

Originating Urban Climate Change Adaptation Planning Guidepost: Urban Landscape Sustainability Framework (ULSF), Quezon City, Philippines

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Abstract

The Quezon City (QC) in the Philippines is developing assertively and replacing vegetation by buildings, roads, gardens and parks, one of the effects of urbanization that exacerbates the formation of Urban Heat Islands (UHI) and changes the microclimate, raising summer temperatures by up to 7°C and increasing surface run-off into cities streams and rivers. To resolve these issues this study originated an Urban Climate Change (UCC) Adaptation Planning Guidepost so called Urban Landscape Sustainability Framework (ULSF) using QC as pilot. The QC was selected based on Logical Decisions for Window (LDW) software results. Pertinent primary and secondary data was collected through internal, external, and online desk research methods and symposia to determine the institutional and personnel adaptive capacity in developing ULSF. Further, Suitability, Feasibility and Acceptability test was also conducted to check the workability of ULSF. The results revealed overall workability of the ULSF at highest rank of five (5). The Framework is flexible and could be tailor-fitted to other similar cities/municipalities to direct authorities on how the future city/municipality development should be designed using environmental friendly materials and energy efficiency techniques, eventually promoting urban landscape sustainability and livable communities resilient to natural and climate related disaster impact.

Keywords: Urban Landscape; Climate Change; Urban Heat Islands; Sustainability; Disaster Impact

1. Introduction

The Urban Landscape Sustainability Framework (ULSF) is the 4th of eight guideposts developed by the author as part of his dissertation that was defended successfully last June 2015 (Raza, 2015). ULSF is about how to prepare an Urban Climate Change Action Plan UCCAP, a key towards urban landscape sustainability. It consists of seven activities developed with corresponding step by step procedures. However this study is limited to provide brief summary of procedure to develop the ULSF. It has to be noted that ULSF is a technically-oriented document that can be used by the technical person/expert assigned or involved in preparing local plans, in coordination with other Local Government Unit (LGU) staff and relevant authorities in the country (Raza, 2016). The ULSF was applied with limited geographic scope on Quezon City, Philippines. It was concluded that the Framework is flexible and adjustable and can be tailor-fitted by other LGUs to mainstream it into city/municipality

sustainable physical and development plans (Raza, 2016).

1.1. Background of the Study

Cities are obviously altered from the natural state, with forests, savannahs and grasslands being replaced by buildings, roads, gardens and parks. Therefore, there is a massive reduction in vegetation area. Such massive changes in the environment will obviously alter the ecology of cities. Four major effects have been identified and extensively studied. Firstly, urbanization affects climate. Cities tend to be hotter than the surrounding countryside and create what is known as urban heat island (UHI). Secondly, urbanization affects hydrology. Cities shed more water as runoff into their streams and rivers. Thirdly, cities are the net producer of carbon dioxide and have lower amounts of stored carbon. Fourthly, cities are widely regarded as having lower biodiversity (Whitford, 2001). If we are to make the cities of the future more sustainable, we must learn to minimize these ecological effects. Thus, to make existing and future cities more attractive places in which to live, it is necessary to mitigate these cities towards resilient urban landscape. The first step in doing this is to quantify these effects, second, to incorporate risks at the very early stages of planning, built institutional and

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personnel's (e.g. Quezon City Government (QCG), barangay and Not for Profit Organizations (NGOs) /civic planners/decision makers/officials) adaptive capacity. Therefore, in order to create sustainable urban landscape for future generations there is need to establish effective tools for climate change adaptation (FIG, 2006) and sustain ecologically stable environment.

To resolve these issues this study originated an Urban Climate Change Adaptation Planning (UCCAP) Guidepost so called Urban Landscape Sustainability Framework (ULSF) using QC as pilot. The QC was selected based on Logical Decisions for Window (LDW) software results. Pertinent secondary data was collected through internal, external, and online desk research methods. On the other hand applicable primary data regarding institutional and personnel adaptive capacity was collected through Symposia using authors' developed questionnaire. The results showed that the QCG, barangays and NGOs/civic planners/decision makers/officials level of adaptive capacity in terms of their knowledge acquisition towards food security is "Poor". In case of other six CC priority areas, i.e., water sufficiency / water sanitary and hygiene, environment and environmental stability, climate-friendly industries and services (infrastructure), sustainable energy, and knowledge and capacity development covered unsatisfactory knowledge. Further, Suitability, Feasibility and Acceptability (SFA) test was also conducted to check the workability of ULSF. The results revealed overall workability of the ULSF at highest rank of five (5). The Framework is flexible and could be tailor-fitted to other similar cities/municipalities to direct authorities on how the future city/municipality development should be designed using environmental friendly materials and energy efficiency techniques, eventually promoting urban landscape sustainability and livable communities resilient to natural and climate related disaster impact (Raza, 2015).

