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# Can Rural Property Tax Generate Revenue? A Simple Accounting Exercise in Sierra Leone

Kevin Grieco

March 2024

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Kevin Grieco

## Summary

How should governments in sub-Saharan Africa boost their own-source revenue? In this research note I explore the decision of policymakers to expand property taxation into rural areas in the context of developing countries. A policymaker weighing the costs and benefits of rural taxation must first consider the potential net revenue that can be extracted from rural areas. Ultimately, this is an empirical question that requires reliable data on the costs and potential revenue associated with rural taxation. Unfortunately, little such reliable data exists. In this project, I seek to fill this gap by measuring village-level costs and potential revenue associated with property taxation in Kono District in rural Sierra Leone.

Based on a set of simulations, I find that property tax in poor, sparsely-populated rural areas can generate positive net revenue. While these gains are modest, they can provide a meaningful source of local government revenue in a context where incomes are near the bottom of the global distribution, and where there are potentially large returns to government spending. These simulations also highlight several features of rural tax collection. First, to increase net revenue, policymakers should prioritise increasing compliance over reducing collection costs. Second, I show that much of the revenue generated from rural taxation is likely to come from a small subset of the total villages. Third, I highlight several trade-offs between salary-based and pay-for-performance (PFP) models of tax collector compensation. I conclude by situating these results in policymakers' broader calculus for taxing rural areas.

**Keywords**: tax administration; rural; Sierra Leone; property tax; tax farming; local government taxation; sub-Saharan Africa.

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# Acronyms

GDP Gross Domestic Product
KDC Kono District Council
NGO Non-governmental organisation
PFP Pay-for-performance

# Introduction

How should governments in sub-Saharan Africa boost their own-source revenue? Currently, governments in sub-Saharan Africa rely heavily on indirect taxes compared to their counterparts in richer countries. Between 2010 and 2020, governments in sub-Saharan Africa, on average, raised nearly twice as much tax revenue from indirect taxes (9.3 per cent) as they did from direct taxes (5 per cent).[1] In contrast, between 2010 and 2020, governments in rich countries, on average, raised roughly the same amount of revenue from both direct and indirect taxes (11 per cent of GDP from both sources).[2] A key component of direct tax revenue in rich countries is property tax, which accounted for roughly 10 per cent of direct taxes between 2010 and 2020.[3] In contrast, property tax revenue is marginal in sub-Saharan Africa. For the 27 (of 48) countries where at least 1 year of property tax revenue data is available between 2010 and 2020, property tax revenue is 0.13 per cent of Gross Domestic Product (GDP), accounting for roughly 2.6 per cent of direct taxes on average. Note that this likely overestimates average property tax revenue across the continent, as the 21 countries with missing property tax revenue in UNU-WIDER's *Government Revenue Dataset* probably generate below average property tax revenue.

To the extent that governments in Africa currently collect property tax they focus on urban centres, and scholarly attention has primarily been devoted to the urban context (e.g. Brockmeyer et al. 2021; Weigel 2020; Knebelmann et al. 2023). There is a clear logic for prioritising urban centres – they contain higher-value properties that are more densely concentrated than rural areas, presumably increasing the return and lowering the cost of collection for each property. However, the fact that property tax might be more efficiently collected in urban centres compared to rural areas does not imply that property tax **should not** be collected in rural areas. In this research note, I explore the decision of policymakers to expand property taxation into rural areas in the context of developing countries.

A policymaker weighing the costs and benefits of rural taxation must first consider the potential net revenue that can be extracted from rural areas. Ultimately, this is an empirical question that requires reliable data on the costs and potential revenue associated with rural taxation. Unfortunately, little such reliable data exists. In this project, I seek to fill this gap by measuring village-level costs and potential revenue associated with property taxation in Kono District in rural Sierra Leone.[4] The primary variable cost associated with rural tax collection in this context are transportation costs for the tax collector. I estimate village-level travel costs by obtaining quotes from motorbike drivers on the travel cost between a tax collector's residence and the set of villages for which a given collector is responsible. I estimate village-level potential revenue with data on the number and type of building structures in each village. I investigate potential revenue under several scenarios through simulation exercises.

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1 Indirect taxes include taxes on goods and services, and taxes on international trade. Direct taxes refer to taxes on income, payroll taxes and taxes on property.

2 Calculations made by the author using the UNU-WIDER Government Revenue Dataset (Version 2021). I use variables for direct and indirect revenue that excluded social contributions and resource revenue. For each country, I average across available data for years between 2010 and 2020. 'Rich countries' refers to the set of 'high-income' in the World Bank's income group classification.

3 Again, calculated by author. Averaging across country averages using available data for high-income countries.

4 Rural, in this context, implies the set of villages and small towns outside the district headquarters town of Koidu. There is no connection to the electricity grid or piped water. There are no paved roads, and the road infrastructure is poor, and often very bad. I consider a set of 1,139 towns and villages across Kono District. The largest town has 841 building structures, and the median town/village has 17. The 75$^{th}$ and 25$^{th}$ percentile towns have 33 and 8 buildings, respectively.

Based on a set of simulations, I find that property tax in poor, sparsely-populated rural areas can generate positive net revenue. While these gains are modest – maximum net revenue under full compliance is US$94,171 in my baseline model – they can provide a meaningful source of local government revenue in a context where incomes are near the bottom of the global distribution, and where there are potentially large returns to government spending. For example, while revenue from rural property tax will be insufficient to undertake large-scale infrastructure development, local government could use the revenue to complement and maintain development projects implemented by central government or non-government organisations (NGOs).

