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STRATEGY SUPPORT PROGRAM | POLICY NOTE 01 MAY 2021

Synopsis: Assessing the economywide impacts of COVID-19 on Rwanda's economy, agri-food system, and poverty

A social accounting matrix (SAM) multiplier approach [1]

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Rwanda's policy response to COVID-19 has been widely praised for its rapid, systematic, and comprehensive approach to containing the pandemic. Although the economic consequences of the actions taken are unavoidable, the country expects to return its economy to its high-growth trajectory as the pandemic subsides. We used economic modeling tools designed to estimate the short-term economywide impacts of the unanticipated, rapid-onset economic shocks of COVID-19 on Rwanda. In this brief, we present a synopsis of the results of this analysis.

- During the six-week lockdown that began in March 2020, we estimate Rwanda's GDP fell 39.1 percent (RWF 435 billion; USD 484 million) when compared to a no-COVID situation.
- Rwanda's GDP in 2020 will be between 12 and 16 percent lower than a predicted no-COVID GDP, depending on the pace of economic recovery. The losses in annual GDP are between RWF 1.0 and 1.5 trillion (USD 1.1 to 1.6 billion).
- While GDP for the industrial and services sectors were estimated to have fallen during the lockdown period by 57 and 48 percent, respectively, exemptions of COVID-19 restrictions for the agricultural sector limited the decline in agricultural GDP to 7 percent compared to a no-COVID situation.
- During the lockdown period, the national poverty rate is estimated to have increased by 10.9 percentage points as 1.3 million people, mostly in rural areas, fell into temporary poverty. Poverty rates are expected to stabilize by the end of 2020, increasing only by between 0.4 and 1.1 percentage points over the pre-COVID situation. While these figures are encouraging, they mask the impacts on poor households of the sharp poverty spike during the lockdown and the inherent complexity of poverty dynamics post-lockdown.

Looking forward, the speed and success of Rwanda's economic recovery will depend critically on expanding Rwanda's social protection programs, supporting enterprises of all sizes, providing broad assistance to the agri-food system, and restoring international trade.

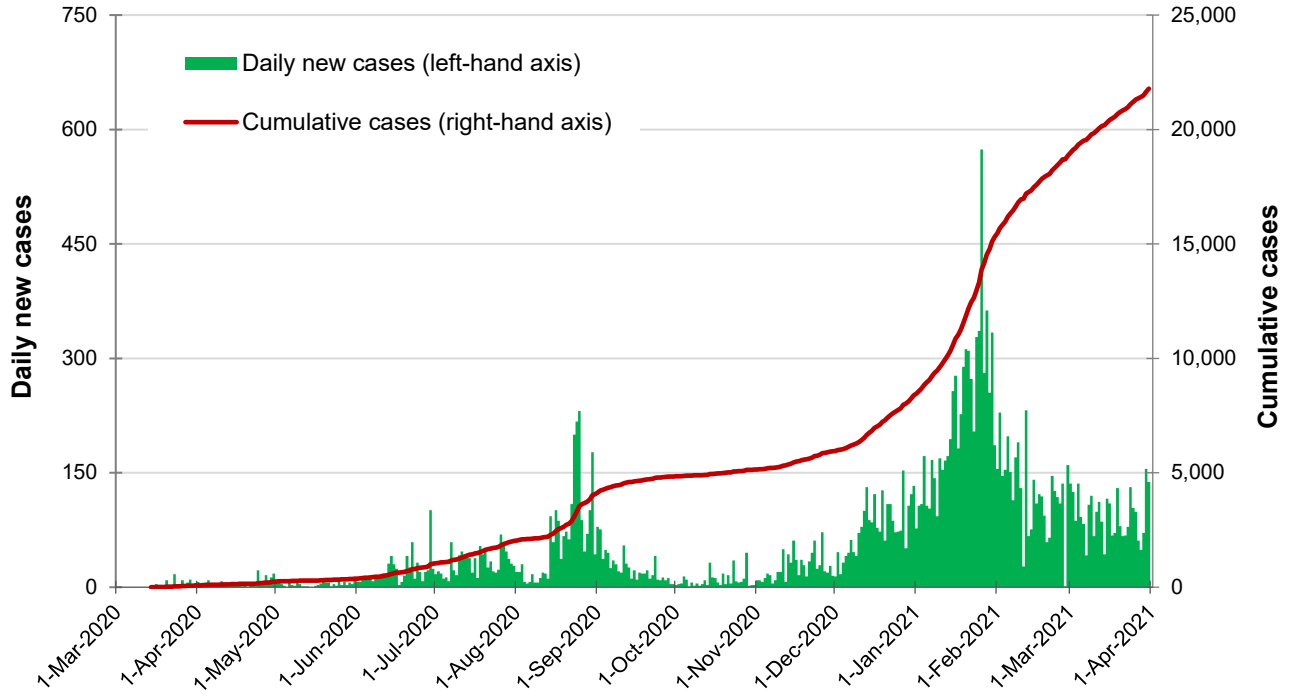
[1] For the full findings of this analysis, including details about the SAM multiplier model and the operationalization of the scenarios, please see the Working Paper from which this Policy Note was developed:

Aragie, E., X. Diao, S. Robinson, G. Rosenbach, D.J. Spielman, and J. Thurlow. 2021. *Assessing the Economywide Impacts of COVID-19 on Rwanda's Economy, Agri-food System, and Poverty: A Social Accounting Matrix (SAM) Multiplier Approach.* Rwanda Strategy Support Program Working Paper 01. Washington, DC: IFPRI. https://doi.org/10.2499/p15738coll2.134400

Overview

Rwanda has been aggressive in containing the spread of COVID-19 with a rapid, systematic, and comprehensive policy response.[2] Even before the first COVID-19 case was confirmed on 14 March 2020, the Government of Rwanda introduced measures to contain the spread of the virus (Figure 1). National lockdown policy measures introduced on 21 March and extended through 4 May effectively limited all economic activities in the country beyond those deemed to be essential.[3] The lockdown policy was eased incrementally in the months that followed, although key public health measures – social distancing, wearing of face coverings, and nighttime curfews to discourage certain social activities – remained in place alongside targeted lockdowns of specific geographic areas experiencing some resurgence in infection rates.

Figure 1: New and cumulative cases of COVID-19 in Rwanda as of 01 April 2021



Sources: Rwanda Biomedical Centre (RBC). 2021. "Latest Updates," Kigali: RBC. accessed 15 Apr. 2021; NISR (National Institute of Statistics Rwanda). 2020. Population Size and Population Characteristics. Kigali: NISR, accessed 20 Aug. 2020; Worldometers. 2021."COVID-19 Coronavirus Pandemic," accessed 26 Apr. 2021.

Rwanda's policy measures to contain COVID-19 were a necessary and appropriate response to the pandemic and its high health risk to all Rwandans. Inevitably, the measures themselves also adversely affected the economy, including incomes and livelihoods for a majority of Rwandan households and business activities across the country. Understanding the nature of those economic impacts is the first step to designing appropriate policy responses to protect the most vulnerable, aid in economic recovery efforts, and return Rwanda's economy to its high growth trajectory.

In this Policy Note, we summarize the results of the use a social accounting matrix (SAM) multiplier model of Rwanda's economy to assess the effects of the COVID-19 pandemic. This assessment was conducted between April and September 2020, a period during which the economic

[2] Beaubien, J. 2020. "Why Rwanda is doing better than Ohio when it comes to controlling COVID-19," National Public Radio (July 15); Busari, S. 2020. "How Rwanda is successfully dealing with coronavirus," CNN (July 22).

