WORLD BANK GROUP

POVERTY
AND SOCIAL
IMPACT
ANALYSIS (PSIA)

FROM EVIDENCE TO POLICY
INNOVATIONS IN SHAPING
REFORMS IN AFRICA

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# Table of Contents

I. Introducing subsidy reforms

1 Universal Price Subsidies in Cameroon: Cost, Impact, and Avenues for Reform

By Thomas Dickinson

Introduction

Cameroon has subsidy programs for food imports, petroleum products, and transport costs. Initially a response to the global food price spike of 2007/08, these subsidies accounted for over 12 percent of government expenditure in 2010, and were forecasted to exceed 20 percent in 2012. By 2012, the government was expected to spend more than CFAF 10 trillion (US$2 billion) on food subsidies (figure 1.1).

Figure 1.1: Cost of Food and Fuel Subsidies in Cameroon, 2007–12
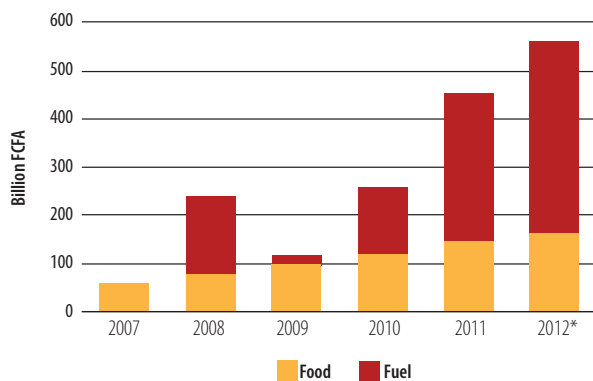
Subsidy Programs

Under the fuel subsidy agreement, the government compensates the National Refinery Corporation for the revenue shortfalls produced by the artificially low prices at the pump. In 2011, subsidies represented 29 percent of the national retail prices for gasoline, 32 percent for diesel, and 49 percent for kerosene.

The transport subsidy program reaches around 10,000 beneficiaries per day. The program cost the government an average of CFAF 3.2 billion annually between 2007 and 2009. The subsidy is almost half the price of a bus ticket (CFAF 270) for the main public transportation companies.

The government began subsidizing imported food products in 2007, reducing import and value-added taxes on several basic items. The main food products benefiting from the government action are maize (5 to 20 percent reduction in import taxes); wheat (elimination of value-added and import taxes); and flour, rice, and frozen fish (5 to 20 percent reduction in import taxes and elimination of value-added taxes). The costs of subsidies increased 26 percent per year on average between 2007 and 2011. The main cause of increased food prices is increases in prices on the international markets.

Universal subsidies succeeded in averting the pass-through of international price rises to the population, which would have otherwise caused significant harm to consumers; impacted economic activity; and, in light of events elsewhere, potentially contributed to social unrest. However, several years after the price subsidy programs were launched, it is useful to assess the effects of the programs in the longer term, particularly their costs and impacts on poverty.

To assess the impact of Cameroon's price subsidy policies, it is necessary to differentiate between direct and indirect effects. The direct effect is the immediate impact of an increase in the price of a good on its direct consumption by a household. The indirect effect is the effect of an increase in the price of a good on the prices of other goods and services that a household consumes.

This study uses consumption patterns and the share in total consumption of the basket of goods consumed by the rich and the poor, rural and urban. The study breaks down the amounts of goods consumed by quintile of the population as a share of total consumption, to identify whether a subsidy is progressive (benefits the poor), or regressive (benefits the rich).

Stakeholders

Focus groups were conducted to discern the major stakeholders in price subsidies, and the population's understanding of the subsidies. Groups were categorized by wealth levels (rich and poor), geographic areas (urban and rural), professions (transport, taxi, and taxi-moto drivers), and areas of potential unrest (Douala and the northwest region).

The population's knowledge about the subsidy program is low, and skewed toward the urban rich who consume the most of the subsidized products. Awareness of the subsidies decreases as distance from Yaounde and Douala (major cities) increases. The Anglophone regions are more aware of the fuel subsidies, because those regions are oil-producing regions and have some grievances. Subsidy-dependent professional groups in the population are better informed, but consider the subsidies unsatisfactory.

Impacts of the Subsidies

Fuel subsidy program. The fuel subsidy program is regressive. The impact of fuel subsidies on total prices is estimated at 0.5 percent, with direct impacts estimated at 0.3 percent and indirect impacts at 0.2 percent. The fuel subsidies are clearly more beneficial to the wealthy than the poor, with rich households spending a larger share of income on fuel than the poor (1.8 percent for the first quintile against 2.8 percent for the fifth quintile).

The wealthiest quintile (Q5) spends 1.26 percent of its household budget on gasoline, whereas the poorest quintile (Q1) only spends 0.16 percent. Likewise, diesel fuel and liquid petroleum gas (LPG, also commonly known as butane or propane) subsidies benefit the rich far more than the poor. Wealthier households commonly use LPG for cooking. Diesel subsidies are the most important subsidy expense for the government in absolute terms (50 percent in 2011). However, diesel represents a very small share of household consumption at any level (and none for the poor). Therefore, gasoline, diesel, and LPG subsidies are all regressive.

Kerosene stands out as a progressive subsidy, benefitting the poor more than the rich. Kerosene is the largest fuel expenditure for poor households (1.67 percent of the budget for Q1 households), compared with Q5 (0.58 percent). This finding holds for rural and urban areas. However, Cameroon's kerosene subsidy accounts for only 13 percent of the country's fuel subsidy expenditure.

Indirect impacts of fuel subsidies also favor the rich over the poor. The wealthiest households have the highest indirect gain, with the rich (Q5) registering a 0.61 percent increase in real income compared with the poor (Q1) registering a 0.46 percent increase. In absolute terms, the richest quintile receives 80 percent of total gasoline subsidies, 95 percent of diesel subsidies, and 85 percent of LPG subsidies (figure 1.2). Even in the case of kerosene subsidies, which are the most beneficial to the poor, the poorest 20 percent of households receive only a little over 10 percent of the subsidy, with the richest quintile capturing 35 percent.

Further, in absolute cash terms, the urban rich benefit more than the rural rich. In rural areas, although fuel sub-

Figure 1.2: Share of Total Fuel Subsidy Captured, by Quintile, Cameroon

(percent)

Legend: Q5, G4, Q3, Q2, Q1
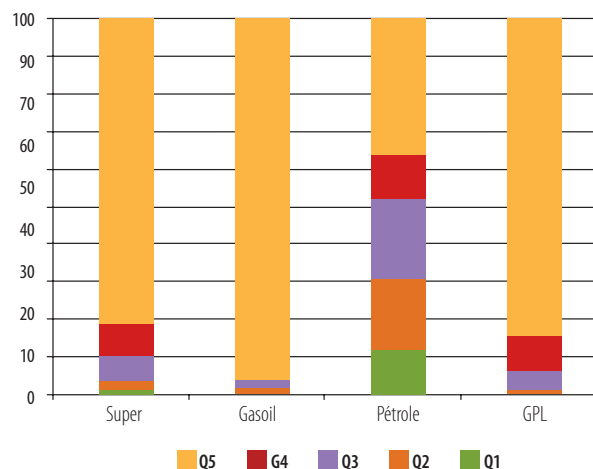
sidies are skewed toward the rich, the subsidies benefit every quintile—including the poor—because rural areas have a larger share of poor incomes than urban areas. Figure 1.3 shows that, in absolute terms, the wealthiest quintile of urban dwellers captures 73.6 percent of the total fuel subsidy, with another 10.4 percent going to the wealthiest rural quintile and the remaining 16 percent

shared among the rest of the population. The poor benefit the least, receiving only 1.9 percent of the benefits of fuel subsidies.

Although the fuel subsidies are large, their impact is somewhat reduced in areas adjacent to neighboring oil-producing countries. Regions bordering Equatorial Guinea and Nigeria import fuel illegally from their neighbors. Moreover, the most common fuel source—wood, which is used in large quantities by the rural poor—is not subsidized.

Food subsidy program. Cameroon's food subsidy is mostly regressive. Imported rice, fish, and wheat are all consumed more by the rich than the poor. The richest quintile consumes almost twice as much wheat as the poorest, and more than three times as much frozen fish as the poor. Similarly, the poor spend the least on rice, particularly in rural areas, where rice is considered a luxury food. Maize is the only progressive subsidy. The poor spend a larger proportion—nearly 7 percent—of their total expenditure on maize, close to five times more than the wealthiest quintile.

In absolute terms, food subsidies benefit the rich more than the poor in Cameroon (figure 1.4). Subsidized food benefits urban households—in particular, the urban

Figure 1.3: Share of Total Indirect Fuel Subsidy Captured, by Quintile and Rural/Urban Area, Cameroon, 2008
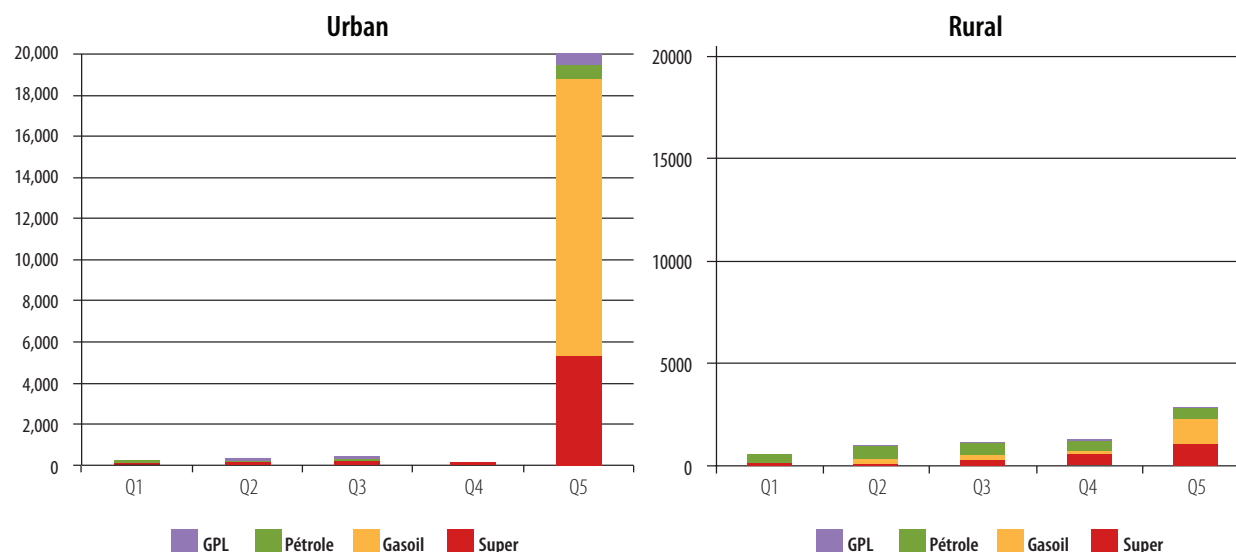
Figure 1.4: Share of Food Subsidy Captured, by Quintile, Cameroon

(percent)

rich—more than poor households. Urban areas capture 54 percent of total food subsidies (figures I-5 and I-6).

Impacts of Reform

Eliminating subsidies on gasoline and diesel (at a baseline price of US$100 a barrel) would free resources equivalent to only 1.8 percent of gross domestic product (GDP). Eliminating the sub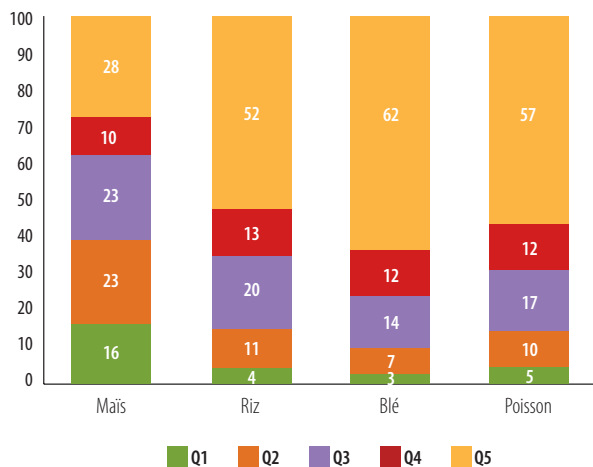sidy on kerosene would free around 0.2 percent of GDP. Releasing these resources would allow their alternative use for social spending to mitigate the impact of fuel price increases on the poor. However, despite the clear economic case for removal of subsidies,

research has shown the proportional adverse effect of their removal can be greatest for the poor, although the rich receive most of the total value of the subsidy.

Simulation of a fuel price increase of 50 percent leads to an increase in overall prices of 3.83 percent, lowering Cameroonian households' income by 3.44 percent. Rural households (+4.34 percent) are impacted more than urban areas (+2.93 percent). Fish and fish production shows the greatest price rise (+9.4 percent), followed by wood production (+6.8 percent) and transport and storage activities (+7.5 percent). The hardest hit by a 50 percent rise in fuel prices are agricultural workers, who suffer an income shortfall of 81.7 percent.

Similarly, a 50 percent increase in fuel costs in Cameroon would lead to an additional 66,000 households (400,000 individuals) falling under the national poverty line. In rural areas, poverty would increase by 2.7 percent, and in urban areas by 1.4 percent. The effects would vary across the regions, with the Centre region suffering the greatest increase in poverty (+5.5 percent), followed by the Adamawa region (+3.1 percent) and the West region (+2.8 percent).

Paths to Reform

International experience underscores the complexity of subsidy reform. Subsidy policies are often implemented to quell unrest tied to price rises. However, unrest is likely to reemerge when subsidies are lifted, because although the benefits of subsidies are diffuse, the impact of price

Figures 1.5 and 1.6: Total Food Subsidy Received, by Quintile and Urban/Rural, Cameroon

POVERTY AND SOCIAL IMPACT ANALYSIS
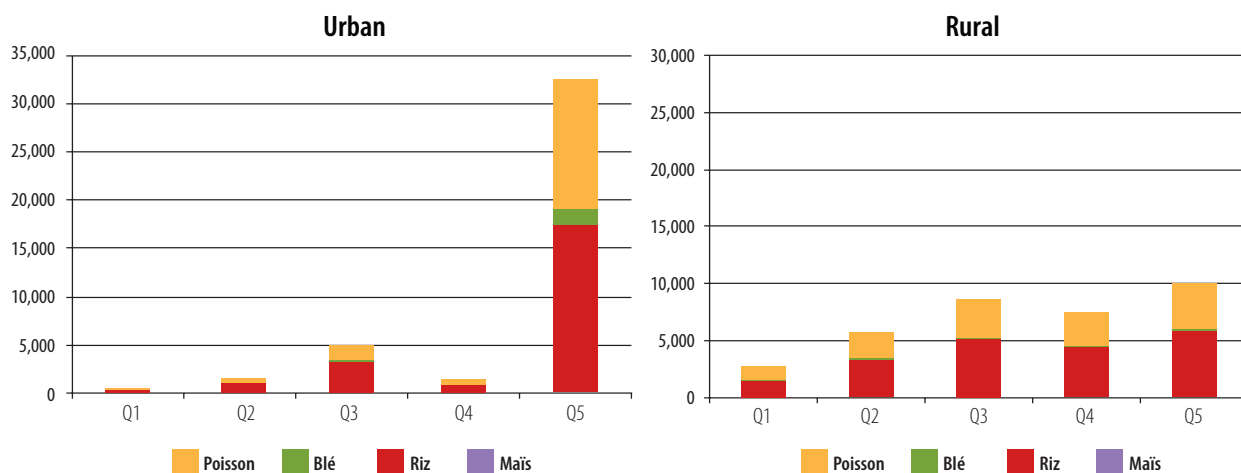
increases is immediate, highly visible, and attributable to government action. Furthermore, the longer a subsidy has been in place, the more difficult reform becomes, as benefits become entrenched among the population, and stakeholders and special interests seek to protect their benefits.

Reform should begin with undertaking extensive analysis to map stakeholders. The government should ensure that its commitment to and implementation of reform is a high priority. The government should maintain subsidies on pro-poor products, prepare a package of compensatory measures—particularly for the poor and special interest groups like taxi drivers—and engage in sustained communication.

Conclusion

Price subsidies on fuel and food items in Cameroon were set to amount to more than CFAF 400 billion in 2013 (3.1 percent of GDP), an unsustainable burden on the country's public finances. Furthermore, the rich capture the overwhelming majority of subsidy benefits (73 percent of total benefits). Only subsidies on kerosene and maize benefit the poor more than the rich. Subsidies are therefore a missed opportunity for poverty reduction.

2 Electricity Subsidy Reform in São Tomé and Príncipe

By Marco Antonio Hernandez & Tito Yepes

Introduction

In 2011, São Tomé and Príncipe spent almost 1.8 percent of gross domestic product (GDP) on subsidizing electricity. This was almost twice the amount spent in Mexico and India, but far below Sub-Saharan Africa's average of 2.7 percent of GDP.

The cost of electricity passed on to most citizens of São Tomé and Príncipe exceeded all tariff levels, except for public administrative entities, state-owned enterprises, and diplomatic missions. In effect, the electricity subsidy is financed by a cross-subsidized tariff structure, where nonsubsidized customers pay 35 percent of the cost of the subsidy. The remaining 65 percent is subsidized via other sources: fuel tax exemptions, international aid, cash transfers, and capital expenditures.

Residential users receive 75 percent of the total subsidy, followed by commercial users at 18 percent, industry at 2.6 percent, and others at 5 percent. The subsidy for residential users is distributed across households with an increasing block tariff (IBT) structure, which charges for the volume of electricity consumed in ranges or "blocks" of electricity consumption. The tariffs increase when con-sumption surpasses certain consumption thresholds that delimit each block. However, many households lack micrometers, which makes it difficult for the public utility company to assess their consumption accurately.

A study of the electricity subsidy analyzed its effects as a redistribution mechanism for the poor in São Tomé and Príncipe. The study suggests steps toward policy reform to improve targeting and reduce the fiscal burden of these subsidies.

Who Receives the Subsidy?

The objective of the subsidy is to make electricity consumption affordable for households whose ability to pay is insufficient to cover the costs. In addition, the subsidy can counteract the negative effects of high variations in oil prices, which transmit into increasing electricity tariffs and disproportionately affect the poor. Further, subsidies allow the government to avoid a negative impact should tariffs increase and consumers begin to use alternative means of power, which could reduce the revenues of the public utility companies.

The rich receive the largest share of the electricity subsidy. The assessment of the benefits of the subsidy used a benefit incidence index, which is the ratio of the share of

subsidies allocated to a group to the share of households in that group. Since it is a ratio, for a progressive subsidy (one that benefits the poor more than the rich), the benefit incidence index would be greater than 1. A regressive subsidy (one that benefits the rich more than the poor) would have an index less than 1, and a neutral subsidy would have an index of 1.

The results of the benefit incidence analysis found an index of 0.77, which means the participation of poor households in the subsidy is 77 percent of their share in the population. Therefore, the average electricity subsidy for the poor is 77 percent of the average subsidy for all households, so the subsidy is regressive.

Figure 2.1 shows the distribution of the subsidy across income quintiles, and figure 2.2 shows the distribution for rural and urban areas. The poorest two quintiles have a benefit index that is less than 1, while the richest quintile has an average subsidy 1.5 times greater than that of the average population. In addition, poor and nonpoor rural Saotomean communities receive a lower proportion of the subsidy than the urban populations (figure 2.2).

Figure 2.1: Distribution of Subsidies, by Income Quintile, São Tomé and Príncipe

Source: Based on Inquérito aos Orçamentos Familiares, IOF 2009/2010.

Eliminating the subsidy for all households is not an option, as this would dramatically reduce their ability to pay for electricity, negatively impacting household well-being. On average, the poorest households spend around 4.3 percent of total expenditures on electricity, while the

Figure 2.2: Distribution of Subsidies, for Rural and Urban Areas, São Tomé and Príncipe
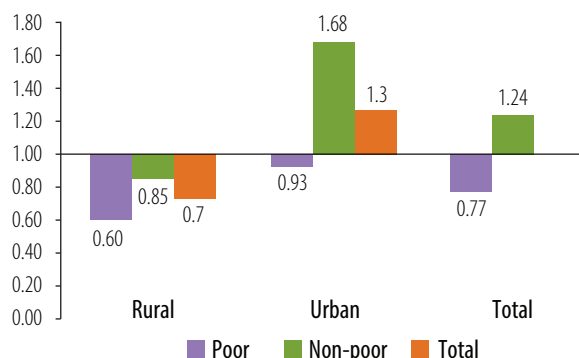
Source: Based on Inquérito aos Orçamentos Familiares, IOF 2009/2010.

richest spend 3.18 percent (annex table 13). The subsidy as a share of expenditure for the poorest households (14.62 percent) is greater than that for the wealthiest households (10 percent). However, poor households still pay relatively more than the rich, highlighting the acute need for reform.

The distribution of the subsidy is the result a of combination of (i) the distribution of access to electricity, (ii) subsidy targeting and rates, and (iii) differences in levels of consumption between households. Of these factors, differences in average consumption play the largest role in explaining the regressive nature of the subsidy. For poor households, the average rate of consumption of electricity is 0.85, compared with 1.13 for nonpoor households. However, access to electricity is also a major factor for rural communities and reduces their subsidy benefit.

The Way Forward

Subsidy reform must balance the incidence of subsidies for the poor, the extent to which households are willing to pay for the service (electricity), and the government's ability to pay for the subsidy program. Reducing differences in electricity consumption levels should be the main priority, followed by addressing differences in access and subsidization and targeting rates.

Policy change should involve modifying the IBT structure and increasing tariffs in the short run. In the long term,

the focus should be on improving rural access and modifying targeting so that it is more differentiated by group rather than by consumption.

Modifying the Block IBT Structure

Making small revisions to the IBT structure is unlikely to have significant impact in increasing the incidence of subsidies for the poor. However, the IBT structure can be reformed to reduce the total amount spent on subsidies, leading to savings that can be used for other purposes. To modify the current structure, two reforms are possible: increasing the tariff for the top blocks, and breaking down one of the blocks. There are three scenarios for achieving these reforms:

1. Increase the tariffs of the top two blocks by 50 percent

2. Dividing the top block into two

3. Combining the four-block tariff structure introduced in option 2 with an increase of 50 percent in the top three tariffs.

Scenarios 1 and 2 do not provide much gain in incidence and offer little reduction in the budget for the total subsidy. The combination of scenarios 1 and 2 in scenario 3 provides higher gains in budget savings, and expenditure groups only slightly surpass the affordability threshold. Therefore, scenario 3 would be a more appropriate means to modify the IBT structure. Assuming households continue to consume electricity at the current volumes, scenario 3 provides an annual budget cut of Db 17 billion, which could be utilized to improve access to electricity for the poor.

