Introduction

Water and sanitation issues affect all Ugandans and every sector of the economy. The benefits of safe drinking water supplies, sanitation, and hygiene are clear and well acknowledged by Uganda's decision-makers (see Box 1). They include improved health, lower mortality rates (especially for infants), improved livelihoods, and higher educational achievement, particularly for women and children. These benefits are not only worthy goals in themselves, but are an essential means of reducing poverty and achieving sustained economic growth (WHO, 2001).

Why Mapping Matters

A primary challenge for government agencies working on water and sanitation issues is that planning and implementing effective interventions requires coordination among multiple actors within and outside government and across many sectors (see Box 2). Most of these agencies are faced with the additional challenge of tying their water and sanitation interventions to poverty reduction efforts. This involves even more stakeholders and coordination across the myriad of plans and policies introduced to deal with poverty reduction, improved drinking water supply, sanitation, and hygiene.

Box 1 WATER SUPPLY, SANITATION, AND HYGIENE: THE LINKS TO HEALTH, LIVELIHOODS, AND EDUCATION

Links to Health

Epidemiological studies for many countries have documented the links between health benefits and the supply of sufficient quantities of clean water, investments in adequate sanitation facilities, and widespread adoption of appropriate hygiene practices (Esrey et al., 1991; Esrey, 1996; Hutley et al., 1997; WSSCC and WHO, 2005). Improving water supply, sanitation, and hygiene is therefore central to Uganda's successful development.

Consumption of contaminated water, for example, has led to outbreaks of typhoid, cholera, dysentery, hepatitis, and guinea worm. Water-related diseases directly caused roughly 8 percent of Ugandan deaths in 2002 (WHO, 2006). In some districts, cholera has become an endemic disease (WHO, 2001-2004; MoH, 2005b; MoH, 2008a).

Unclean water can be especially deadly for infants and young children. Diarrheal diseases are a major killer and were responsible for 17 percent of all deaths of children under 5 years in the country (WHO, 2006). Studies have also documented the links between lack of sanitation and clean water, and child malnutrition--leading to long-term health impacts (Checkley et al., 2003; Checkley et al., 2004).

Inadequate volumes of water result in poor hygiene practices, which in turn increase the risk of disease. Average rural water consumption, for example, ranges from 12 to 14 liters per person per day, significantly lower than the national target of 20 liters per person per day (MFPED, 2004). The risk of disease is even higher with poor hygiene and if soap isn't used for handwashing. Simply washing one's hands cuts the risk of diarrhea in half (MWE, 2007).

Proper sanitation prevents drinking water contamination and the spread of diseases. For example, shallow, uncovered latrines can easily overflow during rain and mix with drinking water. Human waste, if not disposed of correctly, also attracts flies that spread diseases. Poor sanitation also results in increased illness which in turn impacts livelihoods and economic development.

Links to Livelihoods and Educational Attainment

Limited access to clean water, poor sanitation facilities, and inadequate hygiene also affect livelihoods and educational attainments. Since lack of clean water leads to poor health, it in turn reduces a family's ability to work, decreasing family income and increasing health expenditures. Death of the main income earner can plunge a family into poverty. Even barring death, inadequate sanitation hurts a country's economic activity. In Uganda, 9 percent of the population reported falling ill from diarrhea in 2005/06, more than twice the rate in 2002/03 (4 percent). Among the people suffering from diarrhea, 82 percent lost up to one week of productive time (UBOS, 2006a).

When fresh water is not readily available it increases the time burden on family members responsible for water collection. The average Ugandan spends 28 minutes collecting the family's drinking water, but there are large variations between regions (10 minutes in Kampala versus 58 minutes in the Northern Region) (UBOS, 2006a). This time could be spent on other productive endeavors. In some regions, this has negative effects on education, since children bear much of the burden of collecting water for the family.

Inadequate sanitation also impacts educational attainment. Lack of sanitation facilities or inappropriate construction of these facilities (such as not providing sufficient privacy) has resulted in higher dropout rates of adolescent girls in primary schools (Asingwire and Muhangi, 2001).

