

Supplementary materials

Socio-cultural valuation of urban parks: The case of Jose Rizal Plaza in Calamba City, The Philippines

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1. Online survey questionnaire

Valuation Questionnaire

Valuation Survey Consent Form

Thank you very much for agreeing to participate in this online survey.

My name is Dalton Erick Baltazar, a second-year PhD student at Nottingham Trent University in the United Kingdom. This survey is part of my PhD research entitled “Socio-cultural Valuation of Urban Parks: Lessons from the Philippines”.

Project Information

The general aim of the project is to assess how people value the benefits and disbenefits they associate with urban parks. This will be done through the conduct of key informant interviews, a survey, and focus group discussions. The following questionnaire has been designed to collect socio-economic information, environmental knowledge, perception, and behaviour, and the importance you assign to the benefits and disbenefits of the Jose Rizal Plaza.

Eligibility to Participate

Please make sure that you meet the eligibility criteria below before proceeding to answer the survey.

- 18 years old or older
- Currently residing in Calamba City
- Have not responded to this survey yet

Survey Data Management

The survey should take no longer than 40 minutes to answer. Your answers are automatically encoded in a secure platform by Qualtrics. The encoded data will only be accessible to Mr Baltazar, his supervisors, and trained assistants. All the survey data will be anonymised before storage and analysis, and care will be taken to remove other information in the survey that could identify you. None of the information that you will provide will be used for any commercial purposes and/or shared with any third party. The survey data might be used for academic papers, research presentations, news articles, and in other media that we may produce from the project. The encoded data might be kept indefinitely for future case study comparisons.

Right to Refuse or Withdraw

You have the right to refuse to answer any of the questions in the survey or to withdraw all the information that you already have given. You can also stop the survey any time by closing your web browser.

If you wish to withdraw, you can do so by emailing Mr Baltazar or his supervisors with your name and details. If you withdraw from the study within 15 days, your contributions to the project will be destroyed, and your data will be removed. After this period, the data will have been anonymised and prepared for analysis. Therefore, they cannot be individually identified and cannot be withdrawn.

By proceeding with the survey, I agree that:

1. I understand the purpose of the study and the survey.
2. I meet the eligibility criteria to participate in the survey.
3. I am voluntarily taking part in this project.
4. The information I provide can be used as described above.
5. I don't expect to receive any payment for my participation.
6. I understand that I can stop and withdraw from this study at any time.

Contact Information

This study has been reviewed using approved protocols within the School of Animal, Rural and Environmental Sciences and has been approved under application number ARE917. If you have any further questions or concerns about this study, please contact:

Researcher

Dalton Erick Baltazar – dalton.baltazar@ntu.ac.uk | +639276345904

Supervisors

Dr Jillian Labadz (Director of studies) – jillian.labadz@ntu.ac.uk

Dr Roy Smith – roy.smith@ntu.ac.uk

Dr Andrew Telford – andrew.telford@ntu.ac.uk

Dr Marcello Di Bonito – marcello.dibonito@ntu.ac.uk

Any ethical concerns can be raised by contacting AREEthicalReview@ntu.ac.uk.



Please click the image to proceed to the survey.

Valuation Questionnaire

A. Park Use

1. Do you know the previous land use in the area where the Jose Rizal Plaza is now built? Encircle the letter of your answer.

- a. Yes → What was it? _____ b. No

2. Have you ever visited Jose Rizal Plaza?

- a. Yes → answer questions i and ii below b. No

i. How frequent? _____ (times) every [encircle one: week, month, year]

ii. For what purpose(s)? Encircle the letter of your answer. You can give multiple answers.

- a. Health/exercise
- b. Walking the dog
- c. Relax/unwind
- d. Fresh air/pleasant weather
- e. Enjoy scenery
- f. Photography
- g. Watch or participate in events
- h. Others (please specify): _____

3. Do you visit any other parks? Encircle the letter of your answer.

- a. Oo → answer question i below b. No

i. Can you give the names of the other parks that you visit and the frequency of your visit?

Park Name	How many times did you visit the park last year?
-----------	--

- | | |
|----|--|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |

4. Which of the following have you visited in the last 6 months, before the Corona virus disease (COVID-19) outbreak? Encircle the letter of your answer. You can give multiple answers.

- a. Park in a town or city
- b. Woodland or forest
- c. River, lake, or canal
- d. National park
- e. Playing field or other recreational area
- f. A rural village
- g. A beach/coastline area
- h. Children's playground

B. Environmental Knowledge, Perception, and Behaviour

Knowledge

1. Choose from the group of words in the box below what is being defined in each of the following statements. Write the number that corresponds to the term on the line provided before each statement.

(1) Biodiversity, (2) Pollution, (3) Urban sprawl, (4) Sustainability, (5) Watershed management, (6) Development, (7) Waste generation, (8) Population, (9) Resource distribution, (10) Zoning, (11) Climate change, (12) Green spaces

- _____ a. The rapid, unrestricted, and unplanned expansion of cities.
_____ b. The presence of undesirable substances in water bodies and air.
_____ c. The variety of plants and animals in a certain place. A high level is considered desirable.
_____ d. Managing our resources well to make sure that they are still available for future generations.
_____ e. The process of implementing water and land use practices to maintain the natural resources of a certain area.
_____ f. Land area that is covered by grass, trees, or shrubs, usually for recreation, aesthetic, or environmental purposes.
_____ g. The long-term alteration of temperature and weather patterns because of the increased amount of greenhouse gases in the atmosphere.

2. How much do you know about these major environmental laws in the Philippines? Check one box in each line: **0 - Practically nothing; 1 - Only a little; 2 - A fair amount; 3 - A lot**

No.	Law	0	1	2	3
1	Clean Water Act (Republic Act No. 9275)				
2	Clean Air Act (Republic Act No. 8749)				
3	Ecological Solid Waste Management Act (Republic Act No. 9003)				

Perception

1. Please indicate how you feel local environmental issues have become since you have lived here. Check one box in each line: **1 - much worse; 2 - worse; 3 - stayed the same; 4 - better; 5 - much better**. Check **0** if you think you do not have enough basis to answer any of the five options.

