Chapter 18
Perception of Citizens toward Implementation of Urban Forestry: Case of a Local City in the Philippines

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Abstract This study sought to understand how the constituents of Iligan City, a local city in Mindanao, Philippines, perceive the concept of urban forestry as necessary, beneficial and practical to be implemented. Specific objectives were to determine if there is any difference in the perception among the social types of respondents, to determine what demographic factors may have influenced their perception, to understand the reasons for such differences in perception, and to determine current constraints to urban forestry implementation. This study used a combination of qualitative and quantitative data gathering using validated structured questionnaire and visualization method. The respondents were 15 years old and above, coming from four social groups, namely students, professionals, policy makers, and other citizens. The results showed that the students, professionals, and the policy makers differ in perception of urban forestry and the general importance of trees, support the implementation of the program and the materialization of urban forestry from the other citizens (include sidewalk vendors, drivers, and unemployed citizens). With regards to gender, both male and female respondents are strongly aware of urban forestry and the general importance of trees, but their perception on the materialization of urban forestry and support in its implementation in the city differs. On the support of implementation and perception on the materialization of urban forestry, there are significant differences among age groups where 26–50 years old respondents perceived urban forestry weaker than those 15–25 years old, while 51 and above years old are uncertain. Both resident and transient respondents strongly agree on the awareness, support, and materialization of urban forestry in Iligan City.

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1 Introduction

The urbanization process has drastically changed the relationship between human society and the natural environment. Most obviously, the natural environment has been exploited to support economic growth (Konijnendijk 2000). As land surfaces are being modified by development such as concreting, asphalting, and improved infrastructure as a result of global trade industry (Shin et al. 2001; Blaschke 2006), waste heat generated by energy usage results in the increase in surface temperature and overall ambient temperature which have adverse effects on the environment as well as on the health of individuals (Santamouris et al. 1999; Mihalakakou et al. 2002). Adding the effects of climate change, urban areas become unpleasantly warm compared to the surrounding rural areas (Dimoudi et al. 2014). In addition, high volumes of traffic and noise, and increased built-up areas contribute to a lower quality of life, as well as the gradual weakening of the sense of human health and well-being due to intensification of heat stress episodes (European Environment Agency 2005) as a result of decreasing urban greeneries and tree covers.

Urban forestry refers to the cultivation and management of trees in the city for the purpose of improving the urban environment in terms of physiological, sociological, and economic well-being of urban society (Jorgensen 1974; McPherson 2003; Conway and Bang 2014). It advocates the role of trees as a critical part of the urban infrastructure. Urban forests are critical in cooling the urban heat island effects, maintaining moderate local climate, slowing wind and storm water, and shading homes and businesses to conserve energy (Grimmond et al. 1994; McPherson et al. 1997; Miller 1997). Urban forests play an important role in ecology of human habitats in many ways such as air quality regulation, water, and sunlight (Jo 2002; Wang et al. 2006; Chen 2006). It beautifies the city, serves as recreational area for people (Konijnendijk 2000), improves health (Velarde et al. 2007; Arnberger and Eder 2012), and plays a significant role in maintaining biodiversity (Alvey 2006; Konijnendijk et al. 2006; Pickett et al. 2011; Gaffin et al. 2012; Jones et al. 2012). Despite gaining attention in other countries, it is still unpopular and underdeveloped in the Philippines especially in local cities. Most of the studies conducted were done in mega cities and metropolitan areas.

Perception of the environment and programs to improve the environment may influence motives, attitudes, and preferences which could be translated into policies, planning, and management of the urban landscapes (Yuen and Hien 2005; Nasar 2008; Jim and Shan 2013). Perception on urban forestry may depend on the social and cultural values as well as the economic and educational background of the respondents (Acar et al. 2006; Thompson 2002). Understanding perception on urban forestry among social groups could add light on their possible participation, design, and management (Purcell 1992).

This study sought to understand social perception, awareness, and responsiveness on the concept of employing urban forestry in a local city. The main objective of this study was to determine how the constituents of Iligan City, a local city in Southern Philippines, perceive and respond to the concept of urban forestry as

necessary, as well as beneficial and practical to be implemented. Specific objectives were to determine if there is any difference in the perception among the social types of respondents, to determine what demographic factors may have influenced their perception, to understand the reasons for such differences in perception, and to determine current constraints to urban forestry implementation.