Improving Access and Implementing Geographic Targeting

In addition to improving access to electricity, geographic targeting could be implemented in the medium term. To increase access rates, two solutions are possible: increasing access rates to reach that of the urban nonpoor and increasing access rates of the poor to reach the nonpoor rate by geographic area (urban versus rural). Scenario 5 (increasing the rate of access of the poor to reach the rate of the nonpoor in rural and urban areas) has a high-

er budget cut, as the one-time investment to connect households is smaller.

Implementing geographic targeting will involve schemes that provide the subsidy to areas with the largest proportion of poor households. Scenario 6 proposes giving the subsidy only to Agua-Grande and Me-Zochi, which together contain 60 percent of the poor households and 62 percent of the population. Scenario 7 suggests targeting districts with poverty rates above 50 percent. This group consists of 64 percent of total households and 70 percent of the poor.

The current electricity subsidies disproportionately reach households in Agua-Grande and, to a lesser extent, Príncipe. With geographic targeting, scenario 7 would achieve budget reductions for the subsidy while marginally improving benefit incidence. However, households' ability to pay would be affected by the implementation of geographical targeting.

In the Long Run, New Targeting Methods Should Be Adopted

Improving targeting requires dropping quantity-based targeting, which means targeting by group instead of consumption level. Such targeting would require mechanisms to assist the power utility company in identifying the households in each group.

To illustrate the potential gains of targeting by group, the study proposed scenarios 8 and 9. In both scenarios, the subsidy scheme is modified by charging cost recovery tariffs to the fifth and fourth and fifth quintiles, respectively, while maintaining the current IBT structure for the remaining quintile. However, the benefit incidence indexes are not significant in either scenario, which highlights the importance of electricity consumption levels.

Further, although rich households should be subsidized at lower rates, they still need the subsidy, as their capacity to purchase electricity is negatively impacted when the subsidy to richer households is eliminated. If the wealthier quintiles were not subsidized, they would need to spend on average between 7 and 12 percent of their total expenditure to sustain their current electricity con-

sumption level. This amount would clearly surpass the 5 percent threshold, as well as their current level of expenditure (3.4 percent).

The subsidy to the electricity sector in São Tomé and Príncipe represents a high share of the country's income, at 1.8 percent of GDP. Although the electricity subsidy is useful in protecting citizens from fluctuations in international oil prices, the subsidy is regressive, with a benefit incidence index less than 1 (0.77). To target the poor better, it is necessary to reform the subsidy structure. This reform will involve improved targeting mechanisms, and increased access to electricity to improve consumption levels over time.

Changes in consumption caused by tariff variations would affect the subsidy incidence as well as the overall fiscal burden and the public electric utility company's revenue. For example, if tariffs increase for the top blocks, nonpoor households may be incentivized to reduce their consumption, thereby increasing the subsidy, decreasing revenues, and further diminishing the benefit incidence index for the poor.

II. Evaluating health systems and service delivery

3 Women's Preferences for Delivery at a Health Facility in the Kedougou Region, Senegal: Population-Based Discrete Choice Experiment

By Christopher Lemiere, Juliette Puret, Mayassine Diongue and Anta Tal-Dia

Introduction

At 429 deaths per 100,000 live births, Sub-Saharan Africa lags behind other developing regions in reducing maternal mortality. However, there are large disparities across the region. For example, in West Africa the maternal mortality rate ranges from 79 per 100,000 live births in Cabo Verde to 890 per 100,000 in Sierra Leone.

In Senegal, maternal mortality is 390 per 100,000, placing it below the West African average of 480 deaths per 100,000. Assisted deliveries with skilled personnel have been proven to be one of the most effective strategies to reduce maternal mortality. In 2006, the Government of Senegal implemented a free maternal health care policy. Assisted deliveries increased from 48 percent in 2000 to 65 percent in 2010. In Senegal, the Kedougou region presents the lowest rate for assisted deliveries: 25 and 38.6 percent, in 2010 and 2013, respectively.

Using results from a series of questionnaires, this study observes and identifies the preferences influencing decision of women in Kedougou to deliver in a health facility. From the data collected, a discrete choice experiment is performed to assess the demand for maternal health care at health facilities, to inform maternal health policy.

The study combines results from a classic household survey, where socioeconomic and health data on each woman were collected, with data from a discrete choice experiment questionnaire. The latter had two hypothetical health facilities with six attributes: distance, transport, health care personnel type, health care personnel attitudes, availability of equipment and drugs, and delivery-associated cost.

What Is a Discrete Choice Experiment?

A discrete choice experiment (DCE) is an attribute-based measure of benefits. In a DCE, individual decisions about goods and services are determined by the attributes or characteristics of that good or service. Therefore, a DCE

provides a quantitative estimate of individual preferences across various (hypothetical) situations and allows the impact of alternative situations to be simulated.

DCEs are survey-based, where respondents are presented with hypothetical situations (or alternatives) that vary by attributes and levels of attributes, and are asked to make a choice between these alternatives. The responses based on attributes are analyzed using regression techniques (in this case, a logistic regression) to compare: (i) the trade-offs that respondents are willing to make between attributes, and (ii) the probability of choosing defined situations.

Theoretical Framework

Using a random utility model, individual n is assumed to be rational and will choose, between J alternatives, the i alternative associated with the highest utility level. Thus, a woman from Kedougou, n, will choose alternative i over alternative j, if and only if:

$$U_{ni} > U_{nj}, \ \forall i{\neq}j \in J$$

The random utility model assumes that the utility associated with a particular situation or alternative (alternative chosen to deliver in this case) is made up of two components, V_{ni} and ε_{ni}. The determinate component Vni is a function of m alternative attributes x (x_1, …, x_m) that are observed, each valued at a certain "weight" or "preference" (ß_1, …, ß_m). The random component εni is a function of unobserved alternative attributes as well as individual-level variation in tastes. The utility associated with alternative i, therefore, can be parameterized as:

$$U_{ni} = V_{ni} + \epsilon_{ni} = a_1 + \text{ß}1 \ x_{1ni} + \text{ß}_2 \ x2_{ni} +$$
$$\ldots + \text{ß}_m \ x_{mni} + \epsilon_n$$

The ß coefficients for each observable factor provide information on whether respective attributes are important (statistically significant), the direction of its importance (sign of estimated coefficient), and the relative importance of attributes (size of estimated coefficient).

The DCE methodology takes advantage of the fact that the alternatives that individuals choose are observed along with all the other alternatives that they do not

choose. Thus, when individual n is presented with a pair of alternatives, the probability that she chooses heath facility i over health facility j can be written as:

$$P_{ni} = Pr \ [U_{ni}{>}U_{nj}], \ \forall i{\neq}j \in J$$

Substituting this into the equation above, the probability that a woman choses health facility i over j is:

$$P_{ni} = Pr \ [\epsilon_{ni} - \epsilon_{nj} > V_{nj} + V_{ni}], \ \forall i{\neq}j \in J$$

Survey and Data Collection

The surveys were carried out in January 2013. There were two questionnaires: a classic demographic household survey, complemented by a DCE questionnaire. The World Bank designed the household survey, with inputs from health sector partners (local and international). The survey included 10 modules, which dealt with women's education levels, knowledge about health in general and maternal health care, behavior and access to health care and maternal health care, and economic and social situations.

The objective of the household survey was to identify the delays in accessing maternal health care during delivery:

The delay in deciding to seek care, which can be subdivided into: the delay in recognition of labor (and obstetrical complications if any), and the delay between recognition and seeking maternal health care.

1. The delay in accessing the health facility.

2. The delay in receiving care once arrived at the health facility.

The DCE questionnaire consisted of 13 questions where women had to state preferences between three situations: two different health facilities and a third situation entitled "none of the two health facilities" if the respondent did not prefer either of the two health facilities. The same number of attributes describes each health facility. Each attribute[1] has different levels of variation, and so different combinations of attributes determine different fictive health facilities.

The DCE questionnaire was designed using a sequential orthogonal fractional factorial design, with 13 questions, 6 attributes, and 16 levels in total. The 13th question was

a test question to ensure the questionnaire was properly understood and taken seriously by the respondents. In this question, a clearly dominating situation is compared with another situation (every attribute is at its best level versus every attribute is at its worst level). If a woman chose the worst fictitious health facility of the pair, it would probably have meant that she misunderstood the questionnaire.

Overall, 306 women were interviewed, with 168 respondents from the Kedougou department, 90 from the Saraya department, and 48 from the Salemata department (all three departments make up the Kedougou region). The interviewees were on average 27 years old, with the youngest being 14 and the oldest being 52. Fifty-nine percent of the women were in monogamous marriages and 28 percent were in polygamous marriages. Similarly, 58 percent of the women surveyed were the first wives

of the head of household, 25 percent were one of his co-wives, and 4 percent were head of the household. Ninety-three percent of the women were Muslim and 7 percent were Christian. The majority ethnicities were Malinke (44 percent) and Pular (34 percent). Only 36 percent of the interviewed women attended school, with the majority attending only elementary school. Less than 25 percent of the respondents were literate. Forty percent of interviewees reported having a source of income; and a large majority who did were farmers or petty traders.

Results

Home versus Health Facility Delivery

Only about half the women in Kedougou delivered in a health facility (figure 3.1). On average, the longest delay

Figure 3.1: Home Versus Health Facility Delivery
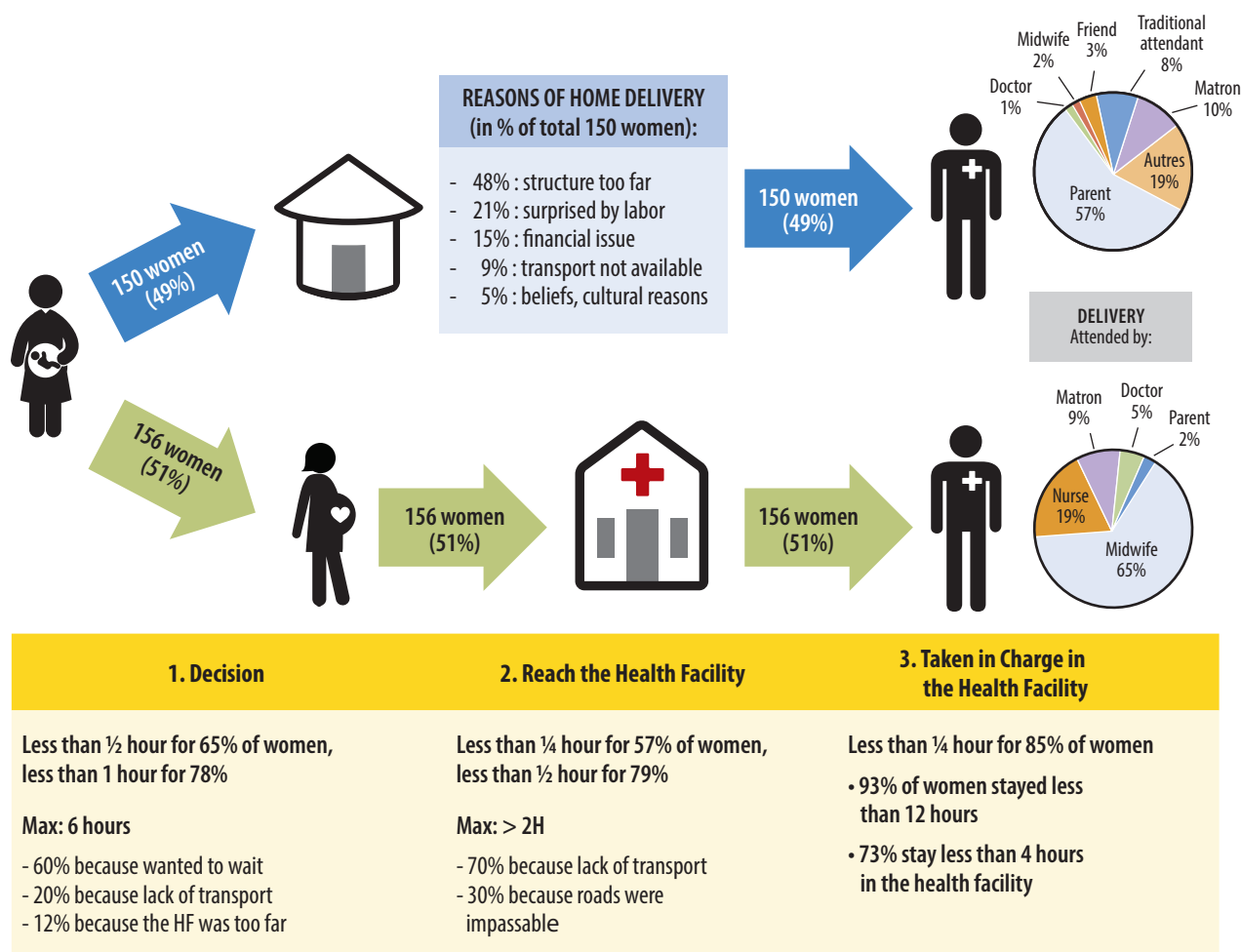
Figure 3.2: Women's Preferences for Health Facility Attributes

Legend:
- Drugs and equipment availability
- Drugs and equipment cost
- Transport cost
- Transport availability
- Health personnel behavior
- Health personnel skills
- Distance

identified through the study was the first delay: the decision to seek maternal health care, although 78 percent of the women decided to seek maternal health care in less than one day. Among them, 65 percent were assisted by a midwife, 19 percent by a nurse, and 5 percent by a doctor. Of those women who delivered at home, more than half (57 percent) were assisted by a parent, 2 percent were assisted by a midwife, and 1 percent were assisted by a doctor.

The probability of a home delivery is five times higher for women who live more than 5 kilometers from the closest health facility. Further, the mother's level of education and the quality of antenatal care also significantly impact the probability of delivering at a health facility. The mother's age and the child's birth rank also impact the probability of delivering at a health facility, but with reduced marginal effects.
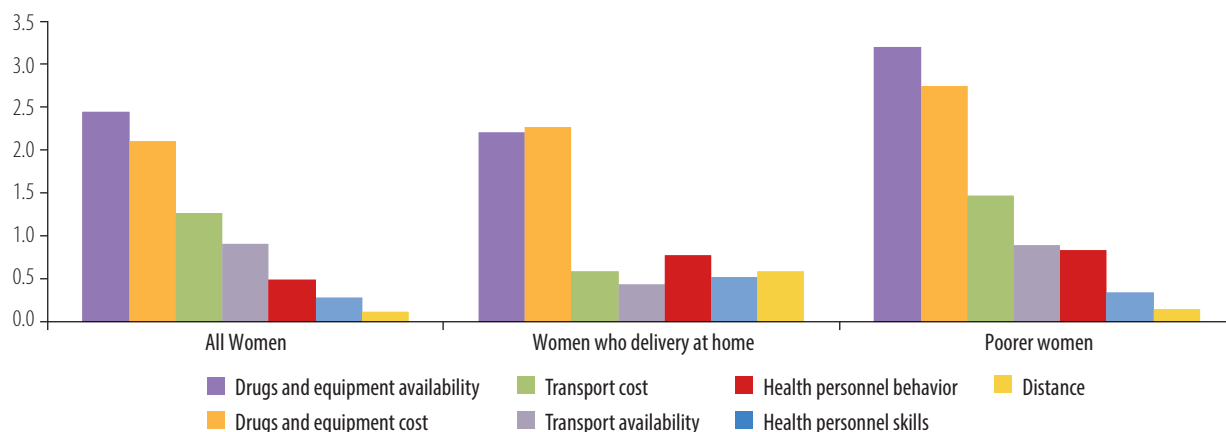
For women who suffered from obstetrical complications, the fact that they attended at least one antenatal care (ANC) visit is significantly the most important factor. Women who went to at least one ANC consultation were six times more likely to deliver at a health facility than those that did not go to any ANC consultation. The negative coefficients for transport and costs of delivery and the positive coefficients for health personnel skills, behavior, and availability of drugs and equipment confirmed that respondents prefer to have skilled personnel, drugs and equipment, and lower transport and delivery costs.

The availability of drugs and equipment is the preferred health facility attribute (figure 3.2). As was expected, the poorer women of Kedougou are more sensitive to the availability of drugs and equipment and their costs.

Women's Preferences for Delivery at a Health Facility.

Where neither health facilities had drugs or equipment, respondents were unable to make a preference and chose option 3 (no preference). However, this option was rarely selected, as it represents only 8 percent to total answers.

Women are willing to pay nine times more to be ensured drugs and equipment would be available at a health facility rather than be attended by skilled health workers (figure 3.3).

Figure 3.3: Willingness to Pay for Attributes

(US$)
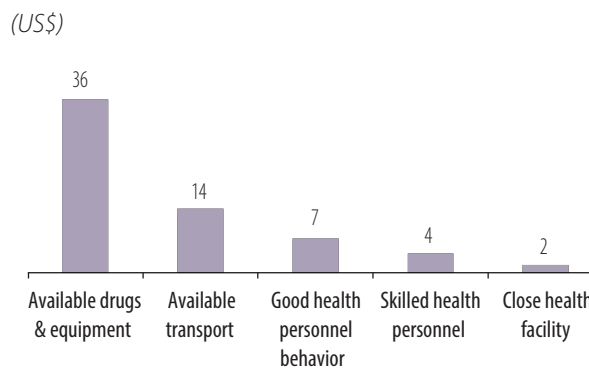
Preferred Health Facilities

To test respondents' preferences across several policy interventions for maternal health, the coefficients from regressions of the data from the DCE survey and a preference impact measure were used to create different combinations of each attribute and determine the women's preferences per combination. Two kinds of interventions were designed, single interventions, where only one health facility attribute varies, and "combined" interventions, where at least two attributes vary.

The results show that 92 percent of the women would prefer a health facility where drugs and medical equipment are always available rather than the "standard" health facility (currently observed). The "ideal" situation (when all characteristics are at their best level) would be chosen by 99 percent of the women.

Figure 3.4: Women's Preferences According to Single Interventions and Costs Subsidies

HF = health facility. HF A = standard health facility + costs subsidized. HF B = improved health personnel behavior. HF C = Transport is available for free. HF D = Drugs and equipment are always available. HF E = Improved health personnel behavior + transport is availa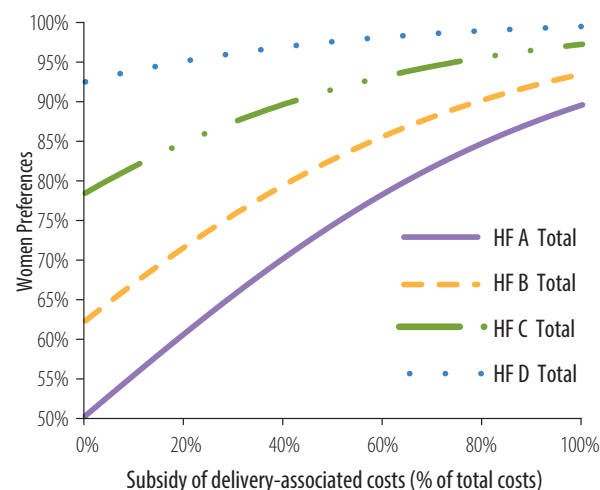ble for free. HF F = Improved health personnel behavior + drugs and equipment are always available. HF G = Transport is available and free + drugs and equipment are always available. HF I = Improved health personnel behavior + transport is available and free + drugs and equipment are always available.

When single policy interventions are carried out, preferences for one health facility attribute over another decrease as the costs associated with delivery decrease. For example, if a single intervention targeting poorer women in the Kedougou region were implemented, 95 percent of the women would deliver in the health facility, even with zero cost subsidies (that is, the costs of delivery are high). Meanwhile, if the policy intervention were improving health personnel behavior, less than 80

percent of the poorer women would deliver in a health facility with zero cost subsidies. However, when costs are subsidized, over 90 percent of poorer women, regardless of policy intervention implemented, would deliver at a health facility (figure 3.5).

Figure 3.5: Poorer Women's Preferences According to Single Interventions and Costs of Subsidies

HF = health facility. HF A = standard health facility + costs subsidized. HF B = improved health personnel behavior. HF C = Transport is available for free. HF D = Drugs and equipment are always available. HF E = Improved health personnel behavior + transport is available for free. HF F = Improved health personnel behavior + drugs and equipment are always available. HF G = Transport is available and free + drugs and equipment are always available. HF I = Improved health personnel behavior + transport is available and free + drugs and equipment are always available.

Some combinations of interventions are preferred over others. Of the women surveyed, 99 percent preferred a combination of a transport subsidy plus drugs and equipment availability. However, as with the single policy interventions, gaps between preferences decrease as the costs associated with delivery decrease (or as subsidies on the costs of delivery increase) (figure 3.6).

Cost Effectiveness of Policy Interventions

Subsidizing transport would be one of the most cost-effective single policy interventions. It would cost US$10 per additional woman delivering in a health facility, with the probability of 78 percent of pregnant women delivering there if transport costs were subsidized. However, for a higher probability of health facility delivery, financing the availability of drugs and equipment at a health facility would ensure that more than 90 percent of women would deliver at a health facility, but at an additional cost per woman of US$45.

Figure 3.6: Women's Preferences According to Combined Interventions and Costs of Subsidies

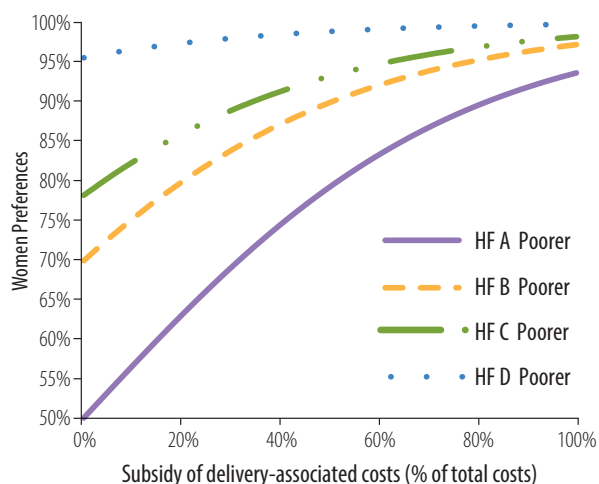**Figure 3.8: Cost Effectiveness Ratios for Single Policy Interventions**

HF = health facility. HF A = standard health facility + costs subsidized. HF B = improved health personnel behavior. HF C = Transport is available for free. HF D = Drugs and equipment are always available. HF E = Improved health personnel behavior + transport is available for free. HF F = Improved health personnel behavior + drugs and equipment are always available. HF G = Transport is available and free + drugs and equipment are always available. HF I = Improved health personnel behavior + transport is available and free + drugs and equipment are always available.