No.	Environmental issues	1	2	3	4	5	0
1	The water quality in your local streams, rivers, and lakes.						
2	The general air quality.						
3	The level of pollution or waste produced by nearby businesses, farms, and industries.						
4	Water shortage.						
5	Weather-related disasters.						
6	Conversion of farms and other green areas to residential and commercial areas.						
7	The population of native animals, such as fish, birds, and mammals.						
8	The quality of public, green, and open spaces (e.g., parks, plazas).						
9	The overall environmental state of the city.						
1 - much worse; 2 - worse; 3 - stayed the same; 4 - better; 5 - much better							

Behaviour

1. How frequently do you do the things below? Check one box in each line: **1 - never; 2 - rarely; 3 - sometimes; 4 - often; 5 – always.** Check **0** if you think you do not have enough basis to answer any of the five options.

No.	Statements	1	2	3	4	5	0
1	When I go out, I prefer walking and cycling, instead of using a car.						
2	I try to reduce my waste by repairing, reusing, and recycling.						
3	I usually buy eco-friendly products and brands.						
4	I encourage other people to protect the environment.						
5	I sign conservation petitions or participate in online/other conservation campaigns.						
6	I donate money or time to support environmental or conservation organisations.						
7	I join environmental or conservation organisations.						
8	I do voluntary work to help care for the environment.						
9	I take the initiative to know more information about environmental issues.						

C. Social Value Orientation

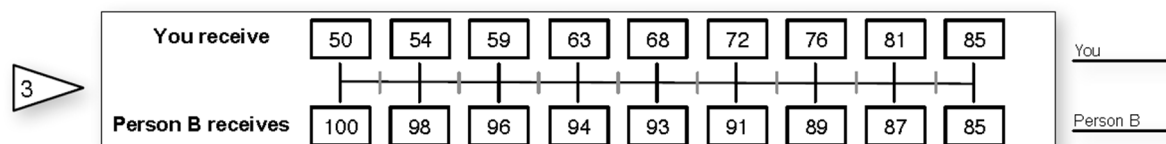
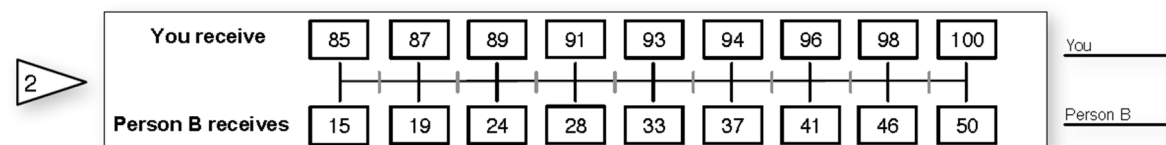
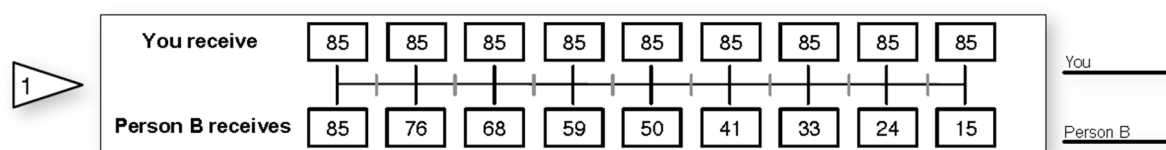
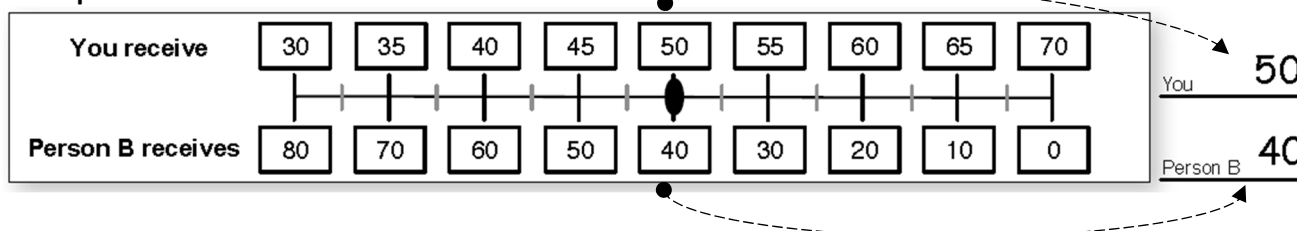
In this part of the survey, **imagine that you have been partnered with another person named “B”**. Imagine that you and person B are unrelated and do not know each other. Person B will also not be informed of your decisions.

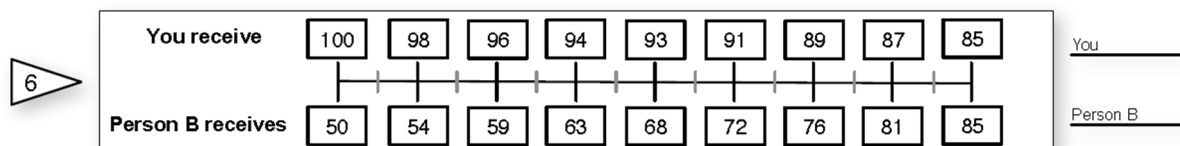
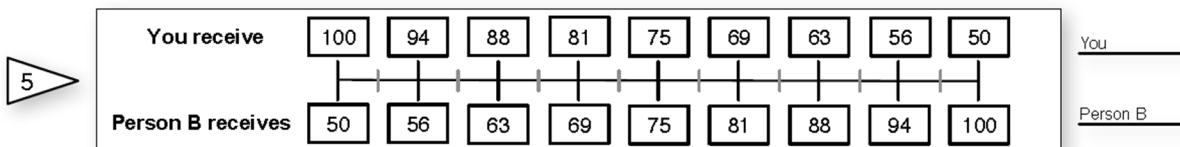
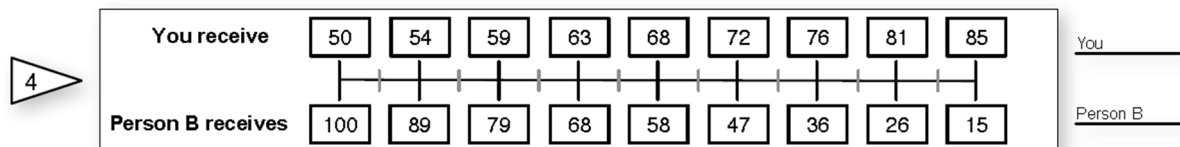
If you were given the power to divide a treasure (in the form of cash in Philippine Peso), how would you do it? **How much would you give yourself and how much would you give B?**

Each number below represents a set of allocation variations. **Choose one allocation** that you prefer in each number **by marking the respective position along the midline**, and then **write the values on the space provided**. Remember that this is about personal preferences, and therefore, there are no right or wrong answers.

