [2].

A housing Environment can be developed by improving equity and efficiency social health, social fairness, the dignity of the resident [3]. Housing varies in rural areas due to environmental and climatic diversity. The houses are built according to geographical features, ways of living and lifestyles of each area [3]. Housing condition depend on the economic and social state of the household. The categories of housing are basically affected by local environment and construction materials which are available locally in the context of the rural area [2]. Owing to the very low incomes, employment and severe poverty that prevail in the rural areas of Bangladesh, the rural populace has little choice but to continue to stick to the indigenous materials, methods and

designs not only because of their low costs but also because of their familiarity and acceptability [9]. And on the other hand, the homestead has mainly two types of settlement: linear and scattered settlement. The shape of settlements was usually influenced by the surrounding landscape. The settlement in which most of the people are engaging in agriculture, forestry, and fishery. The pattern of settlement is the relationship between one house and building to another. Linear and scattered both patterns of establishing a settlement on high land above the annual flood level. The linear type is built on high land along natural embankments of rivers. The scattered settlements built on raised land are often dispersed throughout the land. In the plains land, entire villages have grown over time in the scattered pattern by raising land and such settlements are still being built [9]. A house often begins with an individual household and incrementally develops into a settlement of several houses of inter-generational households belonging to an extended family. Over time the settlement gradually expands in a scattered pattern [10].

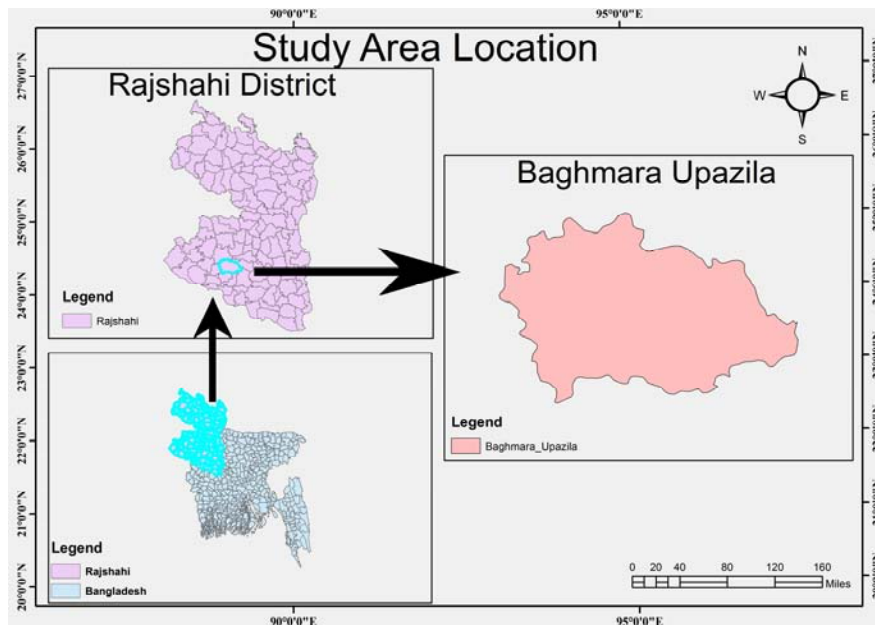
Many relevant studies have been conducted to identify the housing conditions and settlement pattern by using Geographic information system (GIS) and remote sensing perspective. The study focuses on the influential factors that cause changes in rural housing and also the settlement pattern of rural area people. The study purpose is to show the trends and also find out the most influential factors beneath of changing the of housing and settlement pattern. Basically, rural area's housing is different from the urban area due to their income, culture and material availability which creates vulnerable condition for them in some cases. Moreover, settlement pattern also changes according to their culture, habitants, population density and so on. The study mainly focuses the dominant factors behind the rural housing and settlement patterns. Statistical data analysis was done with

association of statistical package for social science (SPSS) to identify the correlation of the factors which influences rural housing and settlement pattern. The settlement system in rural regions is being shaped by various forces.

Basically, housing condition describes the condition of the rural space and with the help of settlement pattern growth prediction in the future decades can be done. With the increase of family members, households are expanding their homesteads in horizontal way that gradually decreasing agricultural lands in rural area. The traditional rural houses are well adapted to the local culture, environment and resources but none the less they also suffer from serious deficiencies [7]. Traditional rural dwellings are usually small, insanitary and suffer from the absence of many of the basic amenities of daily life [8]. The evaluation and indication of these factors behind the condition helps to identify the lacking of these plan in the rural places. The increase in population and the change in culture has a huge impact on the settlement pattern change which also indicates the growth prediction according to the density variation in future. Although the study was identify the trend of shrinking cultivable land through horizontal expansion of housing. New rural houses are needed each year just to cover the population increase; intensive action is needed now to ensure that these dwellings are safe and affordable. So people should work for the betterment than to give recommended suggestions.

2. Study Area

Rajshahi is the first metropolitan city in Bangladesh and a major urban and industrial center of North Bengal, consisting of 13 upazillas or sub districts, where Baghmara upazilla is one of them having Total area of about 366.26 Sq.km. In general, total population in Baghmara upazila 354664 [2].



Source: Prepared by Researcher, 2016.

Figure 1. Study Area Location Map.