These simulations also highlight several features of rural tax collection. First, to increase net revenue, policymakers should prioritise increasing compliance over reducing collection costs. While both compliance rates and collection costs are clearly central factors determining net revenue, I argue that compliance is more important. Simulations show that maximum (and unrealistic) efficiency gains in tax collectors' travel behaviour (i.e. reductions in travel cost) increase net revenue by the same magnitude as a 15 per cent increase in tax compliance. Various policy interventions have been shown to increase compliance by that magnitude (e.g. Balán et al. 2022; Okunogbe 2021; Khan et al. 2019). Second, I show that much of the revenue generated from rural taxation is likely to come from a small subset of the total villages. This is both because **potential** revenue is concentrated, and because many small villages are not visited at all. In the status quo collection scheme, where tax collectors pay their own transport and keep a portion of the collected revenue (i.e. pay-for-performance (PFP)), the majority of villages will not be visited by tax collectors because it is not economic to do so. Third, I highlight several trade-offs between salary-based and PFP models of tax collector compensation. When compliance rates and monitoring costs are held fixed, salary-based compensation models outperform PFP methods. This is because PFP collectors elect not to visit many villages, even if doing so would generate positive net revenue for the government. PFP compensation concentrates the tax burden relative to salary-based collector compensation. Yet, PFP is still probably preferable in low-capacity settings, as they require less monitoring and are likely to lead to higher compliance rates. Hybrid compensation models may be the best option for policymakers looking to balance collection efficiency with concern about the distribution of the tax burden.

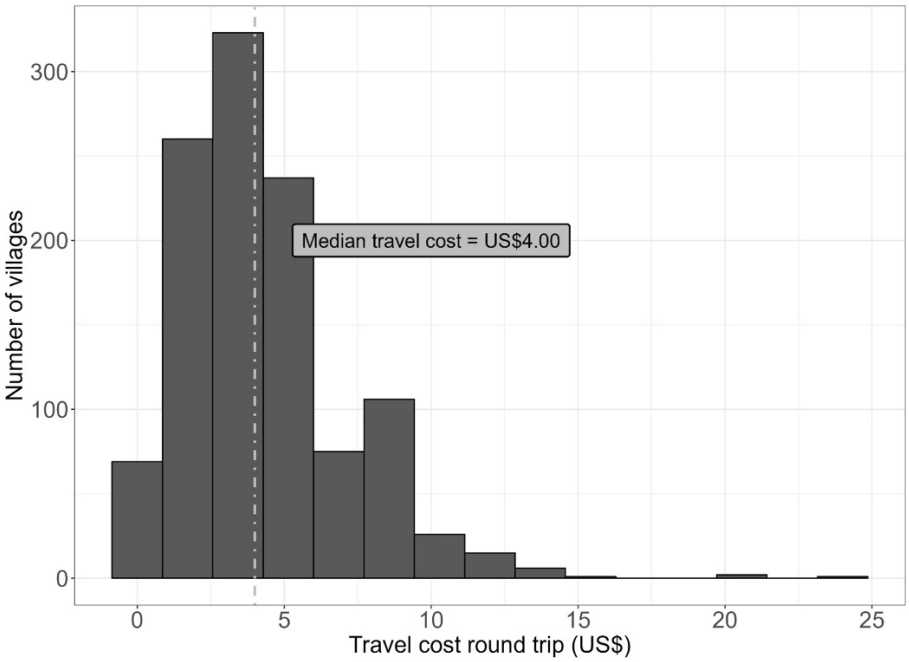
I conclude by situating these results in policymakers' broader calculus for taxing rural areas. Efficiently extracting resources from rural areas may not be the only, or even the primary, motivation for taxing them. The decision of whether, and how, to tax rural areas may impact citizens' perceptions about the fairness of the tax system, thereby affecting compliance rates in both rural and urban areas. If this is the case, counter-intuitively, taxing rural areas may a pro-poor policy, generating additional revenue elsewhere to be ploughed into rural development. In addition, policymakers face state-building motivations for taxing rural areas, where taxation serves the broader function of legitimising state institutions, which may help state leaders achieve their other policy objectives.

# 1 Estimating travel costs for tax collection

In 2018, Kono District Council (KDC) initiated a tax reform aimed at systematically collecting property taxes on residential buildings in rural areas for the first time. In 2021, as in prior years, tax collection was done in person. The KDC has divided the district into 27 tax zones, with a single resident collector being responsible for collecting property tax in each tax zone.

Under the status quo collection scheme, tax collectors are responsible for providing their own transportation to villages to collect taxes – the local government provides neither motorbikes nor upfront financing. As such, most collectors hire motorbike taxis when travelling to and from villages during tax collection. With this in mind, I compiled a dataset of tax collection travel costs by recording the price of a motorbike taxi from each tax collector's residence to each village in their tax zone. To do this, I had a research assistant visit the 'bike park' – a place where motorcycle taxis gather to wait for customers – closest to each tax collector's residence and ask the price for visiting each of the villages in the tax zone. Figure 1.1 presents a histogram of these travel costs. We collected this data for all tax zones, apart from the four tax zones in Nimikoro chiefdom where tax collectors were not named in 2021 – these tax zones are therefore not included in this analysis. I was able to obtain travel cost estimates for all but 17 of the remaining 1,138 villages. I drop these villages from the analysis.[5]

**Figure 1.1 Distribution of travel costs from collectors' residence to each village in tax zone**




Source: Author's data.

# 2 Estimating potential revenue at village level

This section describes my strategy for estimating potential property tax revenue in 1,121 rural villages in the 23 tax zones in Kono that had tax collectors assigned in 2021.[6] Buildings were classified as one of nine types in 2021, each with its own tax rate. Table 2.1 maps each building type to its 2021 tax rate.

[5] It is important to note that the cost of visiting a given village to collect taxes is not necessarily the full cost from the collector's residence to that village - a collector could visit multiple villages in the same day. I analyse and discuss this possibility.

[6] Tax collectors were not assigned in four tax zones in Nimikoro Chiefdom.