In the **example** below, the respondent chose the **50 – 40 allocation**. This means that he/she prefers to receive PhP 50.00, and he/she prefers person B to receive PhP 40.00.

Example:





D. Valuation of Ecosystem Services and Willingness-to-contribute

Ecosystem services (ES) are the tangible or intangible and the direct or indirect benefits that we get from nature. ES are generally categorised into provisioning, regulating, supporting, and cultural services.

- **Provisioning ES** are the products that we get directly from nature, such as food, water, and other raw materials.
- **Regulating ES** are benefits that we obtain indirectly from natural ecosystem processes such as climate regulation, natural hazard regulation, water purification, and pollination.
- **Supporting (or Habitat) ES** refer to the ability of ecosystems to provide habitat to a lot of species and to maintain diversity.
- **Cultural ES** are the non-material benefits like spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences

Ecosystem Disservices (EDS) on the other hand, are the tangible or intangible and the direct or indirect disbenefits that we get from nature. Examples of these are pollens from plants that can cause allergies and the wild animals that can cause fear and discomfort to people.

1. The following are the **ecosystem services** that the **Jose Rizal Plaza** has based on our interviews. Kindly **rate the importance** of each based on your opinion **using the ruler** on the ride side of the statements. An example is given below.

0 – not important at all; 10 – Absolutely essential












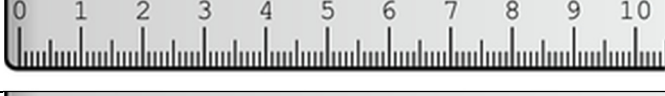





Example:











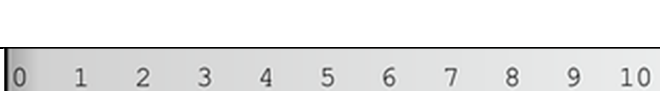


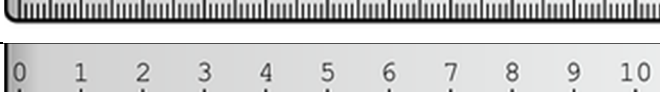



The ability of the park to provide food



Begin here:

1	The ability of the park to help in air purification (or controlling air pollution) through the trees and other vegetation present in it.	
2	The ability of the park to help reduce heat island effect (the increased temperature in urban areas because of hardscapes – surfaces made out of concrete, bricks, and stones).	

3	The ability of the park to help in preventing flood (e.g., plant roots that absorb water, storage areas like ponds).	
4	The ability of the park to serve as a water recharge area (place where water is able to seep into the ground and refill an aquifer).	
5	The ability of the park to help in purifying water (that enters the soil) because of the vegetation present in it.	
6	The ability of the park to prevent soil erosion (wearing away of a field's topsoil by water and wind).	
7	The ability of the park to enable pollination.	
8	The ability of the park to enable seed dispersal.	
9	The ability of the park to enable (eco) tourism.	
10	The ability of the park to provide a place for enjoyment and spending free time.	
11	The ability of the park to offer opportunities for practicing different sports and keeping fit.	
12	The ability of the park to provide a place to disconnect, relax, and diminish stress (mental recreation).	
13	The ability of the park to provide unique and attractive landscapes (aesthetic information).	
14	The ability of the park to provide inspiration for culture, art, and design.	
15	The park provides a place for direct connection with nature (spiritual experience).	
16	The ability of the park to provide a place to pray and practice religious beliefs.	
17	The ability of the park to provide a place for research on and education about nature (information for cognitive development).	
18	The ability of the park to help in the maintenance and exposure of traditional countryside activities and skills (traditional knowledge).	
19	The ability of the park to provide a space where you can maintain or create relations among people and family (social relationships, cohesive communities, diversity appreciation).	

20	The ability of the park to enable the expression of local identity and cultural heritage.	
21	The ability of the park to stimulate the interest of the residents to the city's history and cultural heritage (including Jose Rizal).	
22	The ability of the park to provide a way to commemorate our national hero, Jose Rizal.	
23	The ability of the park to provide revenue for the city (renting the activity area and other facilities).	
24	The ability of the park to provide revenue for locals.	
25	The ability of the park to provide jobs to locals.	
26	The ability of the park to increase property values.	
27	The ability of the park to become a place where different kinds of events in the city (e.g., celebrations, concerts, competitions) can be held.	
28	The ability of the park to serve as an extra parking space for city office employees and residents.	
29	The ability of the park to lower crime rates. It encourages more people to spend time outside their homes and in those spaces, leading to greater degree of informal surveillance of the area and deterring crime.	
30	The ability of the park to provide a notion of government presence/good governance.	
31	The ability of the park to lower road range incidents (by slowing vehicles).	
32	The mere existence of the park, with or without its benefits.	
33	The idea that the park is there for me to use in the future for whatever benefit it can provide me.	
34	The benefits that the park will provide to the future generations.	
35	The ability of the park to enhance the non-economic quality of life of the city residents.	
36	The contribution of the park to increasing the green areas in the city.	

2. The following are the **ecosystem disservices** that the **Jose Rizal Plaza** has based on our interviews. Kindly **rate how concerning** you think each of them based on your opinion **using the ruler** on the ride side of the statements. An example is given below.

0 – not concerning at all; 10 – Absolutely concerning

Example:

The wild animals in the park that cause fear.



Begin here:

37	The unpleasant, ugly, and unsafe appearance of the green areas (with grass and dense vegetation) in the park that are not intensively managed.	
38	The obstruction of fast and comfortable transportation because of the park (motorists slow down to take a peek of the park).	
39	The too much noise from the park when there are events.	
40	The risk of the park providing space for anti-social behaviour, crime, and other illegal things.	
41	The park causing conflict among users - who should be prioritised to use the open space?	
42	The park wasting the land that could have been used for other purposes.	
43	The park exposing visitors to air pollution since it is beside the road.	
44	The frustration that the park brings to residents because of its incomplete features.	

