

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The capability of Landsat TM to provide sun-synchronous and 30 meters spatial resolution is potentially very attractive and valuable source of data for urban climate study. The present study evaluated the effects of land use / land cover type on urban heat island effect in Bangkok Metropolis by determining the relationship between surface radiant temperature and transformed vegetation index on nine land use / land cover type.

The results of the present study can be concluded as follows:

1. The expansion of built-up area in Bangkok Metropolis during 1988 and 1997 was due to a great increasing of residential area, which had the trend to encroach the agricultural areas in Bangkok's vicinities.

2. There was an inverse relationship between transformed vegetation index and surface radiant temperature. It was found that the high TVI were associated with low surface temperature, which corresponded to vegetation areas. On the contrary, the low TVI were associated with high surface temperature, which corresponded to built-up area and bare soil.

3. The surface temperature in urban area appeared higher than rural, whereas the TVI in urban area appeared lower than rural.

In this study, it was found that the presence of vegetation can cool down the surface temperatures in that land cover type. The difference in TVI between urban and rural areas appears to be an indicator of the difference in surface properties such as evaporation and heat storage capacity of the two environments. These surface properties are identified as the factors

influencing the differences in surface radiant temperatures of urban and rural area. Therefore, the decreasing of vegetation and the extension of built up area can give rise to the surface temperature.

The limitation of the study was the data availability, thus the results from two dates of image were still inadequate to predict the tendency of urban heat island effect in Bangkok Metropolis during 1988 and 1997. Because the urban heat island development varies from day to day meteorological conditions, particularly as high humidity can decrease the great surface temperature. However, it was found that the surface temperature in urban area was higher than rural area for both 1988 and 1997. The results indicated the presence of urban heat island effect in Bangkok Metropolis.

5.2 Recommendation

1. Because of the humidity have the great effect to surface radiant temperature. The atmospheric correction should be applied to reduce the effect from atmospheric condition, especially the city in tropical zone that has the high moisture availability year-round.

2. The urban heat island is best developed a few hours after sunset because of the difference between the urban and rural cooling rates. The heat island intensity or urban-rural temperature differences will appear the clearly picture of urban warming at night. Thus the surface temperature at night should be investigated in further study.

3. Air pollution, especially the green house gases can retain more heat, which causes the urban warming. The further study should be consider the relation between air pollution level and air temperature in the industrial area or in the urban area, which release more pollution.

4. More satellite images from every seasons as well as several years are necessary to determine average temperature contour giving rise to better indication of the trend of land use and surface temperature.

5. The surface temperature patterns of Bangkok Metropolis from this study can be used as data supporting for urban planing and management to minimize the heat island effect. In particular, the critical zone with high surface temperature should have more vegetated surface, e.g., tree-lined roads or mini park in order to bring down the excessive heat that generated from surfaces or human activities.