Agrarian dynamics, population growth and resource management: The case of Burundi

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Abstract
What role has intense population pressure played (and continues to play) in ancient and contemporary transformations in Burundian agriculture? A considerable disincentive to development and source of imbalance for some, an engine of agricultural growth for others: does this age-old debate still make sense in the present context? Based on an extensive study of agrarian dynamics, the reconstruction of the different agrarian systems that have been in place in Burundi, and an investigation of the phases of major transformations that have enabled the passage of one system to another, the author ventures a rereading of the most commonly cited interpretations of Malthus and Boserup, and proposes a new approach to this fundamental question.

Introduction
The countryside of the Central African Highlands (Rwanda and Burundi) can be defined by several distinctive characteristics such as a humid and tropical climate tempered by altitudes of 1000 to 2000 meters, low rates of urbanization, dispersed habitats, small peasant landholdings (generally less than 1 hectare per family), very small joint plots, double cropping, manual self-subsistence farming and little marketed surplus.

In this context of very strong land pressure, population growth has become of utmost concern to researchers, development actors and government authorities. Population density jumped from some 100 inhabitants/km² in 1960 to 192 inhabitants/km² in 1990¹ and has continued to increase in recent years. Figures refer to rural population density, almost exclusively agricultural, since urban centers account for only a very small proportion of the country’s population (5% in 1979, 6% to 7% in 1990).

The evolution of Burundian agriculture is most often explained by the following model². The population explosion, by provoking a considerable increase in land pressure, has lead to an expansion of cultivated areas at the detriment of grazing and fallow lands, resulting in a decline of animal husbandry, a reduction in the average surface area per landholding, the cultivation of sloping lands, worsening erosion, an overall decrease in soil fertility and yields, and a situation of widespread under-employment in the countryside. Agricultural techniques having remained unchanged, it would appear that the population explosion provoked a ‘population/resource imbalance’ that is at the root of present problems.

In this interpretation of recent transformations in Burundian agriculture, the man vs. land relationship is the main variable taken into account and population growth is viewed as the root of all evil. Another obstacle is also emphasized: the traditionalist mentality of farmers, demonstrated by their reticence to use so-called modern techniques proposed by extension services, and their deliberate desire to produce only enough to meet their immediate needs, a ‘self-subsistence reflex’ that severely limits the amount of surplus available for marketing.

However, the reality is far more complex. The role of demographic pressure in the transformation process of farming practices must be rethought. Based on an extensive analysis of ancient and contemporary transformations of agrarian systems, this article proposes a new interpretation of the demographic pressure/agricultural growth/resource management relationship as it applies to intensive, manual farming in the mountainous regions of Central Africa.

Concepts and method
Farming practices and agrarian transformations are considered as an ensemble of elements part of an agrarian system, concept fundamental to the Comparative Agricultural approach used here³. By enabling an understanding of the state, functioning and conditions of a society’s agriculture sector at a given moment in history, the concept of agrarian system involves exploring both the operating and reproduction modes of one or several ecosystems, the social relationships of production and exchange that have contributed to the sector’s creation and development, and
the economic and social conditions of the ensemble, particularly the relative pricing system that establishes the modalities for integration into the international markets. A notion first developed by French geographers, very much centered on ‘agrarian structures’ and their spatial expression in the agrarian landscape4, the agrarian system concept was subsequently elaborated upon by agronomist M. Mazoyer starting in 19755.

From the very concept of system stems the notion of balance and ‘reproducibility’, or sustainability, as we would say today. For this reason, the mechanisms that maintain and reproduce the conditions necessary for the functioning of an ecosystem (such as soil fertility recovery, the management of material and human resources, the stability of dominant social relationships) are an integral part of the agrarian system and are a part of its definition.

The investigation, in terms of agrarian systems, of a reality as complex as that of the agriculture sector of a society also requires one to resort to concepts in which efficiency and relevance are measured on different scales.

Hence the concept of cropping system. This concept applies not to a crop but to a plot of land (or a group of plots) cultivated in a particular way by the farmer. The ‘system’ refers to the crop or crops that are planted (and their possible mix), crop sequencing and the ensemble of techniques that are applied to them, in what order (crop management sequence) and under what soil and climate conditions6. One considers, for example, that the mixed cropping of maize and beans in the first cultivation season, followed by a cycle of sorghum during the second season constitutes, if the same sequence is repeated each year in the same place, a cropping system. It would be noted as follows: maize+bean/sorghum.

On a comparable analytical level, the livestock system is a tool that helps understands livestock rearing, involving aspects such as the herd’s composition, its feeding habits, corresponding forage calendar as well as animal husbandry (migration, reproduction, care, etc.)7.

The farming system concept is relevant for carrying out analysis at the intermediate level8 of the production unit. It enables analysis of specific combinations of different cropping systems and, where relevant, the different livestock systems used by the farmer depending on his production means, the labor power available and his interests. It is at this level of analysis where measuring the economic efficiency of production processes is the most interesting, be it calculated with relation to the labor power used (in which case one would address the basic problem of labor productivity) or with relation to the land surface occupied. Cropping systems and livestock systems are therefore sub-systems to the farming system and must be analyzed as such. The use of the farming system concept in the study of African agriculture has lead to long debates, and extensive publications, thus revealing the diverse and complex facets of the African household unit.9 Nevertheless, the farming system concept is useful for capturing the complexity of agricultural production units in Burundi, since extended families and polygamy do not modify the essence of the production unit, which is centered on the nuclear family.

The historical reconstruction to be presented in the first section of this article is based not only on a critical re-reading of historiographic sources available, but also on field work carried out in the country from 1990 to 1995. In effort apprehend the most significant former farming pratices, the author carried out an analysis of the landscape and numerous interviews with aging farmers. Based on this data, attempts were made to (i) reconstitute and then reconstruct the cropping and livestock systems used at different times throughout history, (ii) reconstruct the farming systems currently used and finally (iii) sketch a portrait of the agrarian system as a whole.11 This intellectual construction is built upon an ensemble of concrete elements fixed in both time and space as well as upon a series of specific concepts. The objective is to establish a correlation between the elements (defined beforehand and situated as precisely as possible in both space and time) and to identify consistencies within the ensemble that will serve to carry out analysis over time.

This approach of reconstructing and modeling the agrarian systems that have succeed each other over time in Burundi enables us to examine in a new light the age-old debate of population growth and agrarian transformations that divided the neo-Malthusians and followers of E. Boserup in the 1960s.