HOW DO STREET TREES DEEPLY AFFECT ON-STREET ACTIVITIES OF PEOPLE? AN EVIDENCE FROM HANOI

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Abstract: Site survey was conducted in Hanoi’s six streets to examine how people live today in Hanoi, how they use public spaces in their neighborhoods and how many and what type of street trees are currently planted on the streets. The results of surveys were documenting on how much and where people walk, sit, stand, and carry out various peoples’ activities in the Hanoi’s street and number and type of planted tree species in the Hanoi’s street. Interestingly two facts coming out from this survey results are, peoples’ activities under trees are significantly higher than not under tree activities and certain species have maximum amount of peoples’ activities underneath.

Key Words: Hanoi streets, street trees, on street peoples’ activities

1. INTRODUCTION

If imagine a world without trees, it is easy to see that they are an essential part of this garden world called “Earth”. Trees have been called “nature’s air conditioner” and “the lungs of the earth”. Trees provide solid things like food, wood and paper products, chemicals and medicines, and they bring other economic, recreation and aesthetic benefits. But perhaps the most important role of trees is the one they play in the life support system of our planet.

These trees provide so many benefits that they should always be considered as an urban area default street making feature. Street trees are proving to be a great value to people living, working, shopping, walking and motoring in and through urban places. It makes an important contribution to the health and wellbeing of the residents of the city and to the quality of the city’s landscape.

Much of our time is spent on streets. So a street should be comfortable, with places to walk at a leisurely pace and safely, and have something to engage the eyes. Research on the esthetics quality of urban street landscapes has revealed that street trees are an important factor regarding the attractiveness of streets (Gold 1977; Schroeder et al. 1983) and city streets lined with trees are more favorably viewed by people than the streets without trees and receive more favorable quality of life evaluations (Sheets and Manzer 1991). Street trees, therefore, have a major function in cities as providers of a green living environment and give special landscape character to a place.

Furthermore street trees provide a wide range of benefits for urban environments. Shelter from sun and rain, noise absorption, wildlife shelter and food, oxygen production and glare

reduction are just a few of the advantages of street trees. In addition a big tree can function as a landmark when orientating in an area and the seasonal changes of the vegetation add a dimension of time. Urban street trees create vertical walls framing streets, providing a defined edge, helping motorists guide their movement and assess their speed. Nevertheless, street trees are not without problems. Some of the annoyances that can be associated with street trees are broken curbs, plugged sewer lines, broken gas and water pipes, insect infestation, blocked views and obstruction of power lines.

Research focused on the knowledge and attitudes of urban residents regarding the benefits and problems of trees in urban areas has shown that social, environmental, and practical benefits of trees are high and people also recognized the problems associated with trees but these problems are insufficient to justify against use of trees in urban areas (Lohr et al 2004). In addition, a large body of literature has documented peoples’ opinions and attitudes regarding the values of trees. Studies have been conducted that focused on peoples’ attitudes toward specific kinds of trees (Sommer et al. 1989, 1990; Sommer, R., and Sommer, B.A. 1989, Schroeder and Ruffolo 1996; Gorman 2004), residents’ attitudes and behavior regarding tree planting and care (Summit and McPherson 1998) and the visual characteristic of street trees that contributes to resident preferences (Williams 2002).

It is evident that people have very positive feelings on street trees. There is, however, a lack of research on street tree as an actor shaping peoples’ activities associated with it. The need is to explore the involved variables for better understanding the reason of the relationship between people and trees. In this study, observations of the ongoing street life of Hanoi has been done to get a good view on how people live today in Hanoi, and how they use the public spaces in their neighborhoods. Besides, their existing street trees system also has been observed to gain the relationship between various tree species and peoples’ activities. Two main objectives are addressed in this study.

- To examine the multiple uses of Hanoi’s street other than as simple carriers of vehicles and pedestrians.
- To find out how street trees shape the activities of people on the street.