Figure 3.7: Poorer Women's Preferences According to Combined Interventions and Costs of Subsidies
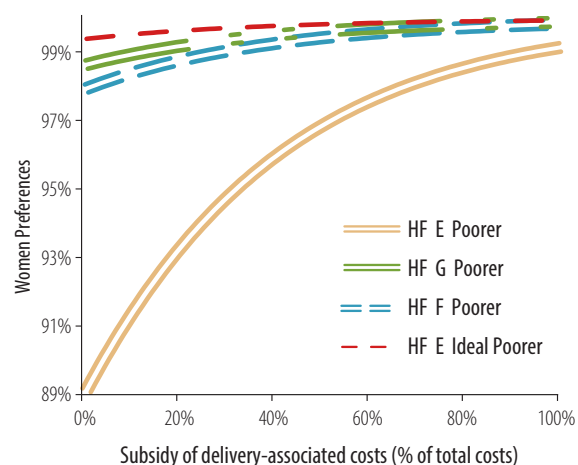
HF = health facility. HF A = standard health facility + costs subsidized. HF B = improved health personnel behavior. HF C = Transport is available for free. HF D = Drugs and equipment are always available. HF E = Improved health personnel behavior + transport is available for free. HF F = Improved health personnel behavior + drugs and equipment are always available. HF G = Transport is available and free + drugs and equipment are always available. HF I = Improved health personnel behavior + transport is available and free + drugs and equipment are always available.
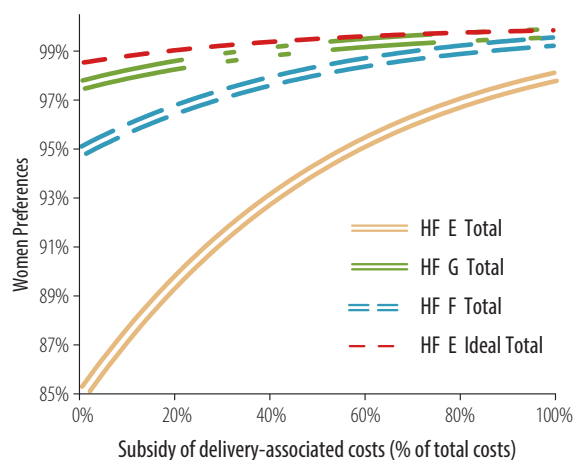
Interestingly, combined interventions are less cost-effective than single ones. For instance, a combination of (i) a 40 percent subsidy of delivery-associated costs, (ii) a total (100 percent) subsidy of transport fees and, (iii) 100 percent availability of drugs and equipment would cost US$61 for each additional woman delivering in a health facility.

The results of this experiment highlight the sensitivities of women to different health facility attributes, and show that discrete experimentation can be utilized to inform

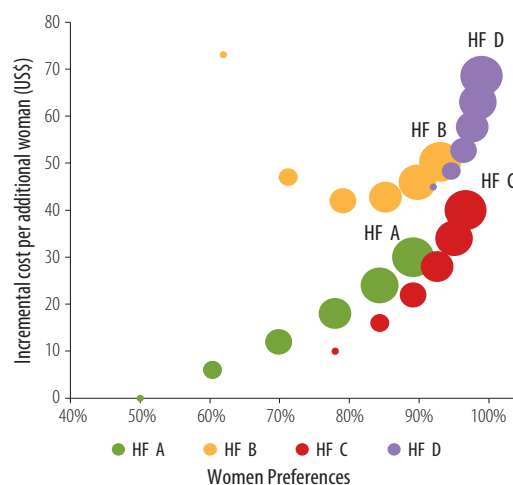health policy, allowing for better maternal health policy and improved health outcomes. In regions where health facility deliveries are low, despite the availability of primary care facilities, policy experiments should be conducted to test the effectiveness of improved quality of care in terms of the availability of drugs and equipment on health facility use. An alternative policy option would be to incentivize women to go to health facilities by solely subsidizing transport and/or delivery-associated costs such as drugs, hospitalization, equipment, food, etc. Although free maternal health care seems attractive, for women in Kedougou drugs and equipment availability, as well as transport to health facilities, are equally important.

The findings of this study have been used by the government to design and evaluate its national result-based financing (RBF) program. This program will combine (i) supply-side incentives paid to health facilities (to improve the quality of health care services) and (ii) demand-side incentives paid to pregnant women (to help them cover their transport and health care costs). Implementation of this dual RBF program was planned for late 2015. Preliminary findings of the evaluation should be known in 2018 and will provide major insights on the best strategies to implement for improving maternal health outcomes.

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1 These attributes, and their respective levels of variation, were identified thanks to four focus group discussions carried out in October 2012. Two focus groups were made up of Women of Reproductive Age (WRA) and/or pregnant women (one group in the Kedougou city and one in a remote area). The two other focus groups were made up of health personnel (one group with midwives and one with "matrons" or birth attendants with limited training).

4 Pro-Poor Healthcare Supply Chains: Kenya

*By Davidson Gwatkin, Sangeeta Raja, and
Christopher Trimble*

Introduction

Limited availability of essential medicines, especially in public facilities, constitutes a well-known barrier to the provision of medical services in several low-income countries. In Kenya, health service delivery is mixed with significant participation from faith-based organizations, for-profit private sector institutions, and government medical institutions. The government owns and operates over half (4,000 of about 7,000) of the medical institutions, of which 3,500 are primary health care centers.

All government medical centers receive medical supplies—medicines, equipment, etc.—through the Kenya Essential Medical Supplies Agency (KEMSA), a quasi-independent affiliate of the Kenya Ministry of Medical Services (MOMS). KEMSA distributes around $40 million worth of supplies annually, of which over half—$25 million—goes to public health service centers.

This study seeks to answer the following questions: to what extent do public pharmaceutical distribution systems contribute to poor service delivery in Kenya? How large a role do transport cost considerations and the strategy for allocating medicines among facilities play in determining any such distributional inequalities?

KEMSA supplies are funded through two channels: the government's Essential Medicines and Medical Supplies list, which receives funds from public budgets of the MOMS and Ministry of Public Health and Sanitation (MOPHS) budgets, and external donors. Public funds account for a total of U$15 million, while donors cover around U$10 million, making a total of U$25 million in supplies shipped to health centers and dispensaries.

Supplies are delivered to health centers and dispensaries by private trucking companies contracted by KEMSA. Traditionally, the frequency of deliveries has been conducted using a "push" approach, where a facility automatically received a predetermined quantity or set of medicines and supplies every quarter. Recently, the model has changed to a "pull" system, where each facility has a fixed ceiling (drawing rights) of how much they may order, and the facilities determine and order the medical supplies to be delivered the next quarter, whose value cannot exceed the drawing rights. At the time of this study, about one-third of all public facilities had transitioned to the new pull model.

The amount of money available per facility is based on a new formula, giving principal weight to the clinic workload (50 percent of total weight), the district's population size (20 percent), the number of facilities (15 percent), and the percentage of the district's population below the poverty line (15 percent).

Theoretical Framework

The questions analyzed in this study are addressed via three related regression analyses based on district-level data. The three exercises represent an effort to overlay the local-level pharmaceutical supply and poverty data from available sources of data.

The first regression examines the hypothesis of inverse care, where the likelihood of a person being able to obtain health care is inversely related to their need for care. Based on this assumption, facilities placed in prosperous districts are likely to receive more medical supplies than those where the economic status of the population is lower. In pharmaceutical delivery, this inequality could occur because better-off districts tend to be closer to urban centers, and hence more accessible via the road network and more likely to have better-staffed facilities.

To examine this hypothesis, the regression uses the per capita value of KEMSA shipments to each district as the dependent variable, and the proportion of the population below the poverty line in each district as the principal independent variable of interest. The exercises also involve three other independent variables that serve as

controls: distribution method (whether push or pull), facility prevalence, and distribution cost.

The second regression exercise assesses shipment cost, that is, whether the cost is indeed greater for facilities in poor areas than in better-off areas, and thus a potential factor in explaining any differences in the volume of supplies delivered. In this case, the dependent variable is the average cost of a KEMSA shipment to each district; the principal independent variable is the percentage of the district population living below the poverty line. There is also a control independent variable—facility remoteness—which is introduced in an effort to help explain whatever cost differences might be found.

The third regression focuses on the influence of the distribution method on how well (or poorly) KEMSA drugs reach poor districts relative to better-off ones. The exercise looks at how the potential influence of the pull approach varies according to the specification of the drawing rights formula employed. This exercise features preparation and comparison of two regressions. Each uses the same independent variable, the percentage of a district's population living below the poverty line; the two alternative independent variables indicate the per capita value of KEMSA shipments to which each district would be entitled under the new and old drawing rights formulas.

Data

To evaluate the correlation between public pharmaceutical distribution and quality of care, this study evaluates three unique data sets: distribution data, health care facility geocodes, and poverty maps, which provide insight on the equity of medicine distribution.

The first regression utilizes data from a newly instituted geographic information system. The second consists of district-level estimates of poverty prevalence, produced through analyses of household survey data.

The number of districts was increased to 150 just before the start of the study. District-level data were available for every parameter except poverty levels per district. As such, in constructing the drawing rights for each district, the poverty level of the new district was taken to be the same as that of the larger district to which it had belonged prior to its creation. As a result, the third exercise is based on only 149 observations with data specific to each observation for all factors other than poverty, and 69 observations with respect to poverty.

The poverty data are from Kenya's Integrated Household Budget Survey. Rural poverty is defined as an individual who spends less than K Sh 1,600 per month; urban poverty is monthly expenditure less than K Sh 2,900. From this database, the population of Kenyans living below the poverty line is around 47 percent.

Data on the percentage of health centers using KEMSA's recently introduced pull approach are from KEMSA's management database for early 2010. Data on the number of facilities per district are from the MOPHS records and the latest Kenyan census.

The delivery cost variable is a simple average, for each district, of the lowest quotes received by KEMSA from the various private trucking companies that submitted bids to deliver shipments to health centers and dispensaries. Facility remoteness is defined as the straight-line distance from the KEMSA warehouse in Nairobi, and the headquarters town of the district in which the facilities are located.

Other variables, like the per capita value of KEMSA shipments to government health centers and dispensaries by district, were retrieved from KEMSA financial records. The workload per facility is defined as the number of patients visiting a facility on average, which was collected through a survey and a series of discussions undertaken with facility staff in the spring of 2011.

Results

Regression One: Value of KEMSA Deliveries to Poor and Better-off Districts

The results of the first regression fail to support the initial hypothesis. KEMSA supply deliveries are pro-poor. The poorest quintile in Kenya receives about 15 percentage points more in KEMSA shipments than the richest quintile, with nearly three times the level of poverty. The bivariate relationship between shipment value and poverty

level is tested and the result is also pro-poor. As poverty increases, so do the volumes of KEMSA shipments.[1] The results also show that the volume of KEMSA shipments favors poor districts not because they are poor, but because poor districts have a better network of facilities and distribution centers than the richer districts.

Regression Two: Cost of Distributing KEMSA Medicines and Supplies to Poor and Better-off Districts

An initial glance at the data on supplying poor districts suggests that it costs more to supply the poor than to stock better-off districts. The regression results confirm this, showing a positive and strong relationship between distribution cost and poverty prevalence. However, there is a wide range of variation in the costs of serving districts with any given level of poverty. Although one of the reasons for increased costs of delivery for facilities in poor districts is their distance from major urban centers, the geographical size of poor districts with several health centers makes it costlier to cover all facilities because of the greater distances between them. Overall, higher distribution costs do not appear to have a significant impact on how well KEMSA supplies poor areas. The introduction of distribution costs as a control vari-

able in the relationship between poverty and shipment values (table 2) hardly makes any difference.

Regression Three: Effect of the Drawing Rights Formula on the Value of Supplies Received by Better-off Areas

This exercise tests the value of shipments in the push and pull approaches. The results show that both formulas are regressive, with the poorest receiving even less in drawing rights via the new pull system and the richest quintile receiving more. Similarly, the bivariate regression results show a negative correlation between the old and new formulas and poverty. The coefficient increases (in negativity) for the pull formula.

Conclusion

These results are directional, with limitations posed by the weak statistical significance of most of the relationships. Although the findings may not be taken as conclusive, they offer considerable value as operating hypotheses for policy development, and are well worth further exploration and research analysis.

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1   The reliability of this finding is severely limited by the fact that the regression coefficient is not nearly large enough to be statistically significant ($p = 0.28$). And the correlation coefficient for the regression exercise is unusually low ($r2 = 0.02$).

III. Public expenditure and safety nets as tools for poverty reduction

5 Safety Net to End Extreme Poverty in Lesotho

By Emma Mistiaen

Introduction

Over the past two decades, Lesotho has experienced significant economic growth. Textiles exports, mining, and public expenditure have underpinned this growth. Agriculture—the sector where the majority of the poor earn their livelihoods—has lagged. As of 2010, nearly 60 percent of households lived below the basic needs poverty line of $1 a day and almost 40 percent lived below the food poverty line.

Lesotho faces serious fiscal challenges as a result of high public expenditure (67 percent of gross domestic product (GDP) in 2009/10) and excessive reliability on the Southern African Customs Union. As a response, the government has reduced recurrent spending, reduced the burden of the wage bill over time, and increased the share of investments in the budget while improving the quality of spending on investments.

Objective

This study was carried out to determine what role safety nets and transfer programs should play in the next decade to even out income inequality and improve the livelihoods of the absolute poor in Lesotho. The study seeks to answer the following questions: (i) could an increase in spending be used to accelerate poverty reduction in the medium to long term? (ii) Which groups and aspects of poverty would it make sense to target with transfers? (iii) Which programs will have the greatest impacts for the most affordable price?

Poverty

With a Gini coefficient of 0.53, income distribution is extremely unequal—one of the worst in the world. Little information exists on household incomes, making it difficult to distinguish the poor from the absolute poor. Further, there are few demographic or other characteristics that can differentiate the poor from the absolute poor. For example, groups that might be considered to be disadvantaged, such as orphans and vulnerable children, people living with HIV/AIDs, the elderly, and the disabled, are not disproportionately poor. Rural areas have higher poverty rates than urban areas, yet there is no other geographical pattern to poverty in Lesotho.

About 200,000 to 400,000 people (or 10 to 20 percent of the population) are food-insecure. High levels of malnutrition have a lasting impact on productivity and in-

comes. Most of Lesotho's poor are chronically poor because of their low productivity, low returns to their labor, low assets, or the destitution of their households. They are also exposed to a range of shocks: theft, drought, unemployment, food price increases, illness, and death caused by disease.

Cash Transfers

This study examines the 10 programs that transfer money or goods to individual households in Lesotho. All 10 programs represent a large share of public spending that is directly transferred to citizens.

Results

Overall, total spending on transfer programs amounts to US$197 million annually, or about US$104 per person. If these amounts were transferred to the poorest quintile, each recipient would receive U$340—almost equal to the estimated poverty line income.

As it currently stands, only a small share of transfers actually reaches the poor. Most large-scale transfers (agricultural subsidies, tertiary business, and school feeding) benefit the nonpoor (figure 5.1). Moreover, while some of the programs aim to raise the poor from poverty in the longer term, most do not explicitly include any measures to increase the productivity of the poor permanently.

There is no framework or institution coordinating transfers to the public. As a result, overlaps and duplication of transfer programs and beneficiaries occur. Further, existing programs cannot be easily scaled up or down to respond to potential shocks: weather or prices. And the lack of an overall strategy or framework makes it difficult for leaders to get a sense of total spending on transfers, and evaluate trade-offs between programs.

Only one of the existing programs has been evaluated, making it even more difficult for policy makers to know which programs have the most impact and are effective in poverty reduction. Moreover, the weakness of the data, on household poverty, and the coverage and impact of programs, reduces the ability to evaluate and compare the effectiveness of transfers.

Challenges

Multiple ministries currently implement Lesotho's transfer programs, with donors being significantly involved in the design of several of these programs. The draft National Social Development Policy states that the policy goal is to prevent and reduce poverty for all Basotho people. To achieve this, a social protection strategy needs to be put in place. A new Ministry of Social Development was created recently, demonstrating the government's commitment to put in place a strong social protection strategy, but its success is dependent on effective coordination of all the safety net programs.

To improve the effectiveness of transfers, policy makers need to improve targeting. Targeting in Lesotho is particularly difficult because: (i) a large share of the population is poor, and it is difficult to distinguish between the poor and the absolute poor; (ii) there is little up-to-date

Figure 5.1: Estimated Coverage of the Poor by Existing Programs
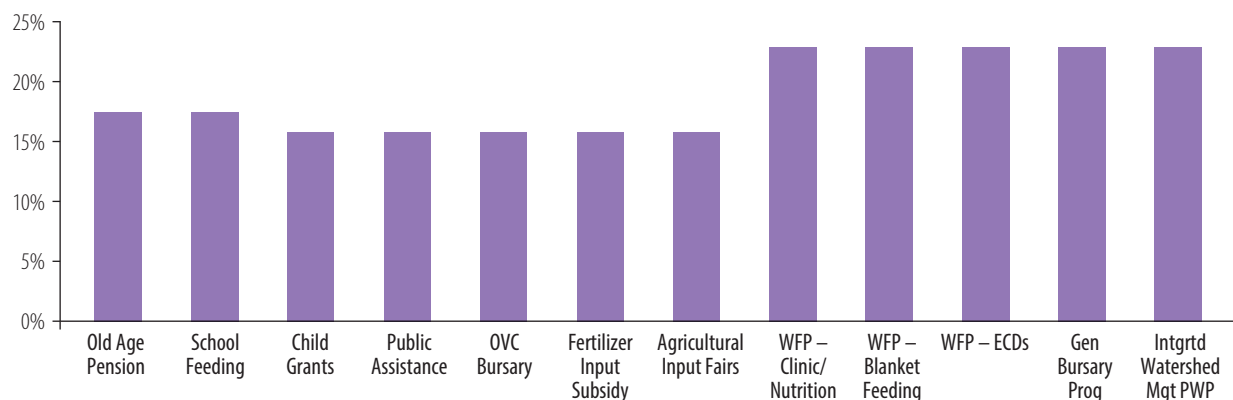
information on household consumption; and (iii) administrative capacity at the local level is limited.

Recommendations

There are several overall, crosscutting recommendations for transfers to have a more permanent impact. Transfers should be more predictable so that beneficiaries can take more risks and plan better.

Programs need to be evaluated more rigorously to ensure effectiveness. Once frequent evaluations are carried out, measures can be taken to improve the targeting and coordination of the most effective programs. Part of the evaluation process will involve improved and increased data collection (household consumption and program-specific data).

Moving toward a more unified, national program, which could consist of multiple distinct interventions but should operate as an integrated approach with clear objectives and targets, would strengthen further effectiveness.

The challenge for Lesotho is to select the most cost-effective instruments for transfers and conduct them in a manner that is fiscally sustainable. Existing expenditures should be used to minimize the need for new spending and improve targeting, while ensuring that programs can be scaled up or down depending on fiscal conditions and the need for social assistance.

To create a more unified national social protection program, the government needs to establish a national safety net strategy for the next five to ten years. This strategy should outline poverty reduction objectives, desired target groups, and coverage and program choices.

It is imperative to establishing a central body with policy oversight and expenditure planning authority over all the transfer programs to improve the overall coordination of transfers. Such a body can oversee the creation of an integrated beneficiary registry system, which would be useful in eliminating duplication of coverage.

Conclusion

Lesotho's solution to poverty would involve continued migration from rural to urban and increased agricultural productivity. However, until then, given the high levels of poverty and inequality, a national cash transfer program that focuses on improving the food consumption of the poorest Basotho at the food poverty line would be clear and easier to coordinate. Such a national program should be linked to addressing some of the basic national priorities. For example, the program should address early childhood malnutrition and the intergenerational poverty effects of HIV/AIDs. Transfers could be a combination of *categorical support*, for very specific groups of the absolute poor in the poorest areas of the country, and *transitional productive support* to those who are either left behind by growth or who live in low-productivity areas.

This study recommends a national program that targets populations with insufficient food, which represent the poorest 10 to 20 percent. Such a program is affordable given Lesotho's current fiscal position. A small program reaching 380,000 individuals at M 37.50 (US$5) per month might amount to M 200 million (US$27 million) annually. A medium-sized program (380,000 beneficiaries at M 75 (US$10) per month) would cost about M 411 million (US$55 million) annually, representing 2 percent of GDP—far below current expenditure, which is at 9 percent of GDP. A single cash grants program targeting households with no able-bodied members could be implemented. In addition, a cash-for-work program or food-for-work program could be used to employ the rural poor during the agricultural slack season. The existing Watershed Management program could provide the framework for a public works program employing the very poor in reforestation, environmental works, and rural road maintenance.

Current fiscal space does not give room for large-scale expansion of cash and in-kind transfers. However, there is scope for making more use of narrowly targeted transfers to reduce extreme poverty by improving the performance of existing programs.

6 Growth, Safety Nets and Poverty: Assessing Progress in Ethiopia from 1996 to 2011

By Ruth Vargas Hill and Eyasu Tsehaye

Introduction

In the past 10 years, Ethiopia has achieved substantial poverty reduction. The proportion of the population living below the national poverty line fell from 44.2 percent in 2000 to 29.6 percent in 2011. Over the same time period, other indicators have also improved: malnutrition has reduced, and stunting has fallen by 38 percent nationwide and up to 50 percent in urban areas.

Many factors have contributed to these improvements. In the past decade, Ethiopia experienced high and consistent growth rates of over 8 percent, driven largely by growth in services and agriculture. At the same time, there were improvements in the provision of safety nets through the Productive Safety Net Program (PSNP) of 2005. In addition, expansion of education and health services and investments in infrastructure and market networks also occurred.

This study explores the factors that drove poverty reduction and improvements in well-being. The study exploits variations in poverty reduction, sectoral growth, and provision of public goods across zones and time to examine what drove the changes in poverty over the period from 1996 to 2011 in Ethiopia. The analysis examines what type of growth—output growth in agriculture, manufacturing, or services—was most effective in reducing poverty. The analysis also examines whether safety nets, and the provision of public goods more broadly, had an additional effect on poverty reduction by increasing redistribution.

Data

To create a data set of zone-year observations to assess correlates and determinants of changes in poverty in Ethiopia, various sources of nationally representative survey data collected by the Ethiopian Central Statistical Agency (CSA) are used. The analysis focuses on 50 zones over a period of 15 years, covering nearly all of Ethiopia's population.

