

Payments for Environmental Services (PES) Schemes in the Kanyabaha-Rushebeya Landscape, Uganda*



Source: Nature Harness Initiatives (NAHI)

As he looked across to the Ugandan side of the border with Rwanda and the Democratic Republic of the Congo, Biryahwaho Byamukama (BB) imagined the time, not so long ago, when rainforest stretched across the landscape, interspersed with abundant waterways and marsh lands. Now one of the most densely populated places in Africa, BB absorbed the reality that nearly all of the forest and wetlands had been cleared for agriculture. Of the hundreds of wetlands that once occupied this area, only the Rushebeya-Kanyabaha remained relatively intact. The Rushebeya-Kanyabaha wetland – the object of his concerted attention in recent years. BB contemplated its global habitat value to numerous species of birds, many of them threatened. Equally important, in his estimation, is the marshland’s provision of immeasurable benefits for people living in the area. Mud fishing, for example, where people pick fish from the muck underfoot with their bare hands. And the numerous raw materials that the wetland provides for craft-making, like the baskets that women weave for tourists and the mats that they make and sell for use in local houses. BB considered how vitally important these activities are which enable women to derive income from the wetland, one of the only reliable sources available to many of them.

* Prepared by Louise Buck with JessicaGoldstein, based on interviews and documentation from Biryahwaho Byamukama, Clement Okia, and Richard Ruhigwa

BB reflected, too, on the critical importance of the wetland in providing water and electric power for use at Kisiisi Hospital, downstream. Such a vital institution - the only health care facility within hundreds of kilometers - servicing people of the wetland and beyond, and its electricity derived entirely from hydropower generated from this source. He wondered about the feasibility of the planned upgrading of the hydro-system to provide power to communities beyond the hospital, given the threats to the wetland ecosystem. If the wetland could no longer provide clean water free of silt, as many feared might happen, this essential electrical system was more likely to be shut down than expanded!

From his lofty vantage point in the Kigezi Highlands, BB confronted the visual reminder of growing pressures to convert the wetland to other uses. Persistent poverty and large family sizes in the area made the need for food a priority, which on one hand seemed to justify the relentless encroachment of agriculture into the wetland. Vegetation around the edges and inside the wetland was regularly cleared, also, for cattle grazing and hunting. BB recognized the contributions of this activity to the severe soil erosion which was so evident to him today, and which he knew would accelerate during the rainy seasons. It is no wonder, he thought, that the siltation that threatens the viability of the hydropower system is a powerful indicator, too, of the multiple threats to the viability of the entire wetland ecosystem and the people who depend upon it.



The Kigezi Highlands above Rushebaya-Kanyebaha Wetland in Kabale-Kisoro Districts, Uganda
(Source: Edirisi)

As BB began making his way back down the steep footpath to his vehicle and driver waiting on the narrow, windy road below, he fortified his resolve to learn all that he could to enable Nature Harness Initiative, the organization he had founded and currently directs, to succeed in its mission to reverse the dynamics in the Rushebaya-Kanyebaha wetland and surrounding landscape that threaten its sustainability.

The Landscape

The Rushebeya-Kanyabaha landscape is circumscribed by the wetland and its associated catchment area. The wetland is shared among the three sub-counties of Bukinda, Rwamucucu and Kashambya which lie in Rukiga County of Kabale district, and is a resource of common interest to the people living the landscape. It is delineated by the boundaries of seven parishes: Kangondo and Kyerero parishes in Bukinda sub-county; Rushebeya-Kanyabaha and Kitunga parishes in Kashambya sub-county and Burime, Nyakagabagaba, Kitojo in Rwamucucu sub-county. The wetland was estimated to be 859 ha originally, while approximately 363 ha (43%) have been converted to farmland (National Biomass Study, 1995). The three-sub-county landscape in which the wetland is situated is approximately xx km² in size.