This research provides new knowledge regarding the topics of urban street trees and peoples’ activities underneath. The issues of information about street life and about how the sidewalks actually function for the people are significant in city planning processes. Moreover, all trees are not equally endearing to city dwellers. Therefore, the selection of suitable street trees is one of the most important decisions made by city arborists and tree agencies. The right species for a particular street is a matter of value. Therefore, knowledge obtained from this research can be helpful to create well-designed landscaped areas dominated by street trees by providing guidance for future street trees selection, plantation, and management.

2. MATERIALS AND METHODS

2.1. Study Area Background
2.1.1. General Information
The study area is Hanoi, capital of Socialist Republic of Vietnam. Hanoi, established nearly 1,000 years ago, is one of the oldest cities in South East Asia. It is situated in the north of Vietnam and in Red River Delta. It is the center of political, economic and cultural activities
of the country. It has an area of 927 km$^2$. Hanoi’s population is 3,145,300 in 2005. The city comprises seven urban districts and five suburban districts.

The climate of Hanoi is typically tropical with monsoon and humidity. Summer (May to September) is hot and humid and winter is (November to March) relatively cool and dry. The average annual rainfall is 1,800 mm and the average annual temperature is 23.2 °C. The average temperature in winter is 17.2 °C, but can go down to 5°C. The average temperature in summer is 29.2°C, but can reach up to 40°C. Being situated on the riverbank and due to strong monsoons, high relative humidity prevails during most of the year.

2.1.2. People and Outdoor Life in Hanoi
The outdoor environment is full of life and activities. The housing standard in Hanoi is low in many of the existing housing areas. Apartments are small and have many residents. Therefore, residents are more or less forced to perform parts of their private life in public. Due to this fact, the outdoor environment has come to function as an extension to people’s homes and provides space for a large amount of activities which otherwise would have been performed indoors. This is however not the only reason why people leave their homes to spend their leisure time in the public spaces.

Hanoi wakes up early morning and the pavements of Hanoi street spring to life. People are out on the sidewalk for exercising, shopkeepers are getting ready for the day, restaurants are opening for breakfast, and street vendors are arranging their wares. Small coal-fired stoves are set up on the sidewalks and function both as private kitchens and tiny public restaurants. Everyone sits down to eat, even fully-grown adults perched on little stools that look like kindergarten chairs. Women wind their way between the endless stream of motorbikes carrying baskets balanced on poles with freshly cut flowers, vegetables, fruits, and chickens bound for market. Outdoor barbers with mirrors simply hung on the street walls can be found at every street corner. Since there is not much available common space in Hanoi, children use the streets and sidewalks as a playground. Bathing children, washing clothes or dishes are common activities taking place on the sidewalk. Hence, street life is vibrant and the street is probably the most used public space for outdoor activities.

Also the commerce in Hanoi takes place directly on the streets. Along sides of most of the streets, people have opened up shops in the building’s first floor. The shops are often quite small and sometimes the shop space is also part of an apartment. The availability of these small shops seems to be very important both for individual families’ economics but also for the neighborhood in which they reside. The shops not only make it possible to earn living, they also open up a “social window” to the world outside. Since the shops are only a few meters in width they create a dense commercial structure and an interesting façade with a large variety of activities along the streets. Opening hours are usually from early morning to late evening and this helps to generate a lively street throughout the day.

As night falls, the people of Hanoi Street still use the pavement as a sitting room combined with dining and kitchen. Dinner is taken early, but this is by no means the signal to end the day. Commerce goes on until well into the night, with most shops staying open until around 10 pm. Even after midnight there are activities on Hanoi Street. Only in the wee hours of the morning the street is a little quieter. But not for long; the daily round is soon to resume.
This is Hanoi, where getting on with life is an art form. Consequently, Hanoi’s street life is an endlessly fascinating subject for any observer of the human condition. With layer-upon-layer of life filling out its spaces and stretching out the day, it is a good place to study “Street Life”.