Data on poverty, agriculture and manufacturing. Poverty estimates are based on the household income and consumption expenditure survey, a nationally representative survey conducted every 4 to 6 years to collect data on household consumption and basic demographics. Annual agricultural production estimates are based on the CSA's annual agricultural sample survey (AgSS). The survey covers about 40,000 households, in some 2,000 enumeration areas. Information on manufacturing output is from the census of small- and medium-size manufacturing establishments, which is conducted every year. Eligible establishments must have at least 10 employees and use electricity.

Services. Estimating the service sector is a bit more complex as no simple survey exists for it. And most existing systematic surveys exclude personal services, such as hotels, restaurants, and domestic help. The number of people engaged in trade and distributive services per zone from the HICE surveys is used to estimate the output of the services sector. This number is multiplied by national estimates of value added per worker from national survey data on distributive trade and services. The value of hotels and restaurants is not captured in this proxy.

Public Goods Provision: Data on Safety Nets and Access to Basic Services

There are three aspects of public goods measured in this study. The first is public data on investments in school and health services. In the absence of such data, data on the average distance to a primary school, which were collected from the welfare monitoring survey (WMS), are utilized as a proxy. Second, Schmidt and Kedir's (2009)[1] estimates of time to travel to a town of 50,000 people in 1994 and 2007 are used to estimate investments in

roads and infrastructure via the reduction in travel time between those years. In the absence of these data, data collected on access to bus services in the WMS are utilized as an alternate measure of infrastructure. Finally, to assess the availability of safety nets the study uses administrative data on the number of beneficiaries per zone per year from PSNP.

Weather Shocks

The Livelihoods, Early Assessment, and Protection project (LEAP), developed by the government and development partners in 2008, uses a crop-modeling approach to estimate rainfall-induced crop loss in the *woredas* throughout Ethiopia. Crop loss estimates are generated for each 50 by 50 kilometer square. The study utilizes data from the LEAP database, which has data points from 1996 to 2012, for the meher and belg seasons.

Empirical Model

These data are used to construct a panel of 50 zones observed four times from 1996 to 2011. Through variations in sectoral output growth and public goods provision (safety nets, primary education, and roads) across zones and time, the study teases out what has been driving changes in poverty in Ethiopia over time. The following equation is used:

$$\Delta \ln p_{zt} = \beta_0 + \beta_Y \Delta \ln Y_{zt} + \beta_N \Delta \ln N_{zt} + \beta_E \Delta \ln E_{zt} + \beta_D \Delta \ln D_{zt} + u_z + e_{zt}$$

where P_{zt} is the poverty rate in the zone z at time *t*, Y_{zt} is zonal output at time *t*, N_{zt} is the proportion of people in zone z covered by a safety net program at time *t*, E_{zt} is increased access to primary schools in zone *z* at time *t*, and D_{zt} is a measure of infrastructure investments in zone *z* at time *t*.

The methodology of Ravallion and Datt (1996)[2] is used to estimate zonal output growth from growth in agriculture versus growth in manufacturing and services:

$$\Delta \ln p_{zt} = \beta_0 + \beta_{Y^a} s_{zt-1}^a \Delta \ln Y_{zt}^a + \beta_{Y^m} s_{zt-1}^m \Delta \ln Y_{zt}^m + \beta_{Y^r} s_{zt-1}^r \Delta \ln Y_{zt}^r + \beta_N \Delta \ln N_{zt} + \beta_E \Delta \ln E_{zt} + \beta_D \Delta \ln D_{zt} + u_z + e_{zt}$$

where Y_{izt}, $i = a, m$, and r is the output of agriculture (a), manufacturing (m), and services (r), respectively, and Sizt-1, is the share of output of sector *i* at the begin-

ning of the period.[3] Interacting the rate of growth in sector *i* with the share of sector *i* in total output allows growth in a given sector to influence poverty according to the size of the sector. The combined expression, $\beta_{Y^i} S^i_{zt} - 1$, provides a measure of the elasticity of poverty to growth in that sector, allowing for estimation of particular components of growth that are more strongly associated with poverty reduction. The expression also allows the examination of the sectoral composition of growth by testing whether $\beta_{ya} = \beta_{ym} = \beta_{yr}$.

The coefficients on growth and social spending are assumed constant across zones and time. Zone-specific time trends are included in the model, *uz*, through the inclusion of zone-specific fixed effects, which allows each zone to have a zonal specific trend in poverty reduction over the period. The inclusion of *N*, *D*, and *E* also controls for the number of time-variant characteristics that may be important in determining poverty.

To establish the causation of reduced poverty by increased growth in the sectors, the study uses weather shocks (from WRS data) as an estimate of exogenous variation in agricultural growth. The study empirically tests this causality because agriculture is most likely to raise concerns about reverse causality.

Results

Equation 1 measures the relationship between poverty reduction, growth per capita in the zone, expansion of safety nets, improvement in access to basic services, and infrastructure.

The results indicate that growth has been an important driver of poverty reduction over the 15-year period analyzed (1996 to 2011). A 1 percent increase in zonal output per capita led to a 0.15 percent reduction in poverty.

Poverty has fallen fastest in zones in which agricultural growth has been strongest. Growth in manufacturing and services has not been a significant contributor to poverty reduction. However, when focusing on urban areas, higher manufacturing growth was associated with higher poverty reduction in the past decade, and the strength of the association was higher than that between agricultural growth and poverty reduction.

The insignificance of the service sector in poverty reduction can be attributed to the imprecise data estimates available, and the small proportion of the workforce in services overall. Further, there is a correlation between growth and the service sector. This is a plausible correlation, given that the measure of services is mostly wholesale and retail trade. Joliffe et al. (2014)[4] show that 64 percent of businesses were established with funds from agricultural production, and that these businesses are mostly active during the months of harvest. Therefore, it is quite likely that the relationship between growth in services and poverty reduction is being captured by the coefficient on agricultural growth.

Finally, the study found that the PSNP had an impact on poverty reduction, in addition to any impact on growth that was facilitated by the program.

Testing Causality

The results for instrumenting agricultural growth with rainfall show that for every 1 percent growth in agricultural output, poverty was reduced by 0.9 percent—much higher than indicated via equation 1. This finding shows that the earlier results were not necessarily affected by reverse causality as much as they were affected by measurement error in agricultural output, which was causing attenuation bias. It could also be the case that agricultural growth induced by good weather is more poverty reducing than agricultural growth brought about by the adoption of improved inputs. This explanation is because most Ethiopians who can afford to use fertilizer are not poor.

To test the degree to which households are falling out of poverty, the same tests were run, but with the poverty gap and poverty severity as the dependent variables. Agricultural growth in all the specifications reduced the poverty gap and the poverty severity index, while public goods did not additionally reduce these measures of poverty through redistribution.

Interaction between Agricultural Growth and Market Access

The study compares agricultural growth and poverty in areas that are far from urban centers, with about 50,000 plus people at the beginning of the time period, with the relationship between agriculture and poverty in areas close to urban centers. Agricultural growth was only poverty-reducing for those close to urban centers, suggesting an important link between agricultural growth and urban demand.

Examining Agricultural Growth

Testing for the type of agricultural growth that affects poverty reduction the most shows that growth in cereal, and not cash crops, was most strongly associated with poverty reduction. In addition, increased use of inputs over the years, on average, did not result in increased poverty reduction. However, further examining the relationship between fertilizer use and poverty reduction shows a significant relationship between the two when the conditions are right, that is, when weather conditions are favorable and when crop prices are high.

Spatial Impact of Growth

Examination of the impact of agricultural growth across the five agro-ecological zones shows that little poverty reduction was observed in the pastoral or moisture-reliable lowlands. Strong poverty reduction was recorded in the other three zones (drought-prone highlands, moisture-reliable cereals areas, and moisture-reliable areas). However, this finding may be because the data used in the study do not lend themselves to looking at poverty reduction in pastoral areas or moisture-reliable lowlands.

Conclusion

Explaining Ethiopia's past growth performance helps to inform what worked and what did not work in achieving poverty reduction. The results of this study can inform policy to strengthen and accelerate growth even more in Ethiopia and across the rest of the continent. The main results of the study are the following: (i) agricultural growth is likely to remain poverty-reducing, especially if it is complemented by growth in non-agricultural demand; (ii) adoption of agricultural technologies can reduce poverty, but their effectiveness

is dependent on good prices and good weather; (iii) the rainfall dependency of agriculture highlights the urgency of appropriate climate change policies; (iv) manufacturing growth can play an increasing role in poverty reduction, particularly in urban areas; (v) service sector growth is closely correlated with agricultural growth; and (vi) safety nets have a high potential to reach the poorest households.

1   Schmidt, E. and M. Kedir. 2009. Urbanization and Spatial Connectivity in Ethiopia: Urban Growth Analysis Using GIS. ESSP2 Discussion Paper 3.

2   Ravallion, Martin, Datt, Gaurav, 1996. How important to India's poor is the sectoral composition of economic growth? The World Bank Economic Review 10 (1), 1–2.

3   In later specifications, Ymzt and Yrzt are proxied with growth in the share of the population living in urban areas in the zone.

4   Jolliffe, Dean, Gbemisola Oseni, Ilana Seff and Alemayehu Ambel, Julia Kowalski, Alina Lipcan, Katie McIntosh, Remy Smida, Signe Jung Sørensen. 2014. Nonfarm Enterprises in Rural Ethiopia: Improving Livelihoods by Generating Income and Smoothing Consumption? Background Paper prepared for the Ethiopia Poverty Assessment, World Bank.

IV. Promoting sector reform for improved value-chains and better livelihoods

7 Burundi: Coffee Sector Reforms and Producers' Well-Being

By Aurelien Serge Bako and Mamadou Ndione

Introduction

Coffee is a major export crop for Burundi, providing 60 to 80 percent of annual export earnings on average. At the end of the conflict in 2005, the Burundian government launched extensive reforms in the coffee sector. It liberalized price setting and marketing activities, eliminated taxes on orchards, and removed state guarantees to finance the sector. With support from international partners, in 2008 these reforms were accelerated by the adoption of a privatization strategy for coffee washing stations (CWS).

The reform of the sector was conducted with the objective to liberalize the sector through: (i) reducing government control of production and export agencies by privatizing existing industrial units, such as washing and pulping stations, parching mills, and warehouses; and (ii) reforming coffee regulatory institutions.

This study of Burundi assessed the livelihoods of coffee producers in regions experiencing liberalization reforms; analyzed the relationship between privatized CWS and food insecurity; and evaluated the impact of supporting organizations, such as InterCafe, to strengthen farmers' capacity to get organize.

State of Privatization Reform

The Government of Burundi planned to privatize 118 CWS. By 2008, 41 of the stations were privatized, and a 25-percent minority stake was reserved for coffee producers' associations (figure 7.1). Producers' organizations have two years from the purchase date to obtain the capital required to purchase the 25-percent minority stake. So far, they have not purchased any of the reserved shares, nor have they been able to acquire any of the state-owned CWS.

To reduce quantity and quality constraints, the Government of Burundi, assisted by several partners, has been providing extension services and subsidized inputs to coffee producers, thereby mitigating cyclical effects and achieving better yields.

In 2009, InterCafe was created to improve the coordination and effectiveness of preparation activities for coffee

Figure 7.1: Burundian Coffee Washing Stations, by Ownership

Cooperatives — 5%
SOGESTAL — 7%
Built by private — 14%
Privatized — 23%
State — 51%
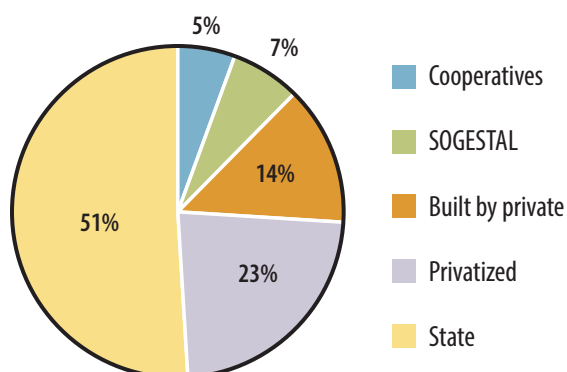
campaigns, leading to encouraging results for the production of green coffee. As a direct result of this organization, green coffee production remained steady, at around 24,000 tons, during the recent "good coffee campaigns," declining by only 3 percent from 2008/09 to 2010/11, and by 1 percent from 2010/11 to 2012/13.

Stakeholders

Producers

Coffee producers are the most aggrieved stakeholders in the sector. Privatization has resulted in longer payment delays for coffee farmers. During the 2012/13 campaign, farmers who sold to private CWS were paid in July, August, and September at respective proportions of 32.2, 19.0, and 4.7 percent, respectively. Meanwhile, farmers who sold to public CWS were paid 35.7, 22.8, and 6.7 percent in July, August, and September, respectively.

Since the privatization was implemented, CWS operators (public, private, and cooperative) have been able to pay producers only after payments of exported green coffee are received. With payment delays and volatility in coffee prices, producers have felt marginalized and on the sidelines of the privatization.

Thus, coffee producers have sought to block further privatization. In some cases, producers have boycotted private CWS entirely, such as Webcor—a foreign company that was the only buyer of the CWS for sale in the first privatization bid. The conflict against Webcor led farmers to smear foreign investors in the sector as robbers and liars, hampering foreign investment in CWS for future privatization phases.

Coffee growers have created cooperatives that manage washing stations. As of 2013, 16 cooperatives that own and manage CWS had been approved to pulp, wash, and dry cherry coffee. Mainly based on offered prices to producers, these CWS are doing comparably well as private and public CWS.

Private Owners of CWS

The private owners are discouraged by low prices and weak production and quality. For example, washed coffee, the low-quality green coffee as opposed to fully-washed green coffee, averaged 46.4 percent annually in 2010–12, up from 37.3 percent of the total coffee produced in 2006–09. This was worrying, especially since low-quality green coffee made up less than 20-percent in 2003–05. Moreover, a portion of coffee produced in Burundi is smuggled into neighboring countries in the East African Community, where producers fetch more for their cherry coffees—particularly in Rwanda and Tanzania.

To improve production, some private CWS have focused resources on forging partnerships with coffee farmers for training, certification, and use of fertilizer. However, to develop durable partnerships, new, private CWS owners have to build strong relationships with coffee farmers. That is, relationships need to go beyond providing inputs for farming, to build trust and develop a sense of loyalty among the producers. Recently, private CWS have started using InterCafe to voice their concerns and improve production yields.

Public Sector CWS and SOGESTALs

Since privatization, public CWS have improved quality control by acquiring and utilizing modern equipment and applying good agronomic practices to face competition. The improvements have helped the public CWS to maintain a presence in international specialty coffee grades. As the portfolios of public coffee management companies (SOGESTALs) are reduced with privatization,

management needs to consider means of reducing employment and other fixed costs, while limiting social tensions and aligning resources on the smaller portfolio.

Commercial Banks

Large financial institutions, which had been involved in the coffee industry, have limited loans and credit facilities to coffee producers associated with a CWS. For example, Interbank Burundi, Banque Commerciale du Burundi, and Burundi Bank of Commerce and Investment typically have been large financial backers of the coffee sector. The banks do not approve of the practices of the new private owners of CWS, especially, their poor skills in negotiating prices and weak management capacity.

Data, Methodology, and Research Design

To assess the livelihoods of coffee growers, the study incorporated data from the 2007 coffee grower census and the 2011/12 agricultural survey, with data from the June 2013 coffee grower survey conducted across Burundi's five SOGESTALs. The survey addressed key questions on the socioeconomic and distributional impacts of previous reforms on coffee professionals, with a focus on CWS privatization.

In consultation with the team that conducted 17 focus groups across the five SOGESTALs in April 2013, the June 2013 survey was carried out by a local firm. The firm used data from the 2007 census to design the sampling frame of the survey. More than 900 household farmers were surveyed, with data collected at the household and individual levels.

The analysis looked at coffee farmers by destination (public versus private CWS) of cherry sold in the 2012/13 coffee campaign. These data were compared with data on the same farmers selling cherry in the 2008/09 coffee campaign.

Coffee growers' sales of cherries to cooperatives were not classified as private sector sales. The outcomes of the analysis could be biased by non-randomly distributed heterogeneity. Private investors' preference for CWS positioned in the five high (coffee growers) population density provinces suggests that regional differences should

be accounted for when assessing the eventual influence of CWS privatization. With respect to coffee grower households' heterogeneity, controlling for possible self-selection bias into the coffee growers' categories should be considered as well.

To gauge the extent of selection bias in the descriptive statistics, regional dummies and characteristics of the selected coffee grower households were introduced as control variables. The analysis used is simple weighted regressions of coffee revenues (or a nutrition/food proxy) on participation or nonparticipation in CWS privatization.

To assess coffee growers' performance in the privatized coffee sector, weighted total coffee revenues (cherries for fully washed and parch for washed coffee) collected from the June 2013 survey were compared with actual official data for calibration. The findings and other result indicators were interpreted with a specific focus on cherry coffee revenues, per capita daily meals, and production and consumption of basic food crops. Finally, the impact of CWS privatization on coffee growers' cherry revenues and food security was analyzed by comparing the respective levels achieved in the two categories of coffee growers under study.

Almost 55 percent of Burundian coffee farmers were considered poor in 2013. The western region had the highest poverty rate of 62.1 percent, and the southern region recorded the least poverty at 32.7 percent. However, these results might have been influenced by the relatively good coffee campaign that Burundi experienced in 2012/13, and the fact that data collection occurred during the harvest period of the agricultural season.

In very poor Burundian producers' homes, members of the household hardly eat more than one and a half meals per day (figure 7.2). Reaching even two daily meals per family member has become a serious challenge, raising issues about nutrition.

For farmers, including the very poor, access to information, communication, and transport are of paramount importance. However, slightly less than 50 percent of very poor and poor coffee farmers had access to radio sets in June 2013. Only 13 to 17 percent of the very poor and poor farmers owned at least one bicycle in 2013, making

Figure 7.2: Average Number of Daily Meals, Coffee Growers' Household Members in Burundi, June 2013

	All members		Under 5 children	
All coffee growers	1.88	1.91	2.42	2.41
Rich or very rich	2.278	2.476	2.65	2.62
No poor, no rich	1.919	1.974	2.52	2.56
Poor	1.851	1.842	2.36	2.27
Very poor	1.725	1.776	2.24	2.27
	Usual daily meal	Daily meal in past week	Usual daily meal	Daily meal in past week

Legend: All coffee growers / Rich or very rich / No poor, no rich / Poor / Very poor

Results

Overall, privatization has increased coffee farmers' nominal receipts. Coffee receipts increased from FBu 42.439 billion in 2008—the year preceding the launch of privatization, to FBu 52.220 billion in 2012—three years after the launch. In the 2012/13 campaign, coffee growers received more cherry revenues from private than public CWS, up from the 2008/09 campaign. Average cherry earnings per farmer selling in public CWS in the 2008/09 campaign were FBu 99,636 versus FBu 132,845 in the 2012/13 campaign.

Growers delivering cherries to private CWS (2.034 daily meals per household member) were feeding their families slightly better than those who were continuing to sell to public CWS (1.911 meals per member). Growers delivering to cooperatives have the least meals per member, at 1.608 daily meals. Further, it appears that subjective poverty incidence for coffee growers trading cherries with private CWS has declined since privatization, even after controlling for regional effects. However, payment

transportation—for mulch and delivery of cherries post-production to CWS—an arduous and profit-losing task.

delays in private and public CWS continue to frustrate producers.

Privatization ushered in improved international price transmission to Burundian coffee farmers. This may explain why coffee trees are being maintained and kept in good health and overall production has increased, presumably as producers have been encouraged by high prices. However, productivity can be increased even further with infrastructure improvements to reduce transport costs. It is common to pay FBu 10 to FBu 15 per kilogram of cherry for transport (2 to 3 percent of the price of 1 kilogram of cherry), but the cost of transport could go up to FBu 50 per kilogram (11 percent of the price of cherry) in some regions.

Heterogeneity Results

Regional heterogeneity has a substantial influence on coffee cherry incomes. In the northern region, privatization has not changed coffee growers' cherry incomes. However, the negative and insignificant sign of participation in privatization implies cherry revenue losses in some areas in the region. Greater experience (age) and education do not seem to affect cherry incomes positively or negatively, although gender might have an effect.

Even in areas where privatization has occurred with a positive impact (albeit clearly weak), some coffee growers selling to private CWS have experienced losses compared with their counterparts selling to public CWS. In the central eastern region, for growers who are not formally educated, revenues are 34 percent less for those selling to private CWS than for those selling to public CWS. A similar situation has occurred in the western region, where the cherry coffee receipts of households led by primary-educated household heads totaled revenue losses of 28.4 percent compared with their counterparts who sell cherries in publicly-owned CWS.

Controlling for the bias of self-selection into each category (age, gender, education, and household), coffee growers seem not to have lost revenues when selling to privately-owned CWS in the southern region, compared with growers selling to publicly-owned CWS in the southern region. But the very small sample weakens this result.

In regions where coffee growers' revenues increased and, consequently, per capita daily meals increased, not all subgroups of coffee growers selling in privately-owned CWS experienced such increases. The losing coffee growers' households represented about 21 percent of total coffee growers' households selling cherries in 2012/13.
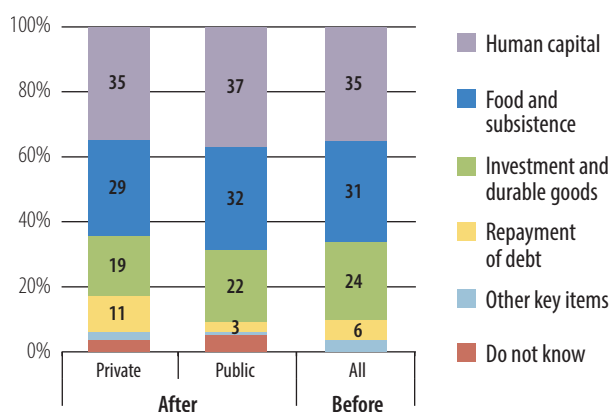
Food Insecurity and Privatization

Food security in coffee growers' households has not deteriorated with the privatization of CWS. Consumption of green banana, banana fruit, dry beans, and maize, particularly by the families of producers selling to private CWS, has increased since privatization. Consumption of sweet potato has also increased since privatization, especially among producers still selling to public CWS. There have been no substantial differences in the consumption of cassava roots and leaves in coffee grower communities since privatization. Although food consumption has improved for producers selling to private CWS, with a positive impact on access to food, it is less clear whether the quality of food has improved.

Since privatization, there have been some changes in the "first" priority spending of producers. Before privatization, among coffee growers, households selling cherries to public CWS allocated income to human capital, food/subsistence, agricultural investments, and debt repayment. Although the categories have not changed, producers still working with public CWS spend less on debt repayments and agricultural investments and more on human capital and food. Growers working with private CWS spend more on debt repayments, have slightly decreased expenditure on food, and recorded an important decline in agricultural investment and durable goods (figure 7.3).

