African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Agricultural Growth in Cameroon: What Effects of Official Development Assistance Financing?

Auteur 1 : Ngoura Ndjidda,
Auteur 1 : Ngo Bilong Amoa Adele,
Auteur 1 : Mohammadou Nourou,

Ngoura Ndjidda, PhD, Lecturer

The University of Maroua/ National Advanced School of Mines and Petroleum Industries /Cameroon

Ngo Bilong Amoa Adèle, PhD, Senior Lecturer

The University of Maroua/ National Advanced School of Mines and Petroleum Industries /Cameroon

Mohammadou Nourou, PhD**,** Associate Professor

The University of Garoua/ Faculty of Economics and Management /Cameroon

Déclaration de divulgation : L'auteur n'a pas connaissance de quelconque financement qui pourrait affecter l'objectivité de cette étude.

Conflit d'intérêts : L'auteur ne signale aucun conflit d'intérêts.

Pour citer cet article : NGOURA .N , NGO BILONG AMOA .A & NOUROU .M (2022) « Agricultural Growth in Cameroon: What Effects of Official Development Assistance Financing? » , African Scientific Journal « Volume 03, Numéro 14 » pp: 609-628.

Date de soumission : Aout 2022

Date de publication : Octobre 2022

DOI : 10.5281/zenodo.7324075

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Abstract

The purpose of this article is to evaluate the effects of Official Development Assistance (ODA) in agriculture on all sectors of the Cameroonian economy. More specifically, it aims to assess the effects of this funding on agricultural value added, industrial value added, food consumption, the well-being of the population and economic growth. To achieve this, we used the Computable General Equilibrium model developed with the support of AGRODEP, PEP and IFPRI. We have come to the following conclusions: any increase in ODA stocks directed towards the agricultural sector generates growth in agricultural production, an improvement in government revenue, and, by extension, contributes to economic growth. To achieve this, strong actions to improve the business climate must be taken by the authorities to attract external capital to finance this sector.

Keywords: Food security, Computable General Equilibrium, External financing, Agricultural growth, Official Development Assistance.

Résumé

L'objectif de cet article est d'évaluer les effets de l'Aide Publique au Développement (APD) du secteur agricole sur l'ensemble des secteurs de l'économie camerounaise. Plus spécifiquement, il s'agit d'évaluer les effets de ces financements sur la valeur ajoutée agricole, la valeur ajoutée industrielle, la consommation alimentaire, le bien-être de la population et la croissance économique. Pour y parvenir, nous avons mis à contribution le modèle d'Equilibre Général Calculable développé avec l'appui d'AGRODEP, du PEP et IFPRI. Nous arrivons, à l'issue des travaux, aux conclusions suivantes : toute augmentation des stocks d'APD, orientées vers le secteur agricole génère une croissance de la production agricole, une amélioration des recettes de l'Etat, et par conséquent contribue à la croissance économique. Pour y arriver, les actions fortes visant à améliorer le climat des affaires doivent être menées par les autorités pour attirer les capitaux extérieurs afin de financer le secteur agricole.

Mots Clés : Sécurité alimentaire, Équilibre Général Calculable, Financements Extérieurs, Croissance agricole, Aide Publique au Développement.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Introduction

In Cameroon, the agricultural sector plays an essential role in the economy. It accounts for nearly a quarter of GDP and generates half of the revenue from non-oil exports. It employs around 60% of the working population (NIS, 2018). It is the main provider of employment, accounting for 46% of employment in 2019 (WDI, 2019) and represents almost 50% of exports (WDI, 2019). Despite this substantial contribution to the economy, agricultural policy has remained stable in Cameroon, with public expenditure allocated to this sector remaining stagnant, with only about 4.5% of the state budget allocated on average each year (MINEPAT, 2016). It is in this context that Cameroon adopted in 2014 the National Agricultural Investment Plan (NAIP)[1], which is a result of Cameroon's adherence to the Comprehensive Africa Agriculture African Agriculture Development Programme (CAADP). The objective of this national policy is to work towards improving the performance of the agricultural sector.

In addition, the government, through Minepat[2], has set up a framework of the Multi-Partner Committee (CMP) for the follow-up of the DSCE, which aims at coordinating ODA actions in Cameroon. Several bilateral and multilateral agencies are involved in supporting Cameroon's agriculture. These include the PIDMA financed by the World Bank, the PADMIR and the PEA-Jeunes, financed by IFAD, the ACEFA programme and the PMEA, financed by the AFD. The Bank's involvement in the CMP-rural has made it possible to draw up a catalogue of interventions in agricultural value chains: World Bank (cassava, sorghum and maize), IFAD (onions), FAO (cassava), German Cooperation (cocoa, poultry and onions) and the European Union (coffee/cocoa and milk). The contribution of these different donors to Cameroonian agriculture is estimated at 890 million euros between 2014 and 2020.

