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**The CAADP Inaugural Biennial Review and the
Africa Agricultural Transformation Scorecard
Results and Areas for Improvement**

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ABSTRACT

In 2014, African heads of state and government adopted the “Malabo Declaration on Accelerated African Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihood”, in which they recommitted to the principles and values of CAADP and set ambitious targets in five broad areas (enhancing agricultural investment, ending hunger, reducing poverty, boosting intra-African agricultural trade, and enhancing resilience of livelihoods and production systems). The African leaders agreed to conduct a Biennial Review (BR) of progress made in achieving their commitments. The first BR report and the Africa Agricultural Transformation Scorecard (AATS), based on 43 indicators, was released in January 2018.

This paper uses the BR data and simple correlations to analyze the potential relationship between progress in recommitting to CAADP or mutual accountability and progress in meeting commitments in the other five broad areas. Various weighting systems are used to demonstrate the sensitivity of the weights chosen for computing the scores to develop the AATS. The current BR applies equal weights to the seven thematic areas, followed by equal weights to performance categories and indicators within each thematic area and performance category, respectively. The other weighting systems considered for the sensitivity analysis include equal weights applied at performance category or indicator level, differential weights based on the ease or difficulty in achieving various commitments using the Items Response Theory (IRT), and differential weighting system that gives more weight to performance categories or indicators that are more directly linked to agricultural transformation.

The results show that the estimated correlation coefficients are mostly near-zero and statistically insignificant. The overall score and classification of whether a country is on track to meet the overall Malabo commitments or not are different for the various weighting systems. With the equal-weighting system used in the current BR, 20 of the 47 reporting countries are assessed as being on track, compared to a lower range of 8 to 19 for the other weighting systems. There are some consistencies across the various weighting systems. Morocco, Rwanda, and Mali are among the top five performers in all the systems. Also, all the countries except for Ghana that are assessed as not being on track in the current BR are similarly assessed in the other weighting systems. Five countries (Benin, Botswana, Ghana, Mozambique, and Uganda) may be considered borderline, as they are on track with three or four of the weighting systems. Other issues with aggregating the indicators into the higher-level scores are unearthed, including the relation between different indicators on the impact pathway, transformation of the indicators into lower-level scores, treatment of missing values, and indicators with competing objectives or subject to double counting.

The findings of the paper will be useful for revising the BR indicators and methodology, an exercise that is currently ongoing and in preparation for the next report that is expected to be presented to African leaders at the African Union (AU) assembly in January 2020.

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ABBREVIATIONS AND ACRONYMS

| | |
|---------|--|
| AATS | Agricultural Transformation Scorecard |
| agODA | official development assistance to agriculture |
| agPER | agriculture public expenditure review |
| AU | African Union |
| AUC | African Union Commission |
| BR | biennial review |
| CAADP | Comprehensive Africa Agriculture Development Programme |
| DRC | Democratic Republic of the Congo |
| FDI | foreign direct investment |
| GAE | government agriculture expenditure |
| GAFFSP | Global Agriculture and Food Security Program |
| GDP | gross domestic product |
| IRT | Item Response Theory |
| JSR | joint sector review |
| M&E | monitoring and evaluation |
| MA | mutual accountability |
| NAIP | national agricultural investment plan |
| NEPAD | New Partnership for Africa's Development |
| PC | performance category |
| PPP | public private partnership |
| ReSAKSS | Regional Strategic Analysis and Knowledge Support System |
| TA | thematic area |

1. INTRODUCTION

In July 2003 at the Second Ordinary Session of the Assembly of the African Union (AU) held in Maputo, Mozambique, the heads of state and government launched the Comprehensive Africa Agriculture Development Programme (CAADP), which is an agriculture-led integrated framework of development priorities aimed at reducing poverty and increasing food security in the continent (AU 2003). Then, the African leaders set a couple of targets: to spend a minimum of ten percent of their total expenditure on agriculture; and to pursue six percent annual agricultural growth rate. The commitment to CAADP was renewed at the Assembly of the AU in 2009 in Sirte, Libya (AU 2009), and again in 2014 in Malabo, Equatorial Guinea, with the adoption of the “Malabo Declaration on Accelerated African Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihood” (AU 2014). Other stakeholders in the sector also aligned accordingly. For example, the commitment by the private sector and development partners is reflected with the launch of the Grow Africa initiative for private sector enterprises (Grow Africa 2016) and with development partners tying their assistance to progress in implementing CAADP via the Global Agriculture and Food Security Program (GAFSP 2016) and the New Alliance for Food Security and Nutrition (New Alliance 2016).

With the adoption in 2014 of the “Malabo Declaration on Accelerated African Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihood”, the African leaders, in addition to recommitting to the principles and values of CAADP, set ambitious targets in five broad areas (enhancing agricultural investment, ending hunger, reducing poverty, boosting intra-African agricultural trade, and enhancing resilience of livelihoods and production systems), and agreed to conduct a Biennial Review (BR) of progress made in achieving their commitments (AU 2014). The inaugural BR report (AUC 2017a), and the accompanying Africa Agricultural Transformation Scorecard (AATS), was launched at the 30th ordinary session of the AU assembly in Addis Ababa in January 2018. This is highly commendable as it is first of its kind in the agricultural sector at the AU level. Out of the 55-member states, 47 (85%) submitted country BR reports, out of which 20 are assessed to be on track to achieving the Malabo commitments by 2025.

A key question arising is how the report and its findings can be used to garner support to intensify CAADP implementation for an accelerated African agricultural transformation (AUC 2017a). The first step to answer this question should be to demonstrate with the BR data and results that it pays off to adopt and implement CAADP and to strive to achieve the various commitments of the Malabo Declaration. Aside from indicating which countries are on track or not on track to meeting various commitments in the seven areas, in addition to a list of five commitments that a country scored the highest or lowest in, there is no analysis in the BR report on how recommitting to CAADP (e.g. designing and implementing a Malabo-consistent NAIP) or mutual accountability for results and actions (e.g. having inclusive, institutionalized mechanisms and platforms for mutual accountability and peer review) has contributed to different outcomes. With 63 and 94 percent of the reporting countries assessed as being on

track in recommitting to CAADP and mutual accountability, respectively (AUC 2017a), it is surprising that only 42 percent of the countries are assessed as being on track toward meeting the overall Malabo commitments. This is surprising because committing to the CAADP principles and values is expected to improve the policy-making process and to safeguard the design and implementation of good policies, which in turn is expected to lead to desirable policy outcomes. Also, mutual accountability is expected to prevent diversion from agreed-on commitments.

Using the Malabo BR data on the 43 indicators and related higher-level scores in the database (AUC 2017b), this paper uses simple correlations to analyze the potential relationship between progress in recommitting to the CAADP process or mutual accountability with progress in meeting the other Malabo commitments. To evaluate the sensitivity of using an equal-weighting system across the seven thematic areas of the Malabo Declaration to develop the AATS, other weighting systems are used. These include equal weights applied at performance category or indicator level, differential weights based on the ease or difficulty in achieving various commitments using the Items Response Theory (Embretson and Reise 2000), and a differential weighting system that gives larger weight to indicators that are more directly linked to agricultural transformation. The findings of the paper will be useful for revising the BR indicators and methodology, an exercise that is currently ongoing and in preparation for the next report that is expected to be presented to African leaders at the AU assembly in January 2020.

Briefly, we find mostly near-zero and statistically insignificant correlation coefficients between recommitting to CAADP or mutual accountability with the indicators on meeting the other Malabo commitments. This is likely due to several technical shortcomings including the measurement issues with the indicators on recommitting to the CAADP process and mutual accountability. The overall score and classification of whether a country is on track to meet the overall Malabo commitments or not are different for the various weighting systems. With the equal-weighting system used in the current BR for example, 20 of the 47 reporting countries are assessed as being on track, compared to a lower range of 8 to 19 for the other weighting systems. There are some consistencies across the various weighting systems, however. For example, Morocco, Rwanda, and Mali are among the top five performers across all the weighting systems, although their ranking varies. Furthermore, all the countries except for Ghana that are assessed as not being on track in the current BR are similarly assessed in the other weighting systems. Five countries (Benin, Botswana, Ghana, Mozambique, and Uganda) may be considered borderline, as they are assessed as being on track under three or four of the weighting systems. Issues with aggregating the indicators into the higher-level scores are discussed. These include the relation between the indicators on the impact pathway, transformation of the indicators into lower-level scores, treatment of missing values, and indicators with competing objectives or subject to double counting, which together suggest careful consideration of the weighting system used.

A summary review of the achievements and impacts associated with CAADP prior to launch of the Malabo Declaration are discussed in the next section, followed by a presentation of the inaugural BR and results. The impact pathway of CAADP and the Malabo Declaration is then presented, followed by the empirical methods, estimation results and findings, and conclusions.

2. A REVIEW OF ACHIEVEMENTS AND IMPACTS OF CAADP

Since the launch of CAADP in 2003, several achievements in the policy-making process in agriculture have been associated with it. For example, CAADP has raised the political commitment and profile of agriculture and has promoted greater participation of multiple state and nonstate actors in agricultural policy dialogue and strategy development processes (AU-NEPAD 2010). The annual CAADP Partnership Platform and Business meetings since 2006 that bring together the different stakeholders at various levels to review progress and make plans have been instrumental (AU-NEPAD 2010 and 2014). Underlying these are various frameworks and tools, including: the four pillar framework documents to guide adaptation of the CAADP principles and targets into national and regional policymaking processes (AU-NEPAD 2010); a monitoring and evaluation framework to track progress in implementation of CAADP (Benin, Johnson, and Omilola 2010); a mutual accountability framework to guide processes at country, regional, and continental levels (Oruko et al. 2011); and a knowledge management system that provides analyses to document progress and derive lessons for the implementation of CAADP (ReSAKSS 2018).

On the effects of CAADP, Benin (2018) shows that implementing CAADP and reaching higher stages of implementation have had significant positive impact on government agriculture expenditure, official development assistance to agriculture, and agricultural land and labor productivity. Using a four-level ordered variable according to the stage of CAADP implementation reached (pre-compact, compact, national agricultural investment plan (NAIP), and obtaining external funding)¹ and cross-country panel data from 2001 to 2014, the effect of CAADP on the government agriculture expenditure, measured as a share of either total government expenditure or agricultural gross domestic product, is estimated at 1.5–7.2 percentage points higher for reaching higher stages of implementation, compared to the pre-compact stage. The effect on agricultural land productivity is estimated at 11–17 percent higher for reaching higher stages of implementation, and that for agricultural labor productivity is 10–23 percent.

3. THE MALABO DECLARATION AND THE 2017 BIENNIAL REVIEW AND RESULTS

With the adoption in 2014 of the “Malabo Declaration on Accelerated African Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihood” (AU 2014), the African leaders, in addition to recommitting to the principles and values of the CAADP, set

¹ The external funding considered are associated with the Grow Africa initiative for private sector enterprises (Grow Africa 2016), the Global Agriculture and Food Security Program (GAFSP 2016), and the New Alliance for Food Security and Nutrition (New Alliance 2016).

ambitious targets in several areas and agreed to conduct a Biennial Review (BR) of progress made in achieving their commitments. The Malabo Declaration involves commitments in seven thematic areas: (1) recommitting to the principles and values of the CAADP; (2) enhancing investment finance in agriculture; (3) ending hunger in Africa by 2025; (4) reducing poverty by half by 2025 through inclusive agricultural growth and transformation; (5) boosting intra-African trade in agricultural commodities and services; (6) enhancing resilience of livelihoods and production systems to climate variability and other related risks; and (7) strengthening mutual accountability to actions and results. Consequently, the BR process was launched in 2016, which involved identifying and defining 43 indicators to use in assessing progress toward meeting the commitments in the seven thematic areas, in addition to development of technical guidelines (AU 2017b), reporting templates, scorecard, and other tools and resources to support its implementation.

The inaugural Malabo BR report and the accompanying Africa Agricultural Transformation Scorecard (AATS) (AUC 2017a) was released at the 30th ordinary session of the AU assembly in Addis Ababa in January 2018. The report allows the AU leaders to appreciate the effort undertaken in tracking the 43 indicators and reporting on the progress made in achieving the various Malabo Declaration commitments. Out of the 55-member states, 47 (85%) submitted country BR reports, from which the various indicators were aggregated into higher-level scores according to a pre-determined methodology (AUC 2017b) to assess the extent to which countries are on track toward achieving the commitments in the seven thematic areas. An overall score of progress to achieving all the commitments by 2025 was also awarded. Whereas the results of progress in achieving the different commitments are varied, 20 of the 47 reporting countries, based on the overall score, are assessed to be on track toward achieving the Malabo commitments by 2025. A list of five indicators that a country performed the best in were highlighted, in addition to the areas needing the most effort, corresponding to the five indicators that the country performed worst in.

Based on the results, the inaugural BR report calls for action on the part of the African leaders to speed up and deepen implementation of CAADP via (re)designing and financing of their national agricultural investment plans (NAIPs) in a manner that is consistent with the Malabo Declaration commitments (AUC 2017a). With 37 percent of the reporting countries assessed as not being on track toward recommitting to the CAADP principles and values (AUC 2017a), the call seems relevant and could be strengthened by demonstrating with the BR data and results that it pays off to adopt and implement CAADP and to strive to achieve the various commitments of the Malabo Declaration. This is the objective of the paper, which, to be able to achieve, will be useful to first appreciate the impact pathway underlying the Malabo Declaration.

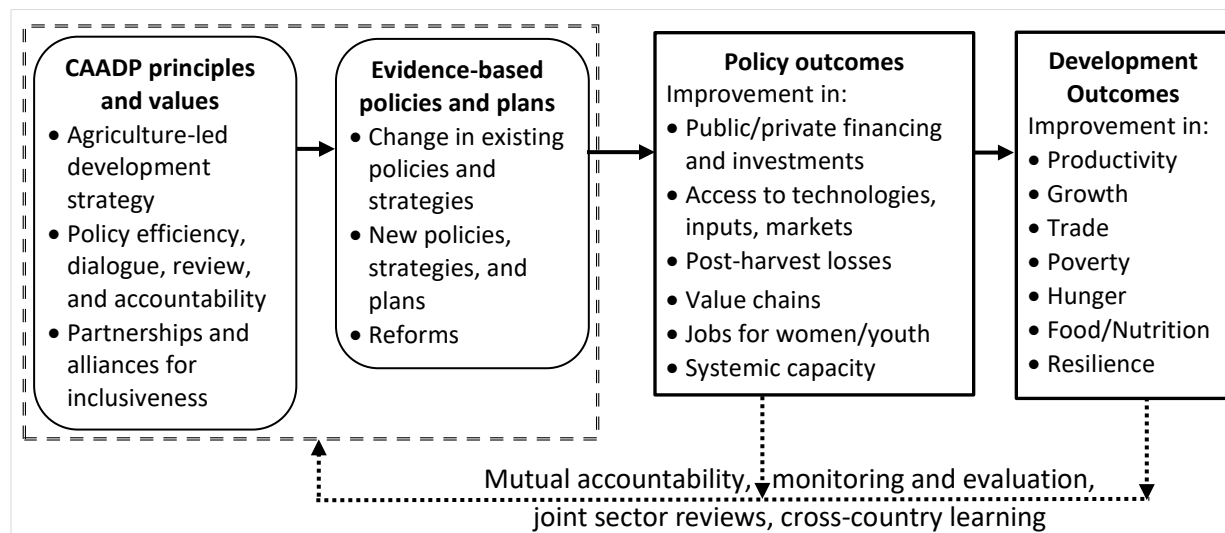
4. CONCEPTUAL FRAMEWORK AND METHODS

4.1. Impact Pathway of the Malabo Declaration

The fundamental hypothesis for recommitting to the CAADP process and to commit to mutual accountability for results and actions is that CAADP brings benefit by reforming evidence-based planning and implementation, rooted in the principles of country ownership and inclusiveness, which may be generalized by the impact pathway shown in Figure 1.² Committing to the CAADP principles and values is expected to improve the policy-making process and to safeguard the design and implementation of good policies, which in turn is expected to lead to desirable policy outcomes. These include increase in the amount and quality of public and private investments, increase in access to technologies and markets, reduction in post-harvest losses, increase in employment for women and youth, and increase in systemic capacity for planning and implementation. The policy outcomes in turn are expected to contribute to better development outcomes—raise productivity, accelerate growth, increase trade, reduce poverty and hunger, increase food and nutrition security, and enhance resilience to climate variability.

The notion of committing to mutual accountability for results and actions is better reflected in the feedback linkages associated with monitoring and evaluation, joint sector reviews, cross-country learning, etc. to improve the policy-making process and the design and implementation of evidence-based policies and plans. This reflects the dynamism in the implementation process, and the form of mutual accountability may be described as collaborative, as opposed to representative or corporate (Steer et al. 2008).

Figure 1: Malabo Declaration impact pathway



Source: Authors' illustration based on Benin (2018).

² This impact pathway underlies the CAADP M&E Framework (Benin, Johnson, and Omilola 2010), the CAADP Mutual Accountability Framework (Oruko et al. 2011), the CAADP Results Framework (AU-NEPAD 2015a), and the Implementation Strategy and Roadmap to Achieve the 2025 Vision on CAADP (AU-NEPAD 2015b).

4.2. Methods

Correlations and Direct Relationships

We understand that rigorous impact evaluation methods are needed to estimate the above relationships and to quantify the effects and payoffs to implementing the Malabo declaration.³ For this paper however, given data limitation, simple correlation coefficients between the indicators on recommitting to CAADP and mutual accountability and the indicators of evidence-based policies, policy outcomes, and development outcomes are used to make initial assessments or first-order analysis of the potential relationships. As correlation coefficients lie in the range of -1 to +1, high values (i.e. approaching +1) will indicate strong positive and direct relationship, with values near 0.5 and zero indicating moderate and weak/little relationships, respectively. Similarly, low negative values (approaching -1) will indicate strong inverse relationship.

We will expect the estimated correlation coefficient to be stronger and closer to the true relationship in Figure 1 for actions and results that are nearer to each other, compared to those that are farther apart. For example, we will expect the estimated correlation coefficient between committing to CAADP principles and government agriculture expenditure to be stronger and closer to the true relationship, compared to the estimated correlation coefficient between committing to CAADP principles and growth or food security, for example. Essentially, the nearer the actions and results are on the impact pathway, the more confident we are that the estimated correlation coefficient approximates the true relationship.

Probability of Achieving Different Commitments

Figure 1 implies that achieving the Malabo commitments associated with any of the development outcomes will depend on achieving other commitments. For example, achieving the commitment on ending hunger will depend on achieving different commitments associated with the policy outcomes, which in turn will depend on achieving different commitments associated with design and implementation of evidenced-based policies, and so on. Because different actions and results impact each other differently along the impact pathway, it means that achieving a commitment at the beginning part of the chain will have differential effects on achieving commitments toward the end part of the chain. Similarly, because actions and results that are farther apart from each other on the impact pathway tend to be weakly related than those are nearer to each other (assuming they are related), it means that the importance of achieving a commitment on any development outcome increases with achieving commitments that are toward the end part of the chain. Although we have grouped the actions and results into four nodes (principles and values, policies and plans, policy outcomes, and development outcomes) on the impact pathway, there are likely to be sub-pathways within the same node.

³ See for example Benin (2018) for estimation of the impact of CAADP.

Within the development outcome node for example, we can envisage a pathway from productivity to growth to poverty or hunger.

Together, these imply that different weights may be attached to achieving the various Malabo Declaration commitments. Furthermore, given that the actions and results along impact pathway are also influenced by several other factors (e.g., political-economy, institutions, infrastructure, climate, etc.), which are different in different countries, the importance of achieving any commitment may not be the same for all countries. Therefore, countries may attach different weights to achieving the various commitments.

We use the Item Response Theory (IRT) (Embretson and Reise 2000) to explore these issues further. Let Y_{ij} represent the unobserved outcome or target for commitment i in country j , and y_{ij} its observed value, with $y_{ij} = 1$ if the country achieves the target and $y_{ij} = 0$ otherwise. Using the standard one-parameter IRT, the probability for country j to achieve the target for commitment i is given by the following standard logistic function:

$$Pr(Y_{ij} = 1|\theta_j) = \frac{\exp\{a(\theta_j - b_i)\}}{1 + \exp\{a(\theta_j - b_i)\}} \quad \theta \sim N(0,1) \quad \dots\dots(1)$$

where a represents the discrimination parameter that is assumed to be the same for all commitments,⁴ b_i represents the difficulty of achieving the target for commitment i , and θ_j is the latent trait of country j (e.g. ability to implement the Malabo Declaration commitments), which is modeled as a sample from a normal distribution for the purpose of estimating the items' parameters. Then, the probability of achieving the target (p_{ij}) can be parameterized as:

$$Pr(Y_{ij} = 1|a, b_i, \theta_j) = \frac{\exp(\alpha\theta_j + \beta_i)}{1 + \exp(\alpha\theta_j + \beta_i)} \quad \dots\dots(2)$$

where $a = \alpha$ and $b_i = -\frac{\beta_i}{\alpha}$. Let $p_{ij} = Pr(Y_{ij} = 1|\alpha, \beta_i, \theta_j)$ and $q_{ij} = 1 - p_{ij}$. Conditional on θ_j , that the commitments or items responses are assumed to be independent, the conditional density for country j is given by:

$$f(Y_j|B, \theta_j) = \prod_{i=1}^I p_{ij}^{y_{ij}} q_{ij}^{1-y_{ij}} \quad \dots\dots(3)$$

where $Y_j = (y_{1j}, \dots, y_{Ij})$, $B = (\alpha, \beta_1, \dots, \beta_I)$, and I is the number of items or commitments. Based on the estimated parameters, the relative difficulty or ease of achieving different commitments can be assessed.

⁴ The discrimination parameter is a measure of the differential capability of a commitment, which would typically be represented as α_i . A high discrimination parameter value suggests a commitment that has a high ability to differentiate countries, or that the probability of achieving a commitment increases more rapidly as the latent trait or ability increases.

4.3. Data and Sources

The data used in this paper are from the inaugural Malabo BR report and database (AU 2017a). These include 43 indicators (Is), which are organized under 23 performance categories (PCs), to track progress in the Malabo commitments under the 7 thematic areas (TAs). Each TA has two to five PCs, and each PC has one to six indicators, with the “commitment to ending hunger” TA having the most number of PCs and Is—5 and 17, respectively. Table 1 shows a summary of the number of PCs and Is for each of the seven TAs, and Table 2 provides a detail description of the TAs, PCs, and Is, in addition to their location on the impact pathway presented in Figure 1.

Several of the indicators, particularly those under the TAs of “recommitting to CAADP process” and “mutual accountability for actions and results”, are constructed indexes from other parameters—see AU (2017b) for details. Such indicators are identified in Table 2 by including next to them the number of parameters used in constructing them in parenthesis.

Table 1: Number of the Malabo BR performance categories and indicators

| Thematic area (TA) | Number of | |
|--|------------------------------|-----------------|
| | Performance categories (PCs) | Indicators (Is) |
| TA 1: Recommitting to CAADP process | 3 | 3 |
| TA 2: Enhancing investment finance in agriculture | 4 | 6 |
| TA 3: Ending hunger by 2025 | 5 | 17 |
| TA 4: Halving poverty through agriculture by 2025 | 4 | 8 |
| TA 5: Boosting intra-African trade in agriculture commodities and services | 2 | 3 |
| TA 6: Enhancing resilience to climate variability | 2 | 3 |
| TA 7: Mutual accountability for actions and results | 3 | 3 |
| Total | 23 | 43 |

Source: Authors’ illustration based on AUC (2017a, 2017b).

