

Towards Property Tax Compliance: A Case Study of Attitudes Toward Paying Property Taxes in Jamaica

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Abstract

Jamaica's property tax compliance rate has consistently been described as "low," "dismal," and "inadequate." Its performance is of utmost importance to the country since the tax is primarily used to fund local services including the provision of roads, road repairs, garbage collection, and the maintenance of streetlights.

This study investigates property tax compliance in Jamaica over the financial years 2010–2011 to 2015–2016 using data from a survey. The survey was designed to address two issues, specifically:

1. Jamaicans' attitude toward property tax, and
2. The effect of fairness, deterrence, and public shame on self-reported willingness to comply with the property tax.

As such, the survey instrument featured an attitude survey along with an experiment, testing the responses to the variables of fairness, deterrence and public shame. The results of the survey were then merged with the actual property tax behaviour of respondents and analyzed spatially in a geographic information system (GIS).

The results of the study suggest, *inter alia*, Jamaica's property tax compliance rate may be higher than previously reported, survey respondents generally had a compliant attitude towards the property tax and highlights the need for an accounting system that can effectively monitor property tax collections and enforcement. It was also noted that penalties and interest charges were applied *ultra vires* the Property Tax Act 1903.

Our findings also entail a discussion on four property tax attitude-behaviour profiles of respondents and highlight the need for a common spatial data infrastructure across government departments. Finally, the study conveys the need to elicit potential latent trends of the investigated phenomenon.

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An Introduction to Jamaica

This section of the working paper provides an introduction to Jamaica and its socio-economic characteristics. It also discusses the administrative and legal framework of Jamaica's property tax system and the importance of the property tax to local government. The section concludes with an overview of property tax compliance in Jamaica.

History and Economic Background

Initially named Xaymaca (land of wood and water) by the Taino Indians, Jamaica was colonised in 1494 by the Spanish and in 1655 by the British. After the abolition of slavery in 1834, Jamaica remained a British colony for 127 years, until 1962. As a commonwealth country, Jamaica is headed by a prime minister and the queen's representative is the governor-general.

The island has an area of 4,240 square kilometres and is 145 km south of Cuba, and 191 km west of Hispaniola. Jamaica has 14 parishes and its capital is Kingston. This is illustrated in figure 1.

Figure 1: Detailed Map of Jamaica



Source: Google Maps (2016)

According to the Statistical Institute of Jamaica (2012) there were 2,711,476 persons living in Jamaica with 24.5 percent of the population living in Kingston and St. Andrew. According to the National Land Policy (1996) cited in Wynter (2014, 27) "80% of the island's land surface is mountainous. Forestry, shrubs and woodland accounts for 44%...agriculture and pasture 46%, mines and wetlands 6% with the remaining 4% occupied by urban and rural settlements."

After gaining independence on August 6, 1962, Jamaica experienced rapid economic growth between 1963–1969. However, in the 1970s the island suffered an economic depression, which affected the standard of living for Jamaicans significantly. In an environment of increased oil prices and an alignment to the communist bloc, Jamaica faced international scrutiny and precipitous devaluation of the local currency. As a result, Jamaica entered into an economic structural reform programme with the International Monetary Fund (IMF) in 1977. Between 1977 and 1998, Jamaica entered into 10 economic oversight programmes with the IMF (Atchoarena and McArdle 1999). In February 2010, Jamaica entered into another economic structural reform programme with the IMF. Thus far, this arrangement has borne fruit as Jamaica's inflation rate reached an all-time low of 3.6 percent in February 2016 (Bank of Jamaica 2016).

Land Tenure Practices

Like many developing countries which are a part of the Commonwealth, Jamaica has various types of land tenure practices; the most prevalent tenure systems being private rights, communal land rights and informal tenure. (Wynter 2014).

Jamaica's private land rights system comprises of freehold and leasehold tenure. Individuals may possess freehold tenure through ownership in fee simple individually, as joint tenants, tenants in common, or through a life interest. However, exclusive occupation and use rights are obtained through a lease, while shared occupation and use rights are obtained through a license.

Communal land rights also take two forms—ownership of lands by maroon communities (Stanfield et al. 2003) and 'family land' (USAID 2010). The National Land Policy (1996) explained that family land is institutionalised through the social relationships in a family, as undivided land is passed down from one generation of family members to the next. Thus, these individuals have customary land rights that are not formally recognised by statute. Squatting may be described as the unlawful occupation of land belonging to another. Squatting is regarded as an informal land tenure that is only illegal when a squatter continues to occupy property after receiving an eviction notice. According to USAID (2010), 20 percent of the Jamaican population are squatting.

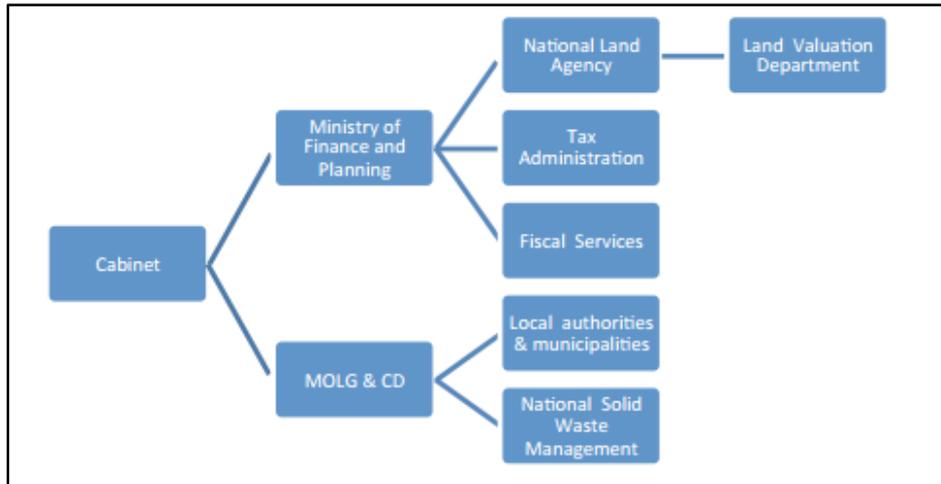
The Jamaican Property Tax System

Tax scholars have described the property tax as the legacy of colonialism (Andelson 2000; Wynter 2014). The property tax was first introduced in Jamaica in 1806 as a tax on quit rents, horses, land use, and stock. By 1890, it was realised that houses were being taxed in a regressive manner. Thus, in 1903, a self-assessed taxation system was implemented on land and buildings. However, in 1943, Jamaica moved towards land value taxation (LVT) with the Bloomberg Commission of Inquiry. By 1957, LVT was implemented with the passing of the Land Valuation Act (McCluskey and Franzsen 2001).

The Jamaican property tax is centrally administered by the Ministry of Finance and Planning and the Ministry of Local Government and Community Development (See figure 2). However, the administrative framework of the tax comprises of both ministries, government agencies (Tax Administration Jamaica and the National Land Agency), parish councils/municipalities, and a public body (the National Solid Waste Management Authority). The role of the various entities are as follows:

1. The Ministry of Finance and Planning through Tax Administration Jamaica (TAJ) and the National Land Agency are responsible for the valuation of parcels, tax assessments, tax exemptions, budgeting, collections, enforcement, and compliance.
2. The Ministry of Local Government through parish councils/municipalities, TAJ and the National Solid Waste Management Authority (NSWMA) are required to manage the distribution and allocation of the tax, garbage collection services, street lighting, administration of the tax, and to undertake enforcement activities.

Figure 2: Departments and Ministries Involved in Property Tax Administration



Source: Wynter (2013, 45). Notes. MOLG & CD is Ministry of Local Government and Community Development

The legal framework of the tax comprises of six legislations—The Tax Collection Act 1867, the Quit Rents Act 1896, the Parochial Rates and Finance Act 1900, the Property Tax Act 1903, the Land Valuation Act 1957, and the Land Taxation (Relief) Act 1959 (Wynter 2014).

The aforementioned legislations govern the property tax as follows:

1. *The Tax Collection Act 1867*. The act regulates tax collection and the responsibilities of tax collectors and those working with tax collectors.
2. *Quit Rents Act 1896*. This legislation gives tax collectors the right to seize a property for outstanding property taxes.
3. *The Parochial Rates and Finance Act 1900*. The act manages the payment of property tax revenue (i.e. tax liability, penalty, and interest payments) in the Parochial Revenue Fund.
4. *Property Tax Act 1903*. This legislation regulates the delivery of tax assessments and notices to tax payers and the payment of property taxes.
5. *The Land Valuation Act 1957*. It manages the land valuation process, the frequency of revaluation exercises, and the objections and appeals process.
6. *The Land Taxation (Relief) Act 1959*. This governs the derating (reduction) and exemption of the property tax.

The property tax has a graduated scale which comprises of three tax bands that is determined by the central government. Table 1 outlines Jamaica’s property tax rates.

Table 1: Property Tax Rates in Jamaica

Property Values (JMD)	Rate Scales
Where unimproved value is less than or equal to \$100,000	\$1,000 is charged
Where unimproved value is greater than \$100,000 but less than or equal to \$1,000,000	<ul style="list-style-type: none"> • \$1,000.00 is charged for the first \$100,000 • For every dollar thereafter 1.5% is applied
Where unimproved value is greater than \$1,000,000	<ul style="list-style-type: none"> • \$1,000.00 is charged for the first \$100,000 • For every dollar thereafter up to \$1,000,000 1.5% is applied • For every dollar in excess of \$1,000,000 (\$1 million) 2% is applied

Source: Tax Administration Jamaica (2014). Notes. Data compiled by research team

The Importance of Property Tax Revenue to Local Government

Like in many other countries, property tax revenue contributes significantly to the fiscal health of local authorities. Osei (2002) contends that 75 percent of local government revenue came from the property tax in the 1960s. This is in keeping with Sepulveda and Martinez-Vazquez (2012) who argued that the property tax is a critical income source for local authorities.

In 1973, the local government took control of the tax and since then it has been centrally administered. As a result, the government provided deficit grants to parish councils, which covered 94.5 percent of the budget for local authorities (Osei 2002).

By 1984, the role of Jamaica’s local government deteriorated as its major functions were transferred to central government entities (McCluskey and Franzsen 2001). This reduced the fiscal stability of local authorities and as such, in 1988 local government reform came to the forefront of the government’s national and political agenda. With the general down turn of the economy between 1990 and 1992, it was clear that the fiscal health of local authorities was at risk. This was evident when property tax revenue only amounted to 21 percent of the total figure needed to provide local services (Osei 2002). In response, the central government in 1993, under the Local Government Fiscal Policy Reform Project, allowed authorities to set and amend licence and user fees since.

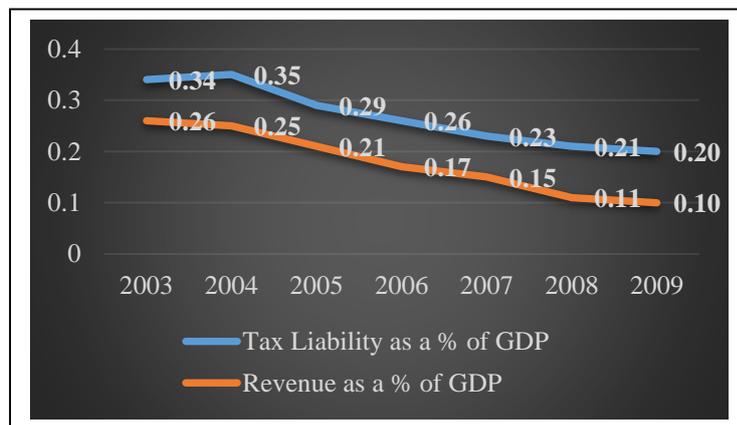
It may be argued that boosting the autonomy of local authorities improved their fiscal health. In 1997/98 fiscal year, the estimated size of the fund was J\$800,000,000. Although, the fund increased significantly, Osei (2002) commented that mayors of the parish councils were dissatisfied, because only 66.66 percent of revenues (from the Parochial Fund) were distributed to local authorities. This situation implies that decentralisation not complemented by the required financial capacity may be a futile endeavour. Stanfield et al. (2003) implicitly illustrated the importance of local authorities of having good fiscal health. Their study on the property tax revenue in Iowa, Nebraska, and Arkansas, showed that in the long term, additional and stable income streams are needed from wide tax bases to complement the property tax and ensure the sustainability of local authorities.

In Jamaica, the property tax is used for “the maintenance and expansion of street lighting, collection and disposal of solid waste, community infrastructure and civil improvements, administration of local authorities, repairs to fire stations and the rehabilitation of parochial/farm roads” (Ministry of Local Government and Community Development 2013).

Overview of Property Tax Compliance in Jamaica

McCluskey and Franzsen (2001) implied that low property tax compliance is not a recent phenomenon in Jamaica. Their study suggested that between 1992/1993 and 1996/1997, property tax compliance ranged from 45 percent to 55.7 percent respectively. Sjoquist (2007) opined property tax revenue as a percentage of gross domestic product hovered between 0.18 percent and 0.23 percent, while property tax collections increased from \$524.7 million JMD to \$1.489.7 billion JMD over the period 1997/1998 to 2002/2003. Additionally, the Private Sector Working Group (2012) position paper on tax compliance in Jamaica, indicated that property tax revenue as a percentage of gross domestic product declined by 61.5 percent, from 0.26 percent (in 2003) to 0.10 percent (in 2009). This is reflected in figure 3.

Figure 3: Property Tax Compliance in Jamaica 2003–2009



Source: The Private Sector Working Group of Jamaica (2012)

A similar trend of dismal compliance rates was observed with compliance data received from the Ministry of Local Government and Community Development for the period 2009/10 and 2013/14. Over the period, average compliance rates for all collectorates, ranged from 39.45 percent (in 2009/10) to 44.91 percent (in 2013/14). This is presented in table 2. Matalon (2012) cited in Dunkley (2012) lamented that he was having difficulty understanding why “the property tax moved from contributing 3.5% of the country’s Gross Domestic Product (GDP) in 2003 to just about 0.1 per cent of GDP in 2009.”

On May 1, 2015, TAJ reported at a Jamaica Information Service (JIS) think tank that \$7.45 billion JMD was earned as property tax revenue for the 2014/15 fiscal year. The entity attributed the increase in property tax collections to the collaborative efforts of TAJ, the Ministry of Local Government and Community Development, the Kingston and St. Andrew Corporation (KSAC), and local authorities. At the same JIS think tank, the director of revenue enhancement and mobilisation at the Ministry of Local Government and Community Development stated “unlike most first world countries, which have a compliance rate of almost 100 percent, Jamaica is still struggling at the 50 percent range” (Thomas 2015 cited in Eubanks 2015).

Table 2: Compliance Rates between 2009/10 and 2013/14

Collectorate	2009–10	2010–11	2011–12	2012–13	2013–14
1	46.48	50.77	46.85	34.88	50.94
2	70.97	71.64	72.69	66.06	82.85
3	50.37	56.07	50.42	50.74	55.85
4	36.62	41.57	38.59	37.18	40.71
5	24.38	43.16	41.07	25.19	41.43
6	42.50	44.38	40.62	43.02	44.54
7	37.58	41.21	36.73	34.39	41.48
8	38.78	43.96	42.09	43.18	48.18
9	29.69	31.52	27.09	30.14	35.94
10	47.21	52.88	44.84	45.35	49.52
11	36.33	42.38	38.44	35.30	41.50
12	29.14	37.10	38.13	38.35	38.26
13	35.92	44.60	43.33	41.69	48.06
14	25.75	30.41	28.07	11.87	33.48
15	43.55	48.48	43.43	44.05	47.95
16	39.70	55.60	51.39	49.12	52.95
17	41.06	48.06	43.22	43.47	47.03
18	44.52	46.14	41.21	39.88	39.70
19	39.45	40.65	39.21	37.31	39.70
20	36.28	38.60	35.78	35.86	38.12
21	42.48	44.86	41.93	40.52	43.81
22	28.87	32.65	32.57	29.55	32.90
23	39.95	44.45	41.11	40.16	41.03
24	24.93	25.43	23.02	22.20	24.04
25	31.61	33.35	30.92	29.70	36.26
26	35.01	40.76	35.46	35.24	38.70
27	30.88	34.03	31.81	32.63	35.22
28	36.22	40.25	35.30	33.07	38.86
29	38.44	50.62	45.39	35.34	48.39
Avg. compliance rate	39.45	44.84	41.45	38.77	44.91
Maximum	70.97	71.64	72.69	66.06	82.85
Median	37.58	43.16	40.62	37.18	41.43
Minimum	24.38	25.43	23.02	11.87	24.04

Source: Compliance rates calculated based on the tax liability, revenue and arrears provided by the Ministry of Local Government (2015). Notes: Avg. compliance rate is average compliance rate.

Research Aims

Our research was designed to investigate the degree to which Jamaican property tax compliance could be improved through various policy measures and/or public information campaigns. Through study of past practices and literature review (see appendix), we determined that there were three primary types of governmental campaigns that might be exploited to encourage increased compliance. Campaigns that emphasized:

- A. fairness by making property owners more aware of the degree to which property tax non-compliance reduced revenue for services that benefited everyone.
- B. deterrence by making property owners more aware of the penalties for non-compliance.
- C. public shame by making property owners more aware that the names and pictures of property tax evaders are published.

In order to provide more information about these potential options we designed a rigorous experiment to compare a scientifically selected representative random sample of taxpayers' survey responses under treatments that emphasized options A through C above. The attitudes survey is discussed in more detail in the next two sections—Methodology and Results.

We also conducted a separate data analysis to measure the relationship between observed property tax compliance (as documented in administrative records) and attitudes (as documented in our random survey of property owners). This exercise is discussed in more detail below in the section titled The Relationship between Documented Compliance and Attitudes.

Methodology: The Attitudes Survey

This section explains the methodological approach and data collection techniques employed to undertake the study, and focuses on the experimental design of the survey. It concludes with the limitations of the research, the ways in which they were addressed by the research team and ethical issues that were considered and addressed in the study. The following section presents and analyses the findings from the attitudes survey.

Research Framework and Contribution to Property Tax Compliance Literature

As mentioned in the Literature Review, this study was designed based on two studies. The first is Song and Yarbrough's (1978) research on tax ethics and taxpayer attitudes in North Carolina and the second is Castro and Scartascini's (2015) field experiment research on tax compliance and enforcement in Argentina.

Like Song and Yarbrough (1978), our study sought to understand the attitudes of property taxpayers and the extent to which it affects compliance (payment behaviour). A field experiment research design with treatment messages were used to understand the relationship between both variables. Unlike Castro and Scartascini (2015), our treatment messages were read to property taxpayers in an attitude survey that was administered at the taxpayer's home instead of being sent as part of the tax payment advisory. The sample of taxpayers in our study were randomly assigned to one of three treatment groups (deterrence, fairness and public shame) and a control group.

In light of the aforementioned, our research is a psycho-behavioural economics tax compliance study which addressed the following gaps in property tax compliance literature:

- The study is the first to use experimental research to understand the taxpayer attitude-taxpayer behaviour relationship for property tax payers in Jamaica and the English-speaking Caribbean; and
- A common feature of tax compliance research that utilises an attitude survey is the missing element of matching taxpayer attitudes to taxpayer behaviour. This study addressed this gap by using GIS technology to create compliance maps and analyse the property tax *attitude-behaviour profile* of respondents.

The Data Collection Process

In order to achieve the research objectives outlined in the introduction, the following data collection techniques were utilised in the order presented below:

Focus Group Session with Compliance Officers

This focus group session was held at the Ministry of Local Government with participants selected by the ministry. The session was comprised of 10 compliance officers assigned to the parishes of Kingston, St. Andrew, and St. Catherine in the Tax Administration Jamaica (TAJ); the Kingston and St. Andrew Corporation (KSAC); the Ministry of Local Government Revenue Enhancement Division; and the St. Catherine and Portmore municipalities. The session provided information on taxpayer behaviour and the internal processes of the entities. These results were used to inform the design of the attitude survey. The findings of the focus group are presented in appendix A.

Focus Group Session with Taxpayers

A focus group comprising 31 property owners, aged 20–79 was selected, reflecting the gender and age breakdown of the Jamaican population. They were administered individual questionnaires and were later placed in groups to discuss issues related to property tax and compliance. The results of this focus group were also used to improve the design of the attitude survey. The results of this focus group are provided in appendix B.

Attitudes Survey

An attitudes survey was designed to capture the perspectives of respondents on issues related to property tax. Additionally, the survey was used as a tool in experiment to test responsiveness to statements aligned to various variables. Questions were read to the participants by survey administrators in face to face interviews.

An initial survey was administered as a pilot study with 300 property taxpayers (100 from each selected location). Taxpayers were randomly assigned to two treatment groups and the control group as part of the experimental design. Table 3 outlines the assignment of property taxpayers to each treatment group.

Table 3: Assignment of Property Taxpayers in the Pilot Study

Community	Control	Deterrence	Fairness	Total
A	50	25	25	100
B	25	40	35	100
C	25	40	35	100
Total	100	105	95	300

Source: The Research Team

The results of the pilot and the behavioural response of respondents to the questions posed, led to the attitude survey being reduced from 82 questions to 61. Questions on sources of income, amount of income, and property characteristics were amended. Based on the overwhelming number of respondents who agreed that the names of property tax evaders should be published in newspapers, public shame was added as a treatment group in the experimental design section of the survey (See figure 4).

The final attitude survey was organized to capture six main areas as follows:

- **Section 1: Property Characteristics**
Questions on the type of tenure, the respondent's status as it relates to the property, the type of unit, and the length of time the respondent has lived at the property were posed here.
- **Section 2: Attitudes to Property Taxes**
Participants were asked to rank their opinions on five statements describing who the local tax net should include.
- **Section 3: Experimental Design**
This section was designed to test if being exposed to statements aligned to one of three variables would have an effect on the responses of participants to five questions. An additional statement was written to serve as the control group for the experiment. The statements tested the variables of deterrence, public shame and fairness, and use of revenue. At the start of the section, survey administrators read the appropriate statement and proceeded to the questions. These questions (See figure 4) covered areas such as the last time property taxes were paid, the amount paid, the likelihood of others in the neighbourhood to pay their next tax bill, the likelihood of the respondent to pay his/ her next bill, and to state their opinion on any justification for cheating on taxes.
- **Section 4: Tax Motivation**
The section focused on questions covering the respondents' own willingness to pay and their estimation of the main variables that motivate persons to pay. This includes the provision and quality of municipal services funded by the tax, the penalties that are associated with tax evasion, the convenience of payment options, and knowledge of the tax calculations. Additionally, respondents were asked to give their estimation of suitable penalties for tax evasion.

- **Section 5: Cultural and Social Attitudes**
In this section, questions on general items of social and cultural importance were stated and respondents were asked to rate their level of agreement or disagreement with each statement.
- **Section 6: Demographic Data**
In the last section, general demographic and income/expenditure related information were requested from respondents.

Figure 4: Treatment Statements and Questions

Control Treatment Group Statement

The property tax is an important source of revenue for the Jamaican Government. I would like to ask you some questions about your own property tax.

Fairness Treatment Group Statement

The property tax is an important source of revenue for the Jamaican Government. It is generally used to provide a number of services to local communities. For example, the money has been used to pay for street lights, garbage collection and the maintenance of roads in local communities such as yours.

Deterrence Treatment Group Statement

The property tax is an important source of revenue for the Jamaican Government. In order to encourage compliance, the government imposes stiff penalties on property tax owners who do not pay their property tax. For example, property owners who are caught evading the property tax may have their property seized by the government.

Public Shame Treatment Group Statement

The property tax is an important source of revenue for the Jamaican government. In order to ensure compliance, the names and pictures of property tax evaders are published in local newspapers and on the internet.

Treatment Questions

1. When was the last time you paid your property taxes? When was the last time you paid your property taxes?

last year 2 years ago 3 years ago 4 years ago 5 years ago 6 years ago 7 years ago other _____

2. How much did you pay in property taxes? _____

3. Please think about the other property owners in your neighbourhood. How likely is it that they will pay their next property tax bill? Please respond on a scale of 0 to 10.

0	1	2	3	4	5	6	7	8	9	10
They will definitely not pay					I am unsure if they will pay					They will certainly pay

4. Please tell me for the following statement whether you think it can always be justified, never be justified, or something in between: Cheating on taxes if you have the chance.

1	2	3	4	5	6	7	8	9	10
Can always be justified									Can never be justified

5. How likely is it that you will pay your next property tax bill? Please respond on a scale of 0 to 10.

0	1	2	3	4	5	6	7	8	9	10
I definitely will not pay					I am unsure if they will pay					I will certainly pay

Source: Treatment statements from the attitudes survey designed by the research team.

