The Spatial Approach in the Identification of Tax Evasion on Rental Income: Case study of Umoja and Kileleshwa Estates in Nairobi, Kenya.

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The Spatial Approach in the Identification of Tax Evasion on Rental Income: Case Study of Umoja and Kileleshwa Estates in Nairobi, Kenya

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Taxation is the process through which the government raises revenue for delivering services to its citizens as well as for its development agenda. Lack of compliance with tax laws reduces revenue required by the government and, at the same time, undermines the efficiency and fairness of the tax system (Wenzel and Taylor 2004). Studies have shown that the self-employed exhibit lower rates of voluntary compliance than taxpayers whose primary source of income is wages and salaries. This disparity could be attributed to the lower probability of detecting unreported self-employment income because of the absence of third-party reporting of income (Joulfaian and Rider 1998). In general, tax evasion can take on different forms, for instance, nondeclaration or underreporting of the tax base, overreporting of deductible expenses, moonlighting, and smuggling (Eichhorn 2006).

In modeling tax evasion, the assumption is that a taxpayer with, say, an income of I, when required to declare a true income, I^d, declares that $I^d < I$, which leads to an evasion, e, amounting to $e = I - I^d$. Consequently, the challenge for any tax administration is that the actual income is not known, and hence enforcing tax compliance can be achieved only through a system of audits and penalties (Frey and Feld 2002).

The success of the tax assessment process depends largely on the development of a high-quality, up-to-date geographic database. Consequently, considerable effort is necessary in the design, implementation, and maintenance of the geographic database (Longley, Goodchild, Maguire, and Rhind 2005).

Tax System in Kenya

In Kenya, as in most countries in the world, taxation is imposed by the state and is compulsory; it is for the benefit of all citizens. However, taxation assumes a non quid pro quo payment principle—that is, pay tax but do not ask for equivalent services.

The Government of Kenya meets approximately 95 percent of its annual budget through taxation. There are vari-

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ous categories of taxes, as spelled out in their respective Acts of Parliament: Income Tax Act (Cap 470), Stamp Duty Tax Act (Cap 480), Value Added Tax Act (Cap 476), and Customs and Excise Tax Act (Cap 472). Taxes on rental income are collected under the Income Tax Act.

Kenya Revenue Authority

The government of Kenya collects taxes through the Kenya Revenue Authority (KRA), which is comparable to the Internal Revenue Service (IRS) in the United States or the Australian Taxation Office (ATO) in Australia. The KRA was established by an Act of Parliament, Chapter 469 of the Laws of Kenya, which became effective on 1st July 1995. A Board of Directors, consisting of both public- and private-sector experts, sets policy for implemented by KRA management. The President of the Kenya appoints the Authority's chairman of the board, while the chief executive of the Authority, the Commissioner General, is appointed by the Minister for Finance (Kenya Revenue Authority 2006).

The purpose of the authority is assessment, collection, administration, and enforcement of laws relating to revenue. The Authority not only is charged with the collection of domestic taxes such as income tax and value added tax (VAT) but also handles customs duties and administers the licensing programs related to road transport (Kenya Revenue Authority 2006).

Among KRA's stated objectives are to:

- enhance efficiency and effectiveness of tax administration;

- eliminate tax evasion by simplifying and streamlining procedures and improving taxpayer service and education thereby increasing the rate of compliance;

- create organizational structures that maximize revenue collection to meet governmental budget needs;

- facilitate distribution of income in socially acceptable ways by effectively enforcing tax laws affecting income;

- protect local industries and facilitate economic growth through effective administration of tax laws related to trade;

- ensure efficient allocation of scarce resources in the economy by effectively enforcing tax policies thereby sending the desired incentives and shift signals throughout the country; and

- facilitate economic stability and moderate cyclic fluctuations in the economy by providing effective tax administration as an implementation instrument of fiscal and stabilization policies (Kenya Revenue Authority 2006).

Most of KRA's operations are automated, and because the City Council of Nairobi has authorized KRA to collect land rates, most of the attribute data are in digital form.

