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AGRICULTURAL GROWTH AND POVERTY REDUCTION IN THE D.R.CONGO: A GENERAL EQUILIBRIUM APPROACH

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Abstract

This paper evaluates the contribution of agricultural growth to poverty reduction in the D.R.Congo over the projection period 2013 - 2020. It raises questions over the investment options to sustain such growth effort. We use a recursive dynamic computable general equilibrium model combine with survey-based micro simulation analysis at both national and subnational levels. We assume in the simulations that the additional growth in total factor productivity is an exogenous factor and find the following results. First, we find that 8.21 % agricultural annual growth rate is more effective at reducing poverty and achieves the goal of halving poverty by 2020. Second, we identify agricultural investment priorities and the required levels of public spending to achieve such growth and poverty reduction goals. We further analyze the growth at the subsector level and find that cereals and roots are more pro-poor. From this perspective, agricultural strategy based on expanding food crops production should be afforded the highest priority.
Keywords: *Computable General Equilibrium, Poverty reduction, Total Factor Productivity.*
JEL Codes: O11 021 O55

1. Introduction

Long term trends for growth and poverty reduction in the D.R.Congo, according to evidence based technical analysis in the strategy support program (Ngeleza, Diao, Ulimwengu & Randriamamonjy, 2011), reveal that the country faces a lot of development challenges. The baseline scenario assumes a continuation of "2002-2009" experience of low agricultural productivity and slow progress in the fight against poverty. It replicates these historic trends from official statistics over the projection period 2010-2015, with an overall economic growth expanding at 5.3% and agricultural GDP at 3% per annum. With these growth paths the country could not achieve the first Millennium Development Goal (MDG) of halving the number of poor people by 2015 at both the national and subnational levels.

For alternative perspectives two scenarios have been considered. The first scenario supposed the pursuit of 6 % annual growth rate in agriculture in line with the Comprehensive Africa Agriculture Development Program (CAADP). The results show that the agricultural, industrial and services sectors expand at 6.2%, 6.9% and 7.4% respectively, dragging an

overall economic growth of 6.8% per year. The poverty headcount rate declines from 70% in 2005 to 35% by 2017 at national level (Ngeleza et al., 2011).

The second scenario (MDG) assessed the feasibility for the country to achieve the first MDG goal of halving its poverty rate in the next 10-15 years. The results show that total GDP will grow at 8.7% annually over the projection period with 8.5% annual growth in agriculture (AgGDP), 9% in industries (InGDP) and 8.6 % in services (serGDP). From this perspective, an annual growth rate of more than 8% in the agricultural sector between 2010 and 2015 is required to achieve the first MDG goal by 2016(Ngeleza et al.)..

However, this technical analysis did not identify agricultural investments priorities nor the required public spending levels to support such growth and poverty reduction goals on a sustainable basis. Furthermore, with the implementation of National Agricultural Investment Plan (NAIP) over the projection period 2013-2020 and growth projections for agricultural products therein, the above results could significantly be modified under alternative growth scenarios and simulations. The sum of these observations justifies the contribution of the present study.

Our main concern is to analyze the contribution of agricultural growth on poverty reduction. Specifically, we aim to address the following issues:

- Is 6 percent agricultural growth enough to achieve poverty reduction goals at both national and sub national levels?
- How much spending is really required to achieve the necessary agricultural growth?
- How should limited public resources be prioritized?
- What should be the priorities among different subsectors in agriculture?

Following Diao, Fan, Kanyarukiga and Yu (2010), we first apply the NAIP's targeted growth to the subsector and crop levels to assess whether these targets can help the country reach 6 percent agricultural annual growth, a goal set by CAADP. We then analyze the linkages between agricultural growth and poverty reduction and assess whether the country can achieve the goal of halving poverty in the next 10-15 years. To evaluate the contribution of agricultural growth to poverty reduction, we further analyze the growth at the subsector level and assess which agricultural subsectors are more pro-poor.

Next, we focus on the required public investment in agriculture and its priorities to achieve these growth and poverty reduction goals. We first assess the investment required for achieving growth and poverty reduction. We further estimate the returns to public investment at the subsector level and then set investments priorities accordingly.

Finally, to estimate the total spending required for achieving agricultural growth targets, we use a two-step approach. We first estimate the agricultural growth required to achieve development objectives using poverty-growth elasticity[2]. Second, the required agricultural growth rate is then used to calculate the required growth in total agricultural expenditures using an expenditure-to-growth elasticity[3].

