IDENTIFICATION OF LAND COVER CHANGES PATTERN USING THE MARKOV CHAIN DEPENDENCE TEST (STUDY AREA: BANDUNG, WEST JAVA)

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INTRODUCTION

BACKGROUND

- Land cover changes are vulnerable in Indonesia nowadays, as land needs continue to increase while land is limited.
- Land cover changes can affect environmental stability.
- Sometimes land cover changes can't be described well with statistical data only ➡ using spatial data to analyse land cover changes.

MARKOV CHAIN DEPENDENCE TEST

- **Markov Chain Concept in land cover study is**

$$X_{t+1} = f(X_t)$$

- **Dependence test is performed to determine whether have or not the dependence of the data.**
- **The dependency can be either first order or second order**
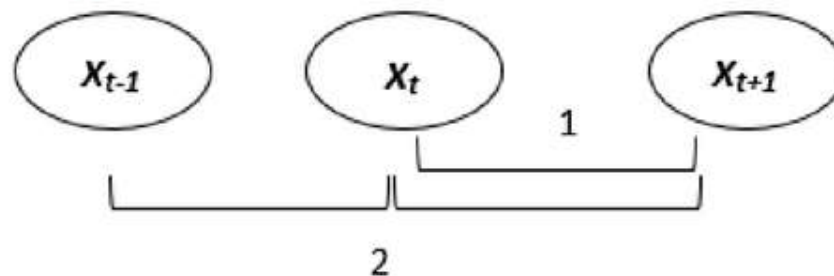
The first case is called first-order, while the second case is called second-order

RESEARCH DATA
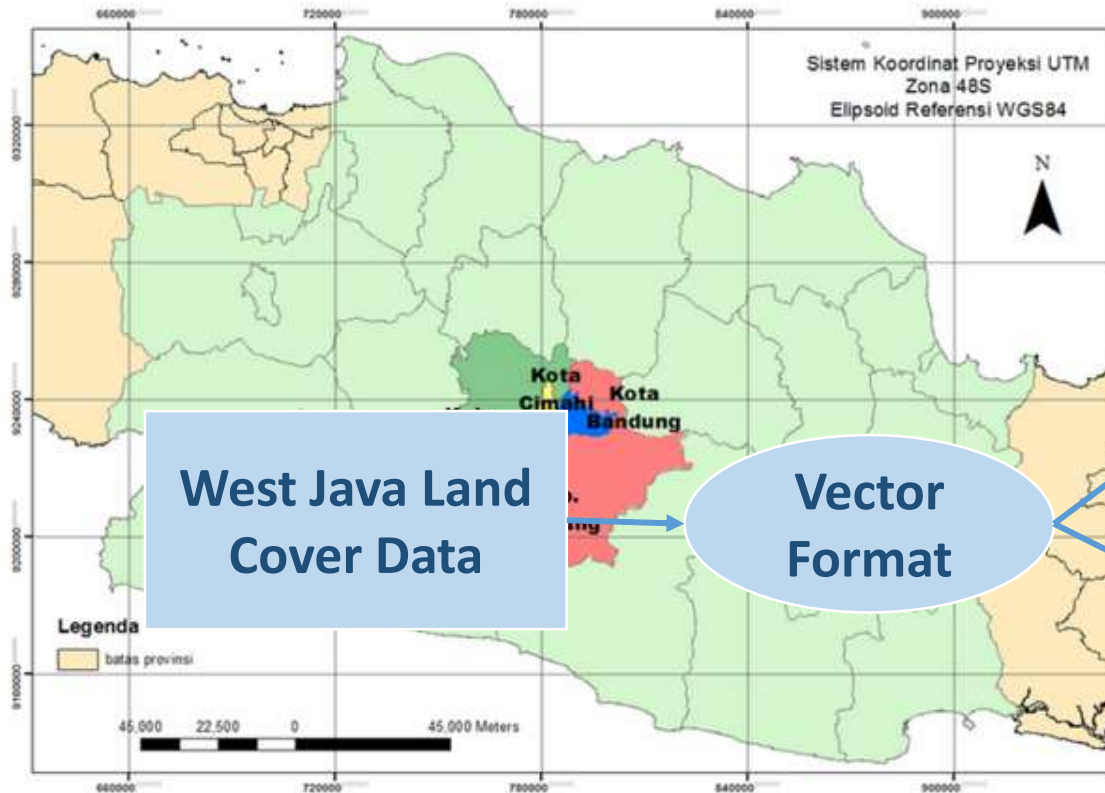
Bandung Land Cover Data → **Raster Format** →
- **1994**
- **1997**
- **2001**

