



Monitoring African Food and Agricultural Policies

GUIDELINES TO IMPLEMENT THE MAFAP METHODOLOGY AND START-UP COUNTRY-LEVEL WORK

DRAFT

Document for consultation – 07 March 2011

Acknowledgments

These draft guidelines have been developed in the context of the —Monitoring African Food and Agricultural Policies (MAFAP) project.

They are the result of the work of a team coordinated by Jesús Barreiro-Hurlé (FAO) and Piero Conforti (FAO), and including Mohamed Ahmed (FAO), Jean Balie (FAO), Lorenzo Bellú (FAO), Coumba Dieng (FAO), Joanna Komorowska (OECD), Materne Maetz (FAO), Cristian Morales Opazo (FAO)

These draft guidelines are based on work undertaken by the MAFAP project during 2010. They serve three purposes: 1. linking the Methodology and Synthesis papers and the related work to the outputs that the project is expected to produce; 2. proposing entry points to facilitate country-level activities; 3. propose examples of the type of analytical work to be undertaken. The document is also meant to facilitate communication and discussion with policy makers and potential partner institutions.

Contents

1. Introduction.....	4
2. Connecting background papers to project outputs.....	4
3. Country level activities	6
3.1 <i>Context and baseline</i>	6
3.2 <i>Measuring incentives, disincentives and market development gaps</i>	8
3.3. <i>Level and composition of public expenditure for agriculture and aid flows</i>	9
4. Examples of calculations	11
4.1 <i>Example of how to identify products for the calculation of indicators of incentives and disincentives: Kenya</i>	11
4.2 <i>Example of calculation of incentives and disincentives for an imported product: rice in Burkina Faso</i>	13
4.3 <i>Example of calculation of incentives and disincentives for an exportable product: gum Arabic in Burkina Faso</i>	18
4.4 <i>Example of calculation of incentives and disincentives for a non-traded product: cassava in Tanzania</i>	23
4.5 <i>Example of calculation of incentives and disincentives along a national value chain: sugarcane</i>	26
4.6 <i>Example of measurement of public expenditures including aid flows in support of food and agriculture in Uganda</i>	28
4.7 <i>Example of a topic for possible in-depth study: cotton in Burkina Faso and international value chains</i>	33
Annex I. Glossary of terms used for the analysis of incentives and disincentives.	39
Annex II. Glossary of terms used in the analysis of public expenditure.	45

1. Introduction

This document offers guidelines for the implementation of the MAFAP project methodology in partner countries. It is conceived as a practical tool to communicate and facilitate analytical work to be undertaken under the project. The content builds, firstly, on existing work in the area of measurement of agricultural policies in Africa, as described in the report titled “*A synthesis of relevant policy analysis work in Africa*”, the so-called “*Synthesis report*”. Secondly, on the “*Concept Paper on the MAFAP Methodology*” presented in Rome at the Workshop of May 4-5, 2010, - informally called “*Methodology report*” - and the ensuing discussions. As agreed among the project team members and during the workshop, the current draft of that paper has to be considered as a starting point which will be revised on the basis of the experience gathered during the implementation of the project. Thirdly, these guidelines are based on other work undertaken and data collected by the MAFAP team during 2010. Specifically, parts of this report are excerpted from the report titled “*Commodity selection in the five pilot countries*” prepared in the framework of the project; and from the OECD discussion paper titled “*A proposed methodology for Measuring government expenditures in support of food and agriculture sector development and application in the case of Uganda*” and presented at the OECD Global Forum on Agriculture in November 2010. All these documents will be available in the MAFAP website (<http://www.fao.org/mafap/mafap-home/en/>)

These guidelines have three objectives.

1. Linking the Synthesis and Methodology reports - and the related discussion held about them - and the ultimate outputs that the project is expected to produce.
2. Proposing entry points to start-up and organize country level work, by discussing how relevant products and production chains can be identified; information and data requirements and likely problems which can be expected to encounter.
3. Providing showcase examples of the types of calculations that will need to be undertaken and a harmonized terminology for them.

Next three sections are dedicated to the three above points, while the two annexes provide an initial common terminology to be used in the analysis.

2. Connecting background papers to project outputs

Based on the Project Agreement the tangible outputs that the project is committed to produce are defined as follows:

1. the Synthesis and Methodology papers published;
2. five in-depth country reports on the measurement and monitoring of policies affecting agriculture and food markets in Burkina Faso, Mali, Kenya, Tanzania, and Uganda (also called “*intensive countries*”) completed;
3. ten policy reviews based on policy indicators - similar to those produced by the World Bank project on Distortion to Agricultural Incentives (DAI) - for the five

countries mentioned above, plus Cameroon, Ethiopia, Ghana, Malawi, and Nigeria (also called “*preparatory countries*”) completed;

4. the triennial MAFAP monitoring report published;
5. one or more policy fora to institutionalize policy dialogue based on monitoring reports at national and regional levels established.

Country-level activities need to focus on items two to four. For the intensive countries, the policy reviews will form part of the in-depth country reports.

A detailed discussion of the outlines of the in-depth country reports [2] and the policy reviews [3] is certainly premature at this stage. In principle, it is not necessary to follow the same format for all of them. However, a core common structure that is complemented by specific country characteristics is envisaged. The country level work should be driven ultimately to fulfill the minimum requirements for a systematic policy monitoring system across countries to be included in final reports. Based on the Synthesis and Methodology papers and the related discussion, the in-depth country reports will have to contain the following four parts:

1. Background description of the economy, the agricultural economy and the policy environment relevant to agriculture and food sectors.
2. Preliminary analysis of measures of incentives and disincentives due to policies and the degree of market development.
3. Preliminary analysis of measures of the extent of public expenditure and aid devoted to agriculture, including foreign resources
4. Findings based on in-depth analyses of incentives and disincentives due to agricultural and food policies and public investment in agriculture.

Detailed description of the incentives and disincentives measures to be included in part 2 is presented at length in the Methodology paper including the Nominal Rates of Protection (NRPs) and Coefficients, as well as Effective Rates of Protection (ERPs) and Coefficients. Part 2 will report on a relatively small set of comparable indicators for a significant sample of commodities. The estimation of these indicators depends on several assumptions and limitations, such as tariff structure and prohibitive tariffs, the presence of technical barriers to trade, the choice of reference prices, the treatment of spatial price transmission and the exchange rate regime considered. The assumptions made will be justified and their impact on the estimation will be illustrated and explained.

Similarly, for part 3, assumptions in terms of the classification followed, the data employed, the institutions involved and the treatment of foreign resource flows will be illustrated and justified, and summary indicators.

These two approaches lead to two sets of indicators which are complementary. By identifying those commodities where (dis)incentives are higher and where public expenditure is oriented simultaneously would make it possible to contrast the actual allocation of resources, including external assistance, with areas of need. Thus, there would be a link between the market development gap and efforts to bridge that gap.

The purpose of Part 4 is to identify the most challenging aspects of the measurement exercise, that is, the assumptions and uncertainties which characterize the computation of indicators presented in parts 2 and 3. Sensitivity analysis may be carried where it is necessary. The discussion will dwell on the extent to which policy and market development indicators presented in part 2 are affected by exchange rates, quality differences, the presence of market power along domestic value chains and when relevant of international value chains, the presence of externalities and the lack or presence of spatial arbitrage and price transmission, and its causes. In addition, for those products where the message given by the policy and market development indicators maybe misleading due to non-explicit policy interventions and/or in order to increase the understanding of how markets and institutions work for critical commodities, further analysis of market development gaps will be carried out.

The sensitivity of results presented in part 3 to the expenditure classification and the allocation of financial flows to different sectors of the economy and purposes will also be analyzed. These aspects are addressed in the Synthesis and the Methodology papers and this project is expected to provide insights, which may either take the form of selected case studies; or of alternative calculations of the indicators. Both types of insights will be presented in part 4 of the five in-depth reports. The analysis carried out in Part 4 will generate the main inputs that will ultimately feed into and sustain a more elaborated and evidence-based policy dialogue at national, regional and continental levels.