Table 2: Description of the Malabo BR indicators and their link to the impact pathway

| Label | Thematic area, performance category, and indicator | Impact pathway node |
|----------------------------------|---|-----------------------|
| Thematic area (TA) | | |
| TA 1 | Recommitting to CAADP process | Principles and values |
| TA 2 | Enhancing investment finance in agriculture | Policy outcome |
| TA 3 | Ending hunger by 2025 | Development outcome |
| TA 4 | Halving poverty through agriculture by 2025 | Development outcome |
| TA 5 | Boosting intra-African trade in agriculture commodities and services | Development outcome |
| TA 6 | Enhancing resilience to climate variability | Development outcome |
| TA 7 | Mutual accountability for actions and results | Principles and values |
| Performance category (PC) | | |
| PC 1.1 | Completing national CAADP process | Principles and values |
| PC 1.2 | Establishing CAADP-based cooperation, partnership, and alliance | Principles and values |
| PC 1.3 | Establishing CAADP-based policy and institutional review/setting/support | Policies and plans |
| PC 2.1 | Public Expenditures in Agriculture | Policy outcome |
| PC 2.2 | Domestic Private Sector Investment in agriculture, agribusiness, agroindustry | Policy outcome |
| PC 2.3 | Foreign Private Sector Investment in agriculture, agribusiness, agroindustry | Policy outcome |
| PC 2.4 | Enhancing access to finance | Policy outcome |
| PC 3.1 | Access to Agriculture inputs and technologies | Policy outcome |

| | | |
|----------------------|--|-----------------------|
| PC 3.2 | Doubling agricultural Productivity | Development outcome |
| PC 3.3 | Reduction of Post-Harvest Loss | Policy outcome |
| PC 3.4 | Strengthening Social Protection | Policy outcome |
| PC 3.5 | Improving Food security and Nutrition | Development outcome |
| PC 4.1 | Sustaining Agricultural GDP for Poverty Reduction | Development outcome |
| PC 4.2 | Establishing Inclusive PPPs for commodity value chains | Policy outcome |
| PC 4.3 | Creating job for Youth in agricultural value chains | Policy outcome |
| PC 4.4 | Women participation in Agri-business | Policy outcome |
| PC 5.1 | Tripling Intra-African Trade for agriculture commodities and services | Development outcome |
| PC 5.2 | Establishing Intra-African Trade Policies and institutional conditions | Policy outcome |
| PC 6.1 | Ensuring Resilience to climate related risks | Development outcome |
| PC 6.2 | Investment in resilience building | Policy outcome |
| PC 7.1 | Increasing country capacity for evidence-based planning, implementation, and M&E | Policy outcome |
| PC 7.2 | Fostering peer review and mutual accountability process | Principles and values |
| PC 7.3 | Conducting a biennial agriculture review process | Principles and values |
| Indicator (I) | | |
| I 1.1 | CAADP process completion index (7) | Principles and values |
| I 1.2 | Existence of, and quality of multi-sectorial and multi-stakeholder coordination body (5) | Principles and values |
| I 1.3 | Evidence-based policies, supportive institutions and corresponding human resource (3) | Policies and plans |
| I 2.1i | Public agriculture expenditure as share of total public expenditure | Policy outcome |
| I 2.1ii | Public Agriculture Expenditure as % of agriculture value added | Policy outcome |
| I 2.1iii | ODA disbursed to agriculture as % of commitment | Policy outcome |
| I 2.2 | Ratio of domestic private sector investment to public investment in agriculture | Policy outcome |
| I 2.3 | Ratio of foreign private direct investment to public investment in agriculture | Policy outcome |
| I 2.4 | Proportion of men and women engaged in agriculture with access to financial services | Policy outcome |
| I 3.1i | Fertilizer consumption (kilogram of nutrients per hectare of arable land) | Policy outcome |
| I 3.1ii | Growth rate of the size of irrigated areas from its value of the year 2000 | Policy outcome |
| I 3.1iii | Growth rate of the ratio of supplied quality agriculture inputs (seed, breed, fingerlings) to the total national inputs requirements for the commodity | Policy outcome |
| I 3.1iv | Proportion of farmers having access to Agricultural Advisory Services | Policy outcome |
| I 3.1v | Total Agricultural Research Spending as a share of AgGDP | Policy outcome |
| I 3.1vi | Proportion of farm households with ownership or secure land rights | Policy outcome |
| I 3.2i | Growth rate of agriculture value added, in constant US dollars, per agricultural worker | Development outcome |
| I 3.2ii | Growth rate of agriculture value added, in constant US dollar, per hectare of agricultural arable land | Development outcome |
| I 3.2iii | Growth rate of yields for the national priority commodities | Development outcome |
| I 3.3 | Reduction rate of Post-Harvest Losses for (at least) the 5 national priority commodities | Policy outcome |
| I 3.4 | Budget lines (%) on social protection as percentage of the total resource requirements for coverage of the vulnerable social groups | Policy outcome |
| I 3.5i | Prevalence of stunting (% of children under 5 years old) | Development outcome |
| I 3.5ii | Prevalence of underweight (% of children under 5 years old) | Development outcome |
| I 3.5iii | Prevalence of wasting (% of children under 5 years old) | Development outcome |
| I 3.5iv | Proportion of the population that is undernourished | Development outcome |
| I 3.5v | Growth rate of the proportion of Minimum Dietary Diversity-Women | Development outcome |
| I 3.5vi | Proportion of 6-23 months old children who meet the Minimum Acceptable Diet | Development outcome |

| | | |
|----------|--|-----------------------|
| I 4.1i | Growth rate of the agriculture value added | Development outcome |
| I 4.1ii | Agriculture contribution to overall poverty reduction target | Development outcome |
| I 4.1iii | Reduction rate of poverty headcount ratio, at national poverty line (% of population) | Development outcome |
| I 4.1iv | Reduction rate of poverty headcount ratio at international poverty line (% of population) | Development outcome |
| I 4.1v | Reduction rate of the gap between the wholesale price and farmgate price | Policy outcome |
| I 4.2 | Number of priority agricultural commodity value chains for which a PPP is established with strong linkage to smallholder agriculture | Policy outcome |
| I 4.3 | Percentage of youth that is engaged in new job opportunities in agricultural value chains | Policy outcome |
| I 4.4 | Proportion of rural women that are empowered in agriculture (5) | Policy outcome |
| I 5.1 | Growth rate of the value of trade of agricultural commodities and services within Africa | Development outcome |
| I 5.2i | Trade Facilitation Index (5) | Policy outcome |
| I 5.2ii | Domestic Food Price Volatility Index | Policy outcome |
| I 6.1i | Percentage of farm, pastoral, and fisher households that are resilient to climate and weather-related shocks (10) | Development outcome |
| I 6.1ii | Share of agriculture land under sustainable land management practices | Policy outcome |
| I 6.2 | Existence of government budget-lines to respond to spending needs on resilience building initiatives | Policy outcome |
| I 7.1 | Index of capacity to generate and use agriculture statistical data and information (Agricultural Statistics Capacity Index) | Policy outcome |
| I 7.2 | Existence of inclusive institutionalized mechanisms and platforms for mutual accountability (3) | Principles and values |
| I 7.3 | Country biennial report submission (4) | Principles and values |

Source: Authors' illustration based on AUC (2017a, 2017b).

Notes: For indicators that constructed indexes, the number of parameters used are included in parenthesis.

5. RESULTS

5.1. Indicators on Recommitting to CAADP Process and Mutual Accountability for Actions and Results

The CAADP principles and values embody the primary intervention of the Malabo Declaration (continuing from the Maputo Declaration), which brings benefit by reforming evidence-based planning and implementation (see Figure 1). As such, the indicators with respect to the TAs on *“Recommitting to CAADP Process”* and *“Mutual Accountability for Actions and Results”* are the ones used in this paper to first assess the extent of adoption of the Malabo Declaration at the country level, and then to evaluate how the adoption has contributed or could contribute to achieving the other commitments and expected outcomes of the Declaration.

As shown in Table 2, the Malabo commitments on *“Recommitting to CAADP Process”* and *“Mutual Accountability for Actions and Results”* are composed of three PCs each, with one indicator for each PC. For recommitting to CAADP process, the PCs are: “completing national CAADP process” (labeled PC1.1); “establishing CAADP-based cooperation, partnership, and alliance” (PC1.2); and “establishing CAADP-based policy and institutional review, setting, and support” (PC1.3). The specific indicators are: I1.1 = CAADP process completion index, which is

based on seven parameters associated with designing and implementing a Malabo-compliant NAIP; I1.2 = existence of, and quality of multi-sectorial and multi-stakeholder coordination body, which is based on five broad parameters of recommended practices on representation and operation of such a body; and I1.3 = evidence-based policies, supportive institutions and corresponding human resource, which is based on three parameters on the extent to which policies are based on evidence with adequate institutions and capacity for planning and implementation. See AUC (2017b) for details of the methodology.

For mutual accountability, the PCs are: “increasing country capacity for evidence-based planning, implementation, and M&E” (labeled PC7.1); “fostering peer review and mutual accountability” (PC7.2); and “conducting a biennial agricultural review process” (PC7.3). The specific indicators are: I7.1 = index of capacity to generate and use agriculture statistical data and information, which is based on the Agricultural Statistics Capacity Index; I7.2 = existence of inclusive institutionalized mechanisms and platforms for mutual accountability and peer review, which is based on three broad parameters on best practices of mutual accountability platforms and conduction joint sector reviews (JSRs); and I7.3 = country BR report submission, which is based on four parameters of the quality of the BR review process and inclusive validation of the report.

The BR data includes information on progress made in each of the indicators for 47 countries the completed and submitted a BR report. There are also scores for the PCs and TAs, where the scores are equally-weighted summations of the indicators and then scaled on a range of zero to ten—see AUC (2017b) for details of the methodology. Basically, the indicators are summed to get a score (C-Score) at the PC level, which are in turn summed to get a score (T-Score) at the TA level.

A summary of the results for Africa and the sub-regions is shown in Table 3. For recommitting to the CAADP process at the Africa-wide level, progress in the underlying indicators is greatest and similar (63 percent) for having a Malabo-compliant NAIP (I1.1) and evidence-based policies and supportive institutions and capacity (I1.3), with progress in having a multi-sectorial and multi-stakeholder coordination body (I1.2) at 48 percent. For mutual accountability at the Africa-wide level, progress in the underlying indicators is overwhelmingly dominated by submission of a country BR report (I7.3) at 94 percent, compared to about 50 percent for the other two indicators.

There are sub-regional differences in the progress made. For recommitting to the CAADP process, the Eastern region made the most progress in having a Malabo-compliant NAIP (I1.1) at 73 percent, with the Western region making the most progress in having a multi-sectorial and multi-stakeholder coordination body (I1.2) at 53 percent, and the Southern region for evidence-based policies and supportive institutions and capacity (I1.3) at 75 percent. The Northern region made the least progress in all three indicators on recommitting to the CAADP process, at 25 percent for I1.1, 47 percent for I1.2, and 43 percent for I1.3. With respect to mutual accountability, the Northern region made the most progress in the Agricultural Statistics

Capacity Index (I7.1) at a value of 68, with the Eastern region making the most progress in existence of inclusive institutionalized mechanisms and platforms for mutual accountability (I7.2) at 72 percent and submission of a country BR report (I7.3) at 96 percent. Here, the Central region made the least progress in all three indicators on mutual accountability, at an index value of 29 for I7.1, 4 percent for I7.2, and 87 percent for I1.3.⁵

Because the higher-level C-Scores and T-Scores are based on equal weighting of the indicators and PCs, respectively, indicators in which progress have been largest will dominate the C-Score and T-Score, irrespective of the relative importance of that indicator in the PC and, in turn, in the TA. As such, the pattern of progress made at the PC level for Africa and the sub-regions is the same as discussed for the indicators. At the TA level, the Eastern region is recorded as making the most progress in both recommitting to the CAADP process and mutual accountability, with the least progress being made in the Northern region for recommitting to the CAADP process and the Central region for mutual accountability.

Table 3: Summary of performance in CAADP process and mutual accountability, 2015-2016.

| | T-Score in | C-Score in performance category | | | Progress in indicator | | |
|-----------------------|---------------|---------------------------------|-------|-------|-----------------------|-------|-------|
| | thematic area | | | | | | |
| CAADP Process | TA1 | PC1.1 | PC1.2 | PC1.3 | I1.1 | I1.2 | I1.3 |
| Target | n.a. | n.a. | n.a. | n.a. | 100% | 100% | 100% |
| Progress | | | | | | | |
| Africa | 5.53 | 5.94 | 4.69 | 5.95 | 63.2% | 48.0% | 62.9% |
| Central | 5.33 | 5.24 | 4.93 | 5.82 | 52.4% | 49.3% | 58.2% |
| Eastern | 6.59 | 9.58 | 4.54 | 5.66 | 95.8% | 45.4% | 56.6% |
| Northern | 3.66 | 2.50 | 4.20 | 4.28 | 25.0% | 42.0% | 42.8% |
| Southern | 5.72 | 5.12 | 4.50 | 7.54 | 51.2% | 45.0% | 75.4% |
| Western | 6.33 | 7.26 | 5.28 | 6.44 | 72.6% | 52.8% | 64.4% |
| Mutual accountability | TA7 | PC7.1 | PC7.2 | PC7.3 | I7.1 | I7.2 | I7.3 |
| Target | n.a. | n.a. | n.a. | n.a. | 63.0 | 100% | 100% |
| Progress | | | | | | | |
| Africa | 3.35 | 2.12 | 4.70 | 9.22 | 52.4 | 49.5% | 92.4% |
| Central | 3.04 | 0.00 | 0.40 | 8.71 | 29.0 | 4.0% | 87.1% |
| Eastern | 7.16 | 4.70 | 7.19 | 9.60 | 59.1 | 71.9% | 96.0% |
| Northern | 5.15 | 2.50 | 3.82 | 9.13 | 68.1 | 38.2% | 91.3% |
| Southern | 5.94 | 2.09 | 6.39 | 9.35 | 54.8 | 63.9% | 93.5% |
| Western | 5.45 | 1.32 | 5.69 | 9.33 | 45.5 | 56.9% | 93.3% |

Source: Authors' based on AUC (2017a).

Notes: See Table 1 for detail description of thematic areas (TAs), performance categories (PCs), and indicators (Is). Range of T-Score and C-Score is 0 to 10. n.a. = not applicable.

5.2. Relationship Between Recommitting to CAADP Process or Mutual Accountability and Progress in Achieving Outcomes

5.2.1. Correlation Among the Indicators of Recommitting to CAADP and Mutual Accountability

⁵ See AUC (2017a) for a presentation and discussion of progress at the country level.

Looking first at the correlations among the indicators of recommitting to CAADP and mutual accountability, the results in Table 4 suggests that the reported progress in the Agricultural Statistics Capacity Index (I7.1) is the least correlated with (or most independent of) the other indicators on recommitting to CAADP or mutual accountability, being only significantly correlated with the reported progress in existence of inclusive institutionalized mechanisms and platforms for mutual accountability (I7.2). The estimated correlation coefficient is 0.4, which is statistically significant at the 10 percent level only, with the other coefficients at 0.3 or less. On the other hand, the reported progress in existence of inclusive institutionalized mechanisms and platforms for mutual accountability (I7.2) is the most correlated with the others on recommitting to CAADP (I1.2 and I1.3) or mutual accountability (I7.1), with estimated coefficients in the moderate range of 0.2 to 0.5 and statistically significant at the 5 percent or higher level of significance. The largest estimated correlation coefficient is between progress in Agricultural Statistics Capacity Index (I1.1) and existence of inclusive institutionalized mechanisms and platforms for mutual accountability (I7.2), with an estimated coefficient 0.5 and statistically significant at the 5 percent level of significance.

In general, the estimated low-to-moderate correlation coefficients suggests that the indicators may be independent of each other, and so they are together useful for tracking the adoption of the Malabo Declaration, consistent with the notion that they capture different components of the CAADP principles and values from which the benefits of adopting the Malabo Declaration derive (see Figure 1). Therefore, aggregating the indicators into a higher-level C-Score or T-Score seems warranted. Issues of how (or weights to use) to aggregate the indicators, in addition to the usefulness of having one composite score involving the six indicators to represent “adoption of the Malabo Declaration”, will be tackled later.

5.2.2. Correlation with Outcomes

The results of the correlations between recommitting to the CAADP process or mutual accountability and progress made in achieving the other Malabo declaration targets and expected outcomes are shown in Table 5. For recommitting to the CAADP process and mutual accountability, we use their T-Scores, which is correlated with T-Scores, C-Scores, and the values of the indicators for the other commitments and outcomes.⁶

In general, the estimated correlation coefficients with the underlying indicators are mostly near-zero and statistically insignificant, although the coefficients with respect to mutual accountability are larger and most of them are statistically significant—five, compared to only one for recommitting to CAADP process. With respect to mutual accountability, the five indicators with statistically significant correlation coefficients are: quality of agricultural inputs (I3.1iii), budget lines for social protection (I3.4), prevalence of wasting (I3.5iii), agricultural

⁶ See annex Tables A1 and A2 for full correlation matrix using the lower-level indicators on recommitting to CAADP process and mutual accountability. A few more of the estimated correlation coefficients are statistically significant, especially for the ones with mutual accountability.

commodity value chains (I4.2), and budget lines for resilience (I6.2). With respect to recommitting to CAADP process, only the correlation with having budget lines for resilience (I6.2) is statistically significant.

These results are surprising and inconsistent with the findings in Benin (2018), which shows that implementing CAADP and reaching higher stages of implementation has had significant positive impact on government agriculture expenditure, official development assistance to agriculture, and agricultural land and labor productivity. Another surprising result is that most of the estimated coefficients with the higher-level T-Scores and C-Scores are strongly statistically significant, despite the weakly-significant, near-zero estimated correlation coefficients with the underlying indicators. This suggests that there are issues with how the higher-level T-Scores and C-Scores are aggregated from the values of the indicators. Moreover, in some cases, policy outcomes indicators are combined with development outcomes indicators making it difficult to disentangle the effects of recommitting to CAADP or mutual accountability.

Table 4: Correlation coefficients among indicators on recommitting to CAADP and mutual accountability, 2015-2016.

| | Recommitting to CAADP process | | | Mutual accountability | | |
|---------|-------------------------------|----------|---------|-----------------------|-------|-------|
| | I 1.1 | I 1.2 | I 1.3 | I 7.1 | I 7.2 | I 7.3 |
| I 1.1 | | | | | | |
| Coeff. | 1.000 | | | | | |
| P-value | n.a. | | | | | |
| Obs. | 43 | | | | | |
| I 1.2 | | | | | | |
| Coeff. | 0.252 | 1.000 | | | | |
| P-value | 0.122 | n.a. | | | | |
| Obs. | 39 | 42 | | | | |
| I 1.3 | | | | | | |
| Coeff. | 0.151 | 0.289 * | 1.000 | | | |
| P-value | 0.347 | 0.066 | n.a. | | | |
| Obs. | 41 | 41 | 44 | | | |
| I 7.1 | | | | | | |
| Coeff. | 0.167 | -0.037 | 0.227 | 1.000 | | |
| P-value | 0.447 | 0.868 | 0.276 | n.a. | | |
| Obs. | 23 | 23 | 25 | 25 | | |
| I 7.2 | | | | | | |
| Coeff. | 0.465 ** | 0.373 ** | 0.234 | 0.385 * | 1.000 | |
| P-value | 0.011 | 0.042 | 0.198 | 0.077 | n.a. | |
| Obs. | 29 | 30 | 32 | 22 | 32 | |
| I 7.3 | | | | | | |
| Coeff. | 0.256 * | 0.204 | 0.271 * | 0.238 | 0.183 | 1.000 |
| P-value | 0.098 | 0.196 | 0.075 | 0.253 | 0.317 | n.a. |
| Obs. | 43 | 42 | 44 | 25 | 32 | 47 |

Source: Authors' calculations based on AUC (2017a).

Notes: *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not applicable, obs. = number of observations.

Table 5: Correlation coefficients between recommitting to CAADP process and mutual accountability and progress made in other Malabo commitments, 2015-2016.

| Label | Malabo thematic area, performance category, or indicator | CAADP process (T-Score) | | | Mutual accountability (T-Score) | | |
|---------------------------------------|---|----------------------------|---------|------|------------------------------------|---------|------|
| | | Coef. | P-value | Sig. | Coef. | P-value | Sig. |
| Malabo thematic area (T-Score) | | | | | | | |
| TA 2 | Enhancing Investment Finance in Agriculture | -0.057 | 0.703 | | 0.217 | 0.143 | |
| TA 3 | Ending Hunger by 2025 | 0.361 | 0.013 | ** | 0.704 | 0.000 | *** |
| TA 4 | Halving Poverty through Agriculture by 2025 Agriculture Commodities | 0.140 | 0.348 | | 0.328 | 0.025 | ** |
| TA 5 | Boosting Intra-African Trade in | 0.175 | 0.239 | | 0.429 | 0.003 | *** |
| TA 6 | Enhancing Resilience to Climate Variability | 0.381 | 0.008 | *** | 0.509 | 0.000 | *** |
| Performance category (C-Score) | | | | | | | |
| PC 2.1 | Public Expenditures in Agriculture | -0.007 | 0.961 | | 0.252 | 0.087 | * |
| PC 2.2 | Domestic Private Sector Investment in agriculture, agribusiness, agroindustry | n.a. | | | n.a. | | |
| PC 2.3 | Foreign Private Sector Investment in agriculture, agribusiness, agroindustry | n.a. | | | n.a. | | |
| PC 2.4 | Enhancing access to finance | -0.062 | 0.679 | | 0.058 | 0.696 | |
| PC 3.1 | Access to Agriculture inputs and technologies | 0.273 | 0.063 | * | 0.510 | 0.000 | *** |
| PC 3.2 | Doubling agricultural Productivity | 0.001 | 0.996 | | 0.090 | 0.547 | |
| PC 3.3 | Reduction of Post-Harvest Loss | 0.260 | 0.077 | * | 0.329 | 0.024 | ** |
| PC 3.4 | Strengthening Social Protection | 0.238 | 0.107 | | 0.522 | 0.000 | *** |
| PC 3.5 | Improving Food security and Nutrition | 0.261 | 0.076 | * | 0.419 | 0.003 | *** |
| PC 4.1 | Sustaining Agricultural GDP for Poverty Reduction | 0.084 | 0.573 | | -0.011 | 0.939 | |
| PC 4.2 | Establishing Inclusive PPPs for commodity value chains | 0.303 | 0.039 | ** | 0.515 | 0.000 | *** |
| PC 4.3 | Creating job for Youth in agricultural value chains | -0.017 | 0.908 | | 0.171 | 0.250 | |
| PC 4.4 | Women participation in Agri-business | -0.042 | 0.776 | | -0.057 | 0.704 | |
| PC 5.1 | Tripling Intra-African Trade for agriculture commodities and services | -0.057 | 0.701 | | 0.159 | 0.287 | |
| PC 5.2 | Establishing Intra-African Trade Policies and institutional conditions | 0.208 | 0.161 | | 0.362 | 0.012 | ** |
| PC 6.1 | Ensuring Resilience to climate related risks | 0.222 | 0.134 | | 0.269 | 0.067 | * |
| PC 6.2 | Investment in resilience building | 0.319 | 0.029 | ** | 0.457 | 0.001 | *** |
| Indicator | | | | | | | |
| I 2.1i | Public agriculture expenditure as share of total public expenditure | 0.033 | 0.833 | | 0.173 | 0.261 | |
| I 2.1ii | Public Agriculture Expenditure as % of agriculture value added | -0.082 | 0.594 | | 0.211 | 0.169 | |
| I 2.1iii | ODA disbursed to agriculture as % of commitment | 0.008 | 0.962 | | -0.060 | 0.727 | |
| I 2.2 | Ratio of domestic private sector investment to public investment in agriculture | -0.043 | 0.797 | | 0.012 | 0.943 | |
| I 2.3 | Ratio of foreign private direct investment to public investment in agriculture | 0.135 | 0.413 | | -0.192 | 0.242 | |

| | | | | | | |
|----------|--|--------|-------|--------|-------|-----|
| I 2.4 | Proportion of men and women engaged in agriculture with access to financial services | -0.048 | 0.786 | 0.031 | 0.864 | |
| I 3.1i | Fertilizer consumption (kilogram of nutrients per hectare of arable land) | 0.054 | 0.723 | 0.059 | 0.701 | |
| I 3.1ii | Growth rate of the size of irrigated areas from its value of the year 2000 | 0.078 | 0.627 | 0.055 | 0.732 | |
| I 3.1iii | Growth rate of the ratio of supplied quality agriculture inputs (seed, breed, fingerlings) to the total national inputs requirements for the commodity | 0.266 | 0.209 | 0.435 | 0.034 | ** |
| I 3.1iv | Proportion of farmers having access to Agricultural Advisory Services | 0.044 | 0.789 | 0.160 | 0.324 | |
| I 3.1v | Total Agricultural Research Spending as a share of AgGDP | -0.020 | 0.909 | 0.160 | 0.350 | |
| I 3.1vi | Proportion of farm households with ownership or secure land rights | -0.229 | 0.208 | -0.148 | 0.420 | |
| I 3.2i | Growth rate of agriculture value added, in constant US dollars, per agricultural worker | 0.122 | 0.520 | -0.139 | 0.464 | |
| I 3.2ii | Growth rate of agriculture value added, in constant US dollar, per hectare of agricultural arable land | 0.049 | 0.756 | -0.064 | 0.687 | |
| I 3.2iii | Growth rate of yields for the national priority commodities | -0.119 | 0.496 | -0.017 | 0.921 | |
| I 3.3 | Reduction rate of Post-Harvest Losses for (at least) the 5 national priority commodities | -0.560 | 0.191 | 0.422 | 0.345 | |
| I 3.4 | Budget lines (%) on social protection as percentage of the total resource requirements for coverage of the vulnerable social groups | 0.282 | 0.163 | 0.644 | 0.000 | *** |
| I 3.5i | Prevalence of stunting (% of children under 5 years old) | -0.252 | 0.128 | 0.005 | 0.974 | |
| I 3.5ii | Prevalence of underweight (% of children under 5 years old) | -0.076 | 0.643 | -0.258 | 0.112 | |
| I 3.5iii | Prevalence of wasting (% of children under 5 years old) | -0.040 | 0.807 | -0.304 | 0.056 | * |
| I 3.5iv | Proportion of the population that is undernourished | 0.109 | 0.552 | -0.025 | 0.890 | |
| I 3.5v | Growth rate of the proportion of Minimum Dietary Diversity-Women | 0.143 | 0.760 | 0.027 | 0.954 | |
| I 3.5vi | Proportion of 6-23 months old children who meet the Minimum Acceptable Diet | 0.026 | 0.887 | -0.092 | 0.612 | |
| I 4.1i | Growth rate of the agriculture value added | 0.066 | 0.660 | -0.004 | 0.978 | |
| I 4.1ii | Agriculture contribution to overall poverty reduction target | n.a. | | n.a. | | |
| I 4.1iii | Reduction rate of poverty headcount ratio, at national poverty line (% of population) | 0.147 | 0.631 | -0.181 | 0.555 | |
| I 4.1iv | Reduction rate of poverty headcount ratio at international poverty line (% of population) | -0.136 | 0.798 | -0.355 | 0.490 | |
| I 4.1v | Reduction rate of the gap between the wholesale price and farmgate price | 0.163 | 0.457 | 0.021 | 0.923 | |
| I 4.2 | Number of priority agricultural commodity value chains for which a PPP is established with strong linkage to smallholder agriculture | 0.217 | 0.142 | 0.460 | 0.001 | *** |
| I 4.3 | Percentage of youth that is engaged in new job opportunities in agricultural value chains | -0.185 | 0.410 | -0.145 | 0.520 | |
| I 4.4 | Proportion of rural women that are empowered in agriculture | -0.181 | 0.459 | 0.064 | 0.793 | |

| | | | | | | | |
|---------|--|--------|-------|----|--------|-------|-----|
| I 5.1 | Growth rate of the value of trade of agricultural commodities and services within Africa | -0.110 | 0.571 | | 0.072 | 0.710 | |
| I 5.2i | Trade Facilitation Index | -0.077 | 0.659 | | -0.036 | 0.836 | |
| I 5.2ii | Domestic Food Price Volatility Index | 0.287 | 0.112 | | 0.036 | 0.845 | |
| I 6.1i | Percentage of farm, pastoral, and fisher households that are resilient to climate and weather-related shocks | -0.164 | 0.503 | | -0.293 | 0.224 | |
| I 6.1ii | Share of agriculture land under sustainable land management practices | -0.222 | 0.239 | | -0.049 | 0.797 | |
| I 6.2 | Existence of government budget-lines to respond to spending needs on resilience building initiatives | 0.319 | 0.029 | ** | 0.457 | 0.001 | *** |

Source: Authors' calculations based on AUC (2017a).