Rainfall in the landscape is bimodal. The long heavy rains are from March to May while the short rains are from October to November. June, July and August are generally the driest months of the year. The mean annual rainfall varies from 800-1000mm. Mean annual minimum and maximum temperatures are 10.9° C and 24.4° C respectively (NEMA, 2001). There has been a rise in average minimum temperatures of 0.7° C since 1995 in Kabale district. This is higher than the world average rise and has resulted in many changes in microclimates of the valleys and hills (Kabale District Council, 2000).

The wetland is a mosaic of natural vegetation, crops and open water patches. The dominant vegetation is *cladium* spp and cyperus papyrus species and these are scattered with *Miscanthidium violaceum*. The swamp is rich in birds; globally threatened species include the Papyrus Yellow warbler (*Chloropeto graciliroshtris*), Papyrus gonolek and others. It is home, also, to the sitatunga, also known as the marshbuck (*Tragelaphus spekii*), as well as the IUCN red data listed Congo clawless otter (*Aonyx congica*) and the Grey-crowned crane (*Balearica regulorum*). The intact wetland is embedded in a long broad valley surrounded by steep hills. It is a permanent swamp and is seasonally flooded in some places. The wetland receives water from rivers Bufureka and Kabigodi and drains North East into Lake Edward. At its heart is a small lake believed to be very deep. The wetland is also rich in fish including *Clarias* and *Protopterus* species.

The Bahiga is the dominant ethnic group in the Rushebeya-Kanyabaha area, who are predominantly subsistence cultivators. In 2002, the population of the three sub-counties was about 67,500, one of the highest populations per area in Uganda. The population density of Kabale district was 290 persons per km² (UBOS, 2002). The settlement pattern is characteristic of the Kigezi highlands where the population is concentrated in lowland areas. Poverty in the landscape is pervasive.

It is insightful to view the Rushebeya-Kanyabaha landscape in the context of the larger Eastern African setting in which it is situated. The International Center for Tropical Agriculture (CIAT) undertook a spatial analysis for Ecoagriculture Partners that mapped wildlife, agriculture and poverty in Eastern Africa (Collet and Jarvis, 2008). A collection of maps conveys the status of a variety of individual variables, and also synthesizes the results into a single map of hotspots for conservation and poverty in the region. In the selection of maps presented in Appendix A, the landscape is situated in the area

circumscribed by the red circle in the southwest most corner of Uganda. The report and the full set of maps may be viewed at this link. [[link to CIAT report,1](#)]

Agriculture

Agriculture is the main economic activity in Rushebeya-Kanyabaha landscape, and is practiced for both subsistence and commercial purposes. Major crops include Irish potatoes, bananas, sorghum and cabbages. All are marketed in regional towns, by foot or bicycle, while the potatoes and cabbages are also transported by vehicle to the capital of Uganda, Kampala. Sorghum is mainly grown and sold for making local brew (*Omuramba*), which groups of farmers often ferment before selling to increase its value.

The soils are under intensive continuous cultivation, especially from the annual hillside cropping systems, with a net loss of fresh organic material (Briggs and Twomlow, 1998). Demographic pressure has forced farmers to abandon shifting cultivation, the indigenous soil replenishment method, for continuous cultivation. This is coupled with the terrace scouring phenomenon, caused by down slope cultivation and soil erosion (Siriri, 1997). Consequently, harvest from the upper third of terraces usually does not exceed 12% of the entire field though farmers manage the entire plot uniformly. Some areas with Eucalyptus trees have no undergrowth leading to dry soils and water runoff. This has resulted in increased lake silting and floods.

Farmers occasionally use animal manures and crop residues for soil fertility replenishment. However, the quantity and quality of these organic resources are often insufficient to meet crop nutrient demands. Alternative organic resources are agroforestry trees and shrubs (Siriri & Raussen, 2001). Yield gradients over the narrow terrace benches (typically 5 - 15 m wide) result in negative net benefits and low returns to labour, and have serious food security implications for this low input farming system.

Threats

Threats to the Rushebeya-Kanyabaha landscape can be grouped with respect to sources of pressure on natural resources, the degradation of the resources, and the institutional capacities to deal with resource pressures and degradation.