2.1.3. Street Trees in Hanoi

Hanoi is a unique Asian city with tree-lined boulevards and is also called the “Green City”. Most of the Hanoi streets are shaded by trees which nearly plait their tops across the road and tree canopy forms an attractive wall of green. According to statistics of “Ministry of Agriculture and Rural Development 2001”, the total number of trees planted in Hanoi is about 440,123 of over 100 different species. There are 22,066 trees in parks, 28,600 trees on the streets, 24,509 trees in land of offices, and 364,948 trees in residential area.

Public Parks and Greenery State Owned Co., Ltd manages whole street greenery system. The company has responsible for taking care and managing of trees to protect against stormy wind, create landscape, and guarantee traffic safety and asset the safety of people.

In French Domination Time, the popular species are big trees, with low speed of growing, such as Thingwa (Hopea odorata), Devil (Alstonia scholaris), Belgium Walnut (Dracontomelum duppereanum), Senegalese Mahogany (Khaya senegalensis). The French planted all the biggest timber in old streets of Hanoi, but at that time roads are big, and houses are all low-storey buildings, lies deep inside, so the trees still have their space to grow. Those trees are planted by rows and each street has its own kind of tree species, such as Belgium walnut in Tran Phu street, Tran Hung Dao street, Phan Dinh Phung street, Senegalese mahogany in Hoang Dieu street. It is very suitable for big streets with large pavement, villas which appear and disappear alternately in trees.

After Independence Day, many flower trees are planted and it has smaller dimensions and the foliage are all widely spread such as Queen of flowers (Lagerstroemia speciosa), Benzoin (Peltoforum tonkinense). So, the view of beauty of street trees has been changed, now it is romance and sparkle, expressed a spirit of budding, blossoming, and building a new life.

In recent years, the most popular species are Senegalese Mahogany (Khaya senegalensis), Queen of flowers (Lagerstroemia speciosa), Cantonese Mombin (Spondias lakonensis), Benzoin (Peltoforum tonkinense), Devil (Alstonia scholaris), Tropical Almond (Terminalia catappa), Belgium Walnut (Dracontomelum dupeurreanum). But nowadays, the popular species are the species whose growing speed is fast and planted easily, such as Cantonese Mombin (Spondias lakonensis), Kapok/silk cotton (Ceiba pentandra). For these trees, the target is taking shade for few years, instead of the beauty in the last tens of year. Such newly planted trees are not only big but also grow quickly. According to the opinion of the Park Company, these species are not suitable for street trees due to their features, these trees grow up quickly but has dry and easy-to-fall branches, dangerous for traffic and people, and does not have nice shape. That is why these are not suitable for the beauty of the city’s landscape. That is the most inappropriate elements of Hanoi’s street trees. These trees are usually planted by the citizens, not belong to the city’s projects. Moreover, a lot of big shadow trees were chopped away. It makes few hours to chop away a big tree, but to plant a new takes about 40 years for it to have a diameter of 40-60 cm. Therefore, in 2004, the company carried out a theme of moving big trees, which was preparation for future.

The city is full of trees and people utilize them in numerous ways for not only commercial but also non-commercial activities. Trees provide important shade and a place for drying
laundry. Trees create “roofs” for the backyards and variety to the streetscape. People can sit
down to rest and associate with each other under trees. Moreover, some trees have a kind of
religious feature as people often come to that tree to pray and burns incenses and do other
religious activities to wish a good health and successful business. When people construct
extensions to the houses and trees stand in the way, they build around the tree trunks, keeping
the trees untouched. Therefore, trees seem greatly respected in the city. As Hanoi has tropical
monsoon climate, Hanoi people seem prefer to plant many trees along the street. All around
Hanoi people are seen planting trees. These plantations can be found in public spaces and the
most eye-catching for someone traveling through the city are the plantations around and in
between the streets.

Hence, talking about Hanoi, nobody can neglect talking about the beauty of the greenery. The
city’s landscape is delineated by a number of street trees and these trees make the
streetscapes and courtyards green thereby increases the beauty of the capital. The trees grown
along boulevards are considered the giant lungs of Hanoi to make the city more close to
nature. Therefore, Street trees are the typical and beautiful in Hanoi.