Property Tax Market in Kenya

According to the Kenya Central Bureau of Statistics (2005), there has been marked growth in the business of real estate. The value of buildings approved by the City Council of Nairobi rose from US$ 6 million in February 2004 to US$ 15 million in March 2005.

Once a casualty of economic decline, the real estate sector has grown to become a major contributor to the current economic recovery of Kenya. It has been buoyed by positive development in other sectors of the economy, such as agriculture and the financial markets. Analysts estimate that the real estate sector has expanded by a whopping 40 percent in the past 12 months alone, with real estate agents and firms as key beneficiaries. The increase in the middle-income bracket in the past 12 months has been

the main driver of the massive demand for residential housing.

Apart from the retail market, the residential market has emerged in the past year as the driver of the rapid growth of the property market. This growth is expected to reach a rate of between 40 and 60 percent following the entry into the property market of financial heavyweights such as Barclays, Standard Chartered Bank, Investment and Mortgages (I&M), Stanbic Bank, and The Kenya Commercial Bank. In addition, Kenyans living abroad have shown renewed interest in the property market with a large fraction of their annual remittances, estimated at US$ 645 million, going toward the purchase of property. The result has been a resurgence of demand in the lower middle-income market segment where demand has pushed prices to between US$ 58,000 and US$ 170,000. Despite this significant development, tax payments in this sector have not demonstrated similar growth.

Problem Statement

Rental income data, like most other data sets, have a spatial component. Hence, use of a Geographic Information System (GIS) would be valuable in providing the necessary information to support decision-making on various taxation issues. For example, this information would enhance the monitoring and collection of taxes on rental income, which in turn would help KRA realize its vision and meet its annual forecasts.

However, taxation of rental income in residential areas is quite difficult to enforce because KRA uses tax returns which allow for self-assessment and do not require the physical address of property. It is very difficult and costly to conduct audits for all properties; therefore, KRA uses a prototype based on samples considering the cost implications. In fact, only one percent of the cases are currently being audited, compared to the recommended three percent. In this regard, GIS would be useful in enhancing and

improving revenue collection through proper monitoring of audits.

With modern developments in geospatial technology and, in particular, space, information, and communication technologies, it is now possible to link data from different disciplines and sources and use the resulting database to query, display, analyze, and even locate tax offenders by their town name, street name, building name, and floor number.

With data from organizations such as the Registrar of Societies, the Nairobi City Council, the Registrar of Titles, and also the KRA, the following can be identified:

- Taxable persons (e.g., individuals and organizations operating within certain locations)

- Taxable incomes (e.g., residential houses for rental purposes)

- Persons who have paid their taxes as required

- Tax defaulters

The first step in locating tax evaders is to determine the precise physical addresses of their developments. These locations can be identified uniquely on a map through coordinates. By using data created in the database, queries can identify persons who have paid their taxes on time and those who have not. For instance, if an organization name appears in the database of the Registrar of Titles and does not appear in the database of KRA, it most likely has not paid its taxes.

Taxation of Rental Income in Kenya

Once the income subject to tax has been established, the appropriate rate is used to compute tax on the rental income. These rates depend on the type of person:

- *Natural persons.* The chargeable rent income is aggregated with

other incomes of the person and taxed at individuals' graduated scales.

- *Legal persons.* The taxable rent income is aggregated with other incomes and taxed at the corporation rate of that particular accounting year.

- *Partnerships.* The chargeable income is shared among the partners according to their profit-sharing ratio; then each partner's portion is taxed in combination with his or her other sources of income.

Tax Evasion and Avoidance

Tax evasion is defined as the deliberate failure to pay tax due to nondisclosure or declaration of income, claiming higher expenses to reduce taxable income, or claiming relief to which one is not entitled. This is illegal and punishable. Individuals may evade tax due to high tax rates, complicated tax systems, or evil practices.

By contrast, in tax avoidance, taxpayers arrange their financial affairs in such a way that they are required to pay less tax. This is achieved by taking advantage of the loopholes in the existing tax legislation.