While Part 4 is expected to be substantive in the reports of the intensive countries, it may not be included in the policy reviews for the set of the preparatory countries. Also, part 1 is expected to be less detailed in the policies reviews for the preparatory countries (Cameroon, Ethiopia, Ghana, Malawi and Nigeria).

3. Country level activities

Given the above summary description of the final outputs expected from the MAFAP project, we now describe the methodology for collection and processing of information and data. Below are listed inputs into the first three parts of the final reports described above. The content of part 4 will be highly country-specific; and will necessarily need to be shaped at a later stage.

It should be highlighted that to the extent possible given the resources available the project will imply also the development of a capacity building effort for country team members involved in the project and for those policy makers that would use the outputs of the project.

3.1 Context and baseline

This part of the country reports will describe the major features of the agricultural and food economy, with special focus on the policy environment. The description will be based on evidence from existing indicators and policy reviews, which will also serve as a logical baseline to the policy measurement exercise. In some cases it might even be possible to establish broad connections between the policy environment and the performance of the agricultural sector.

Most of this part will be based on secondary data and information sources. An important source of information for the policy review is official government documents and regulations which are available at the ministries of agriculture, finance and other relevant administrative bodies. These documents help to define the current policies as well as specific details of its objectives. Additional data on production, trade and prices as well as general characteristics of the economy can be obtained from, inter alia, national offices for statistics, FAO Brief on Line system, the Economist Intelligence Unit or IFPRI Social Accounting Matrices (SAMs). A comprehensive list of sources will be identified with national partner institutions.

The information related to context and baseline will be organized and presented as a third category¹ of MAFAP indicators called Development and Performance Indicators (DPI). These DPI will also relate specifically to contributions and performances of the food and agriculture sectors towards overall economic growth and development. The country level is appropriate to lay the basis for establishing connections between policies and outcomes.

Considering the wideness of DPIs and the broad definition of ‘food policy’, a well-defined scope needs to be established. DPIs can be defined and classified in the following eight thematic categories.

1. Sectoral performance and market indicators (for instance production, consumption, trade and changes in stocks; share of agriculture in GDP).
2. Characteristics of input and output markets (for instance accessibility of output markets and their structure, accessibility of inputs such as land, fertilizers, credit, finance and structure of the related markets; presence and role of Producers’ Organizations, wages)
3. Poverty, inequality and food security (for instance rural poor as a percentage of total poor population; shares of food insecure urban households vs. rural households and food insecure female-headed vs. male-headed households; gross per capita income rural vs. urban; male vs. female).
4. Health (for instance life expectancy at birth; prevalence of underweight and undernourished children; percentage of the population with access to safe drinking water; HIV prevalence)
5. Labour and employment (for instance percentage of rural labour force employed in agriculture; share of women and men in the labour force; earned income ratio female vs. male; minimum wage if relevant).

¹ The first one being those for incentives and disincentives, and the second one the public expenditure indicators.

6. Population (for instance growth rates; migration rates).
7. Education (for instance education indexes; enrolment ratios).
8. Environment and natural resources (for instance degree of deforestation; irrigated land as a percentage of crop land; frequency of drought and other extreme events).

Examples in each category are purely tentative: not all the information listed may be available or relevant in all countries; hence a specific list will need to be compiled for each country report.

National partner institutions should discuss and identify relevant indicators, as well as data sources. Some of the above information may also be available from international databases. Examples include the UN Statistics Division, the World Bank – for World Development Indicators and Africa Development Indicators; the FAOStat and CountryStat; the OECD Statistics portal; the UNDP Human Development Report; the IFPRI's Agricultural Science and Technology Indicators; the NEPAD-CAADP M&E indicators; the AfDB statistics; the UNECA indicators; the IMF Dissemination Standards Bulletin Board. Sector specific indicators may also be gathered from institutions such as the WHO, ILO, UNEP, and UNICEF.

3.2 Measuring incentives, disincentives and market development gaps

Two sources of information on incentives and disincentives are available: the World Bank Distortions to Agricultural Incentives (DAI) project data and papers, which are available for most countries, and Social Accounting Matrices (SAMs). The DAI data and papers can provide information on existing explicit policies and their evolution; while SAMs, instead, allows identifying target products and their role in the economy. Many of the available SAMs computed by IFPRI also show the extent to which products are traded in the domestic market and own-consumed within households. They offer a rough description of production chains and the linkages between products and households types on both the supply and the demand side. Indications from the SAM can also be combined with the analysis of data on consumption and production along time, to warrant dynamic considerations, for instance on nascent sectors which may have good potential.

In selecting products, two considerations are important. Firstly, the selected products need to cover a significant percentage of the total value of production; and, secondly, the selected products need to be representative of different category of tradability of products in terms of importables, exportables, traded, non-traded, and food-security-sensitive products and, if suitable, of promising or emerging value chains.

Once target products are identified, qualitative and quantitative information will need to be collected on at least the following:

- spatial distribution of production and consumption, as well as price transmission across different markets within the same economy (country) and main production chains;
- the presence of large monopoly/monopsony power;
- economics and/or physical bottlenecks in production and marketing;

- state trading, marketing board or similar entities; and,
- externalities associated with production, processing, and consumption.

Quantitative data required is demonstrated by the examples reported in Section 4. They seem to be related to seven main areas.

1. Output price data (retail, wholesale, producer, border; international prices);
2. input prices and production costs at different levels;
3. transaction costs;
4. production data (volume; value; by sub-national areas; different qualities);
5. consumption data (volume; value; by sub-national areas; different qualities);
6. policies (border; tax regimes; subsidies); and,
7. macro (exchange rates; value added and GDP).

With this data at least nominal and effective rates of protection can be calculated for each of the selected commodities in the 10 countries. When data is available the split of this aggregate measure into different components (border policy, efficiency, quality and externalities) should be sought, mainly for in-depth countries.

3.3. Level and composition of public expenditure for agriculture and aid flows

On the public expenditures side, the starting points are the Public Expenditure Reviews for agricultural sector undertaken by different international organizations, such as the World Bank or IFPRI and by national governments of the participating countries. These provide basic information on the expenditures managed by the ministries in charge of the agriculture sector, as well as on how the budget of these ministries fits into the overall budgetary process.

Many of the agriculture-relevant expenditures, however, may occur in other ministries than the ministry of agriculture. It is important to identify how agriculture supportive programmes operate within the countries. It is therefore necessary to understand how agriculture-relevant expenditures are managed, and identify the appropriate ministries/government bodies involved. To that end, interviews with the ministries of planning/finance may be needed to clarify the institutional structure of management of public expenditure in agriculture.

Next, the relevant policy measures have to be identified within each of the ministries. It's important to understand first the broad programmes under each of the ministries considered and then to decide which of the programmes, or their elements, are relevant for MAFAP.

Once the relevant policy measures have been identified, the following information needs to be collected:

- Description of how a given policy measure is implemented (e.g. how the payment is disbursed, whether the payment is specific to agriculture or rather agriculture supportive, who receives the payments, whether it is specific to a commodity,

etc.). It is often the case that several measures under each programme are applied with different implementation criteria. It is very important to separate those, to reflect correctly each of the components of the programme in the MAFAP classification. If getting detailed data is not possible, it is advised to discuss with experts how the relevant shares could be estimated. This information is crucial to put the different policies into the MAFAP classification and ultimately to facilitate budget analysis.

- Data on public expenditure should be as disaggregated as possible and include allocations and expenditure as well as administrative costs and direct transfers.
- Data should also distinguish whether the sources of funding is national revenues or international aid.

