Adding Value: Combining Wetland and Poverty Maps with Economic Analysis

The map overlays highlighted in the previous chapter represent only the first step in analyzing the benefits wetlands provide to people in general and to poor communities more specifically. Additional analyses are needed to manage wetlands in a more sustainable manner, identify and plan development interventions better, and target poverty reduction efforts more precisely. Combining three types of data can greatly enhance these analyses: location of specific wetland uses, extent of use, and economic value of use.

To manage wetlands sustainably, it is important to know not only the type and location of each use, but also to track the exact quantity of each product or service obtained from a wetland. This could include the quantity of papyrus harvested, fish caught, water withdrawn, wood collected, fodder obtained, or wastewater filtered. These data can then be compared to the capacity of a wetland to provide these products and services (e.g., regeneration rate of plants, or the total filtering and waste assimilation capacity) to determine a sustainable use pattern.

To identify and plan development interventions better, an analysis of wetland uses needs to identify the beneficiaries (socioeconomic profile of wetland users) and incorporate livelihood perspectives, economic costs, and economic benefits of different wetland uses. Knowing the economic value of these uses enables analysts to calculate the economic returns per area or labor input and to assess their contribution to household incomes. For a wetland product with an existing market, an economist will multiply the quantity of a harvested product by its market price. For a wetland service without an existing market such as water filtration, economists rely on special valuation tools such as the Replacement Cost Method that estimates the amount of money that could be saved by not building a wastewater treatment facility (Ranganathan et al., 2008).

To target poverty reduction efforts more precisely, decision-makers need to know whether specific wetland uses provide sufficient new revenues to move a poor person above Uganda's poverty line. The analysis generally compares the economic value of a specific wetland product or service to the amount of shillings needed to move that person out of poverty.

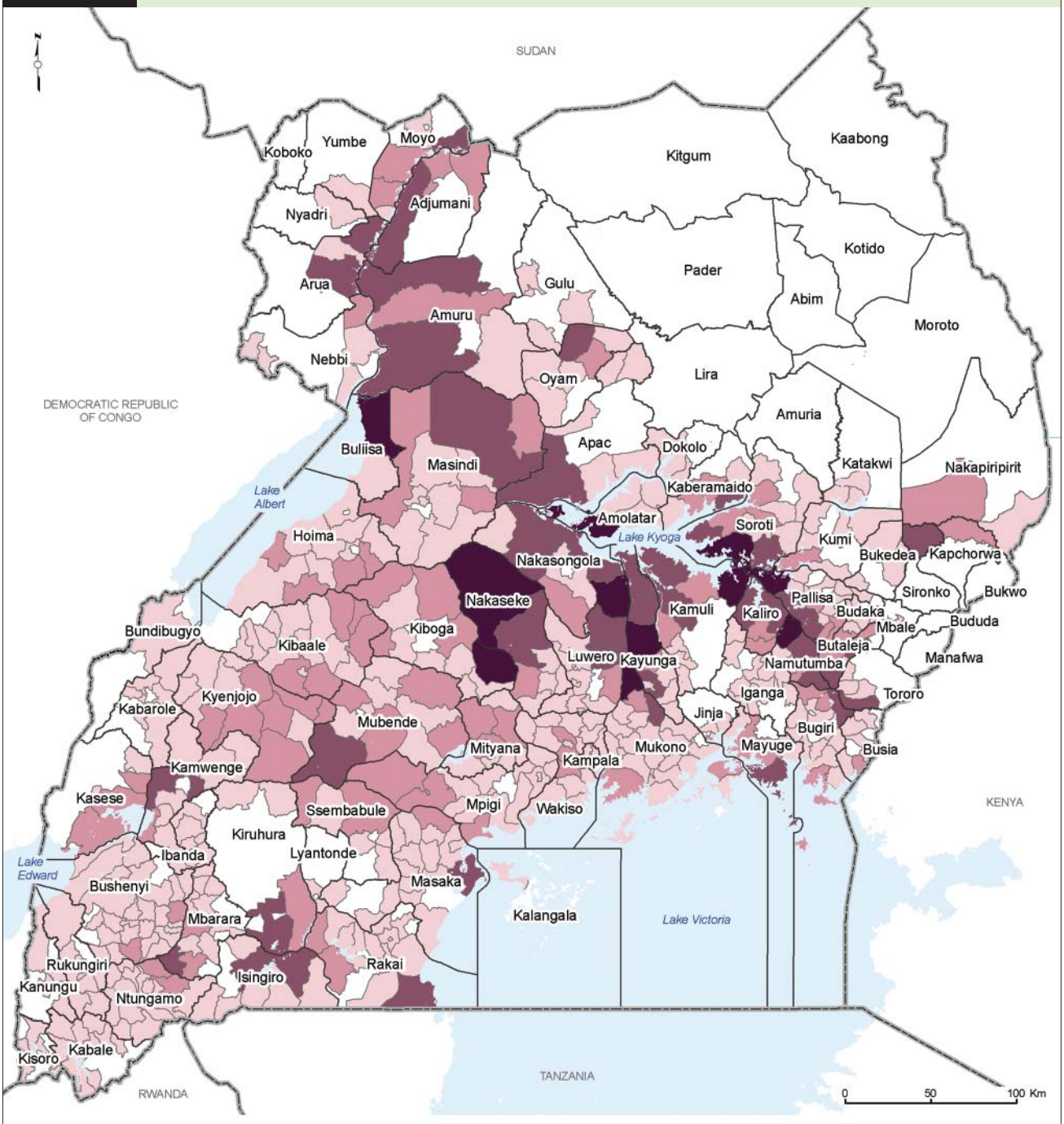
The following analysis integrates these different types of data and looks at one wetland use—papyrus harvesting. The main purpose is to show how the spatial analysis of poverty and wetland indicators can be strengthened with information from economic valuation studies. This analysis will estimate the quantity of papyrus that could be sustainably harvested in each subcounty (based on the area and location of papyrus wetlands), calculate the potential economic value that is associated with this harvest, and compare the potential papyrus revenue to the total amount of money needed to move all poor persons in that subcounty above the poverty line (see Box 1 for the definition of poverty used in this publication).