2.2. Methodology
Two types of surveys were performed to collect data for this study. Those are
1. Survey of street trees; and
2. Survey of peoples’ activities on the street

These disclose how many people walk on the streets; how many people stay on the streets
and what do they do; how many activities are going on; how many and what type of street
trees are currently planted on the streets; what is the proportion of activities under trees and
not under trees; which types of trees dominate on what kind of peoples’ activities on street.

2.2.1. Survey Procedure
Step 1: Measuring of trees structure and characteristics such as tree size, species, tree types,
etc.

Step 2: Counting of various kind of peoples’ activities and pedestrian traffic
In this section, the concern is to describe the many faces of Hanoi’s city streets and sidewalks
by focusing upon their multiple uses. Therefore, peoples’ activities on street were divided
according to their utilization of street into two groups, such as economic activities and non-
economic activities. Economic activities refer to activities related to earning. Non-economic
activities include all other forms of activities; it is, in other words, a residual category. The
survey was conducted in following way.

- For counting of on-street activities, one surveyor walked from one end to other end of
  street observing and noting what people were doing and where they were doing along
  the street within 20 minutes for left side of street and then again the same surveyor
  observed the activities on right side of street.
- For counting of pedestrian, at the same time, one surveyor sat in the middle of street
  on each side and counted the pedestrian passing by him. (Counting results have been
  extrapolated to produce an hourly estimate.)

Here is a flow chart showing the categories of on peoples’ activities carried out on the street.
2.2.2. Survey Period

- The survey took place on winter with nice weather in December 2006.
- The data was collected on weekdays both during the daytime and at the evening.
- Morning activities - From 7 a.m. to 8 a.m.
  - From 10 a.m. to 12 p.m.
- Lunch time activities - From 12 p.m. to 1 p.m.
- Evening activities - From 4 p.m. to 8 p.m.

Table 1 Survey days and weather conditions

<table>
<thead>
<tr>
<th>Survey Days</th>
<th>Weather Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday 15 December, 2006</td>
<td>Sunny, 19°C, 71% Humidity</td>
</tr>
<tr>
<td>Monday 18 December, 2006</td>
<td>Sunny, 16°C, 59% Humidity</td>
</tr>
<tr>
<td>Tuesday 19 December, 2006</td>
<td>Sunny, 16°C, 56% Humidity</td>
</tr>
<tr>
<td>Wednesday 20 December, 2006</td>
<td>Sunny, 15°C, 67% Humidity</td>
</tr>
</tbody>
</table>
2.2.3. Selected Survey Streets
Six streets were selected for this study based on the following selection criteria.
1. regional characteristics
2. population density
3. greenery
4. width of street

The following Figure is showing the location of the streets selected for this study.

![Location map of selected survey streets](image)

**Figure 2 Location map of selected survey streets**

The selected streets are as follows;

I. Hang Chieu street
II. O Quan Chuong street
III. Ngo Gach street
IV. Phung Hung street
V. Tran Phu street
VI. Lo Duc street

I. Hang Chieu Street
Hang Chieu Street is located in Hoan Kiem district. The survey length is 110 m. This street has 2 ways traffic lanes of width 8 m and sidewalk width is 4 m on each side. It is an old street formed since 16th century and one of the busiest streets in ancient quarter which is cultural heritage area. It is 276 meters long from the Quan Chuong gate to Dong Xuan street, crosses Hang Giay street and near the Dong Xuan market, Vietnam’s oldest and largest market. The number of households is 425 according to the data of Commune’s People Committee. It is Commercial Street and shops here are selling mat.
II. O Quan Chuong Street
O Quan Chuong Street is located in Hoan Kiem district. The survey length is 80 m. This street has 2 ways traffic lanes of width 8 m and sidewalk width is 4 m on each side. It is 80 meters long from Tran Nhat Duat street to Quan Chuong gate, joining Hang Chieu street and the number of households are 58. The house row on the left and right side are small tea stalls, and food stalls. There are some small shops like bike repairing or mechanic shops and barber shop on the sidewalk serving for demand of families in the street.

