

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are drawn from the study of the role of mini-bus services in public transportation in Chiang Mai.

1. There are basically two modes of public transport in the study area: city buses and mini-buses. The city-bus system operates on fixed routes, whereas the mini-buses operate on flexible routes. It is obvious that the mini-bus system arose as a result of inadequate city-bus services.

2. The use of mini-buses as part of a public transportation system has several attractive aspects. These include great flexibility in routing and scheduling, operating speeds higher than those of city buses, a seat for every passenger, the ability to provide frequent service at short headways, and essentially door-to-door service.

3. The survey showed that free-running mini-buses operating across the Ping River carried 2.8 passengers per vehicle during peak hours, and 1.3 passengers per vehicle during off-peak periods. However, queue mini-buses operation across the Ping River had very high load factors; these stayed remarkably constant during the daytime hours of operation (06.30-18.30 hrs) at about 11 passengers per vehicle. (The number of cross-river daily person trips by queue mini-buses was about the same as that made by free-running mini-buses.)

4. It is believed that with the present fare structure, mini-bus revenues are in reasonable excess of operating costs; however, the return for most owner-drivers consists only of a nominal income rather than any substantial profit on their investment in the vehicle and licence.

5. It was found that free-running mini-buses predominantly carry passengers for short distances (average trip length = 1.21 km), whereas city-bus trips tend to longer distances (average trip length = 1.80 km).

6. It appears that mini-bus passengers come from a broader spectrum of educational and occupation levels than city-bus passengers.

7. It was realized that the mini-bus service is convenient for those who use it, but its use is restricted by the relatively high fare and the reluctance of drivers to take passengers to destinations that are remote from the city center. It is believed that these facts should serve as impetus for a reduced-fare program and reorganization of the mini-bus service to increase ridership.

8. In 1975, approximately 225,000 daily person trips were made on the public transportation services provided by city buses and free-running mini-buses. About 202,000 person trips per day (90 percent) were made on mini-buses, and 23,000 person trips per day (10 percent) were made on city buses. In addition, a substantial but unsurveyed sector of the public transport services was provided by queue mini-buses. These trips tended to be longer journeys, often between amphoes or nearby changwats.

9. The travel speeds of mini-buses in the study area tended to be higher than those of city buses. It was found that the travel speeds over the routes of the city-bus lines during the two peak periods were significantly different from those of the off-peak periods. In contrast, the travel speed of mini-buses on given route segments is substantially the same at all times of the day. However, the fraction of travel time lost through delays of mini-buses was nearly the same as that for city buses.

10. The waiting time of mini-bus passengers was found to be greatly lower than that of city-bus passengers. This difference may be the principal reason for the predominance of mini-buses for public transportation in the study area.

#### Recommendations for Further Study

Based on the experience gained from the study reported herein, the following recommendations for further studies are made.

1. Study should be made to assess the social role of the mini-bus system; this should be especially aimed at the level of employment created by the mini-bus system.

2. During the course of the research it was apparent that a substantial number of "pirate" mini-buses were in operation in Chiang Mai. The social, legal and economic aspects of such operations should be investigated with the possible view of regularizing such illegal operations.

3. It would be interesting to study the effect of mini-buses on the speed of the traffic stream.

4. Traffic accidents involving mini-buses should be investigated. Such a statistical study should especially assess the causes of collisions attributable to sudden stops, sudden starts, improper stopping to load and discharge passengers, and hazardous driving practices.

5. It would be interesting to conduct further research on the queue mini-buses which, in Chiang Mai, carry passengers from the city center to outlying amphoes and provinces.