**Table 2.1 Annual tax rate by building type**

| Structure type | Tax rate (Le)[7] |
|---|---|
| Mud house (wattle house) with thatched roof | 20,000 |
| Mud house (wattle house) with zinc roof | 30,000 |
| Mud brick house (not plastered) | 40,000 |
| Mud brick house (plastered) | 50,000 |
| Mud bricks house with toilet facilities | 80,000 |
| Cement house without toilet facilities | 120,000 |
| Cement house with toilet facilities | 150,000 |
| Two-storey house (ground floor plus one floor above) | 300,000 |
| Multi-storey house (more than 2 storeys) | 400,000 |

Source: Public announcement from Kono District Council delivered via radio in March 2021.

As the village potential revenue is simply the sum of the tax rate levied on each building in a given village, we could calculate potential revenue at village level by observing the number of buildings in each of the nine building categories in each village. In reality, I do not have such fine-grained data for all villages. Instead, I combine three sources of data to estimate potential revenue at village level.

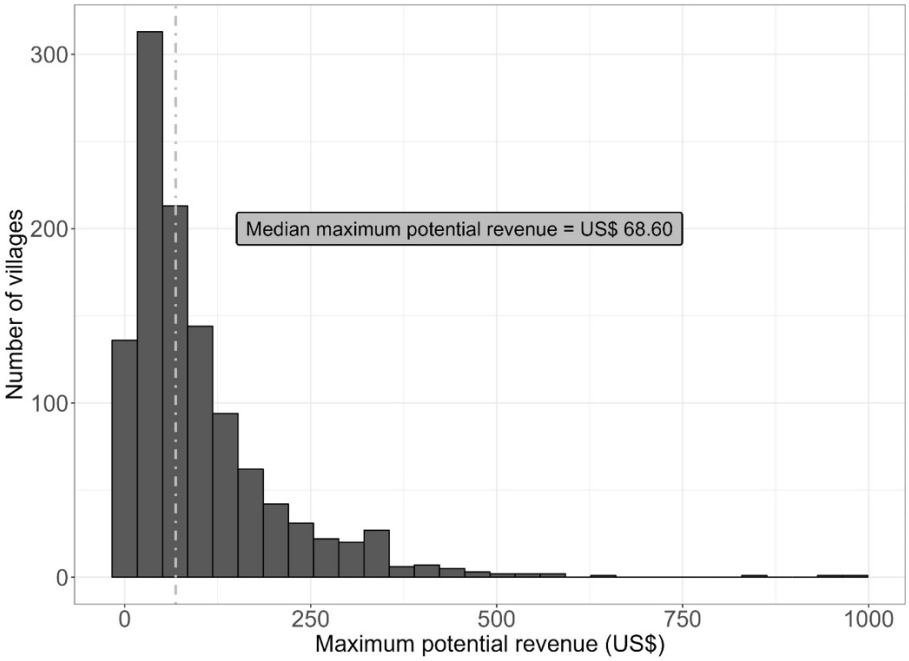
1. **2021 Tax collector potential revenue assessment:** Tax collectors were instructed by the Valuation Office to complete this assessment in all villages that they visited for tax collection, though the completion percentage was less than 100 per cent. This assessment was completed in 128 villages in 2021. For the assessment, the tax collector counted the number of buildings that fall under each of the nine housing categories before commencing tax collection. This allows me to calculate exact potential revenue in villages where I have this data.
2. **2019 Tax collector potential revenue assessment:** Tax collectors also completed a potential revenue assessment in 2019. In the 2019 assessment (and tax season), there were only four categories of housing type: (i) wattle house, (ii) mud brick house, (iii) concrete house, and (iv) multi-storey house. In this survey, tax collectors count the number of buildings that fall under each of these four housing categories. I have data from this assessment in an additional 217 villages, beyond the 128 villages where I have the 2021 assessment data.
3. **2015 National Census data:** In villages where I do not have data from either the 2021 or 2019 potential revenue assessment, I rely on data from the 2015 National Census (Statistics Sierra Leone n.d.). Census data contains a measure of the number of building structures in each community. Unfortunately, census data does not contain information about the type of building structure. To estimate potential revenue from the census data, I multiply the number of building structures in a village times the average potential revenue for each building (calculated from assessment data). I have data from the 2015 National Census for a further 794 villages.

7 The exchange rate when these tax rates were set in January 2021 was Le10,000 = US$1.

For villages where I have the 2021 assessment, I exactly calculate potential revenue.[8] For villages where I have data from a 2019 assessment, but no 2021 assessment, I estimate 2021 potential revenue by reweighing 2019 assessment data. As noted above, the 2019 assessment categorises buildings into one of four possible structure types, rather than the nine structure categories used in 2021. However, the nine categories for 2021 fit within the four housing categories used in 2019. For example, a building recorded as 'mud house' in the 2019 assessment may have either a thatched or zinc roof, which would imply different tax rates in 2021. In these cases, I estimate the 2021 tax rate as the sum of the possible tax rates times the proportion of buildings in each category in the 2021 tax assessment. For example, in the 2021 assessment 69 per cent of mud houses had zinc roofs and 31 per cent had thatched roofs. Therefore, I use Le26,900 (0.69*Le30,000 + 0.31*Le20,000) as the potential revenue for a house listed as 'wattle house' in the 2019 tax collector survey. In villages where I have data from neither the 2019 or 2021 assessment, I rely on 2015 National Census data. As noted above, the census data contains information about the number of building structures in each village, but not the type of building. To estimate potential revenue from the census data, I multiply the number of building structures in a village times the average potential revenue for each building (calculated from assessment data).

Figure 2.1 displays the distribution of potential revenue across villages.[9] The long right tail implies that potential revenue is fairly concentrated in a handful of major towns. For example, villages with the highest 1 per cent of potential revenue (11 villages) contain 11.2 per cent of the district's potential revenue. Villages in the top 10 per cent of potential revenue account for 38.3 per cent of the district's total potential revenue. In contrast, villages that have potential revenue below the median (bottom 50 per cent in potential revenue) account for only 15.4 per cent of the district's potential revenue.

**Figure 2.1 Distribution of maximum potential property tax revenue at village level**




Source: Author's data.

8 The village potential revenue is calculated as the number of building structures in a given category, multiplied by the tax associated with that category, summing across each category.