Box 2 WATER, SANITATION, AND HYGIENE EFFORTS: KEY PLAYERS

Institution	Role
Ministry of Water and Environment	Policy formulation, setting standards, strategic planning, coordination, quality assurance, provision of technical assistance, and capacity building.
Directorate of Water Resources Management (DWRM)	Responsible for managing, monitoring and regulating water resources through issuing water use, abstraction, and wastewater discharge permits.
Directorate of Water Development (DWD)	Lead agency responsible for providing technical oversight for the planning, implementation, and supervision of the delivery of urban and rural water and sanitation services (including water for production). Provides capacity development and other support services to local governments and other water supply service providers.
National Water and Sewerage Corporation (NWSC)	Autonomous entity responsible for the delivery of water supply and sewerage services in the major towns and large urban centers.
Ministry of Finance, Planning and Economic Development	Mobilization and allocation of financial resources including coordination of donor inputs and the privatization process.
Ministry of Local Government	Establish, develop, and facilitate the management of efficient and effective decentralized government systems capable of delivering the required services.
Ministry of Health	Promotion of hygiene and household sanitation.
Ministry of Education and Sports	Promotion of sanitation and hygiene education in schools.
Ministry of Gender, Labor and Social Development	Coordination of gender-responsive development and community mobilization.
Ministry of Agriculture, Animal Industries and Fisheries	Planning, coordination, and implementation of all agriculture development in the country, including irrigation development, aquaculture, and livestock development.
Local Governments	Provision and management of water and sanitation services in rural areas and urban areas outside the jurisdiction of NWSC, in liaison with DWD.
User Communities	Planning, implementation, and operation and maintenance of the rural water and sanitation facilities. User communities are also obliged to pay for urban water and sanitation services provided by NWSC and other service providers.
Donors	Provide financial resources for implementation of water sector activities.
Private Sector	Valuable resource for design, construction, operation, and maintenance of water and sanitation facilities. Conduct training and capacity building for both central and local government staff. Provision of other commercial services including mobilization of financial resources for water sector development activities.
Nongovernmental Organizations (NGOs) and Community-Based Organizations (CBOs)	Supplement public sector efforts and ensure that concerns of the underprivileged and poor are accounted for. Provide financial and planning support to communities and local governments.

Source: MWE, 2008.

Maps—and the geographic information systems (GIS) that underlie them—are powerful tools for integrating data from various sources and therefore can be the vehicle necessary to overcome these coordination challenges. Maps showing indicators of poverty, drinking water supply, sanitation, and hygiene development can provide decision-makers with a more coherent picture of how poverty reduction, safe drinking water, improved sanitation, and better hygiene are related, leading to more effective plans and interventions (see Box 3 illustrating such use in Kenya). Better and more detailed spatial analyses of water, sanitation, and poverty indicators can be used to examine whether current policies and interventions are targeting the crucial issues and localities. Maps can also be an effective vehicle for communicating to experts across sectors. In addition to informing various government actors, access to improved spatial information can help empower the public to query government priorities, advocate for alternative interventions, and exert pressure for better decision-making.

RATIONALE, APPROACH, AND AUDIENCE

Mapping a Healthier Future results from a partnership of Ugandan and international organizations and compares,

Box 3 WATER, SANITATION, AND POVERTY MAPS IN KENYA

In Kenya, the national Water and Sanitation Programme, a 5-year (2005-2009) US$ 65.5 million effort funded by the Danish and Swedish development agencies Danida and Sida, used poverty maps to reach the most disadvantaged administrative areas. The Programme selected the poorest 362 of 2,500 Locations (an administrative unit with on average 10,000 people in rural areas). Locations were chosen in stakeholder workshops with the help of an index showing the poorest Locations with the lowest water and sanitation coverage. Half of the index value was determined by the poverty level in the Location, using data provided by Kenya's Central Bureau of Statistics and based on the country's poverty map. The other half of the index incorporated indicators of safe drinking water access, sanitation coverage, and past investments. This is the first time a major water program in Kenya has specifically targeted the poorest Locations.

Source: Jorgensen, 2005.

for the first time, new poverty maps with maps of various water and sanitation indicators. By providing illustrative examples of maps that can be developed with these indicators and analyses of what they mean for policy, this report shows decision-makers in the water and health sectors how information on the location and severity of poverty can assist in setting priorities for interventions. Similarly, decision-makers concerned with reducing poverty levels will see how comparing levels of poverty in a given location with maps of access to safe drinking water, enhanced sanitation facilities, hygiene behavior, and other environmental health indicators can help fight poverty. Integration of multiple data sets can also strengthen efforts to promote health. Stand-alone water supply interventions have less impacts on health outcomes than well-coordinated interventions that improve drinking water supply, sanitation infrastructure, and hygiene behavior simultaneously (WSSCC and WHO, 2005). This publication strives to show the kinds of analyses that are possible in the Ugandan water and sanitation sectors in order to encourage other analysts and decision-makers to develop their own poverty, water, and sanitation maps.