3. Materials and Methodology

After selecting study topic and objective, previous works related to the topic had been reviewed to find out best way for data collection and then analysis the collect data to get the optimum result. Two types of data from both primary and secondary sources are collected for this study. Primary sources are including questionnaire survey, interview, direct observation, key informant and mapping, structured questionnaire survey. The most crucial part of such an interview is to develop a rapport with the community; this is most often established by listening to the people talk about their problem rather than suggesting solutions. Direct observation of all major activities to just walk around in the community, observing activities asking question at opportune moment, may yield important information. Key informant can be major sources of information. The key informant was BRAC school teacher named "Rahela Khatun". The maps are providing accurate cartographic information. The settlement pattern both in year 2003 and 2016 have prepared using GIS. Secondary data will be collected from Population and housing census 2011 and BBS data Related journals and articles, Website articles. Data analysis is done by qualitative as well as quantitative survey based on questionnaire survey, and furthers the reliable information of the key informants and the transect walk throughout the survey area, moreover the observation of the propagation of the settlement throughout Geographic Information System (GIS). Data are input by SPSS Software. Then data are analysis to different variable. We have found statistical frequency, graph and correlation between different variable. The study is qualitative in nature. It is principally based on some PRA techniques, i.e. key informant and interview method. Key informants are an educated person of the village who is BRAC school teacher. All 102 households were interviewed about factor influencing housing and settlement pattern

Weighted Index: The final stage of the study reveals the ranking of the rural households considering the ideal rural households have pucca house and wall material to get protected from disaster, sanitary latrine for ensuring health protection, drinking water facilities for safe drinking water and drainage system facilities for disposal of waste or protection against unwanted flooding. In the factors like Type of House include kutcha, semi-pucca and pucca houses; Latrine facility includes sanitary or Non-sanitary; Drinking water facility include pond, Tube wall and supply water; Wall materials include Mud wall, Bamboo wall, Tin sheet wall or Brick wall etc. The following table represent the value of different factors that are apply to rank the 102 household in Dhaminkaur and Khord Kaur village.

Table 1. Value of the Factors for the Weighted Index.

Factors	Division	Value
1. Type of House	Kutcha	1
	Semi pucca	2
	Pucca	3
2. Electricity facility	No	1

Factors	Division	Value
3. Latrine facility	Yes	2
	Non sanitary	1
	Sanitary	2
4. Drinking water facility	Pond	1
	Tube wall	2
	Supply	3
5. Drainage system facility	No drain	1
	Kutchra drain	2
	Mud wall	1
6. Wall Materials	Bamboo wall	2
	Tin sheet wall	3
	Brick wall	4
7. Pollution	Yes	1
	No	2

The ranking of the household represents the recent condition of the household. The higher the rank of the household indicates the better the condition of the household. Here the ranking limit is done by the expert opinion. If the summation of all the seven factors value;

- Within 9-10 it indicates the housing condition is Bad
- Within 11-15 it indicates the housing condition is Moderate
- Within 16-17 indicates the housing condition is good.

The Average Housing condition was determined by following mathematical term which is used for ranking;
 $x = F_1 + F_2 + F_3 + F_4 + F_5 + F_6 + F_7 + \dots + F_n$

Where, x = condition of individual household and

$F_1, F_2, F_3, F_4, F_5, F_6, F_7$ = Factors Here, F_1 = Type of House, F_2 = Electricity facility, F_3 = Latrine facility, F_4 = Drinking water facility, F_5 = Drainage system facility, F_6 = Wall Materials, F_7 = Pollution

The average condition of household, $X = \frac{\sum x}{N}$; here, N = number of households

4. Result and Discussion

By applying the method of ranking (discuss in the methodology) in 102 household, the value of the average condition of the household is 13.67 which indicate that the most of the housing condition in Dhaminkaur and Khord Kaur village is Moderate. The average household conditions give us a desired result with the physical survey conducted in Dhaminkaur and Khord Kaur village. In general, total population in Baghmara upazila 354664. Rural Housing is permanent, semi-permanent and temporary house where individuals and their family may live to meet federal regulations or the development of living facilities for people. 3.8% general households live in pucca house, 29.3% in semi-pucca house, 66.0% in kutcha house and the remaining 0.9% lives in jhupri. The percentage of drinking water from tube-well 91.4%, 3.0% from tap and the remaining 5.6% household get water from other sources [1]. The percentage of electricity is Baghmara upazila 41.6% [2]. Our survey area is Dhaminkaur and Khord Kaur Village which is within Subhadanga union in Baghmara Upazila. Total area of Subhadanga union is 6034 acres and Total Number of

households in Dhaminkaur is 648 and Khord Kaur is 249 [2]. Traditionally, Bangladeshi people in rural areas are used to live in a Bari includes a yard, a backyard for women to use, and a small pond or two [1].



Source: Field Survey, 2016.
Figure 2. Semi Pucca House.



Source: Field Survey, 2016.
Figure 3. Kutcha House.



Source: Field Survey, 2016.
Figure 4. Courtyard in the House.



Source: Field Survey, 2016.
Figure 5. Road Connectivity in the Villages.

