AHP for Developing Land Valuation Model in Infrastructure Development

By

Subash Ghimire

Presentation outline

- Introduction
- Objective
- Research Methodology
- Study Area
- Data collection
- Data Analysis and Results
- Conclusion

Introduction

- Investment in infrastructure development for public purpose is very important for the development of any country.
- Inadequacy of compensation amount i.e low valuation is one of the main causes for opposition and delays by affected land owners in land acquisition (ORF, 2010).
- GIS technology is not applied in land valuation for land acquisition in infrastructure development.
- Therefore, land valuation and management process is always controversial for infrastructure development.

Introduction

- Therefore, GIS with Analytic Hierarchy Process is an effective tool for dealing with complex decision by setting priorities and makes the best decision.
- According to Saaty (2008), it is a theory of measurement through pairwise comparisons and depends on the judgments of experts to find out priority.
- Pair wise comparisons are based on forming judgments between two particular criterions rather than attempting to prioritize an entire list of criterions.
- Saaty (2008) has shown that weighting activities in multi-criteria decisionmaking can be effectively dealt using hierarchical structure and pairwise comparisons.

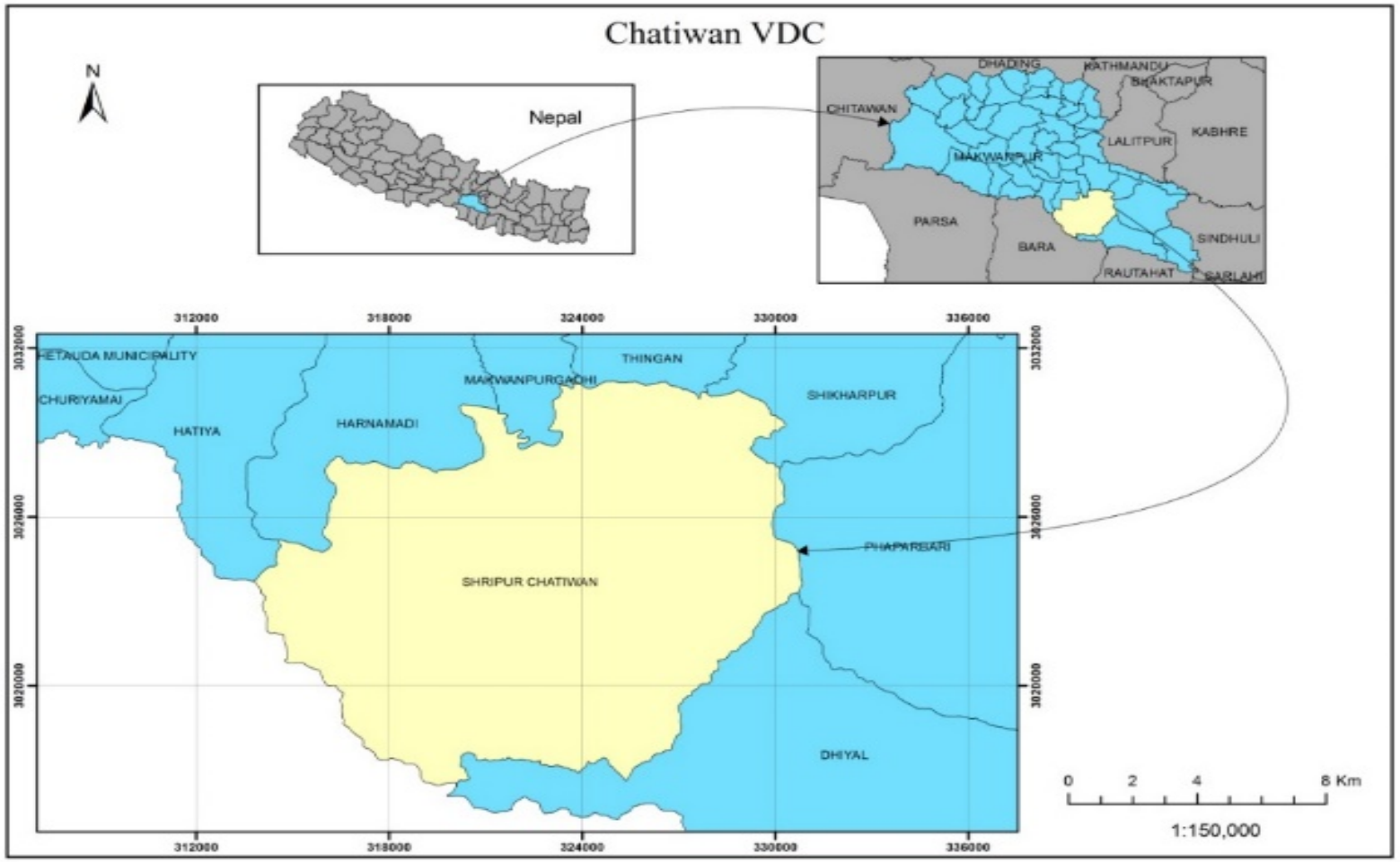