Three factors make this an opportune time to use a spatial analysis of poverty, water, and sanitation indicators to help prioritize investments:

1. *Availability of comparable data at subcounty level.* The Directorate of Water Development at the Ministry of Water and Environment has consistently monitored investments in the drinking water infrastructure (and the level of functional water sources) and can now provide suitable indicators for small administrative areas such as subcounties or parishes. The Uganda Bureau of Statistics released poverty data for subcounties in November 2006 and December 2008. It can also supply census data on water, sanitation, and basic necessities (such as clothing, blankets, shoes, soap, and sugar) at the subcounty and even the parish level.
2. *Demand from sector planners.* Commissioners responsible for planning efforts in both the health and water sectors have expressed interest in incorporating poverty data in their planning and regular sector performance reporting.
3. *Impending debate on criteria to allocate District Conditional Grants.* The latest annual Water Sector Performance Reports (MWE, 2007; MWE, 2008) recommend reviewing the allocation formula for District Water and Sanitation Conditional Grants (funds from the Government of Uganda's budget allocated to districts to invest in improved water and sanitation). The reports suggest taking into consideration other criteria such as the needs of the least-served communities and the differences in per capita investment costs of selected locations. The reports also emphasize that districts should address equity issues among subcounties to a greater extent when allocating resources for rural water supplies. Integrated maps such as those introduced in this publication can help supply the information needed to act on these recommendations.

To show that spatial analyses of poverty and environmental health indicators can improve the information and analytical base for decision-making, this report examines the following:

- Access to safe drinking water sources;
- Access to improved sanitation facilities; and
- How combining maps of unsafe drinking water sources, lack of sanitation facilities, and lack of basic necessities such as soap can guide water supply, sanitation, and hygiene behavior interventions.

Maps of the detailed data on safe drinking water access and sanitation facilities are compared to the 2005 poverty maps (the most recent set of maps at subcounty level). These overlay analyses can be used by different decision-makers for the following purposes:

- *Directorate of Water Development (DWD)* and other water sector institutions (both national and local) such as the Water Policy Committee and the Water and Sanitation Sector Working Group to better align investments in the water sector with poverty reduction objectives, such as prioritizing new water infrastructure efforts in high poverty areas so that the employment and income effects from these investments accrue primarily to poorer communities.
- *Ministry of Health (MoH), Directorate of Water Development, and Ministry of Education and Sports* to prioritize efforts to improve sanitation, for example by funding sanitation education campaigns and leveraging resources for improved sanitation in communities with high poverty rates and densities.

- *Ministry of Finance, Planning and Economic Development (MFPED), Budget Monitoring and Accountability Unit*, and other institutions implementing and monitoring Uganda's Poverty Eradication Action Plan (PEAP) and the upcoming National Development Plan to highlight areas of multiple deprivations, such as high rates of monetary poverty, high dependence on unsafe drinking water sources, and high density of households with unsafe sanitation practices; and to locate areas where poverty reduction investments could be aligned with water and sanitation efforts.
- *Local governments and other local actors* such as District Water and Sanitation Committees or Inter-District Coordination Committees to design and implement pro-poor water, sanitation, and hygiene efforts.
- *Civil society groups* to hold decision-makers accountable for better integration of water, sanitation, hygiene, and poverty issues in policy-making.
- *International development cooperation partners* to link poverty interventions with health and water sector interventions and prioritize budget support for the Poverty Action Fund (established to allocate government expenditures directly to poverty-reducing services and priority programs).

POLICY FRAMEWORK FOR WATER, SANITATION, AND HYGIENE INTERVENTIONS

Sectoral policies establish the overall policy framework for specific water, sanitation, and hygiene interventions. Two policies—the National Water Policy and the National Environmental Health Policy—are especially relevant in the context of this publication.

