Assessment of the Impact of Road Transportation Improvement on Rural Development

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Since 2001, the new government of Afghanistan has addressed the improvement of transportation in rural areas as one of the key issues for the country's development. The improvement of accessibility happens as a consequence of road transportation improvement on rural development. The escalation of land price is followed by this enhanced accessibility. Therefore, it is necessary to identify the rate of escalation and factors related to this in order to understand the variability for future transportation improvement projects. In this study, a questionnaire study was conducted on the residents of four different districts of Afghanistan, where the road projects were constructed in recent years. In this paper, a model is developed to demonstrate the relationship between different factors and increment of the land price. The results of the survey indicate that improvement of transportation has significant effects on land price improvement.

Key Words : *Accessibility, Afghanistan, Rural Area, land price, Transportation Improvement'*

1. INTRODUCTION

Sustainable rural development is a function of a number of factors in which transportation is important of importance[1)].

Because of different conditions and geographical locations in Afghanistan, "rural area" is a term that can cover a wide range of cultural, geographic, and economic contexts. For example, what is considered rural in Kabul Province with a very high population density may not have the same meaning as what is considered rural in a province with a much lower density, like Helmand Province, located to the southwest region of Afghanistan. However, for the purposes of this research, the term rural area will be used for communities with a population of less than 10,000, but could include those communities with a population of up to about 25,000 people located far from the city center. In Afghanistan, rural areas are one of the most important contributors to the cities in the process of production of food and agricultural materials. That is why since 2001 the new government of Afghanistan decided to improve the condition of rural roads in the country, especially in the districts of the capital, Kabul, where around 4.26 million inhabitants are living [5)].The improvement of rural roads is broadly recognized as a fundamental precondition for the development of rural areas[2)]. Due to the fact that rural roads connect villages to the provincial capital, villages to the districts capital and villages to villages, this activity is placed on the highest priority list of the government of Afghanistan.

As in Afghanistan, most of the rural roads are made of gravel and in poor condition that is why in most of the villages the unemployment rate is very high. Ogunsanya (1988) also identified a strong relationship between transportation development and rurality. He argued that the greater degree of rurality shows the lower level of transport development[3)]. The previous literatures reveal that no existing analysis focused on the impact of land price on the improved transportation facility. They also lacked the presence of analysis that can evaluate the con-

sequences of new transportation projects in Kabul, Afghanistan. This study will be helpful by developing the method to evaluate the effects of better accessibility.

Clearly, as rural transport planning needs to be based on the understanding of the potential of an area, its people and their problems and needs[4]. According to this hypothesis rural road construction was initiated from the capital, Kabul. Now approximately 90% of all the districts of Kabul province are connected to the city by asphalt or concrete made roads.

With the improvement of transportation sector, the economic, educational and social conditions of the people are also improved. Both the property and products of the rural population have increased in value. Beside the other factors, one of the measurable factors is the improvement of land prices which is one of the most important changes in the lives of rural inhabitants. Based on the information contained in this paper, it is possible to calculate the relationship between the increases in land prices with other factors, which are improved because of the road transportation.

2. SCOPE AND OBJECTIVES

The main objective of this paper is to describe the most important impacts of road transportation on rural development in Kabul, Afghanistan. Additionally, the authors will demonstrate the importance of transportation for the improvement of the quality of life in all rural areas in Afghanistan. Such betterment should prove a key factor to motivate the government of Afghanistan and the residence of the communities to improve the rural transportation and public private partnerships for the road sector all around the country.

The following are the key points of this research paper.

- To review the impact of improved rural road transportation on the rural areas of Kabul province.
- To identify the advantages and disadvantages of road transportation projects.
- To improve community awareness about road maintenance in the rural areas around the country because it is the most important task for the development of the community.
- To encourage the government of Afghanistan to place more emphasis on the construction of rural road projects.

3. METHODOLOGY

To assess road transportation improvement impact on the development of rural communities in the targeted areas, an interview survey was adopted and data was collected from the site through primary sources, which consisted of personal observations of the author and the questionnaire results in March 2015. During the survey and data collection, questions were asked of the community residents in order to collect information concerning factors related to the transportation facilities and their role in the improvement of community development and daily life. About 50 copies of the questionnaire were distributed to each community in every district to collect the required information. Residents were asked to respond to the survey questionnaires and list the impact of road transportation improvements on their lives. They were asked in order to find a true picture of road transportation improvement impacts on the life of people living in the rural areas. Each factor is considered as a variable for to start processing and analysing activity.

