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The contribution of public investment in the agricultural sector to economic growth and rural poverty reduction

**A high-level dialogue in Nicaragua based
on a prospective analysis**



Summary and key figures

In 2018, the government of Nicaragua requested technical assistance from the Food and Agriculture Organization of the United Nations (FAO) to carry out a prospective analysis of the Nicaraguan economy and the evolution of rural poverty, in the context of the restrictive economic conditions experienced in the country that year. Thus, the FAO Agrifood Economics (ESA) in Rome, together with the FAO Country Office in Nicaragua (FAONI) and in close coordination and support with the country's Ministry of Finance and Public Credit (MHCP), the Central Bank of Nicaragua (BCN) and the Ministry of Agriculture (MAG), developed the study "Analysis of alternative ways of public investment and its impact on economic growth, agriculture and poverty reduction in Nicaragua." This analysis generated quantitative evidence on the impact of agriculture on economic growth and poverty reduction. The results are clear: in all simulated scenarios, it was verified

that an increase – by a value of 0.5 or 1 percent of the Gross Domestic Product (GDP) – of public investment in the agricultural sector generates economic growth, which is reflected, among other things, in GDP growth that varies between 0.8 and 3.5 percent annually through 2030 depending on the scenario. Moreover, it is observed that the difference in the total poverty rate in rural areas with respect to the base scenario would range between 0.5 and 2.25 percentage points in the same period, depending on the agricultural investment scenario. With regard to extreme poverty, the difference is projected to be between 0.16 and 0.31 points. The ongoing high-level dialogue and collaboration between FAO and Nicaragua's economic and fiscal policy-making authorities is an excellent example, which should be replicated elsewhere, of how FAO can influence a country's public policies.

Implementation period:	October 2018 – February 2020.
Location:	Nicaragua, nationwide.
Executors:	FAO Agrifoods Economics (ESA) in Rome and the FAO Country Office in Nicaragua (FAONI).
Financing institutions:	Program III of the FAO Office of Strategic Program Management (SP3) and FAONI
Partnerships:	Ministry of Finance and Public Credit (MHCP) / Central Bank of Nicaragua (BCN) / Ministry of Agriculture (MAG) / nine members of the National System of Production, Consumption and Commerce (SNPCC).
Investment:	USD 44 000 (not including fees paid to ESA and FAONI).
Key words:	Public investment, impact, poverty, economic growth, agriculture, and scenarios.



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Context

An important contraction of Nicaragua's economy

Prior to 2018, Nicaragua showed respectable economic growth and a significant trend in poverty reduction. However, in 2018 there was an economic contraction, mainly due to endogenous and exogenous elements or disruptions, which led to a drop in GDP of 3.8 percent.

The causes of this economic contraction are known and are directly linked to the social crisis that the country experienced that year. Disruptions in supply generated by road blockages and damage to infrastructure affected the confidence of national and international consumers and investors, as well as that of international financial organizations, resulting in an outflow of bank deposits, a decrease in private investment and restrictions on external financing. In addition to the deterioration of confidence, international sanctions were imposed which resulted in additional financing restrictions on the economy, with adverse repercussions for investment, employment, and social indicators.

The effects generated by these events could have been greater, had it not been for the solidity shown by the Nicaraguan economy in the 2010–2017 period and its prudent management during 2018. Even so, there have been adverse effects: increased unemployment and informality, and reduction of household income and consumption. In 2019, the activities of construction, financial intermediation, home ownership, commerce, transportation and communication, and other services continued a process of economic slowdown. In this context, the question arises: will poverty increase as a result of these socioeconomic impacts?

This raises the issue about the role that the agricultural sector could and should play in the economic reactivation, which is based on two findings. The first is that agriculture continues to be an important sector generating value-added products and employment in Nicaragua. At the same time, the majority of the poor reside in rural areas, making the agricultural sector a potential valve for poverty reduction. The second reason is that while other sectors explain the significant economic

contraction, the primary sector has managed to maintain stability in its evolution, meaning it has been resilient to the economic shocks experienced in the Nicaraguan context and has shown great productive potential to influence economic growth and poverty reduction, as long as it is able to adapt to adverse climatic events or significant external shocks.