4.1. Past and Present Condition of Rural Housing Settlement

Through the study area map so that we can identify our study area settlement pattern. There is a clear distinction focusing through the 10 years interval satellite maps. In 2003, we can see in the map that most of the household that makes the settlement in the two villages were built along with a road line and in some cases they made groups. A meager number of scattered settlements are also existed. Despite, the settlement was built in an organized way along the road line and the settlement is not impeding agricultural fields in any circumstances. On the other hand, in 2016 the settlement reflects that it spreads from both sides of the roads and both linear and scattered settlements are present there. Here weighing linear settlement is a (normally small to medium-sized) settlement or group of buildings that is formed in a long line facing towards a same direction [3] and scattered settlement pattern is a dispersed settlement pattern which means the dwellings are not squished together or does not follow any direction [4]. If we conceive the houses which pursue the line trend and where, there is existence of repetition of identical facing of houses as linear settlement; and the houses which does not pursue any bias as scattered settlement; then our study reveals that materially, the greater portion of houses are scattered in nature due to the unplanned development of the houses. This kind of houses does not maintain the linkage with other houses and built in a scattered way. By the frequency rate Survey data indicates that 62.7% houses follows scattered trend and the remainder 37.3% follows linear trend. Increasing number of people is the reason behind increasing number of houses. In Many places in rural areas settlements established on raised mounds are scattered throughout the low-lying terrain and in the rainy season virtually become islands. The aerial survey reveals the increasing numbers of houses are growing more in an organized way than before. Comparing khadokour and Dhaminkour settlement of 2003 and 2016, we can see the settlements are more organized and both linear and scattered settlement is present there.



Source: Google earth images, 2016.
Figure 6. Satellite Map (2003) Shows the Area of Khadokour and Dhaminkour Villages.



Source: Google earth images, 2016.

Figure 7. Satellite Map (2016) Shows the Area of Khadokour and Dhaminkour Villages.

Table 2. Pattern Followed by Individual Households.

Settlement pattern	Frequency	Percent
Linear settlement	38	37.3
Scattered settlement	64	62.7
Total	102	100.0

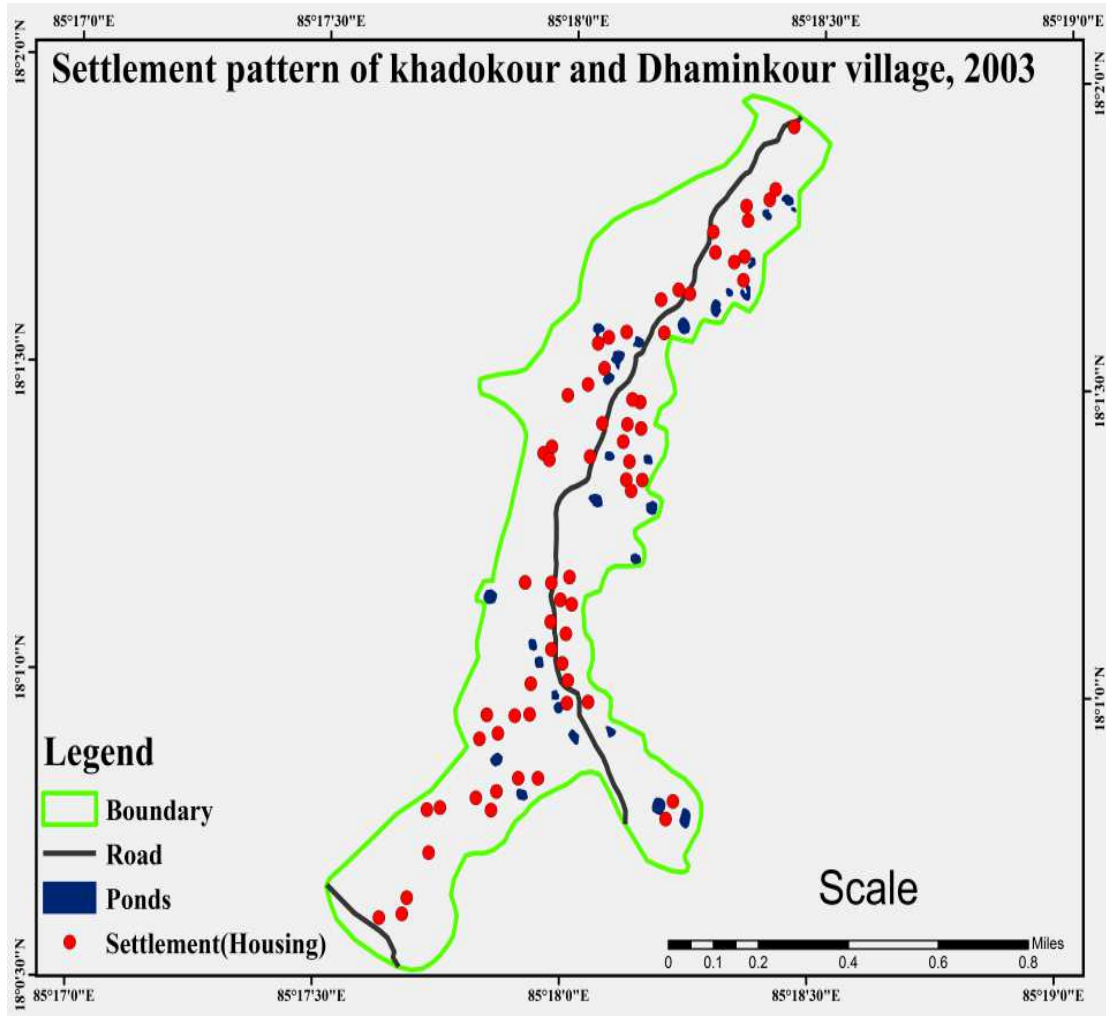
According to table-2, Most of the houses are scattered in

nature. This is because the houses do not maintain the linkage with other houses and built in a scattered way.

