

Automatic Land Parcel Valuation to Support the Land and Buildings Tax

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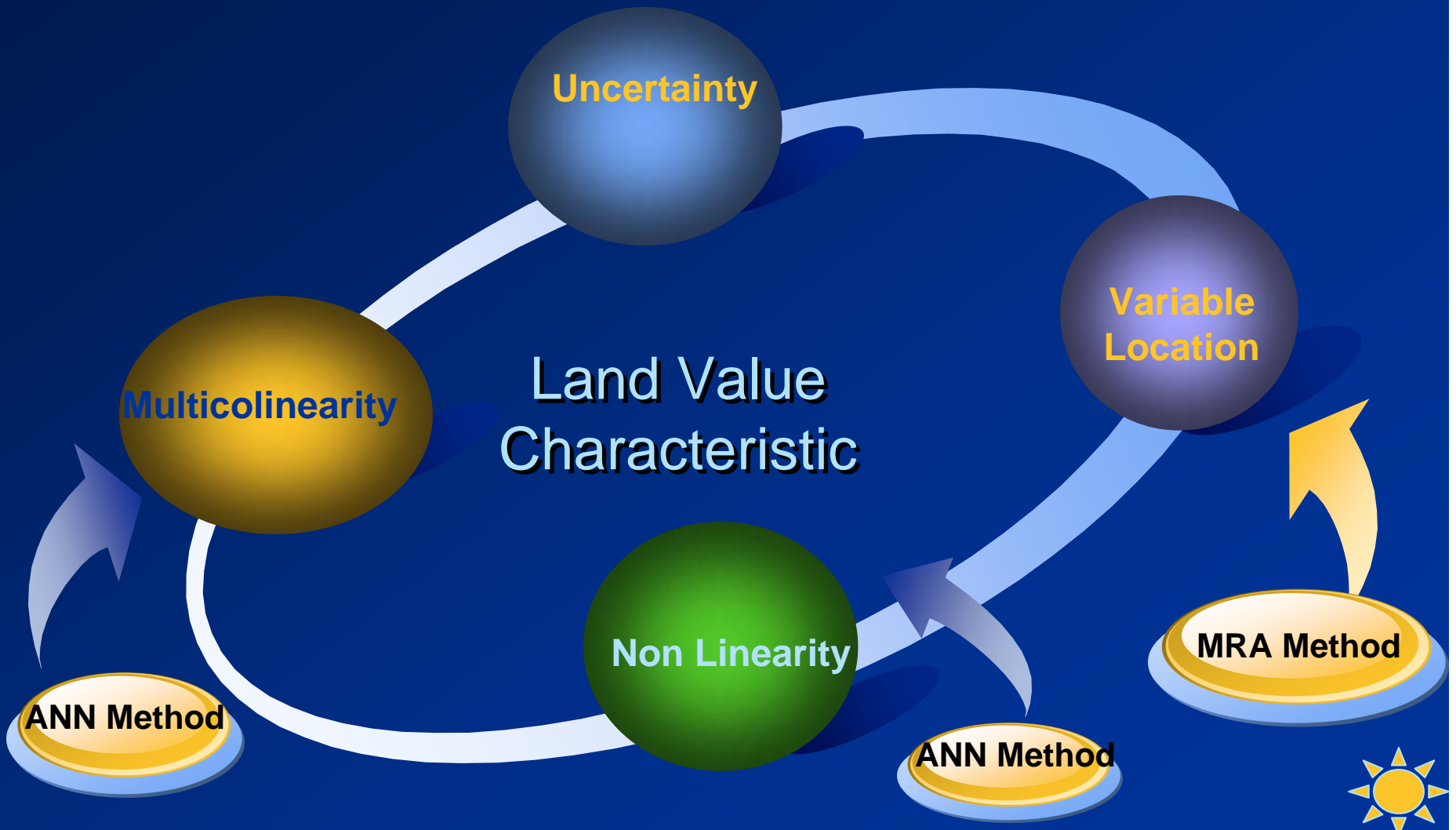


AUTOMATIC LAND PARCEL VALUATION

The purpose of Land Valuation:

**Provide a credible and reliable and
cost-effective estimate
of land value as of given point in time**

BACKGROUND



Problem Identification & Conceptual Framework

LAND VALUE METHOD

Multiple Regression Analysis (MRA)

MRA is one of the most widely used method for land valuation models. MRA is a statistically based analysis that evaluates linear relationship between a dependent (response) variable and several independent (predictor variable), and extracts parameter estimates for independent variables used collectively to estimate value in a mathematical model.

Artificial Neural Network (ANN)

ANN is Computation method applies approach of pattern recognition to solve problem. ANN can calibrate models that consist of both linear and nonlinear term simultaneously.



RESEARCH QUESTION

1

What is the most significant Variabel of the Land Value system?

2

What is the most proper model of the Land Value system?

3

How is the result of MRA method compare with the ANN Method?



OBJECTIVES

Objective

The aim of this study is to develop the automatic land valuation method using spatial analysis and artificial neural network.



METHOD

LAND VALUE METHOD

**Multiple Regression Analysis
(MRA)**

**Artificial Neural Network
(ANN)**

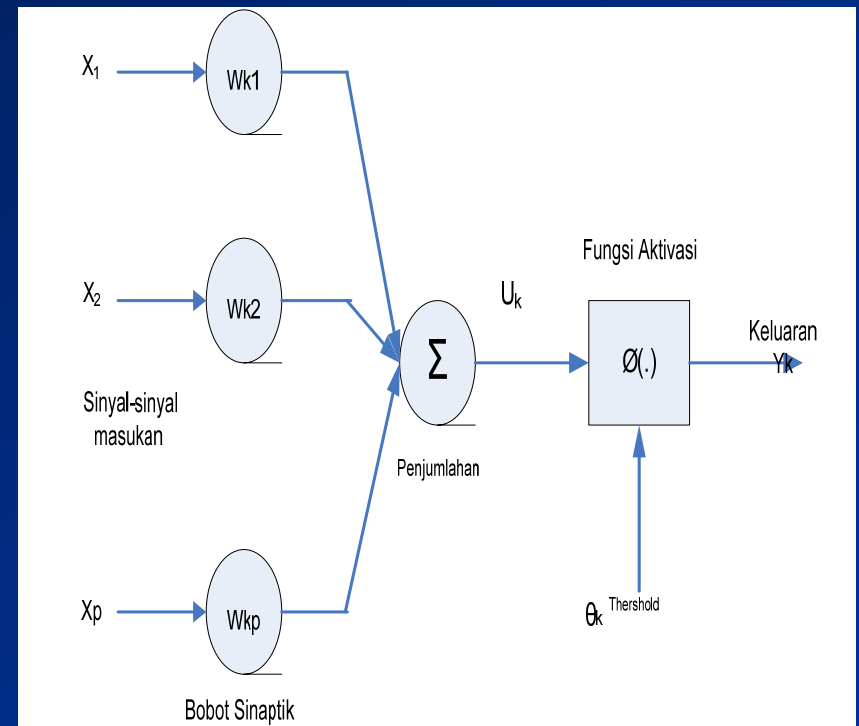
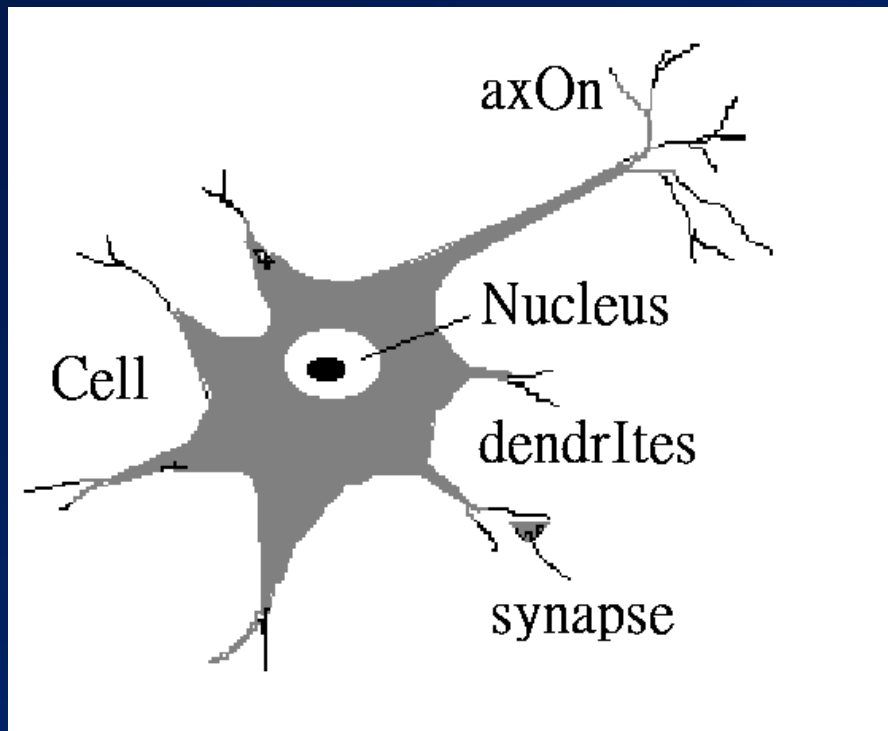
**Case Study analysis in using MRA
Method**