Notes: *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available.

5.3. Explaining the Surprising Results, Other Issues, and Recommendations

Regarding the surprising results with respect to the estimated correlation coefficients, there are four main issues: (1) measurement of indicators, especially on committing to the CAADP process and mutual accountability; (2) treatment of missing values in the indicators used in aggregating the C-Scores and T-Scores; (3) weights used in aggregating the indicators to obtain the C-Scores and T-Scores; and (4) indicators with competing objectives or double counting of indicators. Another issue that needs to be addressed is the weighting system used for aggregating indicators and scores across countries to obtain progress at the sub-regional and Africa-wide levels.

5.3.1. Measurement of the Indicators on Recommitting to CAADP Process and Committing to Mutual Accountability for Results and Actions

On the fundamental hypothesis of CAADP (Figure 1), because it takes time to secure stakeholders' buy-in of the various CAADP principles and processes, and for the principles and processes to be institutionalized, capturing a time dimension or using a cumulative measure of the process since the launch of CAADP in 2003 seem appropriate. The current indicators on the CAADP process and mutual accountability does not capture the dynamic nature of the process. Comparing the current indicators with the ordinal measure of the level of CAADP implementation achieved by end of 2015 (Benin 2016), Figures 2 to 4 and Table 5 show this anomaly for several countries.

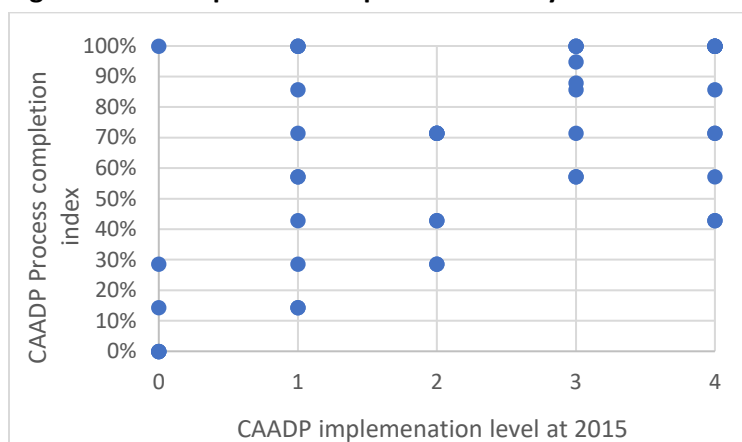
Using the "CAADP process completion index" (I1.1) as an example, Figure 2 shows that there are several countries that by the end of 2015 were at Level 0 (pre-compact) or Level 1 (compact only), but now have a "CAADP process completion index" rating of 100%. These include countries like Mauritius (Level 0) and Congo, Sudan and Zimbabwe (Level 1). Also, several of the countries at Level 1 had a rating of 60% or higher (including Chad and Gabon). On the other hand, several of those that were more advanced in CAADP implementation by the end of 2015 (i.e., at Level 3 or 4) had a rating of less than 60% (including Burkina Faso, Ghana, Liberia, Nigeria, and Sierra Leone).

There are also some data reporting consistency issues. Continuing with the example of the "CAADP process completion index" (I1.1), which is intended to capture the process associated with having a Malabo-compliant NAIP, Tanzania and Chad are rated the similar, 85 and 86 percent, respectively, although Chad supposedly has a Malabo-compliant NAIP whereas Tanzania does not (Figure 3). So, it seems that the values for parameters 5 to 7 in the country reporting template, like the value for parameter 4, should have been zero for Tanzania, as parameters 5 to 7 are follow-up process to having a Malabo-compliant NAIP.

With respect to the indicators on mutual accountability in general, the issue is not clear, as it is possible to have good mutual accountability processes and mechanisms in place irrespective of whether CAADP is being implemented or not. However, as the Malabo Declaration is implemented within the framework of CAADP, it seems that the MA indicators and rating

should be consistent with the CAADP principles and values. As such, MA is a special case within the CAADP process, deriving from the principles of inclusiveness, review, and learning. From this perspective, the current MA indicators seem problematic too. For example, Botswana and Morocco, who are both yet to start implementing CAADP, have a rating of 100 percent for the indicator on “existence of inclusive institutionalized mechanisms and platforms for mutual accountability and peer review” (I7.2). Looking at Figure 4a (rating in I7.2 by whether JSR assessment is conducted or not) and Figure 4b (rating in I7.2 by CAADP Level), the rating in I7.2 seems random.

Figure 2: CAADP process completion index by level of CAADP implementation reached by 2015



Source: Authors’ calculation and representation based on AUC (2017a) and Benin (2018).

Notes: CAADP implementation levels, 0=pre-compact, 1=compact, 2=1 plus NAIP, 3=2 plus secured one source of external funding, and 4=3 plus other sources of external funding.

For example, countries like Botswana, Mauritius, Morocco and Zambia who are yet to start implementing CAADP have higher MA ratings or scores than some veteran CAADP-implementing countries like Burkina Faso, Tanzania and Zambia (see Table 6). Burkina Faso, Tanzania and Zambia have been regularly implementing agricultural joint sector reviews (JSRs) and public expenditure reviews (agPERs) for quite a long time and are therefore expected to have stronger MA processes and mechanisms that are consistent with the CAADP principles and values (Benin et al. 2018). As Table 6 also shows, there is no reward or positive score for reporting progress on an indicator, except when the progress surpasses the minimum threshold (see rating on I7.1 in Table 6). Thus, although all the veteran CAADP-implementing countries did report on indicator I7.1, they received zero scores like some of the non-CAADP implementing countries that did not report anything. Because, reporting is important for learning, such rating or scoring could undermine effort for having a comprehensive database on all indicators.

Figure 3: Sample country completed template on the CAADP process completion index

Country Name: TANZANIA

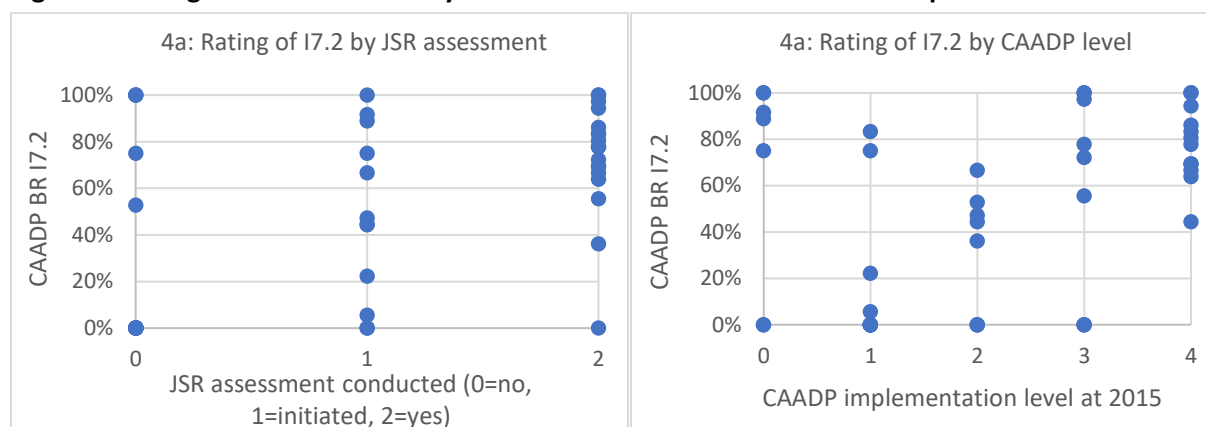
| Performance Category | Country Information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|-------------------|----------|--|-------------------------|--|--|-----|---|--|-----|--------------------------------------|---|-----|--|----------------------------------|----|--|---|-----|--|-------------------------------------|-----|----------------------------|---|-----|--|--|------------|--|
| <p>PC 1.1 Country CAADP Process</p> <p>Target: CAADP process to be fully completed at the country level: Reach 100% of the completion, by the year 2018.</p> <p>Indicator: CAADP process completion Index in (CAADPPro)</p> | <p>Specific actions taken so far for the target: -</p> <p>Achievements on completing CAADP Process:</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Progress item</th> <th style="text-align: center;">2016 Progress (p)</th> <th style="text-align: left;">Comments</th> </tr> <tr> <td></td> <td style="text-align: center;">"Yes" = 100% "No" = 0</td> <td></td> </tr> </thead> <tbody> <tr> <td>1. Existence of Communication on internalizing CAADP, p1</td> <td style="text-align: center;">Yes</td> <td>Through Public, Private, NGOs and Non State Actors (ANSAF, ACT, MVIWATA and EAFF)</td> </tr> <tr> <td>2. Existence of National CAADP Roadmap for implementing Malabo, p2</td> <td style="text-align: center;">Yes</td> <td>Through TAFSIP , ASDP I & II and ASP</td> </tr> <tr> <td>3. Existence of NAIP Appraisal Report, p3</td> <td style="text-align: center;">Yes</td> <td>Through ASDP II. The Review of NAIP(TAFSIP) planned from October 2017 to March 2018</td> </tr> <tr> <td>4. Existence of the New NAIP, p4</td> <td style="text-align: center;">no</td> <td>Our NAIP time frame is up to 2021 however, Malabo issues</td> </tr> <tr> <td>5. NAIP implementation reflected in national budget, p5</td> <td style="text-align: center;">Yes</td> <td>NAIP is implemented through the ASDP framework</td> </tr> <tr> <td>6. Existence of NAIP M&E System, p6</td> <td style="text-align: center;">Yes</td> <td>Through ASDP M&E framework</td> </tr> <tr> <td>7. Existence of NAIP implementation progress Report, p7</td> <td style="text-align: center;">Yes</td> <td>Through ASDP implementation reports i.e Joint Sector Reviews, Performance Reports, Public Expenditure Reviews, New Alliance/Grow Africa Country progress reports and Agriculture Trend Outlook Reports</td> </tr> <tr> <td>CAADP process completion Index is : CAADPPro = Average (p.)</td> <td colspan="2" style="text-align: center;">85%</td> </tr> </tbody> </table> | Progress item | 2016 Progress (p) | Comments | | "Yes" = 100% "No" = 0 | | 1. Existence of Communication on internalizing CAADP, p1 | Yes | Through Public, Private, NGOs and Non State Actors (ANSAF, ACT, MVIWATA and EAFF) | 2. Existence of National CAADP Roadmap for implementing Malabo, p2 | Yes | Through TAFSIP , ASDP I & II and ASP | 3. Existence of NAIP Appraisal Report, p3 | Yes | Through ASDP II. The Review of NAIP(TAFSIP) planned from October 2017 to March 2018 | 4. Existence of the New NAIP, p4 | no | Our NAIP time frame is up to 2021 however, Malabo issues | 5. NAIP implementation reflected in national budget, p5 | Yes | NAIP is implemented through the ASDP framework | 6. Existence of NAIP M&E System, p6 | Yes | Through ASDP M&E framework | 7. Existence of NAIP implementation progress Report, p7 | Yes | Through ASDP implementation reports i.e Joint Sector Reviews, Performance Reports, Public Expenditure Reviews, New Alliance/Grow Africa Country progress reports and Agriculture Trend Outlook Reports | CAADP process completion Index is : CAADPPro = Average (p.) | 85% | |
| Progress item | 2016 Progress (p) | Comments | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | "Yes" = 100% "No" = 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Existence of Communication on internalizing CAADP, p1 | Yes | Through Public, Private, NGOs and Non State Actors (ANSAF, ACT, MVIWATA and EAFF) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Existence of National CAADP Roadmap for implementing Malabo, p2 | Yes | Through TAFSIP , ASDP I & II and ASP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Existence of NAIP Appraisal Report, p3 | Yes | Through ASDP II. The Review of NAIP(TAFSIP) planned from October 2017 to March 2018 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Existence of the New NAIP, p4 | no | Our NAIP time frame is up to 2021 however, Malabo issues | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. NAIP implementation reflected in national budget, p5 | Yes | NAIP is implemented through the ASDP framework | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Existence of NAIP M&E System, p6 | Yes | Through ASDP M&E framework | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Existence of NAIP implementation progress Report, p7 | Yes | Through ASDP implementation reports i.e Joint Sector Reviews, Performance Reports, Public Expenditure Reviews, New Alliance/Grow Africa Country progress reports and Agriculture Trend Outlook Reports | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CAADP process completion Index is : CAADPPro = Average (p.) | 85% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Nom du Pays: TCHAD

| Catégorie de Performance | Informations sur le pays | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-------------------------|------------------------------|--------------|--|--------------------------|--|---|------|--|--|------|--|---|------|--|--------------------------------|------|--|--|------|--|---|----|--|---|------|--|--|------------|--|
| <p>CP1.1 Processus PDDAA pays</p> <p>Cible: Processus PDDAA entièrement achevé au niveau national: Atteindre 100 % d'ici 2018.</p> <p>Indicateur: Indice d'achèvement du processus PDDAA (PDDAAPPro)</p> | <p>Mesures spécifiques prises jusqu'à présent pour atteindre cette cible : -</p> <p>Achèvement du processus PDDAA :</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Les éléments du progrès</th> <th style="text-align: center;">Progrès réalisés en 2016 (p)</th> <th style="text-align: left;">Commentaires</th> </tr> <tr> <td></td> <td style="text-align: center;">"Oui" = 100% "Non" = 0</td> <td></td> </tr> </thead> <tbody> <tr> <td>1. Existence d'information sur l'internalisation du PDDAA</td> <td style="text-align: center;">100%</td> <td></td> </tr> <tr> <td>2. Existence d'une feuille de route nationale PDDAA sur la mise en œuvre de la déclaration de Malabo</td> <td style="text-align: center;">100%</td> <td></td> </tr> <tr> <td>3. Existence du rapport d'évaluation PNIA</td> <td style="text-align: center;">100%</td> <td></td> </tr> <tr> <td>4. Existence d'un nouveau PNIA</td> <td style="text-align: center;">100%</td> <td></td> </tr> <tr> <td>5. Prise en compte du PNIA dans le budget national</td> <td style="text-align: center;">100%</td> <td></td> </tr> <tr> <td>6. Existence d'un système de S-E dans le PNIA</td> <td style="text-align: center;">0%</td> <td></td> </tr> <tr> <td>7. Existence d'un rapport de progrès sur la mise en œuvre du PNIA</td> <td style="text-align: center;">100%</td> <td></td> </tr> <tr> <td>L'indice d'achèvement du processus PDDAA est : PDDAAPPro = moyenne (p.)</td> <td colspan="2" style="text-align: center;">86%</td> </tr> </tbody> </table> <p>Sources de vérification et autres commentaires spécifiques : - Arrêté n° du Ministre en charge de mise en place de l'Equipe multisectorielle pays PDDAA : - CR des réunions et rapports d'atelier.</p> | Les éléments du progrès | Progrès réalisés en 2016 (p) | Commentaires | | "Oui" = 100% "Non" = 0 | | 1. Existence d'information sur l'internalisation du PDDAA | 100% | | 2. Existence d'une feuille de route nationale PDDAA sur la mise en œuvre de la déclaration de Malabo | 100% | | 3. Existence du rapport d'évaluation PNIA | 100% | | 4. Existence d'un nouveau PNIA | 100% | | 5. Prise en compte du PNIA dans le budget national | 100% | | 6. Existence d'un système de S-E dans le PNIA | 0% | | 7. Existence d'un rapport de progrès sur la mise en œuvre du PNIA | 100% | | L'indice d'achèvement du processus PDDAA est : PDDAAPPro = moyenne (p.) | 86% | |
| Les éléments du progrès | Progrès réalisés en 2016 (p) | Commentaires | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | "Oui" = 100% "Non" = 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Existence d'information sur l'internalisation du PDDAA | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Existence d'une feuille de route nationale PDDAA sur la mise en œuvre de la déclaration de Malabo | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Existence du rapport d'évaluation PNIA | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Existence d'un nouveau PNIA | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Prise en compte du PNIA dans le budget national | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Existence d'un système de S-E dans le PNIA | 0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Existence d'un rapport de progrès sur la mise en œuvre du PNIA | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L'indice d'achèvement du processus PDDAA est : PDDAAPPro = moyenne (p.) | 86% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Sources: Government of Tanzania (2017) and Government of Chad (2017).

Figure 4: Rating in CAADP BR I 7.2 by JSR assessment and level of CAADP implementation reached



Source: Authors' calculation and representation based on AUC (2017a) and Benin (2018).

Notes: I7.2 = existence of inclusive institutionalized mechanisms and platforms for mutual accountability and peer review. CAADP implementation levels, 0=pre-compact, 1=compact, 2=1 plus NAIP, 3=2 plus secured one source of external funding, and 4=3 plus other sources of external funding.

Table 6: Summary of CAADP BR scores and performance in mutual accountability for selected countries by stage in CAADP implementation, 2015-2016.

| | T-Score | C-Score in performance category | | | Progress in indicators | | |
|--------------------|---------|---------------------------------|-------|-------|------------------------|--------|-------|
| | TA7 | PC7.1 | PC7.2 | PC7.3 | I7.1 | I7.2 | I7.3 |
| Malabo target | n.a. | n.a. | n.a. | n.a. | 63.0 | 100% | 100% |
| Yet to start CAADP | | | | | | | |
| Botswana | 6.52 | 0.0 | 10.00 | 9.56 | n.d. | 100.0% | 95.6% |
| Mauritius | 5.39 | 0.0 | 9.17 | 7.02 | 60.0 | 91.7% | 70.2% |
| Morocco | 9.89 | 10.0 | 10.00 | 9.67 | 68.1 | 100.0% | 96.7% |
| Namibia | 6.16 | 0.0 | 8.89 | 9.58 | n.d. | 88.9% | 95.8% |
| Advanced in CAADP | | | | | | | |
| Burkina Faso | 5.55 | 0.0 | 6.94 | 9.70 | 58.6 | 69.4% | 97.0% |
| Tanzania | 5.39 | 0.0 | 6.67 | 9.50 | 61.6 | 66.7% | 95.0% |
| Zambia | 5.11 | 0.0 | 5.56 | 9.77 | 48.0 | 55.6% | 97.7% |

Source: Authors' illustration based on AUC (2017a).

Notes: PC7.1 = increasing country capacity for evidence-based planning, implementation, and M&E; PC7.2 = fostering peer review and mutual accountability; PC7.3 = conducting a biennial agricultural review process; I7.1 = index of capacity to generate and use agriculture statistical data and information; I7.2 = existence of inclusive institutionalized mechanisms and platforms for mutual accountability and peer review; and I7.3 = country BR Report submission. Range of score T-Score and C-Score is 0 to 10. n.d. = no data.

Together, the above surprising results and inconsistencies in the reporting could undermine efforts to institutionalize CAADP in countries to the extent that BR ratings and scores shows no positive and statistical significant relationship with outcomes. Regarding the indicators on recommitting to the CAAP process and mutual accountability, the level achieved prior to 2015 should be used as the starting point for the rating in progress, which should be done in a cumulative manner. For recommitting to the CAAP process, the level of CAADP implementation reached (Benin 2018) is a good one. For mutual accountability, the cumulative number and

quality of different reviews (e.g., JSR, agPER, public expenditure performance assessment) undertaken prior to 2015 may be used as the starting point.

As mentioned earlier, it is possible for countries to have good MA processes and mechanisms in place irrespective of whether they are implementing CAADP or not. Furthermore, because CAADP is continuously adapting to experiences during implementation and to expectations of stakeholders, including countries' adaptation of CAADP to fit their own national conditions and priorities, it may be possible for countries that start implementing CAADP at later periods to have more refined implementation strategies after taking account of the lessons from those that started implementing CAADP at earlier periods. Thus, by avoiding any of the pitfalls faced by the early-start implementing CAADP countries, late-start implementing CAADP countries could catch up in terms of the time between implementation and realization of outcomes. These suggest that it will be good for the indicators on recommitting to the CAADP process and mutual accountability to reflect both non-CAADP implementers and catching-up.

5.3.2. Measurement of Other Indicators

There are measurement issues with some of the other indicators, which typically derive from how the reporting templates have been prepared and the assumptions for collecting information on the various parameters to calculate the value of the indicators. For example, regarding the indicator on the "ratio of domestic private sector investment to public investment in agriculture" (I2.2), the value of domestic private investment in agriculture was calculated as a residual, which is total agricultural investment in agriculture less government agriculture expenditure (GAE), ODA to agriculture (agODA), and FDI in agriculture. This assumes that total agricultural investment is the sum of the four components. As the example of a filled template in the top part of Figure 5 shows, this assumption is problematic, with an impossible negative value of domestic private investment in agriculture. It is better to simply collect information on the parts, cautious of double counting with respect to agODA that is already captured in GAE. Moreover, because the indicator includes both the "ratio of domestic private sector investment to government investment in agriculture" and the "ratio of foreign private direct investment to public investment in agriculture", the effect of FDI is completely cancelled out.⁷ In other words, as per the AATS, FDI has no impact on agricultural transformation in Africa.

Take another example of the indicator on the "growth rate of the value of trade of agricultural commodities and services within Africa" (I5.1). As the bottom part of Figure 5 shows, this indicator for Tanzania is left blank and, thus, recorded as a missing value. This is because whereas the values of imports and exports of "goods" are recorded, the values of imports and exports of "services" are not. It seems possible that the information provided for values of

⁷ From Figure 5, "Ratio of domestic private sector investment to government investment in agriculture" is defined as $((TAI - GAE - agODA - FDI) / GAE) \times 100$, and "Ratio of foreign private direct investment to public investment in agriculture" is defined as $(FDI / GAE) \times 100$.

imports and exports of “goods” may already include the values of imports and exports of “services”, as some countries may not record these separately.

These two examples suggest that a thorough review of the reporting template, explaining the assumptions and how to adjust the reporting when different assumptions hold, will be critical for improving the data and consistency across countries.

