

Agricultural Development Domains of Uganda

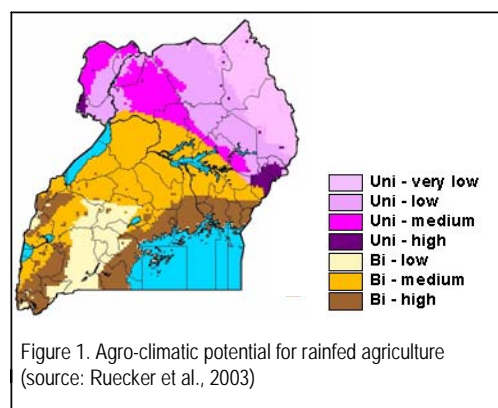
A development domain is the spatial representation of preconditions or factors considered important for rural development, and can be characterized using stratification criteria that, based on theory and previous research, determine the comparative advantage of rural areas with respect to frequently occurring livelihood strategies. In Uganda, agricultural potential, market access and population pressure are used. These factors also show a high degree of spatial dependency and therefore lend themselves to spatial representation (mapping).

Agricultural potential

Agricultural potential is an abstraction of many factors, including rainfall, altitude, soil type and depth, topography, presence of pests and diseases, etc., that influence the absolute (as opposed to comparative) advantage of producing agricultural commodities in a particular place. There are variations in potential depending upon which commodities are being considered. Furthermore, agricultural potential is not a static concept but changes over time in response to changing natural conditions (such as climate change) as well as human-induced conditions (such as land degradation).

For simplicity, agricultural potential in Uganda is classified based on agro-climatic conditions (length of growing season, rainfall pattern and temperature) and altitude, considering production requirements for bananas as an indicator of potential for perennial crops and requirements for maize as an indicator for potential for annual crops. Agricultural potential can thus be classified

according to whether rainfall is bimodal (two seasons) or unimodal (one season), and within each of these



regimes, whether the length of the growing period is low, medium or high (Figure 1).

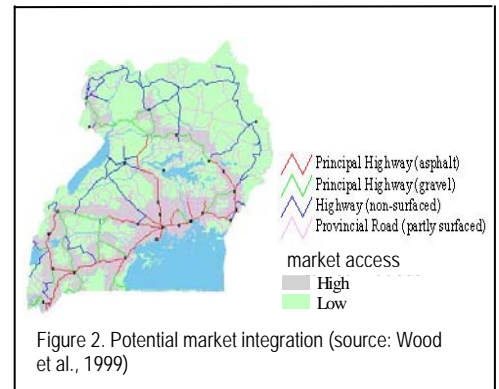
Market access

Market access is critical for determining the comparative advantage of a given location, given its agricultural potential. For example, a community with absolute advantage in producing perishable vegetables may have little or no comparative advantage (low profitability) in

vegetable production if it is far from roads and markets. Market access also is multi-dimensional (distance to roads, condition of roads, distance to urban centers, degree of competition, access to transport facilities, access to international markets, etc.) and dynamic. For simplicity, market

access is classified as high or low using a measure of potential market integration, based on travel time from any

location to the nearest five towns or cities, weighted by the population of the towns or cities (Figure 2).

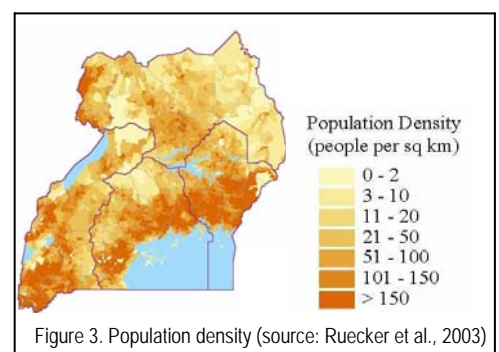


Population pressure

Population pressure affects the labor intensity of agriculture by affecting the land/labor ratio, and may induce innovations in technology, markets and institutions, or investments in infrastructure. Population pressure thus affects the comparative advantage of labor-intensive pathways of development, and returns to various types of investments. Average population density is taken as an indicator of

population pressure, which is classified as high or low based upon rural population density of parishes,

using a cut-off point of 100 persons per square km, which is about the average rural population density in Uganda (Figure 3).



Development domains

The three dimensions, agricultural potential, market access and population pressure, interact with each other in complex ways. Population pressure tends to be higher where there is greater agricultural potential or greater market access, as people tend to move to such areas in search of better opportunities. But, population pressure may have contributed to land degradation, thereby

reducing agricultural potential. Market access tends to be better in more densely-populated areas, since the per capita costs of building roads are lower and the benefits higher. Market access also tends to be better where agricultural potential is higher, since the returns to developing infrastructure are greater.

Overlaying the three dimensions creates a new map showing a set of development domains of Uganda (Figure 4). There are 28 possible domains, though only 16 are represented to any significant extent in Uganda because of correlation among some of the dimensions. The eastern and western highlands have special biophysical conditions for crop and livestock production and are therefore given a unique category.