To address this issue, FAO, hand in hand with the Ministry of Finance and Public Credit (MHCP), and the Central Bank of Nicaragua (BCN), developed a prospective analysis of economic performance and rural poverty, within the framework of a restrictive national context, including economic challenges and lack of external financing. This document systematizes the process that facilitated the development of this study and summarizes its results.



Escenarios de Inversión Pública para el Crecimiento y Reducción de la Pobreza Rural en NICARAGUA

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4 y 5 de Octubre de 2018
 Managua, Nicaragua

Nicaragua's recent economic slowdown

Key figures

	2010–2017 (average)	2017	2018
Economic activity and employment			
GDP at constant prices (growth rates in %)	5.1	4.7	-3.8
GDP per capita (in USD)	1 856.6	2 165.2	2 030.5
GDP per capita (growth rates in %)	5.5	3.1	-6.2
Unemployment rate (%)	5.8	3.7	5.5
External sector (USD million)			
Exports of goods (FOB)	2 381.1	2 548.3	2 516.9
Imports of goods (FOB)	5 151.7	5 597.8	4 829.4
GDP of some sectors (growth rates in%)			
Agriculture	3.1	6.3	3.3
Livestock	1.7	12.6	-5.4
Fishing and aquaculture	4.7	11.1	14.7
Construction	7.3	1.2	-15.7
Commerce	5.9	4.1	-11.4
Hotels and and restaurants	6.8	17.8	-20.2
Investment (growth rates in %)			
Total	8.9	-5.1	-23.6
Public	9.7	-0.5	-15.4
Private	8.9	-6.5	-26.4
Poverty (2014)			
• National poverty:	29.6%		
• Non-extreme national poverty:	21.3%		
• Extreme national poverty:	8.3%		
• Rural poverty:	50.0%		
• Non-extreme rural poverty:	33.7%		
• Extreme rural poverty:	16.3%		

Source: Central Bank of Nicaragua.

2

Challenges

To generate quantitative evidence about the positive role that the agricultural sector can play in economic growth and poverty reduction in Nicaragua

The study sought to generate quantitative evidence about the impact that agriculture can have on economic growth and poverty reduction by answering two major questions:

- » To what extent and at what speed do public investments in the agricultural sector impact economic growth and the reduction of poverty in the country?
- » Facing a restrictive situation in terms of public funding and external financing, in which agricultural sectors is it more cost-effective to make public investments in productive infrastructure in order to generate economic growth and promote poverty reduction?

3

Description

A rigorous process of dialogue and analysis

A high-level process of dialogue and coordination between FAO and the government of Nicaragua

The process, which culminated in the study that is systematized in this document, was relatively new and very successful due to the actors that participated and the degree of commitment of each of them. This process was developed according to the following milestones:

- » **Country Programming Framework 2018–2021.** In October 2018, the FAO Country Office in Nicaragua signed the 2018–2021 Country Programming Framework with the government. This defined a plan for the generation of sector-specific studies and analysis that serve as evidence to strengthen public policy processes.
- » **FAO – Nicaragua agreement.** In the framework of the Food and Agriculture Week held in Buenos Aires, Argentina, on November 20–23, 2018 – where political exchanges and dialogues were held at the highest level – the Minister of Agriculture of Nicaragua and the Agrifood Economics (ESA) of FAO in Rome, together with the FAO Office in Nicaragua (FAONI), agreed to develop actions to generate evidence to guide decision-making and contribute to the country's development in the medium and long-term. This agreement was financed with funds from Program III of the FAO Office for Strategic Program Management (SP3) and FAONI.