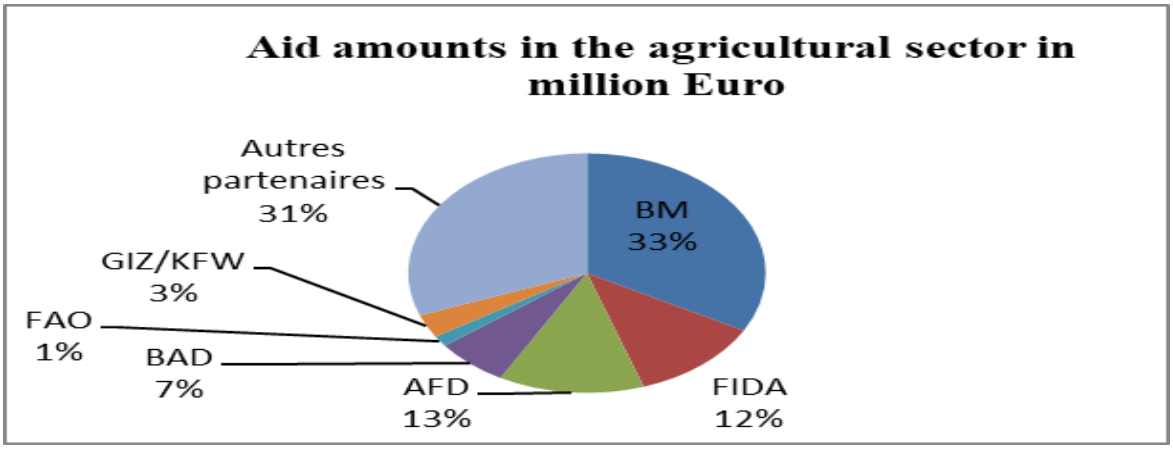
[1] Objectives and Priorities of the NAIP

- To make Cameroon's rural sector products more competitive and gain additional shares in the sub-regional and international markets, while allowing satisfactory coverage of food and nutritional needs.
- To improve the performance of the fundamental factors of production through the optimal use of land and water resources, the improvement of the living environment of rural producers and their connection to markets, the improvement of access to materials, equipment and adapted financing.
- Optimise the sustainable use of natural resources for the balanced promotion of all sectors, taking into account the constraints of environmental preservation and adaptation to climate change.
- Create favourable conditions for the development of the sector by improving governance by involving all the actors concerned, in order to ensure effective and efficient planning, programming, budgeting, mobilisation of funding, implementation and monitoring-evaluation of the development of the rural sector.

[2] Ministry of Economy, Planning and Land Management

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Figure N°1: Donor contributions to the agricultural sector in Cameroon 2014-2020



Source: Author based on data from FAO, Minepat and Minader

Moreover, over the period from 2010 to 2020, the World Bank estimates an overall contribution of nearly CFAF 3,000 billion in terms of global ODA. The amount allocated to the agricultural sector is estimated at more than CFAF 900 billion, i.e., about 26% of the total aid received by the country. At the level of bilateral cooperation, several countries are also involved: France (SCAC/AFD), Netherlands (SNV), Spain (AECID), Canada (CIDA), Germany (KfW, GIZ), USA (USAID), Japan (JICA), South Korea (KOICA), etc.

It is therefore appropriate to ask about the direct and conditional effects of ODA on agricultural growth and the effects on the Cameroonian economy.

To this end, the main objective is to assess the effects of agricultural ODA on all sectors of the Cameroonian economy. More specifically, it is to assess the effects of this funding on agricultural growth, industrial value added, food consumption, welfare, and economic growth. The originality of this work is that it re-examines the effects of ODA not only on the growth of the agricultural sector, but also its repercussions in all sectors of the Cameroonian economy. The remainder of the article is set out in four sections.

1. Literature review

1.1. Theoretical literature review

According to Clemens and al. 2012, ODA appears as an aggregation of very heterogeneous components that may or may not have an impact on growth. Investments in schools, agriculture, and infrastructure influence growth and to some extent on poverty reduction in host countries. The theoretical anchoring of the ODA-agricultural growth relationship shows that ODA funding influences agricultural growth. For Ferry (2013), ODA is now considered one of the main solutions for promoting economic development and reducing poverty. The result of

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Loayza and Raddatz (2010) shows that ODA has a greater contribution in unskilled labour intensive sectors (agriculture, construction, manufacturing). According to Morrissey and al. (2006), the economic debate is about the potential effect of aid on poverty through the public finance channel. By alleviating the budget constraint, ODA can lead to increased spending in social sectors, such as health, education or agriculture. These sectors are most likely to benefit the poor. Several studies have also shown the positive role of ODA on poverty through the public expenditure channel. In this context, Gomanee and al (2002) argue that aid increases pro-poor spending in developing countries. They also show that pro-poor spending is higher in countries receiving more aid, all else being equal. In addition, ODA allocated to a sector is likely to increase public spending in that sector and create added value.

1.2. Synthesis of empirical work

While it is recognised that ODA is important for growth and poverty reduction, it remains refutable. Indeed, the work of Griffen and Enos (1970) questioned the effectiveness or role of aid on the growth and welfare of host countries. Their analysis is based on an empirical study. A study by Levin and Dollar (2005) shows the existence of a variety of fragile, institutionally weak countries that are left behind by the donor community. In addition, some studies have shown that ODA does not necessarily lead to increased sectoral spending and therefore has no effect on growth, especially if the latter is directed towards sectors such as education and health. Indeed, for Dreher and al (2015 and 2019), ODA allocated to a social sector does not always favour the poorest. Morrisson (2002) argues that, in Madagascar and Tanzania, aid allocated to education and health services does not primarily benefit the poor. Castro-Leal and al (1999) conclude that the increase in social spending from ODA in Africa has not benefited the poor. Furthermore, Nourou (2014), using an analysis based on the impacts of aid on development, has shown that increased dependence on foreign aid worsens social and human development. By constructing a social development index similar to GDP, the author found a negative relationship between aid and social development.