The National Water Policy provides the main framework for improving water supplies. To ensure sustainable management and use of Uganda's water resources, the Policy promotes the principles of integrated water resources management (involving various national and local actors) and emphasizes priority allocation of water for domestic use (MWLE, 1999 cited in UN-WWAP and DWD, 2005). It also highlights the importance of equity issues in water supply services—both from a geographic and income perspective—by promoting the principle of "some for all, rather than all for some"[1] (MWLE, 1999).

The National Environmental Health Policy emphasizes the importance of environmental sanitation, which includes: safe management of human excreta and associated personal hygiene; the safe collection, storage, and use of drinking water; solid waste management; drainage; and protection against disease vectors (MoH, 2005a). Safe disposal of excreta, handwashing, adequate water quantity for personal hygiene, and protecting water quality all influence the morbidity and mortality of diarrheal diseases.

To implement these plans and policies, Uganda's policymakers have established targets for water supply and sanitation coverage for both urban and rural areas. To achieve these targets they have developed very specific sectoral strategies and investment plans. Between 2001 and 2015, Uganda intends to spend approximately US$ 951 million and US$ 481 million for investments in rural and urban areas, respectively (MWE, 2007).

The national targets for water supply and sanitation coverage for 2015 are (MWE, 2008):

- Urban areas: 100 percent safe drinking water coverage (defined as the percentage of the urban population with access to a safe drinking water source within a walking distance of 0.2 km) and 100 percent sanitation coverage (defined as the percentage of the population with sanitation facilities in their place of residence), with at least an 80 percent effective use and functionality of facilities.
- Rural areas: 77 percent safe drinking water coverage (defined as the percentage of the rural population with access to a safe drinking water source within a walking distance of 1.5 km) and 77 percent sanitation coverage (defined as the percentage of the population with sanitation facilities in their place of residence), with at least an 80 percent effective use and functionality of facilities.

Since the early 1990s, Uganda has made significant progress in implementing these policies and plans and has moved closer to its 2015 targets. The Water Sector and Sanitation Performance Report of 2008 (MWE, 2008) put rural access to safe drinking water at 63 percent and urban access at 61 percent in 2007/2008. The percentage of households with access to improved sanitation stood at 62 percent and 74 percent for rural and urban households, respectively, in 2007/2008 (MWE, 2008).

LINKING POVERTY, WATER, AND SANITATION

Poverty can be both a cause and a consequence of poor sanitation and unsafe drinking water sources. Poor families, for example, have limited resources to invest in building adequate sanitation facilities within their homes. In general, government policy considers the construction of sanitation facilities a household responsibility rather than a government obligation. Similarly, poor communities may not have sufficient resources to maintain water and sanitation infrastructures once the original capital investments have been made.

Although the average national safe drinking water coverage rate for rural Uganda is two percentage points higher than in urban areas, rural households do not do as well on other water supply, sanitation, and development indica-

1. Adopted from the 1990 "New Delhi Statement," prepared by 115 countries at the Global Consultation on Safe Water and Sanitation.

Box 4 2005 UGANDA POVERTY MAPS: INDICATORS

Human well-being has many dimensions. Sufficient income to obtain adequate food and shelter is certainly important, but other dimensions of well-being are crucial as well. These include good health, security, social acceptance, access to opportunities, and freedom of choice. Poverty is defined as the lack of these dimensions of well-being (MA, 2005).

The poverty indicators produced by the Uganda Bureau of Statistics (UBOS) are based on household consumption and cover some but not all dimensions of poverty. Consumption expenditures include both food and a range of non-food items such as education, transport, health, and rent. Households are defined as poor when their total expenditures fall below Uganda's rural or urban national poverty lines. These lines equate to a basket of goods and services that meets basic monthly requirements (UBOS and ILRI, 2007).

In 2005, the national poverty line (an average of the poverty lines in Uganda's four regions) was 20,789 Uganda Shillings (US$ 12) per month in rural areas and 22,175 Uganda Shillings (US$ 13) per month in urban settings. With these poverty lines, the 2005 poverty rate (percentage of the population below the poverty line) was 31.1 percent at the national level, translating to about 8.4 million Ugandans in poverty (UBOS, 2006b). Rural and urban poverty rates differed significantly, at 34.2 percent for rural areas and 13.7 percent for urban areas.

tors. Rural households are, on average, poorer than urban households in Uganda (UBOS, 2006a). Rural areas have, on average, less water available for their basic needs than their urban counterparts (MFPED, 2004). Rural Ugandans also walk greater distances to water sources than Ugandans in cities and towns (UBOS, 2006a).