Pressures on resources

- High population growth
- Food and nutritional deficits
- Lack of wood (for fuel, poles, stakes, timber)
- Fragmented farms
- Farming on steep slopes
- Poor markets for agricultural products
- Overgrazing
- Hunting of wild animals in the wetland, especially the Statunga.

Degradation of resources

- Wetland drainage
- Hillside run-off and sedimentation of valley bottoms
- Erosion and siltation of streams
- Soil fertility loss resulting in stunted crops, especially bananas
- Soil erosion leading to degraded hill sides and poor water quality
- Loss of plant and animal biodiversity

Institutional capacities

- Limited coordination among actors in the landscape
- Limited leadership and organizational capacity of local institutions
- Inadequate implementation of policies and laws
- Poor organizational management practices
- Limited financing

The Challenge

The degradation of the wetland and the depletion or near-depletion of vital natural resources in and around it has dire livelihood consequences for residents of the landscape, and for biodiversity. As we have learned from BB's musings, the degradation has potentially catastrophic consequences, also, for the hydropower system that generates electricity for a regional hospital downstream. The video component of this case study elaborates the issue.

Notably, however, the role of the wetland in the regional hydropower system may open possibilities for its protection and restoration. The significant economic value of the wetland to this vital private health care facility gives the hospital an interest in its status. The overarching questions that BB is pursuing are: "Can the economic interest of the hospital be transformed into financial and human resources that can create incentives and capacities for managing natural resources in and around the wetland in ways that restore and protect the wetland's ecological function?" "If this scenario is plausible, what ground work needs to be laid to realize the vision?"

BB has identified three key ingredients that are needed to bring to fruition the idea of connecting the status of the wetland to the interests of an external user of a vital wetland resource: 1) a Payment for Environmental Services (PES) scheme, 2) a wetland management system that enables the terms and conditions of the PES to be realized and sustained, and 3) leadership and institutional capacity to bring about an effective wetland management system and PES scheme. BB is working ambitiously on all three fronts. While making important progress, BB often feels that he is fighting an uphill battle. Are there ways that we can help him to realize his vision? To do so we need to know about the status of his efforts so far, and to learn from the research and practice of others who are pursuing similar goals in other places. The remainder of this case provides background that we will need in helping BB to succeed.

The Innovations

Getting Organized – Creating Nature Harness Initiatives (NAHI)

BB and colleagues created NAHI to promote market-based mechanisms for natural resources management. NAHI is a not-for-profit organization registered in Uganda, whose goal is “nature harnessed by communities for improved incomes, health and dignity”. One of NAHI’s initial projects was a [scoping study \[link\]](#), commissioned by [Ecoagriculture Partners](#), to assess the status and the potential for ecoagriculture in Kabale, Kisoro and Kayunga Districts of Uganda (NAHI, 2008). The scoping study enabled BB to identify innovative people and organizations with whom he could ally his emergent organization, and innovative land use practices that could help to frame NAHI’s vision for better management of agriculture and natural resources.

NAHI gained assistance in creating its niche and identity from EcoTrust Uganda. NAHI is working to create its image as a ‘go-to’ organization for ideas, information and technical advice about market-based mechanisms for natural resource management. And it serves as an institutional entity for fund-raising.

Facilitating Collaborative Management – Advancing Capacities and Aligning Interests

Following the scoping study, the nascent NAHI collaborated with the Department of Community Forestry and Extension at Makerere University to assess the activities of stakeholders and planning entities in the Rushebeya-Kanyabaha landscape (Okia et al., 2008). The study found that each organization works on its designated activities; little or no coordination was evident. The study revealed, also, that innovative management activity is project based and lasts, at most, for 2-3 years. Furthermore, it yielded information about stakeholder interests and capacities upon which to build a strategy for collaborative management of the wetland.