Further, information on aid has to be collected. Here the starting point is the OECD's Creditor Reporting System (CRS) database which reports aid from the donors that are members of the Development Assistance Committee (DAC donors). The CRS database provides information on donor commitments and disbursements by "sector" and "purpose code" (a subsector). Although CRS reports aid in agriculture specific sector and purpose codes, there are numerous other sectors or purpose codes that may be of relevance to agriculture and will need to be examined. All relevant categories will need to be analyzed carefully going down to the project description level to pick up all measures relevant to agriculture. The latter, however, may not always be possible. Given that the objective is to reconcile the CRS and the information coming from national budgets, it's important to get as much information on aid as possible at the country level. This will allow analysis of how effectively aid is disbursed within the country. Moreover, information on non-DAC donor countries and their activities needs to be collected. Information obtained at the country level may be a good starting point. Once main non-DAC donors are identified, information on donor commitments and disbursements will be complemented with available sources of data (e.g. AidData, work done by the OECD on non-DAC donors etc.). It is also important to collect as much information as possible on aid that may not be captured in national accounts as it may have a substantial impact on specific commodities or targeted agents in the agricultural sector.

4. Examples of calculations

This section demonstrates the approach to the different tasks stated above. In particular it shows examples of:

- i. the selection of relevant agricultural products for which to calculate incentive and disincentive indicators in the country reports;
- ii. the calculation of incentives, disincentives and market development gaps for importable, exportable and non-traded products, as well as along national and (possibly) international value chains which make up most of part of such reports;
- iii. the measurement of public expenditure devoted to agriculture (part 3 of the reports);
- iv. types of study may be undertaken on the assumptions and uncertainties which characterize the computation of indicators (i.e. a component of part 4 of the reports).

The examples reported in this section are meant to demonstrate the type of reasoning and data required; hence results presented should be considered merely tentative. Moreover, the examples for incentives and disincentives presented consider the single commodity dimension, leaving out the relevance and procedure of aggregating of different coefficients and wedges to obtain a summary indicator for the agricultural sector as a whole in one country.

4.1 Example of how to identify products for the calculation of indicators of incentives and disincentives: Kenya

Policy and market development indicators in the MAFAP project need to be computed for products that are representative of the agricultural sector in each country. Where possible, the project should aim at covering around 70 percent of the value of production. However as important as reaching a significant percentage of total agricultural production value is to have products that cover the main crops with regards to different criteria such as (i) the value of production, (ii) contribution to food security, (iii) contribution to food import bills, (iv) contribution to export revenues, (v) contribution to rural employment and share of land use, and (vi) future developments of the agricultural sector. Last, but not least, the product section must take into account interest on specific crops by country authorities.

Below is a tentative selection of product for Kenya. Sources of the data include a national SAM, national statistical offices and Ministries of Agriculture, CountryStat, FAOSTAT and FAO-TCS (data from National Strategies for Food Security).

From a food security perspective, products to be considered are those playing a large role in the daily calorie intake. In 2003, key items included: milk, maize (grains and flour), cooking banana, kale, sugar, beans and beef. Over half of the national average daily calorie consumption - which is particularly low (around 1744 calories) - in Kenya is derived from consumption of maize (flour and grains), sugar, and beans.

In terms of the food import bill and export value, in 2003 over 45 percent of the total export value was generated from agricultural exports, whereas food imports represented only 6 percent of the import bill. Kenya is a net exporter of tea, coffee, cut

flowers, beverages and tobacco, pulses and oilseeds, and a net importer of manufactured foods, wheat, rice, maize and sugar. In 2003, tea exports represented almost 18 percent of the total value of exports, while cut flower account for another 8 percent. More recent data (HODA Annual Statistics, 2009) point out that Kenya has shown a dramatic increase in cut flowers exports, and has become a leading world exporter in the last decade.

Kenya is a net exporter of meat and dairy products, which in 2003 provided around 12 percent of total agricultural export revenues. Coffee exports accounted for over 4 percent of the total value of exports. In terms of export values, vegetables and fruits ranked 8th and 10th among agricultural products, and the total value of domestically traded production is about three times the value of exports. In the same year, 83 percent of the food import bill was due to wheat and rice imports; and in terms of domestic production tea, cow milk, maize, cattle meat potatoes, beans, sugarcane and poultry account together for 72 percent of the total value. Vegetables and fruits account for about 17 percent.

Given all these considerations, a tentative selection of products to be included in the analysis of incentives, disincentives and market development is summarized in the table below. The selection includes goods which are important for food security, such as milk, maize, wheat, cattle meat and dairy products; as well as key earners of foreign exchange such as tea, coffee, and cut flowers. Based on their contribution to the average diet and increasing importance as exports, beans, vegetables and fruits have also been selected. The cumulated share of production value of the above commodities is just about the suitable target of 70 percent.

Please note that although in this example there is a predominance of commodities labelled as “export” (seven out of ten products and 54% of agricultural production) this does not imply that the same will hold for all countries. In Kenya export crops have a high unit value (i.e. vegetables, tea, cut flower, etc.) and are ready functioning sectors. In Tanzania for example there is also a predominance of export crops in the initial selection carried out by the MAFAP team (seven out of 13 products) but the share of production is much lower (14%) as some of the selected product are important source of foreign exchange although a minor part of agricultural production (i.e. fish, coffee). In Uganda, exports neither represent the majority of products (four out of 11) nor the majority of production value (less than 5%).

Proposed food and agricultural goods for Kenya

Commodity	Type	Share of production value
1. Maize	NON TRADED	11%
2. Sugarcane	NON TRADED	3%
3. Wheat	IMPORT	2%
4. Cattle Meat&Dairy	EXPORT	12%
5. Coffee	EXPORT	3%
6. Tea	EXPORT	14%
7. Cut flower	EXPORT	5%
8. Beans	EXPORT	3%
9. Vegetables	EXPORT	13%
10. Fruits	EXPORT	4%
TOTAL		70%

4.2 Example of calculation of incentives and disincentives for an imported product: rice in Burkina Faso

Main staple crops in Burkina Faso are millet, sorghum, maize and rice. The bulk of rice consumed is actually imported to satisfy demand of urban areas. Rice accounted for 6 percent of the total dietary energy supply (DES) in 2000-05. On average, in 2000-09 rice per capita consumption (as food) was 19 kg/yr. Since the colonial period, Burkina Faso's rice production has not been able to match demand growth. Imported rice prices are currently 33 percent higher than what they were three years ago, before the food price crisis of 2008 (FAO-GIEWS, 2010). Most rice in Burkina Faso is planted in the South-Western region. In other regions rice is planted mainly under irrigation and in small areas. The self-sufficiency ratio of rice was 24 percent in 2006. The rice market in Burkina Faso experiences organisation and structural challenges, and is characterized by numerous isolated producers. There are many buyers and many different markets, of variable sizes. Farmers usually sell their rice individually at harvest for rather low prices. Producers have little information on supply, demand and prices in local market.

For tradable commodities the benchmark price to undertake the comparisons is the border price equivalent. Thus, the yardstick used to measure the incidence of different policy instruments is the extent to which domestic prices diverge from those prevailing in international trade². The use of border price equivalents as a benchmark for policy analysis is justified by the fact that they are prices that would prevail on domestic markets in an open economy. If more than one border prices exists (i.e. multiple entry points for the imported commodity), the analyst should also consider how this can be best reflected in the calculations.

For this example, the benchmark price selected is the c.i.f price, given that Burkina Faso is a net importer of rice and reflects the opportunity cost to producers and consumers. The c.i.f. is a valid reference at a country's border, for a rice of the same

² This is assuming that there are no distortions in international markets. If for some reason or another the border price in the country is not representative of this undistorted price, the international price could be adjusted.

quality of the one imported. Hence, the product chosen should be representative of domestic production and consumption. However, there might be lack of homogeneity between domestically produced rice and what is available in world markets. This problem is overcome by conducting a quality adjustment for the quality difference between products traded in world markets and those produced domestically. In our case there is no need for this adjustment. In addition if the production process of the product in the country generates some kind of externality (positive or negative) the reference price should be adjusted to reflect it. Domestic prices are measured as close to the farm-gate as possible and as close to the raw or primary commodity as possible in order to capture the full range of policy interventions that can affect a commodity along the value chain. In estimating the reference price at the farm-gate, retail or wholesale levels; storage, transport, handling and marketing margins must be taken into account in order to ensure that international and domestic prices are compared at the same point in the marketing chain. For this, additional adjustments might be needed to cover inefficient components of these costs.