4.2. The Expansion of the Housing Settlement in Last 13 Years

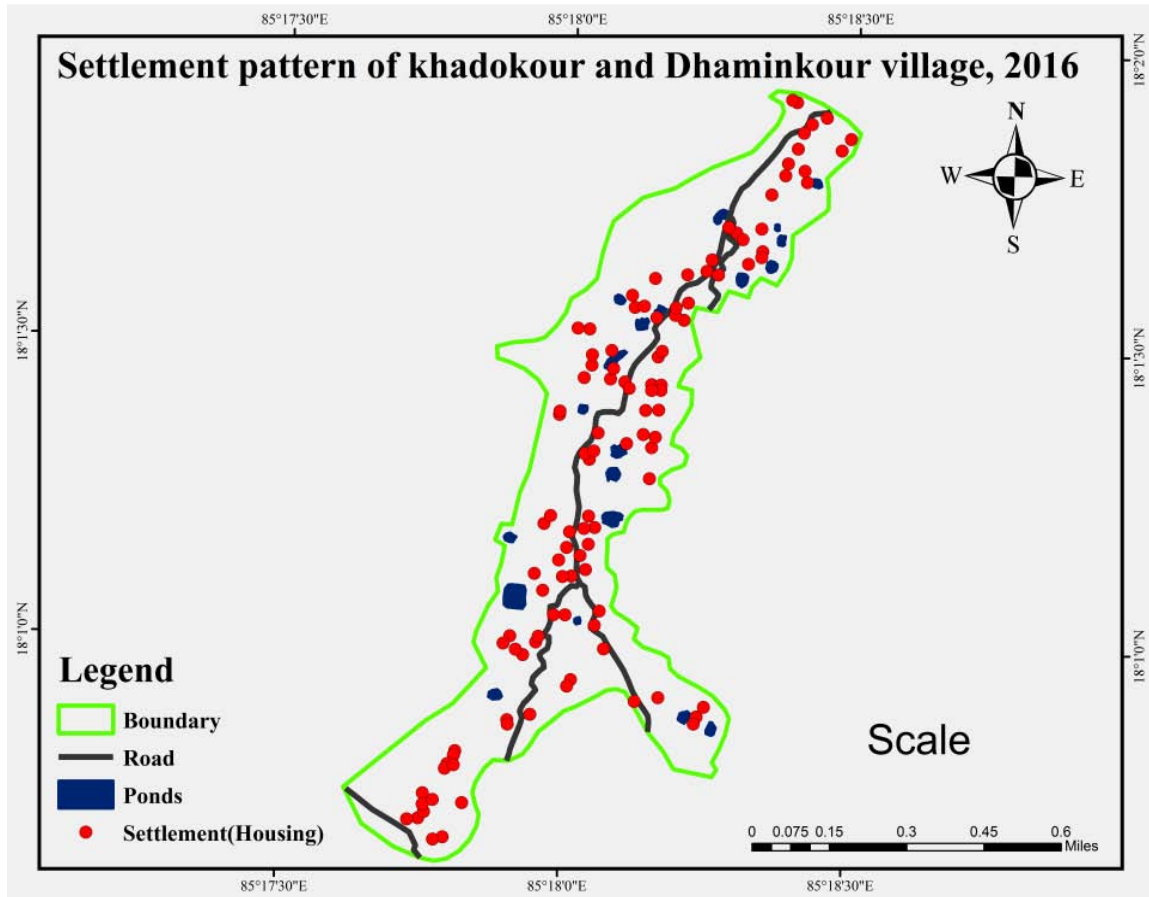
Considering the expansion of the houses as the buffering of the settlement, in 2016 the area of the buffering has increased due to the increasing number of houses. In future the development would spread to the agricultural land.

The figure 8 shows that most of the household that makes the settlement in the two villages were built along a road line and in some cases they made groups. Some scattered settlement are also present. The settlement was built in an organized way along the road line and the agricultural field is not hampering in any condition. In figure 9 comparing 2016 settlement with 2003 settlement in khadokour and Dhaminkour settlement, it can be seen that the settlement are more organized and both linear and scattered settlement are present there. The study includes survey in 51 houses within two villages and the statistics said that the most of the settlement is scattered in nature.



Source: Prepared by Researcher, 2016.

Figure 8. Settlement Pattern of Khadokour and Dhaminkour Village, 2003.



Source: Prepared by Researcher, 2016.

Figure 9. Settlement Pattern of Khadokour and Dhaminkour Village, 2016.

Housing condition: The lands are normally above the flood level. So the housing condition has neglected the height in making. Nowadays in rural and suburban areas, economically stable people try to build semi pucca (more permanent) houses. They share common walls with adjacent buildings. The plan shape of this type of construction is generally rectangular with lengths around 20-30 ft. and width around 10-15 ft. The main structural elements are mud walls which carry the load of the roofing. Many houses have open verandas at the front with roof supported by posts. The opening area is about 30 percent of the total wall area.

According to the study survey, considering the present condition of the housing and utility facilities the representatives described their households as good, moderate and bad condition. The survey indicates 52.94% moderate, 33.33% good and 13.73% bad household condition.