With the benefit of the scoping study and preliminary stakeholder assessment, BB and his colleagues have conducted visioning and scenario-generating activities to begin bringing diverse interests into alignment toward a common vision for the landscape. BB has drawn upon tools for engaging stakeholders in collaborative management of complex landscapes that are accessible through the [Landscape Measures Resource Center \(LMRC\)](#): BB learned about the availability and use of these tools through an Ecoagriculture Leadership Course that he attended in Jinja, Uganda. Through these resources he learned, also, about the potential role of community-based measurement and tracking of landscape performance in advancing collaborative management ([Sayre and Buck, 2008](#)). Furthermore at the leadership course he broadened his network of colleagues who are concerned with improving the management of agriculture and natural resource through collaborative management at multiple scales. BB now collaborates with members of the Uganda Ecoagriculture Working Group and the Kenya Ecoagriculture Working Group to advance his thinking and practice. [[Link to East Africa EWG website, when posted](#)].

BB appreciates the value of colleagues and tools in facilitating the collaborative management of the wetland. But he is also aware of the important influence that land tenure and property rights have in motivating people to change their relationships to resources in the wetlands, and to engage in practices that will not result in their being over-exploited. BB recognizes that knowledge and understanding about the role of property rights in collective management to be complex, and often site-specific. To help BB navigate through this domain we need to develop our own appreciation for factors that affect the design of institutional arrangements that will foster behavior toward natural resources that lead to their conservation and sustainable use. To begin, let us explore the concept of common property management, known in economic terms as the management of common pool resources.



Common Property Management

Elinor Ostrom recently won a Nobel Prize in economics for her lifetime of work in examining the use of collective action, trust and cooperation in the management of common pool resources. In economics, a common-pool resource (CPR), also called a common property resource, is a type of good consisting of a natural or human-made resource such as a hydropower system, or fishing grounds, whose size or characteristics makes it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. A common-pool resource typically consists of a core resource (e.g. water or fish), which defines the *stock variable*, while providing a limited quantity of extractable fringe units, which defines the *flow variable*. While the core resource is to be protected in order to allow for its continuous exploitation, the fringe units can be harvested or consumed.

In 1990 Dr. Ostrom authored a book in which she identified the eight design principles below as prerequisites for a stable CPR arrangement:

1. Clearly defined boundaries
2. Congruence between appropriation and provision rules and local conditions
3. Collective-choice arrangements allowing for the participation of most of the appropriators in the decision making process
4. Effective monitoring by monitors who are part of or accountable to the appropriators
5. Graduated sanctions for appropriators who do not respect community rules
6. Conflict-resolution mechanisms which are cheap and easy of access
7. Minimal recognition of rights to organize (e.g., by the government)
8. In case of larger CPRs: Organization in the form of multiple layers of nested enterprises, with small, local CPRs at their bases.

She also drew the conclusion from her extensive research that common property regimes typically function at a **local level** to prevent the overexploitation of a resource system from which fringe units can be extracted.

BB and Nature Harness are attempting to develop a common property management system. What insights might we derive from Dr. Ostrom's work, and that of researchers who have built upon it help BB and Nature Harness in their efforts?

Reference and additional resources:

Ostrom, Elinor (1990) "Governing the Commons. The Evolution of Institutions for Collective Action". Cambridge University Press.

[Meinzen-Dick, Ruth, Esther Mwangi, Stephan Dohrn. 2006. Securing the Commons. CAPRI Policy Brief 4. Washington DC: IFPRI.](#)

[Collective Action and Property Rights for Poverty Reduction: Lessons from a Global Research Project, CGIAR Systemwide Program on Collective Action and Property Rights](#)

Negotiating Payments for Ecosystem Service (PES) Schemes – Linking internal and external stakeholders in the ecological performance of the landscape

While BB is strengthening his NGO and fostering collaborative management in the landscape, he has his eye also on the ‘prize’ that he hopes one day will help to finance this type of activity, and more importantly provide incentives to the owners and users of resources in the landscape to manage them sustainably. BB read an article in "Environment and Poverty Times", indicating that markets for ecosystem services now exist in his country, with the most common being related to carbon markets (greenhouse gases), water, and biodiversity. Further, these markets are growing steadily and have tremendous future potential (Ruhweza 2009)¹.