9 Note that I exclude from the histogram 4 villages that have potential revenue above Le10 million: Njaiama – Sewafe (Le39,145,000), Yormandu (Le23,710,000), Kayima (Le13,050,000) and Kombayendeh (Le12,810,000).

# 3 Is positive net revenue possible?

Now that we have a village-level data set of travel costs and potential revenue, how can we estimate net revenue? Net revenue is the sum of potential revenue times the compliance rate in all villages visited by tax collectors, minus the cost of collecting that revenue. In my analysis, I directly estimate, and account for, costs associated with tax collectors' compensation and transportation to villages to collect taxes. I discuss other costs (e.g. monitoring costs) and their potential magnitudes.

The status quo approach for compensating tax collectors in Kono District is to use a pay-for-performance (PFP) model, also commonly referred to as 'tax farming'. In this model tax collectors pay their own travel costs, but keep a percentage of what they collect. This allows collectors to recoup their travel costs and receive compensation for their collection efforts. In 2021, tax collector kept 13 per cent of the tax revenue they collected; I use this figure in the analysis. In practice, the PFP system functioned as follows. The collector writes a tax receipt in exchange for a cash payment from a property owner, and deposits this money in an account at a local bank in the chiefdom (called a Community Bank).[10] At the end of the tax collection season, the valuation department counts up the receipts for a given collector and pays out their 13 per cent from the money deposited in the Community Bank account. It was agreed that collectors could use some of the collected money to finance their transportation – this would then be deducted from what they are owed at the end of the tax season.

Which villages does a tax collector visit in their tax zone? It seems naive to assume collectors will visit all villages in their zone, regardless of the costs and benefits of doing so. Under a PFP collection model, we should expect tax collectors to visit a village only if their expected take-home portion of the collected revenue outweighs the cost of travelling there.[11] There is also an opportunity cost for collectors setting out to collect taxes in the villages – if the amount they take home barely covers their transportation costs, they might decide the day would be better spent working on their farm, or not working at all. For the analysis, I assume collectors opt not to visit villages where their net compensation is less than US$3.[12]

If a PFP collector decides to visit some villages multiple times, and increases net revenue by doing so, the costs associated with these additional trips are not reimbursed by the government but are paid by the collector.[13] If the collector judges that another trip will generate sufficient revenue to cover their transportation and opportunity costs, they have an incentive to make that additional trip. The government still receives 87 per cent of the collected revenue, regardless of how many trips the collector makes.

Figure 3.1 presents potential net revenue estimates at a range of compliance levels. The solid blue line presents net revenue estimates from the baseline model – collectors are compensated through a PFP scheme, and only visit one village at a time before returning

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[10] If there is no community bank in the chiefdom, collectors deposit money in the local government's account in the district capital.

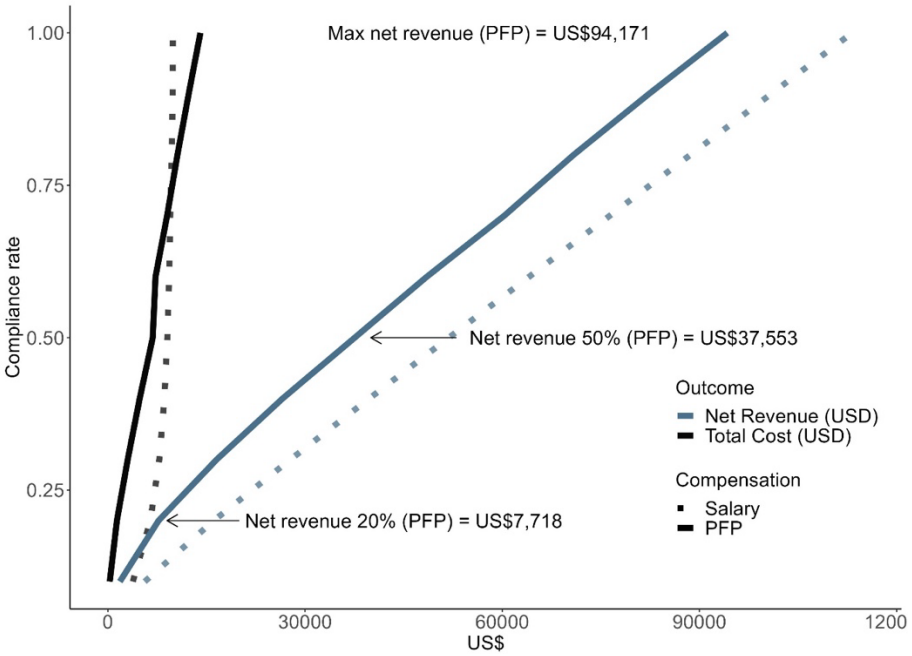
[11] Note that the 'take-home portion of expected revenue' = compliance rate*total potential revenue*percentage collector keeps.

[12] This is based on the 2021 minimum wage of Le600,000, equivalent to US$60 per month (US$3 for 20 working days). It is important to note, however, that waged work in rural areas is uncommon, and almost the entire rural workforce is employed in agriculture (World Bank 2014).

[13] Why would visiting a village a second time increase compliance? It could be that the time between visits has alleviated liquidity constraints that prevented payment the first time around. Alternatively, a follow-up visit may signal government capacity and increased propensity to take enforcement action. However, in a PFP model, the total net revenue received by government is not affected by the number of visits a collector makes to a given village.

home. We see that 20 per cent compliance achieves US$7,718; 50 per cent compliance generates US$37,553; and the maximum net revenue is US$94,171. The solid black line represents the total cost of collection.

**Figure 3.1 Estimate of potential net revenue**




Source: Author's data.