→ **9 classes**

West Java Land Cover Data → **Vector Format** →
- **2006**
- **2011**

→ **8 classes**

RESEARCH METHODS

DATA PREPARATION

Rasterization of data for 2006 and 2011

Clipping of raster data in 2006 and 2011 for Bandung area

DATA NORMALIZATION

Reconstruct road class in 1994-2001 data

Eliminates outlier data

DATA PROCESSING

Data Reclassification

Crosstabulation

Test of Dependence

RECLASSIFICATION DATA

Land Cover Class for 1994-2001 Data

Settlements/buildings
Rice fields
Plantation
Shrubs
Waters
Forests

RECLASSIFICATION →

Built-up Land
Agricultural Land
Agricultural Land
Forest
Waters
Forest

Land Cover Class for 2006-2011 Data

Forest
Fields
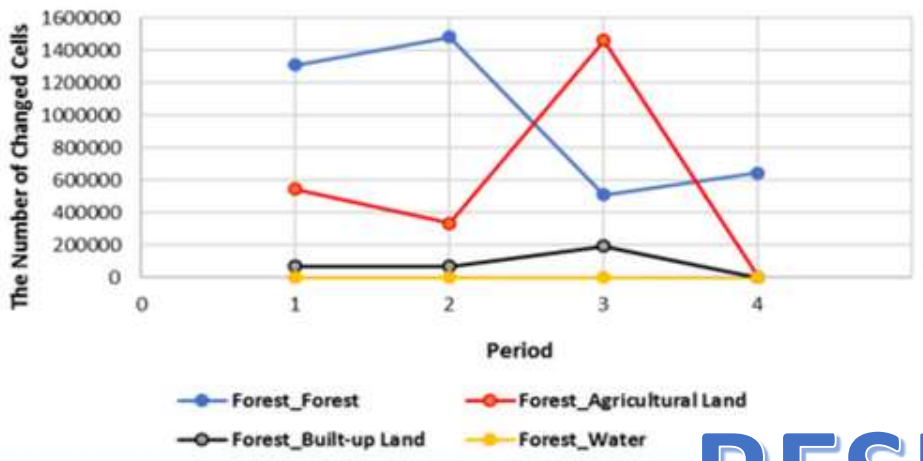Plantation
Settlement
Rice field
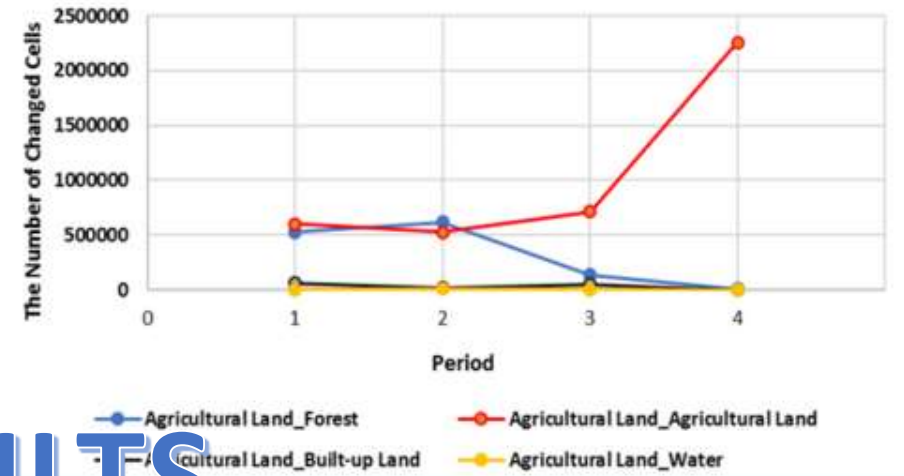Shrub
River/lake/reservoir