A variety of indicators are available for the purpose of monitoring the incentive/disincentive effect of agricultural policies. The difference between the observed market price and the reference price is defined as a wedge in the MAFAP terminology. If expressed as a proportion we obtain the nominal rate of protection (NRP) for a commodity. That is:

$$NRP \equiv \frac{[P_d - P_w]}{P_w} * 100$$

where P_d is the observed market price for the commodity and P_w is the reference price for the commodity once adjusted for, if applicable, quality and externality differences. The NRP is given as the increase in revenue per unit (producer price) in the presence of the policy relative to the one that would be obtained in the base (no-policy) situation.

The advantage of using such an indicator as a quantitative measure of the effects of policy is that the effects of different policy instruments, such as import quota, tariff, subsidy, or the operations of a domestic monopoly, can be analysed and expressed in comparable terms.

When calculating NRP, policy analyst should avoid using data collected only over the short term since these may reflect short term fluctuations caused by exceptional circumstances which may be reversed in the medium or long run. Therefore, when calculating the NRP the analyst should take into consideration whether exceptional circumstances require taking longer time periods.

Moreover, when a policy has different implications for producer and consumer prices, two different rates of protection may need to be estimated. Similarly, if a policy can affect the regional price structure different rates of protection may apply to different region of the same country. This is particularly true and important for big countries.

Below we estimate the NRPs for rice as an import substitute. Consider the following information:

- International CIF price
- Official exchange rate
- Technical coefficient for quality adjustment
- Handling, transport, storage costs at the port of entry
- Custom duties
- Retailer and other margin
- Handling, transport, storage costs from the port of entry to the retail market in Ouagadougou
- Handling, transport, storage costs from the farm gate (average) to the retail market in Ouagadougou
- Observed domestic price on retail market in Ouagadougou

The observed market price in 2007 at the farm gate is FCFA 214,090/t (Direction de la Vulgarisation Agricole, Burkina Faso), while at the consumer (retail) the observed market price is FCFA 237,100/t.

The benchmark price (c.i.f. price) at the border for an equivalent quality of rice is US\$ 353/ton. To express foreign currencies in the domestic currency we use the exchange rate. However, it should be noted that in many developing countries official exchange rates often overvalue the local currency. If this is the case, it is advisable to use the shadow exchange rate in order to reflect the impacts of exchange rate policy on agricultural incentives. In such a case applying the shadow exchange rate we obtain a reference border price. This is not what was done in this example as the FCFA currency is a specific case of a rather stable currency as it is tied to the euro. Thus for this example border price and reference border price are the same. Applying the official exchange rate (US\$ 1 = FCFA479) we obtain the border price (benchmark price in local currency), which stands at 169,532 FCFA per ton.

The next step is to identify any tariffs that are in place for the product. If border policy is not in the form of tariffs but quotas or other non-tariff barriers these should be converted into tariff equivalents. Adding this component to the border price we obtain the observed landed price. For rice in BF the tariff stands at 11,400 FCFA per ton. If the tariffs cover some kind of good or service (i.e. inspection, handling, et.) this proportion should be added to the reference price to obtain the reference landed price. As for BF the share of transfer is 100% (i.e. there are no good and services provided when paying custom duties) the reference border price and the reference landed price are equal.

Next we need to add the transport, handling and marketing costs which allow the product to be placed in the place (market) where competition takes place. Rice imported in BF is landed at the port of Tema in Ghana and then transported via road to wholesale markets in Ouagadougou. The cost of this transport, handling and storage stands at FCFA 59,068 per ton with an additional cost of FCFA 1,300 for transport and handling to retail

outlets. If the analyst considers that these costs are inefficient (i.e. they are higher than they should be due to some kind of market distortion in the haulage sector) then they should be corrected by an efficiency component which reflects the difference between the observed prices and the reference prices. Adding the costs of handling, storage, transport and marketing to the landed price we obtain the parity price at retail level. If these costs are multiplied by the efficiency factor we obtain the reference parity price at the retail level. In this case we consider that the efficiency factor is 1 and thus observed parity price and reference parity price are equal.

Moving from retail to farm gate implies deducting the transport, storage, handling and marketing costs between these two steps in the market. Here we do have data on efficient and inefficient costs. As efficient costs we calculate the average distance from main producing areas to retail market and multiply this cost by the average transport cost and obtain a per ton transport cost of 11,272 FCFA. On the other side the observed transport and margins for farmers from farm gate to retail market is 23,010 FCFA per ton. This implicitly gives an efficiency ratio of 49% (11,272/23,010).

Transport from the farm gate to the wholesaler averages from the Eastern region is FCFA 11,272/t. Market processing, handling and transport facilities are competitive, with no monopoly element. Given this information, producer border price equivalents and NPRs can be estimated as follows:

Rice import price f.o.b (US\$/t) (average 2007- Bangkok 25% broken)	305
BENCHMARK PRICE c.i.f. (US\$/t) (average 2007) = INTERNATIONAL ADJUSTED BENCHMARK PRICE	353
x official exchange rate (US\$ 1.00 = FCFA 479)	479
BORDER PRICE (FCFA/t)	169,087
+Custom duties (WTO tariff profiles - 2007)	11,400
LANDED PRICE AT GHANA BORDER	180,487
REFERENCE LANDED PRICE	169,087
+ transport/storage costs to wholesaler (FCFA/t) (Tema- Ouagadougou) [a. see explanation below]	59,068
= Parity price at wholesale level in Ouagadougou (FCFA/t) = REFERENCE PARITY PRICE AT WHOLESALE (transport, storage, handling and margins considered efficient)	228,155
+Retailer Margin + Transport cost to retailer (average 2007) 6.7%	12,359
= Parity price at retail level in Ouagadougou (FCFA/t)= REFERENCE PARITY PRICE AT RETAIL (transport, storage, handling and margins considered efficient)	240,514

- transport costs, farm gate to wholesaler (FCFA/t) (Internal) [b. see explanation below]	11,272
= REFERENCE PARITY PRICE AT FARM-GATE (FCFA/t)	229,242
OBSERVED MARKET PRICE (FCFA/T) AT FARM GATE = Pd _f	214,090
+Transport and margins for local traders	23,010
OBSERVED MARKET PRICE AT RETAIL LEVEL (FCFA/t) = Pd _r	237,100

- a. Detailed data on transport costs were obtained from the project Trade Hub (2010). According to this source, trucking costs in West Africa are among the highest in the world. It takes about US\$ 3,800 and from 13 to 22 days to bring a container of approximately 30 tons from the port of Tema in Ghana - the main port for imports into Burkina Faso - to Ouagadougou. Since most companies have the same truck capacity and similar loading practices on corridors, for our example, we use information for the most common corridor: this is one connecting Tema, the port of entry in Ghana, to Ouagadougou, which is about 1.057 km the average transport cost is US\$ 3.53 per kilometre.

$$\text{Tema} - \text{Ouagadougou} = 3.53 \text{ US\$} * 1,057 \text{ Km} = 3,731/30 \text{ ton} = 124.37 \text{ US\$/ton} * 479 \text{ (ER)} \\ = 59,068 \text{ FCFA/\$/T}$$

- b. As local transport cost from the farm gate to wholesale market (Ougadougou), we considered the average distance from the three most important rice production areas (Boulgout, Houet, Comoe) to Ouagadougou, which is about 200 Km. Therefore, transport cost from farm gate to wholesaler is: $3.53 * 479 / 30 * 200 = 11,272 \text{ FCFA/\$/T}$

To calculate the wedges and NRP the following prices are thus used.