III. Ngo Gach Street
Ngo Gach Street is located in Hoan Kiem district. The survey length is 128 m. This street has 2 ways traffic lanes of width 6 m and sidewalk width is 2 m on each side. It is 128 meters long, stretches from Nguyen Thien Thuat Street to Hang Duong Street and the population density of this street is 254 people. Despite of its narrowness, shops are in close proximity to one other, crowded with people. Merchandising is diversified. Small businesses are tea stalls, large scale businesses are hotel and at the start of the street, there are many shops selling scarf and hat. It has famous temple situated in the middle of the street and people often come here to pray and burns incenses.

IV. Phung Hung Street
Phung Hung Street is located in Hoan Kiem district. The survey length is 100 m. This street has 1 way traffic lane of width 10 m and sidewalk width is 5 m on each side. It is 1244 meters long from Phan Dinh Phung Street to Hang Bong Street. Many restaurants and food stalls are set up along the street and dishes are diversified and tasty to attract for customers. Some stores selling fast and ready-made food are opened.

V. Tran Phu Street
Tran Phu Street is located in Ba Dinh district. The survey length is 135 m. This street has 2 ways traffic lanes of width 12 m and sidewalk width is 5 m on each side. Numerous fashion shops decorated in a modern way have appeared and contributing a commercial feature to this potential street. Besides, mobile phone shops are opened to meet the demand of local residents. At the start of the street, there are some small bike repairing or mechanic shops. This street is famous for lottery shops along the sidewalk.

VI. Lo Duc Street
Lo Duc Street is located in Hai Ba Trung district. The survey length is 135 m. This street has 1 way traffic lane of width 10 m and sidewalk width is 5 m on each side. This street was established on 18th century and located in French Quarter, south of Hoan Kiem Lake; this was built by the French administration during French colonial rule. Cloth shops extend from the beginning to the end of the street with a very big amount. There is one primary school lying in the middle of the street and hence many small tea stalls and food stalls are set up near the school to meet the demand of the school children.

3. RESULTS AND DISCUSSION

3.1. Pedestrian Traffic – Street by Street – On a Winter Weekday: 7 am – 8 pm
Figure 3 shows pedestrian traffic pattern in each selected survey streets. Street wise discussion of results from Figure 3 is as under.
Hang Chieu Street and O Quan Chuong Street
Hang Chieu Street and O Quan Chuong Street are both situated in the central business district. Both streets are filled to capacity for most of the day and have a rather high volume of traffic in the evening. After 6 pm when the shops close, the pedestrian traffic significantly decreases.

Ngo Gach Street
Ngo Gach Street experiences an evening rush hour when people leave work and walk to the different modes of transport for going back home. Throughout the day, pedestrian traffic flow is gradually increased till evening peak hour.

Phung Hung Street and Tran Phu Street
Phung Hung Street and Tran Phu Street carry almost equal volume of traffic. These two streets are not well visited streets. Throughout the day and evening, these are remarkably quiet. The pedestrian traffic is quite constant with no big variations throughout the day and then drastically drops after 6 pm the shops close and the street become rather deserted.

Lo Duc Street
Lo Duc Street is the most used street with 672 pedestrians per hour in the lunchtime hours. The street is a busy place throughout the day with people visiting the many outdoor tea stalls and food stalls. The presence of the primary school in this street explains the rather heavy winter traffic. Around 6 pm the pedestrian traffic decreases to nearly 1/2 of the daytime traffic.

3.2. Pedestrian Traffic On a Winter Weekday between 7 am and 8 pm
The map (Figure 4) shows pedestrian traffic in six selected survey streets on a winter weekday. Hang Chieu Street and O Quan Chuong Street are the busiest streets in central business district have rather heavy winter traffic 1.68 and 2.29 pedestrians per hour per meter respectively. Lo Duc Street to the south is also rather well traveled and it has 1.29 pedestrians per hour per meter. It is interesting that pedestrian traffic volume on Phung Hung Street is almost equal to that on Tran Phu Street, and have remarkably little traffic 0.66 and 0.65 pedestrians per hour per meter correspondingly. Ngo Gach Street also has quite a number of pedestrians, 0.95 pedestrians per hour per meter.