Selection of Collectorates for the Attitudes Survey

The study areas selected for this research were those collectorates which had the highest, lowest, and median compliance rate in each year, for the financial years 2009/2010 to 2013/2014. Based on data obtained from the Ministry of Local Government (as shown in table 4), the collectorates which satisfied the selection criteria were (1) Port Morant and Morant Bay in St. Thomas; (2) Chapelton in Clarendon; (3) Jackson Town in Trelawny; (4) Port Royal in Kingston; and (5) Buff Bay and Port Antonio in Portland. The collectorates were randomly assigned the identification numbers and this measure was taken to ensure that the name of collectorates in each compliance ranking remained undisclosed. Table 4 shows the collectorates with the highest, lowest, and median compliance rates in each year.

Table 4: Collectorates Selected as Study Areas

Collectorate Ranking	2009/10	2010/11	2011/12	2012/13	2014/15
	Collectorate Numbers				
Highest	2	2	2	2	2
Median	7	5	6	4	5
Lowest	5	24	24	14	24

Source: Selections made by the Research Team based on data provided by the Ministry of Local Government and Community Development in 2015.

In addition to the collectorates which satisfied the selection criteria, the research team also included another collectorate (referred to as Collectorate 3) as a study location because it generated the highest amount of property tax revenue over the study period. Collectorate 23 (a collectorate in close proximity to Collectorate 24) was also included in the sample, because most property taxpayers in Collectorate 24 were unwilling to participate in the survey. As a result, the decision was taken to administer surveys in Collectorate 23 because it was in close proximity to Collectorate 24 and to satisfy the quota of surveys needed for the study. Appendix C provides a description on each collectorate and the parishes where they are located.

Proportionate stratified random sampling was used to determine the number of taxpayers needed from each collectorate. Census data obtained from the Statistical Institute of Jamaica's website was used to calculate the total housing unit population. The housing unit population for each collectorate was used as a benchmark because the research team was unable to obtain data on the number of parcels in each collectorate.

By using the housing unit population of each collectorate, the research team was able to calculate the number of survey respondents that were needed from each collectorate. This process was undertaken based on two assumptions:

- The geographic boundaries of locations referred to as *Special Areas*, by the Statistical Institute of Jamaica, and as *Collectorate*, by the Ministry of Local Government, were the same. All collectorates used in the study were referred to as special areas by the Statistical Institute of Jamaica; and
- At least one property taxpayer lived at each housing unit.

Property taxpayers were randomly selected and assigned to a treatment group. Table 5 shows the number of respondents selected within each collectorate and assigned to each treatment group.

Table 5: Sample population of taxpayers by collectorate and treatment group

Collectorates	Household Population	% of Household Population to Total Population	Treatment Groups				Sample Total	% of Sample to Total Population
			Control	Fairness	Public Shame	Deterrence		
2	160	1	3	3	3	3	12	1
3	1,259	9	25	25	25	25	100	10
4	3,086	23	58	58	57	57	230	23
5	846	6	16	16	16	15	63	6
6	4,654	36	87	87	87	86	347	36
7	1,396	10	26	26	26	26	104	10
23 & 24	1,340	10	25	25	25	25	100	10
14	675	5	13	13	12	12	50	5
Total	13,416	100	253	253	251	249	1006	100

Source: Sample cohort designed by the Research Team. Note: The initial number of respondents selected for Collectorate 24 was shared with Collectorate 23 because of the low number of taxpayers in Collectorate 24 that were willing to participate in the survey.

Although 1,006 respondents were required for the attitudes survey, a total of 1,040 surveys were administered. All surveys were administered within three weeks under the guidance and supervision of the research team. The survey administrators for the pilot study were retained to administer the attitudes survey.

Semi-Structured Interviews

Semi-structured interviews were conducted with two government officials employed at departments which form part of the property tax system. These interviews were conducted to understand:

- the historical development of local governance and the property tax in Jamaica;
- the structure of the Jamaican property tax system;
- how the property tax is administered in Jamaica;
- the process used to value parcels; and
- the steps involved in the processes of valuing parcels and preparing property tax assessments.

The results of both interviews are presented in appendix D.

Data Analysis

In order to analyse the data collected, a triangulated approach was utilised. As such, non-parametric statistical tests, qualitative data analysis, and spatial analysis were used to support the results obtained from each data analysis technique. This approach was also adopted in order to have a robust means of supporting the arguments put forth by the research team. An

explanation on the application of each data analysis technique is provided hereafter.

Statistical Measures

Various statistical methods were used to analyse the data collected. Of importance was the use of the Mann Whitney U test and logistic regressions, which were used to analyse self-reported compliance between treatment groups and identify predictor variables of compliance.

Also referred to as the Wilcoxon rank-sum test or Wilcoxon-Mann-Whitney test, the Mann-Whitney U test is the non-parametric equivalent of the t-test and does not make the assumption of normal distributions. However, it does require that the responses of research participants are ordinal. It is also regarded as being as efficient as the t-test. The test makes three assumptions:

- The observations of all samples are independent of each other.
- Where there is no statistically significant difference between the samples (i.e. the null hypothesis H_0), the probability of the observation from treatment group 1 exceeding the probability of treatment group 2, is equal to the probability of an observation from treatment group 2 exceeding the probability of treatment group 1.
- Where there is a statistically significant difference between the samples, (i.e. the alternative hypothesis H_1), the probability of an observation from treatment group 1 exceeding the probability of an observation of treatment group 2 is different from the probability of an observation from treatment group 2 exceeding the probability of an observation from treatment group 1.

Logistic regressions were utilised to identify predictor variables/factors for self-reported compliance. Bar charts and graphs were also used to illustrate demographic and socio-economic data on respondents.

Qualitative Analysis

The data obtained from focus group sessions and interviews were analysed in a thematic format, in order to show the common themes which emerged from different stakeholders of the property tax system. Qualitative data was used to support information deduced from statistical spatial analyses. Qualitative analysis along with the other data analysis approaches were used to assess the extent to which taxpayers' attitudes match their tax behaviour.

Analysing Property Tax Compliance Spatially

All 1,040 responses from attitudes survey were matched to the property compliance data using the valuation roll number. After cleaning the data, a data frame of 750 records was used including the following data fields:

- the identification number for each respondent;
- location coordinates for each parcel;
- valuation roll number for each parcel;
- scheme address for parcels;

- the collectorate to which each parcel is assigned;
- type of property owner (e.g. individual, government, business, church);
- the tax liability, penalty, interest, total due, total paid and outstanding for each parcel in each financial year;
- compliance rate for each parcel in each financial year (see the sub-heading Calculation of Property Tax Compliance Rates);
- the compliance behaviour for each parcel in each financial year (i.e. compliant or non-compliant); *Note: parcels where their total tax liability was paid for each year were classified as compliant.*
- the average compliance rate for each taxpayer over study period;
- the compliance behaviour for each taxpayer over the entire study period (i.e. compliant or non-compliant); *Note: respondents who paid all their tax liability over the entire study period were classified as compliant.*
- the treatment group to which each respondent was assigned;
- taxpayers' attitudes on the likelihood of payment by their neighbours;
- the likelihood of each taxpayer paying their next property tax bill; and
- the attitudes of taxpayers on the cheating of taxes.

Compliance maps were then created to show property tax attitude-behaviour profiles of respondents in the 2015–2016 tax year. Details on the process of matching taxpayer attitudes and behaviour is provided in appendix E.

Calculation of Property Tax Compliance Rates

Property tax compliance rates were calculated with the data obtained from the TAJ online property tax query portal for each parcel. By making reference to figure 5, the process of calculating the compliance rate for each parcel will be explained.

Figure 5: Calculation of Property Tax Compliance Rates

Tax Year	Tax (\$)	Penalty (\$)	Interest (\$)	Total Due (\$)	Total Paid (\$)	Total Outstanding (\$)	
2010-2011	2,875.00	0.00	0.00	2,875.00	2,875.00	0.00	
2011-2012	2,875.00	0.00	0.00	2,875.00	2,875.00	0.00	
2012-2013	2,875.00	0.00	0.00	2,875.00	2,875.00	0.00	
2013-2014	7,750.00	0.00	0.00	7,750.00	7,750.00	0.00	
2014-2015	7,750.00	0.00	0.00	7,750.00	35,037.50	0.00	
2015-2016	7,750.00	0.00	0.00	7,750.00	7,750.00	0.00	
2016-2017	7,750.00	0.00	0.00	7,750.00	0.00	7,750.00	
				Grand Totals:	39,625.00	59,162.50	7,750.00

Source: Tax Administration Jamaica Property Tax Query Portal. Accessed May 20, 2016. Notes: Property tax compliance history of a parcel (from a study area) since 2010–2011.

To calculate the compliance rate for each parcel, the formula $(\text{total paid}/\text{total due}) * 100$ was used. By making reference to figure 5 and applying the aforementioned formula, the compliance rate for the parcel in the tax years 2010–2011 to 2015–2016 would be:

2010/11:	$(\text{total paid}/\text{total due}) * 100 = (\$2,785.00 / \$2,785.00) * 100 = 100.00\%$
2011/12:	$(\text{total paid}/\text{total due}) * 100 = (\$2,785.00 / \$2,785.00) * 100 = 100.00\%$
2012/13:	$(\text{total paid}/\text{total due}) * 100 = (\$2,785.00 / \$2,785.00) * 100 = 100.00\%$
2013/14:	$(\text{total paid}/\text{total due}) * 100 = (\$7,750.00 / \$7,750.00) * 100 = 100.00\%$
2014/15:	$(\text{total paid}/\text{total due}) * 100 = (\$35,037.50 / \$7,750.00) * 100 = 452.10\%$
2015/16:	$(\text{total paid}/\text{total due}) * 100 = (\$7,750.00 / \$7,750.00) * 100 = 100.00\%$

For the entire period displayed in figure 5 (2010–2011 to 2016–2017), the property taxpayer's compliance rate would be:

$$(\text{total paid}/\text{total due}) * 100 = (\$59,162.50 / \$39,625.00) * 100 = 149.30\%$$

Limitations of the Research

When conducting research, there are limitations that will be experienced that need to be addressed and mitigated. With reference to this study, its limitations are presented in the paragraphs below.

1. The research team was unable to obtain data on the total number of parcels assigned to each collectorate on the valuation roll. This problem was addressed by using the housing unit population for each collectorate.
2. Compliance rates were calculated only with the data provided on Tax Administration Jamaica's (TAJ's) property tax query portal. As a checking mechanism, the team used three formulae to calculate the amount due for each parcel to ascertain if the amount due as calculated by the team was the same figure as the amount due on TAJ's property tax query portal.
3. With the exception of 6 parcels, the amount due calculated for parcels by the research team was the same as the amount due for parcels on TAJ's property tax query portal. For these 6 parcels, the amount due on the tax query portal was higher than the amount due calculated for those parcels by the research team. As a result, the amount due figure on the tax query portal was used to calculate the compliance rates for these parcels. All six parcels had a compliance rate of 100 percent for the 2010–2011 to 2015–2016 tax years.
4. Only detached residential properties were included in the study. Strata (condominium) properties were excluded because the payment of property taxes for strata properties is generally taken from the monthly maintenance fee paid by a strata owner to the strata corporation of their complex.
5. As seen in appendix E, the sample size reduced from 1,040 to 750 respondents. A sample size of 750 from a total population of 850,000 parcels at a 95 percent confidence level, produces a plus or minus four percent confidence interval. Thus, the sample size reflects the housing unit population at an accuracy level of 91 percent to 99 percent.
6. Different organizations use different boundaries to demarcate communities, so there are no standardised geographic boundaries for parishes and communities across the island. This posed a limitation in merging geographic data sourced from these separate organizations. In order to address this, rather than doing a polygon to grid tile conversion of community shapefiles (highlighting specific parcels in a community),

point data was used to map compliance in each collectorate. Since the exact legal boundaries of parcels were not needed to map compliance, point data provided a general indication of the location of each parcel in a community and collectorate. Additionally, all data points were already linked to each parcel by their valuation roll numbers. As a result, the use of point data did not affect the accuracy of tax compliance and tax attitudes that were illustrated on maps. Therefore, the validity and reliability of the research were not compromised. Point data was also considered beneficial since it protects the property owners' identities by not identifying their specific lot of land.

Ethical Considerations

Survey participants were approached by survey administrators and asked to participate. They were told of the nature of research and reassured that responses would be accessed solely by members of the research team, ensuring the confidentiality of their responses. In cases where the respondents changed their mind about participating in the survey, the responses were discarded immediately.

Respondents were interviewed at their place of residence and as such, were aware that their responses could possibly be traced back to their home locations. As such, the issue of confidentiality was emphasised in each survey interview. As a further check to credibility, the survey was designed to minimise the risks perceived by participants by wording questions to solicit opinions on statements. Additionally, self-reported compliance was requested in relation to the most recent payment year, reducing the perceived risk that the information garnered can be used against them.

Another area of concern is the accessing of tax payment records for the participants. Data used to track tax payment history is publicly available online through the Tax Administration Jamaica website and can be accessed by anyone using a valuation number. However, matching the responses to the payment history and spatially representing it could allow persons' confidential responses to be linked back to them. To guard against, the team did not collect the names of the persons from the tax payment history so that when merged, nothing could be used to identify the respondent. As such, the promise to keep the responses anonymous was kept.

While administering the survey, respondents were not advised that their tax behaviour would be matched to their survey responses. Although some scholars may argue that research participants should have full knowledge of the research process, the research team contends that taxpayers rarely, if ever, make decisions with perfect knowledge and information. Thus, the research team believed that the more pertinent issue was to first protect respondents by ensuring their anonymity and confidentiality, and secondly to maintain the validity of the research.

Finally, although the names of respondents were not collected for the research, spatial analysis can further compromise anonymity as highlighted by Sherman and Fetters (2007). They suggest that the uses of spatial analysis at times inadvertently reference locations that make once unidentifiable participants open to public scrutiny. As such, researchers should take care in the design and presentation of the research to avoid this. The research team used point data as against grid data, to add further to the anonymity of respondents through maps

that show compliance and attitudes at a community level and not at an individual parcel level. As such, no one map can be used to identify any particular participant in the survey.

Results: The Attitudes Survey

This section presents and analyses the findings from the attitudes survey.

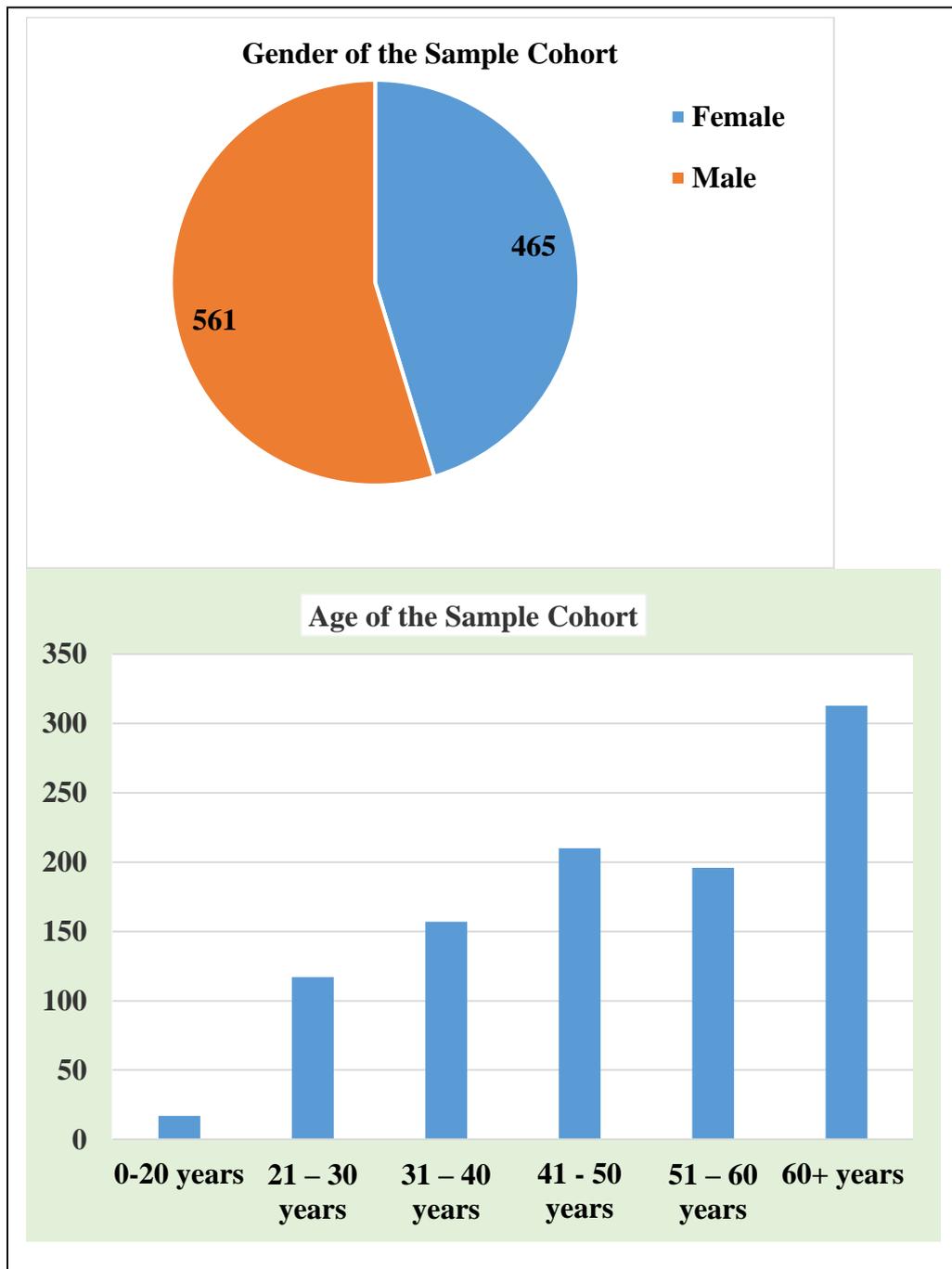
Demographic Characteristics

Of the 1,040 respondents surveyed, 54 percent were males while 46 percent were females. Most respondents (31 percent) belonged to the age group of 60 or more years, while the number of respondents were fairly evenly distributed across the 21–30, 31–40 and 41–50 age groups. Only 25 respondents were 20 years or younger.

In relation to the marital status of respondents, 40 percent of respondents were living with their partner, while 41 percent were single. The remainder of the cohort were widowed (2.3 percent), separated (8.2 percent), or selected other arrangements (8.5 percent) as their marital status. Most respondents (53.1 percent) reported that they had 1–3 children, while 47.9 percent of respondents had more than 3 children.

Feedback from respondents, indicated that 52 percent of the cohort received educational training at the secondary level. However, 23 percent of this sub-group were unable to complete high school. Other levels of educational attainment received by respondents were vocational training (12 percent), undergraduate degree (10 percent), primary education (20 percent) and post graduate qualification (six percent). Figure 6 illustrates the demographic characteristics of the cohort.

Figure 6: Demographic Characteristics of Respondents to the Attitudes Survey



Note: Results of attitudes survey compiled by the research team.

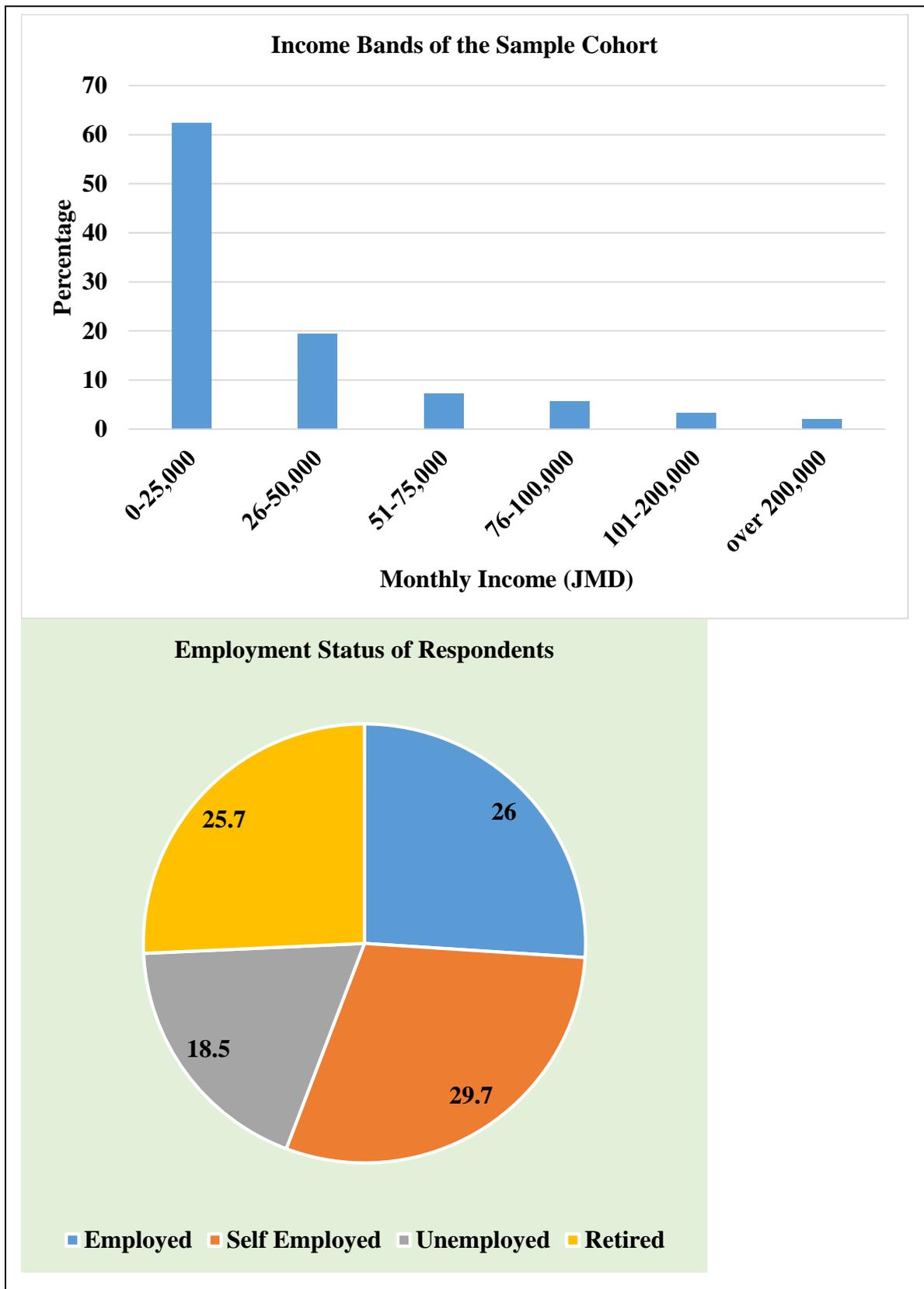
Economic Characteristics

In the attitudes survey, the indicators used to obtain the economic profile of respondents were the reported income earned by respondents and their employment status. Based on the data obtained, 676 respondents earned a maximum of J\$25,000 (US\$202) monthly while 187 persons earned between J\$26,000 and J\$50,000 (US\$210–US\$403) monthly. For the remaining 177 respondents, their monthly income was dispersed over the following income bands as follows:

- J\$51,000 to J\$75,000: 83 taxpayers
- J\$76,000 to J\$100,000: 72 taxpayers
- J\$101,000 to J\$200,000: 12 taxpayers
- Over J\$200,000: 10 taxpayers

The results also show that 26 percent of respondents were employed, while 18.5 percent were unemployed. The remainder of the cohort were self-employed (29.7 percent) and retired (25.7 percent). These figures imply that 48.2 percent of the cohort (those self-employed and unemployed) are not receiving a consistent and stable income monthly. Further, the remaining number of employees were evenly split, with retirees generally earning less income than younger employed individuals. The economic profile of respondents is presented in figure 7.

