5. CONCLUSION

In this study, a transportation network was built as a spatial database in a vector geographic information system. All types of roads were digitized and network topology was created in order to connect each paddy field with each medium and large-scale rice mills in Chiang Mai. Network analyses were implemented in ArcView GIS, customized avenue script, and Visual Basic program to compute the matrices of distance, accessibility index and spatial interactions between 1,410 contiguous paddy fields and 54 rice mills.

The network analysis in GIS was found to be very effective in computing the traveling time (distance) matrix due to the capability of GIS functions which automatically assign nodes that represent rice mills and paddy fields in the transportation network enabling the connectivity among those nodes.

Once traveling time (distance) matrix has been created, accessibility and spatial interaction could be easily computed. These matrices could be conveniently linked to ArcView GIS for trade areas analysis.

Trade areas for specified rice mills were successfully generated by specifying traveling time, using standardized accessibility index and specifying cumulative interaction probability. The results may be visualized as maps in GIS. The results from three working examples using different methods of generating trade zones suggest that care should be taken in selecting parameters such as decay function exponent and threshold levels of traveling time and cumulative interaction probability because they can greatly affect the paddy areas where trading activities are expected for the specified rice mills. Further research is needed to determine more accurate values of these parameters in order to reflect the behaviors of rice trading.