Beyond the Agriculture-Non-agriculture Nexus: Key sectors and key policies of an effective PPG-strategy in Ghana, Senegal and Uganda

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The intervention logic of CAADP

Logic of Policy Intervention

Natural Resources
Human Resources
Farm Resources
Non-agricultural policy
Infrastructure Roads
Infrastructure Storage

Technical Progress

Market Access

Agricultural Sector
- crop
- livestock
- fish
- export crop

Agribusiness

Economic Growth
Non-Agricultural Sector
- industry
- trade
- service
- public service

Policy Outcomes
- Z1 = farm incomes
- Z2 = poverty
- Z3 = public goods
- Z4 = export crop
- Z5 = urban incomes
- Z6 = industry
- Z7 = sustainability

Policy \([\gamma]\) \(W_s = PIF(\gamma)\) Economic Growth \([W_s]\) \(w_x = CGE(W_s)\) Growth in Policy Outcome \([w_x]\)

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Key sectors and key policies
Definition of key sector of a PPG-strategy:

Investment in a sector has high impact on poverty reduction

1. Growth in a key sector implies a high reduction of poverty
2. Budget resources needed to generate growth in this sector are low.
Definition of the concerns

\[ Z_1 = \text{Real net-income of small-scale farmer households} \]
\[ Z_2 = \text{Normalized poverty measure overshoot from the poverty line} \]
\[ Z_3 = \text{Public goods ie total state revenue subtracted by CAADP budget and transfers} \]
\[ Z_4 = \text{Sum of total GDP generated in export sector} \]
\[ Z_5 = \text{Real net-income of urban consumer households} \]
\[ Z_6 = \text{Sum of total GDP generated in industry sector} \]
\[ Z_7 = \text{Negative of the sum of total purchased input payments per hectare of agricultural land} \]
Definition of the CGE-Multipliers

The CGE-Multiplier is defined and calculated to assess the impact of total factor productivity growth in the different economic sectors on the policy concerns, $Z_k$, $k = 1, \ldots, 7$. This multiplier is the linear growth rate for the seven policy concerns induced by an increase of the technical progress in each single sector from 1% in the base run scenario to 10%.

\[ \Delta tp_s = tp_s^{simcur} - tp_s^{base} = 10\% - 1\% \]

**CGE-Multiplier:**

\[
\xi_{CGE}^{ks} = \left( \frac{Z_{kt}^{simcur} - Z_{kt}^{base}}{Z_{k0}^{base}} \right) \frac{1}{t \Delta tp_s}
\]  

\(1\)
Definition of Marginal Budget Productivity (MBP)

- Key sectors are characterized by high marginal productivity of budget units in promoting tp in this sector:

\[
MBP_s = \frac{\partial tp_s}{\partial B_s} = \frac{PIF_s}{\partial B_s}
\]
Definition of the PPG-elasticity

Key sectors of a PPG-strategy are characterized by high PPG-elasticity:

$$PPG_{ks} = \xi_{ks}^{CGE} \frac{\partial p_s}{\partial B_s} = \xi_{ks}^{CGE} MBP_s$$

\(k = Z_2 = \text{Poverty reduction}\)
Key sectors: CGE-elasticities Ghana

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Key sectors and key policies
Key sectors: CGE-elasticities Senegal
Key sectors: CGE-elasticities Uganda

- Agriculture: 3.43%
- Export: 0.03%
- Livestock: 0.38%
- Fish: 1.77%
- Forest: 0.89%
- Food Proc.: 0.89%
- Textile: 0.13%
- Wood: 0.03%
- Mining: 0.03%
- Energy/Water: 0.11%
- O. Ind: 1.24%
- Trade: 2.69%
- Hotel: 2.11%
- Real estate: 1.50%
- O. Serv: 2.39%
- Health: 0.25%
- Edu: 0.79%
- O. Pub: 0.01%

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Key sectors and key policies
Key sectors: PPG-elasticities Ghana

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Key sectors and key policies
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Key sectors: PPG-elasticities Uganda
Key results: Key sectors

- Compared to CGE-based measures (multipliers or elasticities) PPG-elasticities are advanced methodological concept to identify key sectors.
- Agriculture is a key sector in all countries. However, not all subsectors are pro-poor. In Senegal and Uganda food crop is more pro-poor than export crop, while in Ghana significant higher PPG-elasticities have been estimated for export crops.
- In all countries some non-agricultural sectors are pro-poor, too. Especially, in Uganda non-agricultural sectors have been found to be pro-poor, e.g. transport and construction.
- Agricultural sectors are especially pro-poor, because it is less costly to promote in these sectors when compared to non-agriculture. Thus, favorable policy-growth linkages make agriculture the key PPG-sector, while in all countries growth poverty linkages are relatively favorable for non-agricultural sectors.
Definition of Key Policies

- Key Policies are policies which imply the highest future gains per budget units, e.g. for which the following marginal policy gain (MPG) is maximal:

\[
MPG_i = \xi_{ks}^\text{CGE} \frac{\partial p_s}{\partial \gamma_i}
\]

\[
MPG_i = \xi_{ks}^\text{CGE} \frac{\partial I_s}{\partial \gamma_i}
\]
CAADP Policy Instruments

I. Natural resource management (NR)
   \( \gamma_1 \) Water management
   \( \gamma_2 \) Land management

II. Farm management (FM)
   \( \gamma_3 \) FM-food crop
   \( \gamma_4 \) FM-export crop
   \( \gamma_5 \) FM-livestock

III. Market Access (MA)
   \( \gamma_6 \) rural road infrastructure
   \( \gamma_7 \) market support services

IV. Human resource management (HR)
   \( \gamma_8 \) Extension
   \( \gamma_9 \) Research and Development

V. Non-agricultural policy programs
   \( \gamma_{10} \) nonagriculture
PIF Conception

Growth
\[ tp = \text{Logistic}(Be) \]

Effective Budget
\[ B_e = \text{CES}(\gamma) \]

Key sectors and key policies

- Land
- Water
- FM-food
- FM-export
- FM-livestock
- Road
- Market
- Extension
- R&D
- Non-agr
- NR
- FM
- MA
- HR

CAADP

Policy

Budget

PNE

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PIF Conception

Growth
\[ tp = \text{Logistic}(Be) \]
Political costs: Marginal Revenue of CAADP-policies generating poverty reduction