Scenarios are compared over the period 2013-2020, which coincides with the implementation period of the NAIP and we find the following substantives results. Investing in agriculture by allocating at least 10 percent of public resources to that sector, should help to promote an overall economic growth around 8.92 (7.04) % and achieve the goal of halving the number of poor people from 70 percent in 2005 to around 35 percent by 2016 and by 2017 under CAADP2 and CAADP scenarios respectively.

We further find that cereals and roots are more pro-poor and from this perspective, agricultural investment strategy based on expanding foodcrops production should be afforded the highest priority.

2. Data and Analytic Tool

2. 1. Data and Calibration

We use a 2005 social accounting matrix (SAM) for D.R.Congo developed by Nlemfu (2010) and adjusted by IFPRI in 2011 to calibrate the model. It identifies 38 subsectors, 22 of which are in the agriculture[4],9 in the industries and 7 in the services. All these sub-sectors are spatially disaggregated across the then eleven regions in Congo, which allows a regional assessment of sector growth and policy impacts (Maize, Rice, Wheat and other cereals, Cassava, Potatoes, Sweet potatoes, Other roots, Banana, Pulses, Groundnut, Other oil seeds, Fruits, Vegetables, Cassava leafs, Other crops, Cattle, Goat and sheep, Pigs, Poultry, Other livestock (hunting), Fisheries and Forestry).

Households are classified by place of residence at regional level and fall into two main groups: rural and urban. In addition, this matrix includes three factors of production: capital, labor and land. The labor factor is disaggregated into three different types including:

- Mobile family labor only within each zone among the agricultural sub-sectors.
- Unskilled and skilled workers paid mobile within and between rural and urban areas.
- The possession of land by rural households by region defines the land factor.

This disaggregation of the social accounting matrix (SAM) is motivated by the need to better understand the heterogeneity of the production structure at regional level and sources of income between different types of farmer groups.

Moreover, we have reconfigured our model to reproduce the level and trend of growth observed in the previous five years to 2010. This reconfiguration is justified by the fact of the update data to the World Bank's level the period (World Bank, 2013). Given this situation, we recalculated the average annual rate of factor productivity growth by province and by product.

2.2. Model

To analyze these different concerns, we resort to the general equilibrium model dynamic IFPRI (Thurlow, 2004; Diao, Thurlow, Benin & Fan, 2012), applied to the case of the economy of the DRC (Ngeleza et al., 2011).

Indeed, this model is an appropriate tool to analyze the implications of agricultural growth and the various investment options in agriculture on poverty reduction (Figure 1). As such, this model captures synergies and the acceleration of growth offs in different agricultural sectors, and the development of economic links between the agricultural sector as a whole and the rest of the economy. Note in passing that this model includes a micro simulation module poverty analysis. For a description of mathematical equations and the limits of this model see Diao et al. (2012).

2.3. Closure Rules

These closure rules or macroeconomic closure of the model concern the current account, fiscal balance of the government, and the savings or investment account. We assume essentially that the real exchange rate adjusts to maintain balance in the current account, which is fixed by hypothesis. Thus, the country cannot raise loans abroad, but must generate export earnings to finance imports. Although this hypothesis realistically limits the degree of

import competition in the domestic market, it also underlines the importance of export-oriented sectors, such as high-value agricultural sector. For the budget account, the tax rates and consumer spending are determined exogenously, allowing the budgetary savings to adjust to ensure a balance between revenue and expenditure. Finally, we assume that the total investment is adjusted to changes in national savings under the closure rule "savings-driven investment." These two closures will allow the model to capture the negative implications of the consequent crowding of lower government revenues when growth structure is oriented towards sectors that pay less tax as the sector Agricultural.

We assume that land and labor factors are fully utilized and that wages adjust to balance markets. By adopting this rule of full employment closure, we also assume that the labor market working and that wages adjust to balance the supply and demand of labor.

3. Current State of the Agricultural Sector

3.1. Current State

Agriculture is the core sector of the Congolese economy in terms of its contribution to GDP, employment, etc. Its share in national income has reached to 50% in the year 1990. However, since 2002, this share has gradually decreased but the agricultural sector has still continued to provide up to 40.3% of GDP (against about 13% for the mining sector) and employed three quarters of the workforce in 2006 (Herderschee, Samba & Tshibangu, 2012).