3. If you were asked to contribute something to keep the park, would you be willing to make this contribution? Encircle the letter of your answer.

a. Yes → Answer question i below **b. No → Answer question ii below**

i. If you answered **yes, which of the following would you be willing to contribute? Encircle the letter of your answer(s). You can have multiple answers.**

a. Time → Answer the questions below

What is the minimum number of hours do you think you could contribute per month? _____

What is the maximum number of hours do you think you could contribute per month? _____

b. Money → Answer the questions below

What is the minimum amount do you think you could contribute per month? _____

What is the maximum amount do you think you could contribute per month? _____

c. Others (please specify): _____ → Answer the questions below

What is the minimum do you think you could contribute per month? _____
What is the maximum do you think you could contribute per month? _____

ii. If you answered **no**, please indicate the reason. Encircle the letter of your answer.

- a. I don't have extra time and money but otherwise would contribute.
- b. It is the responsibility of the city to keep and maintain the park.
- c. Parks are not important.
- d. I don't use the park. Those that use it should contribute.
- e. Other reasons (please specify): _____

4. In your opinion, how will the Coronavirus Disease 2019 (COVID-19) affect how people use the Jose Rizal Plaza and other parks?

E. Socio-economic Characteristics

1. Which of the following describes you? You can choose multiple answers.

- a. City office employee
- b. Barangay office employee
- c. Calamba City College student
- d. Student from another college or university. Specify the college or university: _____
- e. Owner/employee of a business (e.g., restaurant, canteen, store, salon) in Barangay Halang or Real
- f. Owner/employee of a business (e.g., restaurant, canteen, store, salon) in other barangays
- g. Resident of Barangay San Juan or Barangay 4
- h. Resident of Barangay Bucal or Barangay La Mesa
- i. Resident of Barangay Real or Barangay Halang
- j. Resident of ng Barangay Mayapa or Barangay Masili
- k. Resident of Barangay Canlubang or Barangay Camaligan
- l. Resident of other barangays

2. How did you find out about this survey? Encircle the letter of your answer.

- a. From the posters at the City Office
- b. From the posters at the Barangay Office
- c. From social media (Facebook, Twitter)
- d. From someone working at the City Office
- e. From someone working at the Barangay Office
- f. From the barangay health workers
- g. From Dalton Baltazar
- h. From a friend or a relative
- i. Others (please specify): _____

3. Did Dalton Baltazar interview you as a key informant in the initial stages of his research project?

- a. Yes
- b. No

4. Did you participate in any of the focus group discussions conducted by Dalton Baltazar related to his research project? Encircle the letter of your answer.

- a. Yes
- b. No -> answer 4b below

4b. Would you like to participate in an online focus group about the benefits and disbenefits of The Jose Rizal Plaza?

- a. Yes-> answer i below
- b. No

i. Kindly provide your mobile number or email address so that we can contact you. _____

5. Barangay (village)_____

6. Age: _____

7. Gender. Encircle the letter of your answer.

- a.** Male
- b.** Female
- c.** I prefer to use my own term: _____
- d.** Prefer not to say

8. Marital status. Encircle the letter of your answer.

- a.** Single
- b.** Married
- c.** Widowed
- d.** Divorced
- e.** Separated
- f.** Prefer not to say

9. House ownership. Encircle the letter of your answer.

- a.** Owned
- b.** Rented
- c.** Mortgaged
- d.** Shared with relatives
- e.** Others (please specify): _____

10. Highest educational attainment. Encircle the letter of your answer.

- a.** no formal form of education
- b.** incomplete elementary education
- c.** complete elementary education
- d.** incomplete high school education
- e.** complete high school education
- f.** incomplete college education
- g.** complete college education
- h.** graduate school

11. Which of the following statements describe you? Encircle the letter of your answer.

- a. I am a full-time student.
- b. I am currently not in paid employment, but looking for a job.
- c. I am currently not in paid employment, but not looking for a job.
- d. I am part-time student, and I also work.
- e. I have a part-time job.
- f. I have a full-time job.
- g. I have my own business.
- h. I am retired.
- i. I am a homemaker.
- j. Others (please specify): _____

11b. If you answered **d, e, f, or g**, kindly choose one category related to your job or business. Encircle the letter of your answer.

- a. Agriculture, Forestry, Fishing and Hunting
- b. Mining and quarrying
- c. Manufacturing
- d. Electricity, gas, steam and air conditioning supply
- e. Water supply; sewerage, waste management and remediation activities
- f. Wholesale and retail trade; repair of motor vehicles and motorcycles
- g. Transportation
- h. Accommodation and food service activities
- i. Information and communication
- h. Financial and insurance activities
- j. Real estate activities
- k. Professional, scientific and technical activities
- l. Administrative and support service activities
- m. Government and public administration
- n. Education
- o. Human health and social work activities
- p. Arts, entertainment and recreation
- q. Other (please specify): _____

12. Daily minimum wage rate (PhP 303 in Calamba City). Encircle the letter of your answer.

- a. Less than minimum wage rate
- b. Minimum wage rate
- c. Twice minimum wage rate
- d. Three times the minimum wage rate
- e. Four times the minimum wage rate
- f. Five times minimum wage rate
- g. > five times the minimum wage rate

13. Are you a migrant here? Encircle the letter of your answer.

- a. Yes -> answer the question below
- b. No

Name of your home town (city o municipality): _____

How many years have you lived here in Calamba City? _____

14. Do you have internet access at home or your office?

- a. Yes
- b. No

2. Analysis of the conditions leading to the high valuation of ES and EDS

Fuzzy-set Qualitative Comparative Analysis (fsQCA) was used to deduce the configuration of conditions that lead to a high valuation of ES and EDS and their types. Qualitative Comparative Analysis (QCA) is a comparative method that examines the set-theoretic relationships between causally relevant conditions and a specified outcome. These set-theoretic relationships are then interpreted in terms of necessity and sufficiency. A condition can be interpreted as sufficient if always, when the condition is present, the outcome is also present. By contrast, a condition is necessary if always when the outcome is present, the condition is also present [1]. The set relations (in the form of configurations) produced by any type of QCA is assessed using two measures – consistency and coverage. Consistency is the agreement among cases sharing a specific causal configuration (a combination of conditions) [2].