The box on the following page provides a ‘primer’ on PES that has helped BB understand its basic concepts and principles. Beyond this, he is aware that there are six types of payments/tools that are used in PES schemes. These include direct public payments, direct private payments, tax incentives, cap-and-trade markets, voluntary markets, and certification programs. BB has learned from reading another piece by Alice Ruhweza (2008)², published by the Katoomba Group, about four viable PES schemes that currently operate in Uganda, specifically: 1) The Kakira Sugar Works (1985) Ltd. (KSW) Cogeneration Project, 2) The Uganda Nile Basin Reforestation Project, 3) The Uganda Composting Project, and 4) The International Small Group and Tree Planting Programme (TIST). He has learned, also, that each of these, and other PES program throughout the region, is unique with respect to the types of stakeholders, buyers/sellers, payments, roles and actions involved.

From Ruhweza’s comprehensive analysis, BB noted that challenges in developing markets and payments for services in his region include information, technical, policy, regulatory and institutional barriers. Many sellers of environmental and ecosystem services do not understand how regulatory and voluntary markets work, as in the case of carbon trading, nor how to locate potential buyers. Buyers, policy makers and regulators also lack knowledge and information, such that many projects are *ad hoc* and do not follow accepted guidelines. Many organizations that would like to participate, the way that NAHI might for example, lack the technical, financial and evaluation skills for designing and implementing viable programs. In the absence, yet, of "best practices" BB recognized that one must be inventive to participate. Furthermore, limitations in the national registries, certificate bodies, or financial institutions that are needed to create the pathways from seller to buyer are likely to inhibit the emergence of successful PES systems in Uganda. BB agreed with Ruhweza’s conclusion that because they are an important and valuable tool for environmental management, PES schemes need to be pursued.

¹ Ruhweza, Alice. “Payments for Ecosystem Services in East & Southern Africa. September 2009. http://www.grida.no/res/site/file/publications/PET06_screen.pdf

² Ruhweza, Alice, et al., “An Inventory of PES Schemes in Uganda”, June 2008. Page 20. http://www.katoombagroup.org/regions/africa/documents/2008_Uganda_Inventory.pdf

Payments for Environmental Services (PES)

Payments for environmental services (PES), also known as payments for ecosystem services or benefits, is an emerging conservation paradigm that rewards managers of land, water and air resources for managing them in ways that enable the ecosystem to continue producing them, so they are not degraded or destroyed. Some of the many life-support services that wetlands, forests, grasslands, oceans and fields provide to people around the world include water supply and filtration, climate regulation, nutrient cycling, pollination, pest control, disease regulation, flood control and food provision.

A PES, according to Wunder (2005) is:

1. a voluntary transaction where
2. a well-defined environmental service (or a land-use likely to secure that service)
3. is being 'bought' by an environmental service buyer
4. from an environmental service provider
5. if and only if the provider secures environmental service provision (conditionality).

While a variety of PES schemes have been pilot tested and some have grown into programs of notable size and duration, skepticism remains about the practicality of the concept, and how widely it can be applied. Studies of PES in practice reveal that commonly, the opportunity costs for the provider of the service are larger than the amounts paid, thus the role of "intangibles" is important in inducing participation. Research also has shown that trade-offs between different environmental and social goals are likely to emerge in PES schemes, raising the question about their ability to be multipurpose instruments for environmental improvement and rural development. Researchers also have found that PES schemes can serve as a conflict-resolution instrument, facilitating downstream-upstream problem solving, while sometimes also introducing changes in social perceptions of property rights.

Throughout the world PES schemes are being designed, implemented and researched, as their promise continues to hold high in the face of relentless forces of ecological degradation. In Africa, the [Katoomba Group's Ecosystem Marketplace](#) is an important online forum for sharing ideas and information about innovations in PES.

Are there resources in the 'Ecosystem Marketplace', or information from the references below, that might help BB in his efforts to broker a scheme that will benefit residents of the Rushebaya-Kanyebaha landscape, as well as the regional hospital, downstream, that relies on power generated from water supplied by the wetland?