The many constraints facing the agricultural sector can contribute to the explanation of this continuous and gradual decline of agricultural production include: low productivity of plant, animal and fishery sectors; still insufficient budget allocation; degradation and low levels of access to basic infrastructure; the weakness of domestic demand; the low level of development of production; etc(Herderschee et al. 2012). .

Despite these constraints that hinder its development for more than a decade, the agricultural potential is enormous but largely under used: with nearly 80 million hectares of arable land of which only 9-10% is currently cultivated. The agro-climatic diversity, abundance and regularity of rainfall and the presence of surface water in large quantities allow a much diversified production. The central basin offers favorable climatic conditions for oil palm cultivation, rubber, coffee, cocoa, bananas and cassava while the savanna areas promote the cultivation of cotton, cereals, legumes seed and livestock and mountainous areas with a relatively temperate climate for livestock and high altitude crops such as coffee, tea, green apple.

3.2. Agricultural Development Strategies

Several agricultural development strategies have been put to use in order to revive the agricultural sector and its potential.

The Democratic Republic of Congo has officially launched the Comprehensive Development Program for Agriculture in Africa (CAADP) on June 2010 in Kinshasa with the support of COMESA (Common Market of the African States of the East and Southern Africa).

The Round table for the signing of the Charter was organized on March 2011 in Kinshasa in the presence of government authorities, the Commissioner of the African Union in charge of Rural Economy and Agriculture, Assistant Secretary General of COMESA, NEPAD representatives, FARA, IFPRI, the Re-SAKSS and the Delegates of Technical and Financial Partners, Private Sector of Civil Society Organizations and Agricultural Producers' Organizations.

The organization of the Round Table enabled the Ministry of Agriculture and Rural Development (MINAGRIDER), in consultation with all stakeholders, to begin the process of formulating 2013-2020 National Agricultural Investment Plan (NAIP).

The National Agricultural Investment Plan aims to boost the sector by identifying the major challenges facing the Nation for 2020:

- Secure and modernize agricultural production systems.
- Overcoming malnutrition and food insecurity.
- Mobilize substantial investment.

By opting for sustained economic growth through agriculture as the main strategy to reduce poverty, DRC expects an annual agricultural growth rate of at least 6% and to gradually increase the contribution to the agricultural sector to 10% of the national budget. These growth targets are consistent with the objectives of CAADP.

4. Results

In this point, we present the model results and their interpretations. This presentation is preceded by various growth scenarios and options identified in our work.

4.1. Growth Scenarios

Given the sector agricultural growth options retained in the NIPA, we considered 8 scenarios in the table below:

Table 1 Scenarios

	S_1	S_2	S_3	S_4	S_5	S_6	S_7
Cereal-leg growth	X				X		X
Roots-leg growth		X			X		X
Ocrops led growth			X		X		X
Livestock-led growth				X	X		X
Non Agr. Led growth						X	X

Source: Authors

- The scenarios (S_1 to S_4) focus on promoting the growth of grains, tubers, other crops and livestock respectively, using national targets annual growth rate of total factor productivity;
- The $\mathbf{S_5}$scenario combines the four scenarios above (all sub sectors of agriculture) in one simulation. This scenario is designed to model the joint effects of growth across all agricultural subsectors;
- The $\mathbf{S_6}$ scenario considers that the non-agricultural sector ;
- The $\mathbf{S_7}$scenario: Target annual rate of agricultural growth of 6% without additional growth in the non-agricultural sector ;
- The S_8 scenario target of halving the national poverty rate within PNIA period. This scenario is not included in Table 1.

S_1 to S_4 scenarios are different agricultural growth options at sector level. By cons, $\mathbf{S_7}$ and $\mathbf{S_8}$ scenarios combine S7and S8. These scenarios are used to assess the links and synergy effects of growth in the agricultural and non-agricultural sectors, and the implications on the rest of the economy.

In most of these scenarios, the growth is mainly due to the improvement in total factor productivity. Thus, the total productivity of factors specific to the agricultural sectors by province, were applied so that the potential returns targets are met during the period 2013 - 2020. We assume that the expansion of land remained the same as in the baseline and that this productivity growth is exogenous to the model.

Given the projection of agricultural production induced by NIPA during the period 2013-2020 (NAIP, Appendix 3), we simulate a consecutive exogenous shock to the additional increase in total factor productivity, to assess whether the country could achieve the goal of at least 6% annual agricultural growth during this period.