As a result of differentiated trends in agricultural investment and durable goods, coffee growers selling to pri-

Figure 7.3: Use of Coffee Revenues before and after Privatization, Burundi

vate CWS might be more exposed to shocks than their counterparts who still sell cherries to public CWS. The difference occurs mainly because for those selling to private CWS, the capacity to invest in agricultural fixed assets (arable land) and other agricultural inputs (fertilizers) has lagged behind their counterparts selling to public CWS. But those selling to private CWS invest more in livestock.

Conclusion

Privatization has had a positive impact on cherry coffee revenues, but there are losers. Privatization also had positive impacts on per capita daily meals and food security in general, with losers in each as well. To enhance the privatization strategy, the stakeholders should (i) produce a new and inclusive privatization strategy, piloted by members of InterCafe; (ii) design comprehensive programs to increase productivity and quality in the coffee sector; and (iii) assist coffee growers on the border of unprofitability to diversify their household activities toward nonfarm revenues.

8 Ghana: Analysis of Mining Sector Policies Related to Artisanal and Small-Scale Mining

By Kristina Svensson

Introduction

Artisanal and small-scale mining in Ghana is a large contributor to local economies and rural livelihoods in some of the poorest parts of the country. By 2010, the artisanal and small-scale mining sector employed some 500,000 people across the country, generating about 23 percent of national gold production.[1]

Small-scale mining is well established in the gold heartland of the Western and Ashanti regions and in the northeast Bolgatanga area. With the expansion of large-scale exploration areas and foreign direct investment in mining during the 1990s and 2000s, mainly in the Western and Ashanti regions, conflicts between large-scale mining companies and small-scale miners have been increasingly common.

Ghana was one of the first countries on the continent to regulate the artisanal and small-scale mining sector in 1989. Over the past 20 years, the Government of Ghana has been proactive in identifying legislative and policy measures to manage and support the growth of small-scale mining. The 2006 mining act introduced the prospect of moving policy on small-scale mining from a rather narrow licensing issue, to supporting a sustainable and effective small-scale mining sector. More recently, the 2010 draft mining policy document reinforces the government's priority to make small-scale mining a sustainable sector, as it outlines designated areas for small-scale mining.

The purpose of this analysis, which was conducted in 2011–12, was to provide analysis and recommendations based on broad consultations with relevant stakeholders, including artisanal and small-scale mining operators and communities. More specifically, this study aims to: (i) inform the Government of Ghana on policies and practices related to small-scale mining by producing new data on the sector; (ii) inform the preparation of the next phase of donor support; (iii) facilitate the creation of a platform for dialogue and consultations; and (iv) assess the poverty, welfare, and social impact of the small-scale gold mining law (1989) and do an ex ante assessment of the revised draft mining policy. The team also conducted an international benchmarking exercise looking at four specific policy areas for artisanal and small scale mining.

Institutional Context

There are four main institutional pillars that have governed the implementation of small-scale mining policy in Ghana: the Minerals Commission, the Environmental Protection Agency, the Precious Minerals and Marketing Corporation (PMMC), and the Geological Survey Department. These pillars sit within a broader institutional landscape that includes the Ghana Small-Scale Miners Association, the Ghana Chamber of Mines, members of parliament, parliamentary committees, and a range of nongovernmental organization advocacy groups.

Methodology and Analytical Framework

The analysis is based on a review of existing research, secondary literature, discussions with key informants and stakeholders, and a short period of qualitative fieldwork. The fieldwork was conducted in the Japa designated area and nearby large-scale mining exploration concession areas. Although the study originally emphasized the need for a counterfactual for understanding what would have happened without the policy reform, there was no other country with a comparable economic, political, and social context to analyze national trends in small-scale mining without the policy reforms introduced in Ghana. The constraint on using a counterfactual is also present at the subnational level, as no district-sensitive longitudinal data are available for comparison purposes.

The analytical framework identified six key transmission channels for tracing the impact of policy reform: employment, prices, access, assets, transfers and taxes, and authority.

Economic and Social Impacts of Artisanal and Small-Scale Mining

Economic Impacts

Small-scale mining has contributed significantly to the growth of integrated, sustained local livelihoods, and has even supported the expansion of a middle-income group in local communities. In the poor, remote Upper East region, where the poverty rate is around 85 percent and few large-scale mining concessions have been awarded, small-scale mining policy has flourished with mining land set aside and licenses awarded.

For example, small-scale growth mining in Talensi-Nabdam (one of eight districts in the Upper East region) has allowed the district to become the economic cornerstone of the Upper East region, employing more than 10,000 people in 2010. Formal concessional licenses enabled miners to have access to formal support, including, most recently, a government-backed loan, which has allowed marked increases in gold production in the district. By focusing on formalization and proactive support for artisanal and small-scale miners, this region has created economic growth and reversed trends of impoverishment and emigration.

However, the same policies have been much more difficult to implement in the Southern and Western regions, because of the expansion of large-scale mining exploration and exploitation licenses.

The analysis also noted that for most miners in Ghana, small-scale mining is not a "get rich" quick scheme. While a few very rich individuals have emerged in small-scale mining regions, there has been a marked expansion of a new "middle-income" group of households. The local "very rich" have enough disposable income to buy their own excavators for pit operations. The "rich" rent or lease such equipment; the "semi-rich"—the largest group—includes the pit workers (young and old, transitory and permanent); and, finally, the poor are typically families that have nothing to do with small-scale mining. The poor are subsistence farmers, widows, and other vulnerable communities.

Through upstream and downstream impacts, small-scale mining contributes directly and indirectly to the local economy and income. A typical "modern" gold pit operation involves an excavator, a few grinders, and some labor before being sent for further processing. The organization of workforce in pits is relatively standardized. Each pit has a trusted foreman, a few men shoveling sand into the grinders, and another few men washing the gravel as it comes through the grinder. Before mechanization, women used to be employed to carry the dug-out sand and gravel pans on their head for 300 yards to available grinding machines. Now most women in mining are employed to clean washboards and cook food to sell to laborers.

Children are also involved in the value chain. However, employed children are in many cases limited to evening and weekend activity, where they re-wash the tailings that accumulate as sediment from the first round of washing in and around the small-scale mining pits. With mechanization, welders and local mechanics are also involved in the small-scale mining industry, as local servicing and equipment repairs are frequent. Workers involved in transport and security services are also employed in small-scale mining operations.

Social and Environmental Impacts

The social and environment impacts linked to the growth in small-scale mining are: child labor, sexual abuse of women, population migration, HIV/AIDs, poor environs, and conflict.

Although the lines are blurry on what constitutes child labor, a careful analysis of Talensi-Nabdam's small-scale gold mining camps shows that the child workers of these camps are linked to the wider livelihood diversification pattern unfolding in the Upper East Region. These child workers in small-scale mining projects are incorporated into the small-scale mining labor force as a continuation of their longstanding pattern of involvement in rural livelihoods via "light work," in many cases fitted around their classroom schedules. Studies on child labor in small-scale mining camps have revealed that the sector is not necessarily hindering children's

education, and in some circumstances, it facilitates school attendance, as proceeds from these odd jobs are sometimes used to pay school fees.

Another growing concern linked to the increased small-scale mining activity is the environmental impact and environmental health hazards, which are growing as the sector grows as well. The country's transient population has destroyed stretches of landscape. The use of mercury is frequent and it erodes the soil of its chemicals, rendering post-mining activities such as farming and raising livestock impossible. Further, the long-term impacts of mercury poisoning on the human body are detrimental, and the risk of physical injury in the mines is also considerable and well documented.

Conflicts in small-scale mining operations are of three types: local conflict over borders, conflict over distribution of income, and conflict from military raids. The institutional basis for land ownership usually underpins conflict over borders, and such conflict is usually between extended family relatives. Conflicts over distribution of mining income is frequent if on payday miners receive less than what they expected. Often, this type of conflict involves minor fights, which are resolved by the village authorities (chiefs). Military raids are by far the most severe form of conflict or social violence in small-scale mining pits, as these crackdowns destroy machinery and create an environment of insecurity.

Policy Issues

There are four key issues that significantly impact the performance, management, and oversight of artisanal and small-scale mining in Ghana: taxation and revenue collection; definition and categorization of artisanal and small-scale mining in policies and regulation; formalization and licensing; and the environment.

Taxation and Revenue Collection

Large- and small-scale mines in Ghana are obliged to pay royalties and taxes. Because of the large informality among small-scale miners, however, the government is not able to collect those taxes. Formalization, which would allow for increased tax collection, is hampered by expensive and cumbersome licensing procedures (see figure 8.1). The central purchasing structure, PMMC, operates throughout the country through local buyers. However, the buyers do not ask the sellers if they are licensed or not, which also does not provide incentive for formalization.

Definition and Categorization of Artisanal and Small-Scale Mining in Policies and Regulations

Ghana's definition of small-scale mining is quite rigid: any plot measuring up to 25 acres in size. However, looking at the mining industry in the country today, for regulatory purposes, it would seem inappropriate to lump mechanized small-scale miners—who have increased in number over the past years—with artisanal miners who utilize strictly manual methods to process gold. There seems to be no consistency in definition globally or even among those countries that use the same criteria, including neighboring countries that have near-identical geological characteristics, such as Liberia and Sierra Leone.

Licensing

In 2012/13, just over 1,100 small-scale licenses had been granted in Ghana. The analysis also found that most small-scale pit owners would rather be licensed, as illegal mining brings insecurity through fear of periodic military raids and economic insecurity, and as illegal pit owners are denied opportunities to plan financially and obtain credit to invest for the long term. This continues as most miners have little education, and do not understand how the system works.

Environment

Significant amounts of money have been pledged to reduce environmental hazards, particularly mercury contamination, in small-scale mining operations. The challenges in environmental policy in small-scale mining are: identifying and implementing appropriate technological services and educational programs; ensuring the sustainable and lasting presence of these programs within target communities; and ensuring the dynamism of the operators delivering these programs.

Figure 8.1: Organogram of the Processes and Steps to Receive a Mining License in Ghana
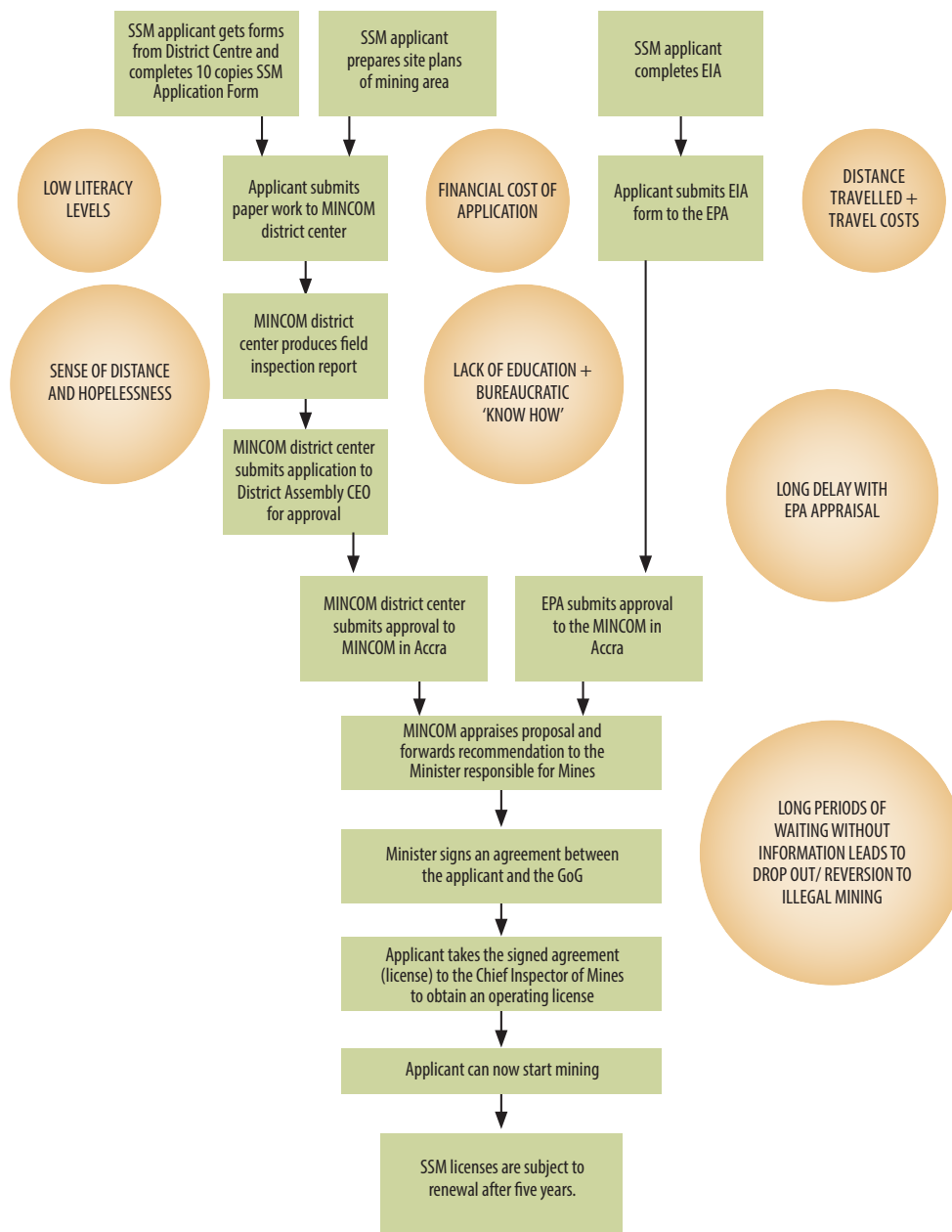
Conclusion

With an estimated seven million of Ghana's 25 million people living in poverty, the small-scale mining sector, with its low barriers to entry and reliable income returns, has become an important source of employment. Ghana was one of the first countries in Africa to regulate the artisanal and small-scale sector. In the past decade, however, the sector has undergone dramatic changes, including increased mechanization and the influx of foreign opera-

tors and financiers. And with rising gold prices, there has been a sharp increase in the number of people involved.

The following are a few priority steps that the Government of Ghana can consider taking to develop, formalize, and manage the impacts of the artisanal small-scale mining subsector today.

To ensure a well-defined policy and institutional framework, small-scale mining policy should be linked to inte-

grated programming and a clear institutional framework. To achieve this, policy should explore a more diverse categorization of artisanal and small-scale miners; recognize the varied context in which artisanal and small-scale mining occurs; develop a more proactive stance on identifying and demarcating areas "suitable" for small-scale gold mining activity; promote integrated land-use planning, taking artisanal and small-scale mining into account; and finally create a clear, connected institutional framework for the management of small-scale mining.

A key to better oversight and control, as well as technical and financial support, is formalization. Examples from other countries show that barriers to formalization can be removed by improving licensing procedures. This might include streamlining and decentralizing the license application process for small-scale mining and reducing license fees.

Revenue collection from artisanal and small-scale mining might increase by decentralizing the collection of some fees for permits and licenses, and administering a tax on gold collected by PMMC buyers.

Continued education and awareness-raising and strengthening of institutions, including the national Small-Scale Mining Association are also needed to improve performance.

Finally, improving environmental conditions at small-scale mines can occur by constructing centralized ore-processing facilities in areas where demand is high, carrying out educational programs at the Minerals Commission district offices, strengthening collaboration with local universities to produce research as an additional resource for piloting technologies and training, and strengthening communication with small-scale mining communities.

1   In 2015, that number has increased to 34 percent.
2   Ghana was the second largest gold producer in Africa in 2013 after South Africa.
3   Modern because now most pit operations are mechanized and use less labor.

V. Policy reforms for enhanced business environment and productivity

9 Barriers, Risks, and Productive Potential for Small-Scale Traders in the Great Lakes Region

By Maria Elena Garcia Mora and Sabrina Roshan

Introduction

Eastern Democratic Republic of Congo continues to struggle with a tenuous security situation and geopolitical constraints with its bordering neighbors. Related to these contextual factors are the barriers to economic opportunity that men and women in the region face. One of the most frequently cited crises in eastern Democratic Republic of Congo is related to sexual and gender-based violence (SGBV).[1]

In 2011, the World Bank conducted a survey on trade barriers to small-scale female cross-border traders in the towns of Goma and Bukavu, border towns in Democratic Republic of Congo and Rwanda, respectively. The findings underscored high rates of corruption and violence toward female traders crossing the border on both sides. From the sample, 67 percent of female traders reported having experienced some form of corruption, 31 percent reported having been insulted, 10 percent reported having undergone some form of physical violence, and

approximately 5 percent of female traders reported having experienced some form of SGBV while crossing the border.

These trade barriers are rooted in various circumstantial and socioeconomic constraints, including widespread regional violence, political instability, poor infrastructure, and low wages or failure of salary payments to border officials, among other issues. Despite these conditions, however, cross-border trade serves as the main source of family income for 76 percent of these traders

This study highlights (i) how and why corruption and SGBV negatively impact small-scale female cross-border traders, (ii) how to design policy to reduce such barriers, and (iii) the extent to which the traders can improve their economic returns in the absence of such constraints.

Sample and Data

A random sample of 628 female traders was used, of which 75 percent live in the Democratic Republic of Congo (40 percent in North Kivu and 35 percent in South

Kivu). The remaining 25 percent of the sample live in Rwanda. The average trader was 35 years old, with 10 years of experience. Forty-nine percent were married, and the rest lived with a partner.

Most female traders in the sample obtained starting capital through informal channels: donations and loans from friends and family. Only 20 percent of the sampled traders are part of a formal traders' association, and just over half are registered with the government. In Rwanda, 38 percent of the traders have a business license; in North Kivu, 70 percent; and in South Kivu, 59 percent. As a result, few small-scale traders in the sample are well informed on trade regulations and the tax code for traded goods, particularly in the Democratic Republic of Congo, where the tax code is administered in a haphazard—often opportunistic—manner.

To complete the analysis, socioeconomic data on border officials was collected. A non-random[2] sample of border officials was created, Including 66 officials from various government agencies on the Congolese side: migration, customs, border control, health, and border police. On average, officials were 42 years old, 90 percent had completed secondary school and were literate in French, and almost all were fluent in KiSwahili. It is unclear how versed border officials were on trade laws, as they seemed to contradict each other on rules and regulations per product traded across the border (annex table 1).

While over half of the sampled traders have accurate business licenses, officials typically perceive small-scale traders as part of the informal sector and the black market. As a result, abusive behavior, particularly toward women—who typically have even less access to information—is commonplace. Moreover, the frequent insecurity in the region leads to high price volatility, which some corrupt officials take advantage of for personal gain.

Why Trade?

Almost 90 percent of the sampled traders are importers, of which around 45 percent import because imports have more competitive prices, 16 percent import goods that are not available locally, almost 12 percent import to replace poor quality goods, and 4 percent import products because local markets are too far away.

Of the remaining 10 percent that export products, 26 percent are fetching more competitive prices abroad, 23 percent have less competition abroad, 13 percent have more space in foreign markets, and 5 percent find demand at home too low.

Results

Overall, the standard of living for most traders in the sample is in line with most other women in their communities, while border officers enjoy a much higher socioeconomic status than most men or women in their communities. For example, only 5 percent of the officials sampled live in houses with dirt or sand floors, compared with 61 percent of traders. Similarly, 51 percent of the officials have electricity in their homes, compared with around 30 percent of traders. Further, median monthly consumption for officials is around US$334, almost twice as large as that of traders (US$170).

Trade Barriers

Based on the survey and focus groups, most trade barriers are in the form of corruption and SGBV.

For this study, corruption is limited to the public sector; corruption is defined as the use of administrative public positions for private gain. A focus group discussion of 100 of the 628 traders in Goma and Bukavu was carried out. These traders revealed that corruption occurs in several forms at the border. For example, corrupt practices include paying officials to move ahead in the queue to cross the border, bribing officials to cross the border before it opens and after it is closed, paying officials informally to cross the border illicitly, bribing to pay less border tax, and paying a bribe that an official has demanded.

Thirty-one percent of all traders have been involved in an incident in which they felt they had to pay a bribe of some sort. Of these traders, 130 were in North Kivu, 53 in South Kivu, and 19 in Rwanda. Some were victims of multiple illicit interactions (figure 9.1).

Figure 9.1: Reported Cases of Corruption by the Authorities

- DRC Police — 25%
- DGM — 18%
- DRC Hygiene — 15%
- DGDA — 13%
- DRC Military — 12%
- OCC — 11%
- RW Customs — 3%
- RW Police — 1%
- Rwanda Immigration — 1%
- RW Military — 1%
- RW Hygiene — 0%
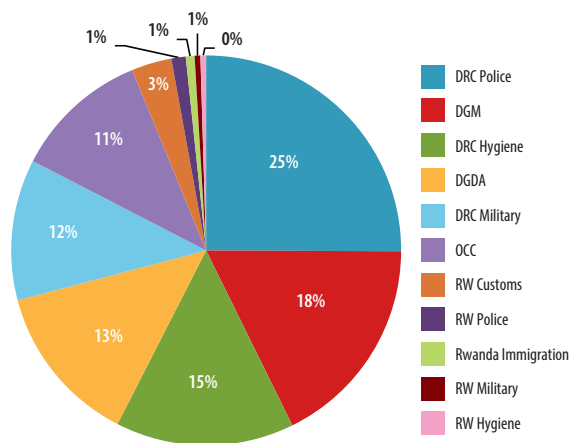
Another trade barrier experienced was confiscation or destruction of goods. Among the 628 traders, 85 reported 146 incidents of confiscation, with the majority of confiscation taking place at the hands of the custom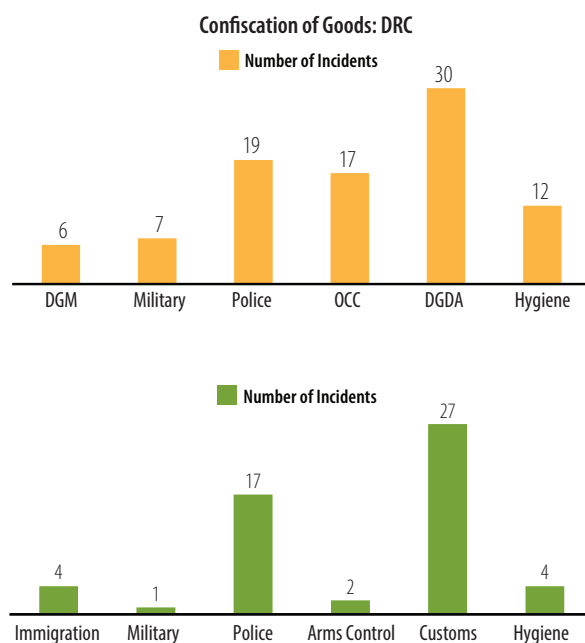s agency (30 reports) (figures 9.2 and 9.3). Twenty-five of the traders had their goods destroyed at the border as well.
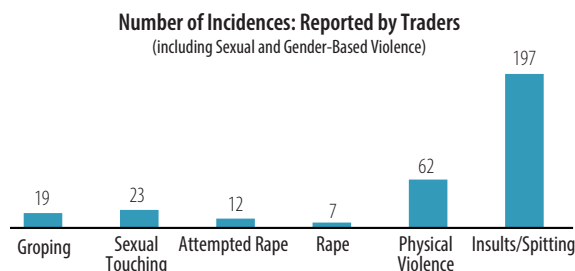
Figures 9.2 and 9.3: Confiscation of Goods in Rwanda and the Democratic Republic of Congo

Confiscation of Goods: DRC

Number of Incidents

DGM	Military	Police	OCC	DGDA	Hygiene
6	7	19	17	30	12

Number of Incidents

Immigration	Military	Police	Arms Control	Customs	Hygiene
4	1	17	2	27	4

SGBV poses the largest barrier to trade at the border. In this study, SGBV is measured by asking about actual incidents that occurred and perceptions of incidents that might have occurred to others, while crossing the border, in the past 30 days. Therefore, traders were asked whether they had been insulted, spat on, groped, sexually touched, or had undergone attempts at rape or been raped while crossing the border.