At the farm-gate level:

Pd_f = producer price at farm-gate level: 214,090

Pw = Parity Price at Ghana border +Transport (Tema – Ougadougou) + Wholesaler Margin and Transport + Retailer Margin and Transport - transport costs farm gate to wholesaler = 229,242

The wedge is just the difference between both prices, -15,152 FCFA per ton, with the wedge we can now calculate the NRP at farm-gate level = $(Pd - Pw)/Pw * 100$

$$\text{NRP} = (214,090 - 229,242) / 229,242 * 100 = -6,61 \text{ percent.}$$

At the retail market:

Pd_r = Observed price in the retail market in Ouagadougou for local rice = Producer Price + (Transport Cost and Margin) = 214,090 + 23,010 = 237,100 FCFA/t

Pw = Parity Price at Ghana border + Transport (Tema – Ougadougou) + Wholesaler Margin and Transport + Retailer Margin and Transport = 240,514 FCFA/t

The wedge is just the difference between both prices, - 3,414 FCFA per ton, with the wedge we can now calculate the NRP at retail level = $(Pd - Pw)/Pw * 100$

$NRP = (237,100 - 240,514)/240,514 * 100 = -1.42$ percent.

The NRP turns out to be negative in both cases, although higher at the farm gate than at the retail level. As mentioned, this is a tentative figure, which would indicate that rice production in Burkina Faso is discriminated *vis a vis* the imported product.

Considering only the case at farm gate level, the MAFAP methodology allows decomposing this total wedge or NRP (if considered as ratio) into different components. All of them together should add to the total wedge or NRP (if considered as ratio).

- **International markets wedge and NRP** = zero as there is no difference between benchmark price and the reference benchmark price.
- **Border Policy wedge and NRP** = includes both the effect of exchange rate policy and tariffs thus compares the difference between reference price and observed price due only to this (in our case just the tariff 11,400 FCFA per ton) with respect to the reference price = 4,97%
- **Efficiency wedge and NRP** = includes only the effect of inefficiencies in transport, storage, handling and marketing costs. In our case the difference between observed costs and efficiency costs from farm-gate to retail (11,738 FCFA per ton) = - 4,88%
- **Quality wedge and NRP** = no differences
- **Externality wedge and NRP** = no differences
- **Residual wedge and NRP** = include any price difference not explained above (- 3,880 FCFA per ton and the tariff (-11,400 FCFA per ton)³) with respect to the reference price = -6,66%

4.3 Example of calculation of incentives and disincentives for an exportable product: gum Arabic in Burkina Faso

Gum Arabic in Burkina Faso is selected as an example of an exportable good. Production of gum Arabic in Burkina Faso is limited; but the product it is considered highly suitable for export. Therefore, policy incentives for this crop and the existence of a

³ The tariff is included here assuming that there should be a total transmission of it to the farmer as an incentive to produce. If this does not happen there is some additional disincentive going on in the value chain.

market development gap can be important. Data for this example was taken from the MAFAP Methodology paper (Annex 2), and from a value chain analysis prepared by CIRAD. Policy incentives are calculated by assuming transmission between domestic and world prices, and that prices refer to homogeneous goods, thus no quality adjustments take place. Observed market prices should be obtained as close to the farm gate as possible in order to see the policy impact for agricultural producers.

Given that gum Arabic is an exportable product, competition is assumed to happen at the border. Therefore comparisons between reference and observed prices have to be made there. The process here is to “take” the product as close to the farm-gate as possible from the port of export and undertake the relevant comparisons at the different levels between observed and reference prices either as absolute values (wedges) or ratios (nominal rates of protection). For an exportable product the benchmark price will be an international FOB⁴ price, as it is assumed to represent the opportunity cost.

International databases - such as the IMF International Financial Statistics, the International Trade Centre, the FAO or other organizations - do not report a reference world price for Gum Arabic. As an alternative, a reference export price for Burkina Faso was obtained from the European Union’s trade database COMEXT, which is the major importer of gum Arabic in the world absorbing 48% of total imports in 2009. This database does not provide prices but quantities and values. Using these, an implicit import unit values can be calculated dividing values by volumes. For the product named “gum Arabic” (PRODCOM code 130120), the average import price in the EU from Burkina Faso in 2004-2009 was 1.129 EUR per ton, while the average import price in the EU from all origins was 1.746. As this price is a CIF price, the difference can be attributed to difference in freight distance, insurance costs, quality⁵ and/or inefficient market functioning (monopsony power of buyers in BF). In this example it will be assumed that the difference is due to freight distance.

As the comparison has to be made using a FOB price, we need additional data to convert the CIF price into a FOB one. The MAFAP Methodology paper reports a FOB price of 818 EUR per ton in 2007, which compares to a CIF price from COMEXT for the same year of 834 EUR per ton. Assuming that the ratio CIF/FOB for 2007 is representative of the ratio for the whole period 2004-2009, the average FOB price for Gum Arabic in Burkina Faso for 2004-2009 can be estimated at 1.107 EUR per ton ($1.129 * (818/834)$). This will be our **benchmark price**. As there is no need to adjust the benchmark price due to distortions in international markets, this will also serve as our **reference benchmark price**. If distortions in international markets existed, these should

⁴ Free on Board, cost of an exporting good at the exit point in the exporting country, when it is loaded in the ship or other means of transport in which it will be carried to the importing country.

⁵ For example in Sudan the following grades/qualities exist on the basis of color, clarity and cleanliness: a) handpicked selected or HPS (selected sorts) - This ensure a pale uniform color and freedom from extraneous material; b) cleaned and sifted (cleaned sifted sort) - This is what is left after the handpicked selected is taken away and the siftings are removed; c) cleaned (cleaned amber sorts) - This is the standard grade used throughout the world. Here, siftings are still present, but the dust is removed; d) siftings - This is the material originated from the production of cleaned and sifted. It comprises of fine particles of gum with a proportion of fine bark and sand; and e) dust - This is produced from the cleaning process. It comprises of very fine particles of gum, sand and clay/earth.

be taken away (if the price in BF was higher due to these distortions), or added (if the price in BF was lower) to the benchmark price in order to obtain the reference benchmark price.

CIF and FOB Prices of Gum Arabic imported to the EU from Burkina Faso

Year	2004	2005	2006	2007	2008	2009
CIF (€/ton)	957	1,928	1,139	834	805	1,112
FOB (€/ton)	938*	1,891*	1,117*	818	789*	1,091*
Border Price (FCFA/ton)	449,302	905,789	535,043	391,822	377,931	522,589

* estimated using the CIF/FOB ratio for 2007

Source: COMEXT and MAFAP methodology paper

To convert the benchmark price into a border price (in local currency) we need to use an exchange rate. As mentioned in the example for rice, the exchange rate in BF is not distorted, and thus the equivalence between FCFA and EUR of 479 can be used. The average **border price** for the period 2004-2009 would thus be 530,413 FCFA per ton. As there is no explicit policy intervention in the exchange rate, this will also be our **reference border price**.

To obtain the landed price we need to correct this price with any explicit tariffs or border restrictions. In the case of Gum Arabic in Burkina Faso, there are no known explicit trade interventions and thus the reference border price and the **reference landed price** are equal. However as it can be seen in the table below, observed landed prices (i.e. the FOB price paid to local producers) differ and the observed landed price in this case should be taken from direct observation.

Next we need to see what the transport, storage, handling and marketing rates are between the border and point of competition. For this product we can assess the incentives and disincentives at two points in the value chain, the wholesale market and the farm gate. The **observed market price at different steps of the value chain** for gum Arabic in Burkina Faso is available from the CIRAD report. These prices are reflected in the following table.

Price in FCFA per ton of gum Arabic in Burkina Faso at different market stages.

Source	Landed	Wholesale	Farm-gate
CIRAD (2010)*	400,000	350,000	200,000

* Gautier, D.; Ouedragogo, G.G.; Badini, Z. (2010). *Rapport filière gomme Arabique*. Programme d'Appui au Développement de l'Agriculture du Burkina Faso, Phase II, CIRAD.

The first thing to highlight here is that although there is no explicit tariff we have an observed landed price and a reference landed price that differ. Thus even though there is no direct policy intervention at the border there is some kind of **border policy wedge**. This can be estimated as the difference between these two prices which is -130,413 FCFA and the **nominal rate of protection due to border policy** would be -0.25 (the wedge divided by the reference price).

