

Public and Institutional Perception on Environmental Issues of Urban Land-use Planning in Eastern Sri Lanka

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Abstract

Urban land-use planning aims to prepare sustainable development to create a better future. The limited number of research papers has been focused on public perceptions of factors of environmental impact for urban land-use planning. This study aims to analyze the public perceptions of environmental impact and expectation of sustainability that emerge due to improper land-use practices. The 220 respondents inclusive of urban dwellers (185 private and self-employees) and 35 government officials were selected for the sample using a random sampling method. The primary data of the study were collected by using a set of checklist questionnaires involving structural surveys. Both descriptive statistics and inferential analysis techniques were used for data analysis. The study indicates that 80.5% of urban dwellers and 19.5% of government officials of respondents were perceived the severity and its consequence on the factors of environmental impact and expectation of sustainability for sustainable land-use planning. Based on the statements of respondents, the government officials are agreed with the statement of sub-factors of urban expanse, urban greenery, wetland filling, water pollution and overall environmental impact in environment impact factor. But, private and self-employees disagree with the above statements of environmental impact factors. In the factor of expectation of sustainability, the government employees are agreed with the statement of the sub-factors of environmental condition, planning and implementation toward *Batticaloa* Municipal Council, organizational commitments, sustainable development and overall expectation of sustainability. But private and self-employees disagreed with the above statements of expectation of sustainability factor in *Batticaloa* Municipal Council.

Keywords: environmental impact, urban dweller, improper land-use, wetland filling, greenery

1. Introduction

Public opinion can widely be used in the sectors such as service-oriented, vulnerability and risk analysis and assessment of tourism (Zhongqiong et al., 2018). When increasing the research in public perception has a higher level of impact on public affairs. This concept has been generated to consider by researchers since the 1960s (Zhongqiong et al., 2018). However, many of the researchers have adapted the societal issue by public opinion and judgment towards public concerns in research on public affairs. It is an intellectual process for distinguishing sensitive information from the public perception, which can enable us to familiar with meaningful objects and events (Hagedorn et al., 2011). However, public satisfaction can be evaluated from the public attitude towards achieving a specific goal of the social dimension. Therefore, several studies have been applied the public perception into risk perception towards human behavior, environmental factors (Bandura, 1986), environmental pollution (Li et al., 2018), climate change (Becker and Sparks, 2018), water quality (Ochoo et al., 2017), the process of the relationship among the risk, culture, and social background (Gaillard, 2008). According to Lü et al., (2009) the hypothesis testing is done to know the status of the quality of public perception and the influencing factors. Such a study describes measuring the influencing of factors of public opinion for specific service quality (Tweed and Sutherland, 2007).

Land-use planning describes the different functions of the utilization of land for various purposes such as residential, commerce, industrial, service centres, recreational and the relationship of these functions but one does not negatively impact another. Rapid urbanization has changed land-use planning which may affect an urban environment condition. Land use is transforming due to the influence of human activities with the process of service provision, which is not only affect for specific services but the surrounding environment (De Groot et al., 2010). Therefore, sustainable land-use planning has predominantly the conceptual framework for environmental concerns (Drexhage and Murphy, 2010). Rees and Wackernagei, (1996) cannot be achieved on its own in urban areas without considering local environmental conditions. Urban environmental problems are the result of a complex series of interactions between human factors, including the ecosystems and health behaviour in which humans live (Ludermir and Harpham, 1998; Shaikh and Levina, 2019). However, the scope of sustainable urban development should be achieved through incorporate appropriate land-use planning while the increasing body of knowledge on the impact of urban expanses (Cooper and Boyko, 2010). As well, the societal urban practices are linked with sustainability dimensions that will result in undesirable urban trends (Basiago, 1998). Therefore, public perception is a well predominant indicator of an area for sustainable urban development. The urban has also been recognized to the impact of built cultural heritage on the social and environmental well-being of different population groups living as a multicultural dimension which is an important dimension of environmental, economic, social and cultural sustainability (Fan, 2015).