References and additional resources:

[Wunder, Sven, 2005. *Payments for environmental services: Some nuts and bolts*, Center for International Forestry Research \(CIFOR\)](#)

[Ecological Society of America, 2000. *Ecosystem Services: A Primer*](#)

[International Institute for Sustainable Development, 2005. *Market for Ecosystem Services*](#)

[Hope, R.A., Porras, I.T., and Miranda, M. \(2005\). *Can payments for environmental services contribute to poverty reduction?: A livelihoods analysis from Arenal, Costa Rica*. University of Newcastle-upon-Tyne, International Institute for Environment and Development, UK.](#)

Conclusions and Questions

In addition to knowledge about tools for collaborative management, about designing institutions for managing common pool resources, and about developing PES schemes, BB appreciates the fundamental importance of knowing about ecological interactions between wetlands and agriculture. Enhancing capacities for collaborative management in the Kanyabaha-Rushebeya Landscape fundamentally is about managing those interactions in ways that reduce trade-offs and improve synergies among components of the landscape system. The overwhelming presence of poverty mediates these interactions.

While recognizing these realities, like most people, BB finds the complexities a bit overwhelming. Can we assist BB in reducing the complexity and making sense of what's possible by reviewing and 'digesting' for him and his colleagues synthesis documents designed to shed light on the issues? Such documents include: 1) [Scoping Wetland-Agriculture Interactions](#), 2) [Development of Adaptive Co-management of a Wetland Landscape in Southern Sweden](#) and, 3) [Linkages Between Land Management, Degradation and Poverty in Uganda](#).

Once we have come to appreciate these 'fundamentals', let us consider these immediate issues and questions that BB would like our help in addressing:

1. Are there ways that we might help BB improve NAHI's web-presence, given the current pursuits of the organization?
2. In addition to the 'hospital hydropower scheme', are there other possibilities for PES projects that might be viable for linking the Kanyabaha-Rushebeya landscape with people and organizations outside the landscape who would have an interest in investing in its sustainable management? Of the current possibilities, what might be the most promising to pursue? What conditions would need to be in place for a potential alternative PES scheme to be realized? What steps should be taken within the next year or so to begin realizing this possibility?