Figure 5: Sample country completed template on domestic private sector investment and intra-African trade in agriculture

| <p>PC 2.2 Domestic Private Sector Investment in Agriculture.</p> <p>Target: Ensure that government investment leverage at least X times domestic private investment in agriculture sector by 2025. (SILENT).</p> <p>Indicator: Ratio of private sector investment to government investment in agriculture (\uparrowDPPrPb)</p> | <ul style="list-style-type: none"> Specific actions taken so far for the target: - Achievements on domestic private investment: <table border="1" data-bbox="472 621 1218 1052"> <thead> <tr> <th>Item</th> <th>2015</th> <th>2016</th> </tr> </thead> <tbody> <tr> <td>1. Total Agricultural Investments, TAI</td> <td>124,160,000</td> <td>496,090,000</td> </tr> <tr> <td>2. Government Agriculture Expenditure (lcu),(USD) GAE</td> <td>56,007,886.36</td> <td>70,402,046.43</td> </tr> <tr> <td>3. Official Development Assistance (ODA) for agriculture, forestry, and fishing, gross disbursements, agODAD</td> <td>164,011,542</td> <td>128,137,941</td> </tr> <tr> <td>4. Foreign Direct Investment, FDI</td> <td>55,818,959</td> <td>31,968,244</td> </tr> <tr> <td>5. Domestic Private Investment in Agriculture, DPPrA = TAI - GAE - agODAD - FDI</td> <td>-151,678,387</td> <td>265,581,769</td> </tr> <tr> <td>Ratio of domestic private sector investment to government investment in agriculture (%), is \uparrowDPPrPb = 100 x DPPrA / GAE</td> <td>-270.816124</td> <td>377.235865</td> </tr> </tbody> </table> <p>Sources of verification and other specific comments: (Private Sector Developmebt), TIC, MoF.</p> | Item | 2015 | 2016 | 1. Total Agricultural Investments, TAI | 124,160,000 | 496,090,000 | 2. Government Agriculture Expenditure (lcu),(USD) GAE | 56,007,886.36 | 70,402,046.43 | 3. Official Development Assistance (ODA) for agriculture, forestry, and fishing, gross disbursements, agODAD | 164,011,542 | 128,137,941 | 4. Foreign Direct Investment, FDI | 55,818,959 | 31,968,244 | 5. Domestic Private Investment in Agriculture, DPPrA = TAI - GAE - agODAD - FDI | -151,678,387 | 265,581,769 | Ratio of domestic private sector investment to government investment in agriculture (%), is \uparrowDPPrPb = 100 x DPPrA / GAE | -270.816124 | 377.235865 |
|--|--|----------------|------|------|--|----------------|----------------|--|---------------|---------------|--|----------------|-------------|--|------------|------------|---|--------------|-------------|---|-------------|------------|
| Item | 2015 | 2016 | | | | | | | | | | | | | | | | | | | | |
| 1. Total Agricultural Investments, TAI | 124,160,000 | 496,090,000 | | | | | | | | | | | | | | | | | | | | |
| 2. Government Agriculture Expenditure (lcu),(USD) GAE | 56,007,886.36 | 70,402,046.43 | | | | | | | | | | | | | | | | | | | | |
| 3. Official Development Assistance (ODA) for agriculture, forestry, and fishing, gross disbursements, agODAD | 164,011,542 | 128,137,941 | | | | | | | | | | | | | | | | | | | | |
| 4. Foreign Direct Investment, FDI | 55,818,959 | 31,968,244 | | | | | | | | | | | | | | | | | | | | |
| 5. Domestic Private Investment in Agriculture, DPPrA = TAI - GAE - agODAD - FDI | -151,678,387 | 265,581,769 | | | | | | | | | | | | | | | | | | | | |
| Ratio of domestic private sector investment to government investment in agriculture (%), is \uparrowDPPrPb = 100 x DPPrA / GAE | -270.816124 | 377.235865 | | | | | | | | | | | | | | | | | | | | |
| <p>PC 5.1 Intra-African Trade in agriculture commodities and services</p> <p>Target: Triple intra-African trade in agricultural commodities and services, by the year 2025 from the year 2015.</p> <p>Indicator: Growth rate of the value of trade of agricultural commodities and services within Africa, in constant US dollars (\uparrowIAT)</p> | <ul style="list-style-type: none"> Specific actions taken so far for the target: - Achievements on Intra-African Trade for agriculture commodities and services: <table border="1" data-bbox="456 1262 1218 1759"> <thead> <tr> <th>Item</th> <th>2015</th> <th>2016</th> </tr> </thead> <tbody> <tr> <td>i)- Value of intra- African <u>imports</u> for agriculture <u>goods</u>, IAMg</td> <td>178,955,873.34</td> <td>169,353,880.06</td> </tr> <tr> <td>ii)- Value of intra- African <u>imports</u> for agriculture <u>services</u>, IAMs</td> <td></td> <td></td> </tr> <tr> <td>iii)- Value of intra- African <u>exports</u> for agriculture <u>goods</u>, IAXg</td> <td>507,644,134.70</td> <td>350,730,201</td> </tr> <tr> <td>iv)- Value of intra- African <u>exports</u> for agriculture <u>services</u>, IAXs</td> <td></td> <td></td> </tr> <tr> <td>4. Value of intra- African trade (imports and exports) for agriculture goods and services, in constant US dollars 2010, IAT = IAMg + IAMs + IAXg + IAXs</td> <td></td> <td></td> </tr> <tr> <td>Growth rate of the value of trade of agricultural commodities and services within Africa, in constant US dollars (in %), \uparrowIAT = 100 x (IAT₂₀₁₆ - IAT₂₀₁₅) / IAT₂₀₁₅</td> <td></td> <td></td> </tr> </tbody> </table> <p>Sources of verification and Specific comments: Tanzania Revenue Authority.</p> | Item | 2015 | 2016 | i)- Value of intra- African <u>imports</u> for agriculture <u>goods</u> , IAMg | 178,955,873.34 | 169,353,880.06 | ii)- Value of intra- African <u>imports</u> for agriculture <u>services</u> , IAMs | | | iii)- Value of intra- African <u>exports</u> for agriculture <u>goods</u> , IAXg | 507,644,134.70 | 350,730,201 | iv)- Value of intra- African <u>exports</u> for agriculture <u>services</u> , IAXs | | | 4. Value of intra- African trade (imports and exports) for agriculture goods and services, in constant US dollars 2010, IAT = IAMg + IAMs + IAXg + IAXs | | | Growth rate of the value of trade of agricultural commodities and services within Africa, in constant US dollars (in %), \uparrowIAT = 100 x (IAT₂₀₁₆ - IAT₂₀₁₅) / IAT₂₀₁₅ | | |
| Item | 2015 | 2016 | | | | | | | | | | | | | | | | | | | | |
| i)- Value of intra- African <u>imports</u> for agriculture <u>goods</u> , IAMg | 178,955,873.34 | 169,353,880.06 | | | | | | | | | | | | | | | | | | | | |
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| iii)- Value of intra- African <u>exports</u> for agriculture <u>goods</u> , IAXg | 507,644,134.70 | 350,730,201 | | | | | | | | | | | | | | | | | | | | |
| iv)- Value of intra- African <u>exports</u> for agriculture <u>services</u> , IAXs | | | | | | | | | | | | | | | | | | | | | | |
| 4. Value of intra- African trade (imports and exports) for agriculture goods and services, in constant US dollars 2010, IAT = IAMg + IAMs + IAXg + IAXs | | | | | | | | | | | | | | | | | | | | | | |
| Growth rate of the value of trade of agricultural commodities and services within Africa, in constant US dollars (in %), \uparrowIAT = 100 x (IAT₂₀₁₆ - IAT₂₀₁₅) / IAT₂₀₁₅ | | | | | | | | | | | | | | | | | | | | | | |

Source: Government of Tanzania (2017).

5.3.3. Treatment of Missing Indicator Values in Calculating Higher-Level Scores

In the calculation of higher-level scores, missing indicator values were replaced with zeros, and then the relevant indicators are equally weighted to get the C-Score, which are in turn equally weighted to get the T-Score. Replacing the missing indicator values with zeros, irrespective of the weighing method used to get the higher-level scores, introduces bias in the estimation of the correlation coefficients with respect to the C-Scores and T-Scores, as done for the estimation for which the results are shown in Table 4. Estimation of the correlation coefficients using the original indicator values naturally excludes the missing values. For the estimation using the C-Scores and T-Scores however, the zeros increase the number of matched pairs of zeros, resulting in a higher correlation coefficient and statistical significance.

Although 47 countries submitted a report, which makes 47 as the maximum number of valid observations, there is only one indicator (I7.3) for which there is no missing observation or a zero value (see Table 7). In addition, there are only eight indicators where all the 47 countries reported values on, including zeros. For many of the indicators, there are severe missing observations, with indicators I3.3 (reduction rate of post-harvest losses for (at least) the 5 national priority commodities), I3.5v (growth rate of the proportion of minimum dietary diversity-women), and I4.1iv (reduction rate of poverty headcount ratio at international poverty line, % of population) suffering the most, with only 6 or 7 valid observations.

When the higher-level C-Scores and T-Scores are recalculated without replacing the missing indicator values with zeros, and then the correlation coefficients are re-estimated using these revised C-Scores and T-Scores, the results turn out to be mostly statistically insignificant (Table 8), compared to when the zero values are included (see Table 5).

Thus, while giving a zero value may be a mechanism for penalizing non-reporting, providing incentives for full and accurate reporting will be a better strategy to get more valid observations, which will be critical for a more reliable estimation of cause-effect relationships and for better cross-country learning.

Table 7: Number of valid observations by indicator for all reporting countries

| Indicator | Number of valid observations | |
|-----------|------------------------------|--------------------------|
| | Including reported zeros | Excluding reported zeros |
| I1.1 | 47 | 43 |
| I1.2 | 47 | 42 |
| I1.3 | 47 | 44 |
| I2.1i | 44 | 44 |
| I2.1ii | 44 | 44 |
| I2.2 | 39 | 38 |
| I2.3 | 39 | 29 |
| I2.4 | 34 | 33 |
| I3.1i | 45 | 45 |
| I3.1ii | 41 | 40 |
| I3.1iii | 24 | 23 |
| I3.1iv | 40 | 40 |
| I3.1v | 36 | 36 |
| I3.1vi | 32 | 32 |
| I3.2i | 30 | 30 |
| I3.2ii | 42 | 41 |
| I3.2iii | 35 | 34 |
| I3.3 | 7 | 7 |
| I3.4 | 26 | 26 |
| I3.5i | 38 | 38 |
| I3.5ii | 39 | 39 |
| I3.5iii | 40 | 40 |
| I3.5iv | 32 | 32 |
| I3.5v | 7 | 7 |
| I3.5vi | 33 | 33 |
| I4.1i | 47 | 46 |
| I4.1iii | 13 | 13 |
| I4.1iv | 6 | 6 |
| I4.1v | 23 | 23 |
| I4.2 | 47 | 16 |
| I4.3 | 22 | 22 |
| I4.4 | 19 | 19 |
| I5.1 | 29 | 29 |
| I5.2ii | 32 | 32 |
| I6.1i | 19 | 19 |
| I6.1ii | 30 | 30 |
| I6.2 | 47 | 35 |
| I7.1 | 26 | 25 |
| I7.2 | 47 | 32 |
| I7.3 | 47 | 47 |

Source: Authors' calculation based on AUC (2017a).

Table 8: Correlation coefficients between recommitting to CAADP process and mutual accountability and progress made in other Malabo commitments—using revised higher-level scores, 2015-2016.

| Label | Malabo thematic area or performance category | CAADP process (T-Score) | | | Mutual accountability (T-Score) | | |
|---------------------------------------|---|----------------------------|---------|------|------------------------------------|---------|------|
| | | Coef. | P-value | Sig. | Coef. | P-value | Sig. |
| Malabo thematic area (T-Score) | | | | | | | |
| TA 2 | Enhancing Investment Finance in Agriculture | -0.079 | 0.602 | | 0.178 | -0.238 | |
| TA 3 | Ending Hunger by 2025 | 0.304 | 0.04 | ** | 0.704 | 0 | *** |
| TA 4 | Halving Poverty through Agriculture by 2025 Agriculture Commodities | 0.114 | 0.479 | | 0.199 | -0.213 | |
| TA 5 | Boosting Intra-African Trade in | -0.093 | 0.585 | | 0.161 | -0.335 | |
| TA 6 | Enhancing Resilience to Climate Variability | 0.299 | 0.061 | * | 0.406 | -0.008 | *** |
| Performance category (C-Score) | | | | | | | |
| PC 2.1 | Public Expenditures in Agriculture | -0.006 | 0.971 | | 0.211 | -0.16 | |
| PC 2.2 | Domestic Private Sector Investment in agriculture, agribusiness, agroindustry | n.a. | | | n.a. | | |
| PC 2.3 | Foreign Private Sector Investment in agriculture, agribusiness, agroindustry | n.a. | | | n.a. | | |
| PC 2.4 | Enhancing access to finance | -0.064 | 0.729 | | 0.069 | -0.701 | |
| PC 3.1 | Access to Agriculture inputs and technologies | 0.208 | 0.166 | | 0.510 | 0.000 | *** |
| PC 3.2 | Doubling agricultural Productivity | -0.054 | 0.748 | | 0.096 | -0.561 | |
| PC 3.3 | Reduction of Post-Harvest Loss | -0.306 | 0.617 | | 0.535 | 0.353 | |
| PC 3.4 | Strengthening Social Protection | 0.274 | 0.176 | | 0.631 | -0.001 | *** |
| PC 3.5 | Improving Food security and Nutrition | -0.003 | 0.987 | | 0.179 | -0.305 | |
| PC 4.1 | Sustaining Agricultural GDP for Poverty Reduction | 0.052 | 0.770 | | -0.133 | -0.453 | |
| PC 4.2 | Establishing Inclusive PPPs for commodity value chains | -0.054 | 0.842 | | 0.256 | -0.339 | |
| PC 4.3 | Creating job for Youth in agricultural value chains | 0.048 | 0.834 | | 0.051 | -0.821 | |
| PC 4.4 | Women participation in Agri-business | -0.450 | 0.053 | * | -0.211 | -0.386 | |
| PC 5.1 | Tripling Intra-African Trade for agriculture commodities and services | -0.384 | 0.175 | | 0.100 | -0.734 | |
| PC 5.2 | Establishing Intra-African Trade Policies and institutional conditions | 0.016 | 0.925 | | 0.080 | -0.632 | |
| PC 6.1 | Ensuring Resilience to climate related risks | 0.068 | 0.713 | | 0.150 | -0.412 | |
| PC 6.2 | Investment in resilience building | -0.007 | 0.967 | | -0.007 | -0.966 | |

Source: Authors' calculations based on AUC (2017b).

Notes: T-Scores and C-Scores exclude the zero values that were replaced for missing values in the indicators. *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available.

5.3.4. Weighting and Aggregating Indicators into Higher-Level Scores

Let S_i be the overall BR score for country i derived from S_{ij} scores for the seven j Malabo commitments or thematic areas (TAs), which are in turn derived from k performance-category (PC) sub-scores (S_{ijk}), and l lower-level indicators (I_{ijkl}) that are first converted into corresponding l lower-level scores (S_{ijkl}), given by:

$$S_i = f(S_{ij}), j = 1, \dots, 7 \quad \dots(4)$$

$$S_{ij} = g(S_{ijk}), k = 1, \dots, K \quad \dots(5)$$

$$S_{ijk} = h(S_{ijkl}), l = 1, \dots, L \quad \dots(6)$$

$$S_{ijkl} = d(I_{ijkl}), l = 1, \dots, L \quad \dots(7)$$

where f , g , and h are aggregating functions and d is a conversion or scaling function. In the existing BR guidelines document, f derives from giving an equal weight (i.e. 1/7) to each TA, and g and h are derived accordingly based on equal weights to PCs within the same TA, as well as equal weights to lower-level indicators (I_{ijkl}) and scores (S_{ijkl}) within the same PC. This implies that PCs under a TA with several other PCs attract less weight than those under a TA with fewer PCs. Similarly, lower-level indicators (I_{ijkl}) and scores (S_{ijkl}) under a PC with several other indicators attract less weight than those under a PC with fewer indicators—see Annex 1 for details on the implied weights for different indicators under each TA. Together, these mean that the indicators on “growth rate of the value of trade of agricultural commodities and services within Africa” (I5.1) and “existence of government budget-lines to respond to spending needs on resilience building initiatives” (I6.2) attract the largest weight in the single score for a country, equivalent to 0.048. On the other extreme, each of the six indicators under the PCs on “access to agriculture inputs and technologies” (PC3.1) and “improving food security and nutrition” (PC3.5) attract the least weight in the overall score, equivalent to 0.005.⁸

In the existing BR guidelines document, d takes several forms, although primarily intended to convert each indicator against a benchmark or target for the reporting period to a scale of 0 to 10. The scale works well for several indicators that are confined within lower and upper bounds that known *a priori*, and the target or benchmark is the same as the upper-bound value. Take the following three indicators for example, “budget lines (%) on social protection” (I3.4), “government budget-lines on resilience” (I6.2), and “country BR report submission” (I7.3), because their measures are confined to 0-100 percent and 100 percent is the target for the reporting period, they are easily scalable to the 0-10 score range by dividing the reported indicator value by 10. For all the other indicators, several of which are measured as growth rates, the reported indicator value can be greater than the benchmark or target. In such cases, reported indicator values greater than the target were given a value of 10, which seems to

⁸ The weight for an indicator is equal to 1 divided by 7 divided by the number of PCs in the TA that the indicator belongs to divided by the number of indicators under the PC that the indicator belongs to (see Annex 1 for details).

penalize extra effort. Similarly, reported negative values (in cases of decline in GDP for example) are given a value of zero, which seems to reward poor performance. Indicators that are not reported on are also given zero values, with similar implications.⁹

For consistency in the ranking of countries, which are based on the calculated scores, a more appropriate function for d will be one that considers the full range of the reported indicator values. A simple method will be giving a score of one to the lowest reported value and a score of 10 to the highest reported value, and then all other reported values are scaled accordingly.

With respect to the equal weights for the seven TAs, although, the African leaders may not have attached different weights to the different commitments, there are several arguments for doing this, including: (1) different indicators or commitments impact or contribute to outcomes differently, implying that those that impact or contribute the greatest should attract larger weights; (2) targets of some commitments are more difficult to achieve than the targets of other commitments, implying that commitments with targets that are more difficult to achieve should attract larger weights; and (3) different efforts are required to collect information and report on for different indicators, implying that the most difficult indicators to report on should attract larger weights.

The first argument on the differential impact of different indicators is consistent with the conceptual framework depicted in Figure 1, which is to consider the importance of the different indicators or commitments in transforming agriculture, which is the primary focus of the Malabo Declaration and pathway for increasing incomes, reducing poverty, and improving food and nutrition security, among other outcomes. The main caveat here is that the relative impact or contribution of the different indicators or commitments in transforming agriculture and achieving the different outcomes is unknown, which may make it difficult to implement the proposed weighting system. Using the example above on the calculated weights, having a larger weight of 0.048 for the indicator on “existence of government budget-lines to respond to spending needs on resilience building initiatives” (I6.2) compared to a weight of 0.005 for each of the indicators on “fertilizer consumption” (I3.1i), “agricultural research spending” (I3.1v), or “farm households with ownership or secure land rights” (I3.1vi) seem illogical, given the obvious importance or contribution of the later three to the former in transforming agriculture.

Whereas the second argument regarding the difficulty of achieving different commitments may be easier to implement, based on the observed countries’ achievement on each commitment, the rationale for using this system of weighting may be like the above to the extent that the most difficult commitments are also the most important. For example, it seems that it will be much easier for the government to have a budget line for resilience (I6.2, which attracts a weight of 0.048) than to spend on agriculture (e.g. I2.1i or I2.1ii, which attracts a weight of 0.012) or agricultural research (I3.1v, which attracts a weight of 0.005). Looking at the data, the rate of achievement of the relative targets was 49.3 percent for I6.2, 6.7 percent for I2.1i, 15.1

⁹ There is more to come on the treatment of missing values in the calculation of the scores.

percent for I2.1ii, and 1.4 percent for I3.1v (AUC 2017a). Indeed, giving a larger weight to less difficult to achieve indicators, and of lower importance as in this example, is counterproductive. The difficulty of implementing different commitments, and how the results may be used to construct differential weights, is demonstrated later using the IRT method presented previously.

The third argument that different efforts are required to collect information and report on different indicators is consistent with providing an incentive for countries to minimize the missing observations problems discussed earlier. For example, the indicators on I3.3 (reduction rate of post-harvest losses for at least the 5 national priority commodities), I3.5v (growth rate of the proportion of minimum dietary diversity-women), and I4.1iv (reduction rate of poverty headcount ratio at international poverty line, % of population) had only 6 or 7 valid observations. With such indicators gaining more prominence in the development discourse, it seems logical to give more weight to them. The main issue here will be how to choose and assign different weights to the different indicators.

To summarize, it seems that treating the achievement of different commitments as equal may bias the BR results toward countries that make greater progress in the least important indicators or commitments for achieving overall agricultural transformation. This may also undermine the motivation to put more effort in the most difficult-to-achieve commitments or collecting information to report on least-common indicators. In the next section, we assess the implications on the AATS of using different weighting systems.

5.3.5. Different Weighting Systems and Implications on the AATS

5.3.5.1. Differential weights based on difficulty of achieving different commitments

Detailed results of the IRT analysis are presented in Table 9, first for the seven TAs (Table 9a), followed by the indicators within each TA (Table 9b), and then for all the indicators together (Table 9c).¹⁰ In each table, the results are organized from the indicator or commitment with the least difficult target to achieve (largest negative coefficient) to the most difficult (largest positive coefficient). The results in Table 9a shows that the commitments related to mutual accountability (TA7), recommitting to CAADP process (TA1), and boosting intra-Africa trade (TA5) are the least difficult to achieve their targets. The commitments in the areas of halving poverty (TA4), ending hunger (TA3), enhancing resilience (TA6), and enhancing investment in agriculture (TA2) are the most difficult to achieve in the order presented, although they are not significantly different from each other.

Looking at results for all the indicators together (Table 9c), the indicators on trade facilitation (I5.2i), reducing post-harvest losses (I3.3), minimum dietary diversity for women (I3.5v), rural

¹⁰ Note that the analysis is based on the data as they are and that no adjustments have been made to address any of the data quality problems identified earlier. See annex Figure A1 for corresponding item characteristic curves with respect to the seven Malabo thematic areas.

| | | | | | | | |
|---------|--|-----------|----------|-------|-------|-----------|-----------|
| I4.1iii | | -1.394925 | .3424418 | -4.07 | 0.000 | -2.066098 | -.7237511 |
| I3.1iii | | -1.30153 | .3295328 | -3.95 | 0.000 | -1.947403 | -.6556578 |
| I1.1 | | -1.30153 | .3295328 | -3.95 | 0.000 | -1.947403 | -.6556578 |
| I1.2 | | -1.213703 | .3182958 | -3.81 | 0.000 | -1.837551 | -.5898545 |
| I4.1v | | -1.130439 | .308459 | -3.66 | 0.000 | -1.735007 | -.52587 |
| I6.1ii | | -1.050947 | .2998208 | -3.51 | 0.000 | -1.638585 | -.4633092 |
| I3.1vi | | -.9008542 | .2855659 | -3.15 | 0.002 | -1.460553 | -.3411554 |
| I7.2 | | -.8292934 | .2797419 | -2.96 | 0.003 | -1.377577 | -.2810094 |
| I3.1ii | | -.7595378 | .2746862 | -2.77 | 0.006 | -1.297913 | -.2211628 |
| I7.3 | | -.7595378 | .2746862 | -2.77 | 0.006 | -1.297913 | -.2211628 |
| I2.4 | | -.6912637 | .2703436 | -2.56 | 0.011 | -1.221127 | -.1613999 |
| I3.5iv | | -.624185 | .2666712 | -2.34 | 0.019 | -1.146851 | -.101519 |
| I3.5vi | | -.624185 | .2666712 | -2.34 | 0.019 | -1.146851 | -.101519 |
| I3.5i | | -.624185 | .2666712 | -2.34 | 0.019 | -1.146851 | -.101519 |
| I3.5ii | | -.4926082 | .261212 | -1.89 | 0.059 | -1.004574 | .0193579 |
| I3.2iii | | -.4926082 | .261212 | -1.89 | 0.059 | -1.004574 | .0193579 |
| I3.4 | | -.4276559 | .2593813 | -1.65 | 0.099 | -.9360339 | .0807221 |
| I3.1iv | | -.4276559 | .2593813 | -1.65 | 0.099 | -.9360339 | .0807221 |
| I3.2i | | -.2983811 | .2574521 | -1.16 | 0.246 | -.8029778 | .2062157 |
| I3.1v | | -.233661 | .2573419 | -0.91 | 0.364 | -.7380419 | .2707198 |
| I5.1 | | -.233661 | .2573419 | -0.91 | 0.364 | -.7380419 | .2707198 |
| I3.5iii | | -.233661 | .2573419 | -0.91 | 0.364 | -.7380419 | .2707198 |
| I2.1iii | | -.1686231 | .2578006 | -0.65 | 0.513 | -.6739029 | .3366568 |
| I5.2ii | | -.1030664 | .2588325 | -0.40 | 0.690 | -.6103687 | .4042358 |
| I4.1i | | -.0367833 | .2604456 | -0.14 | 0.888 | -.5472473 | .4736807 |
| I2.3 | | .098852 | .2654675 | 0.37 | 0.710 | -.4214546 | .6191587 |
| I4.2 | | .098852 | .2654675 | 0.37 | 0.710 | -.4214546 | .6191587 |
| I3.2ii | | .2402375 | .2730108 | 0.88 | 0.379 | -.2948537 | .7753288 |
| I2.1i | | .3138015 | .2777929 | 1.13 | 0.259 | -.2306625 | .8582655 |
| I2.1ii | | .3138015 | .2777929 | 1.13 | 0.259 | -.2306625 | .8582655 |
| I2.2 | | .468409 | .2895536 | 1.62 | 0.106 | -.0991057 | 1.035924 |
| I3.1i | | .5502933 | .2966207 | 1.86 | 0.064 | -.0310727 | 1.131659 |
| I6.2 | | 1.55337 | .408304 | 3.80 | 0.000 | .7531084 | 2.353631 |

Source: Authors' calculation and representation based on AUC (2017a).