3.3. On Street Peoples’ Activities on a Winter Weekday between 7 am and 8 pm
The bar graphs on the map (Figure 5) indicate the extent of on street peoples’ activities recorded in the six selected street surveyed. Pictured are the average number and categories of activities at any time between 7 am and 8 pm on weekdays in December, 2006.

Observations from on street peoples’ activities survey show concentration of activities in the central business district where the highest number of pedestrians are also recorded. The activities patterns of the six streets surveyed differ widely. The activities are mostly eating on vendors and food stalls, sitting and standing (looking at goods on the street, speaking to friends and relatives) and shopping. These are major activities. Hang Chieu Street, O Quan Chuong Street, and Ngo Gach Street have a diverse activity pattern reflecting a busy main street. Hang Chieu Street is dominated by window-shoppers and the large groups of people sitting at all times displays the well known urban activity of looking at shopping goods and speaking to friends and relatives. O Quan Chuong Street, Ngo Gach Street, and Phung Hung Street have a high proportion of people eating at the outdoor restaurants, due to the many

1 Excluding pedestrian traffic
food stall in the sidewalk. Tran Phu Street and Lo Duc Street is not a place where many people choose to spend time. These two streets are fairly quiet and the main activities are sitting, standing, and are dominated by many fixed vendors. Very few children playing activities are recorded at this time of day, because the sidewalks are full of many activities and generally surrounded by traffic and, therefore, parents do not let their children loose to play.

3.4. Street Trees Distribution
Table 2 shows that dominant species distribution of six selected survey streets in Hanoi. Table entries are the number of species which were planted in surveyed streets.

<table>
<thead>
<tr>
<th>Species</th>
<th>Selected surveyed streets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hang Chieu</td>
</tr>
<tr>
<td>Banyan Ficus pilosa rein Da</td>
<td>Moraceae</td>
</tr>
<tr>
<td>Belgium walnut Dracontomelum mangiferum b.l Sau</td>
<td>Euphorbiaceae</td>
</tr>
<tr>
<td>Bo/peepal Ficus religiosa linn Bo de</td>
<td>Moraceae</td>
</tr>
<tr>
<td>Cantonese mombin Spondias lakonensis Dau da xoan Anacardiaceae</td>
<td>2</td>
</tr>
<tr>
<td>Devil Alstonia scholaris</td>
<td>Apocynaceae</td>
</tr>
<tr>
<td>Kapok/silk cotton Gossampinus malabarica merr Gao Malvaceae</td>
<td>1</td>
</tr>
<tr>
<td>Queen of flowers Lagerstroemia flosreginae retz Bang lang Lythraceae</td>
<td>6</td>
</tr>
<tr>
<td>Senegalese mahogany Khaya senegalensis a.juss Xa cu Meliaceae</td>
<td>11</td>
</tr>
<tr>
<td>Thingwa Hopea odorata roxb Sao den Dipterocarpaceae</td>
<td></td>
</tr>
<tr>
<td>Tropical almond Terminalia catappa linn Bang Combretaceae</td>
<td>3</td>
</tr>
<tr>
<td>Weeping fig Ficus benjamina linn Si Moraceae</td>
<td>1</td>
</tr>
</tbody>
</table>

3.5. On Street Peoples’ Activities related with Tree Species – For All Surveyed Streets
Figure 6 is the profile of typical one example, Hang Chieu street showing the number and category of on-street peoples’ activities, number of trees, name of tree species, location and size of trees.