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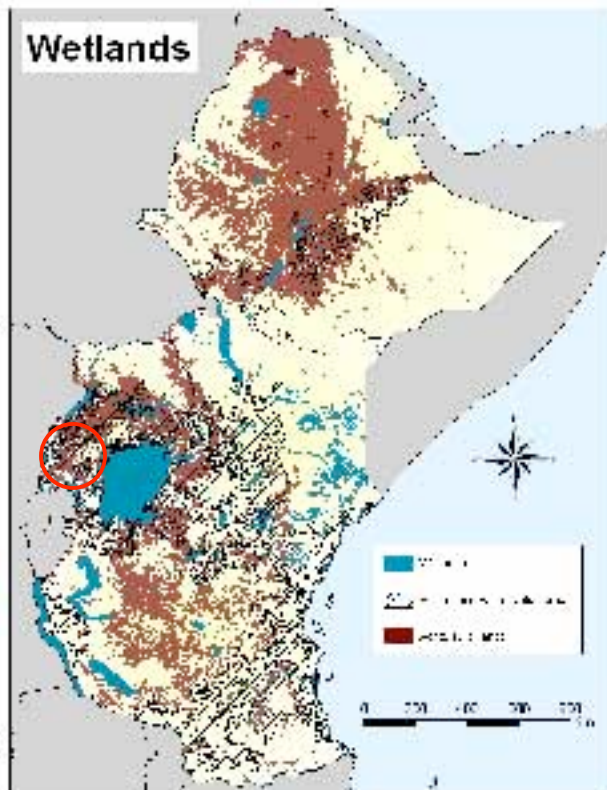
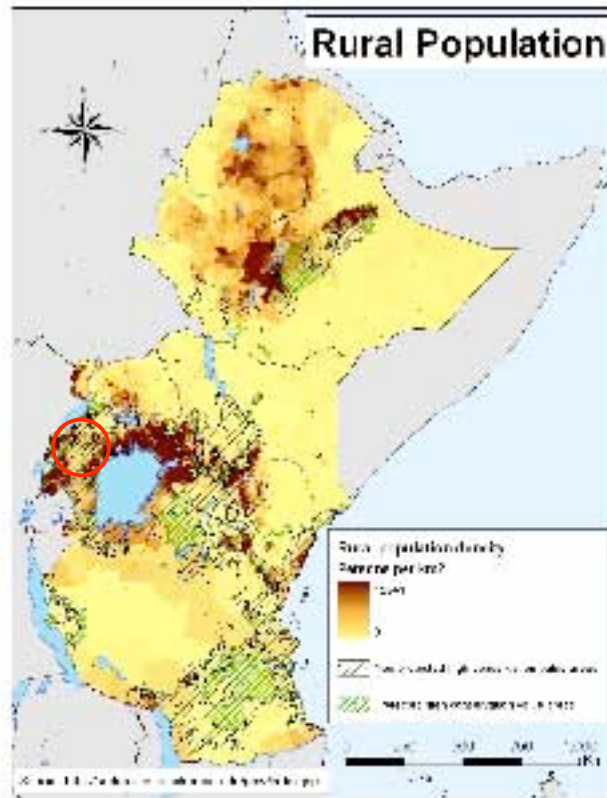
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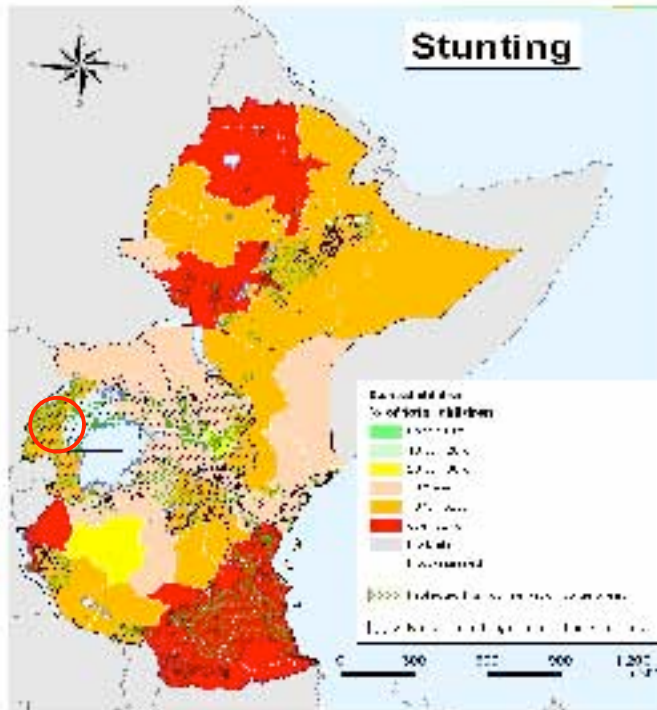
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Appendix A

