RWANDA
IFPRI

Synopsis: Public investment prioritization for Rwanda's agricultural transformation

Benefits of an increase in public spending on agriculture under PSTA 4

Emerta Aragie, Xinshen Diao, David J. Spielman, James Thurlow, Serge Mugabo, Gracie Rosenbach, and Gilberthe Benimana

Although public spending under the fourth Strategic Plan for the Transformation of Agriculture 2018–2021 (PSTA 4) is generally well structured and cost-effective, funding has been largely stagnant—and even declining, when measured in constant prices—during PSTA's first four years. This note summarizes the effects of a modest *reallocation* of public spending under PSTA 4 towards greater cost-effectiveness, as well as a modest *increase* in PSTA 4 spending. Results draw on an economywide modeling tool designed to prioritize public resources around four key development goals: economic growth, employment creation, poverty reduction, and diet quality improvement. Findings indicate the following.

- There is considerable variation across agricultural investment and expenditure options in terms of efficiency in benefit-to-cost ratios and their contribution to development outcomes.

- Public spending on vegetables, coffee and tea, Irish potatoes, and livestock generate substantial gains across multiple outcomes. The same is true for investments in small-scale irrigation, crop R&D, and livestock R&D.

- Differences in the impact and cost-effectiveness of different investment and expenditure options should *not* be interpreted as indications of how desirable they are; rather, they highlight the importance of prioritizing cost-effective spending options.

- If agricultural spending was slightly adjusted to a more efficient allocation, without additional expenditures, each US dollar of spending is expected to generate $2.33 in GDP, compared to $2.05 under the current allocation.

- If agricultural spending was increased by 5 percent annually, totaling $170 million over the 7 years between 2018 and 2024, with the more efficient allocation, the cumulative additional GDP could exceed $800 million during this period. More than 102,000 new jobs are expected to create both within and outside the food system, and the number of poor in Rwanda could be reduced by 1.2 million, mostly in rural areas. The spending increase could also contribute to diet quality improvements.

- If the 5 percent annual growth in agricultural spending occurs only in the remaining three years of PSTA 4 (2022-2024), the total increases in the spending are just $34 million. Accompanied by a more cost-efficient allocation, it would lead to $300 million additional GDP in 2022-24. When growth rate increases to 10 percent per year, the gains are about $378 million. In both cases, GDP increases are with commensurate gains in employment, poverty reduction, and diet quality improvement.

In sum, substantial gains can be realized with an increase in public funding to agriculture and rural development, when such an increase is accompanied by a modest reallocation across spending areas and investment types to increase cost-effectiveness.

Overview

The Strategic Plans for the Transformation of Agriculture (PSTAs) that began in the early 2000s are the main channel for the Government of Rwanda to invest in the agricultural sector. When the government designs ambitious agricultural strategies with limited public resources, prioritization of public investment across a broad portfolio of policies and programs is often a challenging task. As structural transformation advances and as new investments—beyond the farm—become critically important for the agricultural sector, the prioritization of public investment becomes even more complex. Data-driven and evidence-based approaches to public policy, investment, and expenditure prioritization are critical to making informed decisions about development plans in a fiscal environment that is constrained by limited budgets.