4.2. Results and Interpretations

First, we analyze the level of agricultural growth induced by the investment plan; we evaluate its implications for poverty reduction (Scenarios $\mathbf{S_7}$ and $\mathbf{S_8}$). Finally, it will be a question of assessing the level of expenditures necessary to allocate budget to the agricultural sector and identify priority investments.

4.2.1. Accelerated Agricultural Growth: CAADP Scenario (S_7)

The effective implementation of the National Agricultural Investment Plan will enable the agriculture and its sub sectors play an important role in growth and poverty reduction. Indeed, the results show that when the agricultural growth rate of 6% is targeted ($\mathbf{S_7}$ CAADP scenario or scenario) during the period 2013-2020, the annual growth in agriculture is at least 6.15%. Industrial and services sectors increased by 7.07% and 7.39%, respectively, resulting in a growth of 7.04% for the whole of the national economy (Table 2).

Table 2.National and Sector GDP Growth Rates In The Baseline, CAADP And MDG-1 Scenarios

Sectors	Average annual growth rate (%)				
	BASE	CAADP		MDG-1	
	Base-run	2010-2020	2013-2020	2010-2020	2013-2020
Total GDP	**5.56**	**7.06**	**7.05**	**8.83**	**8.92**
Agriculture	**3.34**	**6.03**	**6.15**	**7.99**	**8.21**
Cereals	1.05	5.31	5.37	6.66	6.72
Roots	3.27	5.60	5.75	7.66	7.93
Pulses and oilseeds	2.69	5.83	5.91	7.34	7.44
Other crops	4.35	6.99	7.19	8.53	8.89
Livestock	5.34	7.32	7.37	9.15	9.32
Other agriculture	3.32	5.54	5.55	8.92	9.07
Industry	**6.23**	**7.13**	**7.07**	**9.48**	**9.56**
Mining	7.29	7.21	7.17	10.84	10.88
Manufacturing	5.79	7.32	7.24	8.78	8.85
Processing	5.80	7.46	7.45	9.05	9.23
Other manufacturing	5.77	6.91	6.65	7.97	7.71
Other industry	4.62	6.14	6.07	7.92	7.97
Services	**5.93**	**7.44**	**7.39**	**8.67**	**8.69**
Private services	6.12	7.69	7.63	8.96	8.96
Government services	4.28	5.10	5.04	6.01	6.05

Source: Model results

However, the results show that the objective of 6% agricultural growth is not possible in all provinces. Indeed, as shown in Table 3, only the provinces of Bandundu, Equator and Katanga realize 6.56% respectively 8.10% and 7.27% annual agricultural growth.

Given this level of growth, it would be interesting to assess its implications for poverty reduction. We will consider this alternative in the MDG-1 scenario framework in the following points.

4.2.2. Poverty reduction: MDG-1 scenario (S_8)

Tables 4 and 5 annexes and Chart 1, analyze the situation of poverty between CAADP and MDG-1 scenarios at national and subnational levels. They highlight the number of years needed to reach this MDG-1 target namely to halve poverty within PNIA period.

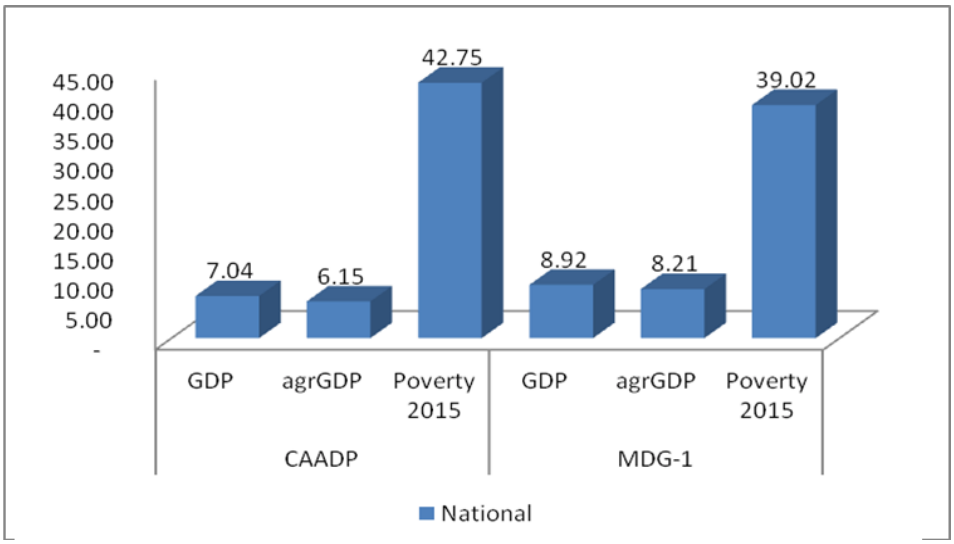

Figure 1.Poverty Headcount Rate within PNIA period

While NIPA is effectively implemented and that the 6% target objective is pursued, the poverty rate is reduced from 48.52% to 42.75% between 2013 and 2015 to reach 29.78% in 2020. In view of this evolution, the country can achieve the goal of halving the 2005 poverty level in 2018.