RECLASSIFICATION →

Forest
Agricultural Land
Agricultural Land
Built-up Land
Agricultural Land
Forest
Waters

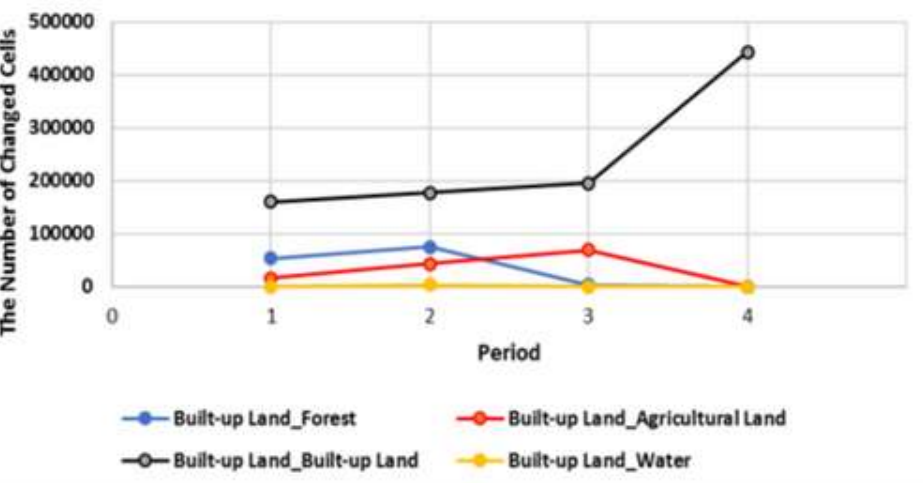Period of 1st year: 1994-1997, 2nd: 1997-2001, 3rd: 2001-2006, 4th: 2006-2011