Figure 7: The Economic Profile of Survey Respondents

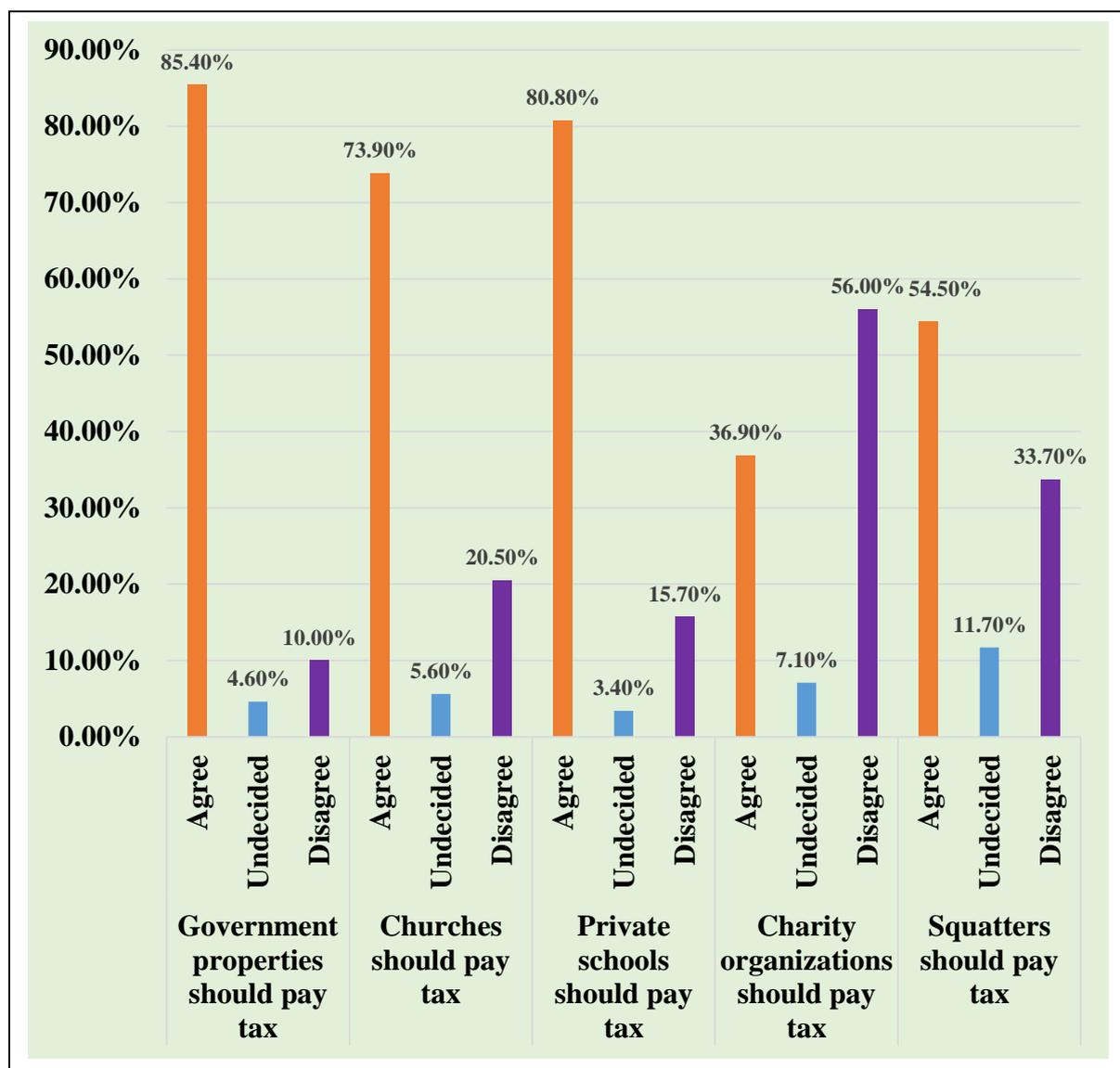


Note: Results of attitudes survey compiled by the research team.

Attitudes to Tax Exemptions

Properties owned by the government, schools, churches, and charity organisations are exempted from paying property taxes. The results obtained from respondents demonstrated that they believed the government, private schools, and churches were to pay property taxes. As shown in figure 8, 85.4 percent, 73.9 percent and 80.8 percent of respondents agreed with statements that the government, churches, and private schools are to pay property taxes. However, 56 percent of respondents disagreed with the statement “charity organisations should pay property taxes.” This suggests taxpayers are in favour of widening the tax base. The results of the Mann Whitney U confirmed this finding. This test produced a statistically significant difference in the responses of both groups of respondents ($p=0.043$). This is presented in figure 9.

Figure 8: Attitudes of Respondents to Tax Exemptions



Note: Results of attitudes survey compiled by the research team.

Figure 9: Comparison of Property Owners and Non-owners Based on Their Perceptions of Tax Exemptions

Groups	Respondents	N	Mann Whitney U	p
Government properties	property owner	534		
	non-owner	463		
	Total	997	122178.0	0.728
Churches	property owner	539		
	non-owner	473		
	Total	1012	127001.0	0.914
Private schools	property owner	541		
	non-owner	471		
	Total	1012	121028.5	0.139
Charity organizations	property owner	541		
	non-owner	470		
	Total	1011	118158.5	0.043*
Squatters	property owner	527		
	non-owner	461		
	Total	988	121232.5	0.956

Note: Results of attitudes survey compiled by the research team.

Quality of Services

Attitudes to the provision of necessary government services were evaluated based on respondents' perceptions about the quality of roads, garbage collection, street lights, fire services, and community drains. These may be viewed as components of community services which directly reflect the role of the state in enhancing the quality of life in communities. Accordingly, satisfaction with community services and by extension environmental quality has long been established as potentially influencing the response to taxation (Alm et al. 2011). While undertaking statistical tests, components were standardized using a dichotomous scale (coded as 0 and 1) to reflect the opinions about levels of state attention afforded to selected municipal services.

When asked to rate the quality of services they received, taxpayers were generally satisfied with the provision of street lights. Most respondents (68 percent) believed their roads were in a poor and very poor condition. The negative majority position was also seen in the response to the frequency at which drains and gullies were being cleaned. Nineteen percent and 34 percent of respondents respectively, expressed that drains in their communities were never cleaned and cleaned once per year. Most respondents (58 percent) were not satisfied with fire hydrants in their communities. The perception of taxpayers on the frequency of bushing was also poor. The majority of the cohort (40 percent) expressed that bushing would take place once per year, while 19 percent expressed that it never occurred. In relation to the frequency of garbage collection, 71 percent of the cohort stated that it's done once weekly. Table 6 shows the attitudes of taxpayers on the quality of services received.

Table 6: The Perceptions of Taxpayers on the Quality of Services

Type of Service	Question Asked	Options Provided	Majority Position	Percentage of Cohort
Streetlights	Rate your level of Satisfaction with the Provision of Streetlights	Scale 1–5 1 = VD, 3= Neutral 5=VS	Satisfied	49%
Roads	How would you rate the quality of roads in your community?	Scale 1–5 1 = VP, 3= Not Sure 5=VG	Poor and Very Poor	32% and 36% respectively Total: 68%
Cleaning of Gullies and Ravines	How often are gullies, drains and ravines cleaned in your community?	Scale 1–5 Monthly, quarterly, bi-annually, yearly, never	Never get cleaned and Yearly	19% and 34%
Fire Hydrants	Are you satisfied with the provision of fire hydrants in your community?	Yes, No	No	58%
Bushing	How often is bushing done in your community?	Scale 1–5 Monthly, quarterly, bi-annually, yearly, never	Never and Yearly	19% and 40%
Garbage Collection	How many times weekly is garbage collected in your community?	Scale 1–5 1,2,3, More than three, none	Once a week	71%

Note: Results of attitudes survey compiled by the research team. VD is very dissatisfied, VS is very satisfied, VP is very poor, and VG is very good.

Collection Services

Perceptions of tax collection services may affect the decision to pay taxes. Helhel and Ahmed (2014) asserted that factors such as inadequate staff at collection facilities may discourage individuals from using these facilities resulting in reduced tax revenue. The definition of tax facilities is also extended to include internet facilities or any other facility which provides the opportunity for remote payment. Besides staffing, it is clear that several features of tax collection facilities may also influence user experience and, by extension, the likelihood of compliance.

In this subsection, perceptions of respondents on tax facilities were analysed by using the parameters outlined in the section Attitudes to Tax Penalties. Likert scales were used to measure respondents' opinion about the tax facilities and means were derived for each component. These values were then used to develop a composite score for perception which gives general indication of the attitude of respondents towards tax facilities.

When asked about the convenience of paying property taxes, these results were obtained:

- 73 percent of respondents expressed that they've never paid their taxes via Tax Administration Jamaica payment portal on their website;
- 59 percent were not knowledgeable on how their tax liability is calculated;
- 50 percent of respondents expressed that queues at their tax office were not lengthy; and
- 77 percent of respondents believed the tax office was not far from their places of residence.

The results of this section are outlined in Table 7.

Table 7: Collection Services

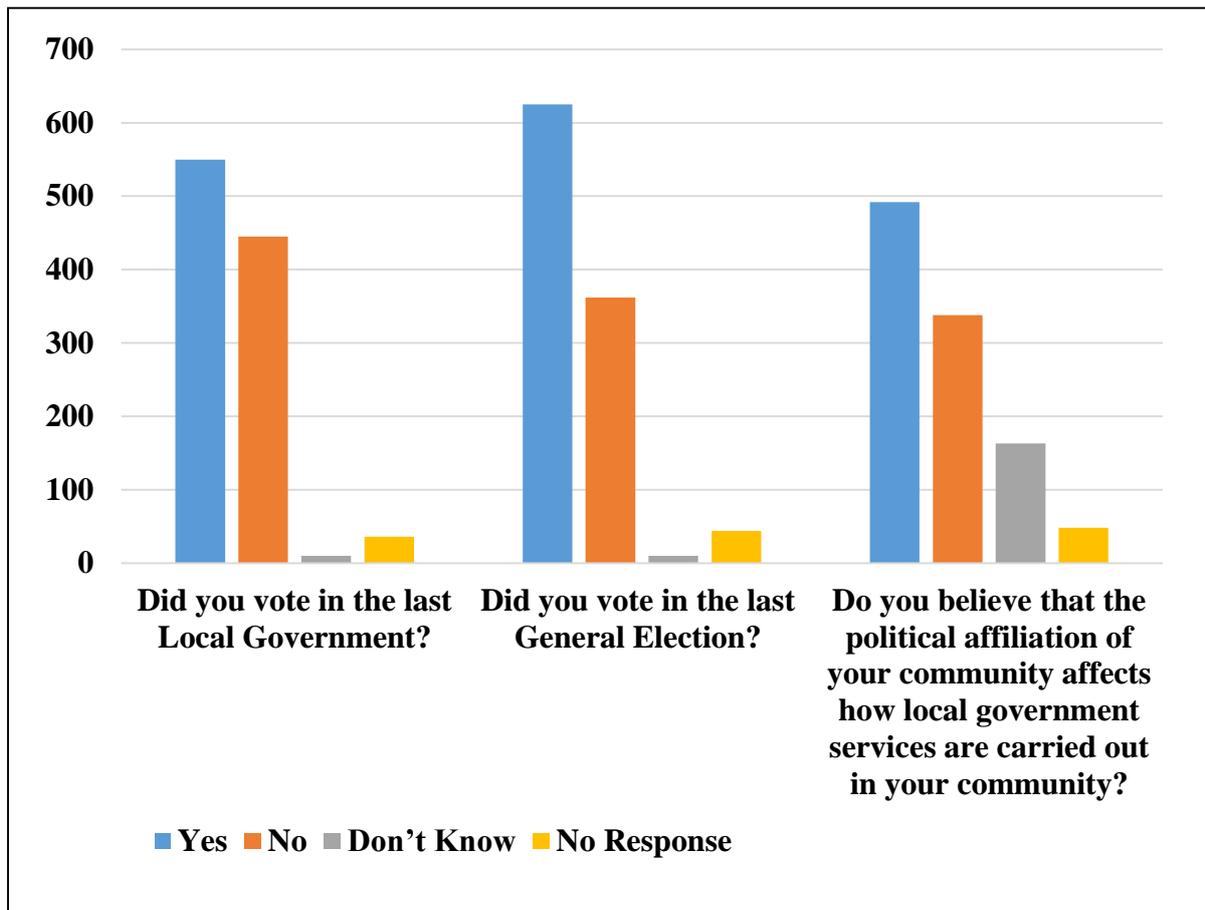
Type of Service	Question Asked	Majority Position	Percentage of Cohort
Website	Do you use the website to pay taxes?	No	73%
Tax Calculations	Do you know how the tax is calculated?	No	59%
Service in Office	Please consider the length of the line at your tax office. Is the cashier line long when you go to pay your property tax bill?	No	50%
Distance	Please consider the location of your tax office. Is the tax office far from your home?	No	77%

Note: Results of attitudes survey compiled by the research team.

Political Affiliation and Attitudes

Of the 1,040 respondents, 52.8 percent expressed that they voted in the last local government election, while 59.6 percent of respondents voted in the most recent general elections. When asked “Do you believe that the political affiliation of your community affects how local government services are carried out in your community?”, 47 percent of respondents said yes, 33.7 percent of respondents said no, and 17.3 percent were unsure. The remaining two percent of respondents provided no response. Figure 10 illustrates the results of this subsection.

Figure 10: Political Affiliation and Attitudes of Survey Respondents



Note: Results of attitudes survey compiled by the research team.

Inferential Statistics on Self-Reported Compliance and Treatment Groups

The results of the Mann Whitney (U) Test used to compare the responses of taxpayers in the control group with those in the fairness, deterrence, and public shame treatment groups proved that there were no significant statistical differences between the responses of taxpayers from the control group and the other treatment groups on the likelihood of:

- paying their next property tax bill;
- their neighbours paying their next property tax bill; and
- getting caught for evading property taxes.

Although the derived p values never satisfied the statically significant criteria, the results of the control group versus fairness comparison in table 8 are hinting that this variable impacts compliance the most. This finding is not alarming because the property tax is a visible tax that is underpinned by the benefits received principle. Thus, the visibility of the tax enables taxpayers to hold the government accountable for the delivery of services from the tax. As such, this is closely tied to transparency and the use of revenue within the property tax system (Youngman 2016).

Tables 8 through 10 also indicate some similarities in the responses of the treatment groups. For example, in the control versus fairness and control versus public shame, comparisons for

the likelihood of taxpayers paying their next property tax bill had the most statistically significant response of the three questions posed.

It is also noteworthy that of the three comparisons, the control versus deterrence comparison (table 9) had the highest p values for all three questions. This suggests that responses of taxpayers assigned to the control and deterrence groups had the least amount of difference. This result implies that deterrence as an enforcement mechanism may not improve the compliance rate of Jamaican property tax payers. As a result, this finding is supporting the results of studies such as Allingham and Sandmo (1972), Clotfelter (1983), and Crane and Nourzad (1985), which demonstrated that deterrence mechanisms such as higher penalties do not have a positive effect on compliance. In fact, the aforementioned studies showed that strict deterrence mechanisms increase tax evasion.

Although the results of the pilot study indicated that taxpayers responded negatively to public shame, these findings are not showing any significant differences between respondents in the control and public shame groups (See table 10). This could have occurred because taxpayers perceived public shame as a deterrence mechanism. This argument has been presented because public shame is a means of enforcing tax liability and as such it would be a way of deterring tax evasion. Additionally, the p values derived from the control versus deterrence and control versus public shame comparisons suggest that the responses of participants from the public shame group are more closely aligned to the responses of participants from the control group than those from the deterrence sample. The results of the inferential statistical analysis on self-reported compliance and treatment groups is conveying that the null hypothesis has to be accepted.

Table 8: Inferential Statistics on Self-reported Compliance and Treatment Groups: Control vs. Fairness

Question	Treatment Groups	N	Mann Whitney U	p
Likelihood that I will pay my next tax bill	Control Group	195		
	Use of Revenue	218		
	Total	413	21163.5	0.93
Likelihood that others in community with pay their next tax bill	Control Group	193		
	Use of Revenue	217		
	Total	410	19194.00	0.132
Likelihood of getting caught evading taxes	Control Group	246		
	Use of Revenue	253		
	Total	499	29018.000	0.172

Note: Results of attitude survey compiled by the research team.

Table 9: Inferential Statistics on Self-reported Compliance and Treatment Groups: Control vs. Deterrence

Question	Treatment Groups	N	Mann Whitney U	p
Likelihood that I will pay my next tax bill	Control Group	195		
	Deterrence	152		
	Total	347	14505.000	0.699
Likelihood that others in my community with pay their next tax bill	Control Group	193		
	Deterrence	182		
	Total	375	17096.500	0.647
Likelihood of getting caught evading taxes	Control Group	246		
	Deterrence	218		
	Total	464	25830.500	0.478

Note: Results of attitude survey compiled by the research team.

Table 10: Inferential Statistics on Self-reported Compliance and Treatment Groups: Control vs. Public Shame

Question	Treatment Groups	N	Mann Whitney U	p
Likelihood that I will pay my next tax bill	Control Group	195		
	Public Shame	207		
	Total	402	18825.500	0.171
Likelihood that others in my community with pay their next tax bill	Control Group	193		
	Public Shame	216		
	Total	409	19678.000	0.313
Likelihood of getting caught evading taxes	Control Group	246		
	Public Shame	255		
	Total	501	25718.500	0.000

Note: Results of attitude survey compiled by the research team.

Predictor Variables of Self-Reported Compliance

Two logistic regression models were developed to determine the influence of selected variables on the likelihood of self-reported compliance. The bivariate associations between possible predictors and the outcome variable were tested using the Chi² and Mann Whitney U tests. Only statistically significant variables were included in both regression models.

The first model—Regression Model 1—demonstrates the influence of socio-demographic and economic variables on the likelihood of compliance. As such, socio-demographic and economic factors were the independent variables, while self-reported compliance was the dependent variable.

The Man Whitney U test was first used to measure the relationship between each socio-demographic and economic variable (in the survey) and self-reported compliance. The results of these tests showed that only the age of taxpayers, and their marital and employment status had an influence on self-reported compliance. As such, the aforementioned variables were included as predictor variables in the first regression. These variables were recoded to facilitate easier and more meaningful comparisons. The results indicated that the selected variables were not statistically significant predictors of compliance. Collectively, these predictors only explained about 3.2 percent of the variation in self-reported compliance and, at an individual level, none emerged as having noteworthy influence on the outcome variable. Marital status appeared to have the strongest predictive power but further post hoc analysis did not unearth alternative patterns. The results of this regression are provided in figure 11.

The second regression model—Attitudes to Taxation and Self-Reported Compliance—examined the extent to which attitudes to taxation may predict self-reported compliance. The results indicated that the variables, at an aggregate level, were not adequate predictors of self-reported compliance. The results of regression model 2 are shown in figure 12.

Figure 11: Regression Model 1

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age (≤30) (reference category)			1.904	2	.386			
31-60	.324	.503	.415	1	.519	1.383	.516	3.705
60+	-.254	.272	.869	1	.351	.776	.455	1.323
married(including common law)	-.430	.230	3.502	1	.061	.651	.415	1.021
employed	.363	.262	1.920	1	.166	1.438	.860	2.405
Constant	1.364	.314	18.88 2	1	.000	3.910		
Model X ² = 10.610; d.f.= 4; p = 0.03								
Nagelkerke R ² = 0.032								

Note: Results of attitude survey analysed by the research team.

Figure 12: Regression model 2

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Not ok to purchase stolen goods	-.380	.920	.170	1	.680	.684	.113	4.152
Not Ok without drivers licence	.149	.872	.029	1	.865	1.160	.210	6.414
Tax evaders name should be published	-.470	.220	4.562	1	.033	.625	.406	.962
Constant	1.420	.166	72.884	1	.000	4.136		

Model X² = 4.913; d.f.= 3; p = 0.178
Nagelkerke R² = 0.015

Note: Results of attitude survey analysed by the research team.

It is evident that at the aggregate level, social, demographic, economic, and ethical variables are not adequate predictors of compliance. As a result, preliminary checks were undertaken in order to determine if both regression models could be used analyse the dataset by treatment groups.

In this regard, the responses to all social, demographic, economic, and ethical variables in the survey were classified by treatment groups. The preliminary analysis revealed that for all variables, all treatment groups had a similar distribution of responses. In light of the aforementioned, the probability that disaggregation would have revealed a significant difference between treatment groups and obtained different outcomes than those derived from regression models 1 and 2 was low. As a result, the regression analysis did not examine the influence of independent variables on self-reported compliance in treatment groups.

The Relationship between Documented Compliance and Attitudes

This section of the paper first recaps the calculation of the compliance rates to ensure readers are clear on how compliance rates were derived. Then we examine the actual compliance data for each property taxpayer to provide an insight into the tax behaviour of property taxpayers. Next, we match the tax attitudes and actual compliance data of respondents for the 2015/2016 tax year by using GIS to map the attitude-behaviour profiles of survey respondents in each study area.

A Recap of the Calculation of Compliance Rates

From the combined dataset on taxpayer attitudes and behaviour (payment pattern) over the period 2010/2011 to 2015/2016, the compliance rate for each taxpayer surveyed was calculated for each financial year by using the formula: (total paid/total due)*100. An example of this process was provided in figure 5 and has been placed below as figure 13. It should also be noted that the compliance data was taken from TAJ's online tax query portal

in March 2016. Thus, the compliance data reported for the 2015/2016 tax year reflects compliance in March 2016.

Figure 13: Calculation of Property Tax Compliance Rates

Tax Year	Tax (\$)	Penalty (\$)	Interest (\$)	Total Due (\$)	Total Paid (\$)	Total Outstanding (\$)	
2010-2011	2,875.00	0.00	0.00	2,875.00	2,875.00	0.00	
2011-2012	2,875.00	0.00	0.00	2,875.00	2,875.00	0.00	
2012-2013	2,875.00	0.00	0.00	2,875.00	2,875.00	0.00	
2013-2014	7,750.00	0.00	0.00	7,750.00	7,750.00	0.00	
2014-2015	7,750.00	0.00	0.00	7,750.00	35,037.50	0.00	
2015-2016	7,750.00	0.00	0.00	7,750.00	7,750.00	0.00	
2016-2017	7,750.00	0.00	0.00	7,750.00	0.00	7,750.00	
				Grand Totals:	39,625.00	59,162.50	7,750.00

Notes. Property tax compliance history of a parcel (from a study area) since 2010/11. Source: Tax Administration Jamaica Property Tax Query Portal. Accessed May 20, 2016.

To calculate the compliance rate for each parcel, the formula (total paid/total due)*100 was used. By making reference to Figure 5 and applying the aforementioned formula, the compliance rate for the parcel in the tax years 2010-11 to 2015-16 would be:

2010-11: (total paid/total due)*100 = (\$2,785.00 / \$2,785.00)*100 = 100.00%

2011-12: (total paid/total due)*100 = (\$2,785.00 / \$2,785.00)*100 = 100.00%

2012/13: (total paid/total due)*100 = (\$2,785.00 / \$2,785.00)*100 = 100.00%

2013/14: (total paid/total due)*100 = (\$7,750.00 / \$7,750.00)*100 = 100.00%

2014/15: (total paid/total due)*100 = (\$35,037.50 / \$7,750.00)*100 = 452.10%

2015/16: (total paid/total due)*100 = (\$7,750.00 / \$7,750.00)*100 = 100.00%

For the entire period displayed in Figure 5 (2010-11 to 2016-17), the property taxpayer's compliance rate would be: (total paid/total due)*100 = (\$59,162.50 / \$39,625.00)*100 = 149.30%

Secondly, it is being reiterated that compliance rates were calculated only with the data provided on the TAJ property tax query portal. Thus, as a means of verifying the amount due figure on the property tax query portal, the following formulas were used:

For Parcels with a Land Value that Was Less than or Equal to J\$100,000

- The IF function: IF (landvalue<=\$100,000, “\$1000”, “FALSE”) was used. This means that for all properties with a land value that is less than or equal to J\$100,000, the amount due would be J\$1000. If not, then FALSE would be result of the function.

For Parcels with a Land Value that Was Greater than J\$100,000 but Less than J\$1,000,000

- The formula [(landvalue–\$J100,000)*0.015]+\$J1,000 was applied. The formula was used because for parcels valued up to \$J1,000,000, \$1,000 is charged for the 1st J\$100,000 plus a rate of 1.5 percent for every dollar up to J\$1,000,000

For Parcels with a Land Value that Was Greater than \$J1,000,000

- The formula [(landvalue–\$J1,000,000)*0.02] + [(J\$1,000,000–J\$100,000)*0.015]+J\$1,000 was used. This formula was applied because the property tax liability for parcels with a value greater than J\$1,000,000 is calculated as follows: J\$1,000 is charged for the first J\$100,000, for every dollar in excess of J\$100,000 but less than J\$1,000,000 at rate of 1.5 percent is applied and for every dollar in excess of J\$1,000,000, a rate of two percent is applied.
- It must also be noted that the sample used is not reflective of Jamaica’s total population of property taxpayers, because information on the number of parcels in each collectorate was not obtained by the research team. As such, proportionate stratified random sampling was used to determine the number of property taxpayers needed from each collectorate to administer the attitudes survey. To this end, the housing unit population for each location was used as the benchmark for calculating the number of property taxpayers that were required. This was undertaken based on two assumptions:
 - The geographic boundaries of locations referred to as ‘special areas’, by the Statistical Institute of Jamaica, and as ‘collectorate’, by the Ministry of Local Government, were the same. All collectorates used in the study were referred to as special areas by the Statistical Institute of Jamaica;
 - At least 1 property taxpayer lived at each housing unit.