2.1 Outcomes and conditions

The outcomes of interest in the fsQCA are the high valuation to park ES and EDS. The values that each case (respondent) assigned to individual ES and EDS were averaged to represent their overall valuation to ES and EDS, respectively. The conditions that were used for these outcomes were separated into three groups to keep a modest number of conditions per analysis [3,4]. These three groups of conditions are a) socio-economic characteristics, b) park use, and c) environmental knowledge, perception, and behaviour. Only questionnaire responses without missing information in any of the outcomes and conditions were included in the fsQCA [5,6]. The total number of cases that were analysed was 441. Descriptive statistics of the outcomes and conditions and the thresholds used for calibration are in Table 2.1.

Previous studies suggest that the distance from green spaces [7,8], house ownership [9], level of education [9,10] and length of stay in an area [11,12] all contribute to how people use and perceive green infrastructure. Hence, these factors were included in the set of conditions for socio-economic characteristics. Recent studies also attempted to link exposure to green spaces and prosocial behaviour, especially among children and adolescents [13,14]. Although the results of these studies are mixed [14], it is interesting to get insights on how prosocial SVO, in turn, affect the value assigned to ES and EDS of green spaces. Respondents from barangays near (within a 4km radius from the park) were given a set membership score of 1, while those far (outside a 4km radius from the park) were given 0. Those who own their house were given 1, while those who do not were given 0. Reaching college was assumed to be the threshold for a high level of education and was given a set membership of 1. Locals were given a set membership of 1, while migrants were given 0. Actual SVO angle scores were used for prosocial orientation. Since these angle scores are continuous values, they should first be transformed into membership scores from 0 to 1. This can be accomplished through a process called calibration [6]. The process of calibration is discussed in the following section.

Park use contained information on the knowledge about the previous land use in the area, park visits and frequency, and visiting other parks. Knowledge about the previous land use was included in the set of conditions as it is hypothesised to aid in the respondents'

comparison between the previous and present ES and EDS of the area. Information on visiting Jose Rizal Plaza and its frequency and visiting other parks were included because studies [15–17] suggest that using green spaces can improve people's perception of the benefits of green infrastructure. Respondents who answered the correct previous land use in the area were given a set membership score of 1, while those who did not were given 0. A set membership of 1 means that the case completely belongs to the set of cases having a specific characteristic of interest (in this case, knowing the previous land use in the area), while a set membership of 0 means that the case completely does not belong to the set of cases with the characteristic of interest. Respondents who have visited the park were given a set membership of 1, while those who have not were given 0. It was the same for visiting other parks – those who visit other parks were given 1, while those who do not were given 0. Weekly visits to the Jose Rizal Plaza were considered frequent and was given 1; monthly and yearly visits were given 0.

The last set of conditions include environmental knowledge, perception, and behaviour, which are assumed to influence and reflect people's relationship with nature. Correct answers were summed to represent knowledge of environmental concepts. Ratings were also totalled for knowledge on environmental laws and environmental perception and behaviour. These scores also need to be calibrated before they can be used for fsQCA.

Table 2.1. Descriptive statistics and membership thresholds set for outcomes and causal conditions in the fsQCA

Outcomes and conditions and their notations	Descriptive statistics (<i>N</i> = 441)	Non - membership	Cross - over	Full membership
<i>Outcomes</i>				
High valuation to ES	<i>M</i> =7.35; <i>SD</i> = 2.08	3	4	7
High valuation to EDS	<i>M</i> = 5.92; <i>SD</i> = 2.46	2	3	6
<i>Socio-economic characteristics</i>				
Prosocial orientation (pro)	<i>M</i> = 30.15; <i>SD</i> = 12.47	22.45	37.09	37.48
Living near the park (nea)	Yes = 69.6%; No =30.4%	0	-	1
Own their house (own)	Yes = 51.7%; No = 48.3%	0	-	1
High educational attainment (edu)	Yes = 67.1%; No = 32.9%	0	-	1
Local (loc)	Yes = 76.4%; No = 23.6%	0	-	1
<i>Park knowledge and use</i>				
Knowledge on previous land use (pre)	Yes = 41.7%; No =58.3%	0	-	1
Visited the park (vis)	Yes =97.3%; No = 2.7%	0	-	1
Frequent visitor (fre)	Yes = 13.6%; No =86.4%			
Visit other parks (oth)	Yes = 49.7%; No = 50.3%	0	-	1
<i>Environmental knowledge, perception, and behaviour</i>				
High knowledge of environmental concepts (enc)	<i>M</i> = 4.34; <i>SD</i> = 1.7	2	4	5
High knowledge of environmental laws (enl)	<i>M</i> = 3.97; <i>SD</i> = 2.07	3	4	6
Positive perception (enp)	<i>M</i> = 22.83; <i>SD</i> =6.18	18	27	36
Positive behaviour (enb)	<i>M</i> = 25.97; <i>SD</i> = 6.42	18	27	36

2.2 Calibration

Calibration is the process of transforming discrete or continuous raw scores for the outcome and causal conditions into fuzzy membership scores [1,18]. The direct method of calibration described by Ragin (2000) [1] was used in this study. Only the ES and EDS values, the SVO scores, and the ratings for environmental knowledge, perception, and behaviour were calibrated as the other conditions are already in 0 (no) and 1 (yes) form. The full membership threshold was set to 7 for ES values. It was set to 6 for EDS – a point lower since the survey data shows that the respondents assigned lower values to EDS. For the prosocial SVO, the full membership threshold was set to 37.48, the value that corresponds to a prosocial person with inequality aversion. The cross-over point was set to 37.09, the lower limit to describe a prosocial who is inequality tolerant. The full non-membership threshold was set to 22.45, the upper limit to represent an individualist [19]. Full membership threshold for high knowledge on environmental concepts was set to 5, while it was set to 6 for high knowledge on environmental laws (rating of 2 in all three laws, rating of 3 in two laws, rating of 3 in one law and 2 and 1 in the other laws). The cross-over and full non-membership thresholds for high knowledge on environmental concepts and high knowledge on environmental laws were set to 4 and 2, and 4 and 3, respectively. The full membership threshold to positive environmental perception and behaviour was set to 36 (at least a mean of 4 for the nine environmental conditions and behaviour), while the cross-over and full non-membership thresholds were set to 27 and 18, respectively (Table 2.2).