Objective

To develop the land valuation model by using GIS and AHP for infrastructure development

Research Methodology

- The quantitative and qualitative research methodologies are adopted for this study.
- The quantitative data were collected from household survey and qualitative data are collected from key informants interview, focus group discussion and participant observation.
- The respondents for primary data collection were 105 representing affected families, Fast Track officials, land administration professionals, civil society member and local leaders.

Study area


Chatiwan VDC
N
Nepal
DHADING
KATHMANDU
BHAKTAPUR
CHITAWAN
LALITPUR
KABHRE
MAKWANPUR
PARSA
BARA
SINDHULI
RAUTAHAT
SARLAHI
312000
318000
324000
330000
336000
3032000
3026000
3020000
HETAUDA MUNICIPALITY
THINGAN
MAKWANPURGADHI
CHURIYAMAI
SHIKHARPUR
HATIYA
HARNAMADI
PHAPARSARI
SHRIPUR CHATIWAN
DHIYAL
0 2 4 8 Km
1:150,000

Respondents for primary data collection

Respondents	Household survey	Department of Road/Fast Track official, (Project Director and Engineers)	Land Administration professional/ decision maker	VDC representatives/Civil society
Numbers	94	3	5	3

Limitations

- The study has used criteria such as road, built up, slope, forest, soil type and river.
- Further study can be carried out including the other criteria for land valuation in land acquisition for infrastructure development.