[3] "Lockdown" is a term commonly used in Rwanda to describe restrictions introduced on 21 March 2020. However, the term does not appear in the announcement and is not officially used to describe the Government of Rwanda's policy response.

impacts of COVID-19 were still unfolding in Rwanda.[4] The SAM multiplier model is a simulation tool that is ideally suited for measuring short-term direct and indirect economywide impacts of unanticipated, rapid-onset economic shocks, such as COVID-19. The multiplier model builds on a SAM, which is a database that captures resource flows associated with all economic transactions taking place in an economy, and represents the structure of the economy in a particular year showing the interlinkages and relationships between all economic actors (i.e., production activities, households, firms, governments, and relationships with the rest of the world) in terms of how they interact and affect each other. The Rwanda SAM captures 86 distinct economic activities or sectors characterizing the Rwandan economy in 2018.

Simulating the economic impacts of COVID-19

We frame the COVID-19 pandemic effects as a result of both (1) external shocks to the Rwandan economy that affect exports and remittances, and (2) policy-induced shocks resulting from the Government's necessary response to containing the COVID-19 pandemic. We use the model to simulate (1) the effects of the six-week national lockdown period; (2) a fast recovery scenario characterized by a strong economic rebound in the third quarter of 2020 and a return to near normal (pre-COVID) economy by December 2020; and (3) a slow recovery scenario characterized by a modest rebound in the third quarter of 2020 but without a return to near-normal levels of economic activity in the fourth quarter (Table 1). The results of our SAM modeling exercise are reported in comparison to a situation where the economy was not affected by COVID-19 during the same period.

Table 1: Recovery scenarios modeled for Rwanda's economy

Quarter	Month	Faster recovery	Slower recovery	Global shocks
Q1	January to March	Pre-COVID-19 period without any shocks		
Q2	April	Six-week lockdown period starts in late March		Decline in remittances and export demand
	May	Lockdown shocks eased by 25%	Lockdown shocks eased by 25%	
	June	Lockdown shocks eased by 50%	Lockdown shocks eased by 25%	
Q3	July to Septem-ber	Lockdown shocks eased by 90% (transport by 80%, hotels/bars & sports by 60%)	Lockdown shocks eased by 50% (transport, hotels/bars & sports by 30%; construction by 70%)	Declines in remittances and export demand reduced by 50%
Q4	October to December	Direct shocks eased by 100%	Direct shocks eased by 90%	Declines in remittances and export demand reduced by 75%

Source: Authors
Note: Only Q2 is modeled in a monthly progression. All other quarters are modeled on a quarterly time-step.

SAM-based models are particularly well-suited to measuring short-term direct and indirect impacts of unanticipated, rapid-onset economic shocks, such as those associated with COVID-19. We used a 2018 SAM for Rwanda that captures resource flows associated with economic transactions taking place in the economy, showing the interlinkages and relationships between all economic actors (i.e., productive activities, households, firms, government, and the rest of the world) in terms of how they interact and affect each other. The SAM is scaled up for the simulations to represent the economy in 2019 or a predicted no-COVID economy in 2020 as a base for comparison.

[4] Between when this assessment was conducted and the publication of results, Rwanda experienced additional lockdowns that varied in geographic coverage, severity, and duration. Additional measures were also introduced across the country to contain the spread of the virus and, at the time of publishing this Research Note, many such measures were still in place. However, it is difficult, if not impossible, to assess the combined economic impact of each and every measure taken in Rwanda since March 2020. As such, this Note offers an illustrative insight into the methods used to understand such economic impacts and is not an economic projection or forecast per se.

The data used to build this SAM are drawn from both domestic sources, such as the National Institute of Statistics Rwanda (NISR) for household and enterprise data and the Ministry of Finance and Economic Planning for national accounts and government accounts, and international institutions, including the International Monetary Fund (IMF) and the Food and Agriculture Organization of the United Nations (FAO). The 2019 mid-year exchange rate is used to provide results in both Rwandan francs and US dollars.

Assessing the economic costs of the COVID-19 pandemic in Rwanda

Findings from our analysis are as follows. First, during the six-week lockdown period, Rwanda's GDP falls 39.1 percent, equivalent to RWF 435 billion (USD 484 million) losses in GDP over this period. Industrial GDP falls 56.7 percent, driven primarily by large declines in mining (82.7 percent) and construction (74.2 percent). Services sector GDP falls 48.4 percent led by the closure of a wide range of non-essential service activities (Table 2).