2.3 fs/QCA software

The fuzzy set membership scores were directly keyed to fs/QCA software Version 3.1b [20]. The software generates a truth table once the outcome and the causal conditions are specified. The resulting truth table has 2^k rows (k = number of causal conditions), reflecting the different configuration of conditions and their outcomes. Column names in the truth table and their descriptions are in Table 2.2.

Table 2.2. Truth table column names and their descriptions [20]

Column Name	Description
number	the number of cases displaying the combination of conditions
raw consist.	the proportion of cases in each truth table row that displays the outcome
PRI consist.	an alternative measure of consistency (developed for fuzzy sets) based on a quasi-proportional reduction in error calculation; in crisp set analyses, this is equal to the raw consist
SYM consist.	an alternative measure of consistency for fuzzy sets based on a symmetrical version of PRI consistency

After the truth tables were generated, they were reduced by setting frequency and consistency thresholds. It was assumed that at least 10 cases are enough to represent a configuration of conditions and its outcome. The consistency threshold was set to 0.80, as suggested by Ragin & Davey (2019) [20]. The software then applies Boolean minimisation rules to simplify the configurations. It produces three types of solutions, namely, complex, parsimonious, and intermediate. The complex solution does not include any remainders or configurations that lack empirical instances or cases in the analysis. The parsimonious solution allows the incorporation of remainders to generate a simpler solution regardless of their empirical possibility and the existing substantive knowledge. The intermediate solution also allows the incorporation of remainders, but only those that are expected to affect the outcome based on previous empirical findings [5,18]. The software also gives raw and unique coverage and consistency for each configuration. Raw coverage is the proportion of cases (that led to the outcome) covered by a configuration. Unique coverage, in contrast, is the proportion of cases (that led to the outcome) covered exclusively by a configuration. Only the complex solutions are presented in the results as the study does not aim to make assumptions on how the conditions could affect the outcomes. Analyses on the negated outcomes (*i.e.*, low valuation to ES and EDS) were also not performed because of the limited number of cases with those outcomes.

2.4 High valuation to ecosystem services (ES)

Table 2.3 presents the reduced truth table generated by fs/QCA for the first ES set-up: high valuation to ES as the outcome and prosocial orientation (*pro*), living near the park (*nea*), owning a house (*own*), high educational level (*edu*), and being a local (*loc*) as conditions. The software produced a total of 32 configurations (2^5), but only 17 remained after the frequency cut-off of 10 and the consistency cut-off of 0.80 were applied. There was a limited diversity of the cases as all the configurations, except for one, led to a high valuation to ES.

The Boolean minimisation applied by the software resulted in a solution with five configurations that lead to a high valuation to ES (Table 2.4). The overall solution coverage is 80%, while the overall solution consistency is 88%. It can be generalised that for the study's 441 respondents, the following combinations of characteristics were sufficient to have caused them to value the ES of Jose Rizal Plaza highly. No condition was necessary for the outcome.

- a. not having a prosocial orientation and being a local resident
- b. not having a prosocial orientation, living near the park, and not owning a house
- c. not having a prosocial orientation, living near the park, and having a high level of education
- d. having a high level of education and being a local resident
- e. living near the park, not owning a house, and being a local resident

Table 2.3. Truth table for the high valuation to ES as the outcome and prosocial behaviour (pro), living near the park (nea), owning a house (own), high educational level (edu), and being a local (loc) as conditions. The actual frequency and consistency cut-off used by the software were 10 and 0.905, respectively.

pro	nea	own	edu	loc	num.	es	raw consist.	PRI consist.	SYM consist
0	0	1	0	1	20	1	0.999	0.999	1
0	1	0	0	1	16	1	0.993	0.992	1
0	0	1	1	1	26	1	0.963	0.960	1
0	1	0	1	0	27	1	0.936	0.931	0.956
1	1	1	1	1	25	1	0.926	0.914	0.962
1	0	1	1	1	12	1	0.912	0.904	0.925
0	0	0	0	1	10	1	0.905	0.898	0.932
1	1	0	1	1	19	1	0.905	0.887	0.969
0	1	0	1	1	64	1	0.898	0.889	0.918
0	1	1	0	1	31	1	0.883	0.870	0.927
0	1	1	1	0	14	1	0.875	0.858	0.916
0	0	0	1	1	17	1	0.873	0.862	0.896
0	1	0	0	0	10	1	0.869	0.858	0.898
1	1	0	0	1	11	1	0.864	0.843	0.910
1	0	0	1	1	12	1	0.856	0.842	0.881
0	1	1	1	1	56	1	0.848	0.825	0.884
0	1	1	0	0	10	0	0.773	0.734	0.803

Table 2.4. fsQCA results for the high valuation to ES as the outcome and prosocial orientation (pro), living near the park (nea), owning a house (own), high educational level (edu), and being a local (loc) as conditions.

Configurations	Raw coverage	Unique coverage	Consistency
~pro*loc	0.470	0.124	0.905
~pro*nea*~own	0.221	0.018	0.917
~pro*nea*edu	0.294	0.025	0.884
edu*loc	0.517	0.138	0.863
nea*~own*loc	0.250	0.028	0.875
solution coverage: 0.798			
solution consistency: 0.879			

Note: * = AND; ~ = negation of condition.

Table 2.5 presents the reduced truth table generated by fs/QCA for the second ES set-up: high valuation to ES as the outcome and knowledge on the previous land use, having had an experience visiting the park, frequently visiting the park, and visiting other parks as the conditions. The software produced a total of 16 configurations (2^4), but only eight remained after the frequency cut-off of 10 and the consistency cut-off of 0.80 were applied. There was also a limited diversity of the cases as all the configurations led to a high valuation to ES.

The Boolean minimisation applied by the software resulted in a solution with four configurations that lead to a high valuation to ES (Table 2.6). The overall solution coverage is 98%, while the overall solution consistency is 87%. It can be generalised that for the study's 441 respondents, the following combinations of characteristics were sufficient to have caused them to value the ES of Jose Rizal Plaza highly. It can be noted that visiting the park is present in all the configurations. It means that visiting the park is a necessary condition for the cases to value the park highly.