Actual Compliance Data: Behaviour of Property Taxpayers in Selected Study Areas

The compliance rate for all taxpayers in each financial year was averaged to produce the annual property tax compliance rate. Next, the annual compliance rate for each taxpayer was also averaged to determine the average compliance rate of each taxpayer for the period 2010/2011–2015/2016. The results of this exercise are presented below.

Annual Property Tax Compliance Rates and Percentage Increase in Tax Liability

Based on the payments made by property taxpayers in the sample cohort over the study period, annual property tax compliance rates were:

- 90.81 percent in 2010/2011
- 88.80 percent in 2011/2012
- 86.85 percent in 2012/2013
- 83.43 percent in 2013/2014

- 80.52 percent in 2014/2015
- 66.47 percent in 2015/2016

When these results were investigated further across selected study areas, a similar trend was revealed, as shown in table 11.

Table 11: Annual Property Tax Compliance Rates in Collectorates 2011/2012–2015/2016

Collectorates	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
2	93	94	80	80	80	75
3	92	88	87	84	80	72
4	90	89	87	85	87	72
5	92	91	89	85	82	78
6	95	93	89	86	81	63
7	96	95	94	92	96	75
14	56	52	51	48	44	37
23	93	91	91	84	66	49
24	88	87	86	80	73	58

Source: Compliance rates calculated by research team with information taken from the TAJ property tax query portal.

Table 11 indicates that property tax compliance rates were relatively high in eight out of nine study areas between 2010/2011 and 2012/2013. In all collectorates, there was a general decline in compliance rates between 2013/2014 and 2015/2016. This may be as a result of an increase in property tax rates in the 2013/2014 fiscal year.

From the sample cohort, it was observed that the property tax liability of taxpayers increased by 75 percent to 300 percent, possibly as a result of increased property tax rates in 2013/2014. When analysed at the collectorate level, the average percentage increase in property tax liability ranged from 140–188 percent. Table 12 shows the average percentage increase for each collectorate and their corresponding compliance rates for the period 2013/2014 to 2015/2016.

Table 12: Average Percentage Increase in Property Tax Liability 2012/13–2013/14

Collectorate	Number of Parcels in Cohort (out of 752)	Percentage Increase in Property Tax Liability 2012/13–2013/14	Average Compliance Rate (2013/14–2015/16)
2	14	169 %	78
3	78	140 %	79
4	115	169 %	81
5	96	161 %	82
6	189	166 %	77
7	115	188 %	88
14	47	169 %	43
23	65	179 %	66
24	32	185 %	70

Source: Calculations based on information provided on TAJ’s property tax query portal. Note: Property tax rates were increased in 2013/14 and is currently charge at the same rate.

Average Compliance Rates for Respondents in all Collectorates

When the average compliance rates of property taxpayers over the study period were analysed, it was revealed that:

- 13.3 percent of the cohort had an average compliance rate in the range of 0–49 percent;
- 10.2 percent of the cohort had an average compliance rate that ranged from 50–79 percent;
- 15.7 percent of the sample had an average compliance rate between 80 and 99 percent; and
- 60.5 percent of the cohort had an average compliance rate that ranged from 100–159 percent.

In light of the findings, the annual compliance rate for each respondent were grouped into the ranges provided above to determine the distribution of compliance rates for the sample cohort. This investigation led to the realisation that in 2010/2011, 89.7 percent of the sample had a compliance of 100 percent or more. For 2011/2012, 86.9 percent of respondents were at least 100 percent compliant. A similar finding was observed for 2012/2013, where 85.2 percent of the sample had a compliance rate that was greater than or equal to 100 percent. For the period 2013/2014–2015/2016, the compliance rates of taxpayers were more diverse. But most respondents were at least 100 percent compliant.

For 2013/2014, the lowest compliance rate for 79.9 percent of the cohort was 100 percent. In 2014/2015, 73.4 percent of the cohort had a compliance rate between 100 percent and 199 percent, with one percent of the sample having compliance rates that ranged from 200–474 percent. In 2015/2016, the compliance rate for 59.6 percent of the cohort ranged from 100–199 percent, and one percent of the sample had a compliance rate in the range of 200–400 percent. Table 13 shows the complete distribution of compliance rates for respondents over the period 2013/2014 to 2015/2016.

Table 13: Distribution of Taxpayers' Compliance Rates 2013/14–2015/16

Year	Number of Respondents (out of 752) in each Range of Compliance				
	0–49%	50–79%	80–99%	100–199%	200%+
2013/14	127	9	13	603	0
2014/15	168	18	6	552	8
2015/16	264	22	8	450	8

Source: Research Team. Compilation was undertaken based on data provided on TAJ property tax query portal.

Table 13 indicates that the number of respondents in the 0–49 percent compliance range increased by 24.4 percent between 2013/2014 and 2014/2015. There was also a 57.1 percent increase in the number of taxpayers with a compliance rate between 0–49 percent. However, the number of respondents with a compliance rate in the range of 100–199 percent reduced by 25.4 percent between 2013/2014 and 2015/2016.

Thus far, the results imply that the compliance rate of Jamaican property taxpayers may be higher than reported, albeit seemingly on a downward trend. This potential disparity may be as a result of how compliance is being calculated, analysed by the government and/or how it is being communicated to the public.

It has been observed that it is often the case that when figures are being provided in relation to property tax compliance in Jamaica, it is property tax arrears (in dollar amounts) that is given and seldom a compliance rate (as a percent). This observation was highlighted in one semi-structured interview and, as a response, it was explained that arrears are provided so as to make it easier for the public to understand.

In light of the results, it is critical that property tax compliance rate for parcels in different value bands be ascertained. Selected study areas comprised of parcels with very high to low land values. In this regard, three value bands were used to determine the compliance rate for parcels from the following categories:

- land value less than or equal to J\$100,000;
- land value greater than J\$100,000 but less than or equal to J\$1,000,000; and
- land value greater than J\$1,000,000.

These value bands were selected in accordance with the property tax rate scales used by the Government of Jamaica. The results of this investigation is presented below in tables 14 and 15.

Table 14: Property Tax Compliance Rates for Each Value Band

Value Band	N	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	Avg. Comp. %
≤ \$100,000	35	81.08%	71.81%	70.51%	77.63%	76.88%	75.57%	75.58%
\$100,001–\$1,000,000	633	91.50%	89.94%	88.11%	85.24%	80.25%	68.79%	83.97%
> \$1,000,000	82	74.75%	71.64%	70.36%	66.48%	63.82%	56.62%	67.28
TOTAL	750	82.44%	77.80%	76.33%	76.45%	73.65%	66.99%	75.61%

Source: Data compiled by research team from the dataset created with survey data and information from TAJ's property tax query portal. Notes: N is number of parcels, Avg. Comp% is average compliance rate

Based on the information provided in table 14, it appears that properties in the second value band had the highest compliance rate throughout the entire study period. Additionally, it must be noted that annual compliance rates for properties in the lowest value band increased above their 2012–2013 rates.

When compliance rates for parcels in the second value band are compared to compliance rates for the entire cohort, it appears that parcels in value band two are a proxy for the compliance rate of the sample. This is illustrated in table 15.

Table 15: Compliance Rates for Value Band 2 and Sample Cohort

Parcels	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	Average Cmplnce %
Value Band 2	91.50%	89.94%	88.11%	85.24%	80.25%	68.79%	83.97%
Entire Sample	90.81%	88.80%	86.85%	83.43%	80.52%	66.47%	82.81%

Source: Research Team. Compliance rates and value bands created with information from the TAJ property tax query portal.

In light of the high compliance rates for the sample cohort, the data set was examined to ascertain the number of taxpayers in the cohort that paid penalties and interest charges in each tax year. In addition, those respondents with an average compliance rate (for the study period) of 100 percent or more were analysed to observe how many of them paid penalties and interest charges. This was done to determine if the high compliance rates were a result of taxpayers making late payments of their tax liability within a given year.

Section 6 of the Property Tax Act 1903 stipulates that where full payment of the property tax has not been made in the month of April in the year tax is due, a penalty of 10 percent will be added to the tax liability. Section 7 of the act adds that when the amount due has not been paid for 30 days after the payment deadline, interest will be charged from the day after the payment deadline to the date of collection at an annual interest rate of 15 percent.

In lieu of the aforementioned, the research team contends that where a taxpayer has only been charged a penalty, he or she paid their liability between April 2–30 in the year when the tax is due. Additionally, when a taxpayer has been charged interest, he or she has not paid their tax liability on or before April 30. Thus, penalty and interest charges can be used to give an indication of when taxpayers paid their liability. It is noted that this approach does not provide explicit details on when a tax liability has been paid, but the tax query portal does not provide the dates when payments were made over the study period.

Table 16 indicates that in the 2010/2011 tax year of the 752 survey respondents, 46.7 percent were charged a penalty, while 2.6 percent were charged interest. In 2011/2012, these figures increased slightly as 52.8 percent of the cohort were charged a penalty and 4.1 percent were charged interest. However, in 2012/2013 there was a decline in the number of respondents who were required to pay penalty and interest charges. For the 2012/2013 tax year 42.3 percent were charged a penalty and 4.9 percent were required to pay interest. The downward trend observed in 2012/2013 continued in 2013/2014, as 33.3 percent of the cohort had a penalty charge, while 4.5 percent had to pay an interest charge. In 2014/2015, 31.3 percent of respondents paid a penalty, while 1.9 percent of the sample had an interest charge levied

against them. In 2015/2016, four respondents were charged a penalty before the end of the tax year. Based on the provisions of Sections 6 and 7 of the Property Tax Act, it would be expected for a penalty to be applied after April 1st and interest charges to be levied after April 30th.

The information provided in table 16 is suggesting that the high compliance rates of the sample was not a result of taxpayers paying arrears (from previous years) in a given or current tax year. This argument is strengthened by the fact that on average only seven percent of respondents who were charged a penalty were required to pay interest. This implies that between April 2011 to March 2016 the cohort was charged interest over the study period. This implies on average, 34.5 percent of the sample paid their property tax between April 2–30, while three percent of the cohort paid their tax liability after April 30 in the year when their tax was due.

Further investigating revealed that all four respondents had a history of non-compliant behaviour. Two respondents were non-compliant each year in the study period. Another had been non-compliant between 2013/2014 and March 2016 and the fourth respondent was non-compliant between 2011/2012 and March 2016. Although these respondents had a history of property tax evasion, it doesn't explain why they were charged a penalty for the 2015/2016 year before it ended.

Table 16: Number of Taxpayers Who Received Penalty and Interest Charges in 2010/11–2015/16

Year	Penalty	Interest	% of Taxpayers with a penalty that were charged interest	% of Sample that was charged a penalty	% of Sample that was charged interest
2010/11	352	20	6%	46.8%	2.60%
2011/12	398	31	8%	52.9%	4.10%
2012/13	319	37	12%	42.4%	4.90%
2013/14	251	34	10%	33.3%	4.50%
2014/15	236	15	6%	31.3%	1.99%
2015/16	4	0	0%	0.53%*	0%*

Source: Research Team. Data obtained from compliance dataset on taxpayer attitudes and actual compliance.
* the percentages for 2015/16 reflects what was observed on the online query portal in March 2016.

The payment history for the parcels associated with the four respondents, were re-checked in the 2016/2017 tax year. This revealed that the 2015/2016 tax liability for each parcel was not paid. In addition, no penalty or interest charges were applied to any of the four parcels for 2015/2016. This is presented in table 17. The investigation also showed that 312 (of 752) had not paid their tax liability at the time of data retrieval from the tax portal (i.e. the first week in March 2016). Thus, the compliance rate of 67 percent (in March 2016) was attained from 58.5 percent of the sample cohort.

Table 17: Property Tax Payments in 2015/16 for Selected Parcels

Period of Data Retrieval from Tax Portal	Respondent #	Tax	Penalty	Interest	Total Due	Total Paid
March 2016	329	2,500.00	250	0.00	2,750.00	0.00
September 2016	329	2,500.00	0.00	0.00	2,500.00	0.00
March 2016	577	1,000.00	100	0.00	1,100.00	0.00
September 2016	577	1,000.00	0.00	0.00	1,000.00	0.00
March 2016	417	7,000.00	700	0.00	7,700.00	0.00
September 2016	417	7,000.00	0.00	0.00	7,700.00	0.00
March 2016	418	4,000.00	400	0.00	4,400.00	0.00
September 2016	418	4,000.00	0.00	0.00	4,000.00	0.00

Source: TAJ Online Property Tax Query Portal. Note: property tax payments were accessed from TAJ’s Online Portal in the first week of March 2016 and September 28, 2016.

Matching Tax Attitudes and Behaviour: Analysing Property Tax Compliance Spatially

This section of the paper spatially examines the data in two ways. The first approach focuses on the average compliance rate of each respondent for the period 2010/2011 to 2015/2016. It shows as compliant only those who have paid their tax liability in full each year over the period. As such, a respondent represented as non-compliant is anyone who has not paid their property tax liability in full, for one or more years over the study period. Where a respondent has an average compliance rate of at least 100 percent, this is represented by a purple dot, while a green dot symbolises that a taxpayer has an average compliance rate that is less than 100 percent. The first map on each collectorate, illustrates the occurrences of average compliance and average non-compliance among property taxpayers over the study period.

The second approach shows the tax attitude-behaviour profiles of taxpayers in each study area. In separating the attitudes from behaviours, four symbols have been used. For attitudes, that is, when asked about paying their tax bills for 2015/2016, those who stated that they paid their last bill are represented by a purple square and are labelled as having a compliant attitude. Those who said they did not pay their last bill were labelled as having a non-compliant attitude and are represented by a green diamond. Behaviours are represented by dots. Those properties shown on the TAJ property tax query portal to have paid all their liability for the 2015/2016 year are represented by a red dot and are labelled as exhibiting compliant behaviour, while those exhibiting a non-compliant behaviour through payment of less than the full amount shown on the system are represented as a blue dot.

As such, where a red dot occurs in a purple square, this indicates that the compliant behaviour matched the compliant attitude. Where a blue dot occurs in a green diamond, non-compliant attitudes and behaviour have coincided. A red dot in a green diamond shows where a non-compliant attitude has been matched by a compliant behaviour, meaning that though the person said they had not paid, they actually did or did so subsequent to the survey. In the case of a blue dot occurring in a purple square, a compliant attitude in the survey has been

matched by non-compliant behaviour. Table 18 illustrates the legend for the compliance maps created. The first map for each collectorate shows those respondents who were compliant, while the second illustrates the attitude-behaviour relationship in each collectorate. Notes are provided to guide the reader on the number of respondents with:

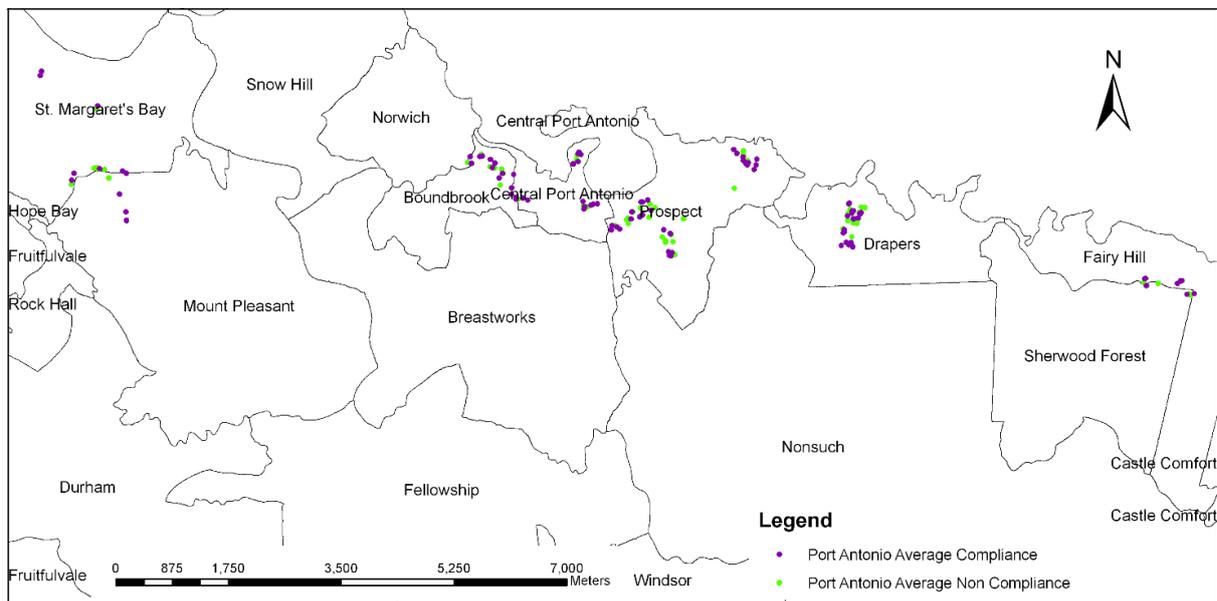
- a. a compliant attitude and compliant behaviour;
- b. a non-compliant attitude and compliant behaviour;
- c. a compliant attitude and non-compliant behaviour; and
- d. a non-compliant attitude and non-compliant behaviour.

Table 18: General Legend for All Compliance Maps

	Compliant behaviour matches compliant attitude
	Non-compliant attitude matches a compliant behaviour
	Compliant attitude matches non-complaint behaviour
	Non-compliant behaviour matches non-compliant attitude

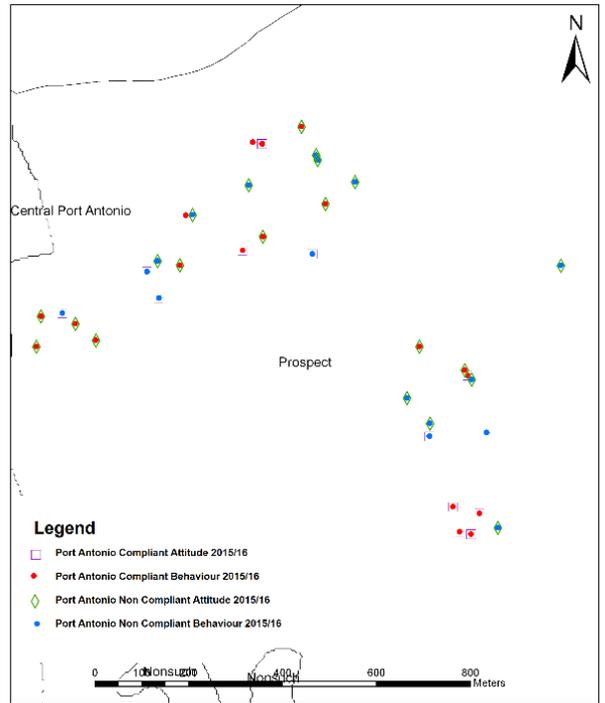
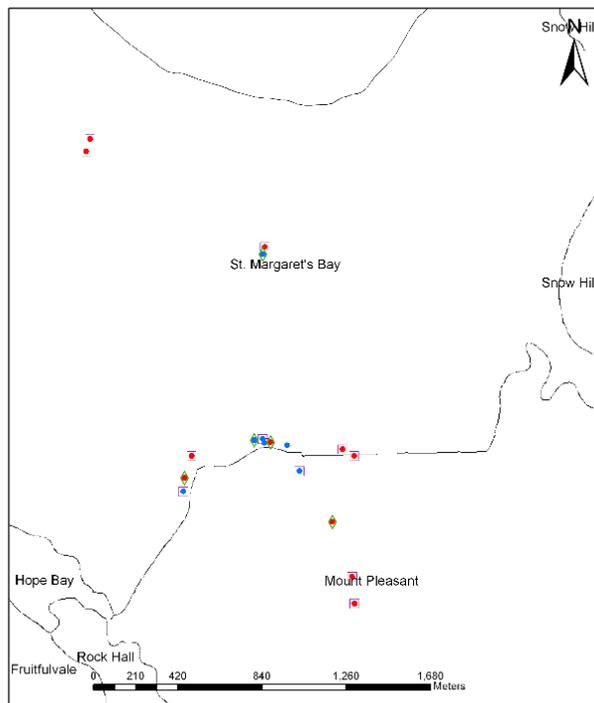
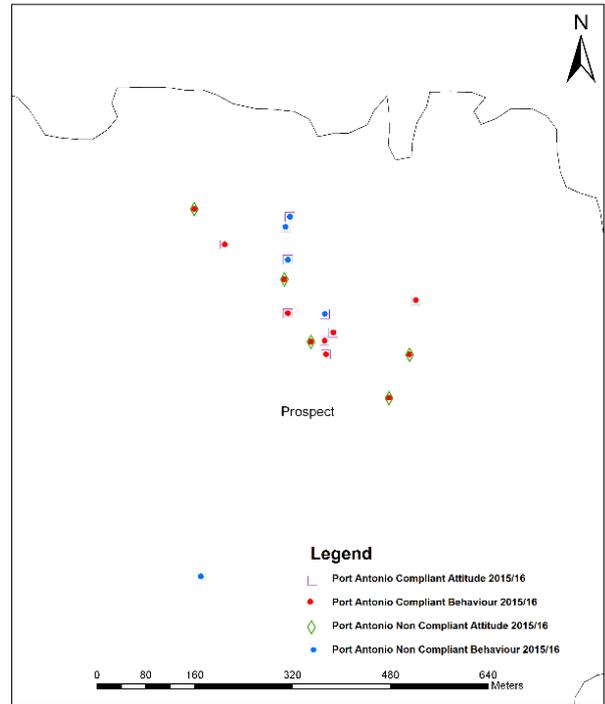
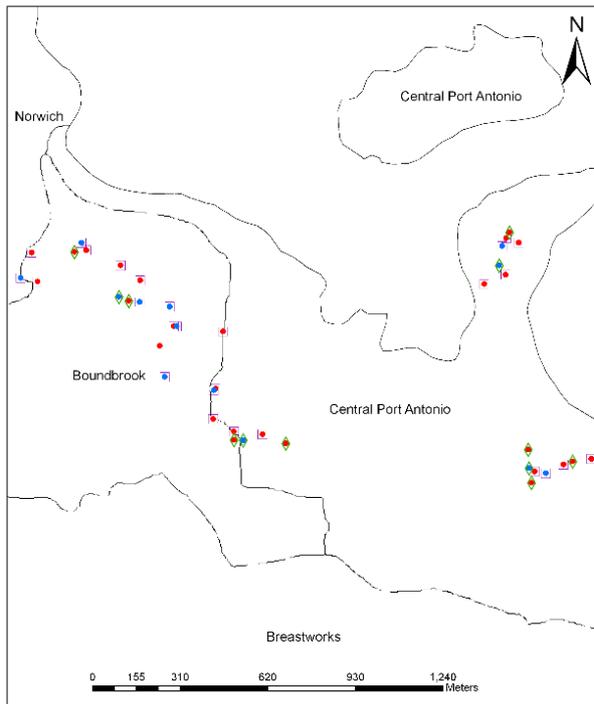
Property Tax Compliance for Respondents in Port Antonio, Portland

Map 1: Port Antonio Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.



The percentage of respondents with an average of 100 percent compliance over the period is approximately 60.32 percent, while those with average compliance less than 100 percent is 39.68 percent.