The planning process is a key factor to implement the project for sustainable development, it reduces the conflict among the societies (Fan, 2015). Address by Gavriliadis et al., (2016) the public opinion is one of the key indicators to assess the quality of planning in urban centres. Which is integrating to choose the public perception by multi-criteria evaluation to support for land-use planning (Derak, 2017). Thus, public perception is recognized of an individual's or group's which will represent thoughts about the future decision-making process. (Liepa-Zemeša and Hess, 2016). This method is a tool to evaluate the public attitude of transparency for land-use planning in the city. (De Groot et al., 2010). However, mapping of public participatory is depicted to general knowledge uniform for land-use planning (Brown et al., 2018). Therefore, environmental and socioeconomic issues are associated with planning and implementation in the urban area (Khew and Yokohari, 2014). Public perception can be addressed that strongly impact the external factors of urban planning in the community planning perceptions. Hence Participants will be willing to take part in achieving individual goals (Liepa-Zemeša and Hess, 2016).

The aim of this study is to the analysis of the perception of institutional and urban dwellers on environmental issues due to the improper urban land-use practices of *Batticaloa* Municipal Council (BMC). Which is focused on the long-term utilization of land resources, sustainable use of land, to minimize improper land-use practices and prevent environmental issues. The degree of anthropogenic change and intensity of environmental issues are challenged to establish and develop decision-making for sustainable land-use planning in the city. Governments, scholars and experts have explored the improvement of urban land-use planning and environment in well-being to live through urban renewal interventions. According to the literature, scholars have recognized public behavior and corresponding measurements of public perception. However, there is a relative lack of understanding about how community participation in planning quality and how it affects urban land-use planning of future behavioral intentions.

The purpose of this questionnaires survey is to examine how urban dwellers and government officials in environmental impact and expectation of sustainability in BMC experience the navigating effect of improved environmental settings on sustainable land-use planning. Therefore specific research answers the following questions:

1. Why measure sustainable environment in urban land-use planning?
2. How do expectations of sustainability steer the decision-making process in urban land-use planning?

2. Materials and Methods

2.1 Selection of Study Area

The BMC is situated in the central part of Eastern Province in Sri Lanka laying North of 7° 39' 53" to 7° 44' 36" and on the East 81° 39' 17" to 81° 41' 54". Which is bounded by Eravurpatttu

Divisional Secretariat Division (DSD) on the North, Kathankudy DSD on the South, Vavunatheevu DSD on the West, and Bay of Bangle on the East. BMC is divided into forty-eight (48) GNDs, the population is 85,636 and consists of some parts of the suburban. Since the study area had a limited variety of geomorphologic units, it was extended approximately to 4,570 ha. The location of the study is depicted in Figure 1.