The role of external financing (ODA) on the development of the agricultural sector is a convincing fact for both developed and developing countries. In a study on the direct effects of agricultural ODA on the growth of this sector, Norton and al. (1992) estimated the effects of ODA on 98 countries over the period 1970-1985 using the panel data method. Their findings show that aid directed to the agricultural sector promotes the development of this sector and at the same time an improvement in the living conditions of the population, as well as the development of the rural sector (Kaya and al., 2008). In the context of SSA countries, Apkodje

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

and Omojimite (2008) used the simultaneous equation method on data from 1970-2007 to analyse the effects of agricultural aid on the growth of this sector. They find that any increase in agricultural financing (agricultural ODA) has a positive impact on agricultural growth, exports, and rural sector development. Reuben Adeolu and Alabi (2014), used the GMM method on data for the period 2002-2010 for selected SSA countries. Their findings showed that ODA directed towards growth sectors such as agriculture would have a positive impact on the productivity of the said sector at the 10% threshold. It would have an impact on agricultural development with an increase in the value added of this sector, an improvement in the standard of living of the population and an increase in state revenue via exports (Loayza and Raddatz, 2010; Ssozi and al, 2019). The same is true for the work of Dillon and Sofia (2010) on the impacts of conditional aid allocated in the agricultural sector in Ethiopia. Using panel data on 15 villages and 4 agricultural sectors, they show that aid does not necessarily impact on agricultural productivity, as it is often poorly directed and monitored.

1. Methodology and Data Sources

2.1. Data and model justification

The Computable General Equilibrium Model (CGEM) is a tool calibrated on a Social Accounting Matrix (SAM). In this research, the SAM is constructed from the 2014 aggregate matrix for Cameroon, developed by the National Institute of Statistics (NIS), which has been modified to address the issue of managing ODA flows in the agricultural sector. The main changes made concern the disaggregation of the agricultural sector, considering the disaggregation of labour and capital factors and the introduction of the land factor. They were made using the 2014 Supply and Use Table (SUT) and the Integrated Economic Accounts Table (IEA). The matrix created includes five categories of production factors (labour, public capital, private capital-APD, private capital-IDE, private capital-TFM and land), four sectors of activity and four products. The institutional accounts are represented by public employees, private employees, farmers, informal and non-farm households, firms, government and the rest of the world.

In this paper, we use the CGE model inspired by Walras's (1874) microeconomic theory of general equilibrium, which is mainly used for simulation and policy-making. The interest of the CGE model compared to other macroeconomic models is its ability to explicitly represent the potential transmission channels of shocks and to take into account the structure of the economy by integrating the different interdependencies between economic agents in a single framework.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

The use of this model is justified to meet our objective, as the CGE model allows us to simulate the effects of ODA and see its impact on all sectors of the economy. In concrete terms, in an improved version, the theoretical model that we postulate in the framework of this work is inspired by the CGE model constructed by Décaluwé, Limelin, Robichaud and Maisonnave (2013) and developed with the support of AGRODEP , PEP and IFPRI , which includes three sectors or branches of production, two of which are goods sectors (agricultural products) and market and non-administrative services (agriculture, industry); a non-market sector (service) that produces administrative services such as the management of agricultural financing through FDI, remittances and ODA. Four types of households are present in this model: rural households (farm and non-farm) and urban households (farm and non-farm). It is multi-sectoral and static on a country basis. World prices are considered as given, since it is the small country hypothesis that is taken into account. On the other hand, the prices of goods traded bilaterally are endogenous. They are determined by the balance between supply and demand for imports from and to a country in the region. Finally, this model assumes that all markets are competitive.

2.2.The Impact model

In this model, each period is solved in static equilibrium. The model equations are described in 8 blocks and define how the variables related from one period to another evolve.

2.2.1 The production block

The standard PEP 1-1 model is applicable to a small open economy with exogenous world prices. The model allows for modifications to incorporate the structural characteristics of an economy. The output of industries is modelled in three stages. At the first level, it is represented by a Leontief-type function between intermediate consumption and the value added of the sector. Then, the value added is a constant elasticity of substitution (CES) function between labour (composite labour) and capital. At the third level, composite labour demand is a CES function between the different categories of labour and capital. The capital factor is assumed to be mobile between industries and we assume a single rate of return on capital for the economy. The demand for labour by industries that maximises total profit is derived from the cost minimisation constrained by the production technology represented by a CES function. The assumption of full employment of labour input is maintained.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

2.2.2 Income, savings and expenditure of agents

The income structure of agents is consistent with that of the SAM. Each category of household receives a fixed proportion of income from the factors of skilled labour, unskilled labour, and capital, plus transfers received from the state, the rest of the world and other households. Household disposable income is obtained by subtracting from income direct taxes paid to the government and transfers paid to the rest of the world and to other households. Household expenditure consists of consumption and investment expenditure. Domestic demand is satisfied by domestic sales, including taxes, and imports, including customs duties.