Going further down the market access path, to compare our reference price to these observed prices we need to add the transport, storage, handling and marketing costs from wholesale to the border. The reference benchmark price needs to be corrected for quality and externality factors as well as for any quantity losses that might occur during the transport. All data should be obtained from local sources (i.e. producers, dealers, official boards, etc.) Reference prices down the value chain are obtained subtracting marketing, handling, storage and transport costs (market access costs). However if there is evidence that observed cost and efficient costs are not the same only the latter are used to obtain reference prices. If this is not done, estimates of policy impacts not directly related to agriculture (i.e. monopoly power in haulage, insufficient transport infrastructure) but with an impact on agriculture would not be captured⁶. If no data on market access costs are available these can be approximated by the observed differences in prices between different market levels (i.e. wholesale versus export) or transport costs.

In the case of Burkina Faso, both approaches are possible as information on market access costs is obtained from the MAFAP methodology paper and on different prices along the value chain from the CIRAD methodology paper. The market access cost from landed to wholesale is 50,000 while the efficiency component is 80%. Thus the observed wholesale price would be 530,413 minus 50,000. For reference prices we need to consider the reference landed price and that only 80% of this cost can be considered efficient and is the part to be deducted to obtain the reference price. Thus our **observed wholesale price** is 350,000 FCFA per ton and our **reference wholesale price** 490,413 FCFA per ton (see table).

BENCHMARK PRICE c.i.f. (EUR/t) (average 2004-2009) = INTERNATIONAL BENCHMARK PRICE	1,107
xOfficial exchange rate (FCFA/EUR)	479
Border Price (FCFA/t)	530,413
+custom duties (WTO tariff profiles)	0
LANDED PRICE (observed in country)	400,000
REFERENCE LANDED PRICE	530,413
Market access costs from export port to	50,000

⁶ The whole methodology is based in comparing reference and observed prices. If observed market access costs are considered and there is evidence that these are not efficient there would be no difference between observed prices and the reference used as benchmark for the calculations.

wholesale (FCFA/t)	
Efficiency component of market access costs (export port to wholesale) [80%]	40,000
OBSERVED (CALCULATED) WHOLESALE PRICE	350,000
REFERENCE WHOLESALE PRICE [reference landed price minus efficient component of market access costs to wholesale]	490,413
Market access costs from wholesale to farm gate (FCFA/t)	150,000
Efficiency component of market access costs (wholesale to farm gate) [60%]	90,000
OBSERVED (CALCULATED) FARM GATE PRICE	200,000
REFERENCE FARM GATE PRICE [reference wholesale price minus efficient component of market access costs to farm gate]	400,413

The **total wedge at wholesale level** would be the difference between the reference price and the observed price at that level - 140,413 FCFA per ton and the **nominal rate of protection at whole sale level** would be -0.26.

The market access costs from wholesale to farm gate can again be obtained from the same sources. In this case the market access cost is 150,000 FCFA per tonne and the efficiency component 60%. Thus the **calculated farm gate price** would be 330,413 FCFA (480,413 – 150,000) and the **reference farm gate price** would be 400,413 FCFA (490,413 – 90,000). The total wedge at farm gate level would be the difference between the reference price and the observed price 200,413 and the nominal rate of protection at the farm gate level would be -0.38.

Total Wedge	-200,413	Total NRP	-0.38
Border wedge	-130,413	Border NRP	-0.25
Quality wedge	0	Quality NRP	0
Externality wedge	0	Externality NRP	
Efficiency wedge	-70,000	Efficiency NRP	-0.13
<i>Border-wholesale</i>	<i>-10,000</i>	<i>Border-wholesale</i>	<i>-0.01</i>
<i>Wholesale-farmgate</i>	<i>-60,000</i>	<i>Wholesale-farmgate</i>	<i>-0.12</i>

From this example we can then conclude that there is a strong disincentive to gum Arabic production in Burkina Faso, most of which is related to border price issues not related to explicit policy interventions.

4.4 Example of calculation of incentives and disincentives for a non-traded product: cassava in Tanzania

This section offers an example of how the project intends to approach the analysis of incentives, disincentives and the so called market development gaps for non-traded products. At this stage, the questions posed are more than the answers provided. A meaningful measurement requires an in depth knowledge of markets and households' behavior as well as specific information. These will need to be worked out with partner institutions at country level. It should be noted that if the non-traded product is the first step on a value chain where processed products are traded, then an analysis as the one presented in section 4.5 would be applied.

The example offered is that of cassava in Tanzania. Cassava is the second most important food staple in the country, after maize, accounting for 15 percent of the average caloric intake. Only 31 percent of total cassava production is marketed, while the rest is own-consumed in rural households – according to the IFPRI Social Accounting Matrix of 2001. This share reflects a country average, which is widely variable; for instance, only 17 percent of production is reported to be marketed in Mtwara, the region in the Southeast corner of Tanzania (Minot, 2010). Given the importance of this staple in consumption, especially for subsistence rural households, it is important to understand the extent to which cassava production is subject to incentives or disincentives arising from policies and/or the degree of market development.

Tanzanian cassava is hardly traded internationally. Domestic markets are supplied with locally produced fresh cassava - which is highly perishable – as well as cassava flours and chips, which are different forms of dried products with a longer shelf life compared to the fresh roots. But the bulk of production seems to be consumed within the household.

As suggested above, meaningful wedges and Nominal Rates of Protection (NRPs) cannot be computed following the approaches described above, despite the existence of international reference prices – such as those resulting from exports from Brazil or Thailand and reported in the FAO Food Outlook. Given the absence of international trade registered for Tanzania these prices would not be relevant to Tanzanian farmers. At most, if prices for Brazil and Thailand prove to be comparable in terms of products' characteristics and type of markets with those available for Tanzania, the policy analyst may run rough comparisons of competitiveness.

Theoretically, estimating rates of protection as presented in the two former examples is only possible when the commodity concerned is actually traded. For a non traded product, ideally the policy analyst would refer to the concept of equilibrium price used as a reference point (i.e. the point at which demand and supply are equal in absence of policy interference, which is replaced by an international market price for traded products) and would practically estimate the rate of protection by comparing actual consumer and producer prices with this equilibrium price. However, due to the difficulty in estimating this equilibrium price ad hoc approaches, as those described below, are needed.

Measures of incentive/disincentive to cassava production can be searched in two different directions. Firstly, by comparing production costs and market prices, and trying to understand from such comparison the reason for the limited extent of the market. Primary areas to explore are market access and transaction costs; lack of development of a value chain to assure tradability; or lack of competitiveness where a high level of production costs compared to market prices may lead to production only using marginal land and workforce for self-consumption. If this path is chosen, the proposed framework for analysis (comparison of reference and observed prices) cannot be applied.

Secondly, the presence of incentives or disincentives may be searched through substitutes in both production and consumption, based on the assumption that any policy intervention in the market of substitute goods will affect the opportunity cost of producing or consuming cassava. Incentives to produce cassava for the market may be affected, for instance, by a policy which affects the maize market, assuming that this product can substitute cassava. A policy that increase maize prices, for instance, or one that lowers maize production costs, may result in an incentive to produce cassava. Or a policy that lowers market price for maize may displace cassava consumption. The detailed methodology follows.

Following the option of calculating costs, one recent computation is reported in a 2009 paper by Mnenwa (Leuven University) for the Mkuranga District. Data seems to indicate very low production costs: total “production and marketing” cost are reported at 24,410 TSh per tons, corresponding to 18.4 US \$ per ton at the official exchange rate of 2009 (1,327 TSh, from the IMF International Financial Statistics).

Benchmark prices for Cassava – or proxies for prices, such as unit values - which can be found in international datasets are all above 65 US \$ per ton⁷. This would indicate a considerably wide mark-up over production costs observed at farm level, which need to be explained. As the product is not-traded the logic behind taking the product to the border or to the farm gate using observer and reference prices (i.e. marketing margins, etc.) cannot be undertaken as it would not reflect the reality of the product. Other analysis is needed. It seems possible, for instance, that spatial arbitrage requires covering times and distances which prevents the marketing of fresh cassava. Or that the quality of cassava produced in Mkuranga – the area in which the example found refers - is not suitable for consumption outside the specific community. Last, but not least, cost data reported in this study could be of little quality; they certainly do not seem widely representative. Thus a detailed analysis would be needed to better understand what the situation of this crop is.