Notes: See Table 2 for description of variables.

The estimated coefficients of the IRT results were used to construct weights. As some of the estimated coefficients are negative, first, they were scaled by giving an index value of 1 to the lowest estimated coefficient and then the other coefficients are adjusted monotonically by adding 1 plus the absolute number of the lowest estimated coefficient. The weight for each indicator is then calculated as the scaled value divided by the sum of the scaled values. Thus, the most difficult commitment to achieve is given the largest weight, and least difficult to achieve is given the least weight. We consider two cases. In the first case, we assume that TAs are weighted equally and then use the results in Table 9b to get the weights for indicators within each TA, so that indicators under a TA are weighted differently (labelled as "IRT-TA" in Table 10, which shows the results). For the second case, the weights for the different indicators are calculated directly using the results in Table 9c in which the IRT is estimated for all the 43 indicators together (labelled as "IRT-I" in Table 10).

Table 10: Weights using different weighting systems

| | Indicator | Equal weights applied at level: | | | Differential weights based on IRT results at level: | | Differential weights based on contribution to agricultural transformation at level: | |
|----------|--|---------------------------------|----------|---------|---|-------|---|-------|
| | | Equal-TA | Equal-PC | Equal-I | IRT-TA | IRT-I | Ag-PC | Ag-I |
| I 1.1 | CAADP process completion index | 0.048 | 0.043 | 0.023 | 0.053 | 0.020 | 0.020 | 0.020 |
| I 1.2 | Existence of, and quality of multi-sectorial and multi-stakeholder coordination body | 0.048 | 0.043 | 0.023 | 0.056 | 0.021 | 0.020 | 0.020 |
| I 1.3 | Evidence-based policies, supportive institutions and corresponding human resource | 0.048 | 0.043 | 0.023 | 0.035 | 0.017 | 0.020 | 0.020 |
| I 2.1i | Public agriculture expenditure as share of total public expenditure | 0.012 | 0.014 | 0.023 | 0.028 | 0.032 | 0.020 | 0.020 |
| I 2.1ii | Public Agriculture Expenditure as % of agriculture value added | 0.012 | 0.014 | 0.023 | 0.028 | 0.032 | 0.020 | 0.020 |
| I 2.1iii | ODA disbursed to agriculture as % of commitment | 0.012 | 0.014 | 0.023 | 0.021 | 0.028 | 0.020 | 0.020 |
| I 2.2 | Ratio of domestic private sector investment to public investment in agriculture | 0.036 | 0.043 | 0.023 | 0.030 | 0.033 | 0.040 | 0.020 |
| I 2.3 | Ratio of foreign private direct investment to public investment in agriculture | 0.036 | 0.043 | 0.023 | 0.025 | 0.030 | 0.040 | 0.020 |
| I 2.4 | Proportion of men and women engaged in agriculture with access to financial services | 0.036 | 0.043 | 0.023 | 0.013 | 0.025 | 0.020 | 0.020 |
| I 3.1i | Fertilizer consumption (kilogram of nutrients per hectare of arable land) | 0.005 | 0.007 | 0.023 | 0.012 | 0.033 | 0.040 | 0.040 |
| I 3.1ii | Growth rate of the size of irrigated areas from its value of the year 2000 | 0.005 | 0.007 | 0.023 | 0.008 | 0.024 | 0.040 | 0.040 |
| I 3.1iii | Growth rate of the ratio of supplied quality agriculture inputs (seed, breed, fingerlings) to the total national inputs requirements for the commodity | 0.005 | 0.007 | 0.023 | 0.007 | 0.020 | 0.040 | 0.040 |
| I 3.1iv | Proportion of farmers having access to Agricultural Advisory Services | 0.005 | 0.007 | 0.023 | 0.009 | 0.026 | 0.040 | 0.040 |
| I 3.1v | Total Agricultural Research Spending as a share of AgGDP | 0.005 | 0.007 | 0.023 | 0.010 | 0.028 | 0.040 | 0.020 |
| I 3.1vi | Proportion of farm households with ownership or secure land rights | 0.005 | 0.007 | 0.023 | 0.008 | 0.023 | 0.040 | 0.040 |
| I 3.2i | Growth rate of agriculture value added, in constant US dollars, per agricultural worker | 0.010 | 0.014 | 0.023 | 0.010 | 0.027 | 0.030 | 0.030 |
| I 3.2ii | Growth rate of agriculture value added, in constant US dollar, per hectare of agricultural arable land | 0.010 | 0.014 | 0.023 | 0.011 | 0.031 | 0.030 | 0.030 |
| I 3.2iii | Growth rate of yields for the national priority commodities | 0.010 | 0.014 | 0.023 | 0.009 | 0.026 | 0.030 | 0.030 |
| I 3.3 | Reduction rate of Post-Harvest Losses for (at least) the 5 national priority commodities | 0.029 | 0.043 | 0.023 | 0.002 | 0.011 | 0.030 | 0.030 |
| I 3.4 | Budget lines (%) on social protection as percentage of the total resource requirements for coverage of the vulnerable social groups | 0.029 | 0.043 | 0.023 | 0.009 | 0.026 | 0.010 | 0.010 |

| | | | | | | | | |
|----------|--|-------|-------|-------|-------|-------|-------|-------|
| I 3.5i | Prevalence of stunting (% of children under 5 years old) | 0.005 | 0.007 | 0.023 | 0.009 | 0.025 | 0.010 | 0.010 |
| I 3.5ii | Prevalence of underweight (% of children under 5 years old) | 0.005 | 0.007 | 0.023 | 0.009 | 0.026 | 0.010 | 0.010 |
| I 3.5iii | Prevalence of wasting (% of children under 5 years old) | 0.005 | 0.007 | 0.023 | 0.010 | 0.028 | 0.010 | 0.010 |
| I 3.5iv | Proportion of the population that is undernourished | 0.005 | 0.007 | 0.023 | 0.009 | 0.025 | 0.010 | 0.010 |
| I 3.5v | Growth rate of the proportion of Minimum Dietary Diversity-Women | 0.005 | 0.007 | 0.023 | 0.002 | 0.011 | 0.010 | 0.010 |
| I 3.5vi | Proportion of 6-23 months old children who meet the Minimum Acceptable Diet | 0.005 | 0.007 | 0.023 | 0.009 | 0.025 | 0.010 | 0.010 |
| I 4.1i | Growth rate of the agriculture value added | 0.007 | 0.009 | 0.023 | 0.007 | 0.029 | 0.010 | 0.030 |
| I 4.1ii | Agriculture contribution to overall poverty reduction target | 0.007 | 0.009 | 0.023 | n.a. | n.a. | 0.010 | 0.010 |
| I 4.1iii | Reduction rate of poverty headcount ratio, at national poverty line (% of population) | 0.007 | 0.009 | 0.023 | 0.021 | 0.020 | 0.010 | 0.010 |
| I 4.1iv | Reduction rate of poverty headcount ratio at international poverty line (% of population) | 0.007 | 0.009 | 0.023 | 0.029 | 0.014 | 0.010 | 0.010 |
| I 4.1v | Reduction rate of the gap between the wholesale price and farmgate price | 0.007 | 0.009 | 0.023 | 0.018 | 0.022 | 0.010 | 0.010 |
| I 4.2 | Number of priority agricultural commodity value chains for which a PPP is established with strong linkage to smallholder agriculture | 0.036 | 0.043 | 0.023 | 0.005 | 0.030 | 0.020 | 0.020 |
| I 4.3 | Percentage of youth that is engaged in new job opportunities in agricultural value chains | 0.036 | 0.043 | 0.023 | 0.032 | 0.013 | 0.040 | 0.040 |
| I 4.4 | Proportion of rural women that are empowered in agriculture | 0.036 | 0.043 | 0.023 | 0.032 | 0.013 | 0.040 | 0.040 |
| I 5.1 | Growth rate of the value of trade of agricultural commodities and services within Africa | 0.071 | 0.043 | 0.023 | 0.062 | 0.028 | 0.030 | 0.030 |
| I 5.2i | Trade Facilitation Index | 0.036 | 0.022 | 0.023 | 0.016 | 0.007 | 0.030 | 0.030 |
| I 5.2ii | Domestic Food Price Volatility Index | 0.036 | 0.022 | 0.023 | 0.064 | 0.029 | 0.030 | 0.030 |
| I 6.1i | Percentage of farm, pastoral, and fisher households that are resilient to climate and weather-related shocks | 0.036 | 0.022 | 0.023 | 0.015 | 0.013 | 0.020 | 0.040 |
| I 6.1ii | Share of agriculture land under sustainable land management practices | 0.036 | 0.022 | 0.023 | 0.042 | 0.022 | 0.020 | 0.040 |
| I 6.2 | Existence of government budget-lines to respond to spending needs on resilience building initiatives | 0.071 | 0.043 | 0.023 | 0.086 | 0.040 | 0.020 | 0.020 |
| I 7.1 | Index of capacity to generate and use agriculture statistical data and information (Agricultural Statistics Capacity Index) | 0.048 | 0.043 | 0.023 | 0.031 | 0.019 | 0.020 | 0.020 |
| I 7.2 | Existence of inclusive institutionalized mechanisms and platforms for mutual accountability | 0.048 | 0.043 | 0.023 | 0.055 | 0.024 | 0.020 | 0.020 |
| I 7.3 | Country biennial report submission | 0.048 | 0.043 | 0.023 | 0.057 | 0.024 | 0.020 | 0.020 |

Source: Authors' calculation based on AUC (2017a), IRT model results, and authors' assumptions.

Notes: The highlighted rows under TA3 are the indicators more directly related to agricultural transformation. n.a. = not applicable.

5.3.5.2. Equal weights at different levels (TA, PC, and I)

The equal weighing system is like the one used in the BR (labelled as “Equal-TA” in Table 10), considering two additional ones. Regarding the one used in the current BR, the weight of an indicator is equal to 1 divided by 7 divided by the number of PCs in the TA that the indicator belongs to and then divided by the number of indicators under the PC that the indicator belongs to. For the second case considered, equal weights are first applied to all PCs and then to all indicators within a PC (labelled as “Equal-PC” in Table 10). Thus, the weight for an indicator is equal to 1 divided by 23 divided by the number of indicators under the PC that the indicator belongs to. For the third case, the weight is applied directly at the indicator level so that the weight of an indicator is 1 divided by 43 or 0.023 (labelled as “Equal-I” in Table 10).

5.3.5.2. Differential weights based on contribution to agricultural transformation

This system of weighting tries to link it to the impact pathway, giving a larger weight to indicators that closely associated with agricultural transformation. First, we define four groups of indicators—policies and processes, agricultural inputs, agricultural outputs, and broader development outcomes. Then, we give an index value of 1 for broader development outcomes, 2 for policies and processes, 3 for agricultural outputs, and 4 for agricultural inputs. The weight for each group is then calculated as the index value divided by the sum of the index values, which is 10. Thus, the weights for the groups are 0.1 for broader development outcomes, 0.2 for policies and processes, 0.3 for agricultural outputs, and 0.4 for agricultural inputs. To assign weights for specific indicators, we consider two cases. In the first case, the weighting is applied at the PC level, and then indicators under the same PC are weighted equally (labelled as “Ag-PC” in Table 10). For the second case, the weighting is applied directly at the indicator level, which deals with the mixing of groups of indicators under the same PC (labelled as “Ag-I” in Table 10).

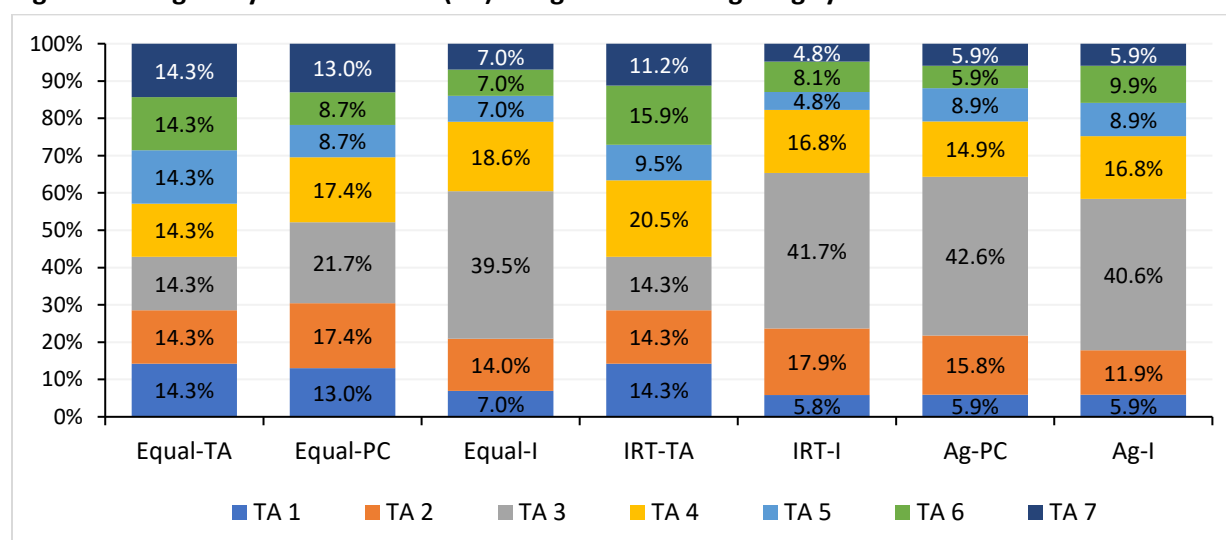
5.3.5.4. Implications on the AATS of the different weighing systems

As the results in Table 10 shows, the weighing system used in current BR/AATS allocates the least weights to the indicators that are most related to agricultural transformation, compared to the other weighting systems (see especially the highlighted rows under TA3 in Table 10). In the same vein, the other weighting systems give more weight to TA3 (see Figure 6), which is the thematic area of the Malabo Declaration under which the bulk of the indicators related directly to agricultural transformation are defined. Together, these imply that the current BR/AATS is the least likely to track progress in agricultural transformation, which is counterproductive to the Malabo Declaration agenda.

The weights from the various weighting systems are used to recalculate the overall score of countries or for the AATS. As the results in Table 11 and Figure 7 show, the overall score and classification of whether a country is on track to meet the overall Malabo commitments or not

are different for the various weighting systems.¹¹ With the current equal-weighting system applied at the TA level (Equal-TA) for example, 20 of the 47 reporting countries are assessed as being on track to meeting the overall Malabo Declaration commitments, compared to 19 when equal weights are applied at the PC level (Equal-PC), and 15 at the indicator level (Equal-I). The numbers are lower for the other weighting systems. In fact, only 8 countries are assessed to be on track with the weighing system based on the IRT results that applies differential weights at the indicator level (IRT-I). With the other weighing systems, 13 to 16 countries are assessed as being on track.

Figure 6: Weights by thematic area (TA) using different weighting systems



Source: Authors' calculation based on AUC (2017a), IRT model results, and authors' assumptions.

Notes: Equal-TA = equal weights for TAs and equal weights for PCs in a TA, and equal weights for indicators in a PC. Equal-PC = equal weights for PCs and equal weights for indicators in a PC. Equal-I = equal weights for all indicators. IRT-TA = equal weights for TAs and differential weights for indicators in a TA based on IRT results. IRT-I = differential weights for indicators based on IRT results. Ag-PC = differential weights for PCs with more weight for and PCs related to agricultural transformation and equal weights for indicators in a PC. Ag-I = differential weights for indicators with more weight to those related directly to agricultural transformation.

Table 11: Summary of country scores and rating as on or off track to meeting overall Malabo commitments using different weighting systems

| Country/Indicator | Equal-TA (3.94) | Equal-PC (3.74) | Equal-I (3.65) | IRT-TA (4.46) | IRT-I (4.20) | Ag-PC (3.74) | Ag-I (3.67) |
|-------------------|--------------------|--------------------|-------------------|------------------|-----------------|-----------------|----------------|
| Rwanda | 6.09 | 6.00 | 5.00 | 5.93 | 4.94 | 5.27 | 5.48 |
| Mali | 5.57 | 5.62 | 4.63 | 5.74 | 4.89 | 4.61 | 4.77 |
| Morocco | 5.54 | 5.23 | 5.06 | 6.09 | 5.06 | 5.51 | 5.49 |
| Ethiopia | 5.35 | 5.15 | 4.38 | 5.60 | 4.64 | 4.59 | 4.79 |
| Mauritius | 5.00 | 4.48 | 3.75 | 4.97 | 3.87 | 4.46 | 4.40 |
| Togo | 4.92 | 4.34 | 3.76 | 5.26 | 3.75 | 3.89 | 4.22 |
| Malawi | 4.92 | 4.83 | 3.90 | 5.19 | 4.10 | 4.13 | 4.07 |

¹¹ Note that only the weights from the alternative weighting systems are applied and that no adjustments have been made to address any of the problems identified earlier with respect to quality of data or the method of scoring.

| | | | | | | | |
|----------------------|------|------|------|------|------|------|------|
| Mauritania | 4.78 | 4.81 | 4.27 | 5.28 | 4.33 | 4.76 | 4.53 |
| Kenya | 4.77 | 4.57 | 3.78 | 4.59 | 4.02 | 3.88 | 3.71 |
| Burundi | 4.71 | 4.60 | 3.79 | 4.99 | 3.79 | 4.18 | 4.14 |
| Cabo Verde | 4.60 | 4.21 | 3.70 | 5.11 | 3.87 | 4.12 | 4.10 |
| Uganda | 4.45 | 4.45 | 3.88 | 4.35 | 4.06 | 3.65 | 3.57 |
| Botswana | 4.38 | 4.18 | 3.30 | 4.67 | 3.53 | 3.24 | 3.01 |
| Benin | 4.32 | 4.21 | 3.54 | 4.93 | 3.91 | 3.36 | 3.36 |
| Burkina Faso | 4.24 | 4.02 | 4.05 | 5.17 | 4.25 | 4.18 | 4.16 |
| Mozambique | 4.13 | 4.16 | 3.28 | 4.72 | 3.37 | 3.49 | 3.23 |
| Namibia | 4.11 | 3.93 | 4.23 | 5.12 | 4.65 | 4.82 | 4.67 |
| South Africa | 4.07 | 4.06 | 3.31 | 4.10 | 3.72 | 3.14 | 3.01 |
| Seychelles | 4.01 | 3.55 | 3.19 | 4.15 | 3.34 | 3.95 | 3.58 |
| Swaziland | 3.99 | 3.69 | 3.27 | 3.89 | 3.65 | 3.13 | 2.89 |
| Ghana | 3.91 | 3.81 | 3.83 | 4.45 | 4.34 | 3.87 | 3.62 |
| Senegal | 3.84 | 3.59 | 3.31 | 4.38 | 3.62 | 3.15 | 3.10 |
| Lesotho | 3.75 | 3.41 | 3.08 | 4.22 | 3.51 | 3.16 | 2.86 |
| Equatorial Guinea | 3.61 | 3.04 | 3.06 | 4.29 | 3.17 | 2.55 | 3.07 |
| Zambia | 3.60 | 3.33 | 3.05 | 4.16 | 3.40 | 3.36 | 3.02 |
| Niger | 3.53 | 3.23 | 2.71 | 4.38 | 2.96 | 2.23 | 2.35 |
| Cote d'Ivoire | 3.52 | 3.59 | 2.85 | 3.61 | 3.16 | 2.68 | 2.76 |
| Egypt | 3.37 | 3.09 | 3.06 | 3.00 | 2.90 | 3.12 | 3.43 |
| Nigeria | 3.36 | 2.82 | 1.91 | 3.63 | 2.07 | 1.86 | 1.78 |
| Guinea | 3.26 | 2.92 | 2.69 | 3.62 | 2.63 | 2.86 | 3.22 |
| Zimbabwe | 3.20 | 3.19 | 2.74 | 3.56 | 2.96 | 2.78 | 2.52 |
| Djibouti | 3.19 | 3.03 | 2.81 | 4.02 | 2.71 | 2.56 | 2.75 |
| Gambia | 3.13 | 2.92 | 2.62 | 3.83 | 2.69 | 3.25 | 3.03 |
| Madagascar | 3.10 | 2.84 | 2.05 | 3.42 | 2.01 | 2.41 | 2.37 |
| Tanzania | 3.08 | 2.96 | 2.82 | 3.72 | 2.92 | 2.99 | 2.84 |
| Gabon | 2.86 | 3.03 | 2.78 | 3.17 | 2.80 | 2.29 | 2.58 |
| Congo | 2.80 | 2.61 | 2.42 | 2.89 | 2.31 | 2.47 | 2.70 |
| Central African Rep. | 2.41 | 2.44 | 1.83 | 2.61 | 1.87 | 2.03 | 2.11 |
| Chad | 2.22 | 2.02 | 1.71 | 2.90 | 1.83 | 1.84 | 1.76 |
| Cameroon | 2.14 | 2.34 | 2.11 | 2.39 | 2.21 | 2.21 | 2.27 |
| Angola | 2.10 | 2.06 | 2.27 | 2.50 | 2.68 | 2.34 | 2.43 |
| Sudan | 1.91 | 1.81 | 1.61 | 2.14 | 1.59 | 1.48 | 1.42 |
| Tunisia | 1.66 | 1.03 | 0.99 | 1.70 | 1.21 | 0.95 | 0.91 |
| Sao Tome & Principe | 1.54 | 1.46 | 1.91 | 2.13 | 2.19 | 2.11 | 2.22 |
| Sierra Leone | 1.53 | 1.65 | 1.58 | 1.78 | 1.58 | 1.97 | 2.02 |
| DR Congo | 1.44 | 1.49 | 1.26 | 1.55 | 1.30 | 1.23 | 1.39 |
| Liberia | 0.95 | 0.95 | 0.51 | 1.00 | 0.47 | 0.46 | 0.44 |

Number of countries:

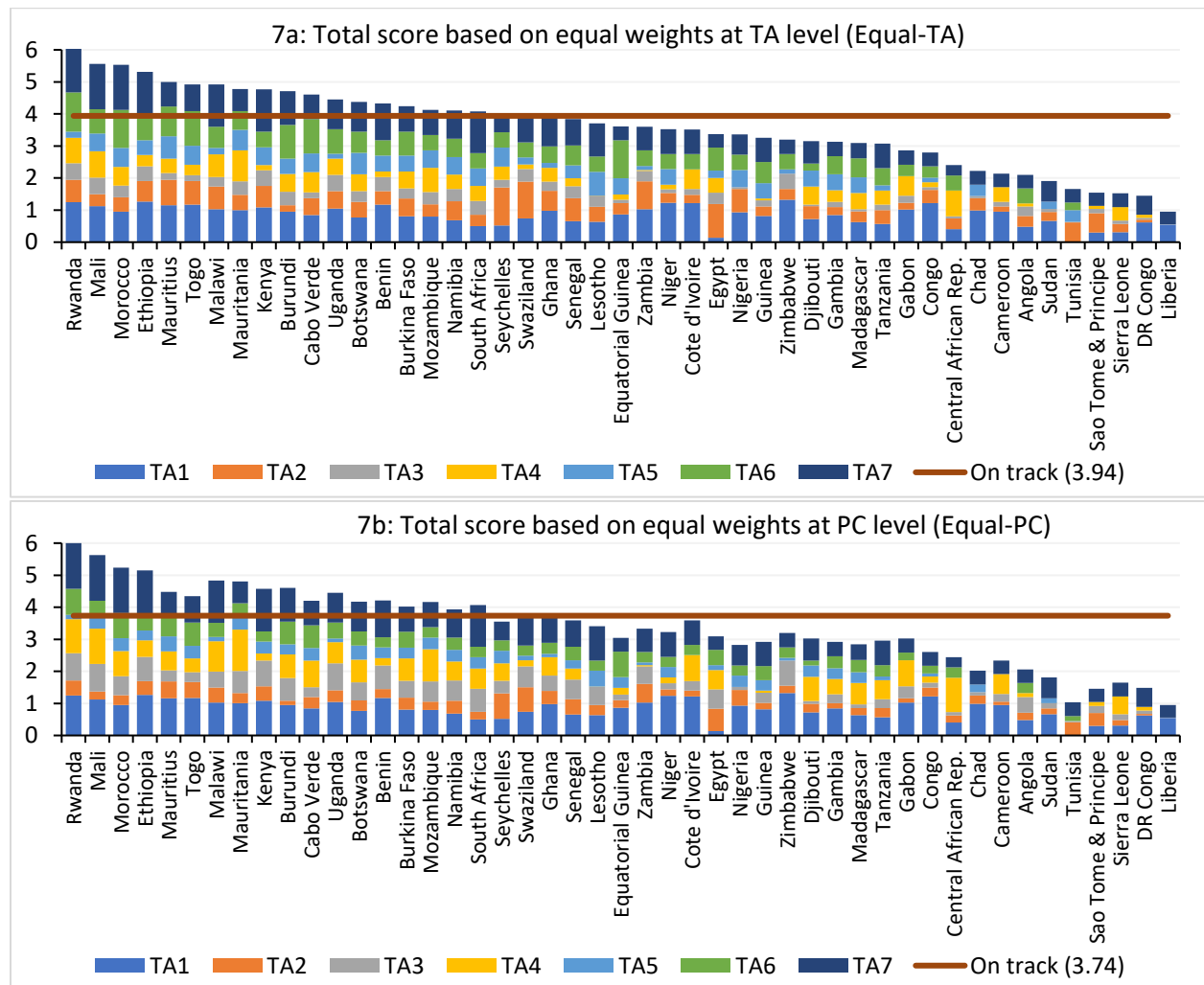
| | | | | | | | |
|-----------------------|--|--|--|--|---|--|---|
| On track | 20 | 19 | 15 | 16 | 8 | 15 | 13 |
| Off track | 27 | 28 | 32 | 31 | 39 | 32 | 34 |
| Top five countries | Rwanda, Mali, Morocco, Ethiopia, Mauritius | Rwanda, Mali, Morocco, Ethiopia, Malawi | Morocco, Rwanda, Mali, Ethiopia, Mauritania | Morocco, Rwanda, Mali, Ethiopia, Mauritania | Morocco, Rwanda, Mali, Ethiopia, Namibia | Morocco, Rwanda, Namibia, Mauritania , Mali | Morocco, Rwanda, Ethiopia, Mali, Namibia |
| Bottom five countries | Tunisia, Sao Tome & Principe, Sierra | Sierra Leone, DR Congo, Sao Tome & | Sudan , Sierra Leone, DR Congo, | Sao Tome & Principe, Sierra Leone, | Sudan , Sierra Leone, Congo, | Chad , Sudan , DR Congo, | Chad , Sudan , DR Congo, |

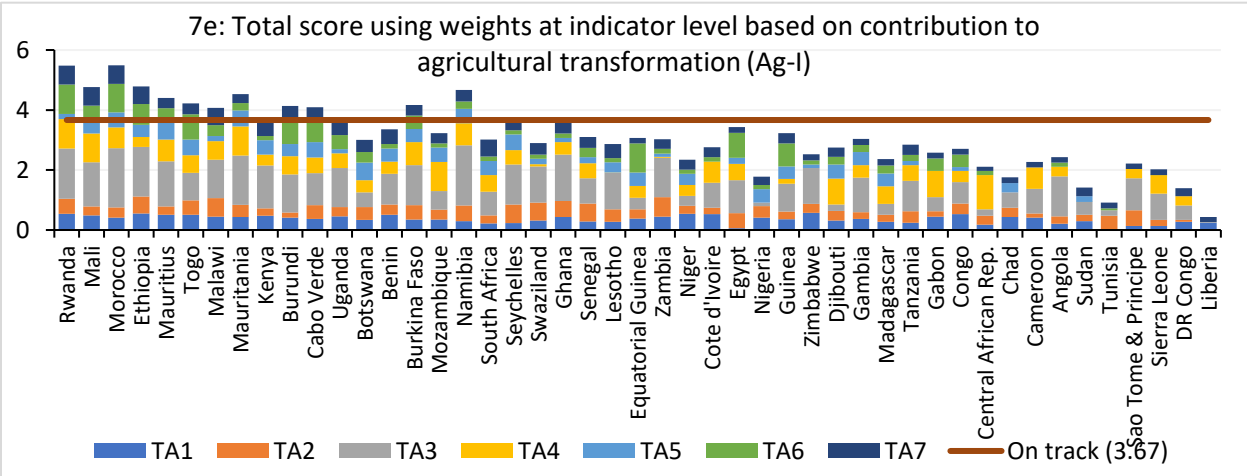
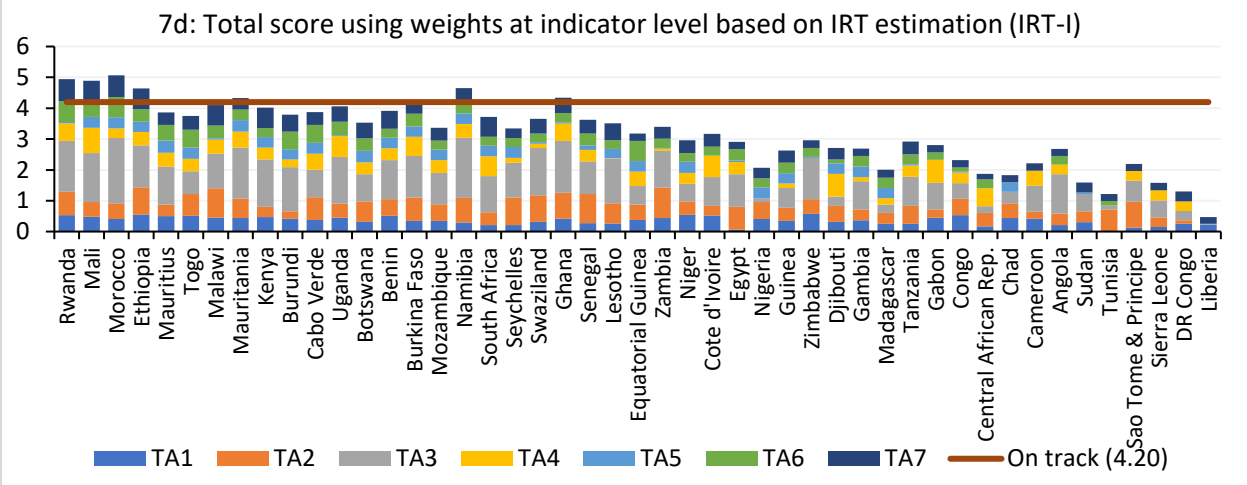
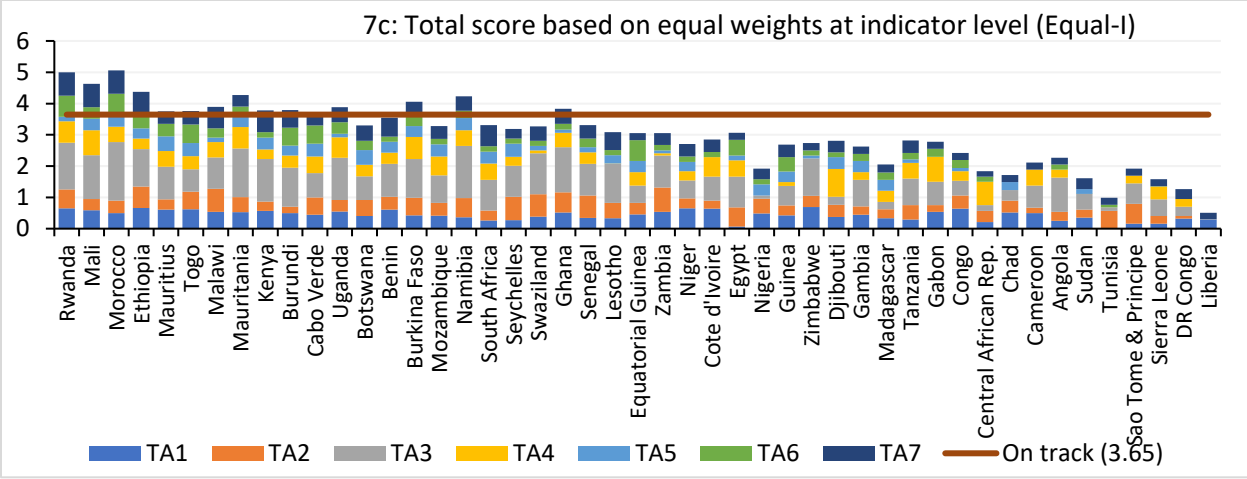
| | | | | | | |
|--------------------------------|----------------------------------|---------------------|----------------------------------|---------------------|---------------------|---------------------|
| Leone, DR Congo, Liberia | Principe, Tunisia, Liberia | Tunisia, Liberia | Tunisia, DR Congo, Liberia | Tunisia, Liberia | Tunisia, Liberia | Tunisia, Liberia |
|--------------------------------|----------------------------------|---------------------|----------------------------------|---------------------|---------------------|---------------------|

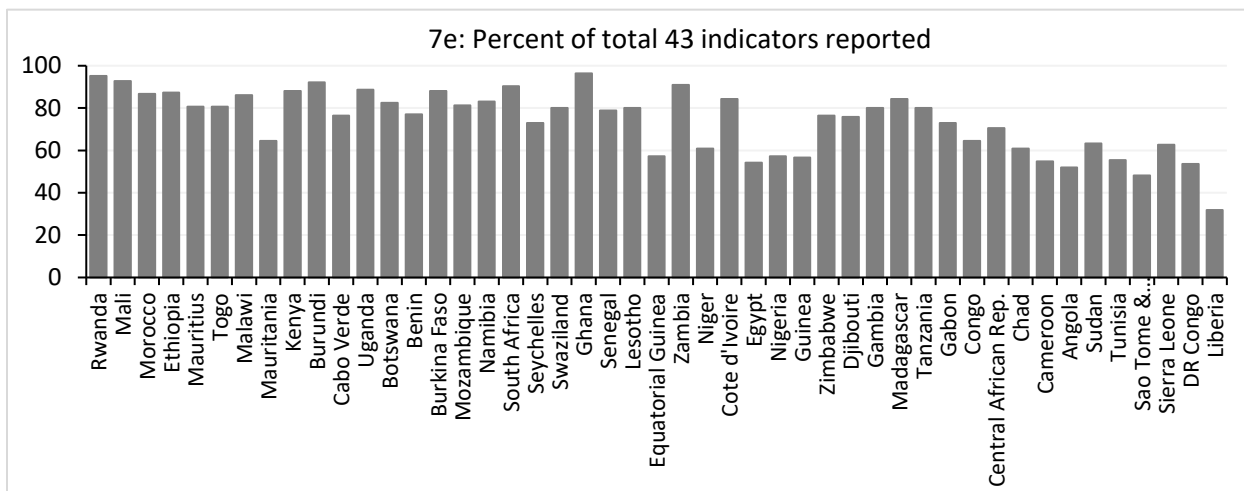
Source: Authors' calculation based on AUC (2017a), IRT model results, and authors' assumptions.

Notes: Equal-TA = equal weights for TAs and equal weights for PCs in a TA, and equal weights for indicators in a PC. Equal-PC = equal weights for PCs and equal weights for indicators in a PC. Equal-I = equal weights for all indicators. IRT-TA = equal weights for TAs and differential weights for indicators in a TA based on IRT results. IRT-I = differential weights for indicators based on IRT results. Ag-PC = differential weights for PCs with more weight for and PCs related to agricultural transformation and equal weights for indicators in a PC. Ag-I = differential weights for indicators with more weight to those related directly to agricultural transformation. Figures in parentheses are cutoff points for determining whether a country is on track or not, with those highlighted in green being on track and those in red not on track. Eight countries (Algeria, Comoros, Eritrea, Guinea-Bissau, Libya, Somalia, South Sudan, and Rep. A. Saharawi) did not submit any report.

Figure 7: Overall score and contribution of thematic area using different weighting systems







Source: Authors' calculations and illustration based on AUC (2017a), IRT model results, and authors' assumptions. Notes: See Table 2 for definition of the thematic areas (TAs).

Furthermore, the ranking of countries varies under the different weighting systems. With the existing BR where equal weights are applied at the TA level (Equal-TA) for example, Rwanda, followed by Morocco, Mali, Ethiopia, and Mauritius are judged as the top five overall performers in meeting the Malabo Declaration commitments. With the other weighting systems, Mauritius drops out from the top five, and is replaced by Malawi, Mauritania, or Namibia depending on the weighting system applied. Also, the top spot is taken over by Morocco. Similar patterns are observed with the bottom five countries, which are Tunisia, Sao Tome and Principe, Sierra Leone, DRC, and Liberia in the current BR (Equal-TA). On applying the other weighting systems, Chad and/or Sudan enter the picture in place of Sao Tome and Principe and/or Sierra Leone, and the order also changes.

There are some consistencies in the results across the various weighting systems, however. First, Morocco, Rwanda, and Mali are among the top five performers in all the seven weighting systems considered, although the order of performance varies. Second, all the countries except for Ghana that are assessed as not being on track in the current BR are similarly assessed in the other weighting systems.

Looking at whether a country is on track or not, Ghana is assessed as being on track in four of the seven systems considered. On other hand, South Africa and Seychelles both of which are assessed as being on track in the current BR are similarly assessed under only one other weighing system, whereas Swaziland is no longer assessed as being on track in any of the other systems. Given the different results of the various weighting systems, five countries (Benin, Botswana, Ghana, Mozambique, and Uganda) may be considered as borderline, since they come out as being on track under three or four of the weighting systems.

Focusing on the results of the weighting systems that put more weight on PCs or indicators that are more directly related to agricultural transformation (Ag-PC or Ag-I), several of the countries

that are assessed as being on track in the current BR (Equal-TA) drop out. The affected countries are Benin, Botswana, Mozambique, Uganda, South Africa, and Swaziland.

Together, the above results show that different weighting systems indeed matter in developing the AATS. Given the agricultural transformation agenda of the Malabo declaration, using a differential weighting system that allocates larger weights to the relevant indicators makes sense. So is applying the weights at the indicator level for two compelling reasons. First, unlike the indicators, the TAs and PCs are not directly observable or measurable. Thus, whereas the TAs and PCs are useful for organizing the indicators in a way that is consistent with how the Malabo Declaration is presented, the relative importance of indicators in agricultural transformation or in achieving broader outcomes should not be diminished by how they are grouped. The exact weights to use can be decided after the data quality and indicator measurement issues have been addressed and the candidate weighting systems are reevaluated.

Implications on the AATS of the different weighing systems and an alternative I-Score method

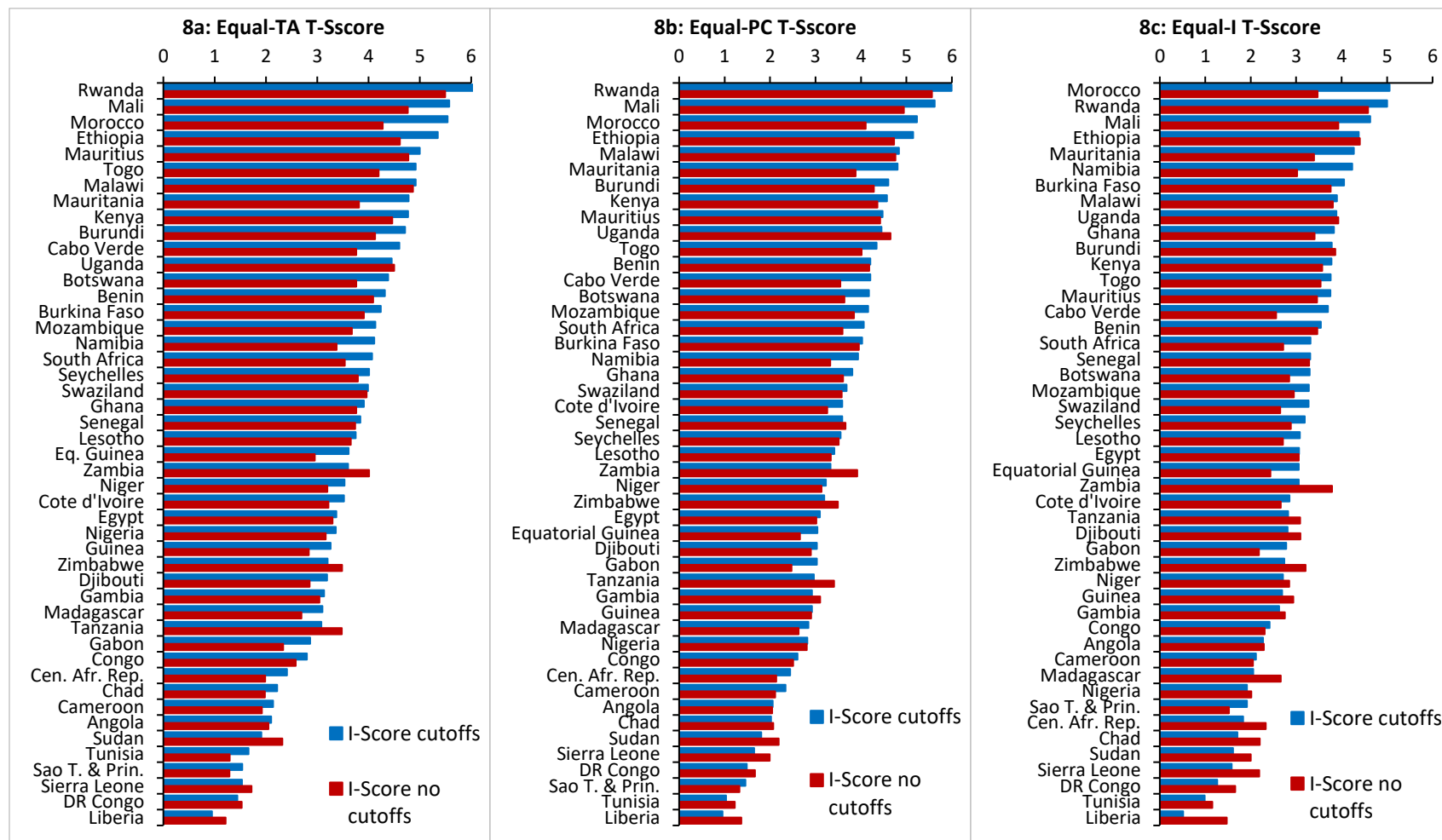
It is also useful to examine the implications of the AATS from using a method for the I-Scores that do not cutoff progress of countries that outperform the target (and are given an I-Score score of 10) or achieve negative growth rates (and are given an I-Score score of 0). The method assessed here considers the full range of the reported indicator values, by giving an I-Score of one to the lowest reported value and an I-Score of 10 to the highest reported value, and then all other reported values are given I-Scores that are scaled accordingly. Those that did not report on an indicator are given an I-Score of zero.

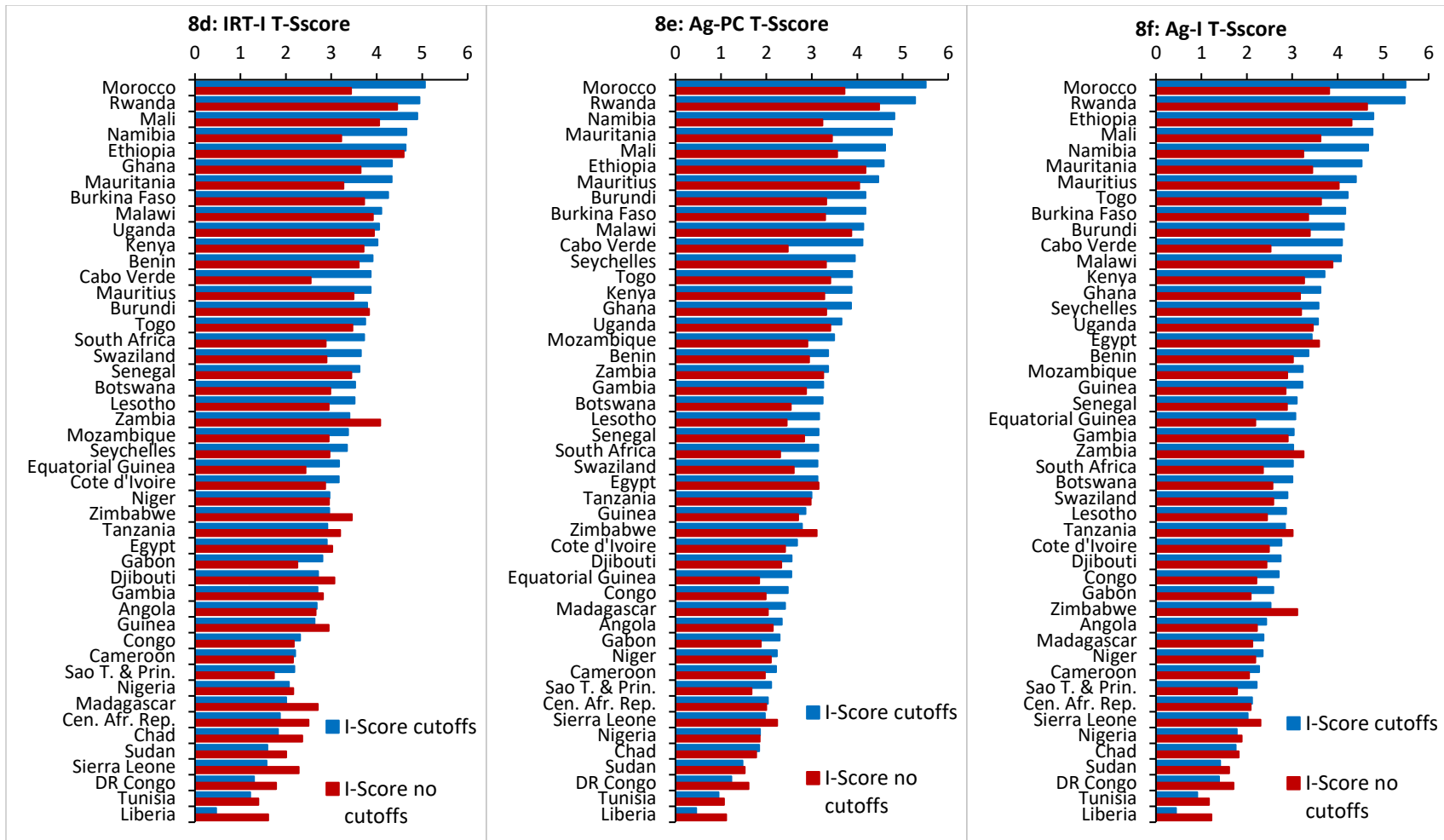
The results of the overall T-Score and ranking of countries are presented in Figure 8, comparing the T-Scores and ranking with the I-Score cutoffs (as done in the current BR) and without the cutoffs. The results are also presented for using the different weighting systems presented earlier.

As the results show, the T-Scores and ranking of countries varies under the two methods, i.e. whether there are cutoffs or not. In general, for countries in the top half of the rankings, the T-Scores calculated without the cutoffs are lower than the T-Scores calculated with the cutoffs. The opposite is observed for countries in the bottom half of the rankings. Among this group of countries, the T-Scores calculated without the cutoffs are closer to or higher than the T-Scores calculated with the cutoffs. Together, these suggest that using the cutoff method rewarded or penalized countries unequally.

These results show that the I-Score method also matters in developing the AATS. Using the cutoff that severely impacts on the core agricultural transformation indicators will be counterproductive. Here too, both methods (with and without the cutoffs) should be reevaluated after the data quality and indicator measurement issues have been, and then a decision can be made on the preferred method.

Figure 8: Overall T-Score with and without I-Score cut-offs and using different weighting systems, by country





Source: Authors' calculation based on AUC (2017a), IRT model results, and authors' assumptions.

Notes: Equal-TA = equal weights for TAs and equal weights for PCs in a TA, and equal weights for indicators in a PC. Equal-PC = equal weights for PCs and equal weights for indicators in a PC. Equal-I = equal weights for all indicators. IRT-I = differential weights for indicators based on IRT results. Ag-PC = differential weights for PCs with more weight for and PCs related to agricultural transformation and equal weights for indicators in a PC. Ag-I = differential weights for indicators with more weight to those related directly to agricultural transformation.

5.3.6. Indicators with Competing Objectives or Subject to Double Counting

A couple of other aggregation issues that need further thought are indicators with competing objectives and or subject to double counting. Regarding the competing objectives for example, because of the budget constraint of governments, increasing “public agriculture expenditure as share of total public expenditure” (I2.1i) and increasing “budget lines on social protection” (I3.4) or “government budget-lines on resilience” (I6.2) may be contradictory in the sense that improvement in one indicator may lead to a decline in the other. Take another example of the indicators on “public agriculture expenditure as a share of agGDP” (I2.1ii) and “total agricultural research spending as a share of agGDP” (I3.1v). Because increasing agriculture expenditure and research expenditure is expected to increase agGDP, it may be difficult to show progress in the indicator over time to the extent that both numerator and denominator are increasing by the same percentage over time.