The findings in Policy Note No. 4 show that the fourth Strategic Plan for the Transformation of Agriculture (PSTA 4) which extends from 2018 to 2024 is generally well structured in terms of its investment portfolio and the cost-effectiveness of these investments. Since the beginning of PSTA 4, however, the budget allocated to the Ministry of Agriculture and Animal Resources (MINAGRI) has stagnated, and even declined when measured in constant prices. Yet increases in allocations to MINAGRI are important for growth and job creation beyond agriculture and for poverty reduction and diet quality improvement among rural and urban households. This policy note, therefore, assesses an urgent question for the Government of Rwanda regarding increased allocation of public resources to agricultural and rural development under PSTA 4, and the allocation of additional funds to maximize returns to key development outcomes focusing on economic growth, employment creation, poverty reduction, and diet quality improvement.
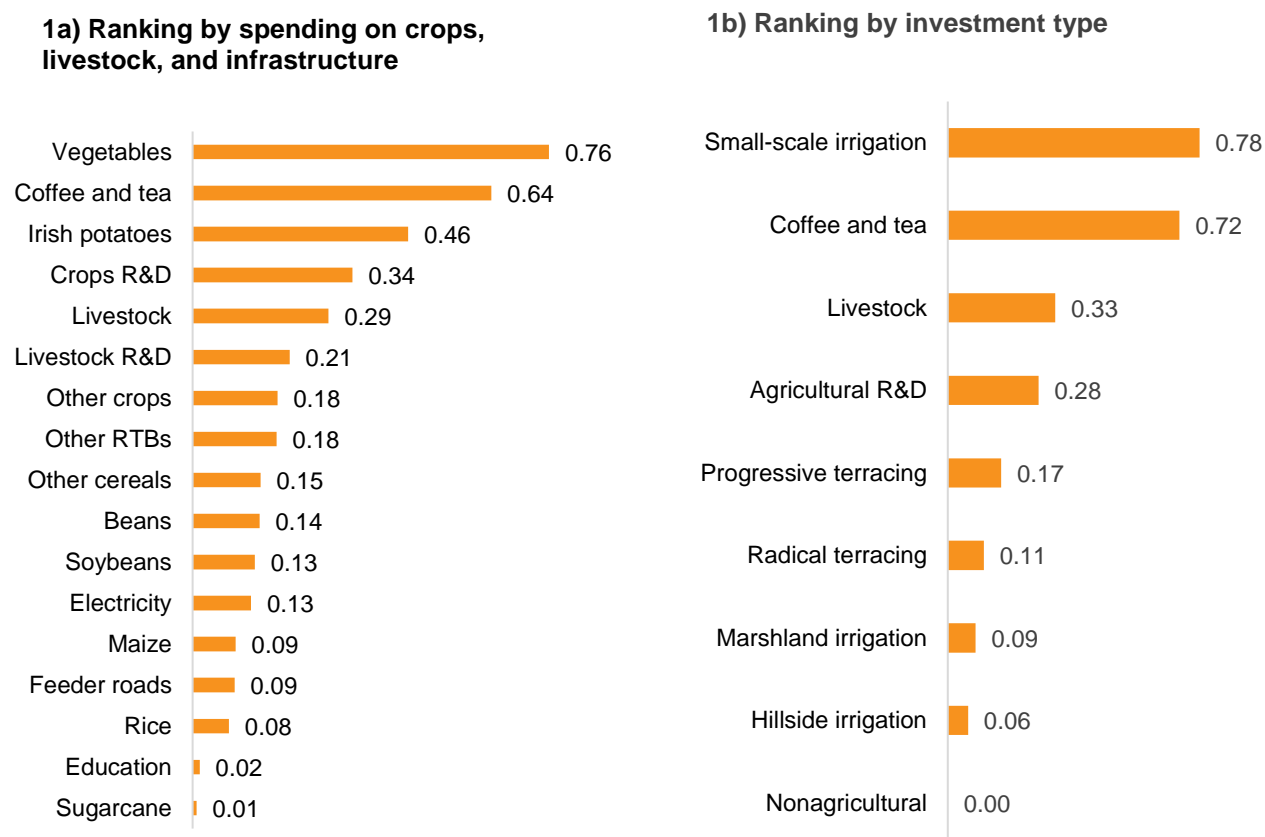
Results are generated by the Rural Investment and Policy Analysis (RIAPA) model, an economywide modeling tool that aims to assist governments in prioritizing limited public resources to maximize the realization of national development goals. The RIAPA model was developed by the International Food Policy Research Institute (IFPRI) and adapted to the Rwandan context with colleagues at MINAGRI, the Ministry of Finance and Economic Planning (MINECOFIN), and the National Institute of Statistics of Rwanda (NISR). To measure the impacts of alternative public expenditure options on multiple development outcomes, the study uses RIAPA's Agricultural Investment for Data Analyzer (AIDA) module, as well as data from multiple sources and from expert insights from MINAGRI.

Main findings

The study focuses first on the efficiency of different PSTA 4 spending priority or investment types measured by the four development outcomes mentioned above. The study then highlights the impact of PSTA 4 on development outcomes in a scenario where the Government of Rwanda reallocates part of its public resources to more efficient spending areas or investment types. This is followed by an assessment of the impact on development outcomes resulting from 5 or 10 percent annual growth in public expenditures on agriculture. Results indicate the following.

First, using a set of composite scores combining the four development outcomes measured as the benefits to investment costs in ratios, the study shows that investments associated with vegetable production generate the highest score (Figure 1). Coffee and tea, while relatively small in terms of public spending, are expected to generate the second largest score, followed by Irish potatoes. These three top-ranked crops are highly tradable high-value products in domestic or export markets, indicating the importance of value chain development for high-value crops in public investment prioritization.