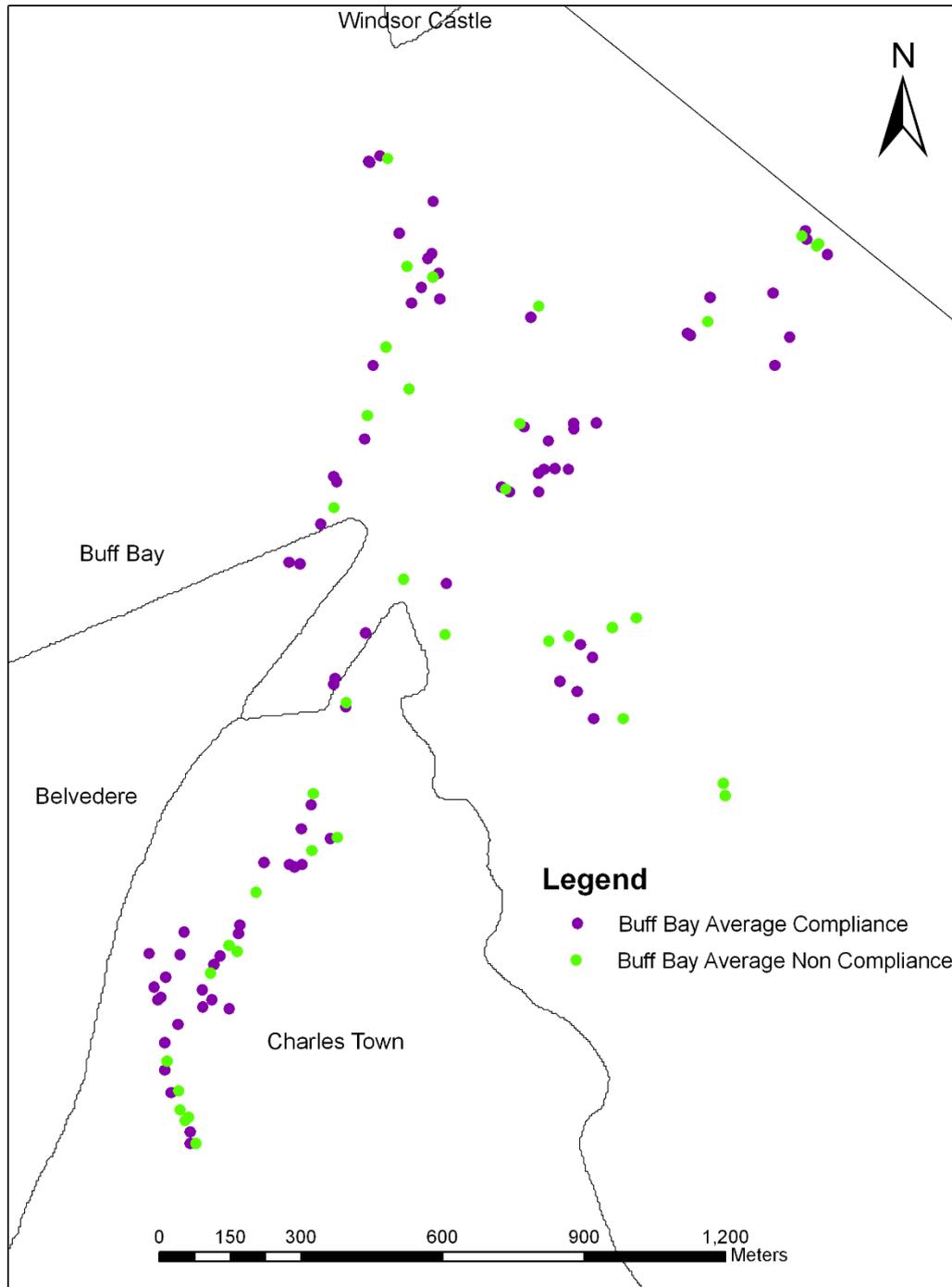
Map 2: Matching Attitudes to Behaviour in Port Antonio, Portland (2015/2016)



NOTES		
	Compliant attitude matches compliant behaviour	37.57%
	Non-compliant attitude matches a compliant behaviour	22.22%
	Compliant attitude matches non-compliant behaviour	22.22%
	Non-compliant attitude matches non-compliant behaviour	17.99%

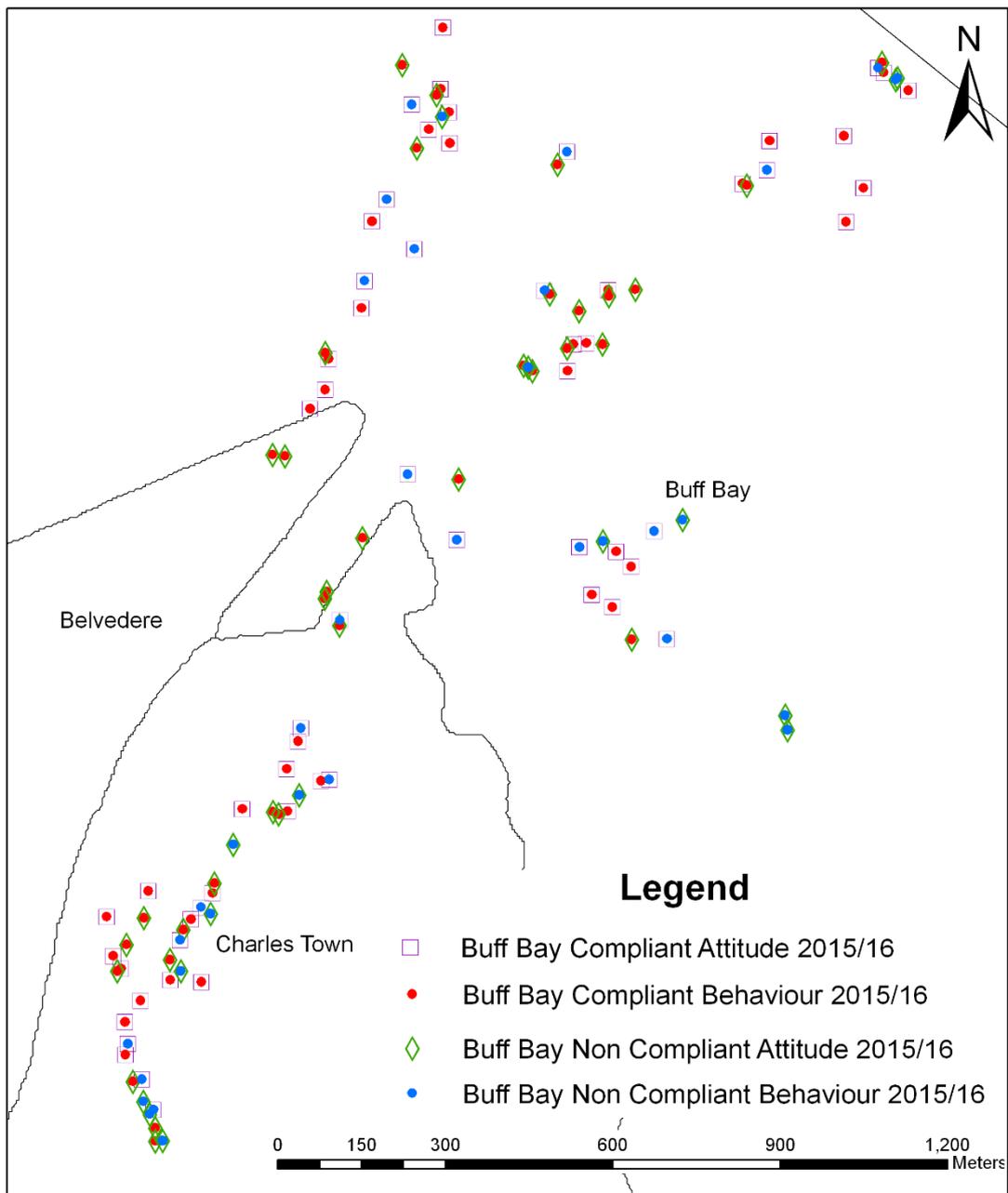
Property Tax Compliance for Respondents in Buff Bay, Portland

Map 3: Buff Bay's Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.



The percentage of respondents with an average of 100 percent compliance (compliant) over the period is approximately 67.83 percent, while those with average compliance less than 100 percent is 32.17 percent.

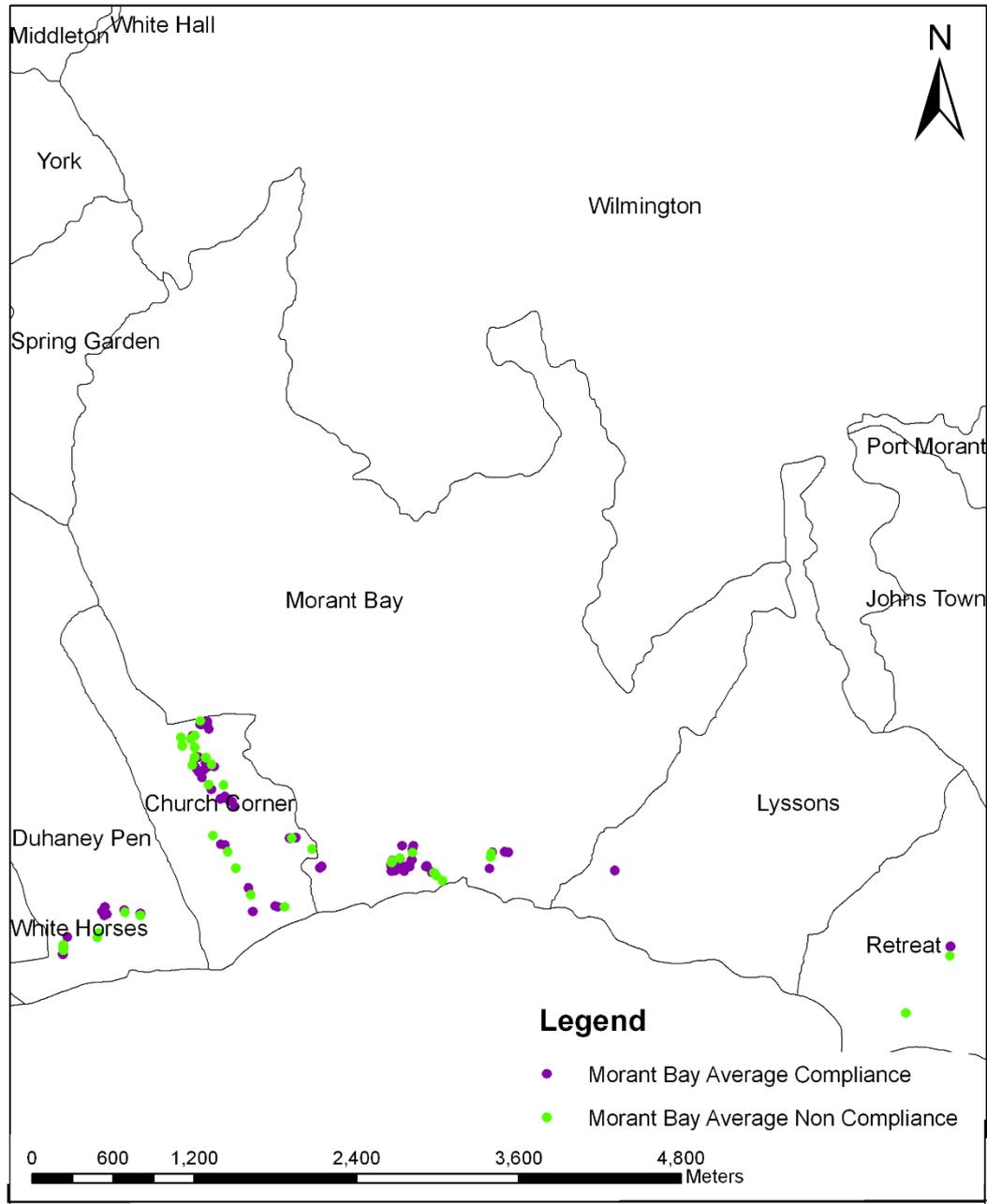
Map 4: Matching Attitudes to Behaviour in Buff Bay, Portland (2015/2016).



NOTES		
	Compliant attitude matches compliant behaviour	38.60%
	Non-compliant attitude matches a compliant behaviour	29.57%
	Compliant attitude matches non-compliant behaviour	19.13%
	Non-compliant attitude matches non-compliant behaviour	13.04%

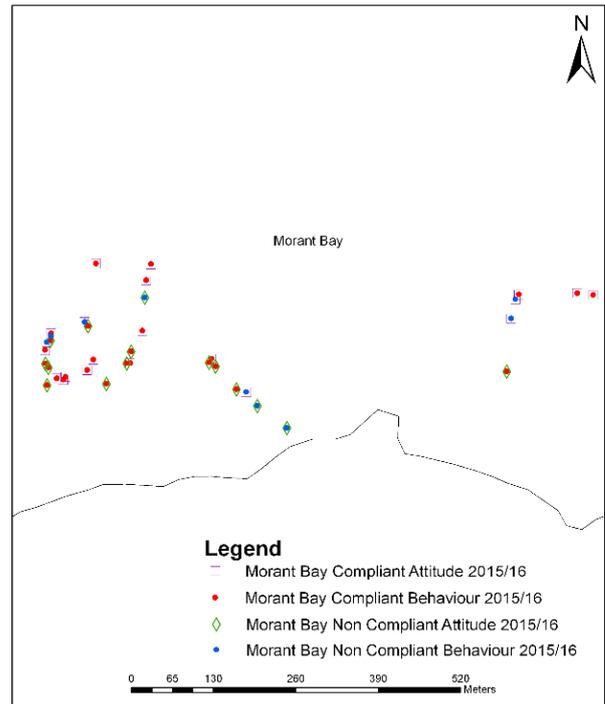
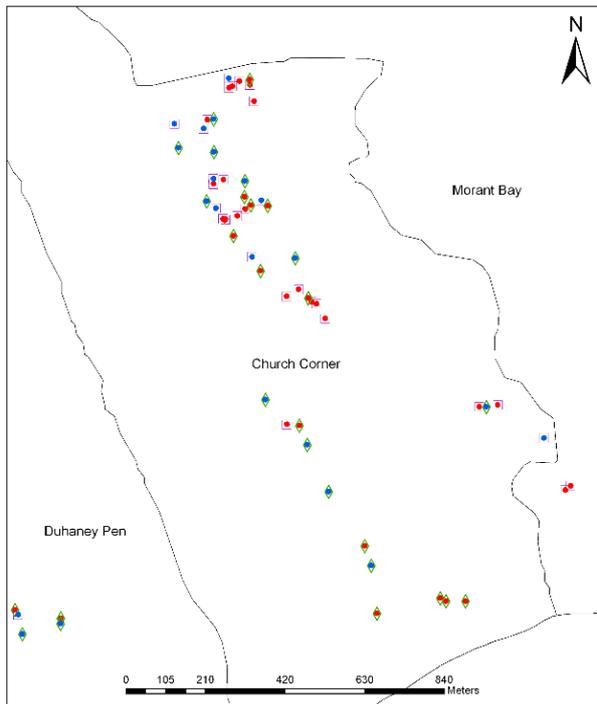
Property Tax Compliance for Respondents in Morant Bay, St. Thomas

Map 5: Morant Bay's Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.

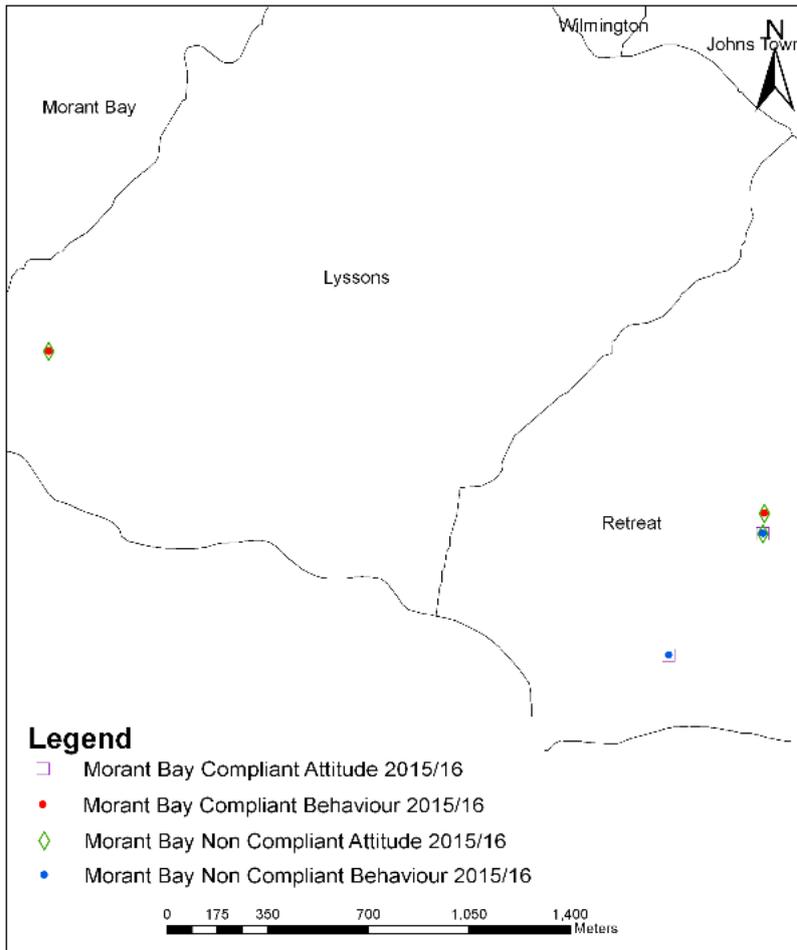


The percentage of respondents with an average of 100 percent compliance (compliant) over the period is approximately 66.96 percent, while those with average compliance less than 100 percent is 33.04 percent.

Map 6: Matching Attitudes to Behaviour in Morant Bay, St. Thomas (2015/2016)



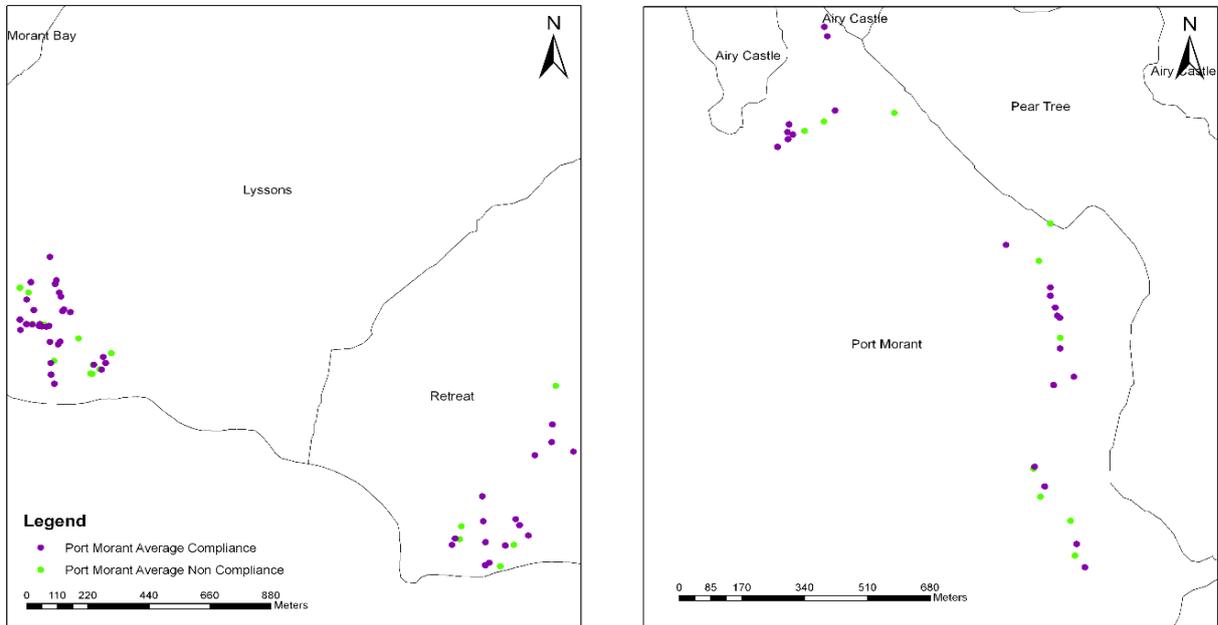
Map is continued on next page.



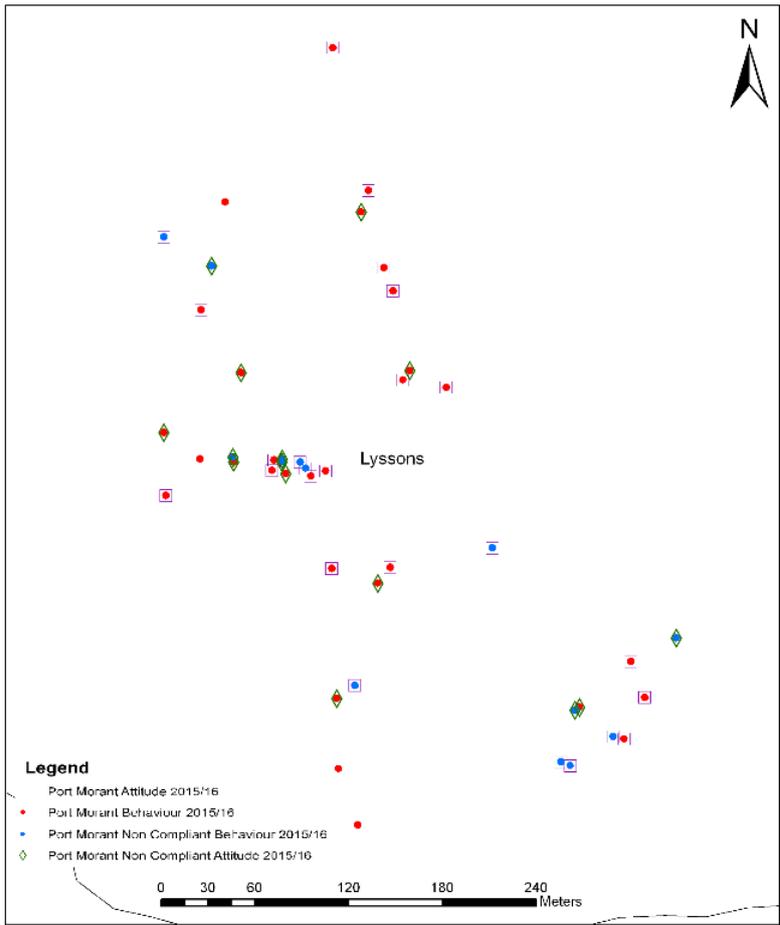
NOTES		
□	Compliant attitude matches compliant behaviour	37.39%
◇	Non-compliant attitude matches a compliant behaviour	29.57%
□	Compliant attitude matches non-compliant behaviour	18.26%
◇	Non-compliant attitude matches non-compliant behaviour	14.78%

Property Tax Compliance for Respondents in Port Morant, St. Thomas

Map 7: Port Morant Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.



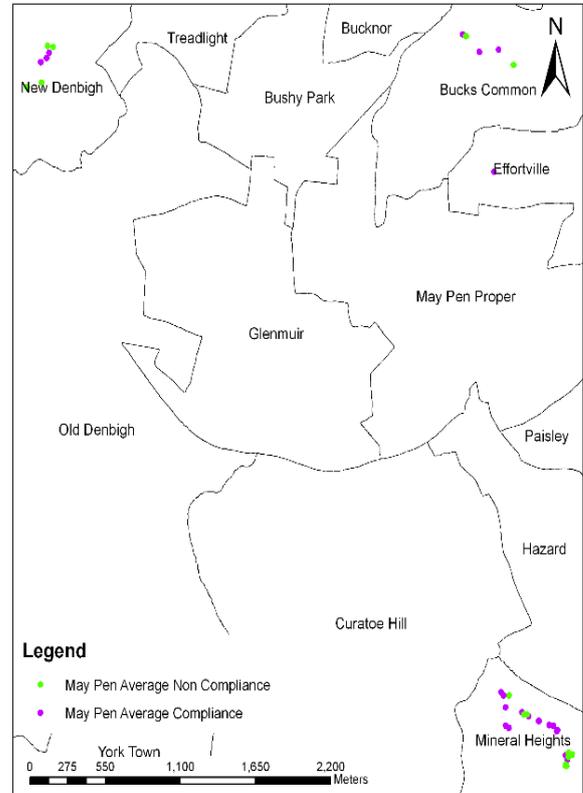
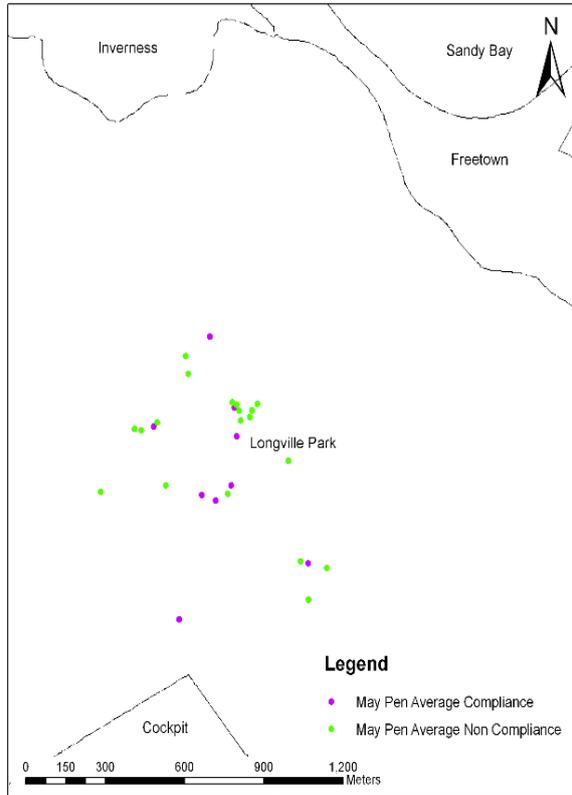
The percentage of respondents with an average of 100 percent compliance (compliant) over the period is approximately 68.75 percent, while those with average compliance less than 100 percent is 31.25 percent.