1.2. Review of Related Literature

Paper The Urban Landscape Sustainability Framework (ULSF) is developed, consulting the United States Environmental Protection Agency (EPA)'s Local Climate Action Framework: A Step-by-Step Implementation Guide (Mias-Mamonong and Yen, 2011), the training manual on preparing a LCCAP used by the Department Interior and Local Government (DILG) in 2013 to train local planners and decision makers (HLURB, 2006), and the United Nations Human Settlements Program (UN-HABITAT) studies in 2011 on Sorsogon City Climate Change Vulnerability Assessment (QCG, 2013) as main related available literature. It has to be noted that ULSF is a technically-oriented document that can be used by the technical person/expert assigned or involved in preparing local plans, in coordination with other Local Government Unit (LGU) staff and relevant authorities

in the country.

1.3. Objectives

This study aims to develop Urban Landscape Sustainability Framework (ULSF) refers here as an urban climate change adaptation planning guidepost that ensures promoting urban landscape sustainability and livable communities resilient to natural and climate related disaster impact. More specifically, this study seeks to achieve the following objectives:

- Assess Institutional Adaptive Capacity (IAC) of the QCG and QCG barangays officials using following parameters:
 - Basic CCA knowledge
 - Institutional Setup
 - Linkages
 - Training
 - Personnel Education
- Assess personnel (Planners / decision makers/officials) Adaptive Capacity (AC) of the Quezon City Government (QCG) barangays and Not for Profit Organizations (NGOs) /civic planners/decision makers/officials using following priority areas:
 - Food Security
 - Water Sufficiency / Water Sanitary and Hygiene
 - Environment and Environmental Stability
 - Human Security
 - Climate-Friendly Industries and Services (Infrastructure)
 - Sustainable Energy
 - Knowledge and Capacity Development
- Evaluate the ULSF using the standard SFA test.

2. Research Design

This research uses the descriptive researches design. The descriptive research is applied in this study to analyze the existing practices being tailored in the LGUs to promote sustainable urban landscape and livable communities resilient to natural and climate related disaster impact.

2.1. Research Locale

This study considered Quezon City, a highly urbanized city, as a pilot LGU, primarily due to its uniqueness and incomparability. It has the biggest land area among the cities in Metro Manila; it also holds the greatest potential for more diverse and better-planned urban development. The city also has the widest expanse of parks and open spaces that provides a natural setting in an urban environment

This was empirically done by collecting data form candidate cities using key personnel interviews. The specialized Logical Decision for Windows (LDW) software with build-in statistical tool to provide mean of the indices corresponding to each indicator was used to process the collected data in order to rank the

cities with the most potential for being a pilot LGU. The following framework is used to rank and select the top-ranked city as a pilot LGU (Figure 1). The resulting ranking of the cities is produced through LDW and is shown in Figure 2 (Raza, 2015).