Household survey data for Uganda and neighboring countries show that access to improved water and sanitation is significantly lower for households in the lowest wealth quintile compared to those in the top quintile (Rutstein and Johnson, 2004; UBOS, 2006a). The richest wealth quintile had to travel less far to reach their primary drinking water source as those in the poorest quintile (World Bank, 2005; Sgobbi and Muramira, 2003).

In addition, household surveys continue to cite ill health as the most common cause of poverty (MFPED, 2004). These personal observations are confirmed by studies and are linked to unhygienic water and sanitation conditions (UBOS and Macro, 2007; Rutstein and Johnson, 2004). Poor sanitation coupled with unsafe water sources increases the risk of waterborne diseases and illnesses due to poor hygiene. This has contributed immensely to the disease burden in Uganda. Households without proper toilet facilities are more exposed to the risk of diseases such as dysentery, diarrhea, and typhoid fever than those with improved sanitation facilities. It is therefore no surprise that communities interviewed as part of Uganda's participatory poverty assessment listed obtaining a safe drinking water supply as one of their top priorities (MFPED, 2002a).

These links between water, sanitation, and poverty have been recognized in Ugandan national development policies. The overall national framework for poverty eradication, the Poverty Eradication Action Plan (PEAP), acknowledges the multiple dimensions of poverty and highlights the links between water, sanitation, and poverty reduction efforts. It gives prominence to water resource management and water for production (for agriculture, industry, energy, etc.) in the chapter dealing with enhancing production, competitiveness, and incomes. It also highlights water supply and sanitation in the chapter on human development. All of Uganda's sectoral plans, strategies, and policies have been attuned to the PEAP since its conception in 1997.

As a result of the PEAP and the second Uganda Participatory Poverty Assessment Process (UPPAP), the government and its development partners have made large investments in the water sector, with an emphasis on improving safe drinking water supplies. By making higher investments in rural areas—which were underserved and had a higher poverty rate—significant pro-poor benefits were achieved between 1992 and 2002 (Rudaheranwa et al., 2003; World Bank, 2005).

New Poverty Maps for Better Targeting

Future pro-poor benefits from water and sanitation investments will require more detailed poverty information that goes beyond rural-urban estimates and highly aggregated district-level averages. This is where maps, such as those introduced in this publication, can be helpful to decision-makers. Information on the location of poor communities is especially important, because targeting poor communities with more coordinated water and sanitation investments can greatly improve household health while keeping implementation costs at a reasonable level (World Bank, 2008).

In addition, precision in identifying poor communities needs to improve because of the following factors:

- Unit costs of drinking water investments per person in rural areas have increased significantly over the past five years. (Many investments in easily achievable low-cost options have already been made.) (MWE, 2008).
- Fiscal constraints in the national budget and other funding sources indicate a shortfall in resources to implement the 2001-2015 sector investment plans, hence a need to prioritize investments, for example in areas with the largest potential gain in safe drinking water coverage rates per unit of investment (MFPED, 2004).

- Equity in water and sanitation investments is an important goal: as they strive to meet the national target of 77 percent safe drinking water coverage for rural areas in 2015, decision-makers want to ensure that coverage is evenly distributed among different wealth classes and does not disproportionately favor the better-off households at the expense of the poor.

Until recently, it has been difficult for health and sanitation planners to consider sub-district levels of poverty for small administrative areas in their planning and targeting efforts because reliable statistics from household surveys were only available for regions and districts. To address this lack, the Uganda Bureau of Statistics has produced new poverty maps relying on a statistical estimation technique (small area estimation) that combines information from the national census and household surveys. The first set of maps, for 1999, used detailed poverty data for 320 counties (UBOS and ILRI, 2004). The next set of maps, for 2002, increased the level of spatial resolution to 958 subcounties (UBOS and ILRI, 2007). The latest maps provide data for 2005 and cover all rural subcounties except for those in Kotido, Kaabong, and Abim Districts (UBOS and ILRI, 2008). The 2005 maps were based on the 2002 population and housing census and the 2005/2006 Uganda National Household Survey, which estimated the national poverty rate at 31.1 percent or 8.4 million Ugandans (UBOS, 2006a). Such detailed maps permit more meaningful spatial overlays of poverty metrics and water and sanitation indicators. These spatial comparisons can provide first insights into the relationship between poverty, water supply, and sanitation development in discrete locations—a key to accurate targeting.