Proposed Model for Identifying Tax Evasion on Rental Income

To identify tax evasion, the following questions need to be systematically addressed:

- Can the proprietor of a plot be found in the land register?

- What type of person owns a particular plot?

- Has a proprietor developed his or her property?

- What type of building has been put up and is it used for rental purposes?

- If a building is used for rental

purposes, does the proprietor have a Personal Identification Number (PIN)?

- If the proprietor has a PIN, then has he or she submitted a return of income for the year and what amount of rent income has he or she declared?

- What amount of tax has been paid on rental income declared?

The flowchart in figure 1 shows the generic procedure for identifying tax evasion for rental income. Implementation of this procedure is done through a program called "Rent Income," developed using Visual Basic 6.0. In principle, this program computes the gross rent income and compares this against the declared gross equivalent. From the GIS database, it reads and displays the following parameters: building ID, total number of units per building, and number of bedrooms for each unit. Then the rental data are entered: the number of months occupied in a year, the occupancy rate for the year (i.e., the number of units occupied in the year), and the monthly rent per unit, depending on the number of bedrooms in each unit.

The potential rental income and the gross rent income are computed by using the following equations:

Potential rental income = rent per month x total number of units x number of months

Gross rent income = potential rental income x occupancy rate

The estimated gross rent income is saved in the database in a field called "Gross" in the building's attribute table. This value is then compared with the figure the taxpayer has declared as gross rent on his or her income return to establish whether there is a significant difference between the two values. A reasonable threshold difference can be adopted, for example, 20%. If the difference exceeds the adopted threshold,

Figure 1. Generic procedure for identifying tax evaders/defaulters for rental income
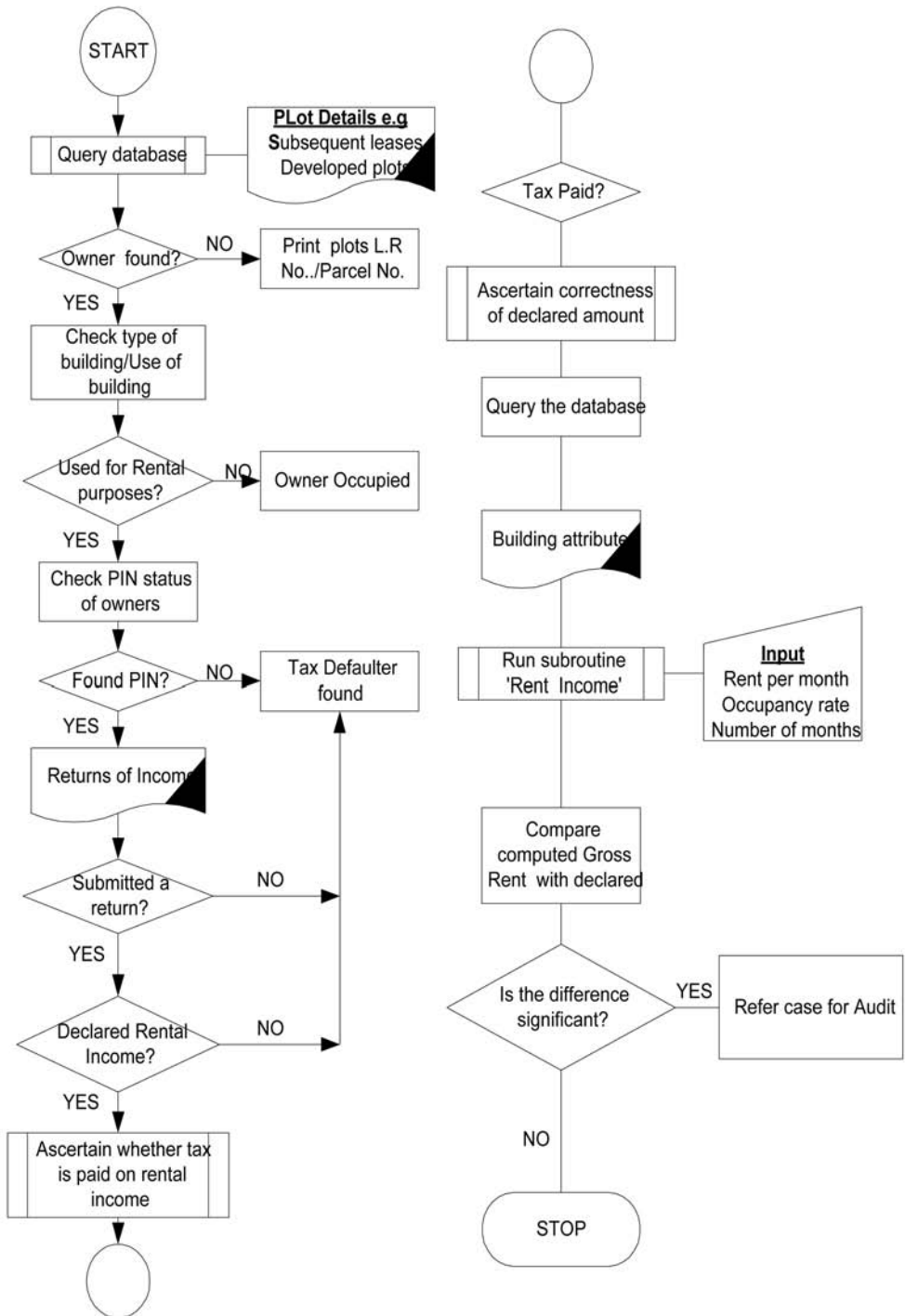
then a decision can be made whether to refer the case to the Tax Audit Department for audit query.