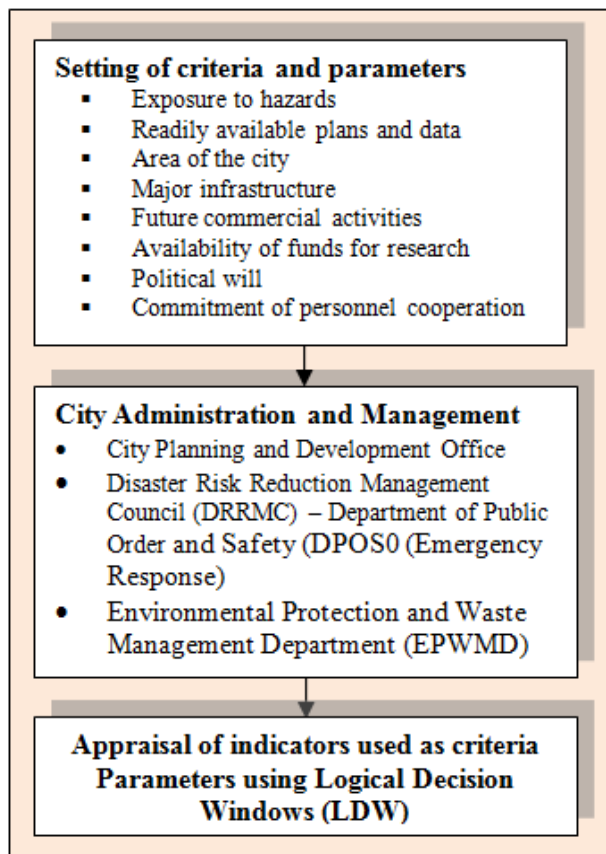


Fig.1. Framework to Rank and Select the Top-Ranked City. *Source: Raza, 2015*



Fig.2. Ranking Produced Through LDWs Software. *Source: Raza, 2015*

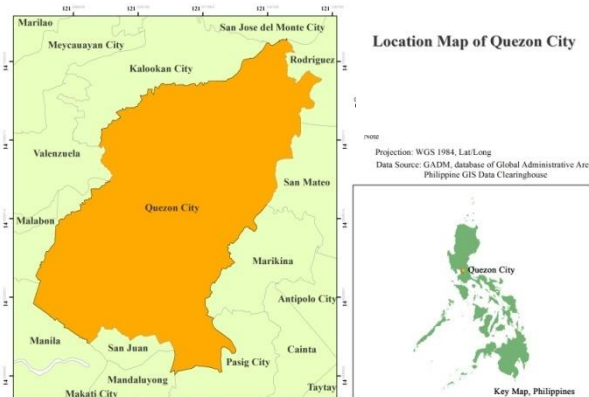
2.2. Sample Size

The geographic extent of the data in this research comprised of the political boundary of QC (see Location Map. 1.). The sample composed of 142 barangays, QC officials, the private sector,

non-government and civic organizations’ representatives that are members of the City Development Council (CDC) are part of the total population as shown in Table.1 (Raza, 2015).

2.3. Research Instrument

Three questionnaires were developed to elicit information from the respondents that are the key personnel or representatives of different departments of the Quezon City Government, barangays, civic and private organizations, NGOs and other direct and indirect stakeholders. One survey questionnaire was the principal instrument used to gather essential data to identify issues which have direct or indirect bearing on the development of ULSF. The second survey questionnaire was used to collect the data in determining the personnel and institutional adaptive capacities, another significant ingredient to develop ULSF. The last survey questionnaire was used to collect pertinent data to perform SFA test (Raza, 2015).



Map.1. Location Map Quezon City.

3. Findings

The collected data were systematically gathered, tabulated, analyzed using Microsoft Excel and Special Program for Social Sciences (SPSS), and interpreted to achieve the objectives of this research as follow:

3.1. Institutional Adaptive Capacity

The institutional adaptive capacity of the barangays and QCG offices were evaluated through following parameters including basic CCA information, institutional setup, office linkages, personnel training, and formal education. Figure 3 show that the barangays have “Excellent” basic CCA information. However, their level of institutional setup, office linkages, personnel training and formal education is “Unsatisfactory”. On the other hand, the QCG offices have “Very Good” basic CCA information, “Excellent” institutional setup, “Good” personnel training and “Very Good” formal education. See Table 2 for the verbal interpretation corresponding to the rating/rank and ranges of percentages (Raza, 2015).

Table 1. Respondents Who Returned the Survey Form.

Personnel and Institutional Adaptive Capacity	Agreed Total Population	Sample Size	Survey Responded
Quezon City Government (QCG) responsible Head of Departments and Offices	3	3	3
City Development Council (Barangay Offices)	142	104	88
Civic, NGO, Private Organizations	16	15	6
TOTAL	161	122	97

Source: Raza, 2015.

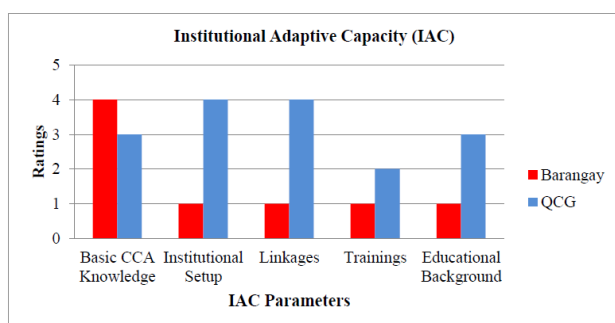


Fig.3. The QCG and its Barangays' Institutional Adaptive Capacity. Source: Raza, 2015

Table 1. Verbal Interpretations Corresponding to Rank/Rating and Rang of Percentages.