Compared to the baseline situation, this development marks a gain of four years (Table 4). This increase is justified by an improvement in the living conditions of people in rural areas, as a result of the increase in their income.

However, if halving the 2005 poverty level in 2015 were targeted (Table 5), the poverty rate would reduced from 47.02% to 39.02% between 2013 and 2015, reaching 20.93% in 2020. Thus, the goal of halving the 2005 poverty rate is reached in 2016.

Therefore, in order to achieve this level by 2015, an additional increase in agricultural and non-agricultural growth were necessary at least 8.21% for the agricultural sector, 9.56% for industry and 8.69% for services which would lead to an increase of at least 8.92% over the whole of the national economy (Tables 2 and 5).

Given the characteristics of the Democratic Republic of Congo, and the differences in agricultural potential between provinces, options for growth and poverty reduction would not have the same effects. Only the provinces for agricultural use would register a growth rate of at least 6%, and five of them would have reached the MDG-1 by 2015 if the NIPA were

effectively implemented and the option reduction of poverty described as a growth option (Table 5).

4.2.3 Agriculture's Share of Budget Expenditures

Given the different growth levels seen in the above scenarios, it is important to estimate the level of agricultural expenditure necessary to achieve these desired growth targets.

Agriculture receives an insignificant portion of the state budget: 0.8 percent in 2002, 1.3 percent in 2004 and 1.7% in 2007. Considering the reference period 2010-2013, as regards the data provided by the Ministry of Agriculture, this share would be 1.07%, 1.37%, 3.85% and 1.26% respectively in 2010, 2011, 2012 and 2013, an average of 1.92% during the period 2010-2013 (MINAGRIDER, 2013).

Based on this trend and in consideration of the assumption of a high elasticity of 0.308, if the target growth scenario is considered by 6%, the proportion allocated budget would be 1.51% in 2013 and 2.62% in 2020 against 1.59\% and 3.24% respectively in 2013 and 2020 when the scenario of poverty reduction is targeted as an alternative (Table 6).

For both scenarios, we considered the growth-poverty elasticities of 0.15 and 0.308 provided by Fan, Yu and Saurkar (2008). This elasticity means that for every 1% increase in agricultural spending, we have a growth of agriculture GDP by 0.15% in the case of the elasticity of 0.15% for 0308 and that of 0.308.

Overall, in order to support these growth efforts, the Congolese State should allocate up to at least 9.01% by 2020 from its budget to the agricultural sector, unlike the insignificant share of 1.92% the reference situation, if he would come to achieving the goal of poverty reduction. So it would be important to ensure both on financial mobilization and planning capabilities that technical execution of national agricultural investment plan. Hence an analysis of priority investments for optimal allocation of resources is essential: it is the subject of the next point.

4.2.4 Growth sector and in identifying priority sectors (Scenarios S_1 to S_4)

Table 7 gives the results of different growth options in the agricultural sub sectors and their contributions in the long-term goals. In this table, the third, fourth and fifth columns tell us about the growth rate of national and agricultural GDP, and national poverty for the various options considered. Take for example, the scenario 'cereal-led growth' that causes agricultural GDP increased up to 3.93% of GDP against a national increase of 5.60%. This situation is explained by the links of production and upstream and downstream consumption.

In other words, the increase in grain production stimulates production in food industries downstream, which while lowering grain prices, increasing disposable incomes and leads to increased demand for other products. These links inter sector or multiplier effects are illustrated in the first column of Table 8.

Furthermore, this table 8 we can identify as priority and potentially profitable agricultural sectors for investment based on four indicators: multiplier effects, effect size. Indeed poverty reduction and yield potential. It appears from this table that the sub-sectors 'Cereal and Tuber' are priority sectors considering the four indicators together. By contrast, if the goal of the government is to focus on sectors with high growth potential and effect initial size, the sub-sectors 'Cereal', 'tubers' and 'Industrial crops' are selected (Figure 2).