**Case Study analysis in using
ANN Method**

**Comparison between of the result of
MRA Method and ANN Method**



Artificial Neural Network Method



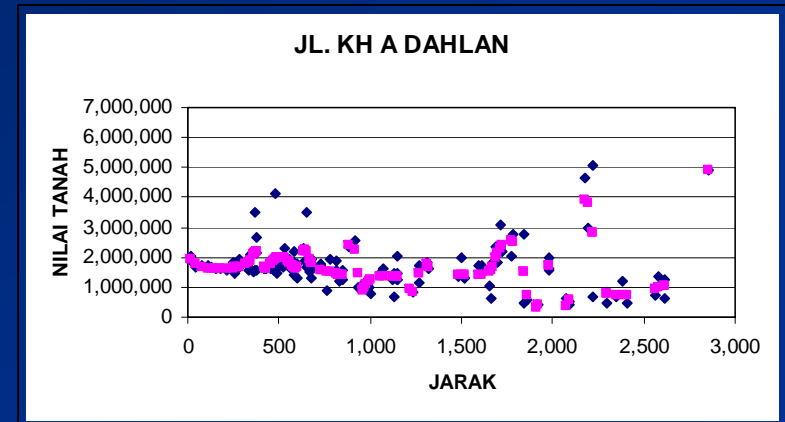
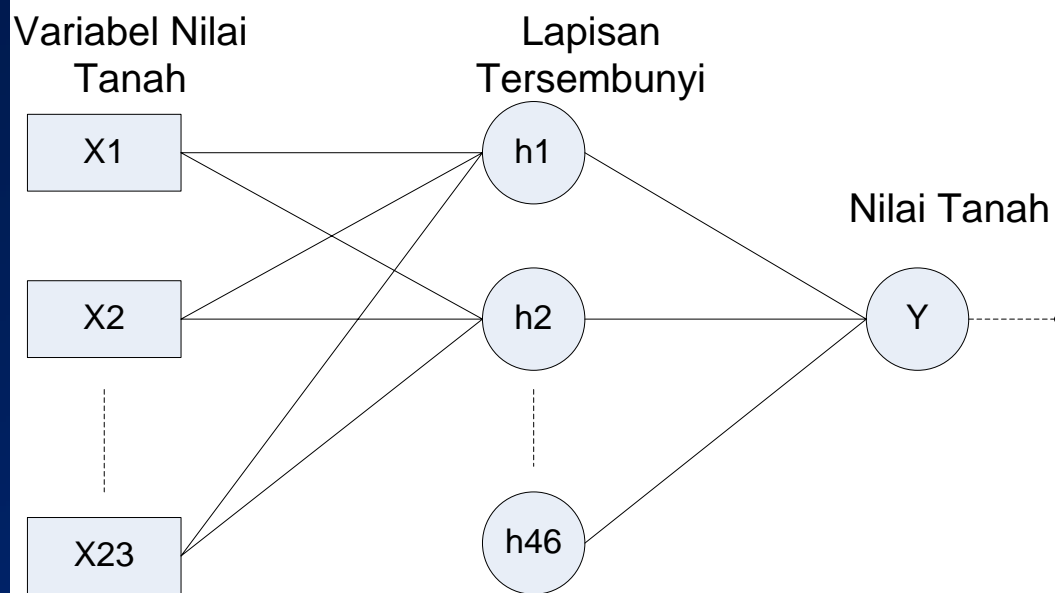
Computational process

Mathematical Model

$$Y = f(X) = v_1 X_1 + v_2 X_2 + v_3 X_3 + \dots + v_{23} X_{23} + b_j$$



Architecture of Artificial Neural Network



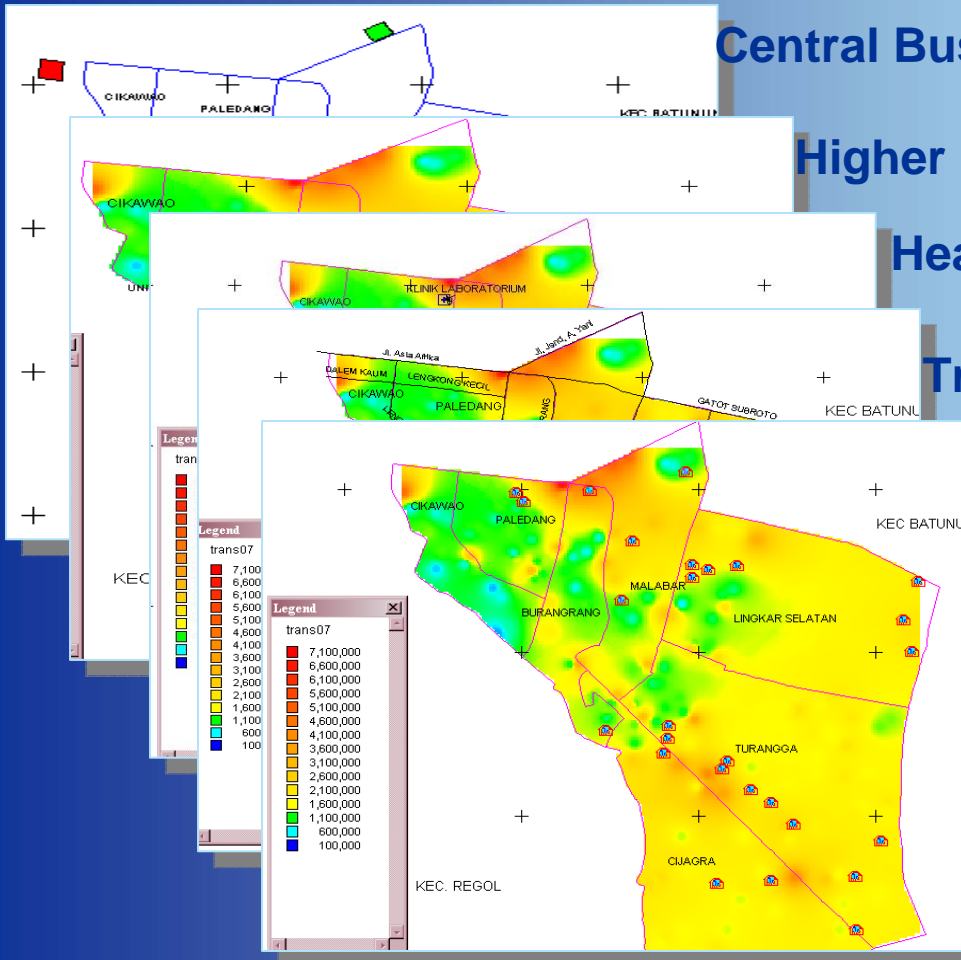
Mathematical Model:

$$H_j = f(X) = v_1 X-1 + v_2 X-2 + v_3 X-3 + \dots + v_{23} X-23 + b_j$$

$$Y = g(H) = g(f(X)) = w_1 H-1 + w_2 H-2 + w_3 H-3 + \dots + w_{46} H-46 + b_k$$



LAND VALUE VARIABLES



Central Business District

Higher Education Facility

Health Care Facility

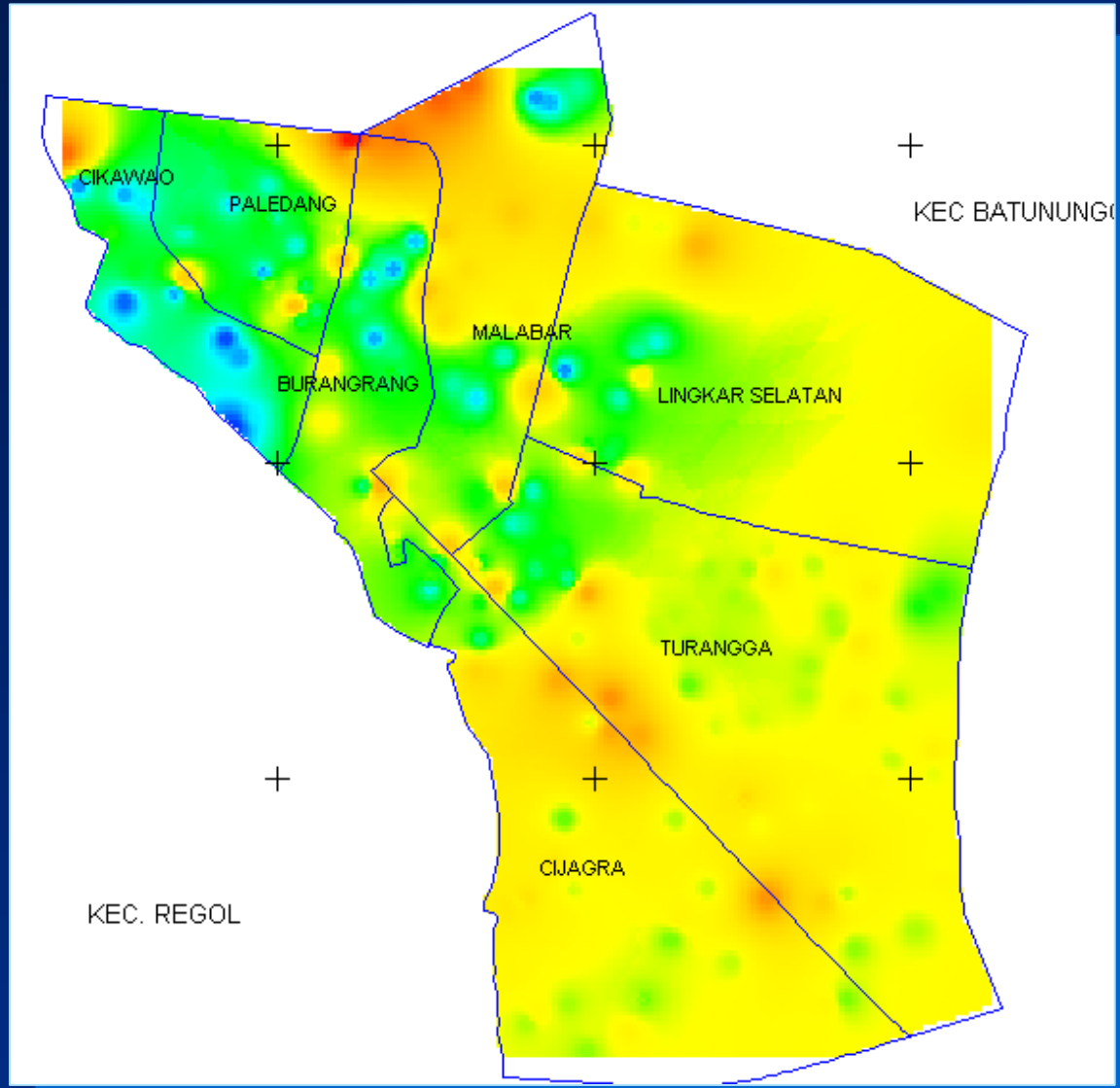
Transportation Facility

Public School Facility

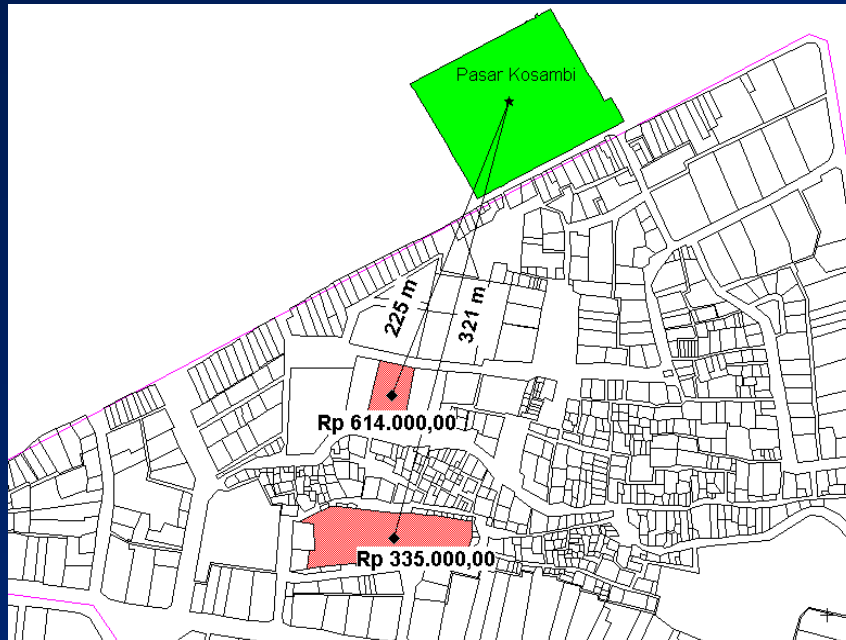
Land
Value



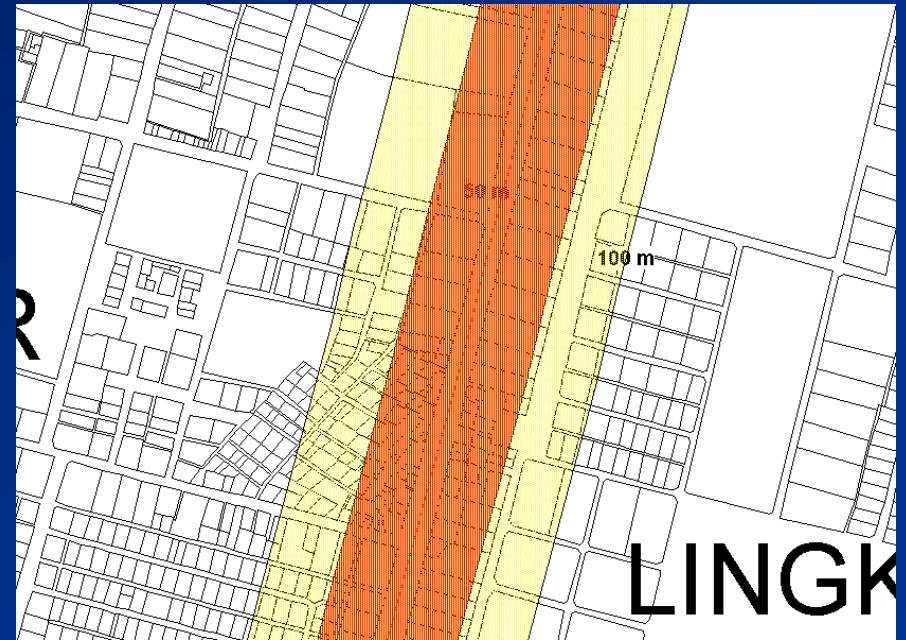
SPATIAL DATA OF LAND VALUE YEAR 2007



VARIABLES MEASUREMENT



