Nutriendo el crecimiento

August 2016

The final assessment of the Millenium Development Goals revealed that Guatemala was the only country to show no progress on eradicating hunger (FAO, 2015). By 2015, the country still had 15.6 per cent of its population living below minimum dietary levels (in 1991, this rate was 14.9 per cent according to the United Nations, 2016). There are several factors that are making Guatemala fall behind, such as low agricultural yields, lack of technology among small-scale farmers, adverse climate conditions, among others. Therefore, efforts to improve agriculture and reduce hunger must continue.

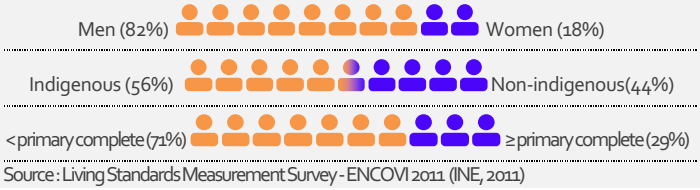
There are certainly several policies in place. However, these strategies could always use further information on the environmental variabilities that might multiply in the near future.

Therefore, we estimated the impacts of the ocurrance of a reduction of agricultural productivity and a drought.

Guatemala's agricultural sector

The Guatemalan economy has a long history of strong reliance on agriculture. In spite of the fact that agriculture only generated 8.7 per cent of the value added, it still was the biggest job generator. In fact, three out of every ten persons (15 years old or more) are employed in the agricultural sector (INE, 2011).

Of the total employed in agriculture, most of them were men, indigenous, or had little education.



Source: Living Standards Measurement Survey - ENCOVI 2011 (INE, 2011)

As a result, the agricultural sector is key to food security, but it is also important to understand how it is connected to the rest of the economy.

While some products like beans, potatoes, roots and tubers, and maize are directly consumed by households, other products like sugar cane, rice and wheat were used almost exclusively by the food processing industries (INE, 2011). This does not mean that households did not consume such products. It only means that they got them in their processed versions, such as sugar, precooked white rice, or cereals. This shows some insights of how the food security chain is built and how the economy is connected.

This policy brief is based on the outcomes of PEP project MPIA-12687

Resource use in agriculture

In Guatemala, agriculture is mainly an unskilled-labor intensive activity, and the second most important factor is land. In fact, large amounts of land are needed due to the low yields of certain products like maize and beans.

Factorial composition of agriculture value added (percentage)

Skilled labor	Unskilled labor	Capital	Land
6.8	61.7	14.9	16.6

Source: Social Accounting Matrix for Guatemala, 2011.

Low yields are usually coupled with low levels of technical use and dependence on rain-fed irrigation systems , which means that any shock in water availability might have great implications for agricultural production and food security.

Climate change, agriculture and food security

It is expected that spatial and temporal patterns of precipitation and water availability will continue to vary, especially in low latitude countries like Guatemala. Some of the expected effects are:

Economic effects: under certain climate conditions forecasted by the Intergovernmental Panel on Climate Change, in 2030, the maize yields could vary between -6.7 and -3.8 per cent, those of the beans could vary from -6.9 to 1.5 per cent, and the rice yields could vary between -10.4 and -7.5 per cent.

Biological effects: some foodborne and waterborne pathogens and diseases are related to extreme weather events. Therefore, poor people and children are more likely to suffer diseases related to the influence of climate change on food quality.

Governance effects: as water scarcity might rise, there is further need to discuss and solve water-related conflicts.

Two climate change scenarios and the effects in Guatemala

All these concerns raised our interest to not only estimate the implications of climate change on agriculture, but to also understand the impact on other social and economical variables. In order to have a complete view of the economy, we used a **computable general equilibrium model**. Therefore, we present two scenarios:

1 **SCENARIO**

Reduction of productivity due to climate change

Simulation:

Total factor productivity of agriculture (for food and seeds) diminishes in eight per cent.

Results:

Under this scenario, we estimate an important drop of the agricultural value added, as well as that of animal production, food industries and services. Altogether, the real GDP is expected to fall in 1.2 per cent.

Var. of real GDP	Var. of private consumption
-1.2%	**-1.4%**

At the same time, exports are expected to fall by 2.1 per cent due to a reduced availability of coffee, bananas, vegetables, maize, cereals and fruits. This could be explained with the fact that lower productivity would translate into less competitiveness in international markets.

Another effect is the fall of tax revenues as a result fiscal space would be reduced. There would also be a reduction of household income and consumption.

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2

SCENARIO

The occurrence of a drought

Simulation:

Using information of water consumption by economic activity, we estimate the likely effects of a drought that reduces in 25 per cent the water stock.

Results:

There was a drop in private consumption, both in real as well as nominal terms in this scenario. This was closely linked to the reduction in disposable income of the urban non-poor households; a group responsible for more than 70 per cent of total household consumption. Although, labor income saw a reduction in all kinds of households, it fell only 5.3 per cent for the urban non-poor, in contrast to more than 10 per cent for the other categories.

Var. of real GDP	Var. of private consumption
1.4%	**-0.2%**

In drought scenario, we would still observe economic growth. However, the results would differ by sector and the agricultural activity would decrease by 23 per cent.

Policy implications

One of the most interesting results is that under a drought scenario the demand for land would fall down by 38 per cent. This is because as water would become scarcer, there would be fewer incentives to engage in agricultural activities. However, due to the importance of agricultural production for ensuring food security, this results show that a proper water allocation system is needed. Therefore, Guatemala cannot postpone the creation of a legal framework to govern water resources.

As we also simulated a reduction in agricultural productivity, we estimated a sharp drop in exports, especially in cereals, maize, fruits, vegetables, coffee and banana. This means that the country would be less competitive to sell agricultural products overseas. At a first stage, this has large implications in the agricultural dependent households, but it would also have negative effects on pursuing an export-led growth strategy.

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PAGE policy analysis on growth and employment

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