4. DESCRIPTION OF VARIABLES

From the survey data, the following variables are considered as a dependent and independent variables to calculate the impact of road transportation improvement on the development of rural areas in 4 districts of Kabul city.

- Land price (LP) is considered as dependent variable. The improvement in land price is affected by the following independent variables.
- Number of Cars in the Community (NC).
- Waiting time in the station (Minutes) (WT).
- Number of Car Accident/Year (CA).

5. DATA ANALYSIS AND MODELING

The work herein is comprised of two parts (visualization of data and presenting of the land price linear model). In Part 1, four set of data such as number of male and female joined the interview, average waiting time in the station, average number of trips/months to the city before and after road construction average income of family per month before and after road construction will be presented by graphs. In the second part, the land price improvement model will be demonstrated.

Firstly, the data related to the people interviewed in four communities from male and female are started to be analyzed. Due to the cultural issues only six female respondents joined the survey program to share their idea about road transportation improvement and its impacts on the community development which is the 3% of the total number of people interviewed.

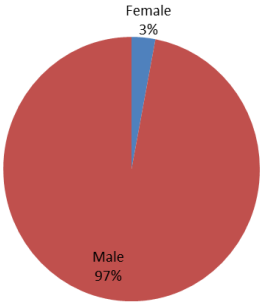

Fig.1 Number of Male and Female Interviewed

The interviewed woment were working in a primary school as teachers.They mentioned that with the improvement of road sector they are now able to come to school on time which was difficult for them before. In addition, their joining in the survey program shows that improvement of road transportation had positive effects on their daily life even it was difficult for them to participate in the survey conducted by men in the rural area.

As there is a strong inverse relation between patient satisfaction and waiting time in the bus stations. In all four surveyed areas, the data shows that before improvement of the road condition residents had a lot of problems with waiting time at the bus stops. **Fig.2** shows the comparing of waiting time of people in the station before and after the road construction which is much more improved.

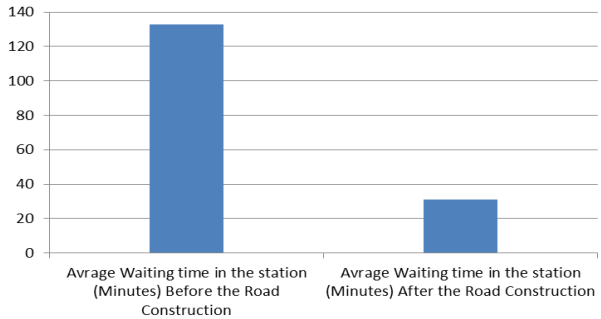

Fig.2 Waiting time (Minutes) in the station before and after road construction

Unfortunately still there is no time schedule for busses and cars to arrive in station and pick up the passengers and due to the unpaved condition of roads the passenger should wait in the station for a long time. In some community they were waiting for two and half hours for cars to arrive and pick them. This long waiting time had negative effects not only on their health, but also on the economic and daily activities.

At the same time Increasing number of trips for the residents positive effects on their life. It will expand their experience rapidly and allow them to do different activity in the city to improve their economical condition. In the above data graph we can see by improving of road condition most of the residents have changed their number of trips to the city.

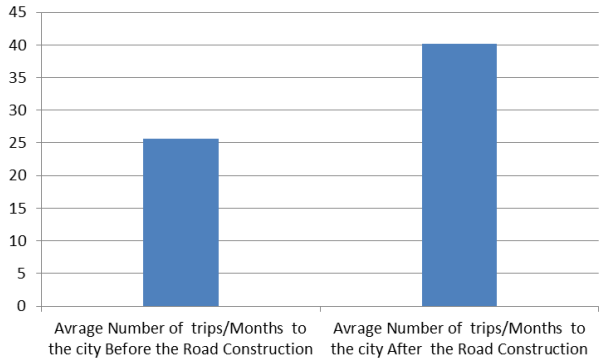

Fig.3 Number of Trips for family/Months before and after Road construction

As in Afghanistan majority of people still living in the rural areas and mainly they are busy with agricultural activities and rehabilitation and construction of infrastructures improves the productivity in the country, that is why the income improvement data graph of the community people shows that by improvement of transportation facilities most of the community residents had increase in their income.