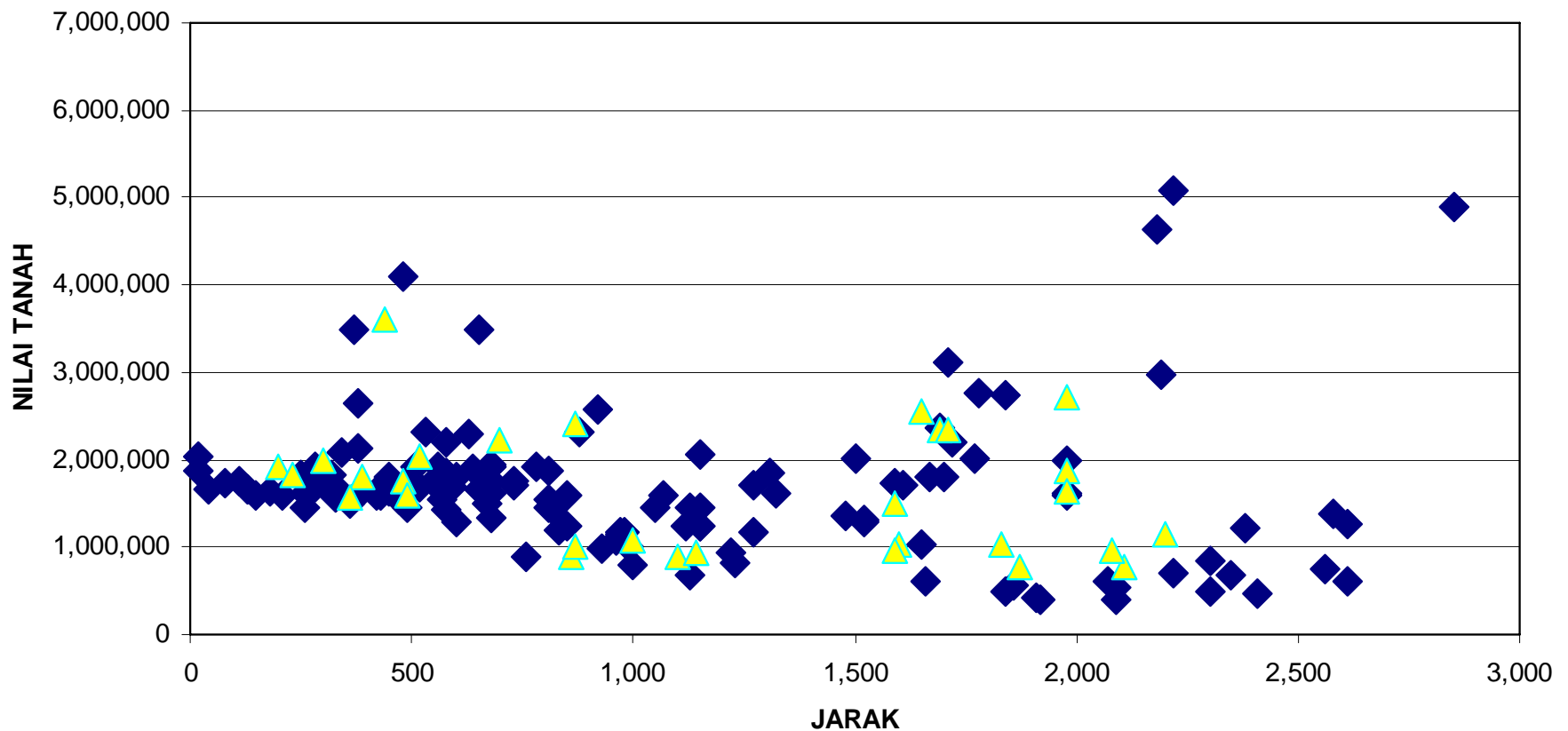
Direct Measurement of Centroid



Measurement of Buffer

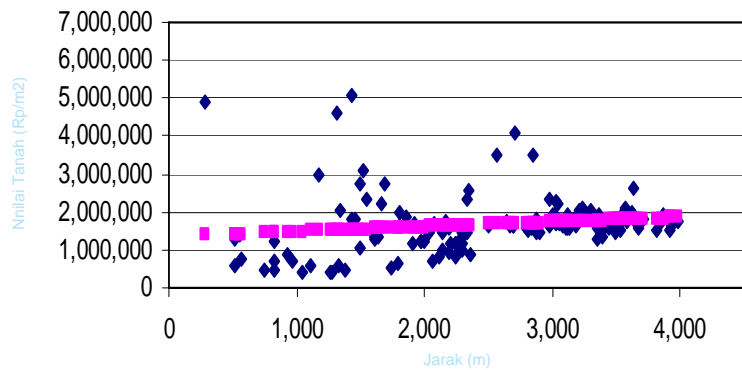
Characteristic of Transportation Facility to the Land Value

Scatter Diagram Nilai Tanah dan Jarak ke JL. KH A DAHLAN

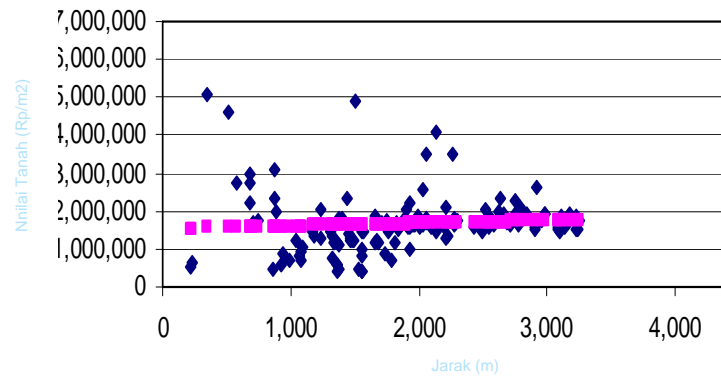


Characteristic of Central Business Distric to the Land Value

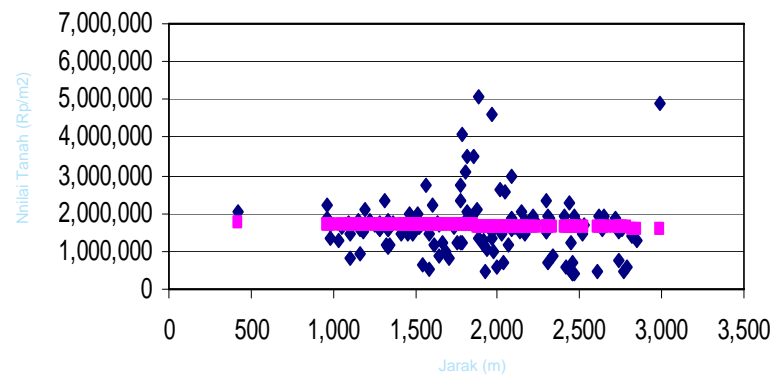
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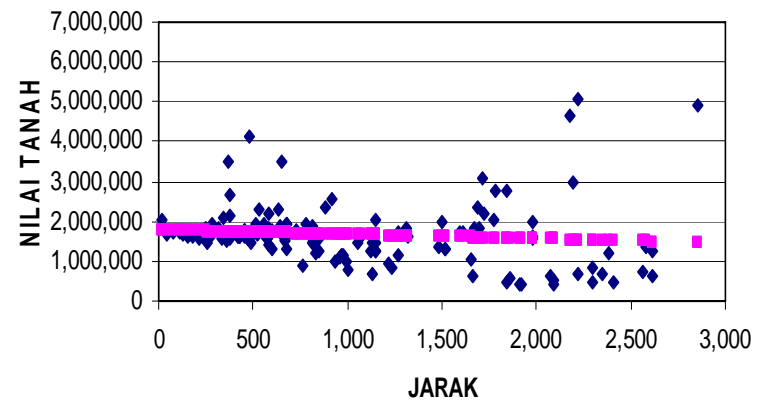
PASAR KOSAMBI