Table 2: Economic costs of the COVID-19 pandemic in Rwanda, simulation results

	Six-week lockdown (March to May 2020)	Fast recovery scenario (Annual 2020)	Slow recovery scenario (Annual 2020)
	(% change from a no-COVID situation in the same period)		
Total GDP	−39.1	−11.5	−16.4
Agriculture sector	−7.3	−2.5	−3.3
Industrial sector	−56.7	−17.4	−24.1
Mining	−82.7	−32.3	−40.1
Manufacturing	−32.0	−9.9	−13.8
Construction	−74.2	−22.1	−31.9
Services sector	−48.4	−13.7	−20.0
Agri-food system	−12.6	−4.6	−5.8

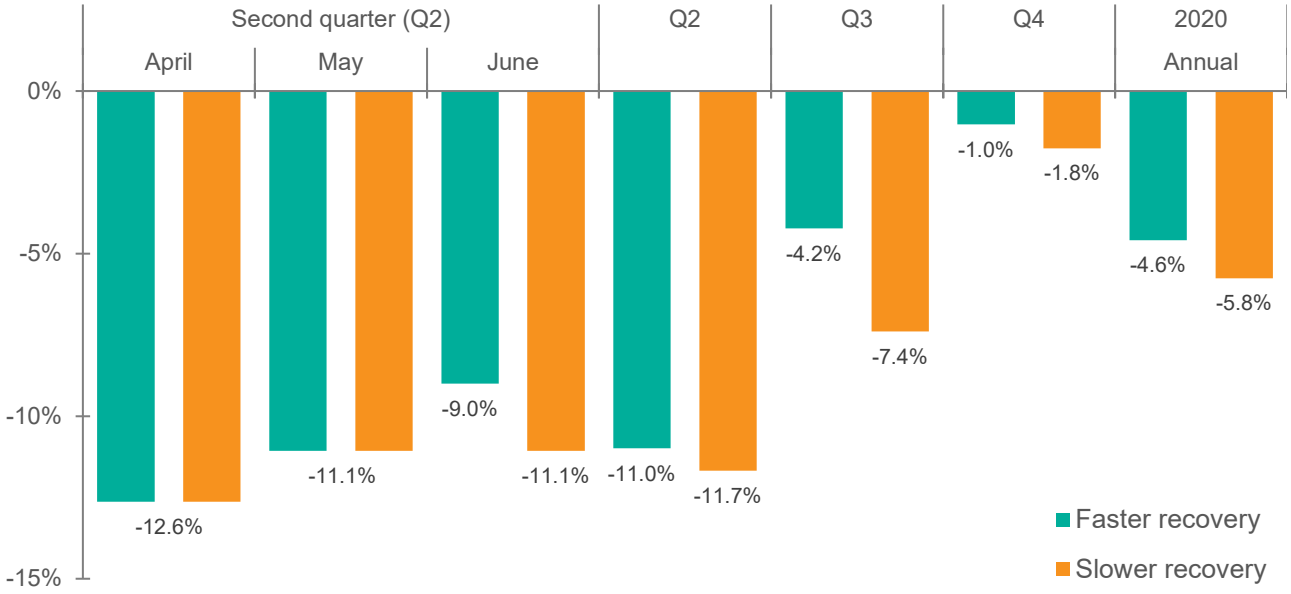
Source: Authors, based on Rwanda SAM Multiplier Model results

Second, agricultural GDP falls only 7.3 percent during the lockdown period. Although the agricultural sector was largely exempt from the lockdown restrictions, economywide linkages affect the sector indirectly via reductions in intermediate demand from many nonagricultural sectors and from reductions in household and export demand. This is also reflected in a 12.6 percent fall in GDP for the broader agri-food system – comprising of agriculture, agro-processing, food trade and transport, and food services – during the same period.

