



ISDSI CHIANG MAI URBAN SUSTAINABILITY STUDENT STUDY: FALL, 2009

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TITLE: Traffic Flow in Wat Ket

BACKGROUND AND HYPOTHESIS

Residents in Wat Ket argue that wider roads would decrease the neighborhood's overall sustainability. In our study, we explored this claim by assessing the relationship between road size and sustainability indicators. As road size decreased, we expected to find higher air quality, lower ambient noise, a smaller proportion of four-wheel vehicles and a higher proportion of human-powered traffic.

METHODS

We collected data during non-peak hours (between 1 and 3 p.m.) on weekdays (Tuesday and Thursday) in the Wat Ket neighborhood of Chiang Mai. We divided data points into three classes of road size: primary (four lanes), secondary (two lanes), and tertiary (single lane). We took measurements in four categories: flow, composition, and noise level, and air quality. During a five-minute observation period, we recorded the number of vehicles to cross a designated transect. Our vehicle categories were: four-wheeled, two-wheeled, and human-powered. To assess ambient noise we played a song through headphones held at arms length, and found the lowest volume at which the song could be heard over ambient noise. Air quality was measured through qualitative observation.

RESULTS

- There were large disparities in total traffic flow between the road types, with a roughly 50% decrease between primary and secondary roads and a roughly 90% decrease between secondary and tertiary roads.
- Ambient noise levels were similar between primary and secondary roads, and lower in tertiary areas. Overall ambient noise was associated with passing vehicles, vending activities, and various extraneous factors such as barking dogs and water fixtures.
- Air quality, mainly defined as vehicle odor and garbage odor, was largely consistent between sites and road types in the absence of immediate odor sources. Vehicle odor was directly associated with passing cars. Garbage smell tended to concentrate on secondary and tertiary roads.
- The proportion of two-wheeled vehicles to four-wheeled vehicles differed between primary roads, where the majority of traffic was four-wheeled, and secondary and tertiary roads, where the majority was two wheeled. While human-powered traffic was roughly consistent between all three road types, it made up a much higher proportion of traffic on tertiary roads.

Potential error sources include small sample size, difficulty in obtaining a random sample, human error, biased qualitative measurements, and omitted variables (e.g., presence of non- traffic-related noises).

CONCLUSIONS

Our findings suggest a higher relative concentration of four-wheeled vehicles on primary roads, and relatively more two-wheeled and human-powered traffic on smaller roads. Potential causes for this relationship include: traffic safety, convenience, accessibility, trip type, and congestion levels. If this is true, we would expect the planned road expansion to lead to a higher proportion of four-wheel vehicles, and a relative decline in other vehicle types. We think that a relative increase in four-wheeled traffic could affect a number of factors related to sustainability, including: noise level, air quality, carbon emissions, and traffic safety.

FURTHER EXPLORATION

While our methods did not allow us to assess a correlation between air quality, noise level, and road types, we believe that this relationship merits further investigation. Future studies should also take into account the



substitutability of vehicle types, as well as their relationship between vehicle type and sustainability. In particular, we recommend exploring the following questions:

- For what purposes do people use each vehicle type?
- How do traffic-related variables such as road size, quality, and safety levels affect vehicle choice?
- Would people readily change their vehicle-use patterns if the road size changed?
- How do different vehicle types impact air quality and noise level?
- How would a potential shift in vehicle-use patterns affect carbon emissions?
- What might be the long-term effects of a road expansion? Would it lead, as residents fear, to an absolute increase in traffic as new businesses move into the area?