BANDUNG SUPERMALL

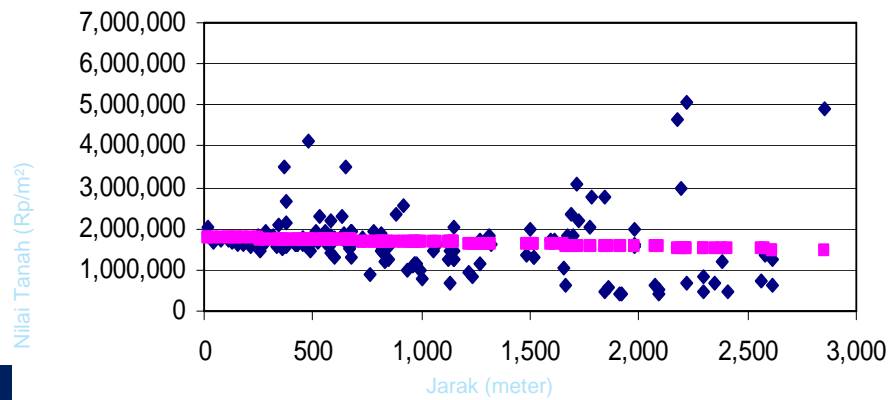


JL. KH A DAHLAN

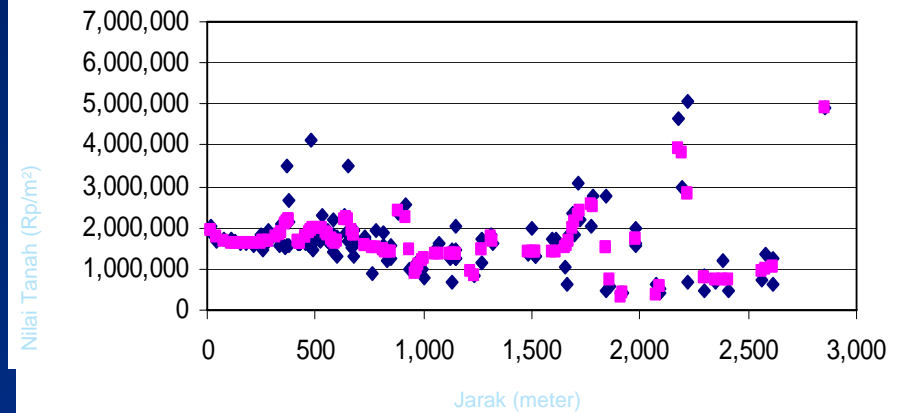


COMPARISON OF MRA AND ANN METHOD

JL. KH A DAHLAN



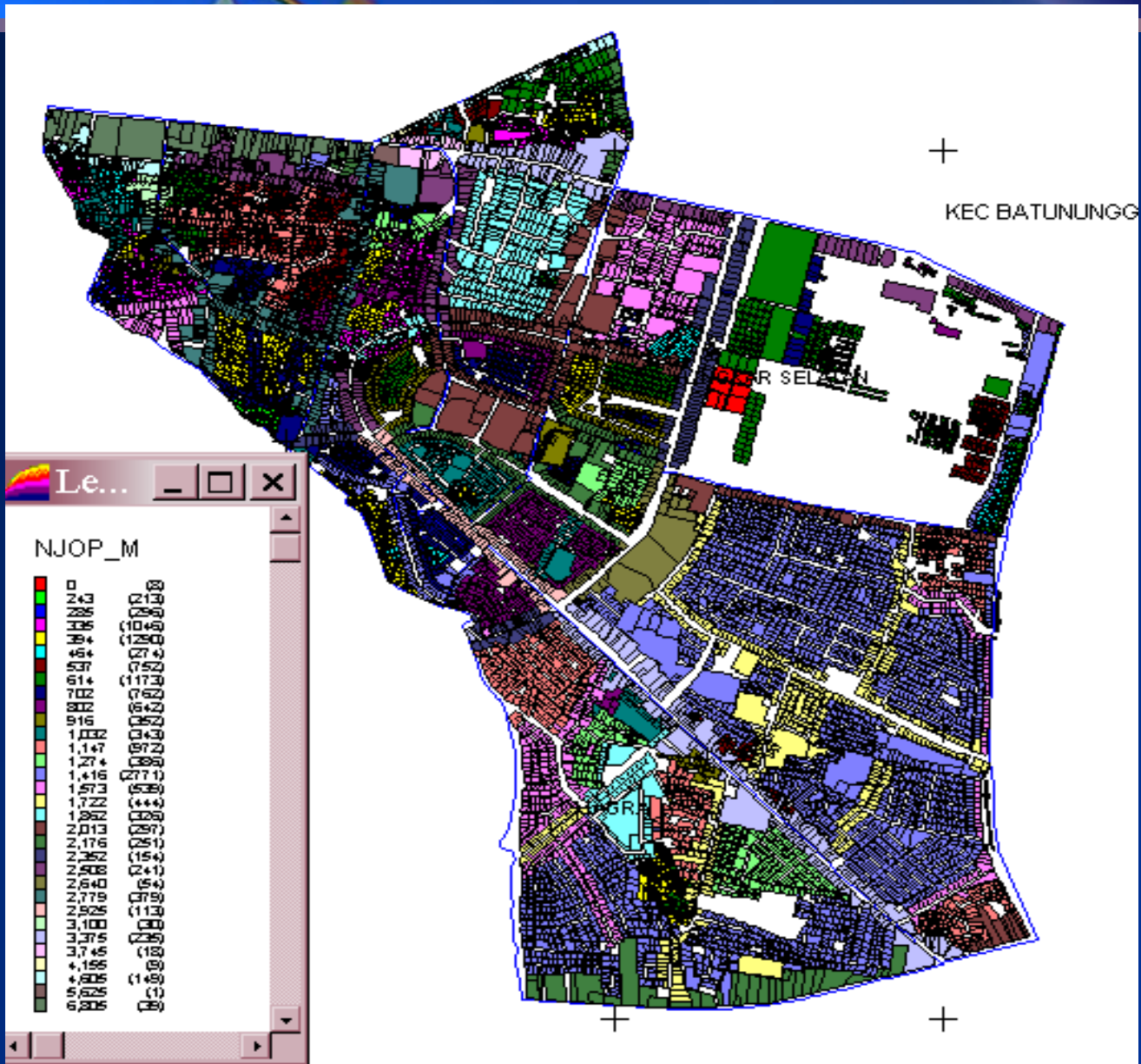
JL. KH A DAHLAN



Multiple Regression Analysis (MRA)

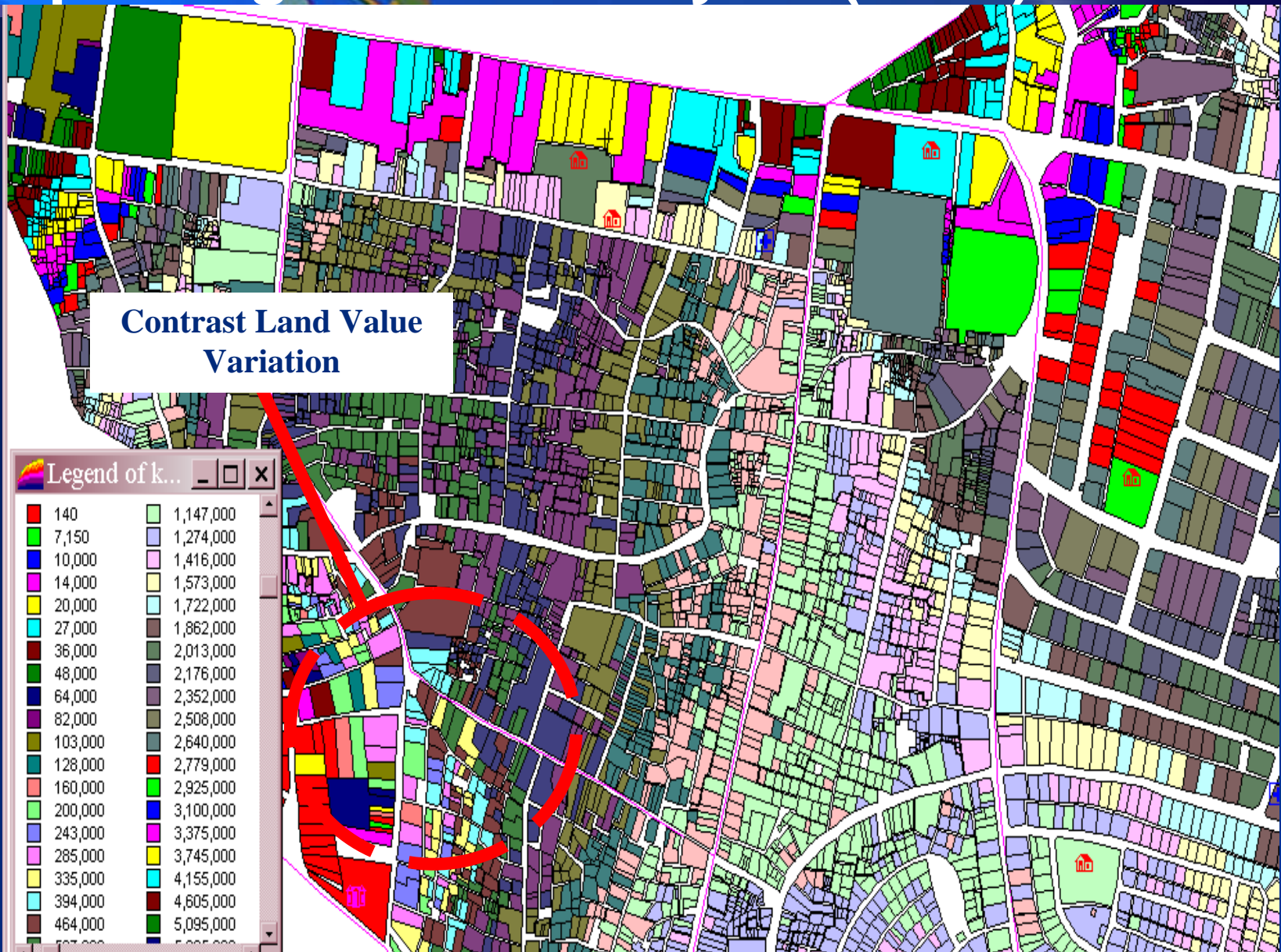
Artificial Neural Network (ANN)