4.3. Influential Factors That Affect the Housing Characteristics and Settlement Pattern

Some factors are responsible for the housing characteristics and settlement pattern. The major factors which are effective are –

i Physical factors

Physical factors are influencing rural housing and settlement pattern. These are include present and past

condition of housing, housing types, material, drainage, drinking water, latrine etc. These factors influence the type and spacing of dwelling. Sometimes existence of utilities like shops, glossaries, ponds also influences the location of the households. We found several ponds in the survey area and these ponds were primarily used for bathing or washing items. Some villagers, particularly few farmers use the ponds to wash their crops. We found 4 small shops that were situated within the village. One was at the opening mouth of the village and the others were the farthest end of the village. The goods that were available in these shops were soap, chips, chocolates, tea, drinks or beverage, biscuits kerosene, etc.

ii Past and present type of households

At the past days most of houses were kutcha. They were traditional style rural housing using soil as the element of house. The belongingness of the land is from father to son trend in last few decades. The houses were near their lands. At past days, 86.27% houses were kutcha, 9.80% houses were semi pucca and the remaining 3.92% houses were pucca. The house forms, building styles and materials used in construction had significant variations in different areas of the locality. Perhaps the only thing in common is the clustering of houses in particular places forming a para, a few of which grouped together to form a village. Most of the housing is semi-pucca. At the present day people are live in

nuclear family. Most of the owner of the houses were belong to their inherit property. The houses are near their lands. At present the existence of semi-pucca House is 45.10%, pucca

house is 37.25% and kutcha house is 17.65%. So the number of pucca houses is increasing day by day.

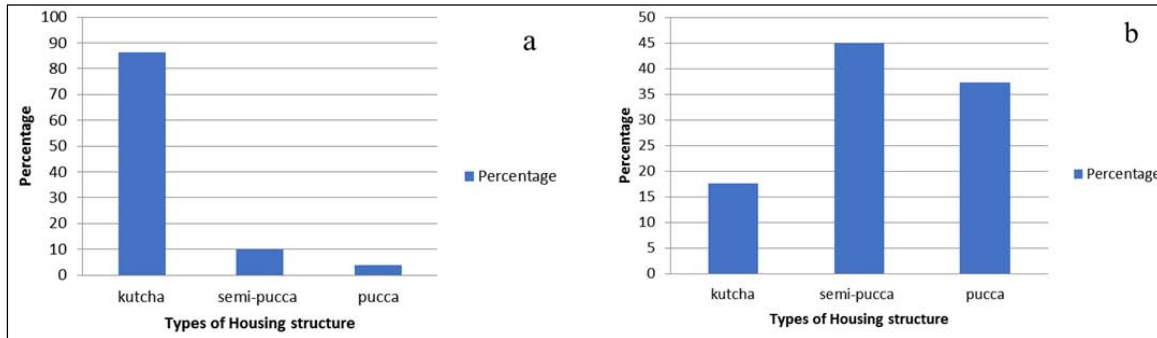


Figure 10. Percentage of Different Type of Households (a) Past Household Structure (13 Years Ago) (b) The Present Household Structure (b).

iii Wall material

The study area has distinctive characteristics in mud-walled housing. Relatively, mud-walled houses of about 15 feet high. Mud-walled houses with two to three level roofs. The rest of the wall is made plastered with cement on both sides. The roof is normally made of tin sheets. Besides houses have their boundary walls made of tin sheets. Some of boundary walls are colorful and high gates. According to survey statistics in Dhaminkaur and Khoddor Kaur Village in present most of the houses are brick walled (58.9%) as the majority houses are pucca and semi pucca, mud walled houses are 33.33% and tin sheet walled houses are 7.84%. (Figure 11)

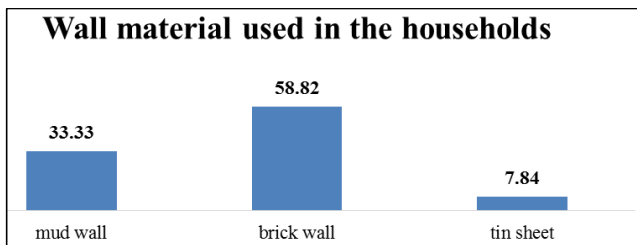


Figure 11. Wall Material Used in the Households.

iv Sanitation

The most people of the village are not aware of their health conditions. The state of their latrine as observed is illustrated below: Most of the residents do not have sanitary latrine. We only found one household that had a septic tank latrine. There was no presence of any hanging latrine. The sanitation condition in Dhaminkaur and Khoddor Kaur Village is not good. The percentage of non-sanitary is 56.86% and sanitary latrine is 43.14%.

v Electricity supply

We have surveyed 102 households and all of them have electricity connection. Almost all the houses have electricity facility. As government is providing power to rural Bangladesh since 1977. But load shedding bother at the evening. The electric bill is approximately 250-1000 taka per household.

vi Drinking Water Facility

Almost 84.31% people use supply water for drinking. The water level in the area is low is the reason behind the low Tube well users (only 15.69%). Those people who did not have any tube well took water from other's tube well nearby. They use the tube well water for cooking and drinking purposes. Most of the people use supply water and water supply is frequent as needed by the residents. Each people have to pay 10 taka for each member of the household.

vii Drainage system

The drainage system of the area is very poor. There exist only kutcha drain. 83% household have no drainage system although 17% household have drainage system facility but those facility is also in miserable condition. These poor drainage system causes temporary flood in rainy days.

viii Waste management system

There is no existence of waste disposal site. Generally people dump their household wastes behind their house yards and ponds which affect the environment and causing different health hazards. Sometimes they dump the waste in the swamps which causes the nuisance of mosquitoes.

ix Economic factor

Economic factor are greatly influences of housing. The economic growth of one village include monthly income, income sources, migration, maintenance cost etc.

x Income sources

The beginning the most popular occupation was that of farmers. With little education, the males had to play the role of farmers. Then with increasing population, roads were building, people also started working as rickshaw pullers and drivers of different vehicles villagers also started working in different shops. Ninety percent of the population lives in the villages where agriculture makes up close to 72% percent of the GDP and sixty percent employment [1]. Most of the people are engaged in agriculture (approximately 62.75%), 13.73% are involved in services, 5.88% are involved in business and the rest 17.65% are in others (others include fisheries, day labor, transport services etc.) [1]. Study reveals that monthly income is less who are engaged in agriculture than those who are involved in services.