Survey streets are divided into two groups based on the regional characteristics of streets. Group I consists of Hang Chieu, O Quan Chuong, Ngo Gach and Phung Hung streets that are commercial streets and Group II consists of Tran Phu and Lo Duc streets that are commercial, residential and official streets. Figure 7 represents the density of activities under each tree species for Group I and Group II. Interesting figure coming out from this Figure is certain tree species have high density of activities. Results from Group I show that Queen of flowers, Kapok/silk cotton, Weeping fig trees contain maximum activities underneath. Results from Group II show that Thingwa and Belgium walnut trees are planted nearly the same amount but density of activities underneath Thingwa is twice of Belgium walnut. Moreover, it is very
vivid that numbers of activities under street trees are significantly higher than not under tree activities in both Groups.

The possible reasons can be physical appearance of tree, psychological features, religious features and land use around the tree. A study of Hanoi trees reveal that Queen of flowers, Weeping fig are the most popular trees in Hanoi due to physical and religious feature and there are most like to have higher density of activities. Queen of flowers tree has nice, colorful flowers with light purple and the main impression of this tree is the “flower’s color”. Weeping fig tree contains spiritual significance, often planted at pagodas or temples. It has many roots represents wealthy, richness and longevity. Interesting kapok/silk cotton tree also has high density of activities although it is not liked by majority of Hanoi people. The high density underneath kapok/silk cotton is therefore referred to land use pattern around it.

4. CONCLUSIONS

The study reported here is in two folds. Firstly, a description of the multiple uses of Hanoi’s streets is presented. Secondly, the study focuses upon the amount of on street peoples’ activities under street trees. Following conclusion can be drawn from the results of this study;

- Each street has its unique pedestrian traffic pattern which is probably dependent on regional characteristics of each street. Evening peak timing is nearly the same for all streets.
- On street peoples’ activities are mostly eating on vendors and food stalls, standing (looking at goods on the street, speaking to friends and relatives) and shopping.
- Certain tree species are appreciated more by people because of physical appearance of tree, psychological features, religious features, and land use pattern around them.

The results from this study represent the peoples’ activities from the point of view of street trees. The viewpoints of regional characteristics cannot be known from this study; these could be fruitful areas for follow-up surveys. Therefore, further qualitative survey is required to observe the land use characteristics around the street trees, and to define the relationship between peoples’ activities, street trees and the space and the buildings around street trees.

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Figure 3 Pedestrian traffic – street by street (The values represent pedestrians per hour)
Figure 4 Average numbers of pedestrians per hour per meter

Figure 5 Intensity of usage per meter

*The values represent average number of activities per meter*
Figure 6 A profile showing on-street activities and tree species (Hang Chieu)
### Group I

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>No. of Trees per 100 m sidewalk</th>
<th>No. of activities per one tree</th>
<th>Contents and density of activities for average crown area (m²)</th>
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<tbody>
<tr>
<td>Belgium walnut</td>
<td>Still = 10.00 0.96</td>
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<tr>
<td>Queen of flowers</td>
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<td>Devil</td>
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<td>Kapok/silk cotton</td>
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<td>Weeping fig</td>
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</tr>
<tr>
<td>Bo/peepal</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
</tbody>
</table>

**Total No. of Trees:** 9.9 / 100 m sidewalk
- **No. of activities:** 64.8 / 100 m sidewalk
- **Not Under Tree Activities:** 32.16 / 100 m sidewalk
- **Total (Under tree + Not under tree):** 123.30 / 100 m sidewalk

---

### Group II

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>No. of Trees per 100 m sidewalk</th>
<th>No. of activities per one tree</th>
<th>Contents and density of activities for average crown area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium walnut</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Senegalese mahogany</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Tropical almond</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Queen of flowers</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Devil</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Cantonese mombin</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Kapok/silk cotton</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Banyan</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Weeping fig</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
<tr>
<td>Bo/peepal</td>
<td>Still = 10.00 0.96</td>
<td>2.93</td>
<td>0.20</td>
</tr>
</tbody>
</table>

**Total No. of Trees:** 13.7 / 100 m sidewalk
- **No. of activities:** 64.8 / 100 m sidewalk
- **Not Under Tree Activities:** 6.9 / 100 m sidewalk
- **Total (Under tree + Not under tree):** 71.71 / 100 m sidewalk

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**Figure 7 Influence of tree species on on-street activities**