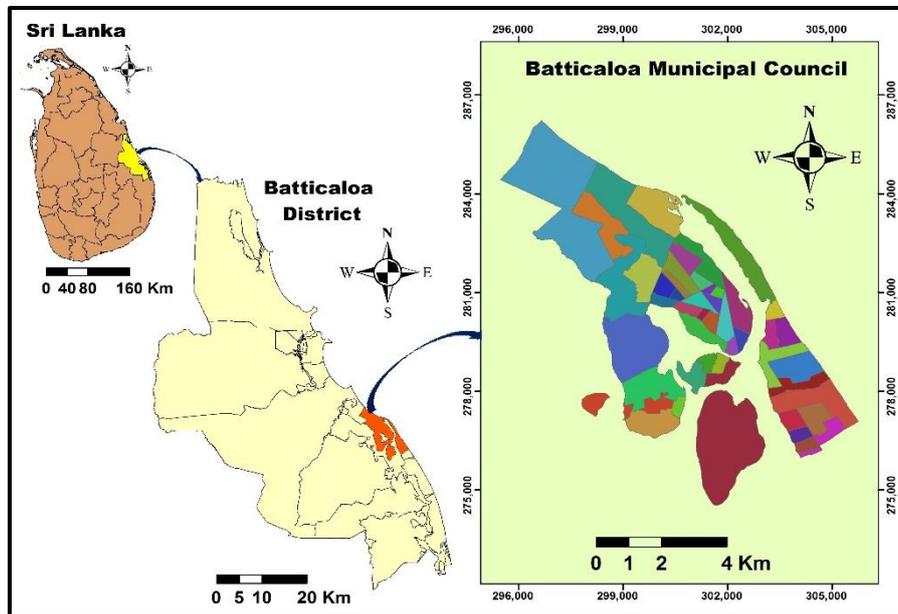


Figure 1: Location of Study Area

2.2 Data Collection

This study intends to acquire the opinions of the respondents, which uses one of the traditional methods of public perception (Derkzen and Boch, 2009). To achieve the desired objective, primary data were used and gathered through the questionnaire and field survey. The questionnaire survey has been done from urban dwellers widely scattered in the city and government officials from different institutions using a random sampling technique. According to the population ratio, samples were employed that 220 to undertake the research, 185 from urban dwellers and the rest of others from government institutions. A set of checklist questionnaires involving checklist items were prepared and administered by the researcher. This set of items dealt with issues related to the factors of environmental impact and expectation of sustainability. Here the questionnaires were used to interview government officials at different levels and individual dwellers to explore the actual situation of sustainable urban development in the study area. The questionnaires survey was done by face-to-face interviews. Few respondents were liked to fill the questionnaire themselves, which has got it next time.

Data collected from the questionnaire survey were analyzed through SPSS software. Differences between the groups are studied using the factors of environmental impact and expectation of sustainability of t-test that ANOVA followed by Duncan Multiple Range Test (DMRT).

3. Results

Based on the questionnaire survey completes and valid for analysis, the effectiveness of the questionnaire was 100%. The sample-based questionnaire data is shown by the descriptive analysis in Table 1, which represents the characteristics of respondents.

According to the descriptive analysis of the questionnaire survey, female respondents are 62.3% which is more than 50% of men, females are normally more encouraged than men when it comes to public perception in BMC. Age group in gender appears the peak histogram from 30-50 years old which approximately more than 60%. The ratio of occupation in self-employee (54.1%) is higher than government and private employees. The nature of jobs in temporary is 67.7% which is generally higher rather than the permanent jobs. 90% of respondents have more than 5 years' service experience.

Table 1: Characteristic of Respondents

		Frequency	Percent (%)	Valid %	Cumulative %
Gender	Male	83	37.7	37.7	37.7
	Female	137	62.3	62.3	100
Age group in Gender	Upto 30	29	13.2	13.2	13.2
	30-40	67	30.5	30.5	43.6
	40-50	73	33.2	33.2	76.8
	Above 50	51	23.2	23.2	100
Occupation	Government	43	19.5	19.5	19.5
	Private	58	26.4	26.4	45.9
	Self-employee	119	54.1	54.1	100
Nature of Jobs	Permanent	71	32.3	32.3	32.3
	Temporary	149	67.7	67.7	100
Work experience in year	Upto 5	23	10.5	10.5	10.5
	6-15	123	55.9	55.9	66.4
	16-25	67	30.5	30.5	96.8
	Above 25	7	3.2	3.2	100

Based on the inferential analysis, the perceptions of government, private and self-employed were estimated which was appraised by sub-factors of environmental impact factor of Urban Expanse (UE), Urban Greenery (UG), Waste Management (WM), Wetland Filling (WF) and Water Pollution (WP). While sub-factors of the expectation of sustainability were measured through Environmental Condition (EC), Planning and Implementation toward BMC (PI), Organizational Commitments (OC), Living Satisfaction (LS) and Sustainability Development (SD). Both sub-factors of environmental impact and expectation of sustainability, which is consisted of four subdivisions.

Based on the hypothesis, the relationship among environmental impact and expectation of sustainability, the public opinion was retrieved by the hypothesis of the relationship among the various

elements. Opinion regarding the statement ANOVA tests done for association among occupation types (i.e. government, private and self-employee) and sub-factors of environmental impact are indicated in Table 2. Hence there is a significant difference among occupations, since P-value is <0.01 , the null hypothesis is rejected at a 1% level with regard to factors of UE, UG, WF, WP and overall environmental impact of government officials and urban dwellers. Based on the DMRT, the occupation of the respondents of the government employee is significantly different with private and self-employment at a 5% level of significance but there is no significant difference between private and self-employment of UE, UG, WF, and WP. Likewise, in the overall environmental impact, the occupation of the respondents of a government employee is significantly differing with private and self-employment at a 5% level of significance but there is no significant difference of respondents between private and self-employee. According to the statements of respondents, the government employees are agreed with the sub-factors of UE, UG, WF, WP and overall environmental impact. But, private and self-employees are not agreed with the statement of sub-factors of UE, UG, WF, WP and overall environmental impact in environmental impact factor in BMC.