Rank	Verbal Interpretation	Maximum %	Minimum %
5	Excellent	100	90
4	Very Good	89	80
3	Good	79	70
2	Unsatisfactory	69	60
1	poor	59	0

Source: Raza, 2015

3.2. Personnel Adaptive Capacity

The QCG and its barangays, and NGOs/civic planners/decision makers/officials' adaptive capacities were evaluated by determining the level of knowledge in the seven priority areas of National Climate Change Action Plan (NCCAP). Figure 4 portrays that all respondents attained "Poor" level of knowledge in the first priority area i.e. food security. In the case of the six other NCCAP priority areas, the barangays and

NGOs/civic planners/decision makers/officials encompassed "Poor" level of knowledge whereas the QCG planners/decision makers/officials covered "Unsatisfactory" knowledge. In the case of the fourth priority area of NCCAP, the barangays and NGOs/civic planners/decision makers/officials hold "Poor" knowledge but the QCG planners/decision makers/officials encompassed "Good" knowledge. See Table 2 for the verbal interpretation corresponding to rank and ranges of percentages (Raza, 2015).

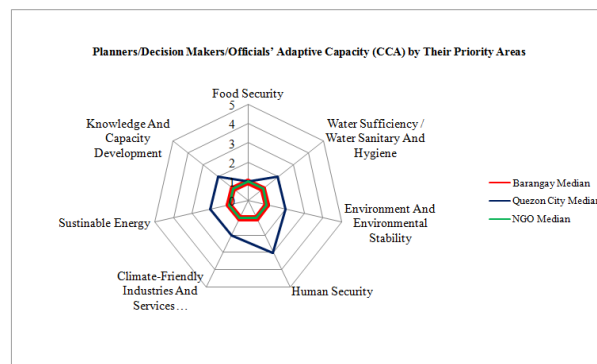


Fig.4. The Level of Adaptation Capacity of Planners and Decision makers Capacity. Source: Raza, 2015

4. Urban Climate Change Adaptation Planning Guidepost

The Urban Climate Change Adaptation planning Guidepost also refers as Urban Landscape Sustainability Framework (ULSF). It consists of 7 steps (Figure. 5). The Framework is a technically-oriented step by step procedure to produce Urban Climate Change Action Plan. A document that can be developed by the technical person/expert assigned or involved in preparing such plans, in coordination with other Local Government Unit (LGU) staff and

relevant authorities in the country. The authorities in-charge of the Philippines Commission on Climate Change (CCC) should also be involved. Due to the nature of the preparation of the document, it is prudent to determine the adaptive capacity of personnel and institutions that will be involved in implementing the procedure of framework to produce City Climate Change Action Plan (CCCAP). Therefore, the findings of the collected data were used to develop the activities and training elements required to perform each specific activity of the ULSF. The application of the Framework is available in the recently presented paper (Raza, 2016) with case examples on extreme weather events and surface temperature impact on Greater Lagro a QC Barangay. It also discussed the scope of GHG, benchmarking and timeframe and implementation of green building code (Raza, 2015).

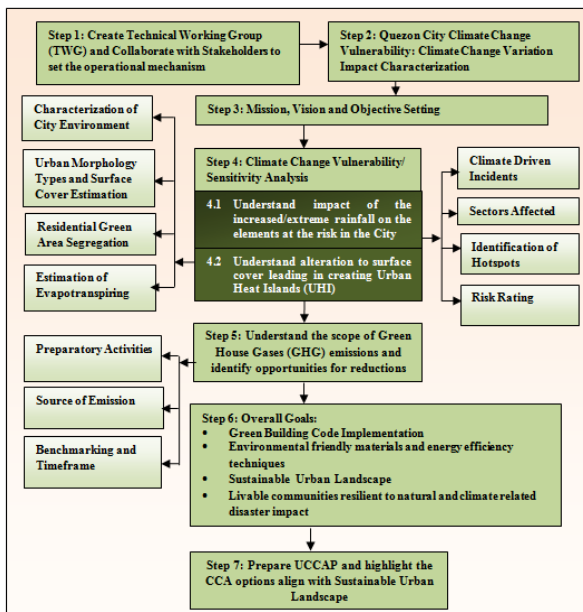


Fig.5. Urban Landscape Sustainability Framework. Source: Modified after Raza, 2015.

5. Assessing the Workability of Urban Landscape Sustainability Framework

The standard of suitability, feasibility and acceptability test was conducted during the pre-final symposium held last December 19, 2014, to assess the workability of the magnified Local Climate Change Action Planning Guidepost magnified in term of ULSF as part of the Risk Sensitive Comprehensive Land Use Development Planning (RSCLUDP) Model. The respondents of the test were assigned by the QCG Administrator and consisted of representatives from key departments which are responsible for developing the QCG’s plans. The data analysis revealed that the City Planning and Development Office (CPDO), Environment Protection and Waste Management Department (EPWMD) and Department of Public Order and Safety – Disaster Risk Reduction Management (DPOS-DRRM) rated the Suitability of

the ULSF to the QCG at the highest rank of 5 and is verbally interpreted as “Very Suitable”. In the case of Feasibility and Acceptability, the three key departments’ representatives rated the ULSF as “Very Feasible” and “Very Acceptable” respectively. See Figure 6 for the graphic representation of the results. The overall workability of the USF was determined by analyzing data collected through the test (1). The results revealed that each key department ranked the overall workability of the Framework at the highest rank of five. See Figure 7 for the graphic representation.