NOTES		
	Compliant attitude matches compliant behaviour	53.13%
	Non-compliant attitude matches a compliant behaviour	16.67%
	Compliant attitude matches non-compliant behaviour	19.79%
	Non-compliant attitude matches non-compliant behaviour	10.42%

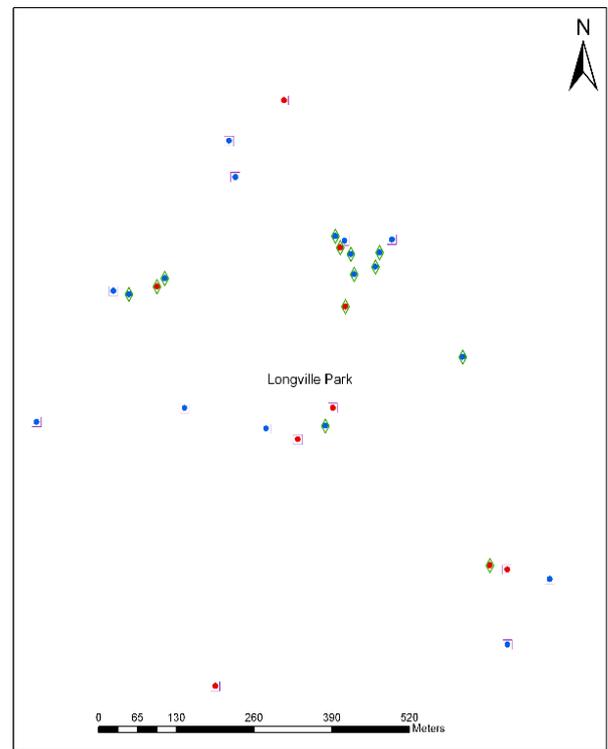
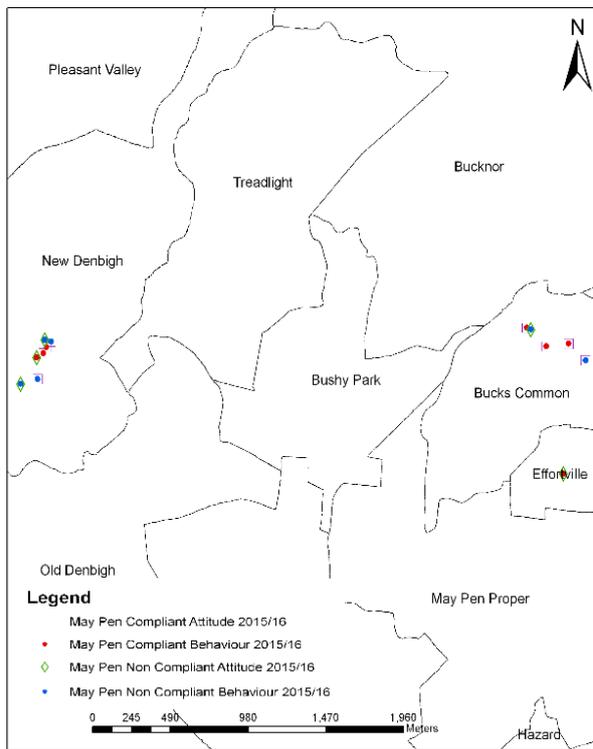
Property Tax Compliance for Respondents in May Pen, Clarendon

Map 9: May Pen Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.

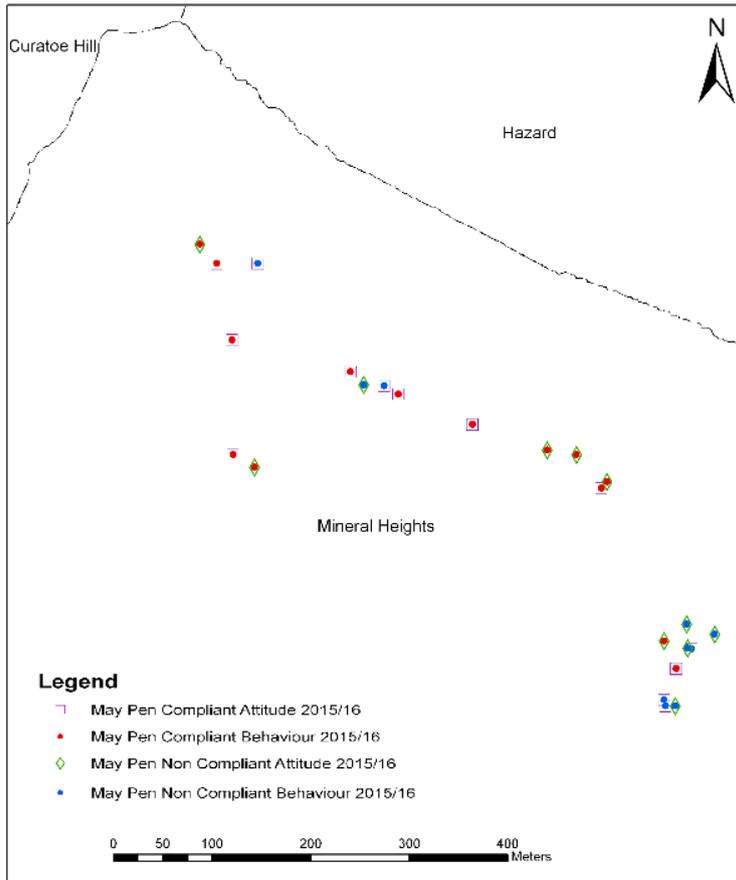


The percentage of respondents with an average of 100 percent compliance (compliant) over the period is approximately 46.15 percent, while those with average compliance less than 100 percent is 53.85 percent.

Map 10: Matching Attitudes to Behaviour in May Pen, Clarendon (2015/2016).



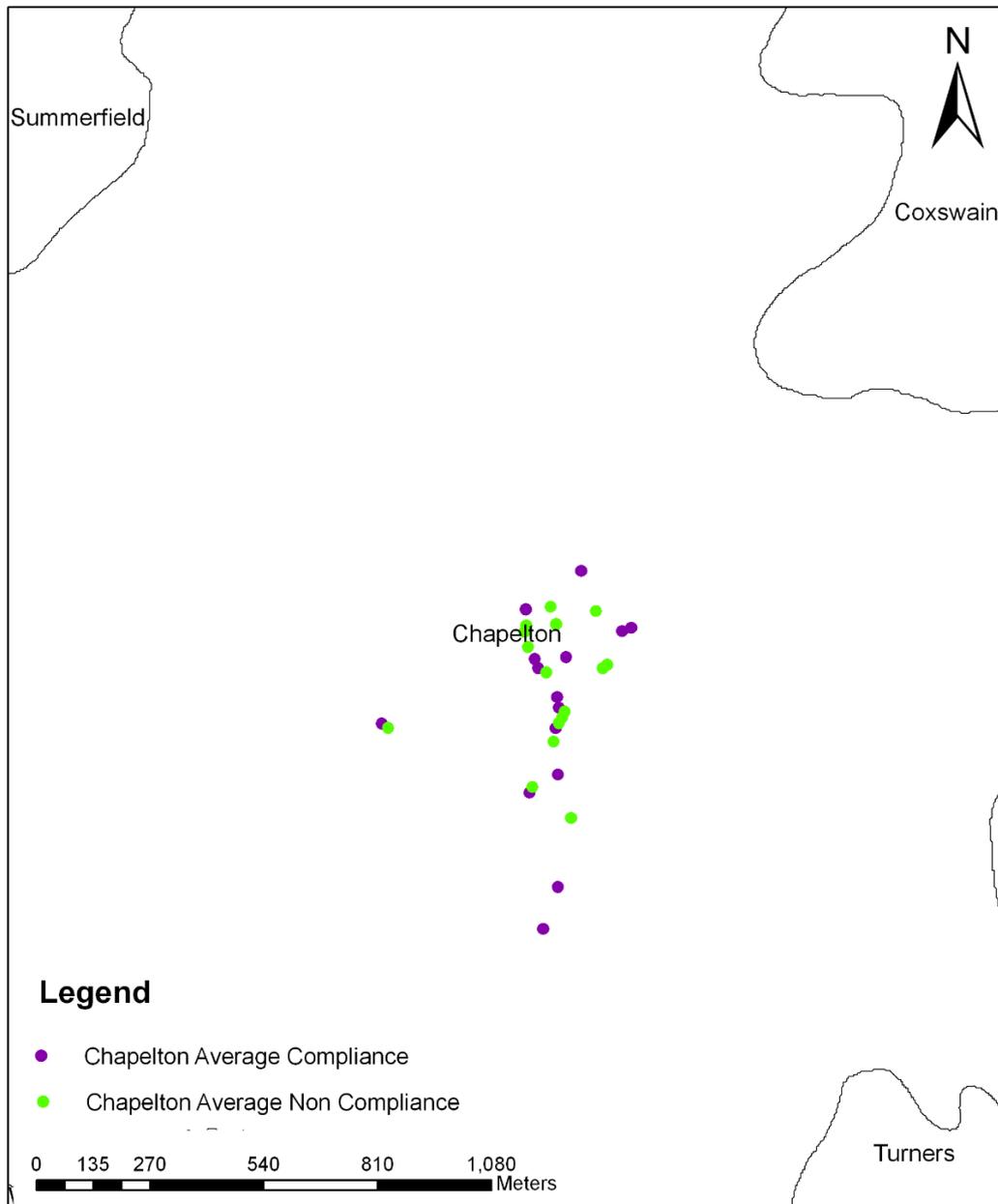
Map is continued on next page.



NOTES		
	Compliant attitude matches compliant behaviour	27.69%
	Non-compliant attitude matches a compliant behaviour	18.46%
	Compliant attitude matches non-compliant behaviour	27.69%
	Non-compliant attitude matches non-compliant behaviour	26.15%

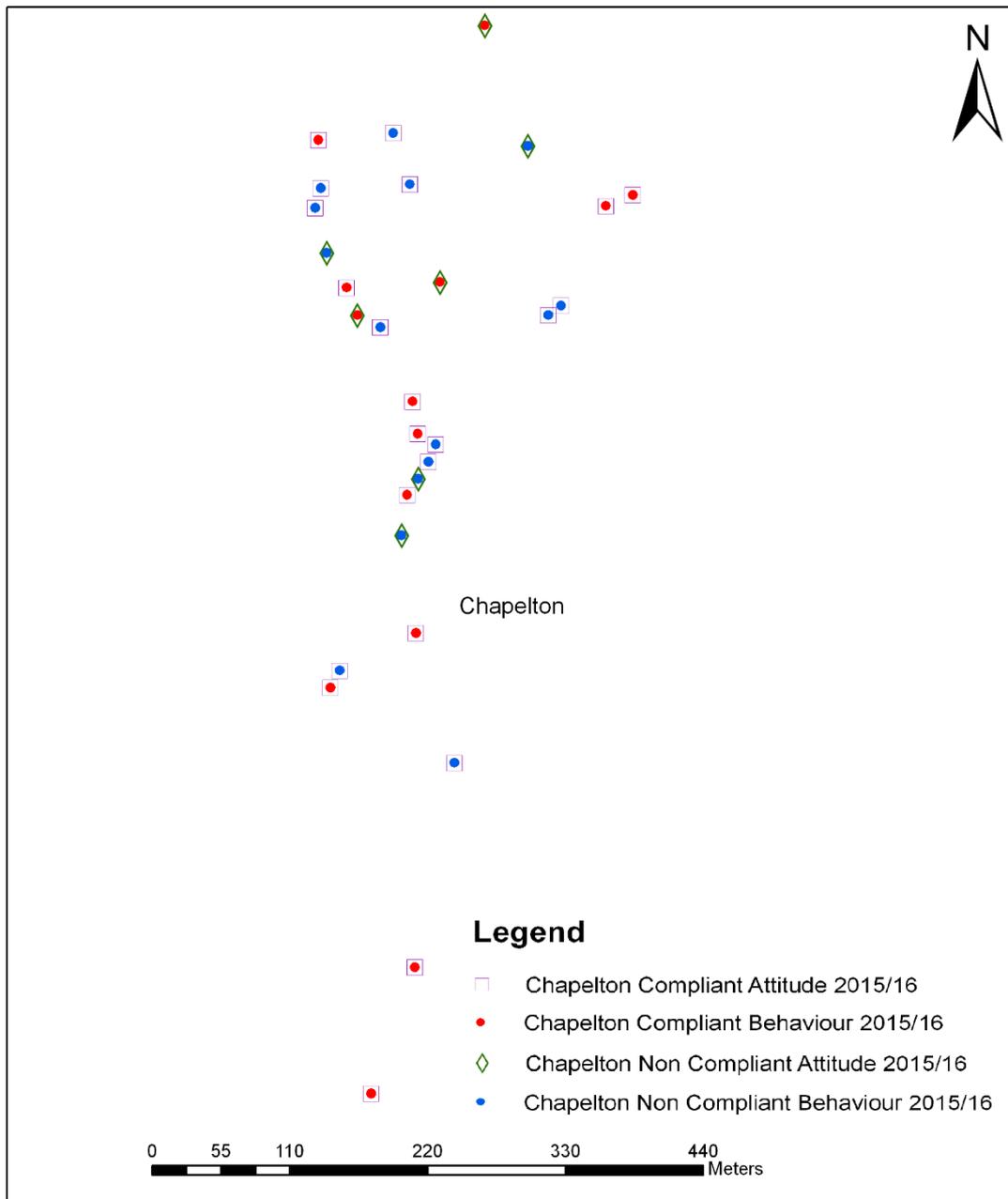
Property Tax Compliance for Respondents in Chapelton, Clarendon

Map 11: Chapelton Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.



The percentage of respondents with an average of 100 percent compliance (compliant) over the period is approximately 48.39 percent, while those with average compliance less than 100 percent is 51.61 percent.

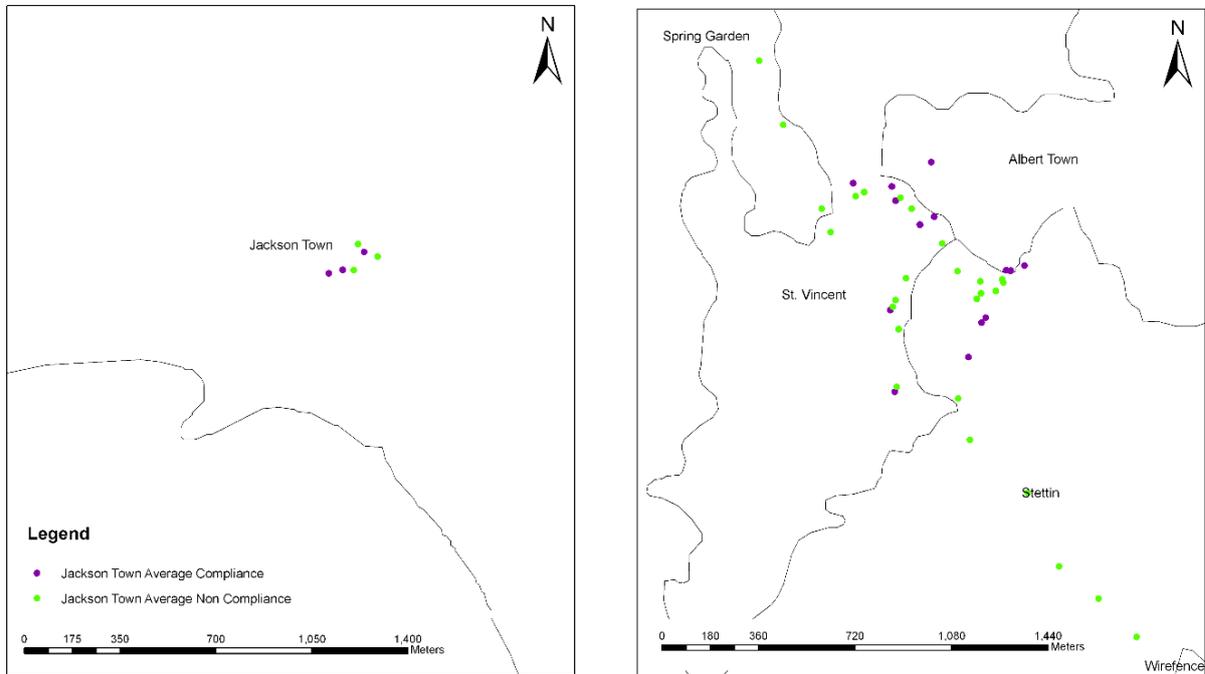
Map12: Matching Attitudes to Behaviour in Chapelton, Clarendon (2015/2016).



NOTES		
	Compliant attitude matches compliant behaviour	38.71%
	Non-compliant attitude matches a compliant behaviour	9.68%
	Compliant attitude matches non-compliant behaviour	38.71%
	Non-compliant attitude matches non-compliant behaviour	12.90%

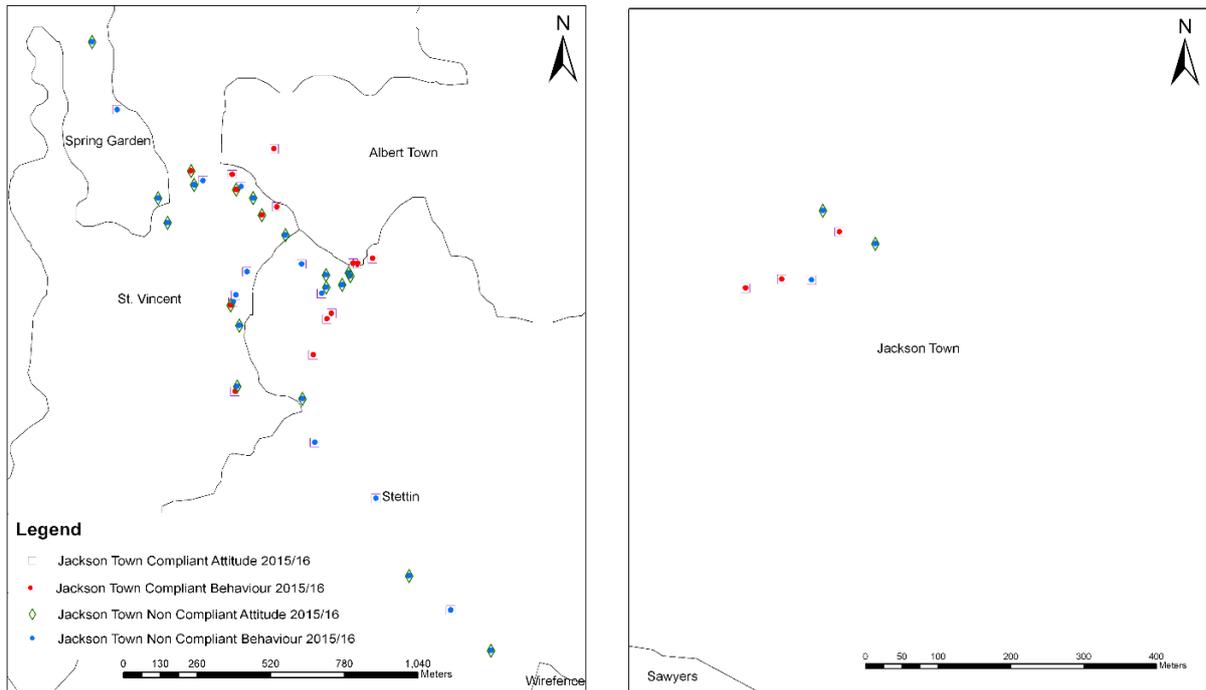
Property Tax Compliance for Respondents in Jackson Town, Trelawny

Map 13: Jackson Town Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.



The percentage of respondents with an average of 100 percent compliance (compliant) over the period is approximately 36.17 percent, while those with average compliance less than 100 percent is 63.83 percent.

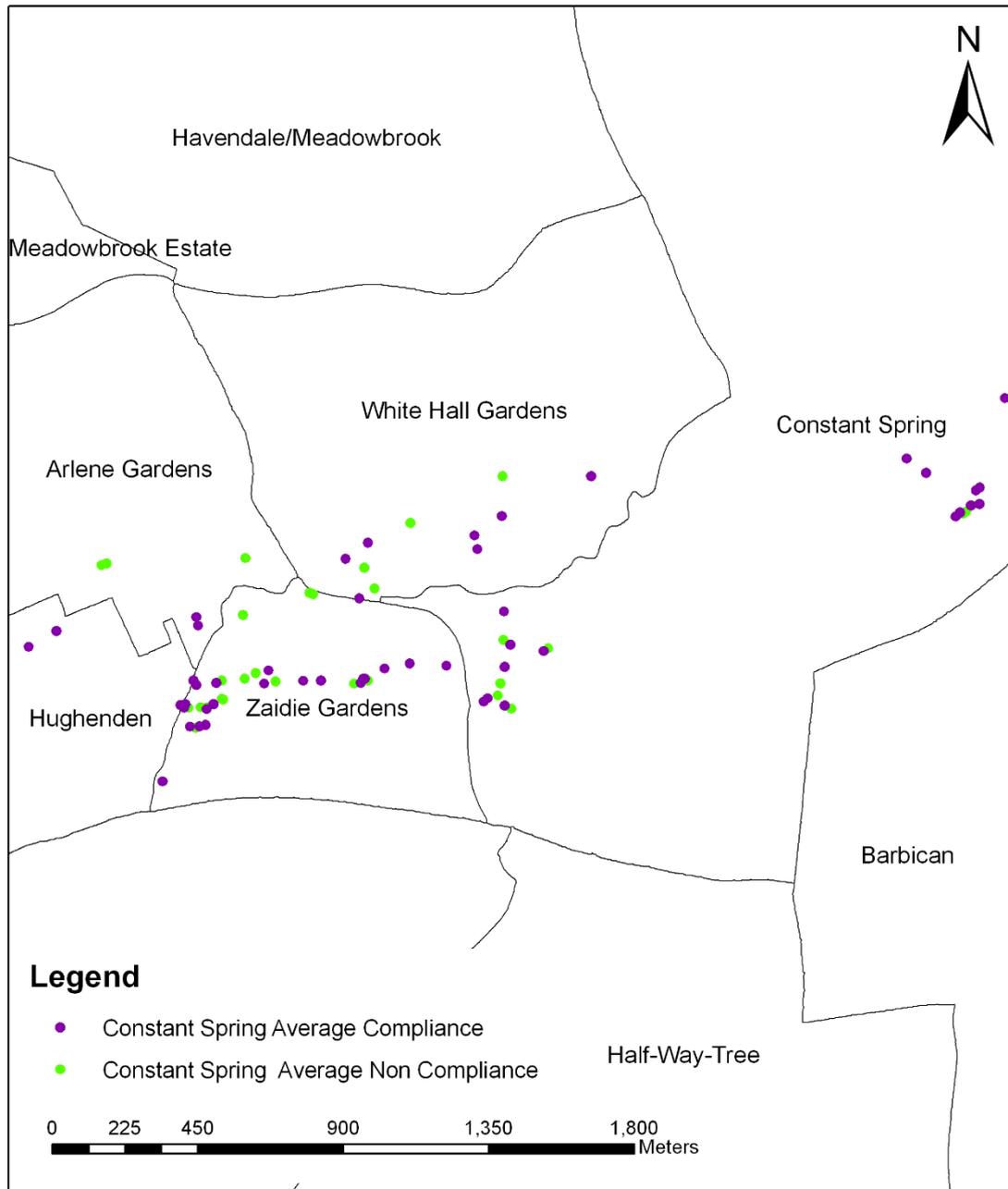
Map 14: Matching Attitudes to Behaviour in Jackson Town, Trelawny (2015/2016).



NOTES		
◻	Compliant attitude matches compliant behaviour	27.66%
◻	Non-compliant attitude matches a compliant behaviour	8.51%
◻	Compliant attitude matches non-compliant behaviour	25.53%
◻	Non-compliant attitude matches non-compliant behaviour	38.30%

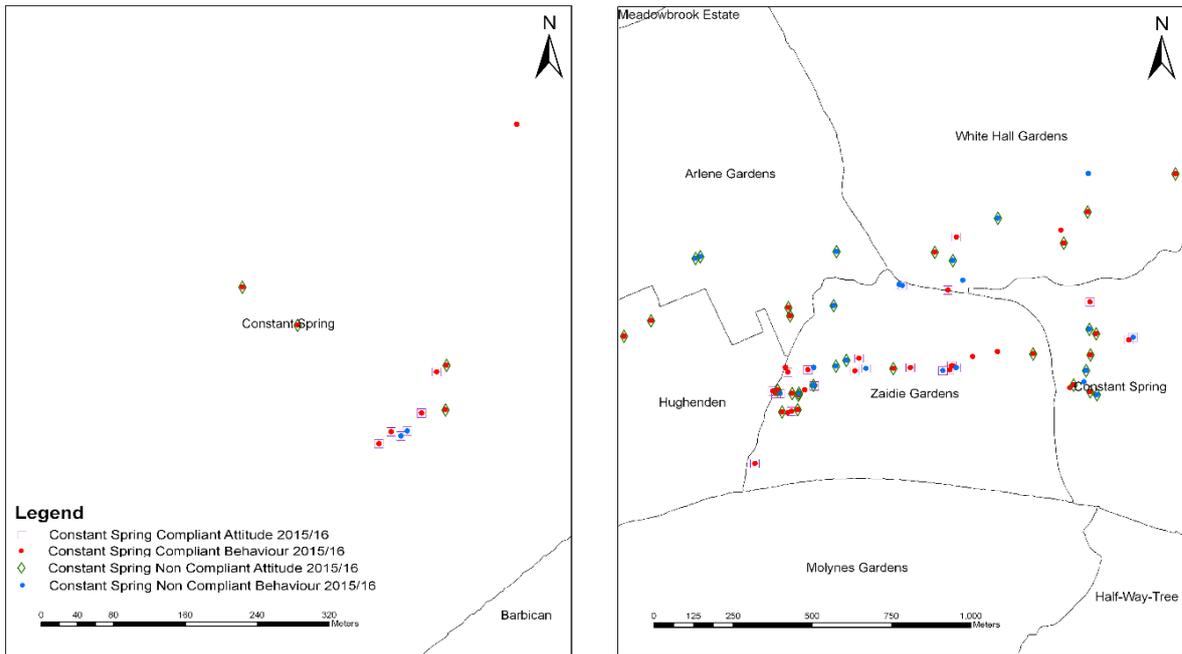
Property Tax Compliance for Respondents in Constant Spring, St. Andrew

Map 15: Constant Spring Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.