Table 2: Result of ANOVA tested for association among occupation type of Environmental Impact

Factors of Environmental Impact	Occupation			F value	P-value
	Government	Private	Self-employment		
Urban Expanse	16.81 (1.16)	13.14 (1.28)	12.73 (1.46)	147.83	$<0.001^{**}$
Urban Greenery	13.33 (1.38)	11.78 (1.30)	12.17 (1.39)	17.06	$<0.001^{**}$
Waste Management	14.07 (1.20)	13.40 (1.10)	13.46 (1.39)	4.22	0.016*
Wetland Filling	14.35 (1.34)	13.36 (1.20)	13.63 (1.13)	8.95	$<0.001^{**}$
Water Pollution	14.91 (1.13)	14.07 (1.40)	13.96 (1.26)	9.03	$<0.001^{**}$
Overall Environmental Impact	73.47 (2.61)	65.74 (2.74)	65.95 (3.50)	99.96	$<0.001^{**}$

Note: 1. The value within the bracket refers to SD

2. ** denotes significant at 1% level

3. Different alphabet among occupation denotes significance at 5% level using Duncan Multiple Range Test (DMRT)

Since P-value is <0.05 , the null hypothesis is rejected at a 1% level with regard to the sub-factor of WM. Based on DMRT, the occupation respondents of a government employee is significantly different from private and self-employee at a 5% level of significance but there is no significant difference between private and self-employee. Hence the statement of WM among government employees is significantly different from private and self-employment. According to the statements, the government employees are

agreed with regard to the sub-factor of WM but private and self-employees disagreed with the statement of WM in environmental impact factor.

According to the results of expectation of sustainability factor, opinion regarding the statement ANOVA tests for association among occupation of expectation of sustainability of government officials and urban dwellers (table 2).

Table 3: Result of ANOVA tested for association among occupation type of Expectation of Sustainability

Factors of Expectation of Sustainability	Occupation			F value	P-value
	Government	Private	Self-employment		
Environmental Condition	14.97 (0.97)	14.10 (1.11)	14.00 (1.12)	9.30	<0.001**
Planning and Implementation toward BMC	15.00 (1.05)	10.30 (1.36)	11.11 (1.40)	126.63	<0.001**
Organizational Commitments	16.00 (0.57)	12.38 (1.53)	11.10 (1.59)	134.03	<0.001**
Living Satisfaction	14.88 (1.10)	14.48 (1.18)	14.80 (1.16)	1.35	0.262
Sustainability Development	16.22 (0.94)	11.80 (1.11)	13.13 (1.40)	118.44	<0.001**
Overall Expectation of Sustainability	76.06 (2.76)	63.05 (3.15)	66.14 (3.94)	181.53	<0.001**

Note: 1. The value within the bracket refers to SD

2. ** denotes significant at 1% level
3. Different alphabet among occupation denotes significant at 5% level using Duncan Multiple Range Test (DMRT)

Since P-value is less than 0.01, the null hypothesis is rejected at a 1% level with regard to sub-factors of EC, PI, OC, SD and Overall expectation of sustainability of government officials and urban dwellers. Hence, there is a significant difference among occupations of a government employee with respect to private and self-employee in government officials and urban dwellers with regard to the sub-factors of EC, PI, OC, SD and overall expectation of sustainability. According to the statements of respondents, the government employees are agreed with the statement of sub-factors of EC, PI, OC, SD and overall expectation of sustainability. But, private and self-employees have disagreed with the statement of the above sub-factors in expectation of sustainability factor.