2 Materials and Methods

2.1 The Study Site

Iligan City is a first class, highly urbanized city in northern Mindanao, Philippines. It is approximately 795 km southeast of Manila and has a total land area of 813.37 km^2, making it one of the 10 largest cities in the Philippines in terms of land area. According to the 2010 census, it has a population of 322,821 people (National Statistics Office, accessed July 2010). Iligan City falls within the third type of climate wherein the seasons are not very pronounced. Rain is more or less evenly distributed throughout the year. Because of its geographical location and being surrounded by mountains, the city experience less strong weather disturbances compared to areas in eastern Philippines facing the Pacific. Despite these facts, in the last three years, the city has declared four times the state of calamity due to typhoons and flooding.

Iligan City has increasingly grown in terms of its economy. This is evident in the development and improvement of infrastructures including the construction of new business establishments and its 14 major heavy industries located in it. However, environmental responsibilities have seemed to be neglected by both the city planners and investors despite these developments. In particular, cultivation of trees in the urban setting was not considered with the construction of new buildings and expansion of highways and city streets. Some of the city trees were even cut down to give way for road expansions and building constructions.

2.2 Data Gathering

This study used a combination of qualitative and quantitative data gathering using validated structured questionnaire with open- and close-ended questions and visualization method. The semi-structured questionnaire was used to assess the perception of the respondents on the concept of employing urban forestry in Iligan City. Each question has five possible answers, ranked from 1 (strongly agree) to 5 (strongly disagree) of which only one is to be selected that best fits the thought and perception of the respondent. The questionnaire contained demographic profile of the respondents including gender, age, marital status, allowance/income, residency,

and occupation. The questions in the survey were grouped into the following themes:

- Awareness on the concept of urban forestry and general importance of trees
- Support for the implementation of urban forestry programs
- Perception on materialization of urban forestry in three settings
- Policy makers' support and prioritization of programs on urban forestry.

The groupings of the contents of the questionnaire into four themes are shown in Table 1. The questionnaire was also translated into the local dialect to help those who do not understand English very well.

The visualization method was also employed (Karjalainen and Tyrväinen 2002; Lewis and Sheppard 2006; Lange et al. 2008) in combination with the questionnaire. The visualizations were prepared using Adobe Photoshop software.

Table 1 Groupings of the contents of questionnaire into four themes

Theme 1: Awareness on the concept of urban forestry and general importance of trees • Concept of urban forestry • Trees are important to environment • Trees are important to human well-being • Absence of trees results in excessive heat • Absence of trees contribute to climate change • Trees cooldown environment • Trees add aesthetic value • Trees help reduce pollution
Theme 2: Support for the implementation of urban forestry programs • Planting, growing, and taking care of trees • Part of urban development plan • For climate change mitigation • Mandatory for commercial establishment • Urban forestry is feasible to be implemented • Support on the implementation • Willingness to participate
Theme 3: Perception on materialization of urban forestry in three settings • Prefer trees in commercial environment • Enjoy shopping in commercial environment with trees • Trees in commercial environment contributes to ecotourism • Prefer trees in residential environment • Enjoy living in residential environment with trees • Trees in residential environment contributes to well-being • Prefer trees in open space • Enjoy visiting open space with trees • Trees in open spaces contribute to nature conservation and climate change mitigation
Theme 4: For Policy makers only • Support urban forestry • Prioritize implementation of urban forestry

Photos of the current scenarios in Iligan City were taken and were computer edited to depict the desired urban forestry scenario. The purpose of the visualization was to provide basis and scenarios from which to analyze how people (respondents) interpret and react to the visual experience of the landscape and to the characteristics of urban forestry (Lange et al. 2008). There were three scenarios used in this study. The first scenario is urban forestry in commercial area (Fig. 1a), the second scenario is urban forestry in residential area (Fig. 1b), and the third scenario is urban forestry in abandoned open space (Fig. 1c).

Fig. 1 Visualization of three urban forestry scenarios: **a** A scenario which depicts the projected urban forestry. On the left shows the present commercial setting of Iligan City while on the right is a picture if urban forestry is employed; **b** A scenario which depicts urban forestry in residential area. On the left shows the present housing project while on the right is a picture if urban forestry is employed in the area; **c** A scenario which depicts the projected urban forestry on abandoned open space. On the left is the current situation while on the right is a picture if urban forestry is employed in the area

This study employed a purposive sampling method. The respondents were identified into four groups, namely (1) policy makers (which include local government heads, members of the city council, and division chiefs; (2) professionals (composed of those who are working in the academe and those in the business sector); (3) students (students from 15 years old and above who do not earn income and only receive monthly allowances); and (4) other constituents (include market and street vendors, public utility vehicle drivers, and unemployed citizen). The respondents' personal profile such as gender, age group, profession, and residency was examined if these are factors that influence their perception on the concept of urban forestry and its implementation in Iligan City. The monthly income was not included since 25% of the respondents are students who are yet dependent for support. Questionnaires were randomly distributed in the different parts of the city making sure that each group of the respondents would have a total of 50 completed questionnaires.