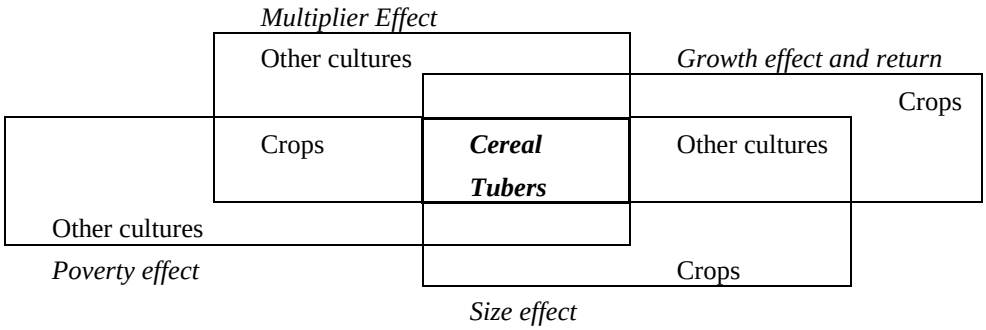

Figure 2. Identification of Priority Sub Sectors and Investment

However, compared to the target objective of 6% growth, no sub sector growth option, taken individually, has realized the long-term goals of growth and poverty reduction by 2015 (Table 7 Annex).

Overall, growth in the agricultural sector was mainly influenced by an increase in yields of certain crops (i.e., 3.5%, 1.22%, 2.71%, 2.63% and 4.86% respectively for maize, rice, cassava, Plantain and industrial crops) which have had a significant impact on the sector output of cereals, tubers and industrial products (other cultures) that are essentially exports (Appendix Table 9).

5. Conclusion

This study analyzed the implications of agricultural growth on poverty reduction in the DRC, using a model of computable general equilibrium and dynamic micro-simulation, during the period 2013-2020.

It was structured around key concerns including that of the issue of the level of public spending compatible with the objectives of sustained agricultural growth and poverty reduction.

The results show that if the National Agricultural Investment Plan is effectively implemented under the MDG-1 scenario, the country could achieve in 2020 a GDP growth of at least 8.21% for the agricultural sector, 9.56% for industry and 8.69% for services which would lead to an increase of at least 8.92% of overall GDP. With these growth rates, the level of poverty is reduced from 47.02% to 39.02% between 2013 and 2015, reaching 20.93% in 2020. Thus, the goal of poverty reduction is achieved 'either in 2016.

To support such an effort of agricultural growth and poverty reduction, a significant increase of public resources allocated to the agricultural sector, up to 10% of the total government budget, is necessary. Indeed, if we consider the hypothesis of a low elasticity, this share would fall 1.95% in 2013 and 9.01% in 2020 if the NIPA is effectively implemented and that the lens WCO-scenario 1 is referred, against 1.77% in 2013 and 6.09% for 2020 to the alternative scenario.

However, for an effective and efficient allocation of these resources, priority and sequence of investment to growth sectors must be considered. Indeed, it appears from this study that, in the agricultural sectors of cereals, tubers and industrial crops are proving priority and potentially profitable for investment. It would be important to ensure both on financial mobilization and planning capabilities that technical implementation of the various agricultural investment options.

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[2] It measures the percentage change in the poverty headcount rate caused by a 1 percent increase in per capita GDP.

[3] It measures a percent change in agricultural GDP growth due to a 1 percent change in total agricultural expenditures.

[4] This disaggregation is motivated by the need to better understand the heterogeneity of the production structure at regional level and sources of income between different types of farmer groups.

ANNEXES

Table 3. National and Regional GDP Growth Rates in the Baseline, CAADP and MDG Scenarios (2013 -2020)