The percentage of respondents with an average of 100 percent compliance (compliant) over the period is approximately 62.82 percent, while those with average compliance less than 100 percent is 37.18 percent.

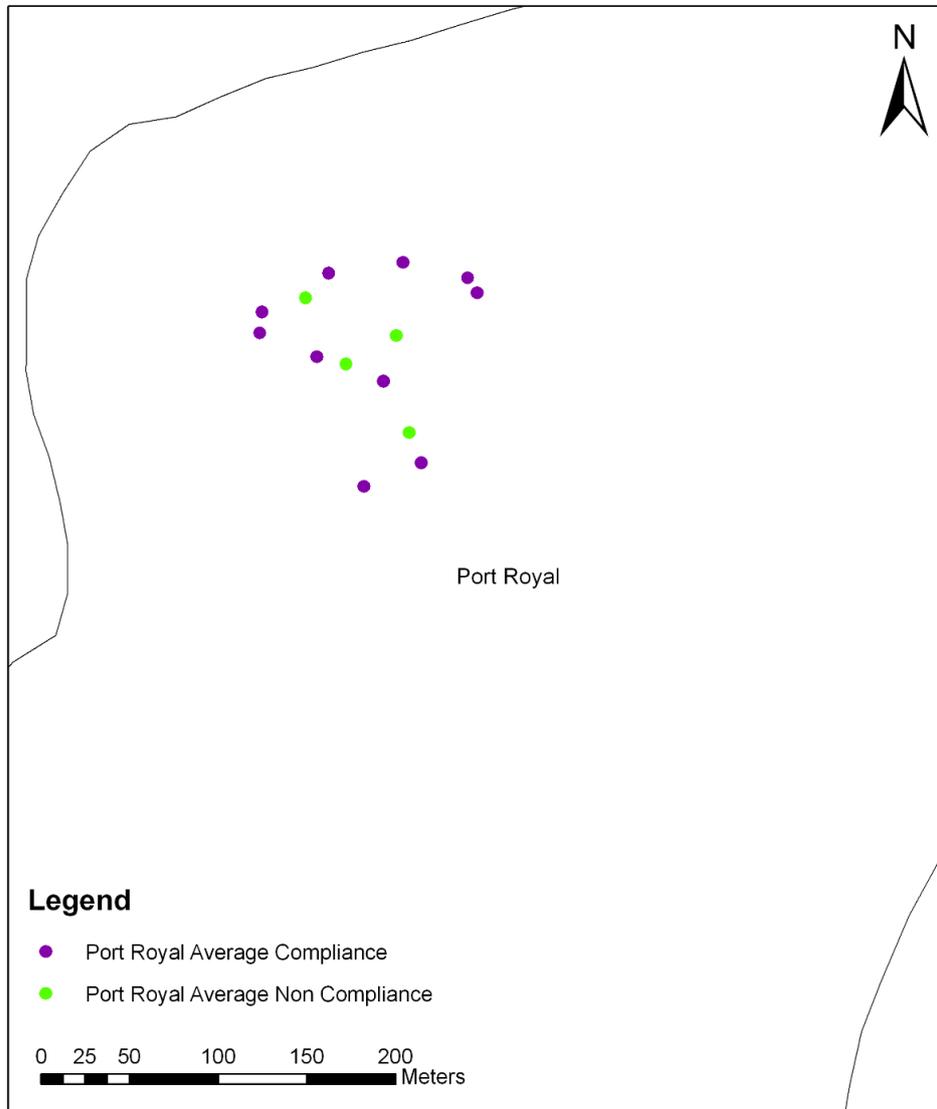
Map 16: Matching Attitudes to Behaviour in Constant Spring (2015/2016).



NOTES		
	Compliant attitude matches compliant behaviour	35.90%
	Non-compliant attitude matches a compliant behaviour	29.49%
	Compliant attitude matches non-compliant behaviour	17.95%
	Non-compliant attitude matches non-compliant behaviour	16.67%

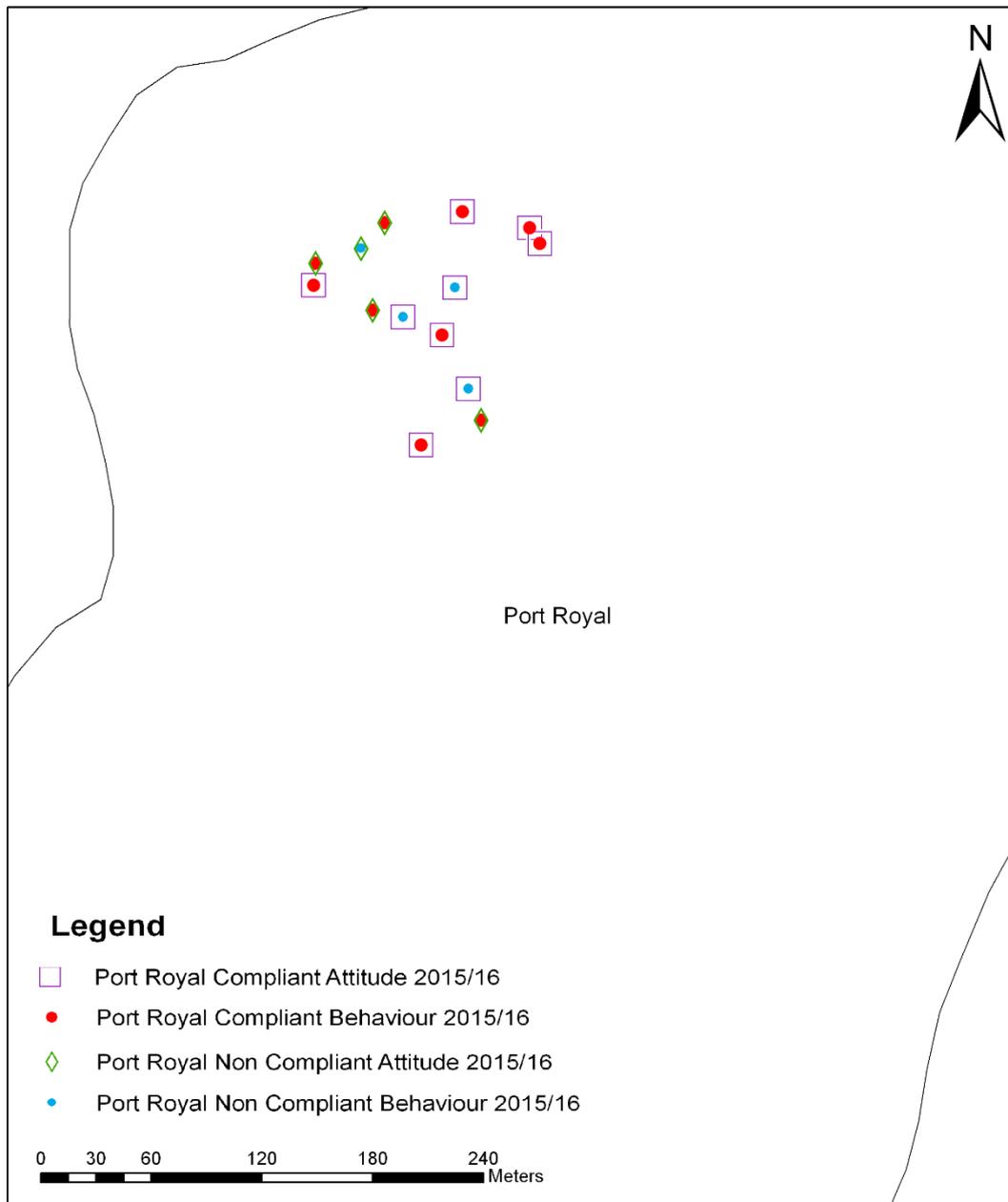
Property Tax Compliance for Respondents in Port Royal, Kingston

Map 17: Port Royal Survey Respondents' Average Compliance over the Period 2010/11 to 2015/16.



The percentage of respondents with an average of 100 percent compliance (compliant) over the period is approximately 71.43 percent, while those with average compliance less than 100 percent is 28.57 percent.

Map 18: Matching Attitudes to Behaviour in Port Royal (2015/2016).



NOTES		
□ ●	Compliant attitude matches compliant behaviour	42.86%
◇ ●	Non-compliant attitude matches a compliant behaviour	28.57%
□ ●	Compliant attitude matches non-compliant behaviour	21.43%
◇ ●	Non-compliant attitude matches non-compliant behaviour	7.14%

The Property Tax Attitude-Behaviour Profile of Collectorates

Based on the information presented in maps 1–18, a property tax attitude-behaviour profile can be deduced for each collectorate. This is presented in table 19 below.

Table 19: Property Tax Attitude-Behaviour Profile of Collectorates

Collectorates	Percentage of cohort who are voluntarily compliant ¹	Percentage of cohort who need enforcement ²	Percentage of cohort with only a willingness to pay ³	Percentage of cohort with a compliant attitude ⁴
Port Antonio	37.57%	39.99%	22.22%	57.79%
Buff Bay	38.60%	42.61%	19.13%	57.73%
Morant Bay	37.39%	44.35%	18.26%	55.65%
Port Morant	53.13%	27.09%	19.79%	72.92%
May Pen	27.69%	44.61%	27.69%	55.38%
Chapelton	38.71%	22.58%	38.71%	77.42%
Jackson Town	27.66%	46.81%	25.53%	53.19%
Constant Spring	35.90%	46.14%	17.95%	53.85%
Port Royal	42.86%	35.71%	21.43%	64.29%

Source: Compilation of data by the research team, based on data provided on the property tax query portal and survey data Notes:

1. percentage of cohort who had a compliant attitude with compliant behaviour
2. combined percentage of the cohort who had:
 - a. a non-compliant attitude with non-compliant behaviour; and
 - b. a non-compliant attitude with compliant behaviour
3. percentage of cohort who had a compliant attitude with a non-compliant behaviour and
4. combined percentage of cohort who had a compliant attitude with non-compliant behaviour and compliant attitude with compliant behaviour

With the exception of May Pen and Jackson Town, table 18 indicates that in 2015/2016 the population of taxpayers who were voluntarily compliant, accounted for at least 33 percent of taxpayers in each collectorate. Noteworthy are Port Morant and Port Royal, which had 53.13 percent and 42.86 percent of respondents who were voluntarily compliant.

Table 18 also shows that collectorates with the smallest proportion of voluntarily compliant taxpayers had an equal proportion of taxpayers who had a compliant attitude with non-compliant behaviour. This implies that compliance rates of those collectorates can be improved if factors preventing taxpayers who had a compliant attitude with non-compliant behaviour profile are addressed. This is particularly true for Chapelton and May Pen, whose proportion of voluntarily compliant property taxpayers could have potentially increased to 77.42 percent and 55.38 percent if such factors were addressed.

The 1:1 ratio of taxpayers who are voluntarily compliant and those who have a compliant attitude–non-compliant behaviour profile, suggests that for every compliant taxpayer (in May Pen, Chapelton and to a lesser extent Jackson Town) there is a non-compliant taxpayer. This merits further investigation into the proportion of the cohort classified as those needing enforcement. On average, 60.91 percent of the sample had a compliant attitude in 2015/2016.

In lieu of the aforementioned, the proportion of taxpayers classified as those needing enforcement were disaggregated for each collectorate. This is presented in table 20.

Table 20: Disaggregation of Those Needing Enforcement

Collectorate	Non-compliant attitude with compliant behaviour	Non-compliant attitude with non-compliant behaviour
Port Antonio	55.56%	44.44%
Buff Bay	69.39%	30.60%
Morant Bay	66.67%	33.33%
Port Morant	61.53%	38.46%
May Pen	41.38%	58.62%
Chapelton	42.87%	57.13%
Jackson Town	18.18%	81.82%
Constant Spring	63.89%	36.11%
Port Royal	80.00%	20.00%

Source: Research Team. Data compiled from data obtained from the property tax query portal and survey data.

As shown in table 20, May Pen, Chapelton, and Jackson Town have the lowest proportion of taxpayers with compliant behaviour. This is to be expected based on the data shown in table 19. The data above also suggests that on average, 55.5 percent of those taxpayers needing enforcement were compliant, while 44.5 percent were non-compliant. It may be inferred that this is largely as a result of the attitude-behaviour profile of the sample cohort in May Pen, Chapelton, and Jackson Town.

Based on the average compliance rate for each year, it is clear that there has been an annual steady decline of 2.36 percent between 2010/2011 and 2014/2015. However, the average compliance rate for 2015/2016 is 15 percent lower than the 2014/2015 rate. This suggests a significant change in the attitude-behaviour profile of collectorates that has negatively affected the 2015/2016 compliance rate.

As mentioned previously, the study implies that the rate of property tax compliance may be higher than reported, but it is also suggesting that property tax compliance rates are declining rather than increasing as media reports indicate. In light of the aforementioned, it may be inferred that the proportion of taxpayers with a non-compliant attitude and behaviour profile are increasing. It appears that the data also conveys that an integral part of restricting this growth involves:

- an investigation into the factors that are prohibiting compliance in collectorates with a similar profile like May Pen, Chapelton and Jackson Town;
- the application of practical measures to address each factor, with a view to making it easier to comply; and
- an improvement of enforcement initiatives in each collectorate.

In lieu of the aforementioned, and because the study potentially indicates that quite a few property taxpayers are paying amounts greater than their annual property tax liability, the attitude-behaviour profile of Jamaican collectorates and the administration of the tax needs further exploration in order to unearth the true nature of property tax compliance in Jamaica.

Emerging Issues and Concluding Remarks

The findings of the study have shown that there is still a great need for research to solve Jamaica's property tax compliance puzzle. Answers to questions such as why was 60 percent of the cohort overpaying their tax liability, and to what extent is this anomaly occurring need to be discovered.

With the aid of spatial analysis, four different types of tax attitude-behaviour profiles were identified and analysed. Additionally, the amalgamation of data from the NLA and the TAJ property tax online query portal highlighted the importance of a shared spatial data infrastructure, which can be used to analyse different types of tax behaviour and the behaviour of taxpayers for different types of taxes. The study implicitly shows that GIS technology can be used to expose built environment issues that are implicit, and are not easily or readily identified with statistical analysis.

The use of GIS to understand property tax compliance is a fairly recent phenomenon for developing countries. In 2012, the Kenyan government launched the GEOCRIS initiative to update its paper based cadastres by creating a GIS platform to house its land parcel data. Such an approach can be adopted by developing countries to have a greater appreciation of issues affecting the efficient management of land.

Literature has generally described Jamaican taxpayers as being non-compliant in relation to the income tax (Bahl and Wallace 2007; Wynter 2014). McCluskey and Franzsen (2001) demonstrated the prevalence of low property tax compliance rate in Jamaica between 1992 and 1999. However, this study implies that most property taxpayers in this study are compliant and willing to settle their property tax liability in spite of their negative perceptions of the property tax system, poor quality of community services, and customer service at collectorates. Thus, it appears that there are sociological factors at play which affect the compliance rate of Jamaican property taxpayers. Nonetheless, further research is needed to confirm this inference.

Despite the decline in compliance rates of the study areas, they were relatively high prior to the significant increase in property tax liability in 2013/2014. This may be indicating that there are factors external to the property tax which are creating a negative impact on compliance rates. This too warrants the call for further research on the subject at a larger scale.

The study implied that collectorates in the more rural and seemingly undeveloped parishes had a higher compliance rate than more developed parishes. In addition, less developed parishes have a higher percentage of unregistered lands when compared to more developed parishes. This is shown in table 21, which comprises of data obtained from the National Land Agency's LandStat Jamaica interactive tool.

Table 21: Registered and Unregistered Lands

Rural/Urban	Parish	Registered	Unregistered	Total Parcels	% of Registered Parcels
Rural	Clarendon	39,723	52,681	92,404	43
	St. Thomas	15,675	21,390	37,065	42
	Portland	12,405	20,886	33,291	37
	Trelawny	15,355	15,381	30,736	50
Urban	St. Andrew	81,928	14,643	96,571	85
	Kingston	12,676	1,327	14,003	91
Total		177,762	126,308	304070	58

Source: Data compiled by the research team from LandStat Jamaica (2014)

Customary land tenure (for example “family land”) has often been cited as a factor that has negatively affected property tax compliance in Jamaica. This issue was raised as a factor in semi-structured interviews with government officials. However, if the data provided is an indication of what currently obtains, then it appears that property taxpayers of unregistered land may perceive compliance as a mechanism for becoming a registered owner or entering the “realm of legality” with regards to land tenure. This is being argued, as the Doctrine of Adverse Possession allows squatters living on private land for at least 12 years with undisturbed possession and paying property taxes the right to become a legal property owner.

The study has also inferred that the distinction between the amount of property tax revenue collected and property tax compliance has become blurred. The application of land value taxation indicates that the property tax base is fixed. As a result, the revenue target of the tax should be the total property tax liability for all parcels in a country. Thus, in principle, Jamaica’s property tax revenue target should be relatively the same each year, depending on the annual number of lot subdivisions. In lieu of the aforementioned, the research team argues that the most suitable method for calculating property tax compliance is by using the formula (total amount paid/total amount due) *100. This method is objective, and it is the internationally accepted approach for calculating tax compliance rates.

With reference to the research design, it appears that the study would have benefitted from a larger sample cohort in order to analyse the attitude-behaviour profile of respondents in each collectorate and by treatment groups. The study also suggests that spatial analysis can be used to further understand the different types of taxpayers and their psycho-behavioural characteristics. It is believed that this application can be utilised for different types of taxes, as all taxpayers operate in a geographic environment. In closing, the study has shown that the creation of a unified spatial data infrastructure, shared by government departments, yields greater results when making steps towards more efficient and robust land markets.

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Appendix A: Results of Focus Group with Compliance Officers

Introduction

This focus group session was held at the Ministry of Local Government in May 2015. The session comprised of 10 property tax compliance officers who were assigned to communities in Kingston, St. Andrew, and St. Catherine. Thematic analysis was used to qualitatively analyse the responses of compliance officers in order to identify and discuss the emerging trends from all data sources later in the paper.

Demographic Characteristics of Compliance Officers

At the time of this session, checks with the Ministry of Local Government revealed that 20 compliance officers were assigned to the parishes of Kingston, St. Andrew, and St. Catherine. From this figure, 14 were females. Both the sample cohort and population of compliance officers had demographic composition of 70 percent females and 30 percent males. Table 22 outlines the demography of the sample.

Table 22: Demography of property tax compliance officers

Demographic Variables	Male	Female
Composition of Sample	3	7
Age Range (years)	27–68	28–48
Years of Professional Experience as a Compliance Officer	2–46	1.5–9
Years of Professional Experience in Local Government	2–46	1.5–19

Source: Data compiled by the research team from the responses of compliance officers.

Quality of Community Services

Compliance officers explained the following were common complaints heard from taxpayers:

- My roads not being maintained. Main roads are being fixed but community roads were not repaired;
- Garbage collection is not on time and infrequent; and
- Property taxes are too expensive.

The cohort agreed that in some instances the complaints of taxpayers are fair. They also argued that in some instances, taxpayers are being unreasonable.

Collection Services

The sample expressed the need for an improvement to the operations at tax offices across the island. Compliance officers believed specific queues for the payment of property taxes should be established in all tax offices. At the time of this session, this approach was being used in a small number of tax offices across the island. The cohort also believed that clear and explicit payment arrangements should be established by policy makers and implemented at all tax offices. This, they believed, would assist by reducing property tax arrears. Compliance officers also explained that taxpayers were not satisfied with the quality of customer service at tax offices. This they attributed to the length of payment queues and the lengthy time period it takes to make payments there.

Collection Strategies

The session revealed that a myriad of techniques was used to collect property taxes. Legislation was used to grant exemptions (a discretionary relief or de-rating of property taxes) to persons in possession who are unable to afford the tax, or to agricultural properties which qualify for a de-rating of their land value. Special payment arrangements were also facilitated to encourage taxpayers with arrears to settle their liability. Compliance officers also advised that in cases where special payment arrangements were facilitated, they are required to assess the ability of taxpayers to pay by conducting an inspection of their property.

The cohort also expressed that different collection strategies were used to increase collections from each social class. Table 23 outlines the characteristics of property taxpayers from each social class and collection strategies employed by compliance officers.

Table 23: Approaches Used to Improve Compliance in Social Classes

Upper Class		Middle to Lower Class	
Characteristics	Action Generally taken	Characteristics	Action Generally taken
They are afraid of having their names published to the public.	The threat of force is generally used.	They generally complain about having insufficient funds.	Reasoning and negotiating a payment plan works with these taxpayers.
Knowledgeable on the uses of the property tax. Those who live in gated communities often complain about not receiving benefits from the tax because they pay property maintenance fees which covers garbage collection, lighting and road repairs in their housing complex.	In these cases, explaining the use of property taxes does not improve compliance. Penalties supported by legislation are applied in these situations.	They generally complain about the government and wage freezes etc.	A psychological approach is taken by sympathizing with taxpayers and allowing them time to lament. This is then followed by negotiating a payment plan.

Source: Table compiled by the research team based on the responses of the sample cohort.

Compliance officers also commented that the use of court summons increased collections, especially in cases where payment arrangements were not honoured. In such instances, it is the norm for full payment to be made before the court date.

Respondents also added that collection rates were higher when their mode of dress reflected each social group. For example, respondents expressed that when going to an upper class

community to collect property taxes, formal attire was worn. For the middle and lower income social classes, semi-formal and casual attires were worn respectively.

Compliance officers also believed that the sex of a property taxpayer played a role the collection of property taxes. They commented that men were more likely to pay if female compliance officers went to collect their taxes. Likewise, female property taxpayers were more responsive when approached by male compliance officers. They also added that higher collection rates were achieved for commercial properties when compliance officers went in groups to collect tax liabilities.

Compliance Officers' Views on Property Taxpayers

Compliance officers expressed a mixture of positive and negative views on Jamaican property taxpayers. The positive comments were:

- Property taxpayers are willing to pay because property taxes in Jamaica are cheaper than in other countries;
- Property taxpayers who are supporters of the ruling political party are more likely to be compliant and more sympathetic to property tax increases; and
- Senior citizens are very compliant with making payments.

However, the negative statements were:

- With an increase in property taxes in the 2013/2014 fiscal year, property taxpayers have become more hostile with making payments; and
- Property taxpayers employed by the government often complain about their inability to pay as a result of the wage freeze.

Compliance Officers' Views on the Property Tax System

At the time of this focus group, respondents expressed a number of concerns about the property tax system. Their concerns are outlined below.

- Insufficient resources. Respondents expressed the need for more equipment such as computers and stationery to improve their output.
- Lack of motivation. Compliance officers explained that their remuneration is low. They viewed their job as being risky and expressed concern about not receiving benefits such as health insurance coverage.
- Interference. Respondents explained that sometimes property taxpayers were not responsive to their collection strategies because of (close) relationship with individuals at the senior management level in government.
- The need for increased communication and a shared spatial data infrastructure for government departments. They explained that updates made to the Tax Administration Jamaica website were not communicated to compliance officers. They also highlighted the need for a database that links records at Tax Administration Jamaica and the National Land Agency. In this regard, respondents provided examples of cases where property subdivisions were not recorded on registered titles. They cited this as a factor that limited their ability to collect property tax revenue.