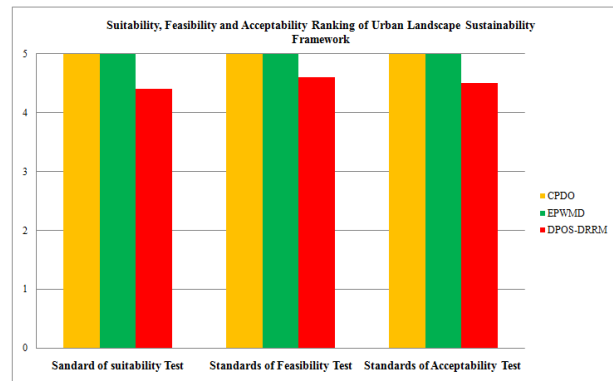


Fig.6. Suitability, Feasibility and Acceptability Ranking of ULSF. Source: Raza, 2015

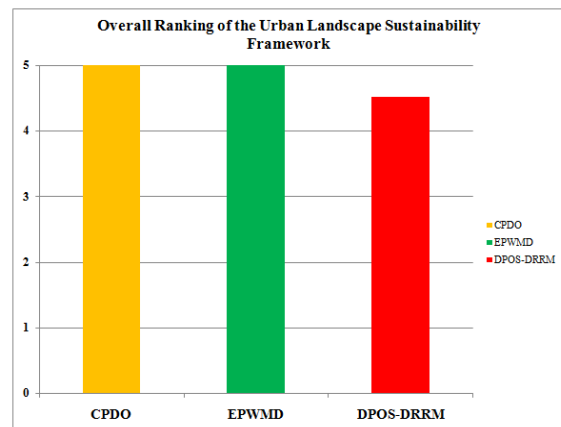


Fig.7. Overall Ranking of ULSF. Source: Raza, 2015

6. Conclusion

The ULSF was applied with limited geographic scope in Quezon City, Philippines to check its workability. It was concluded that the Framework is flexible and adjustable and can be tailor-fitted by other LGUs to mainstream it into city/municipality sustainable physical and development plans. It will provide an opportunity to increase the resilience of the city towards the impact of natural and extreme weather related hazards and to create urban sustainably built environment once fully implemented in at city /municipality level. It also concluded that the key towards urban landscape sustainability and to promote livable communities is through understanding impact of the extreme weather (flooding/drought) on

the elements at risk in the city, alteration in the surface cover and its impact in creating Urban Heat Islands (UHI), and scope of Greenhouse Gases (GHGs) emissions and its impact on temperature rise, biodiversity and air quality. The knowledge of elements at risk in the city due to these impacts is vital for the preparation of the UCCAP. It will also allow Local Government Units (LGUs) to monitor their haphazard rapid development growth towards sustainable development by mainstreaming city risks into development and redevelopment programs, projects and activities (PPAs) to achieve sustainable goals mentioned in the framework as step 6 “overall goals”. However, the personnel and institutional adaptive capacity is declared as inadequate to implement the Framework. Further, the Climate Change lack institutionalization. Therefore, the procedure developed to execute each activity of the Framework has intensive training component and a step by step procedure on how to create a competent Climate Change and Mitigation unit. The overall workability of the USF in terms of Suitability, Feasibility and Acceptability (SFA) was tested and each key department ranked the overall workability of USF at the highest rank of five (Raza, 2015 and 2016).

7. Recommendations

- The Quezon City Government should come up with a resolution to create an Institutional setup in term of Climate Change Adaptation and Mitigation Unit under the City Planning and Development Office (CPDO) that will oversee or give direction to all needed for developing a Urban Climate Change Action Plan.
- Intensive training programs for the City Development Council (CDC) members (barangays representatives) should be conducted to expand their adaptive capacity.
- Furthermore, special training programs for planners and decision makers should be developed to expand their adaptive capacity.
- Due to the geographical limitation of this study, the Quezon City should develop a full blown Urban Climate Change Action Plan with Programs Projects and Activities (PPAs) enhanced with environmental principles and green building code application.
- Learning from Quezon City’s experiences in evaluating the personnel and institutional adaptive capacities, other similar LGUs are highly recommended to replicate the ULSF with minor modification in context to their environmental profile to protect their communities from climate change impacts in promoting sustainable built environment.

8. References

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