- » **Approval by the Ministry of Foreign Relations and formalization of the areas of collaboration.** Among the actions carried out, it was possible to reach a consensus and obtain the approval of the Ministry of Foreign Affairs (MINREX), the Ministry of Finance and Public Credit (MHCP), the Central Bank of Nicaragua (BCN) and the Ministry of Agriculture (MAG), so that ESA and FAONI could carry out this study starting in March 2019. The collaboration with the country was based on two instances: i) a petit committee, made up of the Minister and Vice Minister of Finance and Public Credit, the head of the BCN and the Minister of Agriculture; ii) an inter-institutional committee made up of nine members of the National System of Production, Consumption and Commerce (SNPCC).
- » **Validation process, adjustments and improvement.** The initial idea of the study, its content, methodology and implementation plan, were presented to the Nicaraguan authorities in FAO's first mission in March 2019. Later, in October 2019, through a new mission, the petit committee and the inter-institutional committee validated the first results generated by means of the simulated scenarios. This mission was essential to adapt the simulations, in terms of the amount of public investment, the target sectors and sources of financing. The final report was delivered to the government for discussion in December 2019, and comments were received from some institutions in January 2020 that helped to enrich the study.

The members of the inter-institutional committee

1. Ministry of Foreign Relations (MINREX)
2. Central Bank of Nicaragua (BCN):
 - » Statistics Division
 - » Directorate of National Accounts
3. Ministry of Finance and Public Credit (MHCP):
 - » General Directorate of Fiscal Policies and Statistics
 - » General Directorate of Public Investment
4. Ministry of Agriculture (MAG)
5. Ministry of Family, Community, Cooperative and Associative Economy (MEFCCA)
6. Secretary of the Presidency (SEPRES)
7. Ministry of Development, Industry and Commerce (MIFIC)
8. Institute for Agricultural Protection and Health (IPSA)
9. Nicaraguan Institute of Agricultural Technology (INTA)

Method and presentation of results

To assess the impact of public investment in productive infrastructure, a model – called Computable General Equilibrium (CGE) – was used that, within a framework of statistical and analytical consistency, represents the Nicaraguan economy as a whole, including its macroeconomic restrictions and financing, different markets, and the behaviour of economic actors, among other aspects.

Using this model, an analysis of different scenarios was carried out to evaluate the impact of an increase in public investment in productive infrastructure for the agricultural sector (roads, irrigation systems, storage systems, research and technology, etc.) during the 2020–2028 period. This increase

in investment intensifies gradually until in the 2023–2025 period it represents an equivalent of half a percentage point of GDP, and then it gradually decreases.

The conclusions of the analysis are obtained by comparing the evolution of the economy in a base scenario (without additional investment), with different scenarios of increased productive public investment. The eight simulated scenarios vary depending on the target sector (one or more production chains), the value of the marginal product of public capital, the source of financing (internal or external debt) and the additional amount of investment (0.5 to 1 percent of GDP).

The study presents the results in four sections. The first reviews the economic context and the evolution of poverty since 2010. This section is important to understand why it is necessary to reactivate the economy through public investment, and the role that agriculture could play in this type of effort. Furthermore, it provides important elements for the development of a reference scenario based on the model of the Nicaraguan economy, which is subsequently compared with the simulated public investment scenarios. The second part describes the model including the method of analysis and the data used. An important space is devoted to explaining

how, through the model, the state of the Nicaraguan economy can be fully described. Additionally, a complementary microsimulation methodology for the measurement of poverty in the different scenarios is explained. Then, in the third section, the simulated scenarios are described as well as a detailed analysis of their results. In the last section, the main conclusions are summarized and policy recommendations are provided.

The CGE model used in the study cont.