While these revenue figures may appear small, this reflects the local economic context rather than the magnitude of the tax rates. At the time of writing, Sierra Leone is one of the poorest countries in the world, with a per capital GDP (current US$) of US$476, ahead of only Burundi, Afghanistan, Syria, and Central African Republic.[14] While those figures average across rural and urban populations, rural populations (the focus of this study) are poorer than city dwellers – poverty rates in rural Sierra Leone are three times higher than in urban areas (60 per cent vs. 20 per cent).[15] Indeed, a 2013 survey in rural Sierra Leone estimated average household income at US$200 (van den Boogaard et al. 2019). Given the average property tax rate of US$4.13, this suggests that property tax rates are roughly 1 to 2 per cent of household income, which is similar to median property tax rates in some states in the United States. In the US, the median property tax paid in the median state (US$2,447 in Ohio) is 3.9 per cent of median income (US$61,938). In other states, the ratio of property tax to household income is closer to Kono. For example, the median property tax paid in South Carolina is 1.8 per cent of median household income.[16]

On one hand, these estimates may be optimistic, as several costs are not accounted for. First, I do not consider the cost of transmitting tax demands. If these are delivered in-person the cost will be significant. I estimate the upper bound cost associated with transmitting tax demands at US$5,676, which is the total cost of a government agent with a salary of US$5 per day, visiting all villages, assuming they visit two villages at a time.[17] More realistically, a

[14] According to data.worldbank.org (accessed 9 February 2024).

[15] World Bank (2020), Policy and Equity Brief.

[16] South Carolina pays the fifth least property tax of the 50 US states (US$1,024) and has a median household income of US$58,234. Massachusetts, by contrast, pays the fifth most (US$5,091), equivalent to 5.7% of household income (US$89,026). Income and property tax rates from the US Census Bureau.

[17] This is based on analyses of salary-based tax collectors.

delivery team could probably visit three times as many villages per day, and a delivery cost of under US$2,000 seems more reasonable. Still, this is a significant upfront cost, and local councils should consider more cost-effective methods of making tax demands. One strategy would be to collaborate with other government agencies to communicate with property owners. For example, the National Election Commission maintains a database of registered voters that includes contact information. Another strategy would be to work with Chiefdom Councils to obtain the phone numbers of all village chiefs in the district and inform these chiefs of the tax liability structure through phone calls and follow-up texts. Of course, it would have to be determined that these are legally viable ways of transmitting tax demands.[18]

Second, the cost of supervision is not considered. In a PFP model, the purpose of monitoring is not to prevent shirking – tax collectors have a monetary incentive to collect revenue – but rather to discourage collusion and tax collector abuse. Monitoring would take the form of village visits (spot-checks) from valuation clerks at the local council – the aim of these visits would be to look for signs of collusion, and receive any complaints against the collector.[19] The valuation clerks who would conduct these spot checks already have a salary from local government, and the valuation department has motorbikes for this. Therefore, the only cost associated with these spot-checks is that of fuel. With fuel costing less than US$1 per litre, assuming an average of 5 litres per village visited, the cost of spot-checking 100 villages would be less than US$500.

On the other hand, these estimates may be conservative. First, everything else being equal, governments can increase net revenue by paying collectors a salary (dot-dash lines in Figure 3.1), rather than relying on PFP compensation. At a 50 per cent compliance rate, net revenue with salary-based collectors is 38.1 per cent higher. This is because a PFP compensation model strongly limits the number of villages visited by tax collectors relative to salary-based compensation models. If the government offers collectors a salary, the government has discretion over where a collector visits. To maximise revenue, the government should instruct collectors to visit villages where the expected net revenue outweighs the cost of travelling to the village plus the collector's day rate. So if the travel cost to visit a village is US$5, and the tax collector is compensated with US$5/day, the government would send the collector to visit that village if they expect revenue collected to exceed US$10.[20] By contrast, to visit that same village, a PFP collector would need to expect to collect US$61.60.[21] Simulations bear this out. At a 50 per cent compliance rate collectors visit 87.5 per cent of villages in the salary-based compensation model, but only 33.8 per cent of villages in the PFP model.

Yet, everything else being equal is a significant caveat. Substantial monitoring is likely to be required with a salary-based model. While it is fairly straightforward to confirm that a tax collector has at least visited a village (e.g. by collecting a GPS location), it is less straightforward to ensure that the collector has actually made a serious attempt at collecting taxes. A collector looking to minimise their time invested and maximise their popularity could

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18 Note that the structure of tax rates - a flat rate for each of several building types - means that homeowners can easily determine their tax rate themselves, if given the necessary information.

19 Collusion in our context looks like this: After a taxpayer has paid, the collector writes a receipt. The local government can check if the receipts add up to the total amount collected and returned by the collector. However, upon visiting a property that should pay Le50,000, there is little to stop a collector from writing a receipt for Le40,000 in exchange for a payment of Le45,000, then pocketing the balance Le5,000. A spot-checking supervisory system may deter this behaviour, because the supervisory team can check that property owners have paid the rate they should have.