RESULTS

EQUILIBRIUM STATE

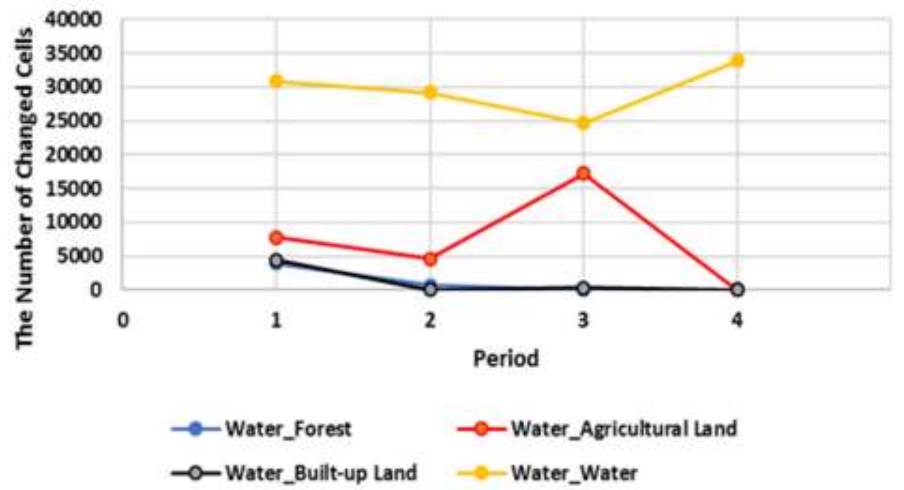## COMPARISON OF LAND COVER STATE IN 2011, 3016, AND 3526
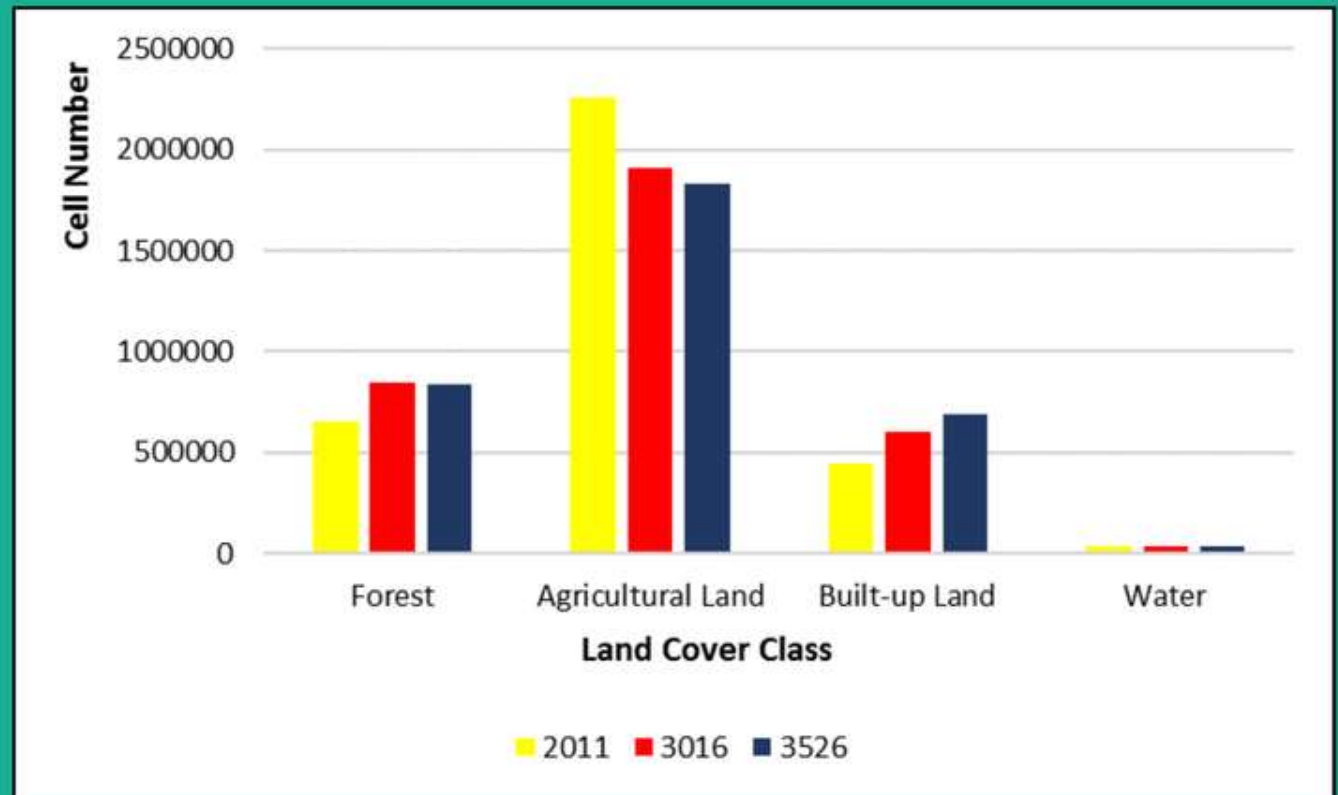
CONCLUSION

- Land cover change pattern in Bandung is second-order that is influenced by land cover at least two interval periods with the various pattern.
- The pattern of changes in a forest to agricultural land has the most dominant trend when viewed partially per period interval.

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THANK YOU!

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