The program also displays the building's shape file and the current building for which gross rent income is being computed. To aid visualization, the program is designed so that the user can zoom in and pan the building shape file without having to go to the ArcView project.

Testing of the Model

Area of Study

For comparison, a high-income area and a low-income area were chosen for study. Kileleshwa Estate was selected as the high-income area; Umoja Estate was chosen as the low-income estate. Figures 2 and 3 present Quickbird images of Kileleshwa and Umoja respectively.

Typically, residences available for rental purposes are single family homes, individual flats, and apartments. These rental properties may be owned by either individuals or corporations. Figure 4 shows a representative building available for rental purposes in Kileleshwa Estate, while figure 5 exemplifies a typical rental property in Umoja Estate.

Data Sources

To create the database, various data sets from different sources were obtained. For the spatial data, these included cadastral plans, Quickbird images, and digital close-range photographs of specific buildings.

The attribute data also were obtained from different sources. For instance, details of owners of plots were obtained from the Ministry of Lands. These details included name and address of proprietors of plots, land registration/parcel number, title number of title deed, registration date, commencement date of lease, lease period, the main lessor, apartment number, floor number of apartment, and plan/file number used to register the sale of apartments according to the Sectional Properties Act of 1987.

Additional information on plots also were included in the database as attribute

Figure 2. A Quickbird image of Kileleshwa Estate

Source: DigitalGlobe

Figure 3. A Quickbird image of Umoja Estate

Source: DigitalGlobe

Figure 4. Typical rental property in Kileleshwa Estate

Photo by research team

Figure 5. Typical rental building in Umoja Estate

Photo by research team

data, for example, details of charges to plots including name of institution issuing the loan, date issued, and amount of loan. This information has a direct influence on the amount claimable as tax deductible, for instance, interest on the loan. This information was obtained from the cadastre at the Ministry of Lands from the proprietorship, property, and encumbrances sections of the land register.

From the KRA Management Information System, the PIN and telephone contacts were obtained and entered into the GIS system, if those records had been submitted to the Authority for taxation purposes.

Data Preprocessing

Cadastral plans were scanned by a drum scanner at 500 dpi. They were then cleaned, edited, and georeferenced to ensure compatibility with the Quickbird images. Vectorization of buildings and other facilities such as police stations and swimming pools was done, and the various themes were saved as shape files. Then the attribute data were added by importing them as Database IV tables and linking them to the appropriate attribute tables. Hot links for secondary leases and also close-range digital photographs of selected buildings were created to enable analyses and visualization.