Third, the Rwandan economy will likely rebound with policy restrictions now gradually being eased and with national economic recovery efforts starting to take shape. However, with uncertainty about the progression of the COVID-19 pandemic both domestically and internationally, it is difficult to predict the pace of the recovery. Moreover, while Rwanda may experience a relatively rapid recovery post-lockdown with the economy returning towards some degree of normalcy, significant constraints along domestic value chains and in the global economy may slow down the pace of recovery. Because of these factors, we consider two different recovery scenarios post-lockdown (Table 1). Under a fast recovery scenario, Rwanda's GDP is expected to fall 11.5 percent in 2020 compared to a no-COVID situation, while under a slow recovery scenario, GDP will fall 16.4 percent. The total losses in GDP are between RWF 1.0 and 1.5 trillion (between USD 1.1 and 1.6 billion) in 2020.

Fourth, we further assess the impact of COVID-19 on the whole agri-food system through 2020. Because of relatively small declines in annual agricultural GDP, the fall in agri-food system GDP is expected to be relatively modest at 4.6 percent under a fast recovery and 5.8 percent under a slow recovery (Figure 2). Under both scenarios, agri-food system growth remains negative throughout 2020, but with a relatively more modest magnitude compared with the two nonagricultural sectors.

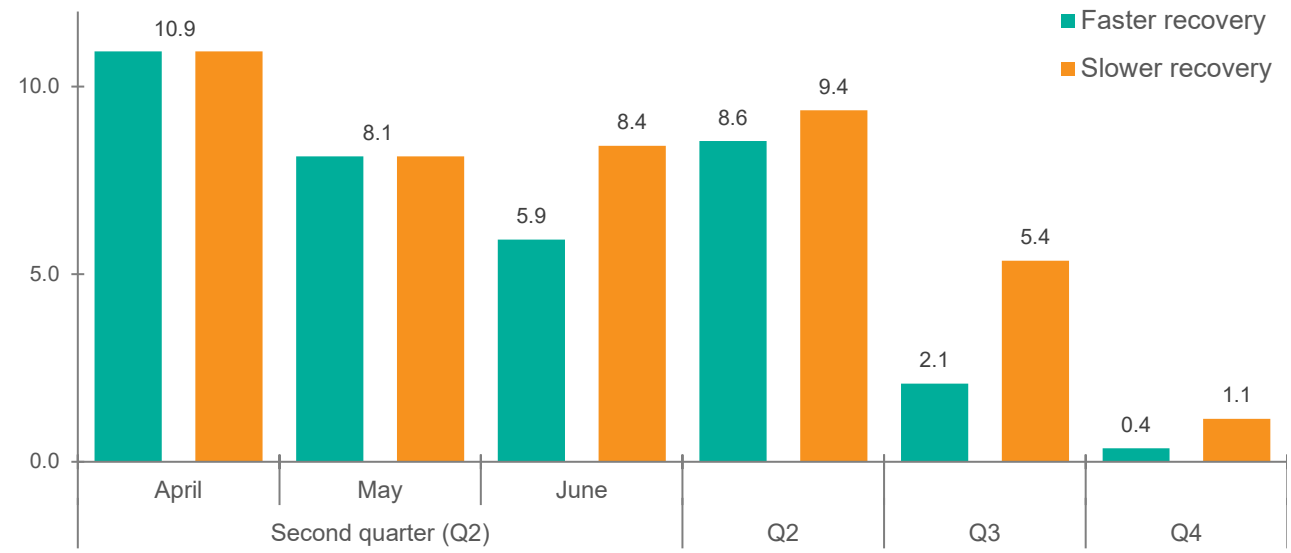
Figure 2: Percentage change in monthly, quarterly, and annual agri-food system GDP under the two recovery scenarios



Source: Authors' calculations based on Rwanda SAM Multiplier Model results
Note: Results are reported in comparison to a normal (no-COVID) situation during the same period.