Based on the DMRT, the occupation of the government employees is no significantly different with government, private and self-employee at a 5% level of significance with regard to the statement of sub-factor of LS, since P-value is >0.05. Hence the null hypothesis is accepted at a 5% level with regard to the sub-factor of LS in expectation of sustainability factor in BMC.

Hence the environmental impact and expectation of sustainability have revealed that both factors are significantly different among the occupation of government employees and urban dwellers. Based on the statistical analysis, the respondents from urban dwellers (private and self-employees) have less satisfaction rather than government employees regarding the factors of environmental impact and expectation of sustainability in the urban land use planning. However, only the sub-factor of living satisfaction has been positively accepted by both parties in the expectation of sustainability of urban land use planning. Here participant perception is an essential tool to indicate the performance of the public participation system (Liepa-Zemeša and Hess, 2016). Before urban land-use planners should define the sustainable development patterns to adapt to changes in urbanization which implicate the source of public dissatisfaction, behavior, attitude towards neighborhoods, and well-being of society (Fan, 2015). The government employees and urban dwellers form a key impression of their opinion and execute extract information and responsive decision. In the end, the government employees and urban dwellers were shown their feedback of attitudes into sustainable land-use planning which process is a multivariate interaction effect.

4. Discussion

Public opinion has critically specified the public involvement system. Government and land-use planners should understand the sources of public dissatisfaction, attitude and well-being for sustainable community development in sustainable land-use planning. The general public determines as a significant sign of public opinion and becomes abstract the information and provide emotional decision which process is known as multivariate analysis.

Especially, resources are very limited in the city, as a result creating complex environmental issues. Environmental impact is essentially known at a municipal level for multiple reasons (Bulkeley and Betsill, 2005). According to Jordan and Lenschow, (2010) which is becoming a highly complex matter by multiple factors both in the short and long run. In general, municipalities' capacity has a relatively lower level of monetary and management. They have depended on acquiring knowledge of strategies and top-down approaches from technical experts (Wiedmann et al., 2011). The government and the urban land-use planners have carried out the burden of proving status that they propose to minimize environmental impact which the issue carries as weight which is bigger for them to handle alone. This study results indicate that there is a statement gap between government officials and urban dwellers in the factors of environmental impact and expectation of sustainability. Basiago, (1998) addresses that the scientific method to minimize environmental impact is not fully used to support sustainable urban land-use planning and the decision-making process.

On the level of expectation of sustainability are considered to be important factors in sustainable land-use planning. Here, the public services and affairs are related to service quality, which is knowledge-based evaluation information from the public opinion. This study results focused on the public

expectation of environmental impact and expectation of sustainability. The government institutions are responded to provide clear and convincing services for the future. However, it should be implemented through the information of the public opinion. Therefore, this study the easy to understand and learning for the public. The cognition and emotions can be measured by public opinion for planning and implementation purposes. When planning it should be described to the public due to it pays more attention to realize the promise and enhance service quality for public participants.

5. Conclusion

This study examined how public perceptions facilitate for participants of urban dwellers and government officials in sustainable land-use planning and environmental issues. It has been realized that urban dwellers and government employees in the study area are aware of the factors of environmental impact and expectation of sustainability emerge due to improper land-use practices for sustainable land-use planning, with levels of opinion varying between urban and among respondents from urban dwellers and government officials depending on the severity of the land-use issues. Increasing UE and WM as well as declining UG and WF, demonstrated by improper land-use practices which are caused to understand of the land-use change and its environmental issues. The quantitative land-use changes are significant in the urban area over time and space. These identified changes are important for policymakers, urban planners, environmentalists, administrators, and politicians in relevant local government for a better understanding of changes that emerged in the city with time and spatial perspective. However, a significant increase in the UE due to the rapid increase in population and a substantial decrease in the wetland is the major changes undergone in the study area. In recent times, development activities have been expanding towards surrounding the wetland areas with the construction of buildings such as commercial, and residential. A large amount of vegetation cover loss in the city is not associated with the greenery of the urban, but with the lightly forested areas spread out throughout the coastal belt. If the sustainable land-use plan is implemented by the municipality, which will be controlled improper land-use practices in the physical development of the urban area and preserve the heritage places and the natural environment condition of BMC.

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