Analysis

The tax status of proprietors having plots with buildings or apartments for rental purposes was established by performing a query of the KRA Management Information System with a relational database management system (Oracle). The query was done for the years 2000–2003 to establish the following:

- Had the taxpayer submitted a return of income for the particular year of income? (yes or no)

- Had the taxpayer declared gross rental income and net rent chargeable to tax in his or her return and what was the amount declared?

Was this declared gross rental income reasonable? (To find out, the amount declared was compared with the amount computed by the "Rent Income" Visual Basic program, taking into consideration such factors as the monthly market rent rate per unit and occupation rate for a particular year of income for that particular building.)

Results

For Kileleshwa Estate, the sample size was 41. For 24 plots (58.5%), the owners were the primary lessee, while for the remainder of the plots, records were missing.

Further, 19 plot owners (79.2%) had a PIN; the remaining 6 (20.8%) had no PIN. Additional analysis of these 19 plots revealed that 6 plots (31.6%) had secondary leases of the individual apartments. For the remaining 13 plots, 5 plots (38.5%) were owned by companies, while 8 (61.5%) were owned by individuals. Of the plots owned by legal persons, all were for rental purposes, while for those owned by individuals, 5 (62.5%) were for rental purposes and the remaining 3 (37.5%) were owner-occupied.

Table 1 summarizes the instances of tax evasion by primary leases in Kileleshwa Estate for the years 2000–2003. Those plot owners who did not have a PIN as well as those whose buildings were used for rental purposes were automatically identified as tax evaders. Companies and individuals cannot pay taxes without a PIN. Table 2 summarizes the instances of tax evasion in terms of persons owning individual apartments in Kileleshwa Estate for the years 2000–2003.

For Umoja Estate, there were 100 plots whose owners were found. For this study, only 54 plots were considered. Of these 54 plots, owners of 34 plots had a PIN (63% of the reduced sample size). The tax status of each plot owner having buildings for rental purposes was ascertained for the same years as for Kileleshwa. Only

Table 1. Summary of cases of tax evasion for primary lessees in Kileleshwa, 2000–2003 *(sample size: 18 rental properties)*

Primary Lessee	No Return*	Zero Return†	Total	No Return*	Zero Return†	Total
		2000			2001	
Companies with a PIN	5	0	5	5	0	5
Individuals with a PIN	6	0	6	6	0	6
Companies with no PIN	1	0	1	1	0	1
Individuals with no PIN	2	0	2	2	0	2
Subtotal	14	0	14	14	0	14
Percentage of sample	77.78%	0	77.78%	77.78%	0	77.78%
		2002			2003	
Companies with a PIN	3	2	5	2	3	5
Individuals with a PIN	5	1	6	5	1	6
Companies with no PIN	1	0	1	1	0	1
Individuals with no PIN	2	0	2	2	0	2
Subtotal	11	3	14	10	4	14
Percentage of sample	61.11%	16.68%	77.78%	55.56%	22.22%	77.78%

Lessee did not submit a return of income.

†Lessee submitted a return of income but did not declare rental income.

Table 2. Summary of cases of tax evasion by type of proprietor owning individual apartments in Kileleshwa, 2000–2003

(total number of apartments: 74)

Type of Proprietor	No Return*	Zero Return†	Total	No Return*	Zero Return†	Total
		2000			2001	
Companies with a PIN	2	9	11	4	7	11
Individuals with a PIN	36	5	41	28	2	30
Companies with no PIN	1	0	1	1	0	1
Individuals with no PIN	16	0	16	16	0	16
Subtotal	55	14	69	49	9	58
Percentage of sample	74.32%	18.92%	93.24%	66.22%	12,16%	78.38%
		2002			2003	
Companies with a PIN	2	9	11	2	9	11
Individuals with a PIN	14	16	30	15	8	23
Companies with no PIN	1	0	1	1	0	1
Individuals with no PIN	16	0	16	16	0	16
Subtotal	33	25	58	34	17	51
Percentage of sample	44.59%	33.78%	78.4%	45.94%	22.97%	68.9%

Proprietor did not submit a return of income.