Figure 1. Composite scores combining the four development outcome indicators, based on their benefit-to-cost ratios (equal weight for each outcome indicator)

1a) Ranking by spending on crops, livestock, and infrastructure

Category	Score
Vegetables	0.76
Coffee and tea	0.64
Irish potatoes	0.46
Crops R&D	0.34
Livestock	0.29
Livestock R&D	0.21
Other crops	0.18
Other RTBs	0.18
Other cereals	0.15
Beans	0.14
Soybeans	0.13
Electricity	0.13
Maize	0.09
Feeder roads	0.09
Rice	0.08
Education	0.02
Sugarcane	0.01

1b) Ranking by investment type

Category	Score
Small-scale irrigation	0.78
Coffee and tea	0.72
Livestock	0.33
Agricultural R&D	0.28
Progressive terracing	0.17
Radical terracing	0.11
Marshland irrigation	0.09
Hillside irrigation	0.06
Nonagricultural	0.00

Source: Rwanda-RIAPA model.
Note: RTBs = roots, tubers, and bananas; agricultural R&D refers to both crop and livestock R&D.

Spending on crop R&D, livestock services,[1] and livestock R&D rank fourth, fifth, and sixth, after these three high value crops in Figure 1. This indicates the importance of R&D investment and livestock sector development to the achievement of broad development outcomes. Sugarcane ranks at the bottom, while rice is positioned at third from the bottom. These two crops dominate investments in marshland development, and both are targeted by the country's agricultural import substitution strategy; however, their contribution to development outcomes measured in their investment efficiency are not particularly encouraging when compared to other options due to the high unit cost of marshland development.

Ranking composite scores by type of investment, findings indicate that small-scale irrigation consistently ranks highest, yielding a score value much higher than the investment option just below it in second place. This clearly indicates that, relative to other options, small-scale irrigation investments are important to the achievement of broad development outcomes. Hillside irrigation, on the other hand, ranks at the bottom alongside marshland irrigation.

The difference in rank between small-scale irrigation and marshland/hillside irrigation should not necessarily indicate that the latter investments are undesirable; rather, they highlight the importance of identifying lower-cost irrigation approaches in irrigation system development. The same is true for investments in terracing. Indeed, in the long run, investments in both irrigation and

---

[1] In this context, the term "livestock" include animal health and reproductive services and inputs, as well as livestock extension and advisory services.

terracing are important to Rwanda for the purposes of agricultural development, environmental protection, and resilience to climate change.

Of course, there is room for improvement. Next, we consider a scenario in which the given level of PSTA 4 spending was slightly reallocated towards more cost-effective expenditures in the remaining period of PSTA 4 (2022–24). A more cost-effective allocation leads to total increase in GDP of $79 million in 2022–24 when compared to a situation without such reallocation. Measured by cost-benefit ratios, each additional US dollar of spending is expected to generate $2.33 in GDP, while under the current allocation, $2.05 GDP gain is associated with per dollar spent. Approximately 11,000 new jobs would be created in the economy, and 103,000 people would be lifted out of poverty.

Keep in mind, however, that PSTA 4 spending has been relatively stagnant in 2018-2021. If PSTA 4 spending could grow by 5 percent annually in its remaining years in 2022–24, and if increased spending is reallocated towards more cost-effective expenditures, additional GDP gains are expected to be $300 million in 2022–24. The gains are realized against a total budget increase of just $34 million. Each dollar of total spending is associated with $2.64 dollar increases in GDP, because the allocation of the increased budget becomes more efficient. Over 35,000 new jobs would be created in the economy, an estimated 436,000 people would be lifted out of poverty, and significant improvements in diet quality would be realized. When the growth rate in spending increases to 10 percent per year, the gains in GDP are $378 million in 2022-24, and outcome indicators for employment creation, poverty reduction and diet quality also further increase. (Figure 2).