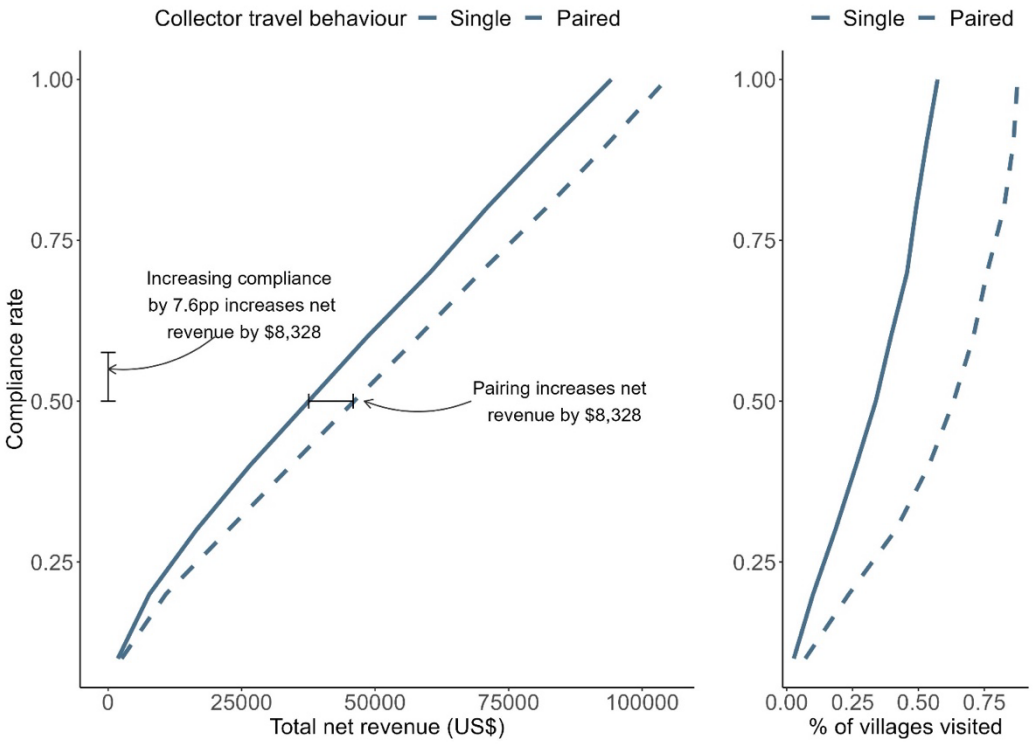
20 A day rate salary of US$5 for tax collectors is quite competitive and is high enough to attract many interested applicants; it could probably be reduced by 20% and still attract an abundance of applicants. As noted, this is 66% higher than the minimum wage.

21 Collecting US$61.60 generates US$8 for the collector, equalling the sum of their opportunity cost (US$3) and transport cost (US$5).

simply show up in a village, record a GPS location, say hello to a few friends, then leave reporting they were unable to collect any taxes and collect their day rate. Moreover, there is good evidence that PFP increases effective compliance rates (Khan et al. 2016). Finally, in a salary-based model, the government would have to pay for collectors to make additional trips to certain villages.[22] Given that the higher monitoring costs and lower compliance rates associated with salary-based collection may swamp the net revenue benefits described in Figure 3.1, I believe the PFP estimates are appropriate, rather than conservative.

Second, I may be making conservative assumptions regarding the tax collectors' travel behaviour.[23] Specifically, I calculate travel costs by assuming that tax collectors only visit one village at a time, always returning back to their resident village before making another collection trip. But many villages are close to one another, and a collector can reduce their travel costs by visiting multiple villages on the same trip. This also allows them to visit more villages at a given compliance rate. Figure 3.2 presents results when we assume that tax collectors can visit two villages on the same trip. To make these estimates, I first place villages in pairs based on geographic proximity, and then calculate revenue and cost statistics at the pair level.[24]

**Figure 3.2 Increasing collection efficiency improves compliance**




Source: Author's data.

[22] I estimate the cost of visiting all villages in a salary-based model at US$5,676. Given how concentrated revenue is, and the likelihood that these larger villages are easier to reach for tax collectors, we might expect an additional trip to the top 20% of villages to cost 20% of the cost of travelling to all, which would be US$1,135.

[23] There is a third way in which these estimates may be conservative. Transportation costs assume that a collector hires a motorbike rider for every leg of the journey. That is the status quo. But local governments could buy motorbikes outright, or rent them long-term, which would probably reduce transport costs.

[24] Specifically, I randomly select a village and pair it with the village closest to it. I then remove both villages from the data set, randomly select another village, and pair that to the most geographically proximate village. And so on. Gross revenue is the sum of the potential revenue from both villages in the pair times the compliance rate. Travel cost to a pair is taken to be the highest travel cost value in each pair. Net revenue is calculated at the pair level as pair-level gross revenue minus travel cost.

The solid lines in Figure 3.2 show net revenue (left panel) when collectors visit only one village at a time, and the dashed blue line shows net revenue when they visit villages in pairs. Not surprisingly, net revenue is higher when collectors can visit villages in pairs. Visiting villages in pairs increases net revenue by: (i) reducing the average travel cost to each village visited, and (ii) increasing the number of villages that collectors decide to visit (right panel). At a compliance rate of 50 per cent, visiting villages in pairs increases net revenue by US$8,328 (22.1 per cent).

Assuming that collectors visit only one village at a time may be conservative because, in PFP models, collectors have an incentive to visit multiple villages in one trip if that maximises the trip's net revenue. Yet, assuming that collectors will visit villages in pairs is likely to be overly optimistic. The best evidence for this assertion comes from a travel subsidy programme set up by the KDC, which incentivised tax collectors to visit far-off, 'hard-to-reach' villages. The subsidies worked – with their travel costs fully subsidised, collectors were much more likely to visit hard-to-reach villages. However, we found no evidence that collectors visited additional villages proximate to the one they were subsidised to visit.[25] This implies that collectors often visit villages one at a time, and that the best estimates for PFP collection probably lie nearer to the solid line than the dashed line in Figure 3.2.

While at baseline collectors are likely to visit more than one village per day on average, it is unlikely travel efficiency can be improved sufficiently for them to visit two villages per day on average (as assumed with the dotted line in Figure 3.2). Therefore, the gap between the solid and dotted lines is probably larger than the **maximum** net revenue gains that can be obtained by reducing travel costs associated with in-person collection. However, a similar net revenue gain can be achieved by a realistic, if impressive, jump in compliance. For example, the US$8,328 net revenue generated by an extreme (and implausible) change in the efficiency of tax collectors' travel behaviour is obtained with a 7.6 percentage point increase in compliance, which represents a 15 per cent jump above the baseline level. While those gains are impressive, they are in line with the effects of various policy interventions and should be considered achievable medium-term compliance gains.[26] There is a policy lesson here – strategies to improve the efficiency of tax collector's travel help, but not as much as strategies that boost compliance.