Domestic demand for each product is the sum of household and government consumption expenditure, investment demand and intermediate consumption demand. Households' final consumption demand for each product derived from their preferences is represented by a Stone Geary utility function. Maximising the utility function under the budget constraint results in a linear expenditure system (LES) with a fixed component related to non-discretionary consumption and a variable component. A characteristic of this function is that there is a minimum level of consumption for each good. Investment demand is split into public and private investment. Finally, mark-up rates are applied to the values of domestic and imported production to determine the value of mark-ups for product demand.

The income of firms is composed of capital income, income from transfers from other agents. Firms pay direct taxes on their profits, interest on debt and transfers to other agents (domestic and non-domestic).

The government is passive, i.e., it does not optimise an objective function. The role of the government is to regulate economic activities and ensure the redistribution of income. Its income (YG) comes from the remuneration of capital (rK),, taxes(t_h) on household income (YH) and taxes (t_f) on corporate income (YF), taxes (t^q) on the sale of products, taxes (t^m) on imports and taxes (t^{ex}) on exports, taxes (t^x) on production and foreign aid (T^{row}). In addition, the government collects transfers from other agents The government's expenditure concerns transfers to other agents, public investments, payment of interest on the domestic and foreign debt. Government expenditure is also the output in value of the non-market sector. The value of investment by destination sector is a fixed proportion of total investment by value. The trade relationship between the rest of the world and a country affects government income through changes in the prices of imported and exported goods. Thus, government income can be modelled as follows:

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

$$YG = t^m.p^{wm}.e.M_i + t^{ex}.p^{fob}.e.EX_i + t^q.p^q.Q_i + t^x.p^x.XS_i + t_h.YH + t_f.YF + rK + T^{row}$$

With, p^{wm} import price, M_i imports, p^{fob} international export price, EX_i exports, p^q product price, Q_i product quantity, p^x output price, XS_i output of goods and e exchange rate.

The government's savings (SG) are summarised as follows: $SG = YG - p^g.\overline{CG} - transferts$

With, p^g the price of government consumption and CG government consumption expenditure.

The Rest of the World agent receives a share of capital income, transfers from domestic agents and import income. The Rest of the World expenditure is the export expenditure, the transfers that the Rest of the World pays to domestic agents. The difference between the income received from the rest of the world and its expenditure constitutes the amount of savings, which is equal to the absolute value of the current account balance, but of opposite sign. The current account balance is calculated by deducting from the value of imports and transfers paid to the rest of the world, the value of exports and transfers received from abroad.

2.2.3 External trade

The income structure of agents is consistent with that of the SAM. Each category of household receives a fixed proportion of income from the factors of skilled labour, unskilled labour, and capital, plus transfers received from the state, the rest of the world and other households. Household disposable income is obtained by subtracting from income direct taxes paid to the government and transfers paid to the rest of the world and to other households. Household expenditure consists of consumption and investment expenditure. Domestic demand is satisfied by domestic sales, including taxes, and imports, including customs duties.

Domestic demand for each product is the sum of household and government consumption expenditure, investment demand and intermediate consumption demand. Households' final consumption demand for each product derived from their preferences is represented by a Stone Geary utility function. Maximising the utility function under the budget constraint results in a linear expenditure system (LES) with a fixed component related to non-discretionary consumption and a variable component. A characteristic of this function is that there is a minimum level of consumption for each good. Investment demand is split into public and private investment. Finally, mark-up rates are applied to the values of domestic and imported production to determine the value of mark-ups for product demand.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

The income of firms is composed of capital income, income from transfers from other agents. Firms pay direct taxes on their profits, interest on debt and transfers to other agents (domestic and non-domestic).

The government is passive, i.e., it does not optimise an objective function. The role of the government is to regulate economic activities and ensure the redistribution of income. Its income (YG) comes from the remuneration of capital (rK),, taxes(t_h) on household income (YH) and taxes (t_f) on corporate income (YF), taxes (t^q) on the sale of products, taxes (t^m) on imports and taxes (t^{ex}) on exports, taxes (t^x) on production and foreign aid (T^{row}). In addition, the government collects transfers from other agents The government's expenditure concerns transfers to other agents, public investments, payment of interest on the domestic and foreign debt. Government expenditure is also the output in value of the non-market sector. The value of investment by destination sector is a fixed proportion of total investment by value. The trade relationship between the rest of the world and a country affects government income through changes in the prices of imported and exported goods. Thus, government income can be modelled as follows:

$$YG = t^m.p^{wm}.e.M_i + t^{ex}.p^{fob}.e.EX_i + t^q.p^q.Q_i + t^x.p^x.XS_i + t_h.YH + t_f.YF + rK + T^{row}$$

With, p^{wm} import price, M_i imports, p^{fob} international export price, EX_i exports, p^q product price, Q_i product quantity, p^x output price, XS_i output of goods and e exchange rate.

The government's savings (SG) are summarised as follows: $SG = YG - p^g.\overline{CG} - transferts$

With, p^g the price of government consumption and CG government consumption expenditure.

The Rest of the World agent receives a share of capital income, transfers from domestic agents and import income. The Rest of the World expenditure is the export expenditure, the transfers that the Rest of the World pays to domestic agents. The difference between the income received from the rest of the world and its expenditure constitutes the amount of savings, which is equal to the absolute value of the current account balance, but of opposite sign. The current account balance is calculated by deducting from the value of imports and transfers paid to the rest of the world, the value of exports and transfers received from abroad.