Figure 2. Gains in GDP and employment in the total economy, in the food system, and in agriculture, as well as poverty reduction and diet quality improvement in national, urban, and rural households following 5 percent and 10 percent annual growth and new budget allocation in agricultural spending, 2022–2024
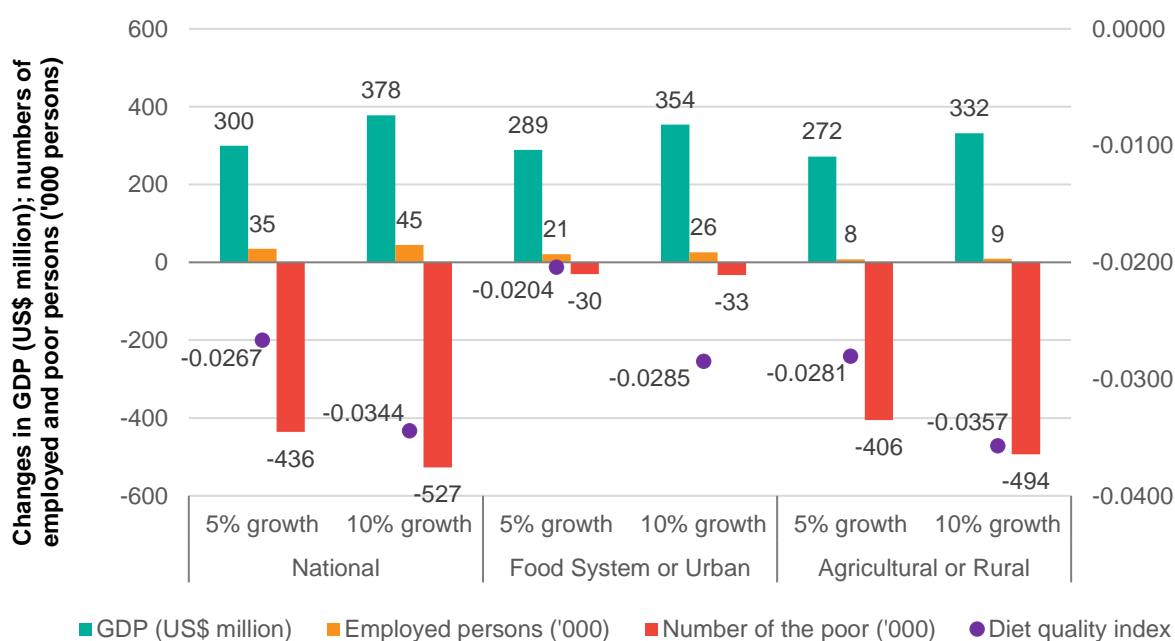
Source: Rwanda-RIAPA model.

Policy recommendations

Looking to the future, it is clear that a modest reallocation of public resources allocated to agriculture can contribute significantly to a range of development outcomes. Substantial additional gains can also be realized with an increase in public resources accompanied by a more cost-

effective allocation across spending areas and investment types.

Increasing the efficiency of some agricultural investments to increase their returns across a range of development outcomes is also important. For example, it may be instructive to examine experiences from other countries that have pursued lower-cost strategies and solutions in irrigation and terracing, particularly Asian countries with similar geographies and agroclimatic conditions.

Finally, there is a case here for continued use of economywide modeling tools such as the Rwanda-RIAPA model to improve the planning and budget allocation processes in the Government of Rwanda and, specifically. MINAGRI. Continued use of these modeling tools should be accompanied by (1) the design and exploration of alternative allocation scenarios will inform future planning efforts, and (2) concerted efforts to improve the availability and quality of data on coverage, costs, and other key parameters for Rwanda that will further improve the estimation of impacts.

In summary, greater analysis and better data will enable the Government of Rwanda and its development partners to address many of the pressing questions and difficult decisions they face in prioritizing public policies, investments, and expenditures for a sustainable and inclusive agricultural transformation in Rwanda.

ABOUT THE AUTHORS

Emerta Aragie is a Research Fellow in the Development Strategy and Governance Division (DSGD) at the International Food Policy Research Institute (IFPRI), based in Washington, DC. **Xinshen Diao** is Deputy Director of DSGD at IFPRI, based in Washington, DC. **David J. Spielman** is a Senior Research Fellow in DSGD at IFPRI and Head of the Rwanda Strategy Support Program (Rwanda SSP), based in Kigali. **James Thurlow** is a Senior Research Fellow in DSGD at IFPRI, based in Washington, DC. **Serge Mugabo** is a Research Analyst in DSGD at IFPRI with the Rwanda SSP, based in Kigali. **Gracie Rosenbach** is a Country Program Manager in DSGD at IFPRI with the Rwanda SSP, based in Kigali. **Gilberthe Benimana** is a Research Analyst in DSGD at IFPRI with the Rwanda SSP, based in Kigali.