A recursive dynamic General Computable Equilibrium (CGE) model has been used, which is “calibrated” with Nicaragua’s data to analyze different public investment scenarios. The model was developed based on the structure of the multipurpose CGE model, which is described in Cicowiez and Lofgren (2017). The latter, in turn, is inspired by the “neoclassical structuralist” tradition that has been followed in the development of CGE models applied to developing countries for the analysis of external policies and shocks. Furthermore, the model used for Nicaragua has similarities with the MAMS model (Lofgren, Cicowiez, and Diaz-Bonilla, 2013) and the IFPRI standard model (Lofgren, Lee Harris, and Robinson, 2002). In both cases, these are widely used and tested models. Furthermore, both have been applied to Nicaragua in previous studies (see, for example, Sánchez and Vos 2006, 2010; Gámez, 2008).

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Results

FAO's impact on policies and the positive impact of public investment in the agricultural sector

- » **FAO is able to influence public policies.** The process of dialogue and collaboration that FAO and the Nicaraguan authorities have managed to sustain constitutes an outcome in itself. Indeed, it enables FAO's capacity to influence public policy to be fully expressed through political and technical dialogue at the highest level. FAO, through the methodological and technical debates surrounding the analysis, has managed to build a space of trust and collaboration with the country's decision-making authorities.
- » **Public investment in the agricultural sector contributes to economic growth and poverty reduction.** The Nicaraguan CGE model developed by FAO is useful for evaluating the macroeconomic (for example, on GDP), mesoeconomic (for example, on the sectoral structure of production), and distributive effects (for example, on the income of different groups of households), in the short and long-term, as a result of increased investment in productive infrastructure, by the public and/or private sector. The main results to be highlighted from the prospective and comparative analysis are the following:
 - **Macroeconomic results.** In all cases, it is observed that an increase in agricultural investment – of 0.5 or 1 percent of GDP, depending on the scenario – generates positive macroeconomic effects in the medium and long-term. Indeed, indicators such as GDP, employment and private consumption grow, on average, at rates higher than those recorded in the base scenario. For example, the average growth rate of GDP would increase by between 0.09 and 0.1 percent, per year, between 2019 and 2030, whether the recipient of that investment is the agricultural sector as a whole, or only livestock, only basic grains, or only coffee producers. In comparative terms, livestock is the sector that shows the greatest impacts. It is also observed that the annual growth rate rises during the period, ending up considerably higher by the end. Thus, in 2030, the increase in the annual GDP growth rate – with respect to the projection without additional investment – will reach values ranging between 0.8 and 1.1 percent for the scenarios with investment in specific sectors, where 1.1 percent corresponds to the livestock investment scenario. In the scenario where the investment is in the agricultural sector as a whole, annual GDP growth would reach 3.5 percent in 2030.
 - **Results related to poverty and inequality.** In terms of poverty, the most important effect is observed in rural areas. Thus, by 2030, it is observed that the difference in percentage points of the total poverty rate in rural areas – with respect to the base scenario – would range between 0.5 and 2.25 percent, depending on the simulated agricultural investment scenario. This same indicator, in the case of extreme poverty, would vary between 0.16 and 0.31 percent. The fall in poverty at the national level, as well as in urban areas, is relatively minor, but even so it is not negligible. The greatest impacts are observed when investing in the agricultural sector as a whole. If investing by sub-sector, although the differences are not large, public investment in livestock has the greatest impact, followed by investment in coffee and basic grains. Inequality, measured by the Gini Coefficient, is reduced in all simulated scenarios, albeit to a small extent.
 - **Sector-specific results.** In general terms, and considering financial limitations, it is

often more effective to focus investments on specific sectors instead of distributing investments evenly among all agricultural activities. The analysis suggests that livestock and meat production has the potential to expand with positive effects on the rest of the economy. In particular, the forward linkages of livestock production (meat and dairy) and its export orientation make this value chain especially attractive as a destination for public investment. The coffee sector also shows potential, as long as the focus is on developing a local processing industry. The development of the agro-industry related to this product, as well as all the others in the primary sector, is vital for the agricultural and food sectors to be a source of economic growth and reduction of rural poverty. However, the production of basic grains should be promoted as a whole and not just product by product, in order to increase the supply of several of the components of the food basket of Nicaraguan households, and thereby increase food security.