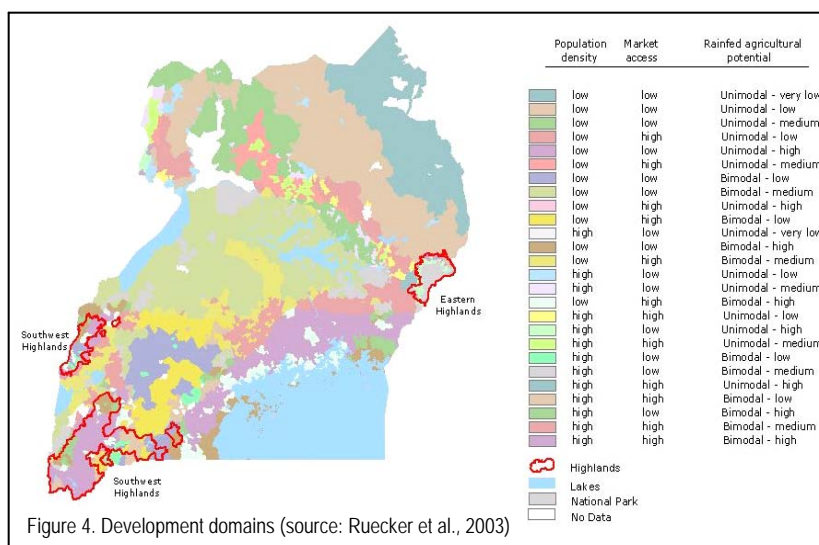


Figure 4. Development domains (source: Ruecker et al., 2003)

Agricultural development strategies

The development domains serve to stratify Uganda into areas where different agricultural development strategies are more or less likely to be successful. IFPRI's research at the household, community and market levels in Uganda indicates, for example, that successful adoption of intensive dairy production practices has occurred in the high agricultural potential, high population pressure, and high market access domain. Similarly, other development strategies that involve perishable commodities are best served by physical proximity to markets and high local demand. On the other hand, success in livestock enterprises has been observed in areas of lower agricultural potential, lower population pressure, and lower market access where land is more abundant and the competition for farmland and cost of land are lower.

There is no simple one-to-one relationship between potential development strategies and domains, but the number of possible development options, including the

Ag. Pot.	Mkt Access	Pop Density	Potential	Development Strategies
High	High	High	HHH	Perishable cash crops
			HHH	Dairy, intensive livestock
			HHH	Non-perishable cash crops
			HHH	Rural non-farm development
	Low	High	HLH	Non-perishable cash crops
			HLH	High input perennials
			HLH	Livestock intensification, improved grazing
Medium	High	High	MHH	High Input cereals
			MHH	Perishable cash crops
			MHH	Dairy, intensive livestock
			MHH	Rural non-farm development
	Low	High	MLH	High Input cereals
			MLH	Non-perishable cash crops
			MLH	Livestock intensification, improved grazing
Low	High	High	LHH	with irrigation investment
			LHH	High Input cereals
			LHH	Perishable Cash Crops
			LHH	Dairy, intensive livestock
			LHH	Rural non-farm development
	Low	Low	LLL	Low input cereals
			LLL	Limited livestock intensification
			LLL	Emigration

Table 1. Potential development strategies (source: Pender et al. 1999)

important option of non-farm rural enterprises, increases where agricultural potential, market, and population measures are higher. Table 1 and Figure 5 illustrate the use of the development domains in

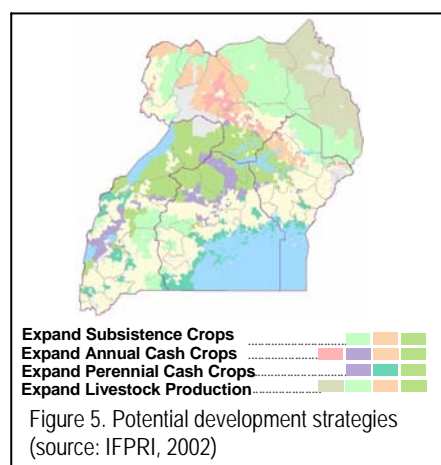


Figure 5. Potential development strategies (source: IFPRI, 2002)

Further reading

- Pender J.L., F. Place and S. Ehui. 1999. *Strategies for sustainable agricultural development in the East African highlands*. EPTD Discussion Paper 41. Washington DC: IFPRI.
- Ruecker, G., S.J. Park, H. Ssali and J. Pender. 2003. Strategic targeting of development policies to a complex region: A GIS-based stratification applied to Uganda. ZEF Discussion Papers on Development Policy, Discussion Paper No. 69, Bonn: Center for Development Research, University of Bonn.
- Wood, S., K. Sebastian, F. Nachtergaele, D. Nielsen, and A. Dai. 1999. *Spatial aspects of the design and targeting of agricultural development strategies*. EPTD Discussion Paper 44. Washington, DC: IFPRI.