2.2.4. External trade

International trade is governed by the degree of substitution between imported and domestic goods on the consumption side and between the domestic market and the foreign market for exports on the production side. The relative prices of foreign goods are assumed to be fixed,

AFRICAN SCIENTIFIC JOURNAL
MANAGEMENT AND ECONOMIC DEVELOPMENT
African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

under the assumption of a small country, so it has no influence on world prices. At the domestic level, these prices are affected by the exchange rate and government policies (taxes, subsidies, and tariff policies). Finally, it is these different instruments that determine import and export flows.

The external demand for the product(EXD) depends on the price at which local producers are willing to sell their product(p^{fob}), given their initial level of exports $\overline{EXDO}$, the exogenous price level on the international market p^{wm} and the elasticity of demand for the product's exports ε^{ex} . To take into account the constraints of exporters of domestic products on the external market, we introduce an export demand function for goods into the model. This function has a finite elasticity.

$$EXD_{ex}^{i} = \overline{EXDO_{ex}} * \frac{\overline{p^{wm}}_{ex}}{p^{fob}{}_{ex}}$$

Following the Armington hypothesis, domestic production (D_i) and imported goods (M_i) are assumed to be imperfect substitutes in domestic consumption (Q_i). The import demand for domestic goods is obtained through a cost minimisation under the constraint of the Armington elasticity(ε) , import and export prices($p^m \; et \; p^d$) , where β and α are a scale and share parameters respectively:

$$Q_i = \beta \left[\alpha {M_i}^{-\left(\frac{1-\varepsilon_i}{\varepsilon_i}\right)} + (1-\alpha) {D_i}^{-\left(\frac{1-\varepsilon_i}{\varepsilon_i}\right)} \right]^{-\left(\frac{1-\varepsilon_i}{\varepsilon_i}\right)}$$

$$\frac{M_i}{D_i} = \left[\left(\frac{\alpha}{1-\alpha}\right) \left(\frac{p^d}{p^m}\right) \right]^{\varepsilon}$$

The model captures the allocation of domestic production of goods (XS_i) between domestic demand (D_i) and export(EX_i) through a constant elasticity transformation function (CET). The export supply is determined by profit maximisation under the constraint of the parameters of the CET transformation function:

$$XS_i = \delta \left[\gamma {EX_i}^{-\left(\frac{1-\tau}{\tau}\right)} + (1-\gamma) {D_i}^{-\left(\frac{1-\tau}{\tau}\right)} \right]^{-\left(\frac{1-\tau}{\tau}\right)}$$

$$\frac{EX_i}{D_i} = \left[\left(\frac{\gamma}{1-\gamma}\right) \left(\frac{p^d}{p^{ex}}\right) \right]^{\varepsilon}$$

In equilibrium, the export supply is equal to the exogenous export demand adjusted by the FOB export price:

$$M_i = EX_i$$

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Export prices are equal to world export prices FOB (p^{fob}) converted into domestic prices through the exchange rate (e) and adjusted by the export tax (t^{ex}). Import prices (p^{m}) are obtained by converting world import prices (p^{wm}) into domestic prices through the exchange rate and adjusted by import taxes(t^{m}):

$$p^{ex} = {p^{fob}.e}/{1 + t^{ex}}$$

$$p^{m} = \overline{p^{wm}}.e.(1 + t^{m})$$

2.2.4 Macroeconomic balance and constraints

In addition to the choice of functional forms of agent behaviour and parameter values, CGE models differ in the choice of macroeconomic closure rules. The equilibrium on each market is obtained through the variations of relative prices and quantities. The exchange rate is fixed and is considered as the numeraire of the model. The labour market includes two segments according to the categorisation of the type of work (skilled, semi-skilled and unskilled). Skilled labour is employed in the formal sector where the wage is rigid hence the presence of unemployment. Semi-skilled and unskilled labour are generally employed in the informal sector, where the wage rate is determined by the equality between supply and demand of the two types of labour. Total investment is driven by total savings.

2.2.5 Modelling the effects of external finance on agricultural growth

To capture the effects of ODA inflows, we incorporate a model of production externalities into the model. We consider the inflow of these funds (ODA) as an increase in the stock of productive capital. To reflect the productivity gains, we intervene at the level of the value-added function by incorporating a productivity factor, i.e., total factor productivity, which we consider to be the ratio of the new capital stock invested to the old capital stock, and the ratio is raised to a power representing the elasticity related to the externality of the capital invested. The value of the elasticity chosen is 0.3 and comes from Cockburn et al (2012).

The sectoral productivity effect is a function of the ratio between the new stock of external finance and the old stock: $\theta_i = \left[\frac{KD^{APD}}{KDO^{APD}}\right]^{\sigma_j^{APD}}$

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Where σ_j^{APD} is the elasticity of productivity related to the capital stock. The value of the elasticity is borrowed from the existing literature. External finance (e.g., agricultural investment) will increase the capital stock.

θ_i : the sectoral productivity effect or externality of external agricultural finance.