- a. visited the park and not visiting other parks
- b. visited the park and not frequently visiting the park
- c. visited the park and knowing the previous land use in the area
- d. visited the park, knowing the previous land use, not frequently visiting the park, and not visiting other parks

Table 2.5. Truth table for the high valuation to ES as the outcome and knowledge on the previous land use (prev), having had an experience visiting the park (vis), frequently visiting the park (fre), and visiting other parks (oth) as the conditions. The actual frequency and consistency cut-off used by the software were 11 and 0.811, respectively.

prev	vis	fre	oth	number	es	raw consist.	PRI consist.	SYM consist.
1	1	1	0	17	1	0.952	0.949	1
1	1	1	1	23	1	0.935	0.930	1
0	1	1	0	14	1	0.915	0.914	0.928
0	1	0	0	124	1	0.901	0.893	0.965
0	1	0	1	101	1	0.868	0.858	0.930
1	1	0	1	88	1	0.855	0.842	0.924
0	0	0	0	11	1	0.826	0.817	0.863
1	1	0	0	56	1	0.811	0.791	0.885

Table 2.6. fsQCA results for the high valuation to ES as the outcome and knowledge on the previous land use (prev), having had an experience visiting the park (vis), frequently visiting the park (fre), and visiting other parks (oth) as the conditions.

Configurations	Raw coverage	Unique coverage	Consistency
vis*~oth	0.483	0.033	0.882
vis*~fre	0.830	0.228	0.867
prev*vis	0.411	0.056	0.860
Vis*~prev*~fre*~oth	0.313	0.024	0.895
solution coverage: 0.985			
solution consistency: 0.875			

Note: * = AND; ~ = negation of condition.

Table 2.7 presents the reduced truth table generated by fs/QCA for the third ES set-up: high valuation to ES as the outcome and high knowledge of environmental concepts (enc), high knowledge of environmental laws (enl), positive environmental perception (enp), and environmental behaviour (enb) as conditions. The software produced a total of 16 configurations (2^4), but only nine remained after the frequency cut-off of 10 and the consistency cut-off of 0.80 were applied. Like the first two set-ups, there was a limited diversity of the cases as all the configurations led to a high valuation to ES.

The Boolean minimisation applied by the software resulted in a solution with four configurations that lead to a high valuation to ES (Table 2.8). The overall solution coverage is 73%, while the overall solution consistency is 91%. It can be generalised that for the study's 441 respondents, the following combinations of characteristics were sufficient to have caused them to value the ES of Jose Rizal Plaza highly. No condition was necessary for the outcome.

- a. not having a positive environmental perception and not having a positive environmental behaviour
- b. high knowledge of environmental concepts and not having a positive environmental perception
- c. high knowledge of environmental concepts, not having a high knowledge of environmental laws and not having a positive environmental behaviour
- d. not having a high knowledge of environmental concepts, high knowledge on environmental laws, and positive environmental behaviour

Table 2.7. Truth table for the high valuation to ES as the outcome and high knowledge of environmental concepts (enc), high knowledge of environmental laws (enl), positive environmental perception (enp), and environmental behaviour (enb) as conditions. The actual frequency and consistency cut-off used by the software were 11 and 0.811, respectively.

enc	enl	enp	enb	number	es	raw consist.	PRI consist.	SYM consist
0	1	1	1	12	1	0.980	0.975	0.975
1	1	0	0	29	1	0.965	0.956	0.957
0	1	0	1	22	1	0.957	0.948	0.948
1	0	1	0	10	1	0.955	0.939	0.945
1	0	0	1	28	1	0.953	0.939	0.944
0	1	0	0	13	1	0.949	0.936	0.940
1	0	0	0	54	1	0.939	0.926	0.936
1	1	0	1	41	1	0.931	0.915	0.928
0	0	0	0	25	1	0.905	0.880	0.891

Table 2.8. fsQCA results table for the high valuation to ES as the outcome and high knowledge on environmental concepts (enc), high knowledge on environmental laws (enl), positive environmental perception (enp), and environmental behaviour (enb) as conditions.

Configurations	Raw coverage	Unique coverage	Consistency
~enp*~enb	0.481	0.099	0.916
enc*~enp	0.522	0.149	0.914
enc*~enl*~enb	0.281	0.028	0.928
~enc*enl*enb	0.146	0.063	0.967
solution coverage: 0.734			
solution consistency: 0.905			

Note: * = AND; ~ = negation of condition.

2.5 High valuation to ecosystem disservices (EDS)

Table 2.9 presents the reduced truth table generated by fs/QCA for the first EDS set-up: high valuation to EDS as the outcome and prosocial orientation (pro), living near the park (nea), owning a house (own), high educational level (edu), and being a local resident (loc) as conditions. The software produced a total of 32 configurations (2^5), but only 17 remained after the frequency cut-off of 10 and the consistency cut-off of 0.80 were applied. The Boolean minimisation applied by the software resulted in a solution with four configurations that lead to a high valuation to ES (Table 2.10). The overall solution coverage is 73%, while the overall solution consistency is 83%. It can be generalised that for the study's 441 respondents, the following combinations of characteristics were sufficient to have caused them to value the EDS of Jose Rizal Plaza highly. No condition was necessary for the outcome.

- not having a prosocial orientation and being local resident
- not having a prosocial orientation, living near the park, and not owning a house
- living near the park, having a high level of education, and being local resident
- owning a house, having a high level of education, and being local resident

Table 2.9. Truth table for the high valuation to EDS as the outcome and prosocial orientation (pro), living near the park (nea), owning a house (own), high educational level (edu), and being a local resident (loc) as conditions. The actual frequency and consistency cut-off used by the software were 10 and 0.808, respectively.

pro	nea	own	edu	loc	num.	eds	raw consist.	PRI consist.	SYM consist
0	0	1	0	1	20	1	0.920	0.914	0.934
0	1	1	0	1	31	1	0.919	0.910	0.958
0	0	0	1	1	17	1	0.898	0.887	0.895
0	0	1	1	1	26	1	0.871	0.860	0.884
0	1	0	1	1	64	1	0.861	0.845	0.877
0	1	0	0	1	16	1	0.858	0.835	0.879
0	0	0	0	1	10	1	0.855	0.829	0.940
1	0	1	1	1	12	1	0.846	0.826	0.854
0	1	0	1	0	27	1	0.845	0.826	0.866
1	1	0	1	1	19	1	0.839	0.809	0.857
0	1	0	0	0	10	1	0.817	0.771	0.892
1	1	1	1	1	25	1	0.809	0.770	0.843
0	1	1	1	1	56	1	0.808	0.785	0.813
0	1	1	0	0	10	0	0.779	0.742	0.805
1	0	0	1	1	12	0	0.726	0.674	0.722
0	1	1	1	0	14	0	0.698	0.686	0.700
1	1	0	0	1	11	0	0.691	0.636	0.684

Table 2.10. fsQCA results for the high valuation to EDS as the outcome and prosocial orientation (pro), living near the park (nea), owning a house (own), high educational level (edu), and being a local (loc) as conditions.