On potential double counting, take the three indicators on child nutrition for example, stunting (I3.5i), underweight (I3.5ii) and wasting (I3.5iii). These are likely to be highly correlated with each other, and so including all three in the same score may lead to double counting of improvement in child nutrition in the higher-level score on “improving food security and nutrition” (PC3.5), which includes three other indicators in the same PC. Even more particular on this issue re the indicators on “reduction rate of the poverty headcount ratio at international poverty line” (I4.1iii) and “poverty headcount ratio at national poverty lines” (I4.1iv), which are combined to compute the C-Score on “sustaining Agricultural GDP for Poverty Reduction” (PC4.1).

From another perspective on double counting, agricultural value added for example appears in more than one indicator and so it used in computing scores in different PCs and TAs. Specifically, agricultural value added contributes to the several C-Scores and the T-Scores in three TAs: enhancing agricultural investment (TA2), ending Hunger (TA3), and halving Poverty (TA4). But since agricultural value added appears in the numerator of some indicators (e.g., I3.2i, I3.2ii, and I4.1i) and in the denominator of other indicators (e.g., I2.1ii and 3.1v), it may have opposing effects in the scores, as discussed earlier for indicators with competing objectives. The correlation coefficient matrices shown in the annex Table A3 for the indicators under each TA highlights some of the issues discussed above for coefficients that are strongly positive with high statistical significance (indication of double counting) or strongly negative with high statistical significance (indication of competing objectives). Some of the main ones to watch out for are summarized in Table 12 below.

Table 12: Summary of estimated moderate to high correlations between indicators by thematic area

| | Positive correlation | | Negative correlation | |
|------------|----------------------|-----------------------|----------------------|-----------------------|
| | Indicator pairs | Estimated coefficient | Indicator pairs | Estimated coefficient |
| TA3 | I3.5i, I3.5ii | 0.6 | I3.1iv, I3.5iii | -0.4 |
| | I3.5iv, I3.5vi | 1.0 ¹ | | |
| TA4 | I4.1iii, I4.1iv | 0.7 | I4.1i, I4.2 | -0.4 |
| | | | I4.1iv, I4.1v | -1.0 ¹ |

| | | | | |
|------------|---------------|-----|--------------|------|
| | | | 14.1iv, 14.3 | -0.8 |
| TA5 | | | 15.1, 15.2i | -0.5 |
| TA6 | 16.1i, 16.1ii | 0.7 | 16.1i, 16.2 | -0.4 |
| | | | 16.1ii, 16.2 | -0.4 |

Source: Authors' calculation and representation based on AUC (2017a).

Notes: See Table 2 for definition of indicators and annex Table A3 for details of estimated correlation coefficients.¹ These perfect coefficients are due to few countries reporting identical progress in the indicators.

5.3.7. Aggregating Country-Level Indicators and Scores for Performance at Regional or Africa-wide Levels

The current method uses a simple average to aggregate the country-level indicators to obtain progress at the regional or Africa-wide levels, which is problematic given the different sizes of countries on the continent or in the sub-regions. It is better to use a weighted average method, where the weight for a country is based on share of the country in the total value of the relevant parameter for the region or group. Common parameters to use include population, land area, GDP, agricultural value added, among others, depending on the indicator of interest. By way of an example, we compare the values reported in the BR (AU 2017a) versus using a weighted average method for the indicators on child stunting (I3.5i), underweight (I3.5ii) and wasting (I3.5iii), adult undernourishment (I3.5iv), and budget lines on resilience (I6.2). The country's share of the 5-years-and-under population is used as the weight for the child indicators, whereas the country's share of total population is used for the other two indicators. The results in Table 13 show that there are differences, especially with respect to the central Africa region. Because the number of observations is different for the various indicators (see Table 6), the shares are calculated using the valid number of observations so that the shares add up to one for each of the indicators.

Table 13: Unweighted and weighted values for sample indicators at Africa-wide and sub-regional levels

| Region | Simple average (AUC 2017b) | | | | | Weighted by share in relevant population | | | | |
|----------|----------------------------|--------|---------|--------|------|--|--------|---------|--------|------|
| | I3.5i | I3.5ii | I3.5iii | I3.5iv | I6.2 | I3.5i | I3.5ii | I3.5iii | I3.5iv | I6.2 |
| Africa | 29.9 | 15.8 | 6.8 | 17.1 | 49.3 | 30.8 | 17.1 | 6.4 | 15.5 | 47.2 |
| Central | 27.2 | 15.8 | 9.2 | 19.0 | 22.2 | 34.4 | 21.5 | 7.7 | 22.9 | 7.8 |
| Eastern | 33.0 | 17.4 | 6.4 | 25.3 | 46.8 | 30.3 | 16.9 | 6.1 | 25.0 | 49.0 |
| Northern | 15.0 | 6.3 | 4.2 | 2.8 | 43.0 | 14.9 | 4.1 | 2.9 | 3.3 | 20.9 |
| Southern | 33.3 | 13.3 | 4.7 | 31.3 | 69.5 | 35.8 | 13.3 | 5.1 | 27.6 | 66.7 |
| Western | 29.3 | 18.1 | 7.7 | 8.9 | 52.7 | 28.0 | 18.5 | 7.6 | 7.8 | 62.5 |

Source: Authors' calculation and representation based on AUC (2017a) and World Bank (2018).

Notes: I3.5i = prevalence of stunting, % of children under 5 years old; I3.5ii = prevalence of underweight, % of children under 5 years old; I3.5iii = prevalence of wasting, % of children under 5 years old; I3.5iv = proportion of the population that is undernourished, % of population; and I6.2 = existence of government budget-lines to respond to spending needs on resilience building initiatives.

6. CONCLUSIONS

With the adoption in 2014 of the “Malabo Declaration on Accelerated African Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihood”, African leaders recommitted to the principles and values of CAADP, set ambitious targets in five broad areas (enhancing agricultural investment, ending hunger, reducing poverty, boosting intra-African agricultural trade, and enhancing resilience of livelihoods and production systems), and agreed to conduct a Biennial Review (BR) of progress made in achieving their commitments. The inaugural BR report, and the accompanying Africa Agricultural Transformation Scorecard (AATS), was launched at the 30th ordinary session of the AU assembly in Addis Ababa in January 2018.

About 85 percent (47) of the 55-member states submitted a country BR report on the 43 indicators for tracking progress in the various commitments. Less than one-half (20) of the reporting countries were assessed to be on track to achieving the Malabo commitments by 2025. A key question arising is how the report and its findings can be used to garner support to intensify CAADP implementation for an accelerated African agricultural transformation.

To help answer this question, which it seems should derive from demonstrating that it pays off to continue to adopt and implement CAADP and strive to achieve the various commitments, the paper uses the Malabo BR data on the 43 indicators and related higher-level scores to analyze the potential relationship between progress in recommitting to the CAADP process or mutual accountability and progress in meeting the other commitments.

The estimated correlation coefficients are mostly near-zero and statistically insignificant, which is likely due to measurement issues with the indicators on recommitting to the CAADP process and mutual accountability. Other issues with aggregating the indicators into the higher-level scores are unearthed, including the relation between different indicators on the impact pathway, transformation of the indicators into lower-level scores, treatment of missing values, and indicators with competing objectives or subject to double counting. These together suggest careful consideration of the weighting system used in computing the scores or developing the AATS, as different weighting systems tested revealed differences in the calculated scores, classification of countries as being on track to meeting the overall Malabo Declaration commitments or not, and the ranking of the performance of countries. A weighting system that allocates larger weights to indicators that are more directly related to agricultural transformation should be considered, given the agenda and pathway for achieving the broader outcomes of the Malabo Declaration. Also, applying the weights at the indicator level makes sense for two compelling reasons. First, unlike the indicators, the TAs and PCs are not directly observable or measurable. Therefore, whereas the TAs and PCs are useful for organizing the indicators in a manner according to how the Malabo Declaration is presented, the relative importance of indicators in agricultural transformation or in achieving broader outcomes should not be diminished by how they are grouped.

The findings of the paper will be useful for revising the BR indicators and methodology, which is an exercise that is currently ongoing and in preparation for the next report that is expected to be presented to African leaders at the AU assembly in January 2020. As such, the issues we raised in this paper are intended to help improve the credibility of the AATS as a reliable instrument for policy actions.

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ANNEX NOTES, TABLES, AND FIGURES

Annex 1a: Formulas for calculating the T-Scores

Following the CAADP BR Technical Guidelines (AU 2017b), the T-Scores (S_j) for the different Malabo commitment thematic areas (TAs) are obtained from weighted summations of the scores (S_{jkl}) associated with the 43 indicators. The weights derive from weighting performance categories (PCs) under each TA equally, and then weighting indicators under each PC equally.

TA1: recommitment to the principles and values of the CAADP process

$$S_1 = \frac{1}{3}(S_{1.1} + S_{1.2} + S_{1.3})$$

TA2: commitment to enhancing investment finance in agriculture

$$S_2 = \frac{1}{12} \sum_{l=1}^3 S_{2.1l} + \frac{1}{4}(S_{2.2} + S_{2.3} + S_{2.4})$$

TA3: commitment to ending hunger in Africa by 2025

$$S_3 = \frac{1}{30} \sum_{l=1}^6 S_{3.1l} + \frac{1}{15} \sum_{l=1}^3 S_{3.2l} + \frac{1}{5}(c_{3.3} + c_{3.4}) + \frac{1}{30} \sum_{l=1}^6 S_{3.5l}$$

TA4: commitment to halving poverty by the year 2025, through inclusive agricultural growth and transformation

$$S_4 = \frac{1}{20} \sum_{l=1}^5 S_{4.1l} + \frac{1}{4}(S_{4.2} + S_{4.3} + S_{4.4})$$

TA5: commitment to boosting intra-African trade in agricultural commodities and services

$$S_5 = \frac{1}{2}S_{5.1} + \frac{1}{4} \sum_{l=1}^2 S_{5.2l}$$

TA6: commitment to enhancing resilience of livelihoods and production systems to climate variability and other related risks

$$S_6 = \frac{1}{4} \sum_{l=1}^2 S_{6.1l} + \frac{1}{2}c_{6.2}$$

TA7: commitment to mutual accountability to actions and results

$$S_7 = \frac{1}{3}(S_{7.1} + S_{7.2} + S_{7.3})$$

Annex 1b: Formulas for calculating the overall score for country i (Africa Agricultural Transformation Score: $AATS_i$)

$$AATS_i = \frac{1}{7} \sum_{j=1}^7 S_{ij}$$

Using the formulas for S_1 through S_7 , the overall score can be written as follows:

$$\begin{aligned} AATS_i = & \frac{1}{21} \sum_{k=1}^3 S_{1.k} + \frac{1}{84} \sum_{l=1}^3 S_{2.1l} + \frac{1}{28} \sum_{j=2}^4 S_{2.k} + \frac{1}{210} \sum_{l=1}^6 S_{3.1l} + \frac{1}{105} \sum_{l=1}^3 S_{3.2l} + \frac{1}{35} \sum_{k=3}^4 S_{3.k} \\ & + \frac{1}{210} \sum_{l=1}^6 S_{3.5l} + \frac{1}{140} \sum_{l=1}^5 S_{4.1l} + \frac{1}{28} \sum_{k=2}^4 S_{4.k} + \frac{1}{14} S_{5.1} + \frac{1}{28} \sum_{l=1}^2 S_{5.2l} + \frac{1}{28} \sum_{l=1}^2 S_{6.1l} \\ & + \frac{1}{14} S_{6.2} + \frac{1}{21} \sum_{k=1}^3 c_{7.k} \end{aligned}$$

As the above formula shows, using equal weights across TAs, followed by equal weights for PCs in TA, and then equal weights for Indicators in a PC yields a large discrepancy in the weights for different indicators, because of the different number of indicators and PCs within each TA. Indicators under TA3 (commitment to ending hunger in Africa by 2025) attracts the least weight, particularly those under $S_{3.1}$ (access to agriculture inputs and technologies) and $S_{3.5}$ (improving food and nutrition security), whereas those under commitments 1, 5, 6 and 7 attract the largest weights.

Table A1: Correlation coefficients between indicators on recommitting to CAADP process and progress made in other Malabo commitments, 2015-2016

| Label | Malabo thematic area, performance category, or indicator | Progress in recommitting to CAADP process: | | | | | | | | |
|--------|--|--|---------|------|--------|---------|------|--------|---------|------|
| | | I 1.1 | | | I 1.2 | | | I 1.3 | | |
| | | Coef. | P-value | Sig. | Coef. | P-value | Sig. | Coef. | P-value | Sig. |
| | Malabo thematic area (T-Score) | | | | | | | | | |
| TA 1 | Recommitting to CAADP process | 0.638 | 0.000 | *** | 0.777 | 0.000 | *** | 0.683 | 0.000 | *** |
| TA 2 | Enhancing investment finance in agriculture | -0.043 | -0.776 | | -0.147 | -0.331 | | -0.022 | -0.884 | |
| TA 3 | Ending hunger by 2025 | 0.134 | -0.370 | | 0.247 | -0.094 | * | 0.439 | -0.002 | *** |
| TA 4 | Halving poverty through agriculture by 2025 | 0.056 | -0.727 | | 0.093 | -0.562 | | 0.098 | -0.542 | |
| TA 5 | Boosting intra-African trade in agriculture commodities and services | -0.380 | -0.019 | ** | 0.192 | -0.248 | | 0.192 | -0.249 | |
| TA 6 | Enhancing resilience to climate variability | 0.163 | -0.309 | | 0.316 | -0.044 | ** | 0.361 | -0.020 | ** |
| TA 7 | Mutual accountability for actions and results | 0.181 | -0.223 | | 0.307 | -0.036 | ** | 0.489 | 0.000 | *** |
| | Performance category (C-Score) | | | | | | | | | |
| PC 1.1 | Completing national CAADP process | 1.000 | 0.000 | *** | 0.312 | -0.042 | ** | 0.237 | -0.126 | |
| PC 1.2 | Establishing CAADP-based cooperation, partnership, and alliance | 0.116 | -0.466 | | 1.000 | 0.000 | *** | 0.380 | -0.013 | ** |
| PC 1.3 | Establishing CAADP-based policy and institutional review/setting/support | -0.030 | -0.849 | | 0.392 | -0.008 | ** | 1.000 | 0.000 | *** |
| PC 2.1 | Public Expenditures in Agriculture | -0.066 | -0.662 | | -0.033 | -0.827 | | -0.011 | -0.944 | |
| PC 2.2 | Domestic Private Sector Investment in agriculture, agribusiness, agroindustry | n.a. | | | n.a. | | | n.a. | | |
| PC 2.3 | Foreign Private Sector Investment in agriculture, agribusiness, agroindustry | n.a. | | | n.a. | | | n.a. | | |
| PC 2.4 | Enhancing access to finance | 0.013 | -0.941 | | -0.112 | -0.535 | | 0.026 | -0.887 | |
| PC 3.1 | Access to Agriculture inputs and technologies | 0.075 | -0.617 | | 0.225 | -0.129 | | 0.324 | -0.026 | ** |
| PC 3.2 | Doubling agricultural Productivity | -0.132 | -0.425 | | 0.006 | -0.969 | | 0.134 | -0.416 | |
| PC 3.3 | Reduction of Post-Harvest Loss | 0.356 | 0.555 | | -0.721 | 0.170 | | -0.090 | 0.874 | |
| PC 3.4 | Strengthening Social Protection | 0.248 | -0.221 | | 0.104 | -0.613 | | 0.273 | -0.178 | |
| PC 3.5 | Improving Food security and Nutrition | -0.279 | -0.105 | | 0.208 | -0.230 | | 0.174 | -0.318 | |
| PC 4.1 | Sustaining Agricultural GDP for Poverty Reduction | 0.002 | -0.991 | | 0.129 | -0.467 | | -0.026 | -0.886 | |
| PC 4.2 | Establishing Inclusive PPPs for commodity value chains | -0.110 | -0.685 | | -0.148 | -0.585 | | 0.232 | -0.387 | |
| PC 4.3 | Creating job for Youth in agricultural value chains | 0.215 | -0.337 | | -0.053 | -0.816 | | -0.127 | -0.572 | |
| PC 4.4 | Women participation in Agri-business | -0.400 | -0.090 | * | -0.303 | -0.207 | | -0.284 | -0.239 | |
| PC 5.1 | Tripling Intra-African Trade for agriculture commodities and services | -0.367 | -0.196 | | -0.191 | -0.513 | | 0.003 | -0.993 | |
| PC 5.2 | Establishing Intra-African Trade Policies and institutional conditions | -0.233 | -0.158 | | 0.223 | -0.178 | | 0.148 | -0.376 | |
| PC 6.1 | Ensuring Resilience to climate related risks | 0.004 | -0.983 | | 0.190 | -0.297 | | -0.042 | -0.819 | |
| PC 6.2 | Investment in resilience building | 0.193 | -0.267 | | 0.138 | -0.430 | | 0.348 | -0.041 | ** |
| PC 7.1 | Increasing country capacity for evidence-based planning, implementation, and M&E | 0.040 | -0.887 | | 0.617 | -0.014 | ** | 0.543 | -0.037 | ** |

| | | | | | | | | | | |
|----------|--|--------|--------|---|--------|--------|-----|--------|--------|-----|
| PC 7.2 | Fostering peer review and mutual accountability process | 0.179 | -0.328 | | 0.452 | -0.009 | *** | 0.235 | -0.196 | |
| PC 7.3 | Conducting a biennial agriculture review process | 0.137 | -0.358 | | 0.225 | -0.128 | | 0.290 | -0.048 | ** |
| | Indicator | | | | | | | | | |
| I 1.1 | CAADP process completion index | n.a. | | | 0.222 | -0.133 | | 0.148 | -0.320 | |
| I 1.2 | Existence of, and quality of multi-sectorial and multi-stakeholder coordination body | 0.222 | -0.133 | | n.a. | | | 0.532 | 0.000 | *** |
| I 1.3 | Evidence-based policies, supportive institutions and corresponding human resource | 0.148 | -0.320 | | 0.532 | 0.000 | *** | n.a. | | |
| I 2.1i | Public agriculture expenditure as share of total public expenditure | 0.215 | -0.161 | | -0.030 | -0.848 | | -0.150 | -0.332 | |
| I 2.1ii | Public Agriculture Expenditure as % of agriculture value added | -0.268 | -0.079 | * | 0.004 | -0.977 | | 0.114 | -0.463 | |
| I 2.1iii | ODA disbursed to agriculture as % of commitment | 0.125 | -0.468 | | -0.097 | -0.573 | | -0.019 | -0.912 | |
| I 2.2 | Ratio of domestic private sector investment to public investment in agriculture | 0.028 | -0.867 | | -0.055 | -0.739 | | -0.082 | -0.619 | |
| I 2.3 | Ratio of foreign private direct investment to public investment in agriculture | 0.052 | -0.752 | | 0.237 | -0.146 | | -0.006 | -0.970 | |
| I 2.4 | Proportion of men and women engaged in agriculture with access to financial services | -0.012 | -0.946 | | -0.108 | -0.545 | | 0.017 | -0.925 | |
| I 3.1i | Fertilizer consumption (kilogram of nutrients per hectare of arable land) | 0.068 | -0.659 | | 0.020 | -0.895 | | 0.030 | -0.844 | |
| I 3.1ii | Growth rate of the size of irrigated areas from its value of the year 2000 | 0.116 | -0.471 | | 0.087 | -0.587 | | -0.044 | -0.783 | |
| I 3.1iii | Growth rate of the ratio of supplied quality agriculture inputs (seed, breed, fingerlings) to the total national inputs requirements for the commodity | 0.062 | -0.773 | | 0.088 | -0.684 | | 0.390 | -0.060 | * |
| I 3.1iv | Proportion of farmers having access to Agricultural Advisory Services | -0.004 | -0.980 | | 0.008 | -0.959 | | 0.111 | -0.495 | |
| I 3.1v | Total Agricultural Research Spending as a share of AgGDP | -0.142 | -0.408 | | -0.044 | -0.799 | | 0.247 | -0.146 | |
| I 3.1vi | Proportion of farm households with ownership or secure land rights | -0.185 | -0.310 | | -0.212 | -0.244 | | -0.092 | -0.616 | |
| I 3.2i | Growth rate of agriculture value added, in constant US dollars, per agricultural worker | 0.066 | -0.730 | | 0.174 | -0.357 | | 0.034 | -0.859 | |
| I 3.2ii | Growth rate of agriculture value added, in constant US dollar, per hectare of agricultural arable land | 0.126 | -0.425 | | -0.019 | -0.907 | | -0.024 | -0.879 | |
| I 3.2iii | Growth rate of yields for the national priority commodities | -0.147 | -0.401 | | -0.247 | -0.153 | | 0.148 | -0.397 | |
| I 3.3 | Reduction rate of Post-Harvest Losses for (at least) the 5 national priority commodities | 0.115 | 0.806 | | -0.477 | 0.279 | | -0.489 | 0.265 | |
| I 3.4 | Budget lines (%) on social protection as percentage of the total resource requirements for coverage of the vulnerable social groups | 0.255 | -0.208 | | 0.100 | -0.628 | | 0.292 | -0.148 | |
| I 3.5i | Prevalence of stunting (% of children under 5 years old) | 0.031 | -0.856 | | -0.390 | -0.015 | ** | -0.174 | -0.295 | |
| I 3.5ii | Prevalence of underweight (% of children under 5 years old) | 0.243 | -0.136 | | -0.229 | -0.160 | | -0.238 | -0.144 | |
| I 3.5iii | Prevalence of wasting (% of children under 5 years old) | 0.078 | -0.632 | | -0.051 | -0.756 | | -0.180 | -0.265 | |
| I 3.5iv | Proportion of the population that is undernourished | 0.307 | -0.088 | * | -0.167 | -0.361 | | 0.060 | -0.744 | |
| I 3.5v | Growth rate of the proportion of Minimum Dietary Diversity-Women | 0.156 | 0.739 | | 0.218 | 0.649 | | -0.371 | 0.423 | |

| | | | | | | | | | | |
|----------|--|--------|--------|--|--------|--------|----|--------|--------|-----|
| I 3.5vi | Proportion of 6-23 months old children who meet the Minimum Acceptable Diet | 0.261 | -0.143 | | -0.247 | -0.167 | | 0.019 | -0.916 | |
| I 4.1i | Growth rate of the agriculture value added | 0.082 | -0.583 | | -0.050 | -0.740 | | 0.119 | -0.427 | |
| I 4.1ii | Agriculture contribution to overall poverty reduction target | n.a. | | | n.a. | | | n.a. | | |
| I 4.1iii | Reduction rate of poverty headcount ratio, at national poverty line (% of population) | 0.221 | -0.468 | | 0.206 | -0.500 | | -0.252 | -0.406 | |
| I 4.1iv | Reduction rate of poverty headcount ratio at international poverty line (% of population) | -0.054 | -0.920 | | 0.054 | -0.919 | | -0.464 | -0.354 | |
| I 4.1v | Reduction rate of the gap between the wholesale price and farmgate price | 0.216 | 0.322 | | 0.108 | 0.624 | | 0.031 | 0.889 | |
| I 4.2 | Number of priority agricultural commodity value chains for which a PPP is established with strong linkage to smallholder agriculture | 0.042 | -0.779 | | 0.211 | -0.155 | | 0.242 | -0.101 | |
| I 4.3 | Percentage of youth that is engaged in new job opportunities in agricultural value chains | 0.241 | -0.280 | | -0.277 | -0.211 | | -0.391 | -0.072 | * |
| I 4.4 | Proportion of rural women that are empowered in agriculture | -0.184 | -0.450 | | -0.213 | -0.381 | | 0.036 | -0.883 | |
| I 5.1 | Growth rate of the value of trade of agricultural commodities and services within Africa | -0.182 | -0.345 | | 0.067 | -0.731 | | -0.038 | -0.846 | |
| I 5.2i | Trade Facilitation Index | -0.109 | -0.533 | | 0.046 | -0.791 | | -0.072 | -0.680 | |
| I 5.2ii | Domestic Food Price Volatility Index | 0.296 | -0.101 | | 0.056 | -0.760 | | 0.242 | -0.182 | |
| I 6.1i | Percentage of farm, pastoral, and fisher households that are resilient to climate and weather-related shocks | -0.014 | -0.956 | | 0.047 | -0.850 | | -0.401 | -0.089 | * |
| I 6.1ii | Share of agriculture land under sustainable land management practices | -0.125 | -0.510 | | -0.089 | -0.642 | | -0.249 | -0.184 | |
| I 6.2 | Existence of government budget-lines to respond to spending needs on resilience building initiatives | 0.050 | -0.738 | | 0.212 | -0.152 | | 0.485 | -0.001 | *** |
| I 7.1 | Index of capacity to generate and use agriculture statistical data and information (Agricultural Statistics Capacity Index) | 0.030 | -0.885 | | -0.143 | -0.486 | | 0.184 | -0.370 | |
| I 7.2 | Existence of inclusive institutionalized mechanisms and platforms for mutual accountability | 0.200 | -0.178 | | 0.313 | -0.032 | ** | 0.495 | 0.000 | *** |
| I 7.3 | Country biennial report submission | 0.125 | -0.401 | | 0.219 | -0.140 | | 0.282 | -0.055 | * |

Source: Authors' calculations based on AUC (2017a).

