



RESEARCH THEME

Agricultural Production Efficiency and
Simulation of the National Wealth: A
Comparative Study in Sub-Saharan Africa

PRESENTATION STEP

- Context of the study
- Objectives
- Methodology
- Data source

STUDY CONTEXT

- According to Sanchez and Sachs (2004), Africa is the only region in the developing world to be passed next to the green revolution of the 1970s and 1980s.
- More than 65% of some 750 million people in sub-Saharan Africa work in agriculture, and the sector is responsible for over a quarter of gross domestic product in most countries. Agricultural products account for about 20% of international trade in Africa and is one of the main sources of raw materials for industry.

STUDY CONTEXT

- According to estimates of the World Food Programme of the United Nations, more than 30 million Africans are currently in need of international food aid. Researchers at the African Union reported that the population grew faster than food production on the continent since 1993, which explains the 20% increase in the number of people suffering from hunger from 176 million to 210 million.
- In this context, how can we improve public-private joint action in the field of cooperation for the development of agriculture for that latter contributes more to the fight against poverty? This document is the result of a research project which aims to answer this question.

OBJECTIVES OF THE STUDY

- The main objective of this study is to evaluate the impact of the level of technical efficiency on the added value of agricultural production in Sub-Saharan Africa. It is precisely:
- Measure the level of technical efficiency of agricultural producers;
- Simulate the added value from the optimal level of technical efficiency;
- Estimate the level of poverty due to the counterfactual added value.

METHODOLOGY

- In this study, we use the non-parametric Malmquist productivity index method to capture efficiency levels.
- The Malmquist index (1953) uses the concept of distance function, and therefore its calculation requires prior assessment of the corresponding border.
- The distance function is calculated as the inverse of the largest increase in production, given the input, so that the expanded production reaches the technological frontier. To define the Malmquist index it is necessary to define the distance functions with regard to the technologies from different periods.

MÉTHODOLOGIE

- The distance function measures the maximum proportional increase in production, given the inputs, to represent the observation period $t + 1$ feasible in period t .
- In this step, for each country will be simulated his agricultural wealth estimated as counterfactual added value. It reflects the agricultural added value that this country would have obtained if the production units in his possession were fully efficient.
- For a country, the value added (VA) is the income derived from all farms. It is written $AV = P - CI$, here P is the production sold and CI represents the inputs.

MÉTHODOLOGIE

- Note that it is possible for a country to have a efficiency level higher than unit according to Malmquist index. In this respect, if we call γ the maximum level of efficiency achieved by one or more countries within the group of countries that are the object of study, the counterfactual value is now written by considering the output orientation $AV^* = (\gamma - \delta) P + AV$.
- In the output orientation for a firm of δ efficiency, the level of production may increase $Y - \delta$ without new investment.
- To obtain the counterfactual income of a country, also known as counterfactual Gross Domestic Product (GDP), income are added to the income of non-farm activities, and excluding activities income.

MÉTHODOLOGIE

- That said, the poverty variable is the percentage of the agricultural population living on less than 2 USD per day (poverty line used).
- *The dependent variable P is the poverty rate among the independent variables, $\ln AVA^* / trav$ is the natural logarithm of counterfactual agricultural GDP per worker, $\ln PIBnonagri / trav$ is the natural logarithm of non-agricultural GDP per worker, $\ln fond / hab$ is the natural logarithm remittances per capita, u is the error term, i is the panel (country), t is the time (years).*

DATA SOURCE

- The study will be made over the period from 1996 to 2010, so 15 years. Probably we will choose twenty sub-Saharan African countries on the basis of data availability, but also the degree of utilization of human and physical capital noted in the empirical literature. Most of the data which are available, the panel nevertheless remains cylinder capacity. Finally, we consider two indices measuring the human and physical capital, namely the primary school enrollment rate from the WDI (World Development Indicator, 2013) and physical capital developed by Heston et al. (2012). The latter is calculated by the method of the permanent inventory data from the PWT 7.1.