- **Financing.** External financing appears to be the most feasible option to finance the additional investment (which, in the period 2023–2025, represents 0.5 percent of GDP) for two main reasons. First, it is superior to domestic financing, the use of which generates a lower economic growth rate due to the displacement or squeezing effect of private investment. In addition, a tax reform has recently taken place that makes it unlikely to expect that any new reform would be political viability. Thus, external financing is the best option. Secondly, the feasibility of this type of financing lies in the fact that public debt would only have increased around 2 percentage points of GDP in 2030, thus remaining at sustainable levels.

5

Impact

Visibility and valorization of agriculture as a wealth generator

The impact generated by this analysis is theoretical but still very important. On the one hand, it helped to generate strong ties both between FAO and the government, as well as between public institutions. This will undoubtedly facilitate coherent decision-making for future public policies. In this context, it was possible to demonstrate that agriculture is a resilient sector, with the capacity to adapt and the potential to contribute to economic development and the reduction of poverty.



6

Key factors

FAO's proactive approach and a rigorous and relevant strategic analysis

- » **The proactive approach of FAONI and the collaboration of the FAO Agrifood Economics (ESA) in Rome.** The close relationship and constant interaction between the FAO Country Office in Nicaragua and the public institutions involved in the project helped to generate an environment of trust, exchange of information and commitment that is essential for the proper development of the study. Moreover, the coordination and collaboration between a FAO Country Office (FAONI), and a division of its headquarters in Rome (ESA), has generated valuable synergies.
- » **Relevance, quality and potential of the study.** The questions in the study corresponded to priority concerns of the Nicaraguan government. The seriousness and rigor of the analysis guaranteed the robustness of its results.
- » **The strategic nature of the analysis.** The medium and long-term vision of the analysis constitutes a powerful tool for decision-making.

7

Sustainability

The solid participation of the country's economic authorities

The interest and involvement of the MHCP and the BCN in the development of the study increases the probability that its results will be considered in decisions related to the country's budget and public investment guidelines. Also, they have created the conditions to continue developing new complementary studies.



FAO Mission, December 2019. Final presentation by ESA and the FAONI team to the SNPCC board (comprised of the President of the BCN, the Minister of Agriculture, the Minister of the MEFCCA, and the Vice Minister of Finance and Public Credit).

8 | Replicability and Scalability

Encouraging similar studies in other countries in the region

The coordinating role that was played by the FAO Agrifood Economics (ESA) in Rome in carrying out the analysis and the interesting results obtained, would facilitate its replication – with appropriate adaptations – in other countries of the region. The FAO Regional Office for Latin America and the Caribbean (FAO RLC) will play a key role in promoting this process.



9 | Lessons learned

Three main recommendations

- » **Contribute to developing a long-term vision.** The prospective nature of the analysis provides very valuable elements for decision-making. This is particularly useful in times of crisis, when the authorities' priorities tend to focus on contingency and solving immediate problems. It also provides tangible information to plan scalable and coordinated policies.
- » **Generate robust and quantitative evidence.** This makes FAO's support to countries more solid and effective.
- » **Achieve methodological flexibility and institutional commitment.** This is a key element for the replicability of the experience according to different institutional contexts and priorities.

Influencing policies by applying macroeconomic theory to the sectoral context

- » **FAO's highest level dialogue with national authorities.** FAO has managed to position itself as an interlocutor that is listened to by the country's authorities, which strengthens its potential impact on public policies.
- » **The involvement of economic institutions.** This has allowed the analysis and delivery of evidence regarding the role that agriculture could and should play in the economic and social performance of the country. It helps to highlight the importance of the agricultural sector and bring sectoral policies more into line with budgetary decisions.
- » **The support of FAO Agrifood Economics (ESA) in Rome.** The contribution of ESA and its constant coordination with the FAONI team generated a harmonious and effective triangle for the development and use of the analysis.



FAO Mission, March 2019. ESA, international consultant and the FAONI team present the project methodology to the Inter-institutional Technical Taskforce.

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