As for substitute products, two competing effects may operate. Firstly, a substitution effect for production factors (mainly labor and land). If maize has a positive (negative) nominal rate of protection this means that observed market prices for maize are higher (lower) than the reference price (adjusted as need be). If this is the case more (less) land will be allocated to maize and less (more) to cassava. This reduces (increases) overall availability of cassava and increases (decreases) its prices. Secondly, there may be

⁷ Fresh cassava prices have been obtained from FAOSTAT (implicit prices for Tanzania and neighbouring countries), CountrySTAT prices for Tanzania and GIEWS (for neighbouring countries). GIEWS also provided prices for cassava derivatives (flour and meal).

a substitution effect in consumption. Again if maize has a positive (negative) nominal rate of protection less (more) cassava will be consumed and its price will raise (decrease). The magnitude of the changes depends on cross-price elasticities of supply and demand for both products.⁸ But in principle one could consider that a positive NRP for the close substitute would result in increased prices for cassava, and therefore some kind of policy intervention too. However there may be also an effect on land allocated to cassava via subsistence agriculture. If the price of maize is high then farms in addition to buying more cassava can also allocate more land to cassava to assure that they have staple food available for self-consumption.

From the Table below, the price cost margin seems to be higher for cassava than for maize; the calculation was made with similar proxies for prices and similar sources for costs. This would give an indication that there is some kind of market gap in cassava, if not more land would be allocated to cassava as the price to cost ratio is higher.

As for the level of incentives and disincentives for maize, the WB DAI project maize shows a negative and small rate of assistance (-1.1 percent for the period 2000-2004) a finding that remains valid today due to occasional export bans for maize that makes maize prices lower and more volatile than in perfect markets – as argued in a 2010 IFPRI report by N. Minot. Under the above framework, the expansion of land allocated to cassava in Tanzania and the fact that still only a minor part of the production is marketed would indicate that the lack of income opportunities from maize and its substitution for cassava outweighs the potential reduction in land allocated to cassava due to the cheap availability of maize. However, this assumes that maize is available as a commodity in rural areas, if this is not the case then only the first effect would be in place.

Production costs and prices. Tanzania 2009			
	cassava	maize	
production cost	175752		
yield Kgs	7200	1187	
yield (tons)	7.2	48321	
cost per ton	24410	36.41	
cost US\$ (US\$/ton)	18.39		
reference prices (US\$/ton)		107.2	
FAOSTAT 2008 US\$/ton	66.6	323	
price over cost	3.6	2.9	
Source: Mnenwa (2009)			

⁸ In a 2009 paper by Leyaro (University of Nottingham), the symmetry constrained cross-price elasticity for consumption between “starch, roots and tubers” and “cereals, grains” is 0.10. This means that a 1 percent increase in maize prices would increase by 0.1 percent the demand of cassava.

4.5 Example of calculation of incentives and disincentives along a national value chain: sugarcane

Sugar cane is a product where considering the value chain can be of interest for the analysis of incentives and disincentives. Farmers grow sugarcane while markets buy processed sugar, and policies can have different impacts for farmers and processors as their capacity to influence policy is different. Below is a description of how protection measures, such as a tariff, can affect stakeholders along a value chain. It shows that incentives and disincentives may not spread proportionally; and that different indicators and calculation criteria can affect results. Where value chains are articulated in several steps entailing complex cost structures, Nominal Rate of Protection (NRPs) may no longer be efficient policy indicators; and incentives and disincentives need to be cast in terms of effective protection.

In this case MAFAP will use as an indicator the Effective Rate of Protection (ERPs). ERP allow tracing how distortions are transmitted via input markets among stakeholders along the value chain. A homogenous rate of protection across stakeholders corresponds to the assumption that markets are fully competitive; hence no stakeholder has the power to determine the rate of pass through of protection to others. The issue of market power is best assessed using the Cost Benefit Ratio (CBR) as it allows tracking changes in profit distribution along the value chain even when the ERP remains unchanged.

In order to remove this assumption, price gaps with respect to a reference need to be collected at all relevant levels, to verify the extent of the transmission of protection from upstream to downstream stakeholders. In this example we consider for the same value chain two products, sugar cane which is not traded and sugar which is traded. Sugar cane is an input in the production of sugar. The reference price for a traded product is computed on the basis of border prices, while for non- traded products the computation has to be done on the basis of input opportunity costs and substitute products. Moreover, when a stakeholder passes on some (positive or negative) protection to another in the value chain, this transfer may not be well captured by standard indicators such as the Effective Rate of Protection (ERP). This is particularly true when there are non-traded inputs in the value chain. There is therefore a need to add another indicator to the ERP to measure the degree of pass-through. The indicator proposed for this objective is the CBR.

Consider, as in Table 1 below, the production chain of sugar, and two stakeholder groups: sugarcane producers and sugar producers. For each we compute a Policy Analysis Matrix (PAM) and assume that the cost of sugarcane enters the PAM of sugar producers - sugarcane being one of the inputs of sugar production - split in a tradable and a non-tradable component, as it results from the PAM of the sugarcane producer.

Table 1. Policy Analysis Matrix -baseline

<i>A. Sugarcane producers</i>					<i>B. Sugar producers</i>				
	REVENUES	COSTS		PROFITS		REVENUES	COSTS		PROFITS
		Tradable Inputs	Domestic Factors & Not traded inputs				Tradable Inputs	Domestic Factors & Not traded inputs	
Observed Market Prices	120	30	80	10	Observed Market Prices	1000	200+30=230	500+80+10=590	180
Reference Prices	110	40	70	0	Reference Prices	800	200+40=240	500+70=570	-10
Gap	10	-10	10	10	Gap	200	-10	20	190

Non-traded products enter as inputs in the PAM of traded products following the assumption that the cost of the former is split into its tradable and non-tradable components, as it results from its PAM. This criterion, which is common and consistent with other PAM assumptions, can hide shifts of protection between the downstream (traded) and the upstream (non-traded) products. The two PAMs are the following:

The numbers in blue color derive from the PAM of sugarcane producers. Panel A and B of the table above show that sugarcane producer and sugar producer enjoy both higher revenues and higher profits than what they would enjoy under perfect competition and without any policy. This is due to the fact that domestic market prices are higher than the references prices of both sugarcane and sugar.

We can now simulate different policy interventions and how they affect the PAM accounts. Assume that some under some “*policy scenario*” sugarcane producers are able to sell to sugar producer at a higher price (i.e., 130), thus reducing the profits of sugar producers, The PAMs under this policy scenario is shown in Table 2 below and the Effective Rates of Protection (ERP)⁹ are displayed in Table 3.

Table 2. Policy Analysis Matrix – policy scenario

A. Sugarcane producers					B. Sugar producers				
	REVENUES	COSTS		PROFITS		REVENUES	COSTS		PROFITS
		Tradable Inputs	Domestic Factors & Not traded inputs				Tradable Inputs	Domestic Factors & Not traded inputs	
Observed Market Prices	130 A	30 B	80 C	20 D	Observed Market Prices	1000 A	200+30=230 B	500+80+20=590 C	170 D
Reference Prices	110 E	40 F	70 G	0 H	Reference Prices	800 E	200+40=240 F	500+70=570 G	-10
Gap	20 I	-10 J	10 K	20 L	Gap	200 I	-10 J	30 K	180 L

Table 3. Effective Rate of Protection: Summary table

	SUGARCANE PRODUCERS	SUGAR PRODUCERS	WHOLE VALUE CHAIN
BASELINE	29%	37%	37%
POLICY SCENARIO	43%	37%	37%

⁹ Note that the ERPEPC is computed as $(120-30)/(110-40)$

The ERP of the sugarcane producer in the policy scenario is higher than that in the baseline because part of the protection of the sugar producer has been transferred to sugarcane producers. But this transfer is not captured by the ERP of sugar producers, which is unchanged, despite their profits have decreased.