xi Monthly income

With higher economic growth and rising incomes people

will be able to spend more on houses. The average monthly income of the households is approximately 7400 taka. The percentage of 1000-5000 income earning household are 23.53%, 5001-10000 income earning household is 50.98%, 10001-15000 income earning household is 15.69%, 15001-30000 income earning household is 5.88%, 30001-50000 income earning household is 1.96% and the remainder 1.96% household earn more than 50000.

xii Migration

Majority of the household (almost 60.78%) does not contain any kind of migration. The rest 39.22% household contains migration among which 24.62% family have one person migration, 10.76% family have two person migration, 3.84% family have more than one person migration. Though the migration rate is low, it is increasing day by day. The

major reason behind the migration is in search of better employment opportunities, for higher education facility, higher income facility, and political issue. International migration rate (approximately 5.63%) is very low with respect to regional migration (approximately 94.37%).

xiii Maintenance cost

Maintenance cost includes the repairing cost, the water supply bills, electricity supply bill and tax. Most of the people are able to pay their maintenance cost. Maximum 45% and 35% cost varies between 1-500 BDT and 501-1000 BDT in Dhaminkaur and Khord Kaur villages (Figure 12). So the maintenance cost is very low in this area, as they are the owner of the area so they don't need to pay their rents. People spend at least 10% of their income for the maintenance.

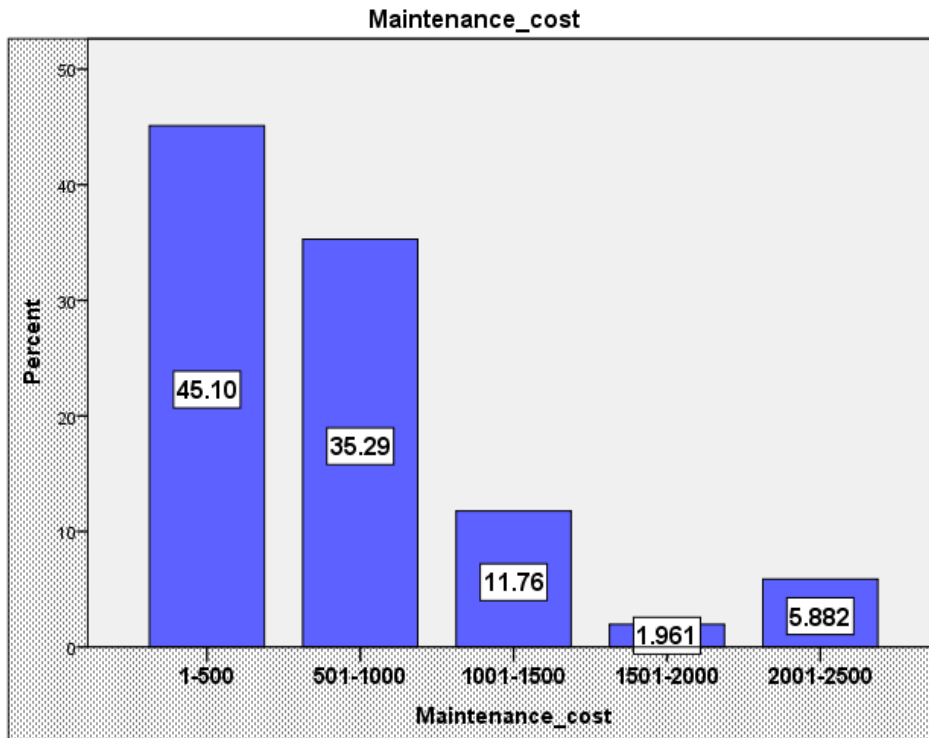


Figure 12. Maintenance Cost of Households in BDT (Taka).

xiv Climate factor

Climate is one of the factors influencing of housing and settlement pattern. These include pollution and disaster. We can see the pollution and Disaster rate in Dhaminkaur and KhordKaur Village is less which encourages people to expand or built new houses there. In our survey most of the people say there is no disaster but 25.49% people say disaster are occur which is flood and the rest 74.51% people does not suffer any kind of disaster. In our survey 23.53% people say pollution are exist which is air pollution, water pollution etc. and 76.47% people does not suffer any kind of pollution.

xv Ethnic and Cultural Factors

These include aspects like caste, community, ethnicity and religion. It is commonly found that the main land owning caste resides at the centre of the village and the other service providing castes on the periphery.

xvi Face of the houses

In Bangladesh traditionally the rural Housing faces are Mostly in North faced. In Dhaminkaur and Khord Kaur villages 41.18% houses are North faced, 33.33% houses are south faced, 11.76% houses area houses are east faced and houses 13.73% are west faced respectively.

xvii Courtyard

In Bangladesh traditionally the rural houses have combined courtyard. In Dhaminkaur and Khordkaur villages we can see 76.47% houses are using combined courtyard and 23.53% houses are using individual courtyard.

xviii Residential segregation and social structure

The study includes survey in 102 households and opinion of all that there is a common segregation in their housing. Since majority of the population is Muslim in Dhaminkaur and Khordkaur village, key informant informed, the number of religious institutions, e.g. mosques and madrasahs have been increasing in the village since last fifteen years.