	GDP			Agriculture			Industries			Services		
	Baseline	CAADP	MDG -1	Baseline	CAADP	MDG -1	Baseline	CAADP	MDG -1	Baseline	CAADP	MDG -1
National	5.50	**7.04**	**8.92**	3.28	**6.15**	**8.21**	6.17	**7.07**	**9.56**	5.83	**7.39**	**8.69**
Kinshasa	6.04	7.82	7.41	-	-	-	5.28	7.30	7.73	6.30	7.99	7.30
Bas-Congo	4.38	5.70	6.03	2.16	5.42	6.55	4.92	5.96	6.26	5.36	4.68	3.31
Bandundu	4.35	6.67	10.10	3.53	6.56	9.92	5.87	7.47	8.74	5.40	6.77	10.45
Equateur	5.17	7.78	10.09	4.72	8.10	9.80	5.17	6.69	9.49	5.94	8.00	11.04
Oriental	5.12	6.43	9.11	3.38	5.38	8.16	6.71	8.06	10.98	4.74	5.64	8.09
Nord Kivu	4.57	5.57	8.20	3.25	3.90	6.90	4.65	5.83	7.69	4.83	5.86	8.51
Maniema	4.52	5.06	5.22	2.03	4.47	4.86	5.48	6.43	6.60	5.57	4.56	4.56
Sud Kivu	4.52	5.54	8.27	2.79	4.63	6.91	5.54	6.32	9.08	3.75	4.37	7.69
Katanga	6.65	7.87	11.69	2.83	7.27	9.84	7.48	7.66	11.70	6.25	8.40	12.27
Kasai Orient	3.59	5.07	7.70	2.52	5.03	6.94	3.81	4.83	6.70	4.41	5.19	8.72
Kasai Occ	3.88	5.15	5.18	3.02	4.90	4.90	4.65	5.07	5.62	4.94	5.87	5.34

Source : Model results

Table 4. Poverty Headcount Rate at Both National and Subnational Levels, Under CAADP Scenario (2013 - 2020)

	GDP	Agr GDP	Poverty 2013	Poverty 2015	Poverty 2020	Year to meet the first MDG goal (halving 2005's povery rate) with 6 percent "CAADP" growth rate	Number of years to meet MDG1 after 2013 with "CAADP" growth	Number of years shortened by CAADP growth to meet the first MDG goal
National	7.04	6.15	48.52	42.75	29.78	2018	5	4
Kinshasa	7.82		33.72	28.67	17.33	2016	3	6
Bas-Congo	5.70	5.42	28.10	21.90	9.05	2 015	2	0
Bandundu	6.67	6.56	63.51	56.77	41.75	2 019	6	7
Equateur	7.78	8.10	71.84	65.11	49.06	2 021	8	6
Oriental	6.43	5.38	47.40	42.54	31.23	2 018	5	3
Nord Kivu	5.57	3.90	47.42	43.10	29.91	2 019	6	3
Maniema	5.06	4.47	27.78	22.51	15.55	2 015	2	0
Sud Kivu	5.54	4.63	58.68	52.07	34.51	2 018	5	3
Katanga	7.87	7.27	49.83	43.25	30.17	2 018	5	6
Kasai Orient	5.07	5.03	38.71	33.34	23.20	2 016	3	3
Kasai Occ	5.15	4.90	28.68	24.50	14.37	2 015	2	2

Source : CGE Model and Microsimulation

Table 5. Poverty Headcount Rate at Both National and Subnational Levels, Under CAADP Scenario (2013 - 2020)

	GDP	Agr GDP	Poverty 2013	Poverty 2015	Poverty 2020	Year to meet the first MDG goal (halving 2005's povery rate) with 6 percent "CAADP" growth rate"	Number of years to meet MDG1 after 2013 with "CAADP" growth	Number of years shortened by CAADP growth to meet the first MDG goal
National	8.92	8.21	47.09	39.02	20.93	2016	3	5
Kinshasa	7.41		32.63	26.22		2 015	2	7
Bas-Congo	6.03	6.55	27.15	18.88	6.15	2 015	2	0
Bandundu	10.10	9.92	62.43	52.62	28.89	2 017	4	9
Equateur	10.09	9.80	71.91	62.75	39.56	2 019	6	8
Oriental	9.11	8.16	46.01	39.08	19.75	2 016	3	5
Nord Kivu	8.20	6.90	45.60	38.33	21.12	2 016	3	6
Maniema	5.22	4.86	26.39	20.37	11.41	2 015	2	0
Sud Kivu	8.27	6.91	54.64	45.22	19.04	2 016	3	5
Katanga	11.69	9.84	47.46	37.95	19.62	2 016	3	8
Kasai Orient	7.70	6.94	37.14	30.54	18.88	2 015	2	4
Kasai Occ	5.18	4.90	28.98	23.37	11.04	2 015	2	2