In summary, rural taxation can generate positive net revenue for local governments, even if in-person tax collection is undoubtedly less efficient than tax administration in rich countries. While the estimates I present in Figure 3.1 do not include the cost of intensive monitoring, I believe this is defensible given the compensation structure for tax collectors – PFP collectors require less monitoring. My estimates also leave out the cost of transmitting tax demands. Given the simple structure of tax rates, local governments should consider low-cost methods for communicating these rates. While my estimates show that, everything else being equal, salary-based compensation for collectors will increase net revenue, there are good reasons to believe that sticking with PFP compensation keeps monitoring costs down and the compliance level up. Finally, policymakers may find it easier to move the needle on net revenue by focusing on taxpayer compliance, rather than tax collectors' travel efficiency.

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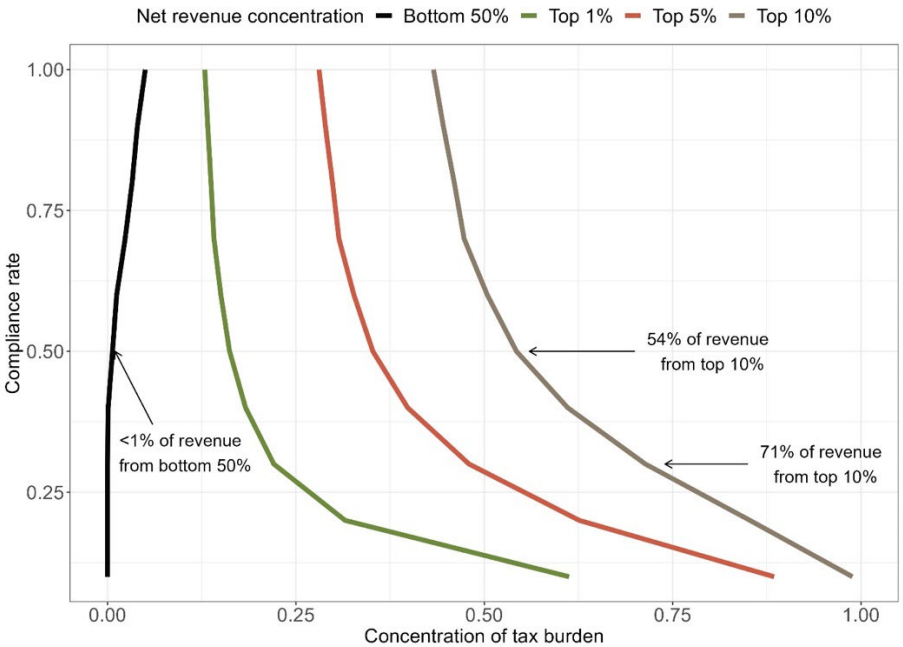
[25] More details can be found in a report written by the author about this subsidy programme (available upon request).

[26] For example, Balán et al. (2022) report that using city chiefs rather than state agents as tax collectors in the Democratic Republic of the Congo increases collected revenue by 43%. Okunogbe (2021) reports that enforcement and legibility messages sent to property owners in Liberia increases compliance rates by a factor of four. The performance-based mechanism for bureaucratic assignment evaluated by Khan et al. (2019) increases revenue by 30%-41%.

# 4 Concentration of the rural tax burden

This simple accounting exercise also reveals that revenue extraction is heavily concentrated in a subset of villages. Figure 4.1 visualises this concentration, where each line presents the percentage of net revenue extracted from a given subgroup, across the range of compliance levels. For example, the brown line (far right) depicts the percentage of total net revenue that is extracted from villages in the top decile of potential net revenue. When compliance is 50 per cent, this group generates 54 per cent of the total net revenue. The tax take is more concentrated at lower compliance levels. For example, moving from 50 per cent compliance to 30 per cent increases the percentage of net revenue generated from the top decile from 54 per cent to 71 per cent. The majority of villages contribute very little revenue. At full compliance, villages with below median potential revenue (the bottom 50 per cent) contribute only 5 per cent of overall net revenue.[27]

**Figure 4.1 Concentration of the rural tax burden**

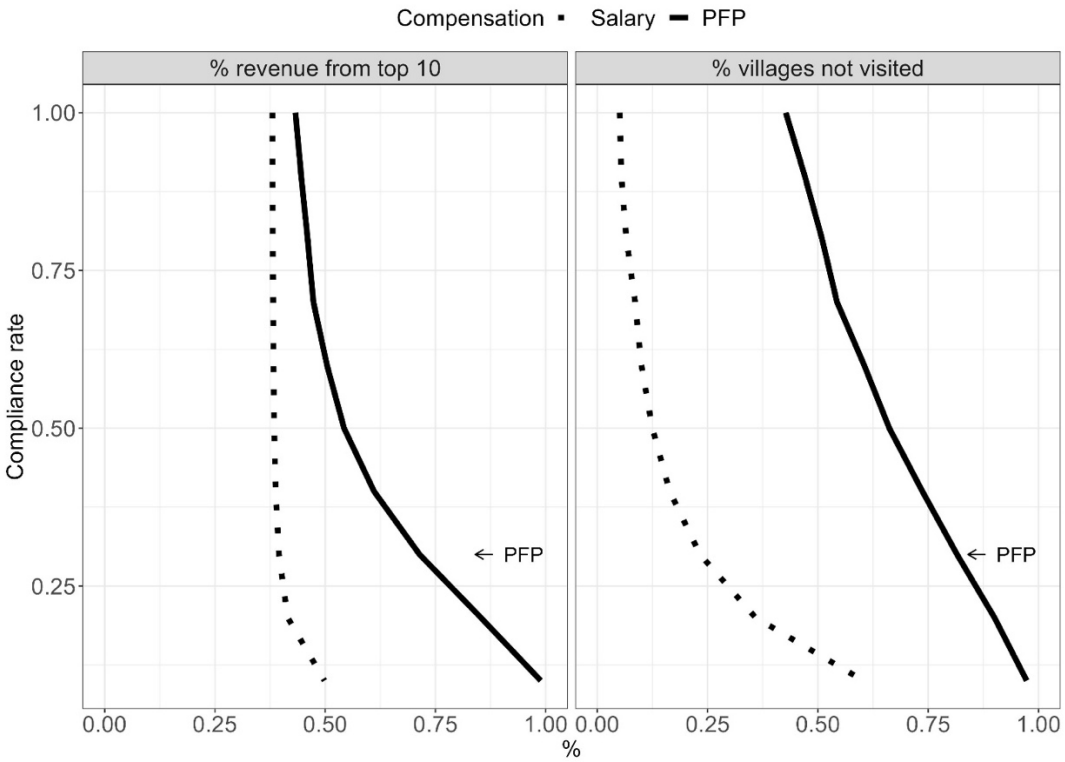



Source: Author's data.