3. Results and discussion

Although ODA financing has undergone a notable evolution in Cameroon, it is not the main source of external financing, as there is also FDI which plays a determining role in the Cameroonian economy and in most developing countries. Considering the hypothesis of perfect mobility of production factors, we simulate a 5% and 10% increase in the supply of capital (ODA) in the agricultural sector. We assume that this additional financing comes from the Rest of the World (ROW), which we refer to as "agricultural ODA financing".

3.1.Impact of increased ODA flows to the agricultural sector on total productivity

The analysis of the results of the simulations aimed at increasing the investments from ODA financing in the agricultural sector shows that, overall, these have an influence on inclusive agricultural growth. Indeed, any increase in the ODA stock of 5% and 10% directed to the agricultural sector leads to an increase in the value added of agricultural production of 2.67% and 6.50% respectively; an improvement (0.135% and 0.30% respectively) in the value added of market services, an upward variation of (0.0248% and 0.049% respectively) for non-market services and of (0.10% and 0.28% respectively) for industries (Table 1). Overall, it allows for an improvement in the value added of the agricultural sector, which results in a transformation of the productive value chain of the various sectors of the Cameroonian economy.

Table N°1: Percentage change in total agricultural sector output following an increase in ODA to the agricultural sector

Types of sectors	Variation 5%	Variation 10%
Agriculture	2,6661%	6,5037%
Industries	0,1050%	0,2896%
Merchand services	0,1350%	0,3044%
Non marchand services	0,0243%	0,0491%
Total	2,7204%	6,5676 %

Source: Authors

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

In addition, this growth in the productivity of the agricultural sector is also likely to lead to a fall in the price of agricultural products of 5.21% and 12.6% respectively, depending on whether it is an increase of 5% or 10%, which necessarily leads to an increase in demand both inside and outside the country. This fall in prices leads to an increase in demand for agricultural products and therefore a variation in the value added of this sector of the order of 2% and 12% respectively. The immediate consequence of this increase in national demand for agricultural products is an improvement in the income of this sector, an increase in state revenue and, consequently, an improvement in the living conditions of the population.

Thus, the decrease in the price of agricultural products following an increase in financial offers directed towards the agricultural sector would contribute to improving competitiveness, developing sub-regional trade and, as a result, improving the economic growth of Cameroon, and even of CEMAC in general.

Table N° 2: Change in demand for agricultural products following an increase in ODA stock

Types of product	Variation 5%	Variation 10%
Agriculture	3,0400%	7,4318%
Industries	0,0026%	-0,0226%
Merchand services	-0,0972%	-0,2760%
Non merchands services	-0,2057%	-0,5117%
Total	2,7391%	6,6213%

Source: authors

3.2.Impacts on economic growth

An increase in demand due to the law of supply and demand could not only improve the competitiveness of Cameroonian agricultural products but also strengthen sub-regional and regional trade (variation in exports of 2.9% and 12% respectively). This performance of the agricultural sector has a positive impact on foreign trade, with an improvement in the balance of trade and a variation in the overall growth of the economy of 0.99% and 2.32%. State revenue also increased by an average of 0.7%, of which 8.66% over the entire period, due to the supply of Cameroonian agricultural products at good prices. As a result, such a scenario could have a significant impact on the external competitiveness of Cameroonian agricultural products, and the repercussions will be more visible in terms of economic growth and the well-being of the population. This result is in line with Kuznets' (1964) logic according to which the agricultural sector represents a feeder of the population, generates revenue for the state and allows the latter

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

to have economic growth. Moreover, the increase in agricultural production has an effect on the growth of Gross Domestic Product (GDP), notably through the channel of investment from ODA (Hansen and Tarp 2000).

3.3.Impacts of increased ODA flows on household welfare in Cameroon

In developing countries, like Cameroon, poverty is a phenomenon concentrated in rural areas where the vast majority of farms maintain rudimentary cultivation practices. As a result, a 5% or 10% increase in the supply of external ODA capital to the agricultural sector leads to an overall change of about 6.4% and 15.02% respectively in the consumption of all households. However, the agricultural sector is a focal point of household consumption. The consumption of agricultural products increases by 4% and 11% respectively. Disposable income increases by 1% and 3% respectively, which leads to an improvement in the purchasing power of consumers and therefore an improvement in the well-being of Cameroonian households.

Table N° 3 : Change in household disposable income following an increase in ODA stock

Types of households	Var 5%	Var 10%
Rural agricultural households	0,2902%	0,7124%
Rural non-agricultural households	0,2901%	0,7026%
Urban agricultural households	0,1023%	0,2545%
Urban agricultural households	0,2829%	0,6723%
Total	0,9626%	2,3404%

Source : Authors

3.4.Effects on employment

The demand for employment in the informal sector fell by 1.034% and 3.92% respectively, which means that most of the workers in this sector have migrated to the formal sector, which generates decent employment and improves living standards. This improvement will have an impact on the development of the other sectors, as well as on the increase in state revenues. This result is consistent with the literature that investment in the agricultural sector creates the conditions for growth and poverty reduction. A manufacturing chain can depend on agricultural production. Under these conditions, any sustainable improvement in agricultural productivity has positive employment effects for the workers in the manufacturing firm.

In the end, this analysis shows that any upward variation in ODA stocks in the agricultural sector leads to an upward variation in the value added of the agricultural sector, improves the

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

standard of living of the population with the increase in disposable incomes, and the repercussions are significant in terms of reducing unemployment especially in the primary sector, notably agriculture.

