Chapter IV
RULES OF THE INVESTIGATION

In this research, some tools are utilized i.e. computer with remote sensing software and Microsoft Visual Basic 5 Control Creation Edition compiler. Another device is HP ScanJet 6100 Scanner System. In fieldwork activity, author utilize one unit of Global Positioning System Garmin 12XL (including downloader unit) and a portable computer (notebook).

Sites

In this research, author used two locations in Cianjur Regency for analysis based on aerial photograph data. First location was in Pacet and relied on southeast slope of Mt. Gede-Pangrango. Second location was east slope of same mountains in area of Puncak. First image in Pacet consists of two land use classes i.e. forest and tea. Second image in Puncak has three land use classes: (i) forest; (ii) mixed garden and (iii) bare phase of paddy field. Figure 9 shows the original images.

Methods

The research framework could be divided into two activities i.e. desk/lab study and fieldwork. Desk study in laboratory is intended to gain comprehensive knowledge about research mainstream in texture analysis. In this study modeling in texture in different images and applications have been studied. In some study, the modeling is not enhanced by intensive fieldwork. In this thesis, actual information based on fieldwork is highly considered. Information collected will be used as reference map. Complete framework is presented in Figure 10.
Good-conditioned and geocorrected aerial photographs are selected and scanned in 150 dpi. The use of higher resolution may be applied. However, higher resolution significantly increases data and in particular resolution, no information gained further. Selection of land use class is then performed. First test of Simple Statistical Texture Classification (SSTC) will be applied on imagette with simple class discrimination. Another test is the applied on more complex imagettes.

In order to gain knowledge on behavior of SSTC, this research implemented different parameter on distance lag. The distance lag is used to set
convolution window. Relationship between distance lag \((d)\) and convolution window \((w)\) is defined as

\[ w = 2d + 1 \]

In this research, author used 4 types of convolution windows that are 3x3, 5x5, 7x7, and 9x9. The use of 3x3 window usually produces crisp output but less generalized polygon.

Fieldwork is intended to map selected areas. Usually, field check is done in only one or more locations related to its class. This approach has limitation since actual boundary is not particularly defined. Usually samples are taken far from the boundary. In order to minimize bias on boundary areas, author use field mapping method. However, since mapping is done in the field, this method needs intensive work on the field. Fieldwork will utilize Garmin GPS to derive land use boundaries. Since GPS system limits observation points to 500 nodes, portable computer (laptop or notebook) and GPS downloader unit are required. This step produced a reference map.

Both image-processing approaches are then assessed based on reference map. Quality and performance of each method is assessed by using error matrix as described in previous chapter.
Texture Analysis with different lag

Field work and classification

Land use selection

Scanning on 150 dpi

Georeferenced Photograph

Reference Map

Field work and interpretation

Accuracy Assessment

Figure 10. Research framework