Map 1 displays the 2005 poverty rates (defined as the percentage of the population below the poverty line) for rural subcounties. Map 2 shows poverty density (defined as the number of poor persons per square kilometer) for these same subcounties. These two indicators can highlight the geographic distribution of poor communities and the number of poor in a given area. Other measures of poverty, such as the poverty gap (the average distance between expenditures of the poor and the poverty line) and inequality related to household expenditures, are also available at this level of detail but are not presented in this report. (For information on poverty indicators, see Box 4; for a discussion of how poverty rate, poverty density, and the number of poor relate, see Box 5.)

Rural poverty rates in Uganda's subcounties range from less than 15 percent to more than 60 percent of the population. Map 1 shows that subcounties with the highest poverty rates (shaded in dark brown) are located in northern districts such as Amuru, Gulu, Kitgum, Pader, Lira, Moroto, and Nakapiripirit. Low poverty rates (shaded in green) can be found in the southwest and central part of the country (e.g., in parts of Wakiso, Bushenyi, Isingiro, Mbarara, and Kiruhura Districts). The reasons for this spatial pattern are multiple and complex, and include factors such as rainfall and soil quality (which determine an area's agricultural potential), land and labor availability, degree of economic diversification, level of market integration, and issues of security and instability (the latter is especially relevant for the northern parts of Uganda).

As can be seen in Map 2, poverty density often follows a spatial pattern that is distinct from the distribution of poverty rates. In some areas, poverty rates and poverty density

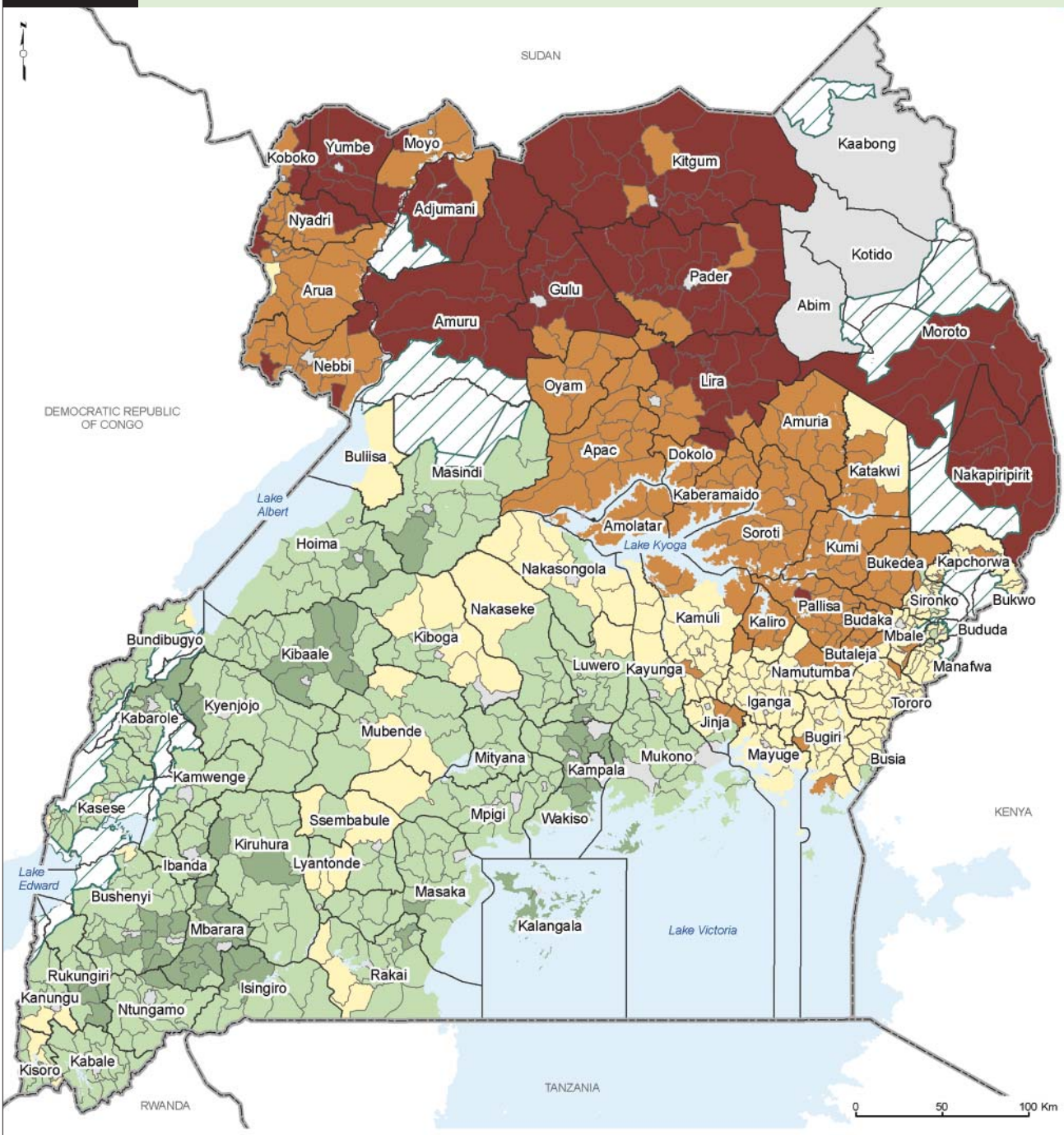
Box 5 MAPPING POVERTY: THE RELATIONSHIP BETWEEN POVERTY RATE, POVERTY DENSITY, AND THE NUMBER OF POOR