3.5.Analysis of the robustness of the results

Analyzing the sensitivity of the results is done using the same simulation technique, but integrating other types of external financing. It is in fact a question of combining two sources of financing: Official Development Assistance and Migrant Remittances, which we call "External Private Capital". All the instruments used are valid. The results are economically and statistically significant and globally respect the trend of results previously obtained in the empirical literature. Considering the hypothesis of perfect mobility of the factors of production, we simulate an increase of 5% and 10% of the supply of private financial capital (FDI, ODA, TFM). We assume that this additional financing comes from the Rest of the World (ROW), which we refer to as "external financing". Starting from a baseline scenario, the results of a dynamic simulation (10 years) using a 2014 social accounting matrix are as follows:

3.5.1 Effects on the overall output growth of the sectors

A shock aiming at increasing external capital (private capital) by 5% and 10%, directed into the Cameroonian agricultural sector has the impact of increasing the overall value added of agricultural and agri-food production by 7% and 20% respectively. This increase corresponds to our hypothesis of a positive impact of increased investment in the agricultural sector. This result confirms that the agricultural sector will be an important part of the Cameroonian economy for the next ten years. Such a policy could therefore increase agricultural productivity and that of other sectors of the economy. Indeed, according to Montalvo and Ravallion (2009), growth in agriculture contributes on average much more to poverty reduction than growth in the non-agricultural sectors.

This simulation shows a variation of more than 26.8% in agricultural productivity, a variation in productivity in the industrial sector due to the low processing of local agricultural products. This variation is 1.3% and 3.2% respectively for the market services sector and 0.24% and 1.4% in non-market services. This variation in value added due to an increase in external financing in the agricultural sector has a significant impact on the Cameroonian economy. According to Taylor, productivity gains can have positive effects on a country's economic growth. Firstly, there is job creation. Lower production costs lead to higher wages, lower prices and lower costs of goods and services, which means more employment. And when employment increases, GDP also increases.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Table N° 4: Change in total productivity of sectors

Sectors	Var Sim 1	Var Sim 2
Agriculture	26,801	64,968
Industries	0,957	2,409
merchants _services	1,379	3,188
merchants_non _services	0,241	1,482
General total	27,464	67,229

Source: Results of the Simulations

3.5.2 Effects on demand

Aggregate demand for agri-food is estimated to have increased by 27% and 68% respectively, thus boosting production in this sector. It also leads to a considerable increase in exports of agricultural and agri-food products of more than 30%, which is synonymous with the competitiveness of Cameroonian agricultural products. This is all the more so as it is commonly accepted in the literature that trade is an important determinant of long-term economic growth. Thus, the decrease in the price of agricultural products following an increase in financial offers oriented towards the agricultural sector would contribute to improving competitiveness, developing sub-regional trade and, by ricochet, improving the economic growth of Cameroon, and even of CEMAC in general.

The analysis of the simulation results shows that any variation of a 5% and 10% increase in the external financial supply, directed to the agricultural sector, leads to an overall variation of nearly 10% and 30% of the consumption budget of all households. However, the agricultural sector is a focal point of household consumption. The consumption of agricultural and agri-food products varies by nearly 31.53% over all periods, of which 16% is consumed by rural households and the rest by urban households. These results corroborate with the literature on the importance of a policy of increasing agricultural finance, whose impact on households goes beyond consumption. This growth in household consumption levels following an increase in agricultural productivity reflects inclusive agricultural growth through improved household welfare.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

3.5.3 Effects on households

Overall, an increase in the external financial supply increases the disposable income of Cameroonian households by almost 9.67%, which is synonymous with an improvement in household welfare. The consumer price index showed a variation of -0.8%, which translates into a clear improvement in household budgets, which is a direct consequence of an improvement in the standard of living of households. This improvement is explained on the one hand by an increase in household disposable income (9.67%) and on the other hand by a significant drop in the price of the industrial composite good of around 9%. Household savings also improved by almost 9.7% following a 10% increase in the financial supply in the agricultural sector.

Table N°5: Change in household disposable income

household types	VAR SIM1	VAR SIM2
Agr rural household	2,924166155	8,9450
Non Agr rural household	2,893724867	8,8492
Agr Urban household	1,117013784	4,6262
Non Agr urban household	2,737493181	8,5035
Total	9,672397987	30,9241

Source: Results of simulation

The savings of agricultural households are estimated to have increased by 4.2% overall. The savings of non-agricultural households are about 5.5%. This shows that the shock has helped non-farm households save much more.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

4 Conclusion

The objective of this paper is to analyse the effects of ODA on agricultural growth and the repercussions of all sectors of the Cameroonian economy. To achieve this, we used the static Computable General Equilibrium model to simulate the impacts of an increase in external financial offers by ODA directed towards the agricultural sector. The results of these simulations show that a shock aiming to increase by 5% or 10% external capital (ODA capital) in the agricultural sector of the Cameroonian economy would have the impact of an overall improvement of 2.66% and 6.50% respectively in agricultural and agri-food value added. This increase corresponds to our hypothesis of a positive impact of increased investment in the agricultural sector. In addition, the general price level would fall considerably by 5.52% and 12.33% respectively, thus reinforcing domestic and external demand, a stimulus for the competitiveness of agricultural products. The fall in the price of agricultural products would lead to a fall in the production cost of the agri-food sector and hence the selling price of its product. Aggregate demand for agri-food would increase by 3.04% and 7.43% respectively, thus boosting production in this sector. This growth in agricultural production also leads to an improvement in national production of 0.99% and 2.32% respectively, thus increasing GDP by 5.5%, thus responding to the theory that investment in the agricultural sector has a positive impact on a country's economic growth.