Eleven percent of all traders reported having heard (third party) that SGBV incidents took place while crossing the border over the past 30 days; 5 percent had undergone some form of SGBV at the border (figure 9.4). Sixty-six percent of these SGBV incidents took place in the Democratic Republic of Congo—52 percent in North Kivu and 13 percent in South Kivu.

Figure 9.4: Reports of Sexual- and Gender-Based Violence

Number of Incidences: Reported by Traders
(including Sexual and Gender-Based Violence)

Groping	Sexual Touching	Attempted Rape	Rape	Physical Violence	Insults/Spitting
19	23	12	7	62	197

Of individual incidents, the most commonly occurring SGVB were sexual touching (23 reports), groping (19 reports), attempted rape (12 reports), and rape (7 reports), of which three incidents occurred in Rwanda. Almost 3 percent of the traders reported having been groped, and an equal number (3 percent) experienced sexual touching, 2 percent were almost raped, and 1 percent had been raped in the past 30 days while crossing the border (figure 9.5).

Among the border officials, across all possible categories of SBGV, only one of 66 witnessed any form of SBGV over the past month. This is in sharp contrast to what the female traders reported.

Figure 9.5: Sexual- and Gender-Based Violence Incident Reports

Reports: Sexual and Gender-Based Violence
(% of Traders who Reported)

■ Third Party ■ Self

Category	Third Party	Self
Groping	8.12	2.71
Sexual Touching	5.57	3.03
Attempted Rape	4.46	1.49
Rape	3.98	0.96
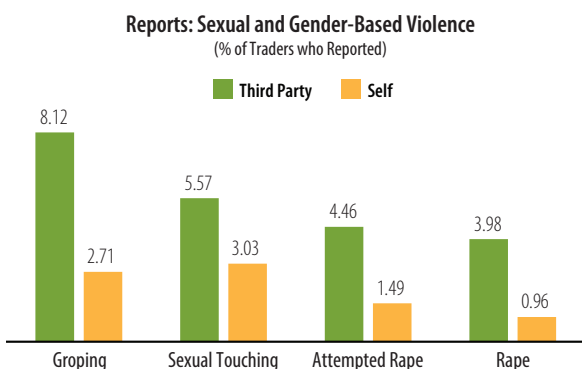
Challenges

The results of this study should be interpreted with caution, as there a few limitations to the study. First, the results from the border officials were skewed, as a non-random sample was used, which did not include Rwandese officials. Second, because of fear of reprisal from government the authorities, some female traders withheld certain information, such as how to avoid border difficulties. Third, officials and traders were not asked similar questions, and so their answers are not comparable. For example, traders were asked if they had heard of or learned about instances of SBGV, while officials were asked if they had seen such activity. Although not comparable, the results might be indicative. However, further analytical research is needed to draw correlations between the reports by the police force and traders.

Recommendations

Based on the survey results, it is still not clear whether the cause of corruption and SGBV is lack of information, institutional failures, poor infrastructure, low salaries of border officials, or lack of supervision. There is a need for further analysis of the causality of corruption and SGBV.

The informality of tariff mechanisms and regulations on these borders requires strong reforms. A training program to inform traders about their rights and regulations regarding taxes and tariffs will deepen the breadth and depth of knowledge related to understanding tax codes and reduce barriers to trade.

It is equally important to create a robust information flow and strong social accountability mechanism to reduce SGBV and corruption at the border. A system is needed that informs traders about their rights, and records grievances as they occur.

Further, expanding economic interdependence within regions will help alter tensions created by border trade, which has historically been marked by transactions based on "blood minerals." Regional integration and collaboration would help strengthen economic ties in the region and, as a result, enable long-term stability.

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1 Sexual and gender based violence was defined in the study as encompassing groping, forced kissing, inappropriate touching, sexual touching, attempt to rape and rape.
2 The government of the Democratic Republic of Congo DRC defined a subset of border officials from which the research team was permitted to draw a sample to interview.

10 Tourism Development in Cabo Verde: Is It Time to Abandon the All-Inclusive Model?

By Andres F. Garcia

Introduction

In the past two decades, tourism has played a central role in Cabo Verde's economy. Gross domestic product (GDP) has doubled in nominal terms since the end of the 1990s and per capita income has grown at an annual rate of 4.6 percent over the same period—with tourism rising from 5 percent of GDP in 2000 to 20 percent 2012. International tourist arrivals increased by more than a multiple of seven from 1999 to 2012, representing growth from around 67,000 to about 482,000. As a result, Cabo Verde's economy has transformed, from one dominated by agriculture and fisheries to a service economy (70 percent of GDP), with a special focus on tourism.

Poverty in Cabo Verde decreased from around 37 percent in 2000, to 27 percent in 2010. More recently, the country graduated from least-developed country to a middle-income country. The increased standard of living is particularly noticeable on the islands with the most tourist arrivals.

Government policy in Cabo Verde has favored tourism for development, granting large fiscal incentives for foreign direct investment (FDI) in the sector. For example, foreign operators benefit from corporate tax exemptions in the first five years of business and a reduced rate of 10 percent thereafter, as well as customs duty exemptions on capital goods imported into the country. These incentives favor large, European all-inclusive resort operators. Although there are smaller, local hotels and services, they often cater to the local population rather than international visitors.

This study analyzes the impact of the all-inclusive tourism development model for Cabo Verde on poverty reduction, employment, and skills transfer. In addition, the study provides a foundation for building a more sustainable tourism development model for the country. The study also identifies opportunities for diversification of Cabo Verde's economy into agribusiness and maritime services.

Impact of Tourism on the Economy

In addition to contributing around 20 percent of GDP in 2012, tourism contributed one-sixth of government spending—around €60 million on average annually. Tourism is a major source of employment. In 2010, over 4 percent of the total labor force was working in the tourism sector; of these, 87 percent were Cabo Verdean. However, in Boa Vista, only 72 percent of tourism workers were Cabo Verdean, and earn a slightly higher monthly wage of €347, compared with €298 on other islands.[1]

Furthermore, tourism produces indirect flows into the economy via construction and food and board purchases. On average, 15 percent of construction workers are Cabo Verdean, with an average monthly wage of €250. In 2011, Cabo Verde had more than 420,000 tourists, who stayed on the island for eight days on average, representing demand for food and drink of almost 10,000 residents—almost 2 percent of total population.

Although many studies have shown that discretionary income spent by tourists, outside hotels, can have a significant impact on local entrepreneurs, there are several reasons to suspect that local spending of tourists in Cabo Verde is low. The country's large all-inclusive resorts generally are not characterized by high levels of local spending. On average, a tourist at an all-inclusive resort spends around €7 to €13 per day, of which around one-third to one-half is spent outside the resort. A possible reason for this could be that tourists find few entertainment options outside the resort, and poor services during excursions (figure 10.1).

Figure 10.1: Tourist Satisfaction with the Quality of Excursions, 2011/12 Winter Season
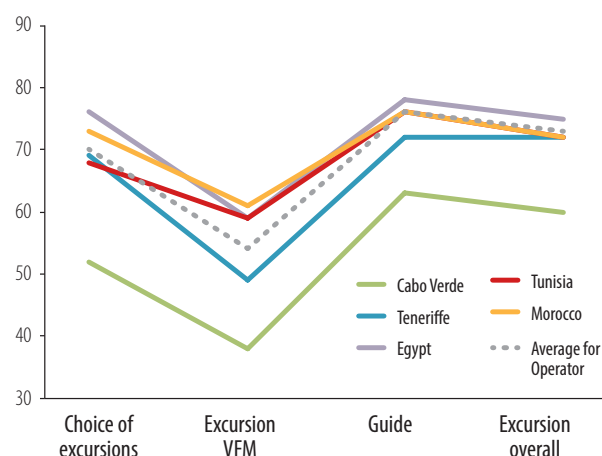
Despite the low level of local spending, the islands with the most FDI in tourism (Sal and Boa Vista) have the lowest poverty incidence rates in the country. The poverty rate of the island of Sal is 10 percent, while the rate of Boa Vista is almost 11 percent (Annex table 2). Both islands have the highest concentration of all-inclusive resorts—over three-quarters of all hotel rooms in Cabo Verde—and experienced sharp reductions in poverty between 2000 and 2010. Over this period, poverty decreased by 59 percent in Sal and 52 percent in Boa Vista (figure 10.2).

Figure 10.2: Changes in Poverty Incidence from 2000 to 2010
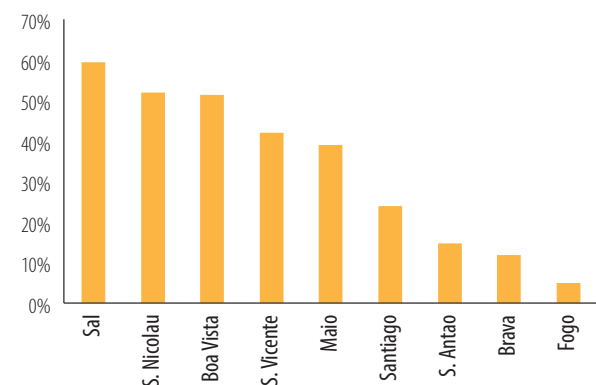
Moreover, data show that households linked to the tourism sector, including hotels and restaurants, have a low incidence of poverty. The poverty rate of households

that are dependent on tourism is estimated at 12 percent (lower than the national average), while the poverty rate of households that are dependent on agriculture and fisheries is 44 and 35 percent, respectively (annex table 39).

Low local spending is further reinforced by the leakages in the tourism sector. These leakages can occur in three ways: profits from large all-inclusive resorts are expatriated to the home country of their foreign owners; salaries of management staff, which is dominated by expats, are also sent back to home countries; and finally, the tourism sector relies on high volumes of imported goods (annex table 39).

All-Inclusive Model

Cabo Verde's tourism sector is geographically concentrated in two islands (Sal and Boa Vista); the sector is also concentrated in terms of ownership. The TUI Group—the parent company of tour operator and all-inclusive resort RIU—controls a third of all international tourist arrivals into the country.

A combination of government policy and poor connectivity between the islands in the archipelago allowed for the growth of an all-inclusive model. Tourists vacationing on certain islands have to take chartered airlines, and tour operators who manage chartered airlines have to ensure high occupancy rates.

With infrastructure being weak, distribution of food from high agro productivity islands to low ones is costly, making local investment in hotels and restaurants even more prohibitive. And although capital goods used in the construction of hotels and resorts are duty free, food and beverage imports are subject to high import duties, further discouraging investment in hotels and restaurants by cash-strapped locals. Moreover, most hotel operators face high utility costs, as power and water distribution is uneven, particularly in the major resort areas, which are isolated with sparse populations.

To estimate the local economic impact of all-inclusive resorts, this study calculates the local benefit generated by each type of accommodation.[2] The local benefit is defined as the sum of local staff salaries; procurement of local fish, fresh fruits, and vegetables; and payment of taxes.

Figure 10.3 shows that the total local benefit of all-inclusive resorts is highest, as these resorts have higher average daily rates and higher occupancy (average room revenue per available room per day) rates. Although upmarket bed and breakfasts purchase more local content (by purchasing more local food and beverages, Annex table 3), their local benefit remains lower than that of all-inclusive resorts because the bed and breakfasts have lower average daily rates. All-inclusive resorts contribute more in taxes and local salaries. For example, a hotel room in Fogo or Santo Antao is more strongly linked to the local economy in percentage of local content and supply chains, but its absolute local benefit is €14 per room per day, compared with €67 per day for the all-inclusive resorts on Sal and Boa Vista islands. The difference is because, the hotels in Fogo and Santo Antao have cheaper daily rates and lower occupancy rates.

Figure 10.3: Hotel Performance and Local Content
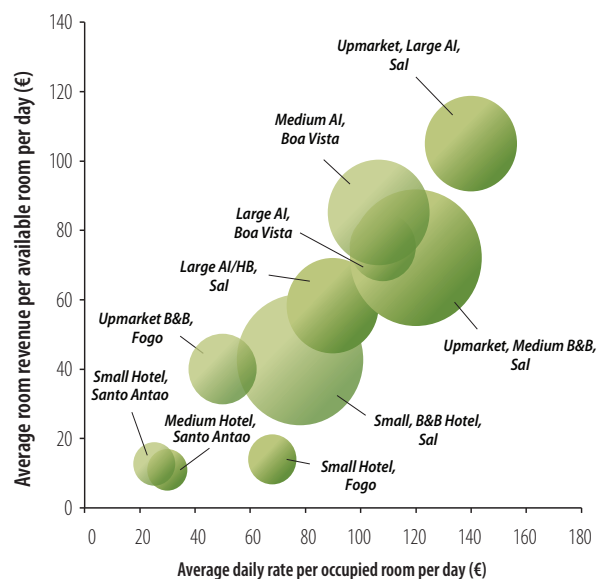
On islands with a very strong tourist presence—particularly Boa Vista and Sal—over 75 and 64 percent, respectively, of surveyed residents were linked to the tourism sector. Similarly, a strong majority of surveyed residents on both islands (78.2 and 72.7 percent, respectively) expressed a desire to work in the tourism industry in the future. On other islands, only about a third of the surveyed residents were currently linked to tourism, yet a substantial majority (over 60 percent) expressed interest in tourism-related employment.

When asked about their support of large-scale tourism, over two-thirds to three-quarters of residents of the islands with the most tourists, such as Santiago, Fogo, Sal, and Boa Vista, described their support as either "very strong" or "fairly strong." Only around one-tenth of respondents expressed no support at all. However, on Sal—a major tourist island, with several all-inclusive resorts—one-quarter of the respondents did not support major tourism development. In other, less tourist filled islands, such as Santo Antao and São Vicente, fewer than half of the respondents supported major tourist development and about a third were completely opposed to it.

Opportunities to Optimize the All-Inclusive Model

With more than 4,000 rooms, a third of Cabo Verde's accommodation, all-inclusive resorts play an important role in the country's tourism. The resorts offer employment, poverty reduction, and development. However, the contribution of the resorts could be improved by enhancing the institutional framework, diversifying into fisheries, improving the management capacity of locals, enforcing environmental protection, and improving the business environment for local investment.

Institutional Framework

Management of the tourism sector in Cabo Verde is carried across two public institutions. The General Directorate of Tourism (DGT), within the Ministry of Tourism, Industry and Energy, oversees the tourism sector. However, the promotion of investment in tourism is handled by Cabo Verde Investments (CI). Unfortunately, the DGT suffers from insufficient staffing, low capacity, and lim-

Perceptions of the Tourism Sector

In assessing the impact of tourism on development in Cabo Verde, it is important to understand the perceptions of tourism by locals. As such, the study utilized the results of a survey carried out in 2010 by the University of Cordoba, Spain, on Cabo Verdeans' attitudes toward tourism.

ited funding. Although CI's mandate is limited in scope, it stopped marketing Cabo Verde as a destination in 2014, leaving a large gap in the industry.

Both institutions appear to have had overlapping functions. Further, the government's ability to manage the sector has been constrained by a lack of continuity in the institutional framework, as tourism has fallen under three different ministries over the past decade and, at one point, was even a stand-alone ministry. As a result, there are unclear linkages between public and private players, which is particularly worrying where the market is dominated by a few large European operators.

Moreover, the industry is suffering from unreliable data collection, in particular on international tourism arrivals.

Low Diversification

Fisheries were once considered one of the major natural resources available in Cabo Verde. In recent decades, the sector has been in decline. GDP from fisheries decreased from 2 percent in the 2000 to around 0.7 percent in 2011. Poverty analysis shows that a third of fishery workers live in poverty.

Although local fish (about €4 per kilogram) are cheaper than imported fish (€13 per kilogram), about 80 tons of frozen fish (two containers to Sal and Vista) are imported per month. Policies pushing for greater support for the fish industry and integration of the local fish supply chain with large, all-inclusive resorts would diversify government revenue sources.

Poor Management Capacity

Local employment is relatively high in the tourism sector on some islands; however, non-local employment still represents significant leakages. Local workers would benefit from more vocational training, in particular in waiting tables and housekeeping. The poor housing conditions for workers further hamper local employment. The poor housing settlements can expose tourists to the outbreak of disease, which would hurt the country's tourism sector.

Weak Enforcement of Environmental Protection Laws

Although Cabo Verde has a strong legal framework for environmental protection, often regulations are not enforced. For example, large construction sites are often located less than 80 meters from the sea, which goes against the law. Similarly, all special tourism zones are required to have zoning plans for each development; however, only those located on the islands of Boa Vista and Maio currently have zoning plans.

Moreover, the presence of hotels creates considerable need for potable water and electricity, while generating large amounts of solid wastes, which are not always properly treated.

Poor Business Environment for Local Investment

The poor business environment renders independent local hoteliers, as well as other businesses along the tourism value chain, less competitive. The costs of inputs (utilities, transport, and food) are very high because of limited inter-island connectivity. Adding to this is the red tape involved in starting a business in Cabo Verde. The country performs poorly in getting credit (126th rank), starting a business (131st rank), protecting investors (133rd rank), and resolving insolvencies (183rd rank). It is at the bottom of the list for these, even compared with other tourist destinations (Seychelles and Mauritius) on the continent.

Conclusions

This study set out to test whether all-inclusive resorts have little impact on the Cabo Verdean economy. The findings reveal broader economic impacts from all-inclusive resorts, including the potential for poverty reduction. However, there is room for the government to encourage the development of all-inclusive resorts that have more linkages with the local Cabo Verdean economy, while minimizing environmental impacts. Further, current leakages in the industry can be reduced by improvements in the local fish value chain, improving inter-island infrastructure, as well as programs that encourage increased local hiring.

1   Except for Sal island, which also has similar wages as Boa Vista
2   There are two important limitations to this analysis. First, this definition of 'local benefit' is partial and limited to available data. Bringing additional criteria into the 'local benefit' calculation, like environmental impact, while beneficial, is not within the scope of this study. Second, this analysis focuses entirely upon the tourist establishment and does not consider spillover benefits beyond the hotel walls.

11 Road Transport Reforms along the Abidjan-Ouagadougou Corridor

By David Cal MacWilliam

Introduction

High transport costs in Africa, and in West Africa in particular, result in high prices to the consumer and a loss of external competitiveness for producers. Although significant studies have been undertaken showing that liberalization and reforms would result in economic efficiencies and lower costs for imports and exports, structural distortions and constraints have remained in place.

In West Africa, the available research finds that high transport costs are the result of a combination of dilapidated infrastructure and market distortions. The existing regulatory frameworks and shortcomings in their implementation limit effective competition in the transport industry, increasing costs and leading to a gap between prices and costs, as well as to an environment not conducive to investment.

The sector is divided between many small, informal, and inefficient transporters and a few larger and relatively efficient companies. The lack of criteria for access to the transport profession and transparent mechanisms to match supply and demand for transport services has given rise to the emergence of a few dominant operators that allocate services freight to truckers while earning large rents. Yet, operators carry the freight at barely break-even rates.

Low profitability creates strong incentives to resort to short-term rent-seeking behaviors, including overloading of trucks beyond the legal axle load limit. Overloading adversely affects the durability and safety of operations, damages the road network, and discourages containerization. In addition, slow rotation time on the corridor increases market costs, affecting profitability and slowing down transportation traffic.

The purpose of this study is to assess the poverty and social impacts of the proposed reforms in the partici-

pating countries. It is expected that the impact will vary between the in-transit country (Côte d'Ivoire) and the land-locked country (Burkina Faso), and between various social and demographic groups within the countries.

Challenges

Cost Environment

The data show that fees charged by port and road transport operators are the main factors contributing to the high costs of transporting goods on the Abidjan-Ouagadougou corridor (figure 11.1).

According to the most recent Doing Business data, handling and inland transportation costs per 20-foot container add up to $2,305 and $4,330 for exports and imports, respectively, in Burkina Faso, and $1,390 and $1,960 in Côte d'Ivoire. This is well above the corresponding costs in other West African countries, except Mali. It is also significantly higher than costs in Mauritius and Singapore, respectively the best African and global performers.

Although high transport costs would be expected for landlocked countries, given the distance to the port, car-

Figure 11.1: Comparative Costs of Transit to Burkina Faso from Selected Ports
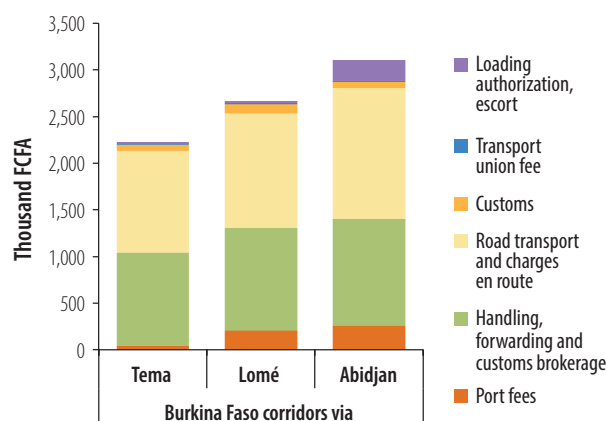
go handling and transportation represent a higher proportion of total costs between Ouagadougou and the Port of Abidjan (81 percent in the case of exports) than between Bamako and the Port of Dakar (68 percent). Likewise, cargo handling and transportation are significantly more expensive in Côte d'Ivoire than in other coastal countries.