Configurations	Raw coverage	Unique coverage	Consistency
~pro*loc	0.492	0.173	0.865
~pro*nea*~own	0.225	0.068	0.853
nea*edu*loc	0.367	0.067	0.789
own*edu*loc	0.266	0.032	0.786
solution coverage: 0.73			
solution consistency: 0.826			

Note: * = AND; ~ = negation of condition.

Table 2.11 presents the reduced truth table generated by fs/QCA for the second EDS set-up: high valuation (worry) to EDS as the outcome and knowledge on the previous land use, having had an experience visiting the park, frequently visiting the park, and visiting other parks as the conditions. The software produced a total of 16 configurations (2^4), but only eight remained after the frequency cut-off of 10 and the consistency cut-off of 0.80 were applied. The Boolean minimisation applied by the software resulted in a solution with two configurations that lead to a high valuation to EDS (Table 2.12). The overall solution coverage is 57%, while the overall solution consistency is 84%. It can be generalised that for the study's 441 respondents, the following combinations of characteristics were sufficient to have caused them to value the EDS of Jose Rizal Plaza highly. Not knowing the previous land use in the area and visiting the park are necessary conditions for the high valuation of the EDS of Jose Rizal Plaza.

- a. not knowing the previous land use, visited the park, and not visiting other parks
- b. not knowing the previous land use, visited the park, and not frequently visiting the park

Table 2.11. Truth table for the high valuation to EDS as the outcome and knowledge on the previous land use (prev), having had an experience visiting the park (vis), frequently visiting the park (fre), and visiting other parks (oth) as the conditions. Actual frequency and consistency cut-off used by the software were 11 and 0.825, respectively.

prev	vis	fre	oth	number	eds	raw consist.	PRI consist.	SYM consist
0	1	0	1	101	1	0.856	0.846	0.911
0	1	1	0	14	1	0.850	0.834	0.933
0	1	0	0	124	1	0.825	0.810	0.885
1	1	0	0	56	0	0.796	0.781	0.844
1	1	1	0	17	0	0.773	0.758	0.812
0	0	0	0	11	0	0.756	0.738	0.799
1	1	1	1	23	0	0.746	0.723	0.794
1	1	0	1	88	0	0.736	0.707	0.793

Table 2.12. fsQCA results for the high valuation to EDS as the outcome and knowledge on the previous land use (prev), having had an experience visiting the park (vis), frequently visiting the park (fre), and visiting other parks (oth) as the conditions.

Configurations	Raw coverage	Unique coverage	Consistency
~prev*vis*~oth	0.324	0.034	0.827
~prev*vis*~fre	0.536	0.246	0.839
solution coverage: 0.57			
solution consistency: 0.84			

Table 2.13 presents the reduced truth table generated by fs/QCA for the third EDS set-up: high valuation to EDS as the outcome and high knowledge of environmental concepts (enc), high knowledge of environmental laws (enl), positive environmental perception (enp), and environmental behaviour (enb) as conditions. The software produced a total of 16 configurations (2^4), but only nine remained after the frequency cut-off of 10 and the consistency cut-off of 0.80 were applied. Like the first two set-ups, there was a limited diversity of the cases as all the configurations led to a high valuation to EDS. The Boolean minimisation applied by the software resulted in a solution with four configurations that lead to a high valuation to ES (Table 2.14). The overall solution coverage is 75%, while the overall solution consistency is 84%. It can be generalised that for the study's 441 respondents, the following combinations of characteristics were sufficient to have caused them to value the ES of Jose Rizal Plaza highly. No condition was necessary for the outcome.

- a. not having a positive environmental perception and not having a positive environmental behaviour
- b. high knowledge of environmental concepts and not having a positive environmental perception
- c. high knowledge of environmental concepts, not having a high knowledge of environmental laws and not having a positive environmental behaviour
- d. not having a high knowledge of environmental concepts, high knowledge on environmental laws, and positive environmental behaviour

Table 2.13. Truth table for the high valuation to EDS as the outcome and high knowledge on environmental concepts (enc), high knowledge on environmental laws (enl), positive environmental perception (enp), and environmental behaviour (enb) as conditions. The actual frequency and consistency cut-off used by the software were 10 and 0.847, respectively.

enc	enl	enp	enb	number	eds	raw consist.	PRI consist.	SYM consist
0	1	0	1	22	1	0.954	0.940	0.945
0	1	0	0	13	1	0.912	0.886	0.887
0	1	1	1	12	1	0.906	0.874	0.882
1	1	0	0	29	1	0.898	0.866	0.867
1	0	0	1	28	1	0.892	0.853	0.855
1	0	0	0	54	1	0.885	0.853	0.866
0	0	0	0	25	1	0.871	0.837	0.843
1	0	1	0	10	1	0.853	0.783	0.794
1	1	0	1	41	1	0.847	0.803	0.813

Table 2.14. fsQCA results table for the high valuation to EDS as the outcome and high knowledge on environmental concepts (enc), high knowledge on environmental laws (enl), positive environmental perception (enp), and environmental behaviour (enb) as conditions.

Configurations	Raw coverage	Unique coverage	Consistency
~enp*~enb	0.502	0.108	0.874
enc*~enp	0.526	0.143	0.841
enc*~enl*~enb	0.287	0.027	0.866
~enc*enl*enb	0.153	0.064	0.930
solution coverage: 0.75			
solution consistency: 0.844			

Note: * = AND; ~ = negation of condition.

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