LAND VALUE DATA YEAR 2006



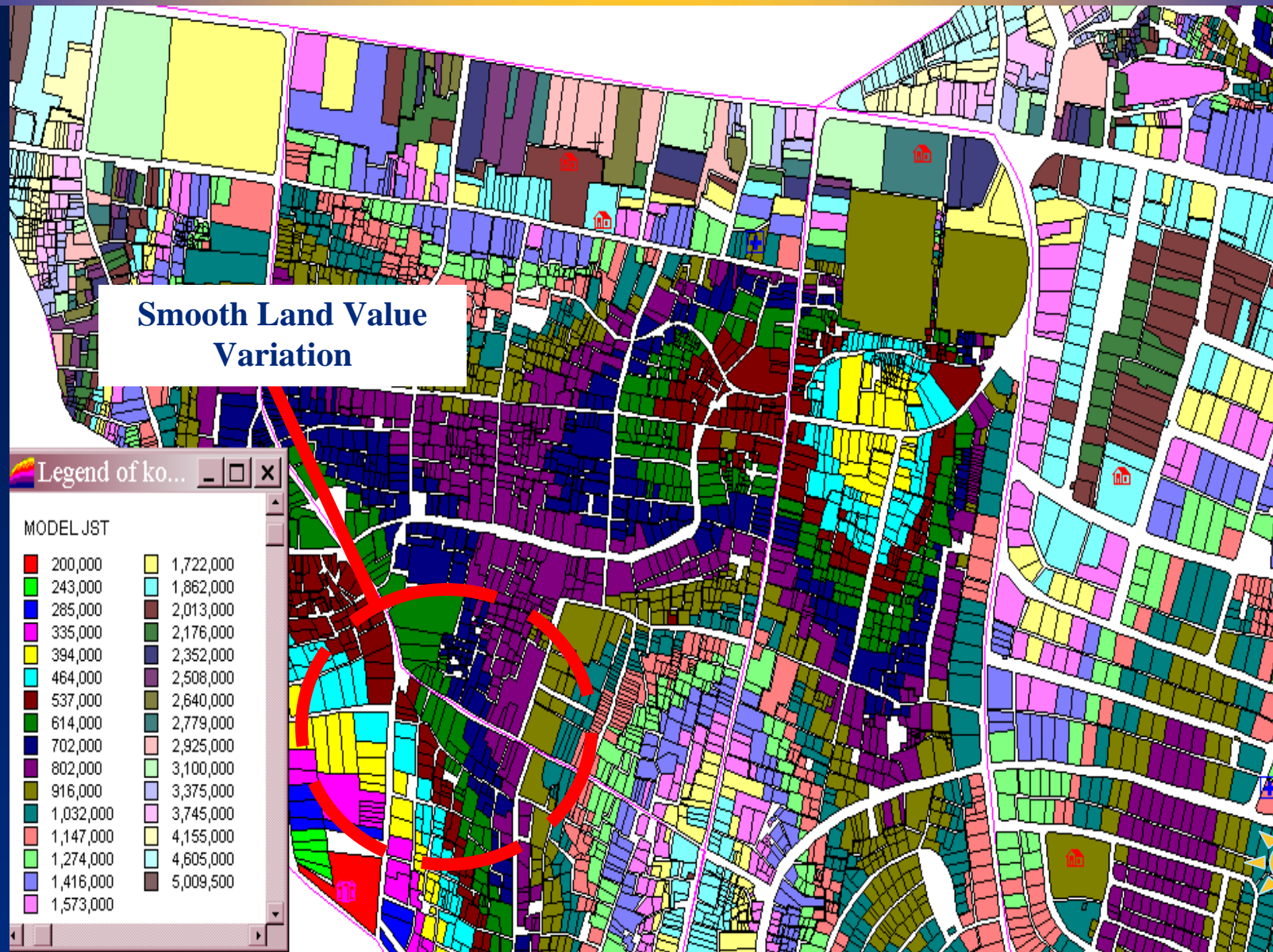
LAND VALUE MODEL

Multiple Regression Analysis (MRA) Method

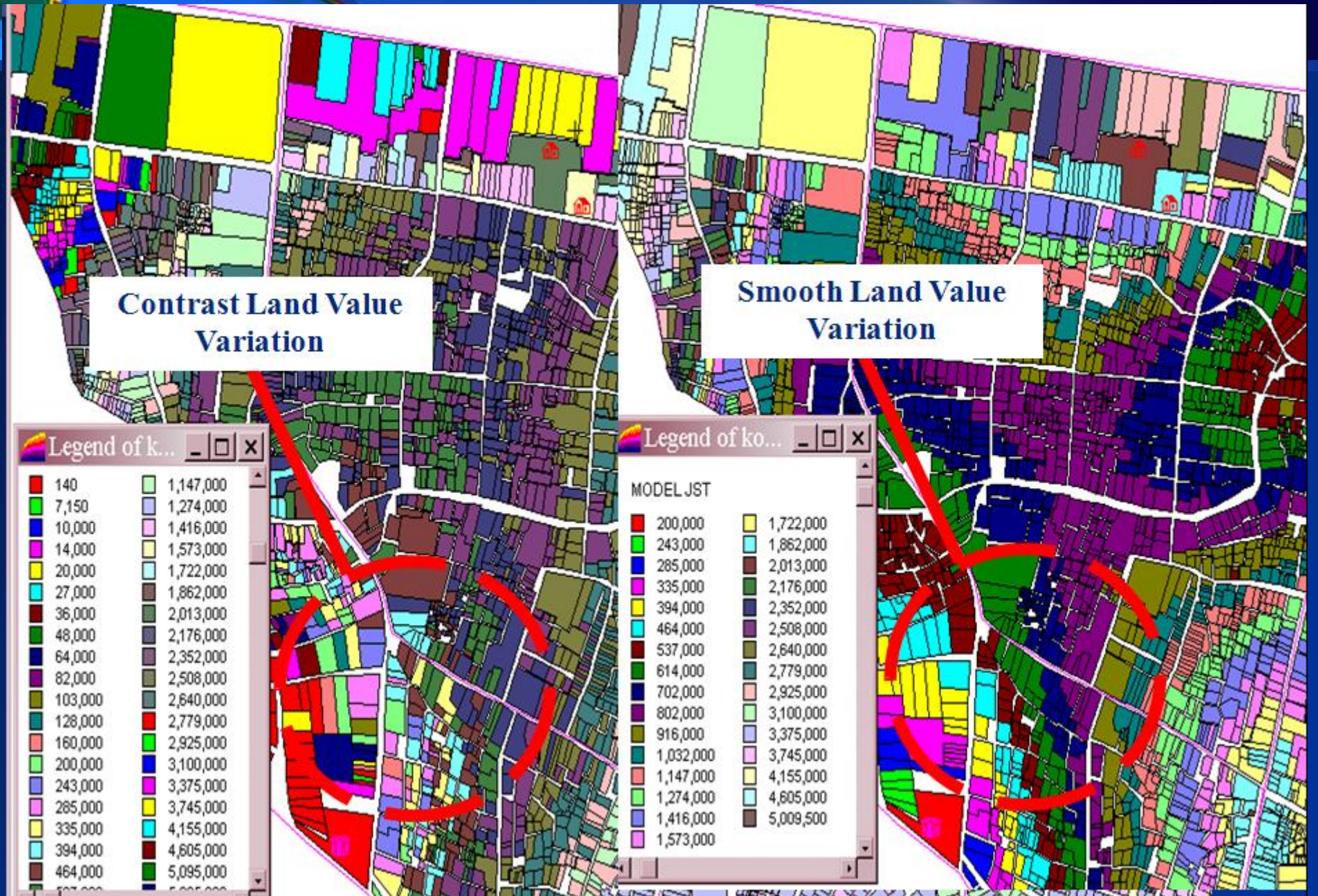


LAND VALUE MODEL

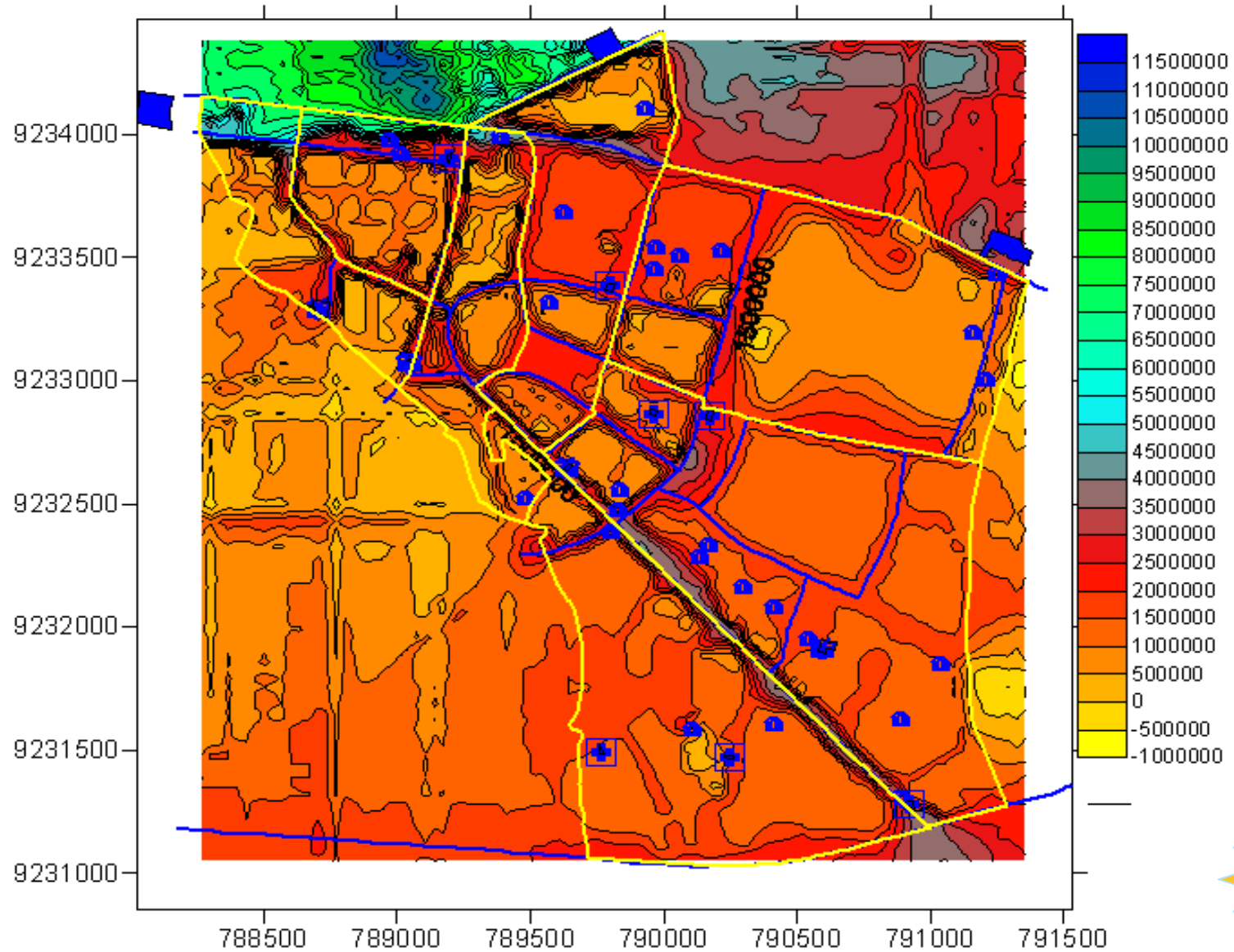
Artificial Neural Network (ANN) Method



COMAPRISON OF THE RESULT

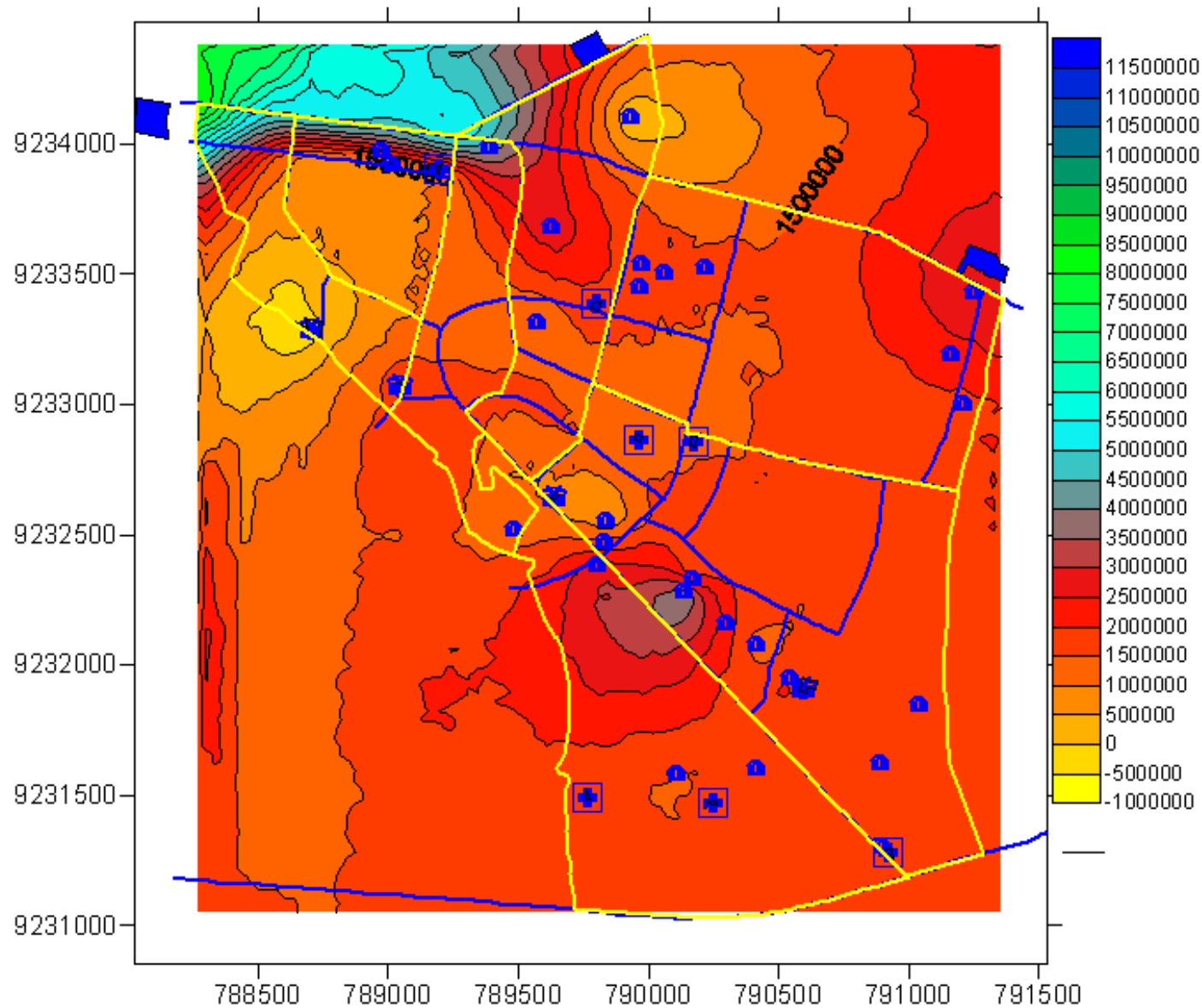


SPATIAL INTERPOLATION OF LAND VALUE DATA YEAR 2006

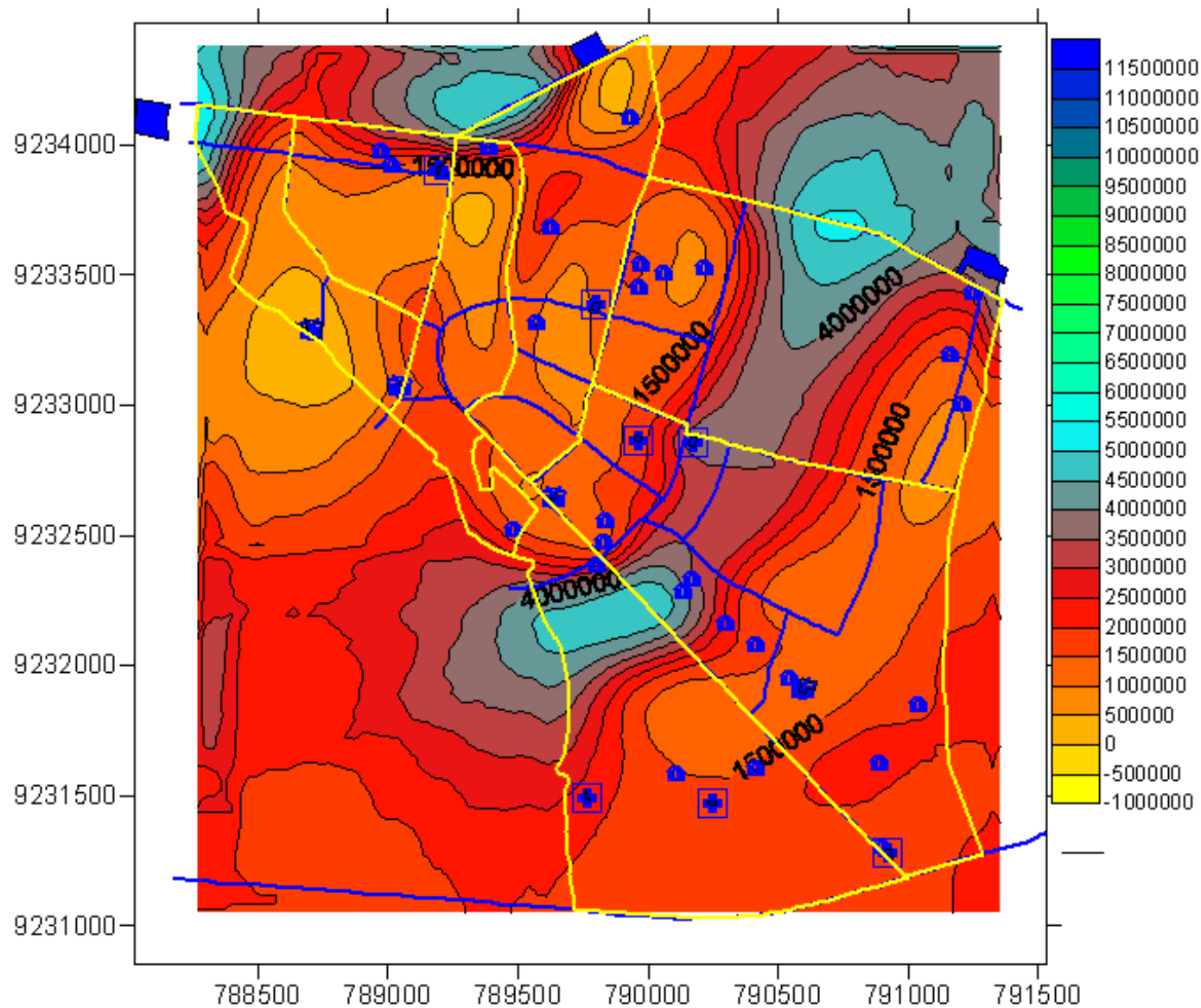


SPATIAL INTERPOLATION OF LAND VALUE MODEL

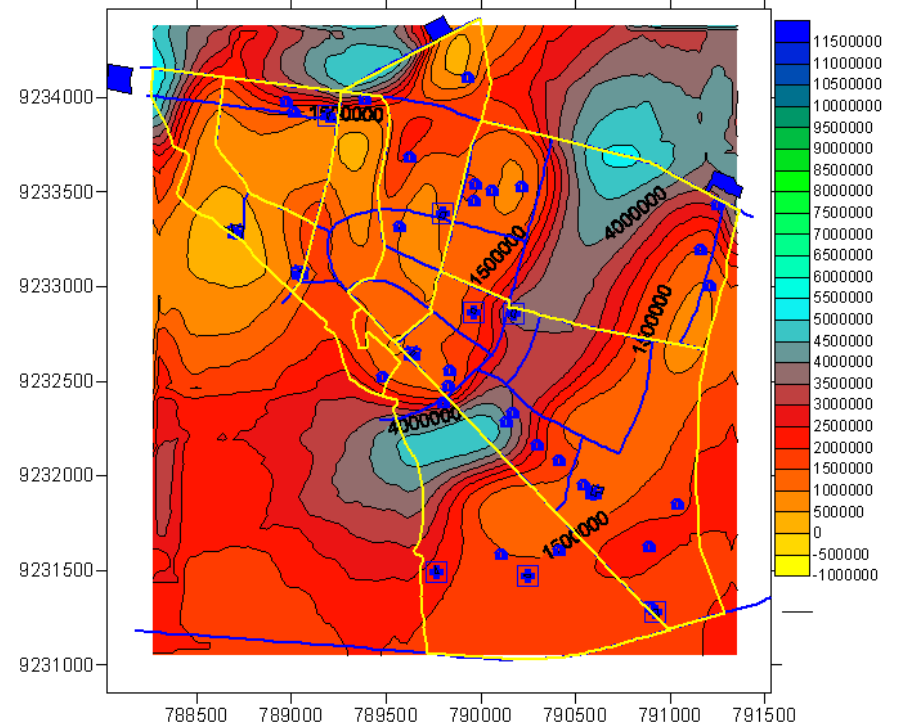
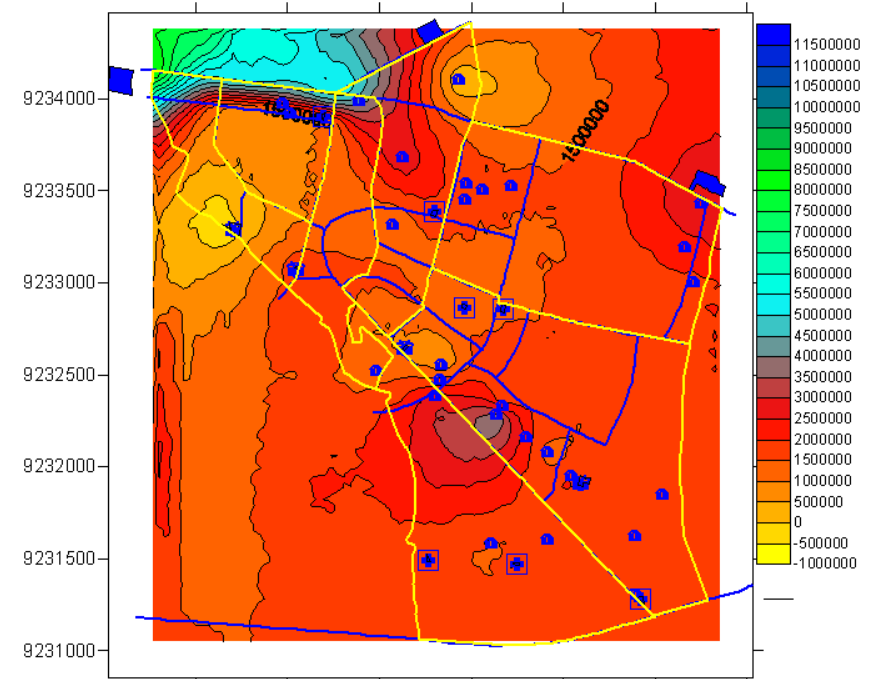