The theoretical total annual potential papyrus harvest for all subcounties was calculated from detailed maps of papyrus wetlands (NFA, 1996). The total papyrus area for each subcounty was multiplied by the quantity of papyrus that could be sustainably harvested per year (400 bundles per hectare of papyrus wetland based on Karanja et al., 2001). It was assumed that all papyrus stems were accessible in the subcounty and that their quality was homogeneous and high enough to be harvested and sold.

Map 11 (page 28) presents the total annual revenue that could be obtained from harvesting all papyrus areas in each subcounty. The potential revenue for each subcounty was obtained by multiplying the annual harvest quantity by its average sales price. The data are based on an economic study of papyrus harvest and sales in Pallisa District (Karanja et al., 2001) which determined an average sales price of 500 Uganda Shillings for each bundle of harvested papyrus. (This translates to an annual theoretical return of 200,000 Uganda Shillings per year for each hectare of papyrus wetland, equivalent to about US$ 118 per hectare per year with 1US$ = 1,700 Uganda Shillings.)

Map 11 shows 444 subcounties without any papyrus revenues (areas in white). These subcounties have no papyrus wetlands and most of them are in the northern districts. Other subcounties without papyrus revenues are in southeast Uganda (Manafwa, Sironko, and Bukwo Districts), the southwestern highlands (parts of Bundibugyo, Kanungu, and Kasese Districts), and parts of Kiruhura and Lyantonde Districts. The other 514 subcounties have papyrus wetlands and could realize revenues from papyrus harvests (subcounties shown in shades of purple). The subcounties with the largest potential total annual papyrus revenues (shaded in dark purple) are in the districts of Buliisa, Nakaseke, Luwero, Kayunga, Kamuli, Pallisa, and

Map 11 THEORETICAL ANNUAL REVENUE FROM PAPYRUS HARVEST BY SUBCOUNTY



THEORETICAL ANNUAL REVENUE FROM PAPYRUS HARVEST
(million Uganda Shillings/year (thousand US$/year))

- Subcounty without papyrus
- 0 – 150 (0 – 88)
- 150 – 400 (88 – 235)
- 400 – 1,000 (235 – 588)
- 1,000 – 2,200 (588 – 1,295)

OTHER FEATURES

- District boundaries
- Subcounty boundaries
- Water bodies

Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), and theoretical annual revenue from papyrus harvest (authors' calculation based on NFA, 1996 and Karanja et al., 2001).

Box 5 CALCULATING THE THEORETICAL AMOUNT OF CASH NEEDED TO CLOSE THE POVERTY GAP

To calculate the theoretical cash transfers needed to raise the entire poor population in a subcounty above the poverty line, economists require three metrics: number of poor in an administrative area, poverty line, and poverty gap. The following example showcases the calculation using rural data for one of Uganda's regions.