Fifth, with significant losses in GDP under the two recovery scenarios, our model analysis shows that poverty rates are expected to increase by the end of 2020, though rather modestly. The expected poverty rate by the end of 2020 is about 0.4 percent higher under the fast recovery scenario and 1.1 percent higher with slow recovery (Figure 3). But these small changes mask the large spikes in temporary or transitional poverty during the six-week lockdown. During this period, the poverty rate is about 10.9 percentage points higher nationally than in a no-COVID situation during the same period, 11.6 points higher in urban areas and 10.8 points higher in rural areas. An additional 1.3 million people fall into poverty in this period, with most of these people residing in rural areas. While the post-lockdown income and poverty trends are encouraging, they mask possible long-last effects of the sharp spike in temporary poverty during the six-week lockdown period and the complexity of long-term poverty dynamics that may leave many households significantly more vulnerable than before the pandemic.

Figure 3: Percentage point change in national poverty under the two recovery scenarios



Source: Authors' calculations based on Rwanda SAM Multiplier Model results

Finally, we assess the impacts of COVID-19 on Rwanda's economic growth by comparing the simulation results with actual GDP in 2019, which is a more commonly used measure in the macroeconomic policy analysis. Our simulation results indicate that, while positive growth may expect to return in the third and fourth quarters, Rwanda is likely to fall into a recession with negative annual GDP growth overall in 2020. Under the fast recovery scenario, annual GDP in 2020 is expected to fall by 3.8 percent from that in 2019 and fall by 9.2 percent under the slow recovery scenario.

In year-on-year comparisons, projections for Rwanda's economy from the International Monetary Fund (IMF) indicated an expected –0.2 percent annual growth rate in 2020, which is a significant decrease from the 9.4 percent growth rate achieved in 2019.[5] In fact, Rwanda's GDP fell by 3.4 percent, according to figures released by the National Institute of Statistics of Rwanda in March 2021.[6] While results from our fast-recovery scenario track with NISR's actual figures closely, they should not be interpreted as an accurate projection or forecast, especially when compared to other, more appropriate projection and forecasting tools that have been used by the IMF and Ministry of Finance and Economic Planning (MINECOFIN).[7] The difference in these outlooks is largely a question of methodology.

Forward-looking, scenario-based assessments such as ours differ from other foresighting exercises, such as forecasts, predictions, projections, and speculation. Scenario-based assessments are most useful in situations characterized by high levels of uncertainty within complex systems, and hinge on the analysis of plausible alternative pathways along which events may occur.[8] Scenario analysis using structural models, in particular, is useful for isolating the outcomes of different shocks and policy changes – rather than focusing on combined impacts only – and for tracing impacts and spillover effects across different impact channels or pathways that link immediate shocks to the ultimate outcomes of interest.

Ultimately, the difference between the IMF outlook, NISR's actual figures, and our own assessment is largely a question of methodology, which are detailed in the Working Paper that accompanies this brief. Importantly, any economic outlooks – included those provided here – face considerable uncertainty given the unprecedented nature of this global pandemic. This requires constant revisiting of the analysis when new data and information become available for the country and the global situation. Hence the inclusion of both IMF projections and actual NISR figures.

Policy recommendations

Already, the Government of Rwanda – through its various ministries and agencies and in consultation with various economic stakeholders and development partners – has formulated and implemented plans to expand its social protection programs and revitalize the economy. A critical element in this path to recovery is the Government of Rwanda's National Economic Recovery Plan. However, additional analysis is still needed to understand the impact of the policy response options available to the Government. The design of these policies will be critical to mitigating the negative shock of COVID-19, determining the speed of the economic recovery, and ensuring that the benefits are sufficiently broad to reach all affected households in Rwanda, especially the most vulnerable.

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[5] IMF (International Monetary Fund). 2021. *Rwanda. IMF Country Report* no. 2021/001. Washington, DC: IMF, accessed 10 Jan. 2021.

[6] NISR (National Institute of Statistics Rwanda). 2021. Gross Domestic Product – 2020. Kigali: NISR., accessed 30 Mar. 2021.

[7] In particular, we note that our assessed GDP losses for the second quarter of 2020 significantly exceed those of other assessments and the actual figures from NISR. This has implications for the overall economic and distributional outcomes generated by the SAM multiplier model assessment reported here.