Inland Transportation Costs

The trucking industry in the West African Sahel seems highly competitive, with few barriers to entry. However, the industry is controlled by rent-seeking cartels benefiting from existing government policy. The lack of criteria for access to the profession and nontransparent mechanisms have given rise to the emergence of a few dominant operators that allocate freight to truckers at a large profit to themselves, but at barely break-even rates to the operators physically carrying the freight (figure 11.2).

Cutthroat rates offered to small operators force them to resort to short-term survivalist models of behavior aimed at achieving higher profitability. A strategy such as overloading the truck beyond axle load limits to carry more load per trip wears on trucks and road infrastructure, and

discourages containerization—a more efficient way to transport goods across borders.

Further, slow rotation times—round trips per truck—also affect the profitability of the trucking industry. Long delays at the port in Abidjan, the poor state of road infrastructure, and roadblocks are frequently cited reasons for slow truck rotation times. The costs related to slow turnaround per truck prohibit truck maintenance and the purchase of new fleets of trucks for even more trips. For example, in Côte d'Ivoire, the truck sector has only 17,000 trucks of 19 tons, with only 69 percent of these registered as commercial cargo transport vehicles.

Background

The road transport sector along the Abidjan-Ouagadougou corridor is marked by a form of organization that hinders its development and that of the broader economy. The sector is comprised of various actors and agents whose roles are rather formalized in a fairly well-established institutional sense, although not all are formal institutions or actors. The actors can be broken down into two categories: regulators and operators, those directly engaged in the provision of trucking services.

The regulators are various government agencies, such as the ministries of transport, state, interior, and security. In addition, there are the police, military, and other security agents, as well as health, forest, and agricultural agencies. While the involvement of all these national institutions is appropriate, their application and implementation deviates considerably from good practice. There are also quasi-state actors involved, such as the Shippers' Council—an organization that represents and defends the interests of exporters, importers, shippers, and the users of transport services in the context of delivery of goods. Further, in Burkina Faso, other players include the Chamber of Commerce and Industry and the Road Transport Training Center.

The private sector consists of the shippers, who can be individuals, producers, distributors, or firms. The sector also has the freight forwarders, stevedores, transporters, truckers (formal and informal), and drivers (operators).

Figure 11.2: Schematic Decomposition of Trucking Costs and Prices
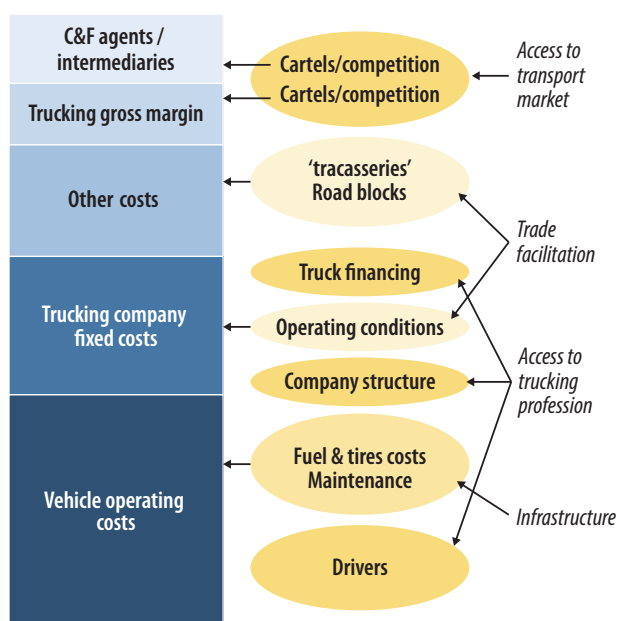
The other parties under the private sector are the unions that organize each of the professions, such as the drivers' union, the freight and passenger carriers union, and the transporters union. In Côte d'Ivoire, there is a particular role for people who act as intermediaries between the cargo carriers and drivers, merchants, or shippers. This person is called a "coxeur" and is also part of the private sector value chain.

Proposed Reform Agenda

Burkina Faso

The Strategy for Accelerated Growth and Sustainable Development plan emphasizes the need for improving the transport and logistics sectors to achieve the country's long-term development goals. Complementing this, Transport Strategy 2011–25 was created to guide the development of policies enabling profitable investment in the sector and maximizing its contribution to growth and competitiveness. Targeted reforms will address international transit, management of road infrastructure, transport service fees, the trucking industry, road safety, and road and rail infrastructure.

Côte d'Ivoire

The Ivorian Ministry of Transport recently presented its plans to improve transport in Côte d'Ivoire and facilitate exchanges along the Abidjan-Ouagadougou corridor. The reform program focuses on improving regulation of the road transport sector, professionalizing the trucking sector, supporting transporters to improve trucking fleets, facilitating trade, reforming driver licenses, strengthening driving schools, and revamping infrastructure in the port, rail, and road networks.

Macroeconomic Impact of Proposed Reform

Using data from West Africa, two possible scenarios are presented as possible avenues for reforms. The first scenario assumes that the share of transit traffic would remain the same between coastal and landlocked trucking fleets, while the second scenario examines shifts in profit shares to lower operators. Both scenarios assume

that axle load controls reduce overloading of transit trucks by 97 percent. The reforms conducted in all scenarios are: professionalization and modernization of the transport sector, fleet renewal, improved corridor management and control, promotion of containerization, improved road conditions, and reduced cost of maintaining infrastructure.

As a result of the reforms, the net benefit to the regional economy is around $400 million to $500 million per year. One-third of the benefit comes from axle load controls. Governments could be expected to save $200 million to $300 million in road maintenance, while the trucking industry (and especially the number of informal operators) would shrink as a result of productivity increases and less waiting time in queues at ports and border posts. The reforms reduce transport costs per ton by 20 percent and transport prices by 19 percent. Further, the regional (West Africa) trucking industry would gain about $60 million in net revenue, while shippers, producers, and consumers in landlocked countries could gain $200 million in net economic benefits.

Impact of Reform on "Losers"

While the reforms will create economic gains, there will be some losers in the sector. The informal truckers would be expected to lose 16,000 jobs, although some might gain by shifting to the formal sector. Of this group of informal truckers, those most vulnerable to the reforms are the older, illiterate, informal truckers, who are nearing retirement and are unwilling or unable to modernize. However, the requirements for professionalization could be cumbersome for some truckers who might want to modernize their trade, as the costs involved and the lack of other economic activity to transition to could likely have negative impacts on them.

Similarly, in Côte d'Ivoire, should the freight exchange system become fully operational, the "coxeurs" will likely be out of a job, as a majority of them have little education with seemingly limited possibility to transition to other activities.

Therefore, the policy question is not whether to proceed with reforms, but how to mitigate the potential

negative impacts of reform by minimizing the potential loses for the "losers" of reform. This study proposes the following mitigation measures for negatively affected stakeholder groups:

- Create supporting policy measures for operators intending to transition to other activities, such as access to finance as well as training opportunities to transition to other activities. Carefully structuring measures to facilitate access to finance for fleet renewal, including purchasing or upgrading of new trucks, trailers and equipment across the whole spectrum of truckers and companies, from large to small, and formal to informal. To achieve this, an analysis of collateral requirements, interest charges, amortization periods and down payments for each type of stakeholder is important.

- Phasing and sequencing reforms so that older operators, who have difficulty transitioning can be "grandfathered" out. This allows for natural attrition to occur, and to permit a logical phasing-out period. Some adjustment will be required even among those willing and able to modernize.

- Creating appropriately designed scrapping mechanisms of old trucks could be useful in modernizing the road transport sector and also provide resources for those wanting to transition to other activities. Further, participation in "scrappage" schemes could also help identify those truckers leaving the sector and facilitate their access to and participation in other programs that could ease their transition.

- Attaining economies of scale, by creating cooperatives for small and artisanal operators, potentially enabling them to share costs and assets as a means to attain a greater degree of professionalization. Moreover, small and artisanal operators could partner with larger, formal operators, including through the sale of their trucks. If unable to professionalize, informal/small operators, can transition to other activities based on their existing skill levels or asset endowments.

Conclusion

The road transport sector in West Africa, including in Côte d'Ivoire and Burkina Faso, suffers from a lack of competitiveness emanating from high costs and resultant high transport prices. Transport costs directly and indirectly affect price structures across other economic sectors and contribute to a lack of internal and external economic competitiveness. In response, the transport ministries in Côte d'Ivoire and Burkina Faso have undertaken a series of reforms in the transport sector. These reforms will increase economic activity, reduce transport costs and prices, increase imports and exports, and hopefully result in increases in consumer and producer surplus. These reforms introduce economic gains for the majority but also losses for some. However, "losers" can be assisted by facilitating their transition to other economic activities.

## 12 Building Resilience in the West African Sahel

By Andrew Dabalen, Francesca de Nicola, Ruth Hill, and Vasco Molini

Introduction

The Sahel, that belt of dry lands just to the South of the Sahara stretching from Mauritania and Senegal in the West to the Red Sea in the East, has become closely associated with environmental degradation and social distress. Households in this belt face many shocks. Most of the shocks reported by households cluster around weather, prices and health; figure 12.1 highlights why drought remains a menace. High exposure to multiple and often extremely costly shocks leads to high levels of vulnerability, as happened recently in 2012 when as many as 18.4 million people, including about one million children under the age of five, were rendered food insecure (UNICEF, 2012). These headline humanitarian estimates are often the subject of media attention, cor-

Figure 12.1: Sahel Precipitation, 1900-2009
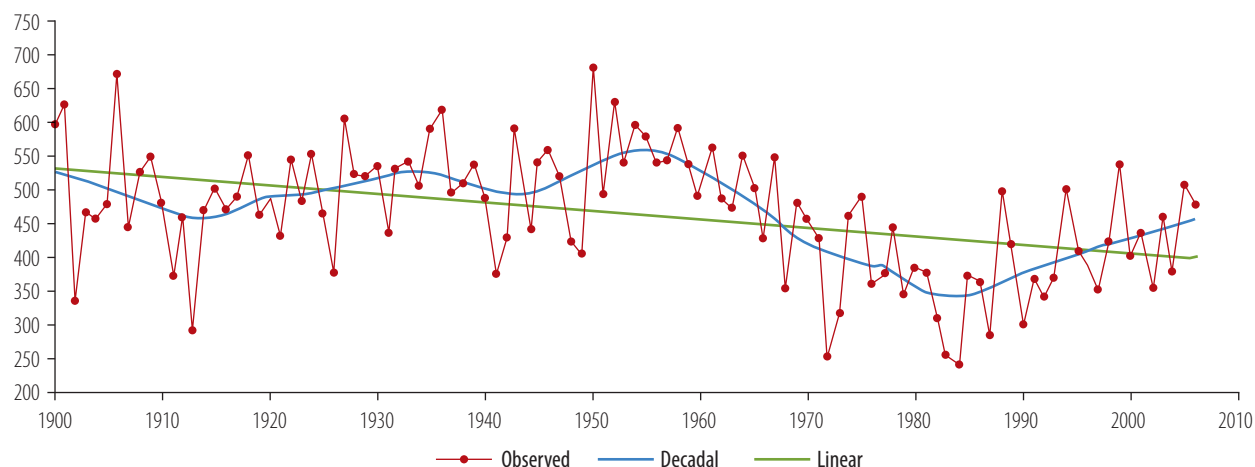
Note: The black line represents the long-term trend in rainfall across the Sahel from 1900 to 2009. A significant downward trend is observed.
Source: Institute of Science for Global Policy: www.scienceforglobalpolicy.org

rectly, because they are indicative of the extent of potential immediate welfare losses of the population. However, such covariant shocks may impose substantially larger longer-term welfare losses than the immediate damages. Given the high levels of risk and related losses from shocks, this study attempts to answer two related questions.[1] First, how large are the welfare losses attributable to shocks? Second, how high is the demand for ex-ante risk insurance and how large are the welfare gains from such insurance?

Six countries are included in the study: Burkina Faso, Ghana, Mali, Niger, Nigeria, and Senegal. For Ghana and Nigeria, only territories in the north of these countries lie in the Sahel belt, so the statistics and evidence on welfare losses apply to households resident in those areas. For other countries, the entire sample is included.

How to answer these questions?

To quantify the ex-post welfare losses, the report examines child health outcomes in five of the six study countries. Child health is measured as height-for-age (a measure of long-term nutritional deficiency which has been found to cast a long shadow on adult health and economic outcomes) and weight-for-age. The measure of shock, which is drought, is the 'greenness index' that takes into account anomalies estimated by accumulated rainfall and temperature variations over a spatial resolution of an area that is equivalent to about 30 km by 30 km around the equator (or 0.25*0.25 degrees), but leaves out all anthropogenic causes of change in greenness. To understand the impact of drought on child health, the study estimates the marginal increase in malnutrition for children aged 1–3 years, using knowledge of a child's birth and exposure to drought when the child was in-utero.

To gauge the demand for ex-ante insurance and to estimate the welfare gains from such insurance, the study undertook a thought experiment and a field experiment targeting farmers in Burkina Faso and Senegal. The thought experiment is built around a model of farmer behavior that imagines a farmer who faces multiple risks but can choose from three financial instruments: interest bearing savings, weather insurance and insured credit. To make the thought experiment realistic, the model

supposes that weather insurance cannot fully insure the farmer because the design of such products is complicated and costly, and idiosyncratic risks, such as health shocks, cannot be priced into the premium for weather insurance. The thought experiment then is to answer how the farmer should choose.

The field experiment offered about 800 farmers and members of either farmers' groups or Rotating Savings and Credit Associations (ROSCAs) in Burkina Faso and Senegal USD 12 which they could keep or 'invest' in one or more of four financial products: (a) weather insurance product to protect against losses to the main crops in Burkina Faso (maize) and Senegal (groundnuts) due to drought; (b) agricultural investment savings at home, involving the farmer earmarking a certain amount of savings to a particular purpose which is stamped and stated on the front of the envelope kept at home; (c) a savings product for agricultural input purchases, where the farmer assigns a certain amount of savings into an envelope that is kept with the treasurer of the ROSCA or farmers' group to which the farmer belongs; and (d) emergency savings managed by the treasurer of the ROSCA or farmers' group to which the participant belongs.

Findings of the study

The study finds that welfare losses following a shock (that is, ex-post welfare losses) are large. While around 20 percent of the children in the sample are stunted or underweight, we estimate that around one-third of the children in our sample face a 50 percent chance of falling into malnutrition in the near future, as a consequence of exposure to weather shocks. The spatial variation of the fraction of children who would be considered vulnerable in each cluster is shown in the map in figure 12.2. The spatial map of vulnerability to malnutrition indicates substantial, but not perfect, overlap between clusters that are highly vulnerable to stunting and those with a high prevalence of underweight (the short run malnutrition measure) children. This is especially the case in the clusters in north-central Nigeria, and eastern Burkina Faso.

High levels of vulnerability in the Sahel are typically attributed to lack of resilience, and our study shows that indeed levels of resilience are low and vulnerability high.

Figure 12.2: Cluster Level Vulnerability Maps, Height-for-Age (left) and Weight-for-Age (right)
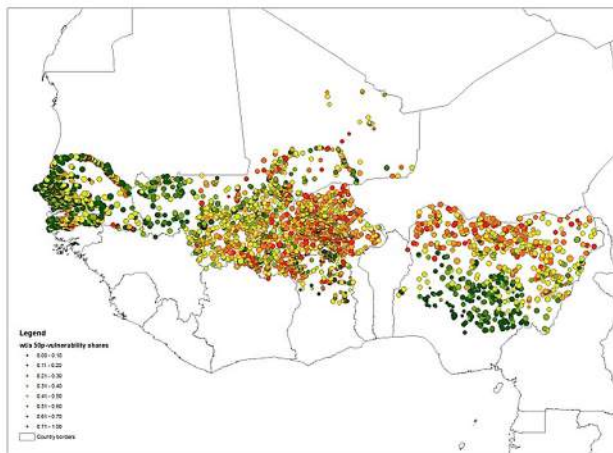
a. Height for Age
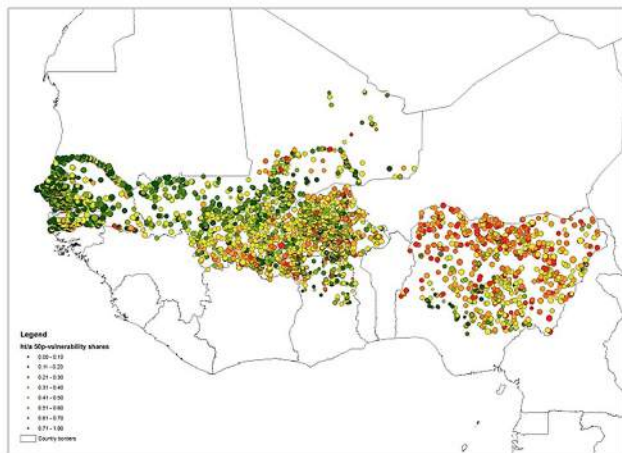
b. Weight for Age

Source: Authors' calculation using DHS (various), NDVI and TRMM

A simple measure of resilience, which contrasts a household's current consumption to its long run potential income, shows that only about one in three households in the Sahel can be considered resilient. However, the fraction differs from country to country. It ranges from 19 percent in Niger to 35 percent in Burkina Faso and northern Nigeria. Given the high risk context, the elevated levels of vulnerability and lack of resilience that the shocks induce, we would expect that households, and particularly farmers, would have high demand for insurance to protect against health, weather and crop losses.

Demand for insurance is high and it improves welfare

The field experiment indeed confirms that there is a high demand for insurance. All individuals who were offered either weather insurance or high-commitment investment savings invested a positive amount. For those offered low investment savings, only one person did not invest positive amounts, and just 4 percent of individuals did not invest in emergency savings. The evidence also suggests that amounts invested were higher in Burkina Faso. The experimental results also suggest that insurance was more effective at encouraging agricultural investments than savings. Increased insurance purchases resulted in higher levels of input spending and fertilizer use, and the increased spending on inputs resulted in higher yields.

Those offered insurance also consumed more meat, fish and rice one month after the experiments than those offered savings instruments. But this difference is, in part, driven by the fact that those offered insurance invested less of the money they received in paying for insurance, and this allowed them to take home more unrestricted cash than individuals offered savings. They then used the unrestricted money they took home for more consumption). As a result, those offered insurance were better able to manage shocks that had occurred, 4 percentage points more than the control group, consistent with the finding that these individuals produced more on average and had more savings.

Second, the structural model suggests that poor farmers would gain more from the introduction of financial instruments, except for savings. For both weather insurance and credit, the welfare gains are larger at the lower end of wealth distribution. However, the results from the field experiment show that there was no difference between treatment groups on the broader welfare outcomes such as consumption, food security or consumption of luxury items such as meats, fish, rice, and onions. Any differences in these welfare levels were observed only a month after the experiment began.

Third, there were significant differences in gender preferences for these financial products. Men invested more in

weather insurance than women, while women invested more in emergency savings (figure 12.3). The difference in investments in insurance between men and women holds even after controlling for access to informal insurance, amount of land cultivated, the type of crops grown, the implicit price of insurance product, and time the product was offered relative to the start of the planting season. The finding that men tend to invest more in the weather insurance product while women tend to invest more in the emergency savings product, may reflect vulnerability to different types of risks across gender such as men typically being more exposed to agricultural shocks and women being more exposed to health- and children-related shocks. This suggests that the benefit of a wide scale rollout of voluntary insurance is likely to benefit men more than women. Across countries, participants in Burkina Faso were more likely to invest in the weather insurance product as well as in both high-commitment savings products – agricultural investment and emergency.

Figure 12.3: **Differences in Demand Across Male and Female Farmers**
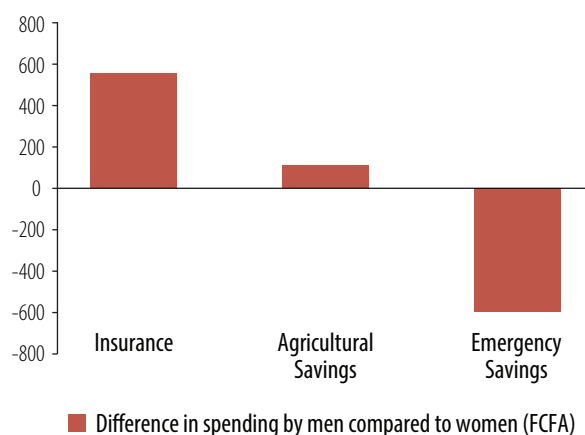
Source: Delavallade, Clara, Felipe Dizon, Ruth Vargas Hill, Jean Paul Petraud, 2015.

Fourth, although commitment was valued by farmers — evidenced by the fact that the amount of money spent on savings products was, on average, twice as high as that spent on insurance products (even when the inter-est rate was zero) — farmers preferred savings products that they believed gave them more flexibility. Savings were lower in products that were perceived to be more flexible. Finally, although smaller amounts were saved in savings instruments that were perceived to have higher commitment, these instruments were marginally more effective at encouraging agricultural investments when compared to the other savings products.

Policy implications

First, substantial protection will come from widely shared economic growth. Second, scaling up modern safety nets, which are recent but expanding in the region, should provide substantial relief to a fraction of the population in coming years. At present, these new programs are in pilot stages and the most advanced (Niger) is about two years old. Therefore, it will be a while before these programs mature and deliver protection that has impact. Nonetheless, it is still important to implement and scale up these programs. Third, given the size of the extremely poor and non-resilient populations, safety nets will not be enough. The fraction of the population that is estimated to be chronically poor is more than one-third, and at least an additional one-third is estimated as non-resilient. Therefore, to expand protection to a wider group and make it robust, this report argues for a major role for the development of inclusive financial markets. At present, no more than 10 percent of the households say they use credit or insurance to protect against the downside of shocks. However, as the field experiment demonstrated, there is a high demand for financial products which, when offered, were used by households to make investments and protect themselves effectively against shocks. Therefore, there is untapped potential for these products to be part of the instruments for protection of households in the region. Finally, for these products to expand demand and appeal to a larger population, it is important that they be flexible – that is, build in commitment, which people value, but do not make the commitments too stringent. Moreover, beware of gender specificity of risks, and be creative with pricing, including potentially offering discounts to the poor.