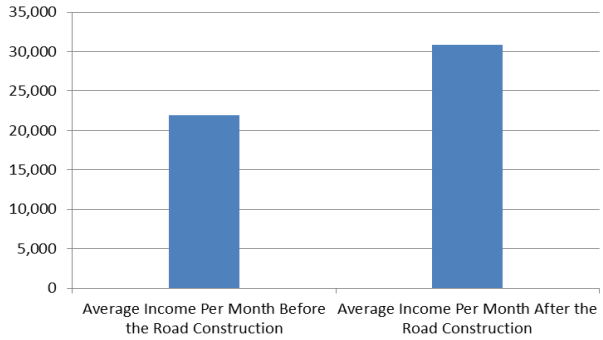

Fig.4 Resident's Average Income before and After Road construction

Fig.4 show the diffrence in income of people before and after the road construction which is significant. The unit for income improvement is Afs which 1US$ is equal to 60Afs.

Secondly, to present the transportation improvement effects on land price factor, the following model is proposed for comprehend information which is calculated by an analysis software, JMP.

Response Land Price (LP)

Summary of Fit

RSquare	0.52
RSquare Adj	0.51
Root Mean Square Error	872639
Mean of Response	1156841
Observation or Sum Wgts	402

Parameter Estimation

Term	Estimate	Std Error	t Ratio	Prob> /t/
Intercept	596108.94	105538.90	5.65	<.0001
Number of Cars in the Community (NC)	9238.11	1866.22	4.95	<.0001
Waiting time in the station (Minutes) (WT)	-3523.04	1225.42	-2.87	0.0043
Number of car Accident /Year (CA)	102088.57	6111.76	16.70	<.0001

Fig.5 Statistical Results of Land Price Model

In this model it shows that Land price as a dependent variable has significant relationships with the independent variables such as Number of cars in the community, Waiting time in the station and number of car accident per year. The P value for all variables are reasonable. It can be observed that the regression model provides moderately acceptable predictions. The equation for this model will take the following form.

LP= 596108.94+ 9238.11NC − 3523.04WT+ 102088.57CA

In terms of the data presented in model , the rate of change in land price is enrolled by explanatory variables of Number of Cars in the community with the rate of 9238.11, Waiting time in the station with the rate of -3523.04, Number of Car Accident/ Year by the rate of 102088.57 and an intercept with the rate of 596108.94 which is acceptable with the R-square of 0.52. The positive sign for the number of cars in the community and number of car accident /year shows that by increasing of them the land price factor will also increase. But, in the same time the minus sign of waiting time in the station variable indicate that by decreasing of waiting time in the stations the land price variable will increase which is reasanable. From the results of the above model, we can conclude that road transportation improvement is one of the most easiest way for the improvement of people life especially in rural areas. Beside the improvement of their property, they can access schools, hospitals and all other life-related facilities easily. Meeting of each other for them will become easier which is important factors for the stabilization of community, at least in Afghanistan's context. The only varible which the model also showed that is the number of car accident per year which is unfortunately increased because of road transportation improvement. This is the only significant varible which has negative effects on the life of community people.

6. CONCLUSIONS

This study explores the impact of road transportation improvement on the development of rural areas in four districts of Kabul Province. It is focusing on land price function for districts of Kabul province. This function presents the influence of different factors on the land price improvement. A review of the survey data indicates that the investment in the road sector is one of the most important activities for the stabilization of the country. This is especially so in such countries as Afghanistan where more than 50% of the population lives below the poverty level. With the improvement of transportation, we can change the life of people to a better condition. The study explores that improvement of land price will change the life of the people. Their income will increase, they will easily find access to the life different facilities such as health, school and relatives.

Finally, this study proves the value of improved transportation and its impact on the value of land prices which contribute to the betterment of rural life. Also, we should note that the result of this study is based on short-term effects of roadway improvement. In long-term the benefits of the roadway improvements will be more than what has been mentioned in this study and the collected data by author will be useful to do research on the improvement of housing system, improvement of community empowerment and improvement of road conditions which is mostly not in good condition.

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