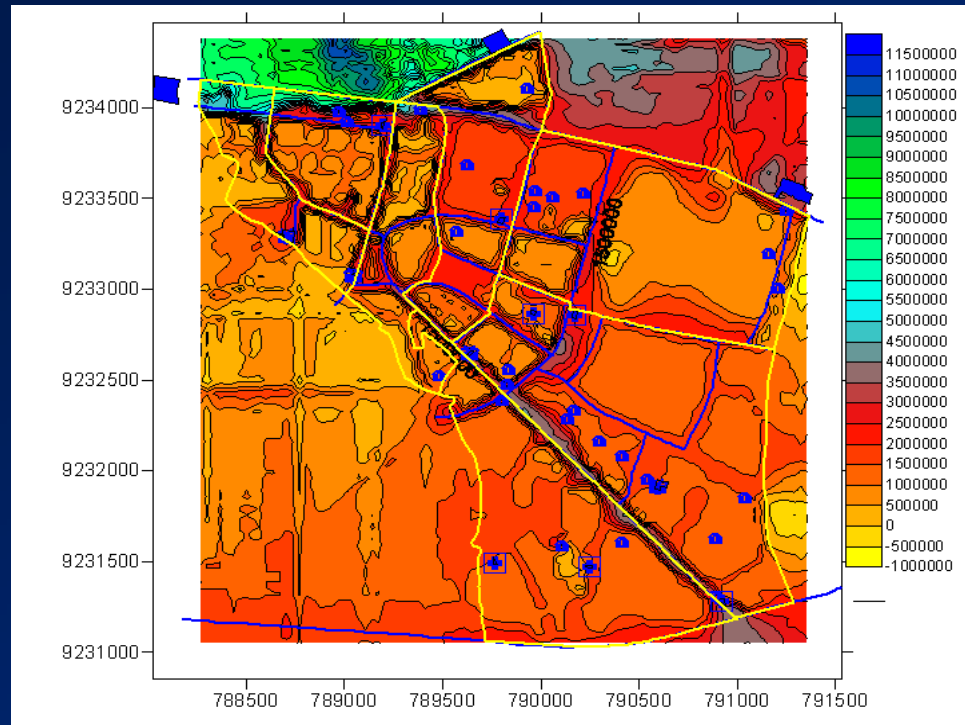
Multiple Regression Analysis (MRA) Method



SPATIAL INTERPOLATION OF LAND VALUE MODEL Artificial Neural Network (ANN) Method



COMAPRISON OF THE RESULT



CONCLUSSION

- ❖ **Multiple regression analysis (MRA) is the most widely used method for calibrating model. The used of MRA has been the long standing choice for calibration of land value model. MRA is a statistically based analysis that evaluates linear relationship between a dependent (response) variable and several independent (predictor variable), and extracts parameter estimates for independent variables used collectively to estimate value in a mathematical model.**
- ❖ **Artificial neural network can calibrate models that consist of both linear and nonlinear term simultaneously.**



CONCLUSSION

- ❖ **LINEARITY ASSUMPTION CANNOT BE SUPPORTED BY THE LAND VALUE VARIABLES**
- ❖ **THE USE OF NONLINEAR METHOD IS RECOMMENDED FOR THE LAND VALUE MODELING**
- ❖ **The land value modeling using spatial analysis and artificial neural network is a promising method for the automatic land valuation activities.**





THANK YOU