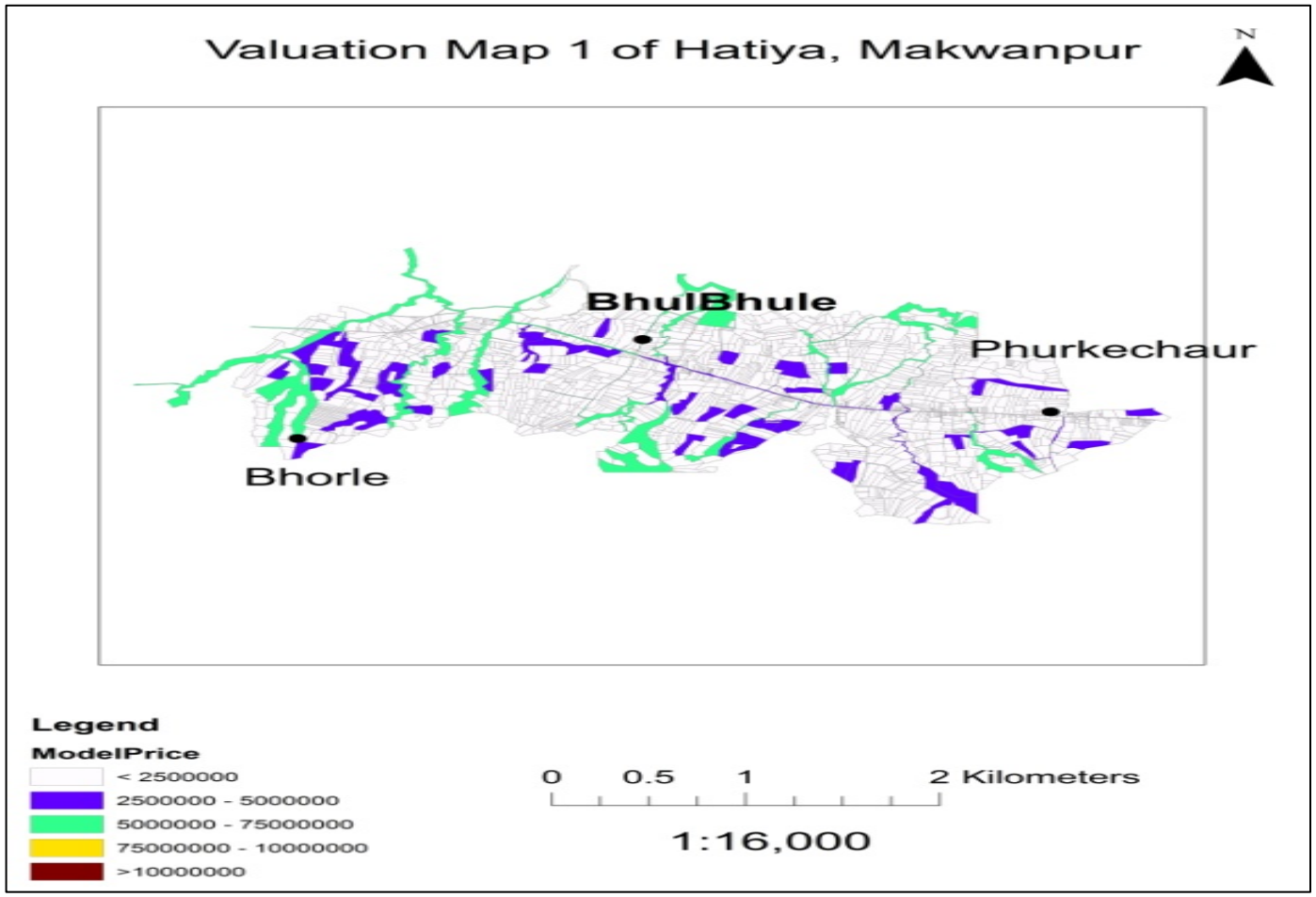
Data Analysis and Results

Criteria	Percentage	Level of importance
Road	100%	Very high important
Built up	72.38%	High important
Slope	66.67%	Very high important
Natural environments (River & forest)	49.52%	Medium important
Soil type	42.71%	Medium important
Social environments	97.14%	Notimportant

Calculating Eigenvector

Land valuation criteria	Road	Slope	Built up	Natural environments	Soil type	5th root of product	Eigen vector
Road	1	1	3	5	5	2.371	0.360
Slope	1	1	3	5	5	2.371	0.360
Built up	0.333	0.333	1	3	3	0.998	0.160
Natural environments	0.2	0.2	0.333	1	1	0.419	0.060
Soil type	0.2	0.2	0.333	1	1	0.419	0.060
SUM	2.733	2.733	7.666	15	15	6.578	1.000
SUM*PV	0.983	0.983	0.830	1.157	1.157	5.110	

Valuation Map



Conclusion

- The AHP is applied for land valuation in infrastructure development.
- The land valuation model for infrastructure development has been developed considering various criteria.
- The land value is determined with spatial analysis and Analytical Hierarchy Process (AHP). A numerical weight or priority is derived for each element of the hierarchy.
- The decision makers systematically evaluates its various elements by comparing them to each other two at a time.
- Land value modeling is carried out to determine the value of each parcel by using dependent variable, which is a land market price and independent variable which is parcel quality level.
- Independent variable is a synthesis of weight value of each criterion that influence parcel quality level.

Thank you!