[8] Msangi, S., A. Utah, and M. Batka. 2012. African agricultural futures: Opportunities, challenges and priorities. Paper prepared for presentation at the "Food Security in Africa: Bridging Research and Practice Conference," Sydney, Australia, November 29-30;

Zurek, M., and T. Henrichs. 2007. "Linking scenarios across geographical scales in international environmental assessments." *Technological Forecasting and Social Change* 74(8): 1282-1295.

Specific recommendations include the following:

- Continued policy support to the agri-food system is critical to ensuring that the incomes derived from farming and agribusinesses continue as a stabilizing influence on Rwanda's economy. This means ensuring that policies continue to facilitate farm and livestock management, trading activities in agricultural input and output markets, food processing, agri-food-related transportation, and the provision of extension and other services.
- Recovery in mining, construction, and many services sector activities depend acutely on many micro-, small-, and medium-sized firms. Stimulus packages to help all firms in these badly affected sectors are needed not only to protect the livelihood of workers and entrepreneurs earning income from such activities but also to advance economic recovery.
- Social protection programs should give attention to the most vulnerable households in the lowest *Ubudehe* categories, to those households relying on nonfarm small businesses in both rural and urban areas, and to other groups that have experienced substantial income losses during the pandemic. The expansion of Rwanda's social protection programs is essential to preventing large numbers of households from falling into poverty.
- Finally, efforts to minimize the negative impacts of COVID-19 on Rwanda's economy will partly depend on restoring regional and international trade – especially agricultural trade. There is a need to keep Rwanda's international borders as open as public health and safety measures can allow. This will enable both imports and exports to flow over Rwanda's borders.

Each of these recommendations is accompanied by one essential, overarching recommendation – continued analysis based on emerging new information and data and discussion between researchers and policymakers. Relevant and timely analysis and broad policy engagement are critical not only to understanding the pandemic's effects on livelihoods and the country's economic growth trajectory, but also to designing effective policies and programs to protect those livelihoods and to return Rwanda to its encouraging growth trajectory.

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ACKNOWLEDGMENTS

This brief was prepared under the Rwanda Strategy Support Program (Rwanda SSP), which is managed by IFPRI. The analysis here was conducted as part of a collaboration with the Ministry of Finance and Economic Planning (MINECOFIN) and the National Institute of Statistics for Rwanda (NISR) under the project titled “SAM-CGE Modeling Capacity Building for Evidence-based Policy Analysis and Strategy in Rwanda,” which receives financial support from the Deutsche Gesellschaft für Internationale Zusammenarbeit Gmb (GIZ). Additional financial support was provided by the Bill and Melinda Gates Foundation (BMGF); the United States Agency for International Development (USAID); the European Union through the Rwanda SSP; and the CGIAR Research Program on Policies, Institutions, and Markets (PIM).

This paper was prepared with guidance and input from Thierry Kalisa and Didier Tabaro of MINECOFIN and from Arend Kouwenaar, Jan Miksch, and Ksenija Maver of GIZ. We thank our IFPRI colleagues, Karl Pauw and Clemens Breisinger, for their contributions to the underlying analytical framework, and Todd Benson for his technical and editorial assistance in preparing this paper.

We also acknowledge insights on the current situation in Rwanda related to the COVID-19 global pandemic provided by individuals at MINECOFIN, MINAGRI, the Ministry of Trade and Industry (MINICOM), the Rwanda Agriculture Board (RAB), the National Agricultural Export Development Board (NAEB), CGIAR, the research community, the donor community, and the private sector.

Any opinions expressed here belong to the author(s) alone and do not necessarily reflect those of the Government of Rwanda, IFPRI, CGIAR, or the funders listed above.

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The Rwanda Strategy Support Program (Rwanda SSP) is managed by the International Food Policy Research Institute (IFPRI). Funding support for Rwanda SSP is provided by the European Union (EU); the United States Agency for International Development (USAID); and the CGIAR Research Program on Policies, Institutions, and Markets (PIM). This publication has been prepared as an output of Rwanda SSP. It has not been independently peer reviewed. Any opinions expressed here belong to the author(s) and do not necessarily reflect those of IFPRI, EU, USAID, or CGIAR.