- Improving legislation. Compliance officers believed Jamaican tax laws were outdated and should be revised. They also argued that the judicial system was too lenient to non-compliant property taxpayers. They expressed that the court gives non-compliant individuals a long period of time to pay arrears. They also explained that there's no legal provision which allowed them to seize the possessions of non-compliant taxpayers. They all agreed that legislation needed to be more enforceable. Respondents also expressed that the government should implement ongoing property tax advertisements in each fiscal year. They commented that advertisements were only heard or seen close to the payment deadline, which is at the end of a financial year.

Appendix B: Results of Focus Group with Property Taxpayers

Introduction

The aim of this session was to obtain taxpayers' views on the convenience of paying, the present property tax system, how taxes were being used, the quality of services received from the government, and the willingness of taxpayers to pay. Like Focus Group 1, responses to questions posed in this session are presented in a thematic format. The results of this data collection instrument reflected the feedback obtained from respondents at the time of the focus group. They are presented below.

Demographic Characteristics

The sample comprised of 31 property taxpayers living in Kingston, St. Andrew, and St. Catherine. This session was conducted in May 2015. This session also had a greater number of females (80.6 percent) in comparison to males (19.4 percent). Most respondents (61.9 percent) were 45 years and older. The vast majority of respondents (80.6 percent) were registered owners on title. Table 24 shows the demographic composition of the sample.

Table 24: Demographic Composition of Taxpayers in Focus Group 2

Demographic Variable	Composition				
	Sex	Male		Female	
6		25			
Age Group	20–29	30–39	40–49	50–59	60+
	2	6	10	12	1
Category of Property Taxpayer	Owner		Tenant	Caretaker	
	25		1	3	

Source: Data compiled by the research team. Note: 2 respondents did not identify the type of property taxpayer they were.

Quality of Community Services

The general feedback from respondents on the quality of community services provided, indicated that they were being affected by the poor state of their roads, non-functioning street lights, and infrequent garbage collection. A few respondents also complained that gullies were only cleaned once per year in their communities. They also lamented about infrequent beautification projects in their communities and explained that these were only done with the initiative of residents on public holidays such as Labour Day. This is an annual Jamaican holiday on May 23rd.

Collection Services

There were mixed responses on this subject matter. Most respondents believed that there was a sufficient number of tax offices and mediums for paying property taxes. The minority expressed the need for more payment centres.

Respondents were generally disgruntled with the quality of customer service at tax offices. Lengthy cashier queues in tax offices were a common complaint made by respondents. One respondent lamented “An entire day is needed to pay property taxes!”

Respondents suggested tax offices should be opened at 6:30 a.m. on weekdays and on Saturdays. Many respondents explained the difficulty they faced with using their lunch break from work to pay property taxes at tax offices. A few respondents suggested that property taxes should be taken as monthly salary deduction like mortgages. However, those who paid their tax bill online were satisfied with the online payment portal. Respondents all agreed that a complaints hotline should be created, so that property taxpayers can be heard.

Property Taxpayers’ Views on the Property Tax System

Respondents shared the view that the property tax system was inconvenient. Members of the cohort explained that in some instances, property taxpayers are required to join different lines to pay their tax bill at the tax office. They elaborated by advising that property taxpayers are required to join one line to obtain their tax liability and another to make payment.

Taxpayers also believed that the calculation of their property tax bill needs to be more explicit. Several respondents commented that the calculation of their tax liability was not clear. Some also added by arguing that the property tax system is not transparent. Respondents were concerned about not receiving information on how property tax revenue is used to improve the physical characteristics of their community. This was important to respondents because they generally regarded the property tax as fiscal tool that increased their property values.

Respondents generally believed that in some instances the government was too relaxed in its approach to improving property tax compliance. Two suggestions offered by taxpayers to boost compliance were to hire debt collectors and bailiffs to seize items belonging to those who were non-compliant. However, they also believed that the government should provide incentives to those who were consistently compliant, or establish community competitions such as the *Most Compliant Community Competition*, which could provide an award and other benefits to property owners from the most compliant community. The sample cohort also believed that the public needs to be educated on the benefits of paying property taxes. They also added that the benefits of the tax must be tangible and clear to property taxpayers.

Appendix C: Description of Study Areas

Clarendon

The parish of Clarendon is spread over 1,192.9 sq. km (460.6 square miles [sq.m]), roughly 10.9 percent of the island's total area. It is located towards the south central part of the island and has a population of approximately 246,322 as of 2012. Clarendon is bordered on the north by St. Ann, on the west by Manchester, on the east by St. Catherine, and on the south by the Caribbean Sea. It is predominantly flat and has a history of extensive sugar cane farming due to its terrain. Clarendon has also been the site for bauxite mining.

May Pen

May Pen is the capital of Clarendon and is one of the busiest towns in the country, servicing most of the parish's southern population. May Pen is the home of one of the largest tax collectorates, and has served as the hub for tax related services in that part of the island. The town also boasts many churches, factories, a courthouse, modern libraries, and numerous stores. May Pen's economy is supported by the Jamalco bauxite plant that has remained in operation even after the closure of other plants in other parishes and from employment in the town itself. Employment is also from agriculture through the numerous sugar cane farms in the area. Due to its position near the exit of Highway 2000 connecting the Kingston Metropolitan, residents also travel to and from the urban area for work.

In the communities surrounding May Pen, there is a large mix of low income to upper income communities. Squatting is also an issue of concern in the area. Several new developments have been created over the last few years with the several phases of the government subsidised Longville Park sub-division contributing greatly to these numbers.

Roads in the area range from very poor to poor. However, other services such as electricity, postal services, piped water and wireless fidelity are present in the town and surrounding communities. May Pen is also known for its high crime rates evidenced in frequent murders and high levels of organized crime such as extortion.

Chapelton

Located to the north of the parish, Chapelton was initially a plantation settlement named Chapel Town, whose name was distorted over time, to its present name. The location also home to Clarendon College High School and the Chapelton Hospital.

Chapelton comprises primarily of residential properties that are serviced by postal services, piped water, electricity and good road conditions. It is anticipated that in the near future, there will be an influx of housing developments, as a section of Highway 2000 is being built en route to the community.

Kingston and St. Andrew

Established in 1692, Kingston is the capital and largest city in Jamaica. It has an area of 480 km² (190 sq. miles). The parish is located on the south eastern coast of the island. It faces Kingston Harbour and connects Port Royal to the Norman Manley International Airport.

In 1923, the parish councils of Kingston and St. Andrew were combined to form the Kingston and St. Andrew Corporation by the Kingston and St. Andrew Corporation (KSAC) Act 1923. The KSAC governs the Kingston parish (old downtown and Port Royal) and Greater Kingston, which is also known as the corporate area and includes the parish of St. Andrew.

The Kingston parish is bounded by St. Andrew to the north, west, and east. There are two main sections in the Kingston area—New Kingston and old downtown Kingston. A combined population of 1,041,084 was recorded for Kingston and St. Andrew in 2011.

Kingston and St. Andrew are the most developed urban and suburban sections of the island. Both locations are generally serviced by a better road network, more technologized postal services, wireless fidelity, electricity, piped water, and cable television. There are several primary and secondary schools in both parishes, which have very high academic ranking in comparison to other secondary schools in the island. The corporate area also hosts most of the island's universities and tertiary educational facilities and better medical facilities.

Properties in the corporate area fetch relatively high property values, which is partially a result of the myriad of social amenities such as international and local food chains, and night life entertainment events. As a result of the relatively high property values in the corporate area, property tax revenues earned from these properties are also high.

Constant Spring Gardens

This is an upper middle income residential community that is located in northern section of Kingston and is characterised by large single storey residential properties, dispersed over ¼ acre lots. The community is bounded by Mannings Hill Road to the north, Red Hills Road to the south and the Boulevard thoroughfare to the east.

The community has a relatively good road network, although there are a few roads that have been deteriorating in some sections. The community is also serviced by electricity, piped water, cable television, wireless fidelity, postal service, fire hydrants, garbage collection and public transportation by bus and taxi. The neighbourhood is in close proximity to social amenities such as petrol filling stations, supermarkets, fast food chains, local restaurants and pharmacies.

Port Royal

Known to archaeologists as the *City that Sank*, Port Royal is a small community at the end of the Palisadoes strip and at the mouth of the Kingston Harbour. It was the home to privateers and buccaneers under the colonial rule of Spain and Britain respectively. The community has been featured in films such as Disney's *Pirates of the Caribbean*, *Cutthroat Island*, and *The City Beneath the Sea*.

Port Royal comprises of detached and semi-detached residential properties that are located in close proximity to the sea. The local economy of the location is fishing, but this has been reduced significantly. As a result, there is very little economic activity in the community.

The community is serviced by piped water, electricity, postal services, and public transportation from the Jamaica Urban Transit Company (JUTC).

Portland

Portland is a rural Jamaican parish with an area of 814 km² (314 sq.m) and a population of 82,183. It is located in the north eastern section of the island, in the county of Surrey. Its capital is Port Antonio and is well known for its beaches such as Frenchman's Cove, the Rio Grande River, the Errol Flynn International Airport, and the Blue Mountain Peak.

Portland is one of Jamaica's main producer of bananas, coconuts, and coffee. The parish has locally been regarded as a playground for Jamaica's aristocrats, who have acquired tourist attractions in the location. Notable attractions in the parish are Somerset Falls, Reach Falls, Nanny Falls, Boston (the home of Jerk Pork) and The Blue Lagoon, with a depth of 200 feet. The parish has 14 caves that are located along its coast in areas such as Buff Bay, Orange Bay, Hope Bay, Port Antonio, Boston Bay, Long Bay, Innis Bay, and Nonsuch. Portland also has a total of 17 rivers which form a network throughout the parish. The three largest rivers are the Rio Grande, Buff Bay River, and Hectors River.

Like Port Royal, the parish has been featured in films such as *Twenty Leagues Under the Sea* by Walt Disney in 1954, *The Harder They Come* by Vista Productions in 1972, and the music video for "Man Down" by recording artiste Rihanna was filmed in the parish in 2011.

Buff Bay

Buff Bay is a small, linear settlement along the north eastern coast of the parish. The local economy of the area is predominantly supported by farming and small retail shops along community roads.

Residential properties in the area are dispersed over one-fourth acre lots that are provided with a good road network. Properties are serviced by piped water, electricity, and postal services. Social amenities in the location include churches, petrol filling stations, supermarkets, and small haberdasheries. The Buff Bay Tax Office is located on the outskirts of the town centre en route to Port Antonio via the North Coast Highway.

Port Antonio

Port Antonio is the capital of Portland and is characterised by historic buildings in the town centre. The area comprises of a mixture of upper middle income communities such as Anchovy, Dolphin Bay, Titchfield, Boundbrook, and retail properties.

The area is serviced by a road network where some sections are in need of repair, piped water, electricity, wireless fidelity, landline and mobile telephone communication networks, postal services, and cable television. The location has a limited number of social amenities, namely primary and secondary schools and local fast food chains.

St. Thomas

St. Thomas is a parish occupying a total land area of 742.2 km² (286.5 sq.m). It therefore represents approximately 6.7 percent of Jamaica's total land mass. As its boundaries, St. Thomas has St. Andrew on the west, Portland on the north, and the Caribbean Sea to the south. The total spread of the parish ranges from the Blue and John Crow Mountain peaks towards the north down to sea-level to the south.

This parish has a special place in the island's history, as it was the location for the well-known Morant Bay Rebellion in 1865. Currently, the parish is generally considered underdeveloped and is plagued with poor water supply, poor roads, and low development. The population in the parish in 2012 was 94,410 according to Statistical Institute of Jamaica.

Morant Bay

Morant Bay is the capital of St. Thomas. The compact rural town sits on a hill overlooking the sea and features narrow roads, and a mix of older style and modern buildings. Newer developments have spread out to flatlands closer to the sea. Services such as banking, health, and police services are available in the general area. Morant Bay is also home to the Morant Bay Collectorate that services the communities to the west of the parish and those in the immediate environs to the east. Users of the collectorate come from as far as Albion, approximately 25 km away.

The town's economy is supported from employment in the local businesses, farming, fishing, and remittances from seasonal workers who participate in farm and hospitality work programmes. Formerly, St. Thomas had economic support from the coconut and banana industries which have closed down, along with the employment from the now defunct Good Year tyre factory.

The communities immediately surrounding Morant Bay vary from low income to middle income. There are several squatter communities in the area with persons who have claimed both government and privately owned idle land. Upper middle income communities are generally occupied by returning residents who have chosen the area as their place of retirement. Lower middle income communities are generally owned by local retirees and young professionals such as health practitioners and police officers.

Port Morant

Port Morant is located some 13 km east from Morant Bay. Port Morant is more rural in its feel and is a very small township. The township is also on an incline that slopes above sea level. In its early years, it was one of Jamaica's main ports which exported bananas and rum.

The communities surrounding Port Morant are lower income than those in the Morant Bay area and have less formal sub-divisions. The area, therefore, has more family land which is informally subdivided and passed from generation to the next. The economy of the area is similar to that of Morant Bay, with more reliance on farming and fishing as sources of income.

Trelawny

Trelawny parish occupies an area of 874.3 sq. km (337.6 sq. m), about eight percent of Jamaica's land mass. It has a population of 75,558 as of 2012. Trelawny is bordered by the parishes of St. Ann in the east, St. James in the west, and St. Elizabeth and Manchester in the south. Trelawny is known for its mix of fairly flat lands and the uninhabited areas of the Cockpit Country (Jamaica's largest rainforest and limestone region). The economy of the parish has primarily been supported by the planting of sugar cane. It is also home to several

guesthouses, and its capital Falmouth in 2012 became the home of a pier that receives cruise ships into the island.

Jackson Town

Jackson town is a rural area that is situated in close proximity to the Cockpit Country. The location comprises of residential and small retail shops that are sparsely dispersed on hilly terrain. Jackson Town has well surfaced main roads, but parochial roads are in a poor state of repair. The area is also serviced by piped water, electricity, garbage collection, postal services, and land line and mobile communication services. The location has a limited number of social amenities because urban infrastructural development has been skewed towards Falmouth, the parish capital.

Appendix D: Results of Semi-Structured Interviews with Government Officials

Property tax calculation and collection is a coordinated activity which involves the Land Valuation Division of the NLA, TAJ, and Ministry of Local Government. Though coordinated, the distinct separation of the roles came to the fore. The fact that the two systems are not directly linked so that updates to the valuation roll does not return an automatic update to the TAJ's database was made clear by both interviewees. In fact, the NLA has also made the distinction between its role of assessment and maintenance a direct part of its public education drives. Generally, however, the public sees the two functions as united, evidenced in the frequent queries to the NLA regarding increases in tax liability caused by a change in tax rates and not a change in the land values, as has been the case in the past few years.

Property Assessment

Property assessment, maintenance of the valuation roll, and the updates to the roll are the purview of the Land Valuation Division. Revaluation exercises are prompted by an order by the government official (minister) in charge of the NLA's operation. Such orders can be done as frequently as every five years, but have generally followed 10 year cycles with the last exercise being prompted by the IMF in 2010. The exercise was paused due to lack of funds but has been since been completed in 2013.

Taxes are based on the unimproved value of lands and, therefore, a revaluation exercise begins with a general reconnaissance of all the properties in the island as against house to house stops. The aim of this stage is to (1) verify property characteristics; (2) apply the relevant land use codes; (3) update records; and (4) note omissions from the existing roll. Subsequently, recent sales transactions are analysed and from that standards are created which may be applied to groups of properties according to the use, location, amenities and proximity to Central Business Districts (CBDs).

The results are reviewed by the assessment teams and when the list is complete, the minister is notified of the completion of the new valuation roll.

From the last revaluation exercise, most properties showed an increase in values, though not in uniformity across the island. Decreases in values are not the norm and where these occur, they are usually in areas exposed to disaster and hazards such as flooding. Albeit, in cases of increases in the nominal values, the effect of inflation and the devaluation of the Jamaican dollar may show a decrease in real terms.

Property assessment is made difficult by the lack of financial support since the NLA is an executive agency, responsible for funding 75 percent of their operations. Revaluation exercises would therefore come from the funds made by the agency. According to the legislation, three percent of the revenue collected from property taxes should go to the agency but in practice this is not the case. \$120 million J, or US\$1.0 million, was the amount that was used for the last exercise and though it is a large sum for the division to amass, it is a fairly low figure when considered on a parcel by parcel basis.

Additionally, the separation of the different databases of information such as planning permits, sales transactions, and title (ownership) information has proven to be a real challenge in the assessment process. Some of these difficulties are combatted when

committees with representatives of these departments are formed and as such, flow of information among the organizations starts happening.

Adoption of Land Values

Though the roll may be prepared, the new values cannot be applied by the NLA until an order is granted by the minister to do so. As such, the current tax liabilities are still based on values from 2002 as against values from the 2013 revaluation exercise. This delay in applying the values is not solely a decision of the minister, but came from advice of a committee created specially to deal with property taxes and comprised of NLA, TAJ, and local government (among others) representatives. This recommendation was made in light of the current macroeconomic state of the country.

The implications of operating from the old values do not affect revenue directly since, the government can (and have) change(d) the property tax rates to fit the revenue needs. However, it is evident that lags in applying current values brings about inequity since properties whose values have not increased significantly over the period may be attracting taxes at a certain point in the scale, while properties that have increased in values drastically over the period may be avoiding the application of the appropriate rates reflecting their true values. In these cases, though not many, where a decrease in land values has occurred, this burden may become more acute.

Setting the Tax Rates and Targets

The tax rate is considered a progressive tax rate which taxes different valuation bands. These rates are set in Parliament, and the current rate has not changed for the past six years.

From a technical perspective, recommendations to have an annual increment added to the rates have been tabled in Cabinet. This is in order to reduce the distortions that are created by sudden, large increases in the rates, and to ensure that the revenues being collected move in line with the inflationary changes in the costs of the services covered by the revenue. This suggestion has not been accepted, however, for this year, but remains an item which can be discussed each fiscal year.

Targets for each fiscal year, on the other hand, are set based on several factors, such as (1) the state of the economy; (2) performance through compliance efforts two to three years prior; (3) legislative framework; and (4) special events that may affect revenue collection (negative: elections, positive: the Olympics).

The process includes first, examining the full liability of all properties and then, based on the factors above, determining a percentage of that amount that seems reasonably attainable. This is then added to 20 percent of the total arrears to create a dollar figure for the total target for the year. For the fiscal year 2015/2016, 62 percent of the total liability was selected to inform the total target of J\$7.2 billion.

Collections and Compliance

Compliance is looked at from more than one perspective, the primary one being the percentage realised of all revenues payable for the particular fiscal year. Compliance is assessed on what is collected from the current amount due and for any future fiscal years.

Arrears are not counted as part of the compliance target, although arrears are combined to make the total target. Generally, the payment of a sum of money indicates an intention to comply, and usually these persons are not pursued since they have already made contact with the authorities and would have been reminded of the outstanding balance.

The main collection periods are April to June and February, March and sometimes January. An increase in collections can come from a special push on the part of the government officials or a feel good event (like an Olympic win) occurring during the year. Amnesties are avoided because they have been found to be unsuccessful in recovering the amounts necessary and may have long term effects on revenues, and the fact that frequent amnesties foster a laissez-faire attitude to the liability. In lieu of amnesties, deferment of penalties are usually used to help spur payments.

These principles also guide the way success in collection efforts is communicated to the public. When communicating the performance, the preferred way is to express collections as a dollar figure in relation to the target. Therefore, information on the websites are usually expressed this way. This was said to make it easier for the public to understand especially as a one off titbit of information as against disclosing compliance rates. Usually, rates are discussed in forums that allow for explanations such as on broadcasts and during town hall meetings.

Shortcomings of the Existing System

There were several shortcomings identified for the current system, and in both interviews they were found to overlap. These are summarised below.

- Existing legislative framework:
Although the Land Valuation Act allows for five yearly revaluations, the Land Valuation Division has no autonomy in starting the process or adopting the new values. The Minister is required to give separate orders for these to be done. Depending on the political and other objectives, the orders may be delayed.

Another example is that legally, court summons cannot be served after 6 pm when most persons are at home, so that limits the ability to reach the delinquents. This restriction has been extended to 9pm, offering some amount of leeway for the compliance officers.

In some other countries, the law allows for a general notice to be published when taxes become due and then subsequently, notices can be sent out to the delinquents. In Jamaica, each person must be mailed an initial notice. The per parcel costs of preparing and sending the notices (usually a gross J\$12.0m to J\$15.0m), for many parcels, outweighs the income to be received from that parcel.

- Outdated and disconnected databases:
The databases supplying information to the Valuation Division are often inadequate in supply and not linked to each other, requiring other processes to sources sales data, planning data and updated ownership data in the cases of transfers. Additionally, the valuation roll is not directly linked to the tax payment system so updates on one system is not reflected in the other in real time or automatically. Changes in addresses, or the fact that parcels are reflected by a unique identifier which is separate

from the taxpayer's unique identifier makes it hard to locate the delinquent. Though these issues have been improving over the years, there are still issues that hamper the operations of all the departments. It was suggested that committees comprising officers across the different agencies help the processes to work faster.

- **Human resource constraints:**
Documentation of processes guiding the operations of certain key functions has been lacking over the years and this coupled with migration of staff with the relevant experience necessitates constant retraining on the part of the valuation division. From the collections side, compliance officers are not always assigned solely to property tax so in meeting individual targets, other taxes that reap larger sums may be targeted instead of property tax. Over the past three years, the local authorities have assigned other persons to work alongside TAJ's compliance officers which has seen the target being met two out of three times since then.
- **Rural family land and squatting:**
The prevalence of large tracts of land which are without registered title, form part of an unsettled estate, or very low in value contribute to low collections.

Common Complaints

The most common complaints relate to the allocation and use of the funds. Because people cannot see what they are paying for, they may be reluctant to pay. Another complaint is that the funds collected in an area are not allocated to that area. The latter point has been foregone by officials for the following reasons.

- The cost of the services may not align with the collections from the area (for example provision of services in Kingston—an urban area—may at a lower cost than in a rural area);
- Without using a centralised fund, some areas will not get services while others will be better off; and
- Setting the rate by parish would require a properly functioning system in which compliance is higher than it is now.

Possibility of the Improved Land as Tax Base

The common consensus was that the unimproved value of the land works best as the current basis of the values for the tax. The following reasons were cited.

- The costs of carrying out the valuation exercise would greatly outweigh the revenues to be received
- The general heterogeneity of the properties in the area complicates the ability to apply the values and would require a comprehensive inventory exercise
- The planning and other regulatory authorities would need to change their operations to provide details of initial plans and subsequent changes
- Paired with the current financial landscape, it would pose difficulties

Nevertheless, the possibility of a hybrid model where some properties are charged based on land values, and others on improved values, was acknowledged. The success of this was, however, noted to be dependent on modern innovations such as crowd sourcing of detailed property information from professionals and the public alike.

Appendix E: The Process of Matching Taxpayers' Attitudes and Behaviours

In order to match the attitudes of taxpayers to their tax behaviour, a data frame was created in XLS format by undertaking the following steps:

1. Entering the GPS coordinates for properties from the attitudes survey into iMap Jamaica to obtain the valuation roll number for each parcel.
2. Entering the valuation roll number for each parcel into the TAJ online Property Tax Query Portal. After entering the valuation roll number for each parcel in the tax query portal, the payment history for the parcel was provided for the period 2010–2011 to 2015–2016. This process was executed manually for all 1,040 parcels by the research team. All responses from the attitudes survey were linked to the property compliance data by the valuation roll number.
3. After compiling the dataset, it was verified by using two IF functions to ascertain if the latitude and longitude of the property compliance (tax payment) subsection of the table matched the tax attitudes subsection of the dataset. For both IF functions, all cells in the dataset returned 'yes'. This ensured that both sections of the dataset were properly matched.
4. Rows with missing latitude and longitude information were removed from the dataset. This action left 941 rows of data. This data was then cleaned to remove the incomplete valuation numbers that were sourced on iMap Jamaica. A valuation roll number is a composite of a map, grid, enclosure, and parcel number. In cases where the valuation numbers were incomplete, the parcel numbers were missing or the valuation roll number had an extra digit, which made it unsearchable in the property tax query portal. This left a total of 890 records. After cleaning the data for duplicates of the same valuation number, 824 records remained. Next, correct valuation roll numbers that produced a *No records found* message after entering it on the property tax query portal were removed from the dataset. This reduced the dataset to 789 records. After cleaning for records with government and private ownership that had no tax liability, 774 records remained. The dataset was then cleaned for those records with only part of their tax liability for the period under study. This left 750 records. Of this number, residential properties owned by the government, commercial entities, and churches for which property taxes were being paid still remained.
5. After completing the data frame, it was added to ArcMap and saved as a data layer. It was then projected to the Jamaican National Grid (JAD 2001). Shapefiles of Jamaican communities and parishes were also added as data layers to the Table of Contents Frame in ArcMap.
6. Compliance maps were then created to show property tax attitude-behaviour profiles of respondents in the 2015–2016 tax year.