Notes: T-Scores and C-Scores exclude the zero values that were replaced for missing values in the indicators. *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available or applicable.

Table A2: Correlation coefficients between indicators on mutual accountability and progress made in other Malabo commitments, 2015-2016

| Label | Malabo thematic area, performance category, or indicator | Progress in mutual accountability: | | | | | | | | |
|--------|--|------------------------------------|---------|------|--------|---------|------|--------|---------|------|
| | | I 7.1 | | | I 7.2 | | | I 7.3 | | |
| | | Coef. | P-value | Sig. | Coef. | P-value | Sig. | Coef. | P-value | Sig. |
| | Malabo thematic area (T-Score) | | | | | | | | | |
| TA 1 | Recommitting to CAADP process | 0.030 | -0.886 | | 0.413 | -0.004 | *** | 0.271 | -0.069 | * |
| TA 2 | Enhancing investment finance in agriculture | -0.035 | -0.865 | | 0.261 | -0.080 | * | 0.060 | -0.692 | |
| TA 3 | Ending hunger by 2025 | 0.639 | 0.000 | *** | 0.640 | 0.000 | *** | 0.527 | 0.000 | *** |
| TA 4 | Halving poverty through agriculture by 2025 | 0.374 | -0.072 | * | 0.206 | -0.196 | | 0.033 | -0.837 | |
| TA 5 | Boosting intra-African trade in agriculture commodities and services | -0.056 | -0.786 | | 0.213 | -0.199 | | -0.223 | -0.178 | |
| TA 6 | Enhancing resilience to climate variability | 0.236 | -0.255 | | 0.433 | -0.005 | *** | 0.086 | -0.592 | |
| TA 7 | Mutual accountability for actions and results | 0.617 | -0.001 | *** | 0.874 | 0.000 | *** | 0.548 | 0.000 | *** |
| | Performance category (C-Score) | | | | | | | | | |
| PC 1.1 | Completing national CAADP process | 0.295 | -0.162 | | 0.376 | -0.013 | ** | 0.252 | -0.103 | |
| PC 1.2 | Establishing CAADP-based cooperation, partnership, and alliance | -0.201 | -0.347 | | 0.199 | -0.206 | | 0.197 | -0.210 | |
| PC 1.3 | Establishing CAADP-based policy and institutional review/setting/support | 0.186 | -0.364 | | 0.390 | -0.009 | *** | 0.269 | -0.077 | * |
| PC 2.1 | Public Expenditures in Agriculture | 0.142 | -0.489 | | 0.269 | -0.070 | * | 0.332 | -0.024 | ** |
| PC 2.2 | Domestic Private Sector Investment in agriculture, agribusiness, agroindustry | n.a. | | | n.a. | | | n.a. | | |
| PC 2.3 | Foreign Private Sector Investment in agriculture, agribusiness, agroindustry | n.a. | | | n.a. | | | n.a. | | |
| PC 2.4 | Enhancing access to finance | -0.169 | -0.502 | | 0.150 | -0.403 | | -0.282 | -0.112 | |
| PC 3.1 | Access to Agriculture inputs and technologies | 0.670 | 0.000 | *** | 0.508 | 0.000 | *** | 0.319 | -0.029 | ** |
| PC 3.2 | Doubling agricultural Productivity | 0.041 | -0.864 | | 0.154 | -0.349 | | 0.058 | -0.726 | |
| PC 3.3 | Reduction of Post-Harvest Loss | -0.391 | 0.744 | | 0.425 | 0.476 | | 0.266 | 0.668 | |
| PC 3.4 | Strengthening Social Protection | 0.611 | -0.012 | ** | 0.483 | -0.012 | ** | 0.498 | -0.010 | *** |
| PC 3.5 | Improving Food security and Nutrition | -0.165 | -0.462 | | 0.244 | -0.158 | | 0.088 | -0.613 | |
| PC 4.1 | Sustaining Agricultural GDP for Poverty Reduction | -0.297 | -0.217 | | -0.033 | -0.853 | | -0.048 | -0.786 | |
| PC 4.2 | Establishing Inclusive PPPs for commodity value chains | 0.488 | -0.153 | | 0.445 | -0.084 | * | 0.309 | -0.244 | |
| PC 4.3 | Creating job for youth in agricultural value chains | 0.386 | -0.172 | | 0.065 | -0.775 | | -0.117 | -0.604 | |
| PC 4.4 | Women participation in agri-business | -0.029 | -0.941 | | -0.123 | -0.615 | | -0.165 | -0.498 | |
| PC 5.1 | Tripling Intra-African trade for agriculture commodities and services | 0.106 | -0.744 | | 0.132 | -0.653 | | 0.080 | -0.786 | |
| PC 5.2 | Establishing Intra-African trade policies and institutional conditions | -0.038 | -0.855 | | 0.106 | -0.527 | | -0.205 | -0.217 | |
| PC 6.1 | Ensuring Resilience to climate related risks | -0.085 | -0.730 | | 0.029 | -0.873 | | -0.092 | -0.617 | |
| PC 6.2 | Investment in resilience building | -0.109 | -0.619 | | 0.223 | -0.198 | | -0.308 | -0.072 | * |
| PC 7.1 | Increasing country capacity for evidence-based planning, implementation, and M&E | 0.950 | 0.000 | *** | 0.554 | -0.032 | ** | 0.643 | -0.010 | *** |
| PC 7.2 | Fostering peer review and mutual accountability process | 0.481 | -0.020 | ** | 0.999 | 0.000 | *** | 0.198 | -0.278 | |

| | | | | | | | | | | |
|----------|--|--------|--------|----|--------|--------|-----|--------|--------|-----|
| PC 7.3 | Conducting a biennial agriculture review process | 0.287 | -0.156 | | 0.449 | -0.002 | *** | 0.999 | 0.000 | *** |
| | Indicator | | | | | | | | | |
| I 1.1 | CAADP process completion index | 0.030 | -0.885 | | 0.200 | -0.178 | | 0.125 | -0.401 | |
| I 1.2 | Existence of, and quality of multi-sectorial and multi-stakeholder coordination body | -0.143 | -0.486 | | 0.313 | -0.032 | ** | 0.219 | -0.140 | |
| I 1.3 | Evidence-based policies, supportive institutions and corresponding human resource | 0.184 | -0.370 | | 0.495 | 0.000 | *** | 0.282 | -0.055 | * |
| I 2.1i | Public agriculture expenditure as share of total public expenditure | 0.167 | -0.435 | | 0.056 | -0.718 | | 0.121 | -0.434 | |
| I 2.1ii | Public Agriculture Expenditure as % of agriculture value added | 0.010 | -0.962 | | 0.321 | -0.033 | ** | 0.346 | -0.022 | ** |
| I 2.1iii | ODA disbursed to agriculture as % of commitment | -0.392 | -0.087 | * | 0.094 | -0.587 | | -0.042 | -0.807 | |
| I 2.2 | Ratio of domestic private sector investment to public investment in agriculture | 0.353 | -0.116 | | 0.083 | -0.614 | | 0.065 | -0.694 | |
| I 2.3 | Ratio of foreign private direct investment to public investment in agriculture | 0.130 | -0.575 | | -0.217 | -0.184 | | 0.035 | -0.833 | |
| I 2.4 | Proportion of men and women engaged in agriculture with access to financial services | -0.192 | -0.432 | | 0.117 | -0.511 | | -0.295 | -0.090 | * |
| I 3.1i | Fertilizer consumption (kilogram of nutrients per hectare of arable land) | -0.042 | -0.844 | | 0.202 | -0.184 | | -0.212 | -0.163 | |
| I 3.1ii | Growth rate of the size of irrigated areas from its value of the year 2000 | 0.311 | -0.139 | | -0.074 | -0.644 | | 0.090 | -0.577 | |
| I 3.1iii | Growth rate of the ratio of supplied quality agriculture inputs (seed, breed, fingerlings) to the total national inputs requirements for the commodity | 0.500 | -0.048 | ** | 0.289 | -0.171 | | 0.182 | -0.395 | |
| I 3.1iv | Proportion of farmers having access to Agricultural Advisory Services | 0.324 | -0.141 | | 0.095 | -0.561 | | -0.067 | -0.681 | |
| I 3.1v | Total Agricultural Research Spending as a share of AgGDP | -0.273 | -0.245 | | 0.332 | -0.048 | ** | 0.171 | -0.318 | |
| I 3.1vi | Proportion of farm households with ownership or secure land rights | 0.256 | -0.304 | | -0.119 | -0.516 | | -0.395 | -0.025 | ** |
| I 3.2i | Growth rate of agriculture value added, in constant US dollars, per agricultural worker | 0.021 | -0.938 | | 0.027 | -0.889 | | -0.143 | -0.449 | |
| I 3.2ii | Growth rate of agriculture value added, in constant US dollar, per hectare of agricultural arable land | 0.212 | -0.331 | | -0.048 | -0.761 | | -0.100 | -0.530 | |
| I 3.2iii | Growth rate of yields for the national priority commodities | -0.271 | -0.247 | | -0.038 | -0.831 | | 0.111 | -0.525 | |
| I 3.3 | Reduction rate of Post-Harvest Losses for (at least) the 5 national priority commodities | 0.201 | 0.799 | | 0.506 | 0.247 | | 0.220 | 0.635 | |
| I 3.4 | Budget lines (%) on social protection as percentage of the total resource requirements for coverage of the vulnerable social groups | 0.606 | -0.013 | ** | 0.488 | -0.011 | ** | 0.496 | -0.010 | ** |
| I 3.5i | Prevalence of stunting (% of children under 5 years old) | -0.288 | -0.205 | | 0.006 | -0.969 | | -0.125 | -0.454 | |
| I 3.5ii | Prevalence of underweight (% of children under 5 years old) | -0.423 | -0.050 | * | -0.198 | -0.226 | | -0.199 | -0.225 | |
| I 3.5iii | Prevalence of wasting (% of children under 5 years old) | -0.415 | -0.055 | * | -0.343 | -0.030 | ** | -0.192 | -0.236 | |
| I 3.5iv | Proportion of the population that is undernourished | 0.221 | -0.364 | | -0.103 | -0.574 | | 0.036 | -0.846 | |
| I 3.5v | Growth rate of the proportion of Minimum Dietary Diversity-Women | -0.295 | 0.630 | | 0.211 | 0.649 | | 0.270 | 0.558 | |

| | | | | | | | | | | |
|----------|--|--------|--------|----|--------|--------|-----|--------|--------|-----|
| I 3.5vi | Proportion of 6-23 months old children who meet the Minimum Acceptable Diet | 0.221 | -0.364 | | -0.169 | -0.347 | | -0.071 | -0.694 | |
| I 4.1i | Growth rate of the agriculture value added | 0.081 | -0.694 | | -0.064 | -0.671 | | -0.104 | -0.488 | |
| I 4.1ii | Agriculture contribution to overall poverty reduction target | n.a. | | | n.a. | | | n.a. | | |
| I 4.1iii | Reduction rate of poverty headcount ratio, at national poverty line (% of population) | -0.379 | -0.315 | | -0.129 | -0.675 | | 0.324 | -0.279 | |
| I 4.1iv | Reduction rate of poverty headcount ratio at international poverty line (% of population) | -0.774 | -0.226 | | 0.023 | -0.965 | | 0.146 | -0.783 | |
| I 4.1v | Reduction rate of the gap between the wholesale price and farmgate price | 0.017 | 0.955 | | 0.113 | 0.608 | | 0.189 | 0.389 | |
| I 4.2 | Number of priority agricultural commodity value chains for which a PPP is established with strong linkage to smallholder agriculture | 0.400 | -0.043 | ** | 0.449 | -0.002 | *** | 0.336 | -0.021 | ** |
| I 4.3 | Percentage of youth that is engaged in new job opportunities in agricultural value chains | 0.217 | -0.456 | | -0.100 | -0.657 | | -0.211 | -0.346 | |
| I 4.4 | Proportion of rural women that are empowered in agriculture | 0.127 | -0.745 | | 0.176 | -0.471 | | -0.102 | -0.678 | |
| I 5.1 | Growth rate of the value of trade of agricultural commodities and services within Africa | -0.033 | -0.883 | | 0.082 | -0.673 | | -0.064 | -0.742 | |
| I 5.2i | Trade Facilitation Index | 0.089 | -0.673 | | 0.077 | -0.659 | | -0.340 | -0.046 | ** |
| I 5.2ii | Domestic Food Price Volatility Index | 0.134 | -0.552 | | -0.046 | -0.803 | | 0.112 | -0.540 | |
| I 6.1i | Percentage of farm, pastoral, and fisher households that are resilient to climate and weather-related shocks | -0.241 | -0.451 | | -0.465 | -0.045 | ** | -0.168 | -0.491 | |
| I 6.1ii | Share of agriculture land under sustainable land management practices | -0.082 | -0.738 | | -0.213 | -0.258 | | -0.064 | -0.739 | |
| I 6.2 | Existence of government budget-lines to respond to spending needs on resilience building initiatives | 0.006 | -0.977 | | 0.606 | 0.000 | *** | 0.181 | -0.222 | |
| I 7.1 | Index of capacity to generate and use agriculture statistical data and information (Agricultural Statistics Capacity Index) | n.a. | | | 0.412 | -0.036 | ** | 0.301 | -0.136 | |
| I 7.2 | Existence of inclusive institutionalized mechanisms and platforms for mutual accountability | 0.412 | -0.036 | ** | n.a. | | | 0.451 | -0.001 | *** |
| I 7.3 | Country biennial report submission | 0.301 | -0.136 | | | | *** | n.a. | | |

Source: Authors' calculations based on AUC (2017a).

Notes: T-Scores and C-Scores exclude the zero values that were replaced for missing values in the indicators. *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available or applicable.

Table A3a: Correlation coefficients matrix on indicators under “enhancing investment finance in agriculture” (TA2), 2015-2016

| | I2.1i | | I2.1ii | | I2.1iii | | I2.2 | | I2.3 | | I2.4 | |
|---------|--------|------|--------|------|---------|------|--------|------|--------|------|--------|------|
| | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. |
| I2.1i | 1.000 | n.a. | | | | | | | | | | |
| I2.1ii | -0.020 | | 1.000 | n.a. | | | | | | | | |
| I2.1iii | -0.038 | | 0.073 | | 1.000 | n.a. | | | | | | |
| I2.2 | 0.023 | | -0.021 | | -0.214 | | 1.000 | n.a. | | | | |
| I2.3 | -0.182 | | -0.078 | | 0.009 | | 0.009 | | 1.000 | n.a. | | |
| I2.4 | -0.182 | | -0.049 | | 0.059 | | 0.059 | | -0.168 | | 1.000 | n.a. |

Source: Authors’ calculations based on AUC (2017a).

Notes: See Table 1 for definition of indicators. *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available or applicable.

Table A3b: Correlation coefficients matrix on indicators under “ending hunger by 2025” (TA3), 2015-2016

| | I3.1i | | I3.1ii | | I3.1iii | | I3.1iv | | I3.1v | | I3.1vi | | I3.2i | | I3.2ii | | I3.2iii | |
|---------|--------|------|--------|------|---------|------|--------|------|--------|------|--------|------|--------|------|--------|------|---------|------|
| | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. |
| I3.1i | 1.000 | n.a. | | | | | | | | | | | | | | | | |
| I3.1ii | -0.109 | | 1.000 | n.a. | | | | | | | | | | | | | | |
| I3.1iii | 0.522 | ** | 0.375 | * | 1.000 | n.a. | | | | | | | | | | | | |
| I3.1iv | 0.112 | | -0.059 | | 0.206 | | 1.000 | n.a. | | | | | | | | | | |
| I3.1v | 0.039 | | 0.010 | | -0.269 | | 0.336 | * | 1.000 | n.a. | | | | | | | | |
| I3.1vi | -0.027 | | -0.235 | | 0.060 | | 0.294 | | 0.112 | | 1.000 | n.a. | | | | | | |
| I3.2i | 0.059 | | -0.221 | | 0.247 | | -0.053 | | -0.110 | | 0.410 | * | 1.000 | n.a. | | | | |
| I3.2ii | -0.205 | | 0.093 | | -0.003 | | -0.212 | | -0.048 | | -0.175 | | 0.328 | * | 1.000 | n.a. | | |
| I3.2iii | -0.097 | | -0.020 | | 0.051 | | 0.253 | | 0.424 | ** | -0.060 | | -0.077 | | -0.109 | | 1.000 | n.a. |
| I3.3 | 0.054 | | 0.609 | | 0.069 | | 0.580 | | 0.488 | | 0.127 | | -0.454 | | -0.421 | | 0.687 | * |
| I3.4 | 0.010 | | 0.117 | | 0.117 | | 0.272 | | 0.526 | ** | 0.117 | | -0.226 | | 0.124 | | 0.367 | |
| I3.5i | -0.140 | | 0.224 | | -0.052 | | -0.152 | | -0.092 | | 0.057 | | -0.282 | | -0.050 | | 0.041 | |
| I3.5ii | -0.233 | | 0.316 | * | 0.124 | | -0.254 | | -0.190 | | 0.005 | | -0.051 | | 0.113 | | 0.017 | |
| I3.5iii | -0.190 | | 0.128 | | 0.177 | | -0.365 | ** | -0.217 | | -0.195 | | -0.064 | | 0.040 | | -0.045 | |
| I3.5iv | -0.132 | | 0.432 | ** | 0.116 | | -0.198 | | -0.052 | | -0.189 | | -0.299 | | 0.103 | | -0.059 | |
| I3.5v | 0.087 | | -0.039 | | -0.872 | | 0.111 | | -0.161 | | 0.575 | | -0.232 | | -0.401 | | -0.647 | |
| I3.5vi | -0.170 | | 0.432 | | 0.116 | | -0.198 | | -0.052 | | -0.189 | | -0.282 | | 0.088 | | -0.218 | |

Table A3b—continued.

| | I3.3 | | I3.4 | | I3.5i | | I3.5ii | | I3.5iii | | I3.5iv | | I3.5v | | I3.5vi | |
|---------|--------|------|--------|------|--------|------|--------|------|---------|------|--------|------------------|--------|------|--------|------|
| | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. |
| I3.3 | 1.000 | n.a. | | | | | | | | | | | | | | |
| I3.4 | 0.399 | | 1.000 | n.a. | | | | | | | | | | | | |
| I3.5i | 0.361 | | -0.007 | | 1.000 | n.a. | | | | | | | | | | |
| I3.5ii | -0.396 | | -0.184 | | 0.606 | *** | 1.000 | n.a. | | | | | | | | |
| I3.5iii | -0.188 | | -0.017 | | 0.076 | | 0.304 | * | 1.000 | n.a. | | | | | | |
| I3.5iv | 0.446 | | 0.145 | | 0.442 | ** | 0.280 | | -0.040 | | 1.000 | n.a. | | | | |
| I3.5v | | | 0.509 | | 0.003 | | 0.178 | | 0.014 | | -0.024 | | 1.000 | n.a. | | |
| I3.5vi | 0.446 | | 0.145 | | 0.429 | ** | 0.246 | | -0.049 | | 1.000 | *** ¹ | -0.024 | | 1.000 | n.a. |

Source: Authors' calculations based on AUC (2017a).

Notes: See Table 1 for definition of indicators. *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available or applicable. ¹ These perfect coefficients are due to few countries reporting identical progress in the indicators. The missing value for the correlation between I3.3 and I3.5v is because there is only one valid observation for the pair.

Table A3c: Correlation coefficients matrix on indicators under “halving poverty through agriculture by 2025” (TA4), 2015-2016

| | I4.1i | | I4.1iii | | I4.1iv | | I4.1v | | I4.2 | | I4.3 | | I4.4 | |
|---------|--------|------|---------|------|---------------------|------|--------|------|--------|------|--------|------|--------|------|
| | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. |
| I4.1i | 1.000 | n.a. | | | | | | | | | | | | |
| I4.1iii | 0.022 | | 1.000 | n.a. | | | | | | | | | | |
| I4.1iv | -0.056 | | 0.694 | | 1.000 | n.a. | | | | | | | | |
| I4.1v | -0.028 | | 0.738 | | -1.000 ¹ | | 1.000 | n.a. | | | | | | |
| I4.2 | -0.394 | *** | -0.149 | | 0.307 | | -0.056 | | 1.000 | n.a. | | | | |
| I4.3 | 0.088 | | -0.562 | | -0.790 | | -0.044 | | -0.168 | | 1.000 | n.a. | | |
| I4.4 | -0.208 | | -0.060 | | -0.088 | | 0.054 | | -0.177 | | -0.082 | | 1.000 | n.a. |

Source: Authors' calculations based on AUC (2017a).

Notes: See Table 1 for definition of indicators. *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available or applicable. ¹ These perfect coefficients are due to few countries reporting identical progress in the indicators.

Table A3d: Correlation coefficients matrix on indicators under “boosting intra-African trade in agriculture commodities and services” (TA5), 2015-2016

| | I5.1 | | I5.2i | | I5.2ii | |
|--------|--------|------|--------|------|--------|------|
| | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. |
| I5.1 | 1.000 | n.a. | | | | |
| I5.2i | -0.541 | *** | 1.000 | n.a. | | |
| I5.2ii | -0.015 | | -0.120 | | 1.000 | n.a. |

Source: Authors’ calculations based on AUC (2017a).

Notes: See Table 1 for definition of indicators. *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available or applicable.

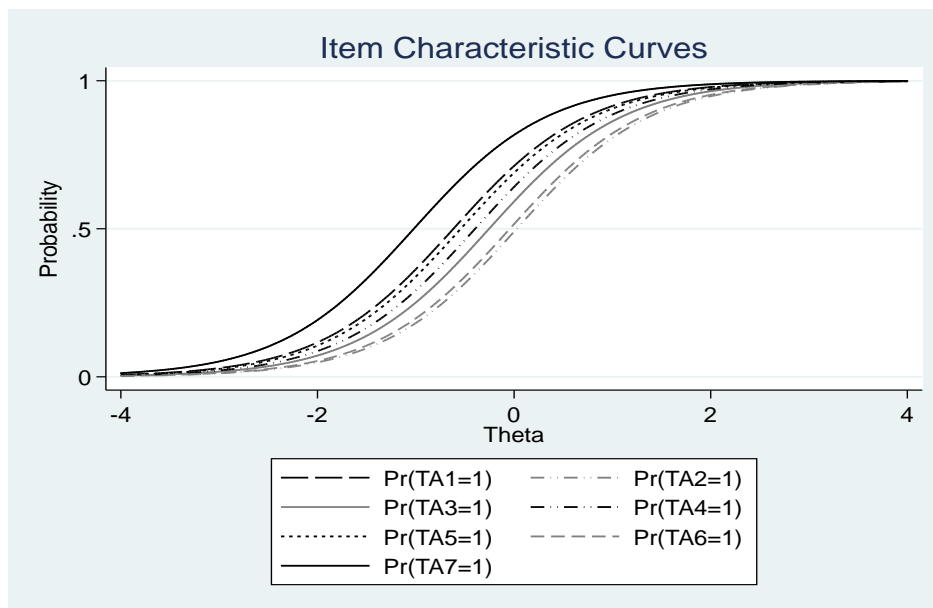
Table A3e: Correlation coefficients matrix on indicators under “enhancing resilience to climate variability” (TA6), 2015-2016

| | I6.1i | | I6.1ii | | I6.2 | |
|--------|--------|------|--------|------|--------|------|
| | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. |
| I6.1i | 1.000 | n.a. | | | | |
| I6.1ii | 0.726 | *** | 1.000 | n.a. | | |
| I6.2 | -0.400 | * | -0.429 | ** | 1.000 | n.a. |

Source: Authors’ calculations based on AUC (2017a).

Notes: See Table 1 for definition of indicators. *, **, and *** represent statistical significance at the 10, 5, and 1 percent level, respectively. n.a. = not available or applicable.

Figure A1: Item characteristic curves for Malabo Declaration commitments



Source: Authors’ calculation and representation based on AUC (2017a) and model results.

Notes: TA1 = Recommitting to CAADP process, TA2 = Enhancing investment finance in agriculture, TA3 = Ending hunger, TA4 = Halving poverty through agriculture, TA5 = Boosting intra-African trade in agriculture commodities and services, TA6 = Enhancing resilience to climate variability, TA7 = Mutual accountability for actions and results.

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