Open- and close-ended questions were prepared for five groups of respondents from each social type. Data gathering was conducted from November 2010 to February 2011. It is worth noting that the survey was conducted with the help of graduate students trained as research assistants. They were coached in the procedures and ethics of research survey.

2.3 Statistical Treatment

Chi-square test was used to determine if there are any significant differences in the answers among the four groups of respondents based on the three themes of the survey and to determine if demographic profiles of the respondents, such as their profession, gender, age group, and residency, are factors that influence their perception on the concept of urban forestry in Iligan City. All tests were run using Paleontological Statistics (PAST) software.

3 Results

The profile of the respondents ($N = 200$) is shown in Table 2. It was made sure that each of the categories (students, professionals, policy makers, and other constituents) has 50 respondents. The summary of the answers of the respondents on the four themes of the survey is shown in Table 3. The results show that the students, professionals, and the policy makers strongly agree on the awareness of the concept of urban forestry and general importance of trees, whereas the other constituents only agree. The results are the same with regard to the support for the implementation of urban forestry programs and the perception on materialization of urban forestry. Results of the chi-square test showed significant differences among the four groups of respondents on the three themes of the survey (Table 3).

The results also showed that, overall, there are significant differences between the other constituents and the rest of the groups of respondents on all three themes.

Descriptive statistics was applied to determine if the demographic characteristics of the respondents are factors influencing the way they perceive the concept of urban forestry. For the analysis of gender, results in Table 4 show that both male and female respondents have high awareness on the concept of urban forestry and general importance of trees. But with regards to their perception on the materialization of urban forestry and support for the implementation of the program in the city, females strongly agree, whereas males only agree. Chi-square test (Table 4) indicates that gender is not a factor that influences the respondents' awareness of urban forestry and general importance of trees. However, with regard to the support for the implementation of urban forestry and on the materialization of urban forestry, there are significant differences on the perception between males and females.

Variations in the perception among age groups were also observed. In Table 5, all age groups strongly agree on the awareness of urban forestry and general importance of trees. As to the support for the implementation, 15–20 years old and 51 and above age groups strongly agree, whereas 21–25, 26–30, and 31–50 years old only agree. For the perception on the materialization of urban forestry, all age groups, except 51 and above which is uncertain, strongly agree. The chi-square test (Table 5) showed that when it comes to the age groups, regardless of the social group of respondents, there are no significant differences on the respondents' awareness of the concept of urban forestry and general importance of trees. However, on the support on the implementation of the program and the perception on the materialization of urban forestry, there are significant differences among age groups.

Table 2 Demographic and socioeconomic characteristics of the respondents (N = 200)

	N		N
Gender		Occupation	
Male	86	Student	50
Female	114	Professional	50
		Policy maker	50
		Others	50
Age		Civil status	
15–20 years	31	Single	82
21–25 years	35	Married	92
26–30 years	30	Widow/widower	11
31–50 years	53	Separated	15
51 and above	51		
Income: (PhP/month)		Residence	
below 5000	78	Transient	41
5001–10,000	30	0–10 years	20
10,001–20,000	38	11–20 years	34
20,001–30,000	22	21–30 years	33
30,001–40,000	13	31–40 years	29
40,001–50,000	11	41–50 years	18
50,000 above	8	50 above years	25

Table 3 Summary of the answers of the respondents and chi-square test on the different themes of the survey. Values in parentheses are the general weighted averages (GWA) of the total scores of their answer to each question

Themes	Students	Professionals	Policy makers	Others	X^2	Sig.
Awareness on the concept of urban forestry and general importance of trees	Strongly agree (1.26)	Strongly agree (1.33)	Strongly agree (1.38)	Agree (2.06)	37.51	0.000**
Support for the implementation of urban forestry programs	Strongly agree (1.70)	Strongly agree (1.84)	Strongly agree (1.74)	Agree (2.46)	49.54	0.000**
Perceptions on the materialization of urban forestry in three settings	Strongly agree (1.20)	Strongly agree (1.21)	Strongly agree (1.46)	Agree (2.17)	46.14	0.000**
Policy makers' support on urban forestry	–	–	Strongly agree (1.47)	–		
Policy makers' prioritization of urban forestry	–	–	Strongly agree (1.71)	–		