†Proprietor submitted a return of income but did not declare rental income.

one plot in Umoja Estate was owned by a company, while the rest were owned by natural persons. The instances of tax evasion are summarized in table 3.

Figures 6 and 7 show the trends of tax evasion in the two study areas.

Figures 8 and 9 show the spatial distribution of the instances of tax evasion in Kileleshwa and Umoja, respectively. The plots are classified as follows:

- *No return.* Plots with rental properties whose owners did not have a PIN and also those who had a PIN but did not submit a return of income.

Table 3. Summary of cases of tax evasion in Umoja, 2000–2003
(sample size: 53 rental properties)

Owner	No Return*	Zero Return†	Total	No Return*	Zero Return†	Total
		2000			2001	
Companies and individuals with a PIN	25	3	28	25	3	28
Companies and individuals with no PIN	20	0	20	20	0	20
Subtotal	45	3	48	45	3	48
Percentage of sample	84.90%	5.67%	90.57%	84.90%	5.67%	90.97%
		2002			2003	
Companies and individuals with a PIN	8	9	17	12	7	19
Companies and individuals with no PIN	20	0	20	20	0	20
Subtotal	28	9	37	32	7	39
Percentage of sample	52.83%	16.98%	69.81%	60.38%	31/21%	73.58%

Owner did not submit a return of income.
†Owner submitted a return of income but did not declare rental income.

Figure 6. Trends in tax evasion in Kileleshwa, 2000–2003
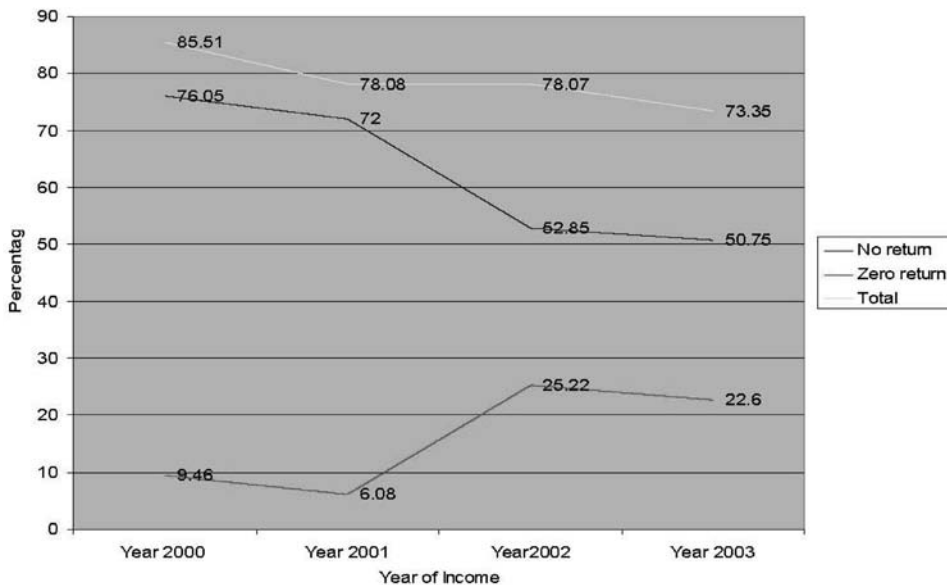
- *N. established.* Plots whose proprietors could not be found in the cadastre; thus the tax status could not be established.

- *Zero rent income (ZRI).* Plots with rental properties whose owners submitted a return of income without declaring rent income.

- *Owner-occupied.* Buildings occupied by the proprietor only.

- *Return.* Plots with rental properties whose owners had submitted a return and declared rent income.