Source: CGE Model andMicrosimulation

Table 6. Agriculture Expenditures

Indicator	Baseline (2010-2013)	CAADP Scenario		MDG-1 scenario	
		Low elasticity	High elasticity	Low elasticity	High elasticity
Agriculture expenditures	10.57	40.98	19.96	54.72	26.65
Total expenditures budgets	4.69	18.19	9.37	24.30	12.49
Total expenditures Ratio (%)					
Agric. expend. /Tot. Expend.					
Bench mark	1.92				
For 2013		1.77	1.51	1.95	1.59
For 2020		6.09	2.63	9.01	3.25

Source: CGE Model andMicrosimulation

Table 7.Sector Scenarios: Poverty and GDP Growth Options (2013 - 2020)

	GDP reference for 2020 (millions CDF)		GDP growth 2013-2020(%)		
	GDP	AgrGDP	GDP	AgrGDP	Poverty 2020
CEREAL-led growth	12 203 964.99	2 116 157.87	5.60	3.93	38.73
ROOTS-led growth	12 318 042.66	2 131 927.63	5.72	4.09	36.91
OCROP-led growth	12 468 366.07	2 197 886.16	5.88	4.52	38.92
LIVESTOCK-led growth	12 189 564.75	2 053 712.73	5.62	3.71	37.89
ALLAGR-led growth	13 020 739.82	2 545 986.24	6.32	6.01	33.21
CAADP scenario	14 290 151.16	2 585 878.83	7.04	6.15	29.78

Source: CGE Model and Micro simulation

Table 8.GDP Growth Options and Investment Priorities (2013-2020) (2013-2020)

Identification of priority agricultural sub sectors								
	GDP growth multiplier		Initial size		Growth-poverty Elasticity		Growth-poverty Potential GDP growth	
	Value	rank	Value	rank	Value	rank	Estimations	rank
CEREAL-led growth	5.77	3	8 336 498.94	3	-0.80	3	Medium to high	2
ROOTS-led growth	5.78	2	8 343 728.59	2	-0.87	1	Medium to high	3
OCROP-led growth	5.67	4	8 357 561.40	1	-0.74	4	Medium to high	1
LIVESTOCK-led growth	5.94	1	8 312 234.34	4	-0.83	2	-	-

Source: CGE Model and Micro simulation

Table 9. Return Growth and Agriculture Production (MDG 1-Scenario)

	Returns					**Production**				
	Level (mt/ha)			**GDP Growth**		**Level (mt)**			**GDP Growth**	
	Bench mark	**Baseline**	**Target**	**Baseline**	**Target**	**Bench mark**	**Baseline**	**Target**	**Baseline**	**Target**
	2013	**2020**	**2020**	**2013-2020**	**2013-2020**	**2013**	**2020**	**2020**	**2013-2020**	**2013-2020**
Cereals										
Maize	0.79	0.76	1.01	-0.53	3.50	732.10	1 136.09	1 497.32	6.48	10.76
Rice	0.83	0.67	0.90	-2.92	1.22	208.08	136.42	299.29	-5.85	5.33
Other cereals	0.64	0.52	0.73	-2.85	1.90	34.61	8.62	31.74	-18.01	-1.23
Tubers										
Cassava	8.65	7.34	10.43	-2.33	2.71	1 711.30	2 631.80	3 690.61	6.34	11.60
Potatoes	5.14	4.10	6.50	-3.17	3.40	72.62	136.87	178.11	9.48	13.67
Sweet potatoes	5.44	4.35	5.76	-3.15	0.83	92.62	200.34	256.85	11.65	15.69
Other tubers	6.06	4.98	6.63	-2.78	1.27	275.32	480.89	610.96	8.29	12.06
Plantain	4.38	3.64	5.26	-2.61	2.63	90.14	143.18	193.13	6.83	11.50
Leguminous plant and oleaginous										
Pulses	0.64	0.53	0.72	-2.57	1.79	88.36	138.35	191.84	6.62	11.71
Peanuts	0.84	0.70	0.87	-2.46	0.49	125.17	213.50	275.84	7.93	11.95
Other oleaginous	3.60	2.91	3.76	-2.97	0.61	150.95	212.00	314.73	4.97	11.07
Other cultures										
Fruits	15.50	12.68	16.77	-2.84	1.13	203.53	376.55	484.51	9.19	13.19
Vegetables	5.80	4.86	6.52	-2.50	1.69	87.29	151.60	201.94	8.21	12.73
Industrial cultures	0.41	0.35	0.57	-2.33	4.86	114.10	230.08	320.00	10.54	15.87
All cultures										

Source: CGE Model and Micro simulation