In addition, the results of the simulations show an overall upward variation of nearly 6.4% and 15.02% respectively in the consumption of all households, the upward variation in the consumption of agricultural households being an essential element in the improvement of their standard of living and well-being. The disposable income of Cameroonian households would improve by almost 0.967 and 2.33% respectively, synonymous with an improvement in well-being. The consumer price index shows a variation of -0.8%, which translates into a clear improvement in the household budget, which is a direct consequence of improvement in the standard of living of households. However, this variation remains low in order to influence the improvement in the living conditions of the population, as we only note an improvement in rural and agricultural households. It should also be noted that the influence of international aid on inequalities can be more or less direct and depends on its purpose. Its transmission channels are different if it is allocated to infrastructure projects or to education and health projects, agriculture or if it is distributed directly to the populations.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

REFERENCES

Akpokodje G., and Omojimite B., (2008), «" The Effect of Aid Flows on Nigeria's Agricultural Growth » Pakistan Journal of Social Sciences 5.6 (2008): 514-520.

Decaluwe B., Lemelin A., Robichaud V., Maisonnave H., (2013), «The PEP standard single-country, static CGE model », Version 2.1, Juillet 2013, Partnership for Economic Policy, 163 pages.

Castro-Leal F., Dayton J., Demery L., Kalpana Mehra,(1999), Public Social Spending in Africa: Do the Poor Benefit? *The World Bank Research Observer*, Volume 14, Issue 1, February

Dillon A., Mussa Sofia, (2010), "How does food aid impact agricultural production and household supply to agriculture in Ethiopia?."

Dreher A., and Langlotz S., (2019), « Aid and Gowth : New Evidence using Excluable instrument », Canadian Journal of Economics, Vol 56 (3).

Dreher, Axel and Andreas Fuchs, (2015), « Rogue Aid ? An Emperical Analysis of China 's Aid Allocation », Canadian Journal of Economics, Vol 48 (3).

Gomanee, K., Girma, S. and Morrisey, O. (2002), « Aid and growth: Accounting for transmission mechanisms in sub-Saharan Africa ». Paper presented at the "Understanding Poverty and Growth in sub-Saharan Africa" conference, University of Oxford.

Griffin, K. B., Enos, J. L. (1970) « Foreign capital, Domestic savings and economic development ». Oxford Bulletin of Economics and Statistics, 32(2), 99-112.

Hansen H., Tarp F. (2000). « Policy arena : Aid effectiveness disputed ». *Journal of International Development*, 12 (3), p. 375-398.

Kaya, Ozgur, Ilker Kaya, and Lewell Gunter (2008), « The impact of agricultural aid on agricultural sector growth », Proceedings of the Southern Agricultural Economics Association Annual Meeting. 2008.

Levin V., Dollar D., (2005), « The Increasing Selectivity of Aid, 1984–2002." Policy », Research Working Paper 3299.

Loayza Claudio Raddatz, Norman V., (2010), « The composition of growth matters for poverty alleviation », Journal of Development Economics Volume 93, Issue 1, September 2010, Pages 137-151

MINEPAT (2016), « Plan National Plan of Agricultural Investment » The Republic of Cameroon, 188 pages

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 14 , Octobre 2022

Montalvo, J. G., Ravallion M., (2010). The pattern of growth and poverty reduction in China. *Journal of Comparative Economics*, *38*(1), 2-16.

Morrison A., (2002). The Economics of Capital Regulation in Financial Conglomerates, Oxford Financial Research Center Working Paper No. 2002-FE-08, Available at SSRN: https://ssrn.com/abstract=331040 or http://dx.doi.org/10.2139/ssrn.331040.

Morrissey O., Von Haldenwang C., Armin Von Schiller; Maksym Ivanyna and Ingo Bordon, (2016), Tax Revenue Performance and Vulnerability in Developing Countries, *Journal of Development Studies*, 52, (12), 1689-1703

Norton, George W., Ortiz J and Pardey (1992), « The impact of foreign assistance on agricultural growth." Economic Development and Cultural Change 775-786.

Nourou, M., (2014), « Foreign Aid and Development: looking beyond the growth effect », JOURNAL OF ECONOMIC DEVELOPMENT, Volume 39, 17 pages.

Reuben Adeolu, Alabi, (2014), « Impact of Agricultural Foreign Aid on Agricultural Growth in SubSaharan Africa », African Growth & Development Policy Modeling Consortium (2014).

Ssozi J., Asongu S., Voxi Amavilah (2019), « The effectiveness of development aid for agriculture in Sub-Saharan Africa », Published: Journal of Economic Studies, 46(2), pp. 284-305 (2019)

Walras L., (1874), « Éléments *d'économie politique pure, ou Théorie de la richesse sociale »*, Lausanne, L. Corbaz, Pp 112-125.

World Bank (2019), Annual Report 2019