- *Secondary leases.* Plots with subsequent leases of individual apartments.
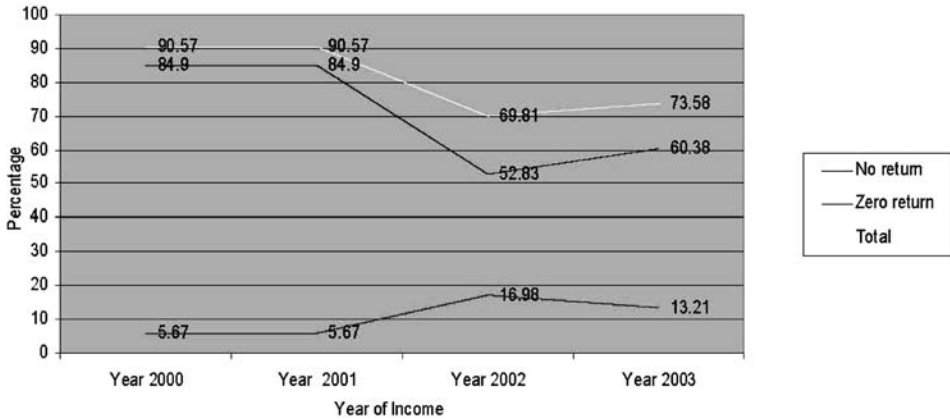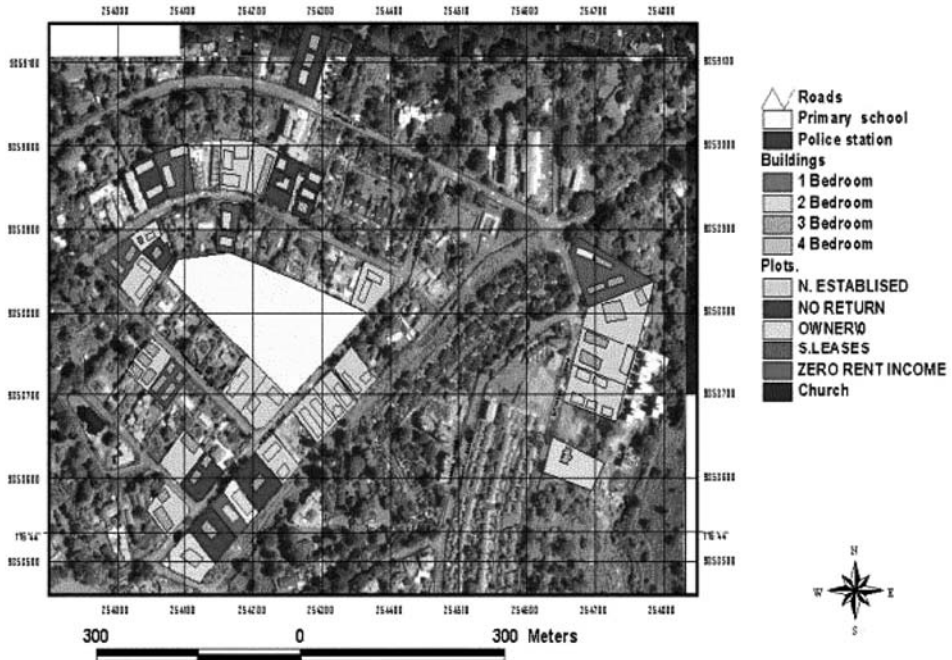
Figure 7. Trends in tax evasion in Umoja, 2000–2003

Figure 8. Spatial distribution of Tax Evasion in terms of plots in Kileleshwa (primary leases), 2003.


Discussion

This study found many taxpayers whose PIN numbers did not indicate whether they were earning any type of rental income. This can be attributed to the fact that the PIN is usually assigned when an individual gets his or her first job. The records are usually not updated as an individual builds an investment portfolio over time. Therefore, if an individual invests in rental property, it is not shown in the Management Information System of the KRA.

In addition, most of the plots owned by women did not have a PIN. It was difficult to determine if they were tax evaders because their income may have been taxed as their husband's income.