1   For more details see: Andrew Dabalen, Francesca de Nicola, Ruth Hill and Vasco Molin, 2015, "Vulnerability and Resilience in the Sahel," World Bank, Washington D.C.; Federica Alfani, A. Dabalen, P.F. Fisker and Vasco Molini, 2015, "Can We Measure Resilience? A Proposed Method and Application to West African Sahel," Policy Research Working Paper, No. 7170, World Bank, Washington, D.C.; Federica Alfani, A. Dabalen, P.F. Fisker and Vasco Molini, 2015b, "Vulnerability to Malnutrition in the West African Sahel," Policy Research Working Paper, No. 7171, World Bank, Washington, D.C.; Clara Delavallade, Felipe Dizon, Ruth Vargas Hill, Jean Paul Petraud, "Managing Risk with Insurance and Savings: Experimental Evidence for Male and Female Farm Managers in the Sahel," Policy Research Working Paper, No. 7176, World Bank, Washington, D.C.; Francesca De Nicola, 2015, "Handling the Weather: Insurance, Savings, and Credit in West Africa," Policy Research Working Paper, No. 7187; World Bank, Washington, D.C.

13 Municipal Information and Communications Technology Capacity and Its Impact on the Urban Poor Affected by Climate Change

By Gaurav Relhan

Introduction

After the end of the civil war in 1992, Mozambique posted an average annual growth rate of 8 percent between 1996 and 2008. The country's poverty headcount fell by 15 percentage points between 1997 and 2003, bringing almost 3 million people out of extreme poverty. However, annual per capita income was still only U$330 in 2007 and 54 percent of Mozambicans still live below the poverty line.

Political stability, increased privatization, and a deregulation of markets have sparked surging capital growth in non-agricultural sectors, causing a rapid expansion of cities across the country. Urbanization in Mozambique is increasing at roughly 4.5 percent annually, with cities now housing almost 20 percent of the country's population and contributing almost 75 percent to its gross domestic product (GDP). Approximately 3.5 million people live in 10 of Mozambique's coastal cities, and 70 percent of those live in the cities of the Maputo metropolitan area, Beira and Nacala.

Although urbanization is transforming the city centers into drivers of economic growth, the concentration of population in Mozambique's coastal cities poses a risk, as the country has been susceptible to recurring floods. A major disaster has struck Mozambique every five years, translating to an average loss of GDP growth of 1 percent per year. During the past 50 years, the country has experienced more than 68 natural disasters, which have caused the deaths of more than 100,000 people and affected as many as 28 million people.

The urban poor are the most vulnerable to climate-related disasters. At least 70 percent of the urban populations of eight of Mozambique's cities live in informal settlements. A majority of these settlements lack drainage systems and have poor access to roads, schools, and hospitals (map 13.1).

Map 13.1: GIS Maps of Maputo: Location of Drainage and Sanitation Networks
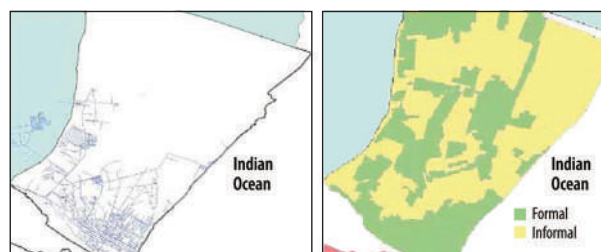
While heavy rainfall is the cause for flooding in Mozambique, it is exacerbated by poor drainage systems, wind-driven tidal surges, seawater intrusion, and upstream dam releases on the many rivers that flow through and near these cities. National flood response is coordinated through an inverted pyramid of increasingly well-resourced public agencies.[1] As a flooding increases in magnitude, disaster management moves from municipal agencies to regional and finally national agencies if necessary.

Several information and communications technology (ICT) projects have been launched to improve planning, targeting of poverty reduction strategies, and effective prevention responses in cases of urban disasters. This study explores the integration and effectiveness of ICT at the local government level in reducing vulnerability to climate change disasters and flooding in Mozambique. The study seeks to assess whether municipal ICT growth is having an equitable impact on the urban poor; the effectiveness of local government-level ICT in enhancing urban climate resilience in the country; and what policy reform is needed to bridge any digital divides.

What ICT Tools Can Be Used for Climate Change?

Four types of ICT tools are commonly adopted by local governments worldwide: Geographic Information Systems (GIS), e-governance, wireless communications, and early warning systems (EWS), including telemetry.

Geographic Information Systems

GIS allow the viewing, understanding, interpreting, and visualizing of data in ways that reveal relationships, patterns, and trends in the form of maps, reports, and charts. In its simplest form, a GIS system can be thought of as a digital map that contains a database of valuable information embedded within it. In the context of urban flood-risk reduction, GIS can furnish municipal officials and relief agencies with in-depth clues on the location of the most at-risk residents based on the low-lying topography of their settlements, their type of housing structures, their proximity to drainage systems and canals, and so on.

E-Governance

E-governance encompasses computerization and Internet-based sharing of information by governments to improve efficiency, accuracy, reliability, and transparency in government services. By eliminating intermediaries and simplifying government-to-government, government-to-citizen, and government-to-business transactions, making them more accessible to a wider audience, e-governance reduces opportunities for corruption by supporting transparency and accountability measures.

E-governance tools such as E-Land Planning and E-Registration are used for various land and building management purposes, such as the issuance of construction licenses, land titling and registration, and land purchases. Often, these tools automatically perform functions such as validation of plot topography (to check flooding susceptibility), violation of environmental regulations, and so on, before granting any certification. Therefore, by curbing unauthorized construction on low-lying plots or the illegal sale of flood-prone plots, e-governance tools can reduce the vulnerability of cities and communities to flooding.

Wireless Communications

Wireless technology, such as text messaging (SMS), is often used during emergencies by local governments to convey messages to citizens, and also to enable citizens to send instant messages to emergency centers or local authorities.

Early Warning Systems

EWS, involving the use of technology such as telemetry (also known as Supervisory Control and Data Acquisition or SCADA), precipitation simulation software, and sensor-induced alarm mechanisms, can help prevent the loss of lives by forecasting in advance upcoming floods, typhoons, landslides, tsunamis, and other associated disasters. Such systems provide timely estimates of the potential risk faced by communities, economies, and the environment through their monitoring and predicting capabilities. EWS systems are often applied to make automated measurements of changing data, such as river and drainage levels and atmospheric conditions, which could lead to prediction of natural disasters with a high degree of accuracy.

Data and Methodology

To assess the current status of ICT adoption toward enhancing urban climate resilience, existing ICT capabilities (overall government information technology (IT) infrastructure, GIS, e-governance, wireless communications, and early warning systems) were surveyed in eight coastal cities of Mozambique: Maputo, Matola, Beira, Pemba, Xai-Xai, Chibuto, Macia, and Manhica.

The quality of IT infrastructure was measured by assessing parameters related to the number of functional computer systems installed in municipalities, the speed of Internet connections, the general IT skill level of municipal officials, the technical support available from the local community (needed to ensure that the infrastructure can be sustainably used and maintained), and so forth.

To measure the use and application of GIS, identification and quality assessment of the following features was performed: depiction of vulnerable communities, topography, drainage systems, road networks, and hospital and

emergency centers. The level and quality of these features on the GIS digital maps was also assessed.

Each municipality was surveyed to assess the respective capabilities of its installed e-governance systems, and to analyze whether any of them helped enhance urban climate resistance. Further, the study used two separate electronic applications: SIGEM in Maputo and LIMS in Pemba.

SIGEM is a GIS-based, e-governance municipal system that involves geo-referenced digital maps and a networked software platform capable of producing a variety of analyses and images. Data in the system have been populated by integrating and updating the existing data sets at different institutions. SIGEM currently pertains to the management of formalized areas only. However, it lacks any capability for measuring the susceptibility of land plots to natural disaster while reviewing and issuing land titles or construction licenses.

LIMS is a type of cadastre system that commonly tracks land ownership, boundaries, and adjacent landmarks and often includes land use information. This information can be crucial as a fundamental source of data on land disputes and lawsuits over land ownership. Other benefits of LIMS include: (i) improved quality of rural and urban planning, (ii) establishment of a transparent backlog of land management decisions, and (iii) improved revenue collection at the provincial, district, and municipal levels.

As of 2011, at least 85 percent of all urban denizens in Mozambique had access to a mobile telephone, with mobile coverage extending to most urban regions and surrounding areas. Departments of public relations and communications in each city were assessed to identify any collaborative arrangements they had with mobile phone operators and radio channels, and to assess the medium they used to collaborate with disaster-response agencies. Adoption of any relevant mobile phone–based solution was also surveyed in the municipalities.

This study assessed the available ICT-based EWS capacity that the National Institute of Meteorology) might have, as well as the capacity wielded by the three regional water authorities under whose purview the surveyed cities fell. In addition, the study surveyed each city's capabilities in

the form of sensors or telemetry systems installed in or along its associated hydrological bodies, such as coastlines, rivers, and drainage.

Results

To synthesize the overall level of ICT impact on urban climate resilience for each city, the study quantifies the broad ratings of "low," "moderate," and "high" impact so that a mean rating can be calculated. This quantification is also necessary to calculate an overall rating for impact on the urban poor. The method chosen was to assign a numerical scale from 0 to 10 for climate resilience and from −2 to 4 for impact on the poor. In annex table 37, the overall scorecard for each city is outlined. Maputo enjoys a far higher level of effectiveness in its ICT impact on climate resilience than any other city, and seven times higher than the effectiveness currently experienced in Pemba, which ranks at the bottom (21 versus 3) in this cluster of cities. Matola and Xai-Xai rank in the middle in this evaluation. The rankings demonstrate that the local governments of the more economically advanced cities possess higher potential to harness ICT toward better urban development and planning.

As was expectedly, bigger municipalities have greater resources at hand to upgrade their capabilities. However, the distribution of ICT impact tends to be more equal or even higher for the poor in the smaller and less prosperous cities, such as Pemba and Xai-Xai, than in the economically most significant ones. These results indicate that the introduction of ICT at the local government level in Mozambique is creating a regional-level digital divide, one in which the southern region is more advanced than the central and northern regions in terms of ICT capability. Political economy factors may be compelling institutions to leverage ICT to target different population segments based on a region's socioeconomic conditions.

Further, the introduction of ICT is creating a community-level digital divide in which the poor in smaller, less advanced cities tend to be more favorably impacted by the harnessing of any ICT at the local-government level, compared with the poor in richer cities. This second pattern might be attributable to the fact that smaller cities simply host a greater proportion of underprivileged

communities, or perhaps to the fact that the economic gap between the relatively better-off and the poor is not as pronounced in these smaller cities vis-à-vis bigger metropolitan areas, implying that any ICT intervention will impact the poor more.

Policy Recommendations

This study's analysis of ICT impact on climate resilience for the urban poor highlights a growing digital divide between cities and communities. Narrowing that divide will involve an overhaul of processes and culture, such that institutional ICT systems function as planned and are regarded as integral "go to" mechanisms by the intended population segments. This overhaul could be achieved in several steps: first, integrating citizens' voice in ICT interventions; then leveraging community-government-driven collaboration, such as crowd-source-based geo-mapping mechanisms; and finally, modifying the government's ICT policy to increase access to technology and the Internet, cultivate institutional commitment and culture for ICT growth, and empower social intermediaries.

Conclusion

The adoption of complex new products and services in public sector institutions of countries where subsistence lifestyles and widespread poverty are still common raises the question, whether rapid ICT adoption might be causing as much harm as good if it leaves the bulk of citizens untouched or isolated by a digital divide. The findings from this study suggest that within the framework of leveraging ICT for public sector reform in Mozambique, differences in municipal resources and governance structures have led to a situation where ICT capabilities have been better developed in the cities that are of greatest economic significance, and least developed in cities where economic output is smallest. But, significantly, the digital divide in the impact of ICT appears to be widest in the better-equipped, wealthiest cities, and narrowest in the lower capacity, smaller ones. However, with the right policy reforms, improving demand-side governance, working with local communities, and improving access to the Internet and technology, ICT can be evenly phased into disaster response tools across Mozambique.

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1   The National Disaster Management Institute (INGC), for disaster response; National Institute of Meteorology (INAM), for forecasting; Regional Water Authorities (ARA), for water control and management; the National Directorate of Water (DNA), for hydro-meteorological management; National Emergency Operations Center (CENOI), for response coordination.

14 Challenges and Opportunities of Mobile Phone-Based Data Collection: Evidence from South Sudan

By Gabriel Demombynes, Paul Gubbins & Alessandro Romeo

Objective

Between 2005 and 2011, mobile cellular subscriptions in Africa increased from 87 million to 433 million. Accompanying this growth, there has been a proliferation of mobile applications, including digital money transfers and payments, citizen polling surveillance, remote health care consultation and diagnosis, and transmission of timely market information to farmers. This study examined the opportunities and challenges of using mobile phones as a research tool, based on the experience of the South Sudan Experimental Phone Survey (SSEP).

South Sudan Experimental Phone Survey

In early 2010, South Sudan was a year away from independence and there was a need for comprehensive baseline data that could inform future policy. Given the nation's poor infrastructure, limited road network, and high transportation costs, mobile phones were a cost-effective solution to collecting high-frequency data. Mobile ownership per household in South Sudan increased from 2 percent in 2006 to 18 percent in 2010, with urban households having two phones on average.

Methodology

A sample of households in urban centers in South Sudan was given mobile phones, whether they had previously owned a phone or not. Participants were called once a month for four consecutive months and asked questions. Upon completion of the survey, the participants were distributed airtime credit. The participants can be split into four categories: those who received a Nokia phone and SSP 5 of credit, a Nokia phone and SSP 10 of credit, a solar-rechargeable phone and SSP 5 of credit, and a solar-rechargeable phone and SSP 10 of airtime credit.

Results

Overall, the response rate declined from 68 percent during the first round of the survey (December 2010), to 52 percent in round 4 (figure 14.1).

Respondents can be categorized into four response categories: "full compliers," who completed all four rounds of the survey; "intermittent compliers," who completed between one and three surveys intermittently; "drop-outs," who dropped out after successful completion of one or more surveys; and "non-compliers," who did not complete a single survey.

Figure 14.1: Response Rates by Month, Type of Phone, and Incentive
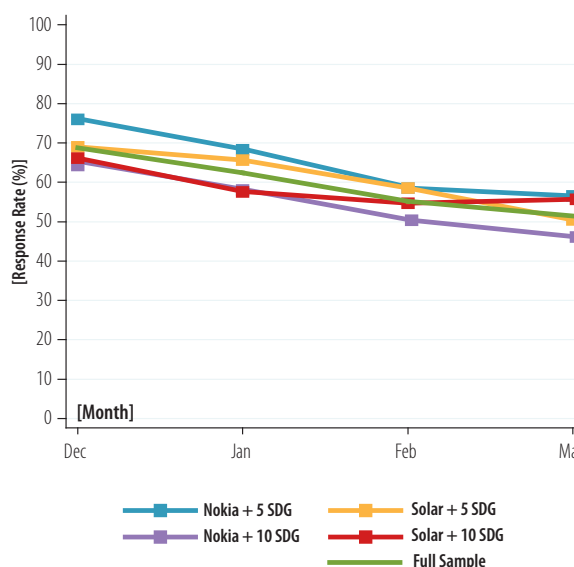
Approximately 17 percent of the sample were non-compliers, while 31 percent were full compliers. Approximately half of all households (52 percent) completed between one and three surveys over the data collection period. Of these households, close to half (24 percent of the sample) dropped out after at least one successfully completed interview, 7 percent after round 1, 6 percent after round 2, and 10 percent after round 3.

Of respondents who received Nokia phones, those offered the SSP 10 credit were about 10 percent less likely in each round to complete the survey compared with respondents offered the SSP 5 credit. There was not a similar pattern among respondents using solar-rechargeable phones. Nokia and solar phone users completed surveys with the same frequency: among 4,028 possible completed surveys across all four survey rounds, the overall response rate for users of both phones was 59 percent. This suggests that the constraint of having to charge the Nokia phone using an electrical outlet did not influence survey completion.
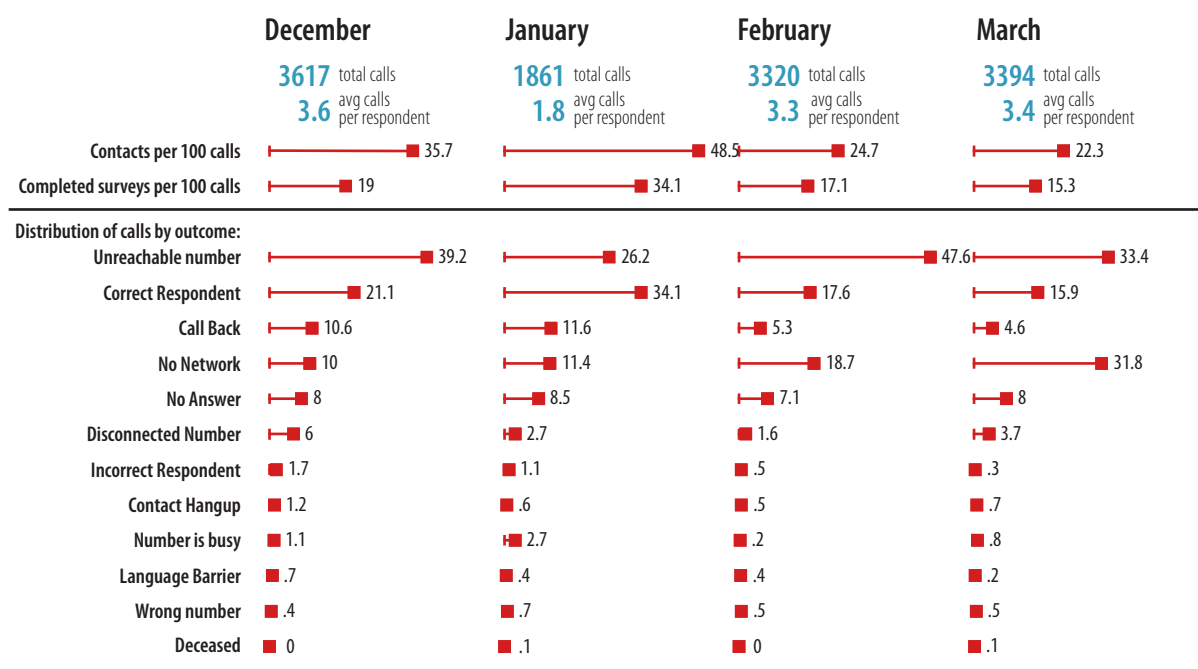
Three prohibit regressions were used to distinguish factors associated with successful completion of the survey. Participants who completed all four survey rounds were more likely to be over age 30 years and more likely to have access to an alternative phone. Gender, the type of phone, and the incentive value were not associated with the probability that a respondent would complete all four rounds of the survey. The very strong geographical pattern associated with completing all four survey rounds suggests that the differential reliability of network coverage across the 10 urban centers was a strong determinant of response rates. Poverty status was not associated with survey completion. Participants who did not complete a single survey were less likely to be female, less likely to have access to an alternative phone, and more likely to have been offered a pre-paid credit of SSP 10.

Challenges

Major challenges related to reaching the correct respondent involved an unreachable number (37 percent of calls) and no network coverage (18 percent). Problems with the network increased over the course of the four month period, peaking at 32 percent of all dialed numbers in March. Calls to Bentiu and Torit in December and January, and to Aweil and Bor in March were cited as being particularly and consistently problematic because of poor network connectivity. The fraction of unreachable numbers was especially high in February, when 47 percent of all dialed numbers were unreachable (figure 14.2). In addition, the call center reported that respondents complained about faulty batteries (solar phones) and the cost of recharging batteries (Nokia phones).

Figure 14.2: Calling Efficiency by Indicator

	December	January	February	March
	3617 total calls	**1861** total calls	**3320** total calls	**3394** total calls
	3.6 avg calls per respondent	**1.8** avg calls per respondent	**3.3** avg calls per respondent	**3.4** avg calls per respondent
Contacts per 100 calls	35.7	48.5 / 24.7		22.3
Completed surveys per 100 calls	19	34.1	17.1	15.3
Distribution of calls by outcome:				
Unreachable number	39.2	26.2	47.6 / 33.4	
Correct Respondent	21.1	34.1	17.6	15.9
Call Back	10.6	11.6	5.3	4.6
No Network	10	11.4	18.7	31.8
No Answer	8	8.5	7.1	8
Disconnected Number	6	2.7	1.6	3.7
Incorrect Respondent	1.7	1.1	.5	.3
Contact Hangup	1.2	.6	.5	.7
Number is busy	1.1	2.7	.2	.8
Language Barrier	.7	.4	.4	.2
Wrong number	.4	.7	.5	.5
Deceased	0	.1	0	.1

Other challenges with survey implementation were related to content. Respondents were wary of questions focused on governance and leadership, and needed reassurance on confidentiality. Questions on food security, access to medicines and health care, frequency of illness, and personal security yielded consistent response patterns.

Recommendations

Future studies using mobile data collection might mitigate non-response by:

1. Sending simple reminders (possibly using text messages (SMS)) to reduce the number of intermittent compliers.

2. Targeting older, female household members could reduce the number of non-compliers, but such targeting would not be desirable for surveys seeking a representative sample of individuals, for example, labor force surveys.

3. Having multiple options to call respondents by recording an alternative contact number (on a different mobile network), to reduce disruption caused by network coverage.

In addition, it was noticed that larger incentives in the form of pre-paid calling credit did not work to encourage survey completion. In fact, participation rates were slightly lower for those who received the greater incentive.

Finally, partnering with the national statistics bureau for accurate sampling and implementation of the survey was critical to the success of the SSEP project.

Annex

Table 1: Knowledge of correct fees and procedures

	Mean	N
Trader must pay for jeton	0.18	66
Trader must pay for document simplified declaration	0.08	65
Trader must pay import taxes	0.03	66
Trader must pay for quality control service	0	66
Trader must pay for sanitation control service	0	66

Table 2: Poverty headcount in tourism, agriculture, and fisheries, 2010

	All	Tourism	Agriculture	Fishing
Praia	12	9	20	22
Santiago	28	14	45	35
Santo Antão	41	23	48	39
São Vicente	17	15	29	26
Fogo	40	19	51	53
San Nicolau	21	12	20	37
Sal	10	8	16	18
Boa Vista	11	9	8	10
Maio	21	9	22	26
Brava	38	23	41	44
National	27	12	44	35

Table 4: Share of local sourcing of fresh food and vegetables (FFV) and fish

Island	Type of Accommodation	% Local Sourcing	
		FFV	Fish
Sal	Upmarket, Large AI	0	3
	Small B&B Hotel	50	100
Boa Vista	Large AI	0	0
	Medium AI	20	100
Fogo	Small Hotel	25	100
	Upmarket B&B	50	100
Santo Antão	Medium Hotel	60	100
	Small Hotel	100	100

POVERTY
AND SOCIAL
IMPACT
ANALYSIS (PSIA)

WORLD BANK GROUP