Poverty data for the Northern Region

Total rural population: 5.4 million

Rural poverty line: 20,872 Uganda Shillings per month (US$ 12 per month)

Rural poverty rate (percentage of people falling below the poverty line): 66 percent of population

Poverty gap in percent of poverty line (how far below the poverty line the poor in a given area are): 27 percent of poverty line

Calculation

Total rural poor population = Total rural population × Poverty rate

= 3.5 million

Poverty gap in Uganda Shillings = Poverty gap in percent of poverty line × Rural poverty line

= 7,723 Uganda Shillings per poor person per month (US$ 4.50 per poor person per month)

Theoretical amount of cash needed monthly to close the poverty gap for the region

= Total rural poor population × Poverty gap

= 19.7 billion Uganda Shillings per month (US$ 11.6 million per month)

Theoretical amount of cash needed annually to close the poverty gap for the region

= Theoretical amount of cash needed monthly to close the poverty gap × 12

= 237 billion Uganda Shillings per year (US$ 139 million per year)

This estimate is a minimum based on assumptions of perfect targeting, no corruption, and no program costs. In practice, more resources and different approaches will be required because perfectly targeted cash transfers are neither feasible nor the best intervention to move the entire poor population above the poverty line.

Source: UBOS and ILRI, 2007.

Soroti. All of these districts have large papyrus wetlands neighboring Lake Victoria, Lake Albert, Lake Kyoga, and other smaller open water bodies.

To determine what contribution papyrus wetlands can make to poverty reduction, the revenue from papyrus harvest can be compared to the amount of money needed to move all poor persons in that subcounty above the poverty line. Box 5 provides an example of how to calculate this amount.

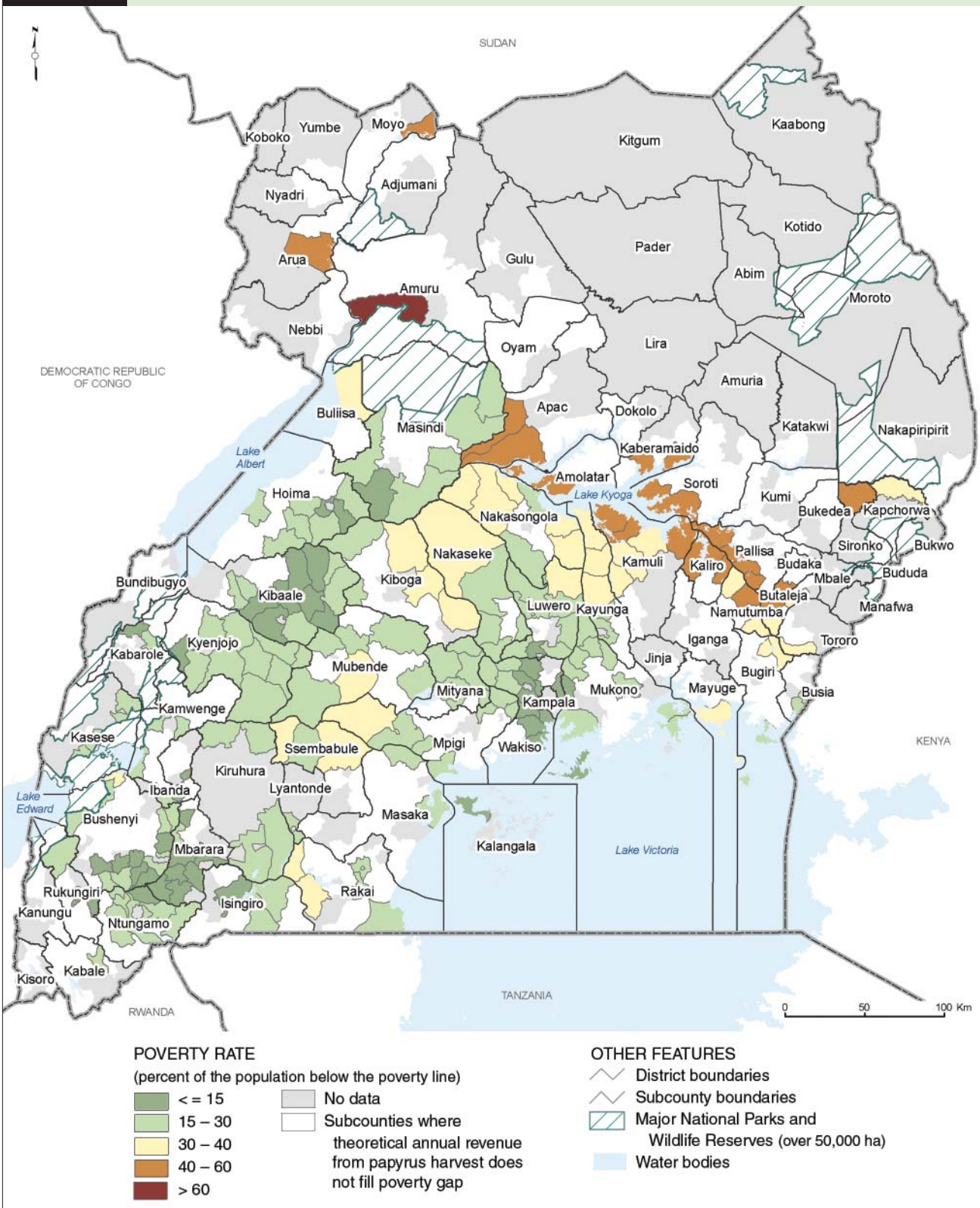
Of the 514 subcounties with papyrus wetlands, 210 could harvest and sell enough raw papyrus to theoretically close the poverty gap within their administrative unit. Map 12 (page 30) highlights these 210 subcounties and shows their corresponding rural poverty rates. The great majority of them represent better-off subcounties with poverty rates of 15-30 percent. Only a few, in the proximity of Lake Kyoga, are an exception to this pattern and have higher poverty levels of 40-60 percent.