**highly significant

Table 4 Summary of the answers of male and female respondents and the chi-square test for significant differences on the three themes of the survey. Values in parentheses are the general weighted averages (GWA) of the total scores of their answer to each question

Themes	Female	Male	X^2	Sig.
Awareness on the concept of urban forestry and general importance of trees	Strongly agree (1.41)	Strongly agree (1.64)	4.89	0.429^{ns}
Support for the implementation of urban forestry programs	Strongly agree (1.91)	Agree (2.26)	15.57	0.008**
Perceptions on the materialization of urban forestry	Strongly agree (1.38)	Agree (2.01)	13.25	0.021*

*significant; **highly significant; ^{ns}not significant

Table 5 Summary of the answers of the respondents based on age groups and the chi-square test for significant differences on the three themes of the survey. Values in parentheses are the general weighted averages (GWA) of the total scores of their answer to each question

Themes	A	B	C	D	E	X^2	Sig.
Awareness on the concept of urban forestry and general importance of trees	Strongly agree (1.25)	Strongly agree (1.64)	Strongly agree (1.52)	Strongly agree (1.69)	Strongly agree (1.50)	12.59	0.702 ^{ns}
Support for the implementation of urban forestry programs	Strongly agree (1.89)	Agree (2.13)	Agree (2.0)	Agree (2.27)	Strongly agree (1.87)	96.13	0.047*
Perceptions on the materialization of urban forestry	Strongly Agree (1.20)	Strongly Agree (1.78)	Strongly Agree (1.65)	Strongly agree (1.87)	Uncertain (3.75)	118.95	0.000**

A 15–20 years; *B* 21–25 years; *C* 26–30 years; *D* 31–50 years; *E* 51 and above
**highly significant; *significant; ^{ns}not significant

Table 6 Summary of the answers of resident and transient respondents and the chi-square test on the three themes of the survey. Values in parentheses are the general weighted averages (GWA) of the total scores of their answer to each question

Theme	Residents	Transients	X^2	Sig.
Awareness on the concept of urban forestry and general importance of trees	Strongly agree (1.58)	Strongly agree (1.38)	1.829	0.872 ^{ns}
Support for the implementation of urban forestry programs	Strongly agree (1.89)	Strongly agree (1.97)	3.477	0.626 ^{ns}
Perceptions on the materialization of urban forestry	Strongly agree (1.66)	Strongly agree (1.32)	5.460	0.362 ^{ns}

^{ns}not significant

A test was also conducted to determine if there are significant differences between residents of Iligan City and transient respondents on their perception on the concept of urban forestry. Table 6 shows that residency (or being transient) in the city are not factors that influence their perception on the concept of urban forestry in Iligan City.

4 Discussion

The perception on the concept of urban forestry depends on the structure and composition, and the socioeconomic and demographic backgrounds of the respondents (Acar et al. 2006; Zube et al. 1982). The students, professionals, and policy makers all showed strong perception on the three themes of this study. According to Chung and Poon (1999), the young and the highly educated people have higher environmental awareness. The positive relationship between attitude toward environment and education reflected in this study is in line with other studies (Yabiku et al. 2008; Zhou et al. 2009; Larson et al. 2011). Also, these three groups of respondents may have had more experience with nature during childhood which made them disposed to positive attitude toward urban forestry and the desire to have it implemented around them (Bell et al. 2003; Sebba 1991). When asked of their reason why they support urban forestry, the most common answer was because they learned from school and perfectly understand the importance and functions of trees in all environmental settings. On the other hand, the lower perception of other constituents on three themes of this study reflects important information. Generally, these people have not received higher education compared to the rest of the respondents that makes them less appreciative of the importance of trees in the urban setting. In addition, compared with the professionals and policy makers, they receive very little income that would only make their ends meet in a day. Based on the open- and close-ended questions conducted during the survey, some respondents stated that they would only practically think of how to earn a living rather than thinking about things that do not concern their daily survival. According to them, they do not have extra time to participate in other activities. Furthermore, other respondents stated that they fear the implementation of urban forestry because it might take away their means of livelihood such as the street vendors and public vehicle drivers.