According to the sample statistics, the rate of tax evasion was higher in the low-income area than in the high-income area. In the high-income area, taxpayers were more faithful in submitting their returns, even though most were not declaring rent income. This may be attributed to the higher rate of corporate ownership in the

Figure 9. Spatial distribution of tax evasion in terms of plots in Umoja, 2003
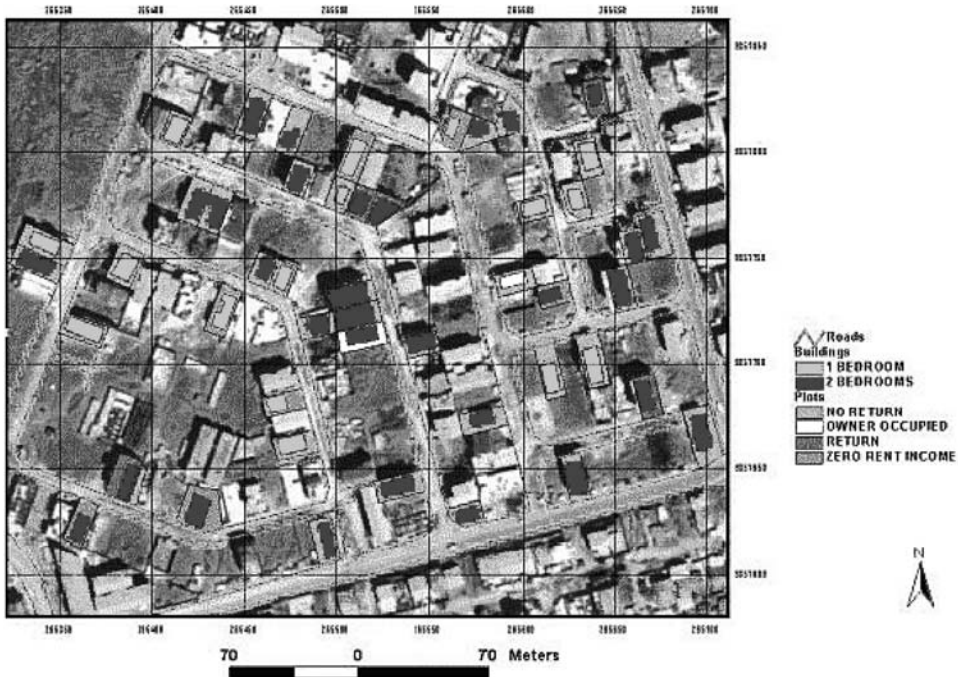
high-income area as compared to the low-income area. Therefore, we concluded that individuals are more notorious in not submitting returns.

However, in terms of those who submitted returns but did not declare rent income, Kileleshwa had a higher percentage. Thus, we concluded that companies, which were the majority of tax evaders there, took advantage of the fact that the KRA relies more heavily on self-assessment to compute payable taxes.

Conclusions

The main objective of this study was to demonstrate how the KRA can increase its revenue collection by use of geospatial technology. A well-structured database containing all the appropriate data enables simple and complex analyses to be performed. This technology can be extended to other sources of income, such as business income and employment income, because most of them have a spatial element and are usually aggregated for taxation purposes.

An information database of rent in-come including other factors that affect taxable income, such as charge on land and buildings, was created, and various queries and analysis were performed. The system can support tax audits because attribute data such as loans with buildings as security are shown in the fiscal cadastre, which forms part of this system. The system also shows when such loans were taken and thus can be used to compute the allowable interest on loans that should be deducted to determine the taxable rent income.

Both the high- and low-income areas contained culprits of tax evasion, with the study showing the low-income area to be the worst one. Individuals, as opposed to corporations, were also identified as the worst in terms of tax evasion. Thus, it is advisable for KRA to establish why this is so and strategize in order to minimize this crime.

The study has also demonstrated that, since data used for purposes of identifying tax evaders is owned by different government organizations, e.g., the Nairobi City Council and the Ministry

of Lands, there is a need to ensure access to this data if KRA is to meet its objectives.

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