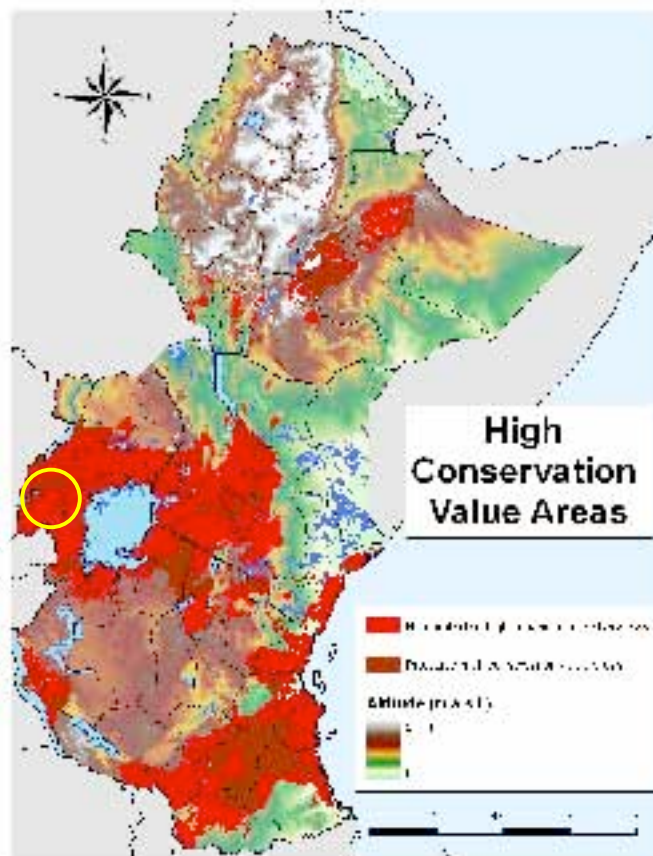
Maps Depicting Key Variables that Affect the Dynamics of the Kanyabaha-Rushebeya Landscape.

Source: Collett, L. and A. Jarvis, 2008

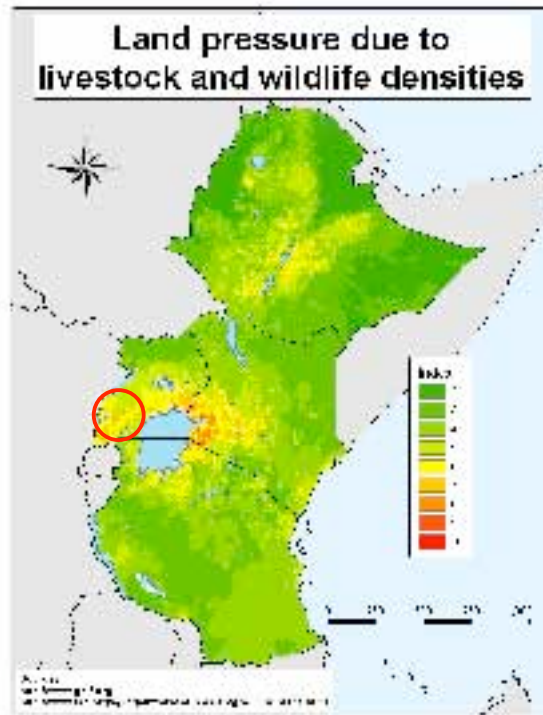




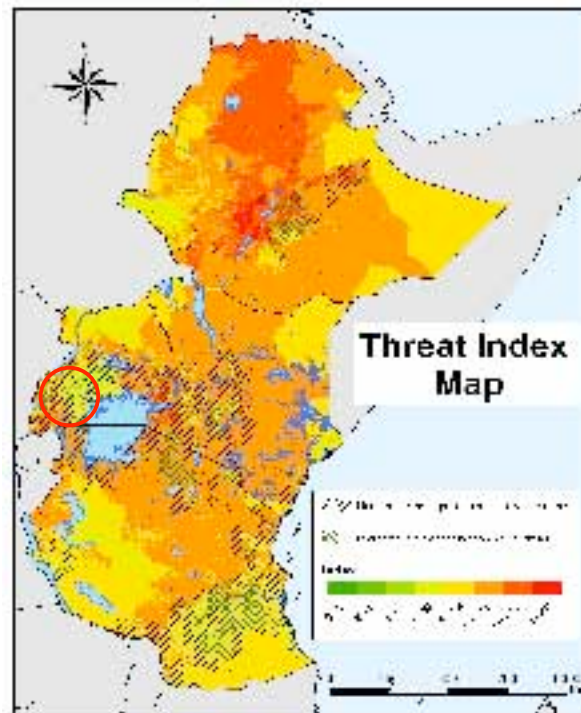
Percentage children with stunting in the study region (Source:)



Map of high conservation value areas and protection status (Source:)



Index of pressure on land from resampled wildlife density and livestock density.



final index of hotspots for competing conservation and livelihood needs.