Understanding the complementarity between the poverty rate and poverty density is important for designing and implementing pro-poor water and sanitation interventions. Using either the poverty rate or the poverty density alone will likely be ineffective, either missing many poor people or wasting resources on families that are not poor. For example, targeting only subcounties with the highest poverty rates will not reach all or most of Uganda's poor. In densely settled areas, the proportion of the poor relative to the non-poor may be low, but may still represent a large number of poor people. Relying exclusively on poverty rates for targeting would lead to "undercoverage" of the poor in these densely settled areas. On the other hand, providing resources only to areas with the highest poverty densities will bypass the poor in drier and less densely settled areas.

The total number of the poor in a given area is also an important metric. Poverty rate and poverty density measures alone are not sufficient to identify the most promising subcounties for pro-poor targeting. Subcounties may have high poverty rates or high poverty densities but still differ in their total count of poor persons. Two subcounties, for example, could each have a poverty density of 50 poor persons per square kilometer, but only 5,000 poor persons may be living in the 100 square kilometers of the first subcounty versus 50,000 poor persons inhabiting the 1,000 square kilometers of the second subcounty. Examining the total number of poor per subcounty is necessary because Uganda's subcounties differ greatly in population size (ranging from as few as 2,500 to more than 200,000 inhabitants) and in area.