For 304 subcounties, sales of raw papyrus are insufficient to close the poverty gap and are shown as white areas in Map 12. These subcounties either need to increase papyrus returns by adding value to the raw material (for example, developing and selling papyrus mats, crafts, or briquettes) or obtain other wetland revenues. Almost twice as many subcounties would be able to close their poverty gap, for example, if they produced mats that sell at 3,500 Uganda Shillings a piece (calculation based on Karanja et al., 2001). The poverty reducing effects of wetlands could be even greater if communities could capture higher revenues from other marketable wetland products or from new markets that provide payment for ecosystem services.

Maps 11 and 12 support the following observations:

- Papyrus harvesting, a more accessible source of income for poor families with fewer capabilities, is labor intensive and has low economic returns. It cannot provide enough income in the aggregate to close the poverty gap. The potential revenues from all papyrus wetlands in Uganda (based on a sustainable harvest rate) is close to 88 billion Uganda Shillings (US$ 51.8 million) per year, which translates to an annual average return of 10,000 Uganda Shillings (US$ 6) for each poor Ugandan.
- At the individual level, however, harvesting of papyrus can be an important source of cash for poor families.
- Because of its low returns, harvesting of papyrus should be seen as a source of income that prevents people from sliding further into poverty rather than as a means of escaping poverty.
- In 210 subcounties, the potential revenues from harvesting and selling raw papyrus are larger than the cash needed to close the poverty gap for all the poor families

Map 12 POVERTY RATE FOR THE 210 SUBCOUNTIES WHERE THEORETICAL ANNUAL REVENUES FROM PAPYRUS HARVEST EXCEED POVERTY GAP



Sources: International boundaries (NIMA, 1997), district administrative boundaries (UBOS, 2006a), subcounty administrative boundaries (UBOS, 2002a), water bodies (NFA, 1996; NIMA, 1997; Brakenridge et al., 2006), rural poverty rate (UBOS and ILRI, 2008), no papyrus (NFA, 1996), and subcounties where theoretical annual revenue from papyrus harvest does not close the poverty gap (authors' calculation based on NFA, 1996 and Karanja et al., 2001).

of the subcounty (based on the most optimistic assumptions). All of these subcounties have large papyrus wetlands. The great majority of them have comparably low poverty rates of 15–30 percent, requiring very specific targeting of poor households to realize poverty reduction impacts. Only a dozen subcounties around Lake Kyoga have high poverty levels of 40–60 percent requiring less precise targeting of poor households. Further investigation at more local and household levels is needed to explore where papyrus harvest could help to reduce poverty, where it may represent a trap that keeps people in poverty, and where new efforts are needed to capture greater revenues from other wetland products and services.

This preliminary analysis demonstrates that information from economic valuation studies provides analysts with an opportunity to gauge more precisely how a specific wetland use could contribute to poverty reduction in a specific location. Future studies should expand on this example and map the economic value of all major wetland uses—both those with a market (beekeeping, fishing, livestock, etc.) and those that do not have a market yet (ecosystem services such as water filtration and carbon sequestration). Such maps and analyses would allow a more comprehensive economic evaluation of different wetland uses. They would provide wetland managers with stronger arguments for encouraging a specific wetland use or for optimizing the returns from a comprehensive bundle of wetland products and services.