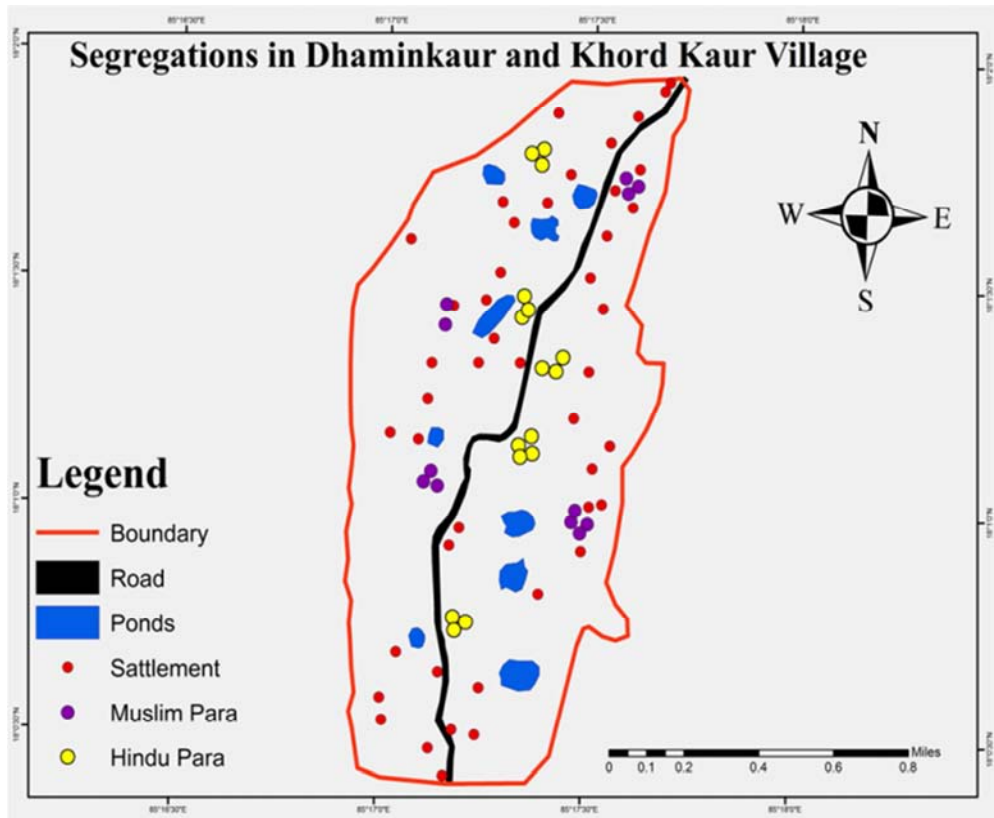


Figure 13. Segregation of Religion in Dhaminkaur and Khordokaur Village.

The different region people live separately. The segregation type is like Muslim Para and Hindu Para. This are like all Muslims live together and all Hindus live together. According to them the segregation is needed for the locality, as their culture and norms and customs are different.

xix Distribution of plots and sizes

The distributions of plots and sizes have a close relationship because as much as the distribution is frequent the sizes of plots become smaller. The principal factors which observed in the state for the distribution of plots and sizes are drainage condition, irrigational facilities, nearness to the habitation sites, soil fertility, growth of population, separation of new families and right of inheritances etc. In the state, the law of inheritances allows all children to have their share equally in each farm unit of the family. Once, a farmer inherited then distributes the fragmented plots again to the number of inheritances. Therefore, the number of plots becomes increased in the next generation and turns to smaller in size in an unending process. We can shows fragmentation of plots of rectangular shape smaller in size near the residential unit and bigger on the marginal sites.

5. The Changing Tradition of Housing

Reasons for Changing Condition

Relation was established between different factors. Factors that are the main reason for the Changing Condition are:

- i. Increasing income: Due to improvement of the agricultural sector the rural people are earning more

money. Increasing income is the main reason the development of pucca houses and the improvement of the housing condition. When the sample size is 102 then, the Pearson correlation between types of housing and monthly income of the households is 0.59 and the significance (2-tailed) is 0.052. Correlating present condition of housing with monthly income, there is positive Co-relation present with this two condition. It indicates that the increasing income leads to owning of pucca houses and creates the housing condition much better.

- ii. Increasing migration rate: The income of the migrating people is more than the local people. By this income they improve the condition of their houses. The migrating people follow the trend of the housing structure in urban area and implement it when they arrive in rural areas. When the sample size is 102 then, the Pearson correlation between the present condition of the housing and migration of the house members is 0.641 and the significance (2-tailed) is 0.048. Correlating present condition of housing with migration we can see they are positively correlated and it is indicating that migration rate influence the housing condition. The existence of the migration improves the quality of households. Most of the rural resident especially young age people are migrated for better education in the urban areas and started to live better quality of life due job facility. Migrated people used to send money in the rural areas and the number of Semi pucca and Pucca

- housing structure will be increased day by day.
- iii. Variation in income source: Those who are involved with service or business earn more than the agricultural sector workers. In agricultural sector those who are involved in piper petal cultivation earn more and their housing condition is better than the others. When the sample size is 102 then, the Pearson correlation between the present condition of the housing and migration of the house members is 0.684 and the significance (2-tailed) is 0.046. If we correlate present condition of housing with income source we can see they are positively correlated and the value is 0.684. It is indicating that income source influence the housing condition. Our analysis also indicates that those two factors are strongly co-related.
 - iv. Reduction of joint family: Those who are single family, their housing condition is better than the joint family. The reduction of joint family increases the number of houses. By the survey we have come to know that the family whose are single, was in a joint family by 5-10 years. And sometimes they live in a same area where they were adjoined but now they are separated by dividing up the land by creating walls or separating kitchens. When the sample size is 102 then, the Pearson correlation between the present condition of the housing and migration of the house members is 0.541 and the significance (2-tailed) is 0.048. If we correlate present condition of housing with family type we can see they are positively correlated and the value is 0.541. It is indicating that family type influence the housing condition. And the correlation value is very strong.