The policy makers of the Iligan City showed strong support and prioritization of urban forestry. They initiated the creation of the "The Iligan City Environment Code of 2010" which covers development plans and protection measures of forest resources, has the governing principles for water resources, waste management, pollution management, ecotourism, environmental impact assessment, etc. According to them, urban forestry would add aesthetic value to the city and would encourage more tourists to come, both local and foreign which in turn would boost the local economy.

Gender was not a factor that influenced the respondents' awareness of urban forestry and general importance of trees in Iligan City. However, with regards to the support for the implementation and on the perception on materialization of urban forestry, females strongly agree, whereas males only agree. A study that was conducted in Turkey on women's participation in forestry showed that the most important factors affecting women's participation are perception related to forest dependence, quality of cooperatives, quality of forest organization, and forest quality (Atmis et al. 2007). Also, Chinese women usually take charge of the

household affairs and typically more dependent on the immediate environment (Jim and Shan 2013) making them more willing to help improve their surroundings may it be through urban forestry. Women in the Philippines are quite similar to Turkish and Chinese women. Despite the increase in women's education and completion rates in the Philippines, they continue to participate in areas where women are traditionally occupied and still follow the gender stereotyping in their chosen career (World Bank 2012). These facts were proven to be true among women in Iligan City. Female respondents who were interviewed stated that they want more trees near where they live because it would help cooldown temperature at home to save energy thereby saving money. It would also give better place for their children to play so they do not have to go far. In addition, they said they know it could help minimize pollution and the green view would help relieve stress. Males, on the other hand, showed lower support on implementation and materialization of urban forestry. In the Philippines, men are usually the provider of the family. According to the Philippine Labor and Employment Plan 2011–2016, men continued to dominate the workforce as they accounted for more than 60% of the total employed over the past ten years. Relative to the labor force, their participation rate, at an annual average of 80.4%, exceeded that of the women by 30.1% points (National Statistics Office Labor Force Survey). According to some of the respondents, support on the implementation and materialization of urban forestry can be a threat to their working hours thereby reducing their income. In addition, men have more indoor and outdoor recreations compared to women (Culp 1998; Johnson et al. 2001) that could be sacrificed when they participate in urban forestry. Twenty-seven percent of the male and 16% of the female policy makers and professionals interviewed have recreational activities after work or on weekends.

Age groups were proven to affect perception of urban forestry. The highest positive perception on the three themes of the study was found in ages 15–25. The 15–20 and 21–25 age groups are mostly composed of students studying in high school and college. In the Philippines, the largest group of unemployed are the young people between 15 and 24 years old corresponding to 50% of the national unemployment (Weber 2012). When they are not working, they would have more time to participate in other activities. In addition, they are still energetic, idealistic, and more imaginative of bright future making them more participative in urban forestry. They have not lost trust in the authorities and tend to believe everything is possible. When interviewed, some students even related that they yearly participate in tree planting in the vicinity of the city, such as the mangrove area. Some of them are members of campus organizations which are advocating clean and green environment. On the other hand, the weaker support on the implementation of ages 26–50 could be attributed to the fact that they are the workforce of the society (National Statistics Office). They tend to think that supporting this activity would mean extra load or possibly leaving their jobs to do dirty outdoor works. According to some respondents, they even have to do 2–3 jobs just to support the family's need. On the perception of materialization, the 51 and above age group is uncertain. This group of people is mostly about to retire or retired from their jobs and had much frustrations from the society. Form talking to them, it was found out that

many of them are more skeptical of the governments' promises and have lost trust in authorities based on past experiences. These results are similar to the findings of age effects on the perception of urban green spaces in China (Jim and Shan 2013).

Both permanent residents and transient respondents strongly agree on the three themes of the survey. This result implies that regardless of length of stay in Iligan City, people have the highest preference for high-quality naturalness and deep ecology of urban landscape for better well-being (Shin et al. 2001; Blaschke 2006). According to transients in Iligan City, it does not matter if they are staying in the city temporarily. They would support urban forestry because it could give overall national impact and that what could be applied in this place can be applied in other parts of the Philippines for the benefit of the majority.

5 Conclusions

Overall, the perceptions of the citizens of Iligan City toward urban forestry were affected by demographic factors such as profession, gender, and age. Being transient or permanent resident of the city did not cause variation in the perception. But looking into the result, the general responses of the respondents were all positive and none were negative. All of the respondents want Iligan City to have improved urban green spaces to be home for local biodiversity, source of livelihood for local people, add value to ecotourism, contribute more to health/well-being, efficient carbon sink, and biomass resource. It is hoped that local people would understand and support more of the urban forestry initiatives.

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