A major reason for this concentration is that tax collectors decide not to visit many villages because doing so is not economic. As Figure 4.2 shows (right panel), even at full compliance, PFP collectors do not visit 43 per cent of villages. At 50 per cent compliance PFP collectors do not visit 66 per cent of villages; this figure increases to 90 per cent when compliance drops to 20 per cent. Figure 4.2 also highlights the extent to which the concentration of extraction is exacerbated by PFP collection, by also considering concentration statistics for salary-based collectors. We can see that the percentage of total net revenue generated from the top 10 per cent (left panel) is always lower for salary-based collectors; the concentration gap is larger at lower levels of compliance. At full compliance, salary-based collectors only leave 5 per cent of villages unvisited (right panel). At 40 per cent compliance only 16 per cent of villages are not visited by salary-based collectors; the corresponding statistic for PFP collectors is 74 per cent.

[27] Note that if all villages had equal potential revenue, half the villages would contribute 50% of net revenue.

**Figure 4.2 Concentration of tax burden: PFP vs. salary**




Source: Author's data.

Importantly, note that these findings about the distribution of the tax burden assumes that compliance levels are equal across villages. If, for example, compliance rates are higher in larger villages than in smaller ones (e.g. because they are richer), concentration rates will be higher. If, on the other hand, compliance rates are higher in smaller villages, the burden of tax collection will be less concentrated than the estimates provided here.

# 5 Policy implications

These analyses have several implications for policy. First, taxing rural areas can generate modest, though potentially meaningful, revenue for local governments. While potential revenue is insufficient for large-scale development projects, rural taxation could supply local governments with discretionary revenue for projects to reach long-hanging benefits. One strategy would be to use revenue to complement and maintain projects implemented by central government or NGOs. Central government and NGOs have built many school buildings, heath centres and water points across Kono. However, these projects often fall into partial or complete disrepair due to a lack of maintenance. For example, the rooms in a hospital or school could be unusable because a collapsed roof or broken handpump makes a well more difficult to use.[28] KDC could use its own source revenue to maintain development projects and the stock of existing public goods. Given the low cost of labour and locally sourced materials (e.g. mud bricks), an own-source revenue budget of US$30,000 could be used to undertake 50 maintenance projects costing US$600 each.

[28] Other examples include broken lights, leaky ceilings, missing school furniture and broken generators.

Second, given the concentration of potential revenue, taxes will be most efficiently extracted from larger, more easily reached villages. Considered narrowly, a policymaker motivated only by local revenue extraction should ignore villages that have potential revenue below the median – these villages contribute little to the overall revenue take. If a policymaker wanted to further simplify their task, focusing on the 10 per cent of villages with the most potential revenue is a good bet, as at least 50 per cent of the net revenue take would be extracted from these villages. But even policymakers who are strictly motivated by revenue maximisation should be wary of this approach. The distribution of the tax burden may impact the perceived fairness of the tax system, and in turn tax compliance and revenue. It seems possible that extending the tax net into rural areas may impact the compliance rates of property owners in urban areas, who have higher tax liabilities. Rural taxation may increase the perception of fairness for urban property owners, and thereby increase compliance. A similar logic may play out within rural areas. While potential revenue in rural areas may be concentrated in a small subset of villages, compliance rates in these villages may be a function of the breadth of the tax net (the number of villages taxed in rural areas). If the breadth of taxation impacts compliance rates, there may be pro-poor motivations for taxing poorer rural areas.[29] If government transfers and public services disproportionately benefit the poor, and expanding the tax net increases revenue raised in richer areas (through higher compliance rates), the tax imposed on rural areas may be outweighed by the additional services paid for by the increased revenue from richer areas. Counter-intuitively, taxing rural areas may do more to redistribute wealth than not taxing them at all. Policymakers who take these arguments seriously may want to avoid focusing their attention solely on high potential areas, whether they are urban or rural. As far as I am aware, there is little evidence for or against the hypothesis that expanding the breadth of taxation increases compliance rates.

Third, the way that tax collectors are compensated has implications for generating revenue, especially the distribution of the tax burden. Given the lower cost of monitoring, pay-for-performance collection is likely to be the default compensation package for many low-capacity local governments thinking about collecting revenue. However, if the choice of which villages to visit is left up to PFP collectors alone, most villages will not be visited at all – a situation likely to be seen as unfair by property owners in villages that are visited. Policymakers should consider methods for getting PFP collectors to visit more villages – a subsidy programme that pays the travel costs for collectors to visit villages they would otherwise not visit may be one good option.

Policymakers may have motivations for rural taxation that extend beyond revenue maximisation. Another motivation for tax collection in rural areas follows a state-building logic, where the goal of taxation is to create social contract links between the state (or state authorities) and citizens. By this logic, policymakers tax rural areas to engage these citizens with the state and legitimise the state to citizens. In this way, systematic tax expansion is itself an act of legitimisation. Thus legitimised, state leaders might find that citizens are more likely to comply with their other directives and policies, and more likely to engage with state institutions, such as courts, schools and hospitals. Some evidence for this logic can be found in the exciting new research from Weigel and Ngindu (2023).

[29] This line of argument runs contrary to suggestions that expanding the tax net into poor rural areas increases inequality.

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