6. Major Findings

According to the data collected from two different study houses having different materials, it is found that the population growth rate is decreasing; the housing number is increasing day by day due to the increase in population and the reduction of joint family. As the single families build single houses. At past days when almost all the family was joint, the floor area of the houses was large. Reduction of joint family is the reason for the reduction of the floor area used by the houses as single family is building houses by dividing up the land. By the survey, it was known that land ownership is handed from the father to son and so on. The households were near their agricultural land. At past, most of the families were joint-family. At recent days, family member distribution is changing. The single-family consists of 3 to 5 members. There is traditional style rural housing using soil as the element of the house. The number of pucca houses is increasing day by day because of the urban growth as the rural area is influenced by the growth. The growth centers are having increased accessibility to the urban area through media and transportation. Improvement of the condition of the people by increasing income through the improvement of the agricultural sector, migration of the people and increasing income through the nonfarm activity of

the rural people.

7. Conclusion and Discussion

The study is conducted to analyze the present condition of housing and pattern of settlement. The paper explores and describes traditional housing practice, local's interpretation of the frequent natural calamities, environmental behavior, economic, social and environmental dimensions determinants associated with in housing and settlement pattern. With a particular focus on the most effective factor that influences the housing pattern. The factor which is distribution of plots and sizes, climate condition, cultural, available resources, Residential segregation and social structure that are the reason for the changing rural condition of the house. This study is ensuring that any new dwelling built in the rural area does not adversely impact on existing housing and on the environmental values of the land. It also examines the importance of practicing this type of settlement pattern that meaningfully includes both linear and scattered settlement. The settlement was built in an organized way.

As the increasing number of houses in urban areas may expand to the agricultural land of the rural areas. So the government should take a step to define the boundary of the villages. The condition of the houses which need improvement should be improved by the rural development governmental and non-governmental organizations. The more study on these topics can help to reveal the existing overview of the rural areas to the common people and the problems would help the government to recover the situation.

References

- [1] O. A. M. Zobayer Ahmed "Horizontal Expansion of Housing in Rural Areas of Bangladesh: Does Population Growth Matter?," *Developing Country Studies*, vol. 3, 2013.
- [2] M. S. U. M Hasan, C D Gomes, "Rural housing in Bangladesh: An inquiry into housing typology, construction technology and indigenous practices."
- [3] R. A. A. F. M. Ashrafal Alam, and Md. Enamul Kabir, "Rural settlements dynamics and the prospects of densification strategy in rural Bangladesh," Springer, 2016.
- [4] S. H. N. Z. Davood Jamini, Alireza Jamshidi, Mohamad Sadegh Ebrahimi, "Review and Assessment of Factors Influencing Villagers' Satisfaction with Rural Housing (Case Study: Avramanat Region, Kermanshah Province)," *Journal of Research and Rural Planning* vol. 3, 2014.
- [5] M. M. R. Md Abdul Halim, Md Zahidul Hassan, "Agricultural Land Conversion in the Sub-Urban Area: A Case Study of Rajshahi Metropolitan City," *Journal of Life and Earth Science*, vol. 8, pp. 21-30, 2013.
- [6] P. Geddes, *Morphology of Rural Settlements*.
- [7] N. Uddin, "A study on the traditional housing technology of Bangladesh," *Indian Journal of Traditional Knowledge*, vol. 7(3), pp. 494-500, July, 2008.

- [8] R. Hafiz, "Financing Housing and Increasing Affordability of the Rural People in Bangladesh, Bangladesh," BUET, 2000.
- [9] D. M. H. Mohammed A. Muktedir, "Traditional House Form in Rural Bangladesh A case study for Regionalism in Architecture."
- [10] T. Chowdhury, "Segregation of women in Islamic societies of South Asia and its reflection in rural housing - case study in Bangladesh." MArch thesis, Montreal, McGill University, 1992.
- [11] "District Statistics 2011, BANGLADESH BUREAU OF STATISTICS, Rajshahi," 2013.
- [12] "District Statistics 2011, Rajshahi," Bangladesh Bureau of Statistics (BBS) June 2013.
- [13] OLGAY, Victor (1963) Design with climate. New Jersey, Princeton University Press.
- [14] ISLAM, Nazrul et al (1981) "A survey of housing in a Bangladesh village". Paper presented at the Regional Workshop on Transfer of Rural Housing Technology. Dhaka, Center for Urban Studies.
- [15] Rahmatullah, (2007). Broad Land Use Planning of Entire Bangladesh: A National Priority for Sustainable Development, Dhaka: Bangladesh.
- [16] Rahman, M. A. (2012). Impact of Foreign Remittance on Land Holding and Land Relation in Rural Area of Bangladesh: A Case Study the Jirtoly, Village in the District of Noakhali [Draft] Dhaka: Department of Development Studies, University of Dhaka.
- [17] Rahman, M. H. and Manprasert, S. (2006). Landlessness and its Impact on Economic Development: A Case Study on Bangladesh, Journal of Social Sciences, 2 (2), pp. 54 -60.