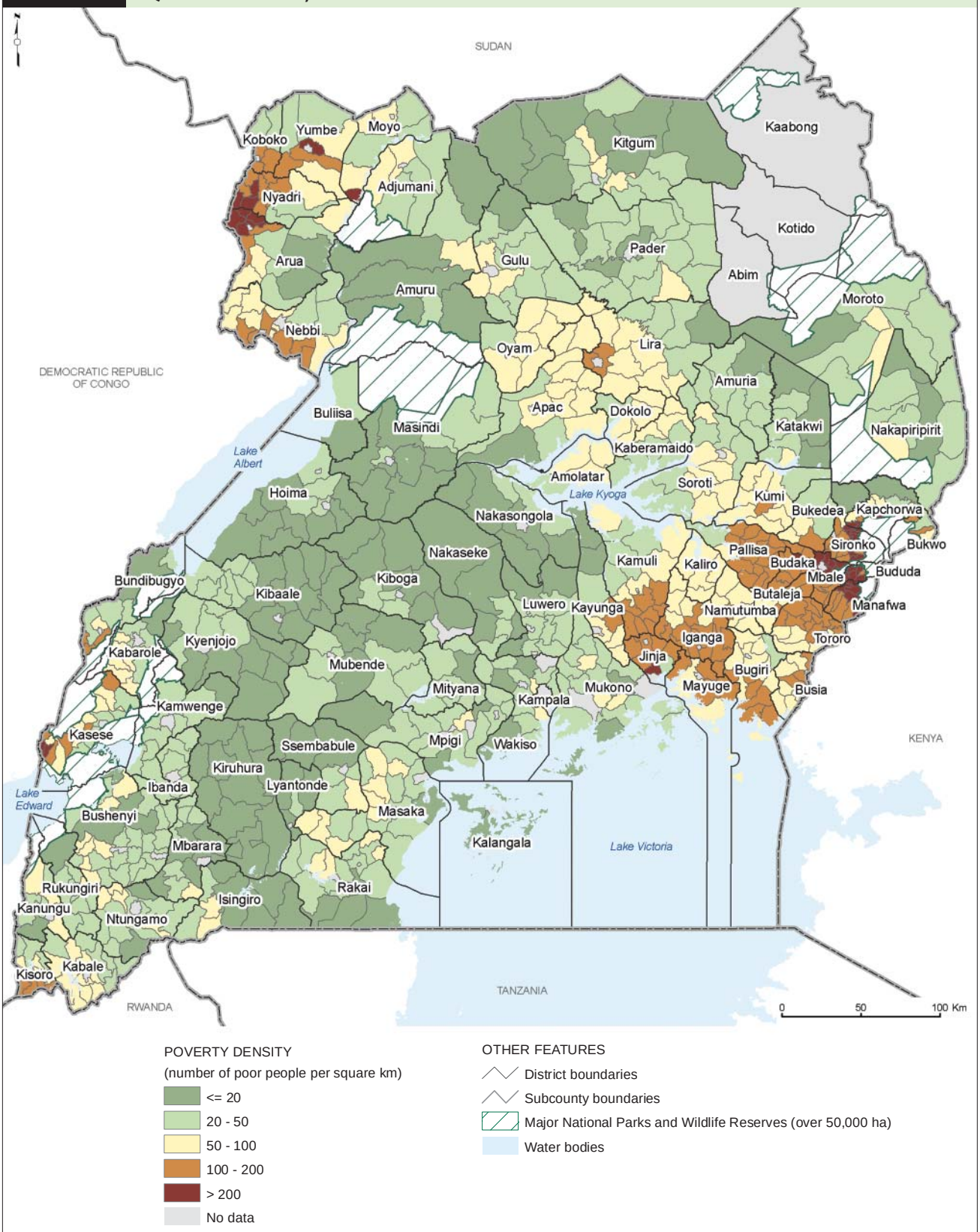
In this publication, these three metrics were selected to portray the geographic distribution of the poor. While there are other useful poverty indicators, these were chosen as a first approximation to show how poor each subcounty is, and where poor households are spatially concentrated. With this information decision-makers can gain first insights to develop more effective support and services for the poor. In most cases, additional analyses using metrics that capture the depth and severity of poverty (e.g., poverty gap and squared poverty gap) and other dimensions of well-being will be needed to better understand poverty patterns and examine cause-and-effect relationships.

Map 1 POVERTY RATE: PERCENTAGE OF RURAL SUBCOUNTY POPULATION BELOW THE POVERTY LINE, 2005



Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006b), subcounty administrative boundaries (UBOS, 2002a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), and rural poverty rate (UBOS and ILRI, 2008).

Map 2 POVERTY DENSITY BY RURAL SUBCOUNTY: NUMBER OF PEOPLE BELOW THE POVERTY LINE PER SQUARE KILOMETER, 2005



Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006b), subcounty administrative boundaries (UBOS, 2002a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), and rural poverty density (UBOS and ILRI, 2008).

increase or decrease in parallel patterns. In other parts of the country they are inversely related.

Poverty density generally is lowest (shaded in dark green) in remote, sparsely populated areas (UBOS, 2007). Many of these areas have drier conditions and lower agroecological endowments. Subcounties with the lowest poverty densities are in the districts of Nakasongola, Nakaseke, Luwero, Kiboga, Ssembabule, Rakai, Kiruhura, and Mbarara, which also exhibit generally low poverty rates in Map 1. Subcounties in parts of Kitgum, Amuru, Pader, and Moroto Districts also show very low numbers of poor per square kilometer, but here poverty rates are among the highest in the country. A selected set of subcounties have both: relatively high poverty rates and high poverty densities (shaded in brown in Map 1 and Map 2). These include subcounties in southeastern Uganda (Pallisa and Budaka Districts) and in northwestern Uganda (Nebbi, Arua, and Nyadri Districts).