A more accurate indicator in these conditions is a Benefit Cost Ratio¹⁰, which can also be computed at both market and reference prices. As shown in Table 4, BCR in the alternative scenario increases for the sugarcane producer and decreases for the sugar producer, thus capturing the fact that profits of sugarcane producers have increased at the expenses of those of sugar producers.

Table 4. Benefit - Cost Ratio at observed and reference prices

	SUGARCANE PRODUCERS		SUGAR PRODUCERS	
	Baseline scenario	Policy Scenario	Baseline scenario	Policy Scenario
At observed market prices $[A - (B+C)] / (B+C)$	9%	18%	21%	20%
At reference prices $[E - (F+G)] / (F+G)$	0%	0%	2%	2%

4.6 Example of measurement of public expenditures including aid flows in support of food and agriculture in Uganda

A public expenditure measure should be included if it generates monetary transfers in support of the agricultural sector, regardless of the nature, objectives or impacts of the measure. Monetary transfers in support of food and agriculture sector development may be provided in two forms: actual budgetary transfers (such as production subsidies) and the revenue forgone by the government (such as tax concessions). Both types of transfers should be included in the calculations. As far as targeting is concerned, they can be direct to individuals, farmer groups or the sector as a whole. This section demonstrates some of the most important steps in the measurement of public support to agriculture, based on an example on Uganda.

First one must identify the main actors involved in public spending in the food and agriculture sector. Much of the expenditures that are important for the agricultural sector may occur outside the agricultural ministries and institutions; therefore the first step is to identify the main actor(s) responsible for public expenditure in agriculture. In the case of Uganda, many programmes under the Programme for the Modernisation of Agriculture, that has shaped public expenditures over the past decade, are managed by ministries that are not directly linked to agriculture. Overall, the most important ministries involved in public spending on agriculture include:

- the Ministry of Agriculture, Animal Industry and Fishery (MAAIF), the main government body responsible for agriculture and four autonomous organisations:

¹⁰ The Benefit Cost ratio is computed as $[130 - (30+80)] / (30+80)$ at market prices and as $[110 - (40+70)] / (40+70)$ at reference prices.

National Agricultural Research Organisation (NARO), the National Agricultural Advisory Service (NAADS) Secretariat, the Uganda Cotton Development Organisation (UCDO) and the Uganda Coffee Development Agency (UCDA);

- at the local level, the District Agricultural Extension, NAADS and programs under Non-Sectoral Conditional Grant (NSCG);
- and ministries that are not directly linked to agriculture: the Ministry of Finance, Planning and Economic Development, Ministry of Energy and Mineral Development, Ministry of Works and Transport, Ministry of Local Government, Ministry of Water and Environment, Ministry of Health, Ministry of Education and Sports, Ministry of Tourism, Trade and Industry and even the Office of the Prime Minister.

Second one must split the public expenditure using the categories put forward for classification proposed in the methodology paper and summarized in Annex II. This classification is based on the economic characteristics of the different types of expenditure in order to facilitate an analysis of their potential economic effect. Among the secondary data sources at our disposal, only one document produced by the Government of Uganda (2008), contained information allowing for a breakdown of public expenditures as proposed in the MAFAP methodology. The document provided data on budget allocations¹¹ to 181 programmes under PMA pillars for three fiscal years: 2005/2006, 2007/2008 and 2008/2009. Ideally the analysis should be done both for budgeted and disbursed amounts, unfortunately, we did not find any information on actual expenditures at such a detailed level and therefore we had to base our analysis on budgeted amounts. The results are shown in Table 1.

Among agricultural-specific measures, most are in the general sector support category (Figure 2). The only policy transfers directed to individual agents in the sector are input subsidies provided to agricultural producers. Although officially the government has abolished most nationwide subsidies on inputs, subsidized inputs and livestock are increasingly channeled through development projects, such as Non-sectoral conditional grant (NSCG) and extension programmes, such as National Agricultural Advisory Service (NAADS) (World Bank, 2010). Other expenditures falling in the input support category are on-farm pest and disease control measures.¹²

Among the sector general support measures, the most important are extension services, absorbing on average almost half of the expenditures falling within that category. Other important investments include training and marketing. Agricultural research accounts only for about a fourth of what is allocated to extension and agricultural infrastructure receives even a smaller share.

Table 1. Public expenditures in support of food and agriculture sector in Uganda

¹¹ No information on transfers to agriculture in form of forgone revenue (e.g. tax concessions) was available, neither in this document nor in any other sources of information at our disposal.

¹² It is important to note here that we did not find any programme directed to other agents in the sector. Whether that is effectively the case in Uganda or whether this is because PMA framework does not cover transfers to consumers, traders, processors and/or input suppliers is unclear.

UGX billion			
	2005/06	2006/07	2007/08
I. Agriculture specific policies	198	243	346
<i>I.1. Payments to the agents in the agro-food sector</i>	35	43	75
I.1.1. Payments to producers	35	43	75
Production subsidies and payments to farmers via development projects	0	0	0
Input subsidies	35	43	75
<i>variable inputs</i>	23	32	56
<i>capital</i>	4	3	4
<i>on-farm services</i>	9	8	16
Income support	0	0	0
Other	0	0	0
I.1.2. Payments to consumers	0	0	0
I.1.3. Payments to input suppliers	0	0	0
I.1.4. Payments to processors	0	0	0
I.1.5. Payments to traders	0	0	0
I.1.6. Payments to transporters	0	0	0
<i>I.2. General sector support</i>	163	200	271
Agricultural research	29	27	49
Technical assistance	0	0	0
Training / agricultural education	16	19	19
Extension	83	109	136
Inspection (veterinary/plant)	0	0	0
Infrastructure	8	9	9
roads	1	2	3
irrigation	6	7	5
other	0	0	0
Storage/public stockholding	0	0	0
Marketing	27	36	58
Other	0	0	0
II. Agriculture supportive policies	153	199	203
Rural education	2	3	3
Rural health	49	27	14
Rural infrastructure	102	169	186
rural roads	65	93	109
water and sanitation	0	37	38
energy	34	33	32
other	3	6	7
III. Total expenditures in support of food and agriculture sector development (I+II)	351	442	549

Source: Own calculations based on Government of Uganda (2008)

Figure 2. Composition of agricultural-specific spending in Uganda, average 2005/06-2007/08

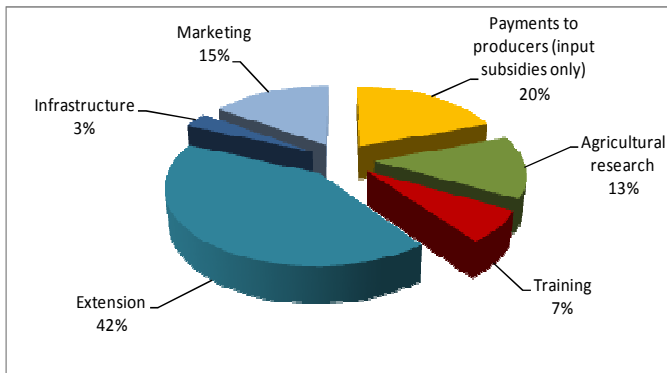
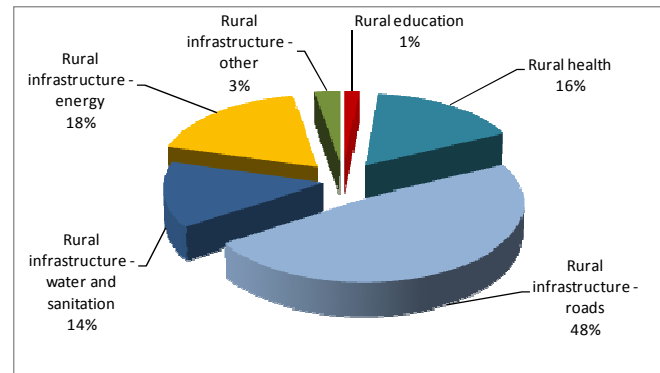


Figure 3. Composition of agricultural supportive spending in Uganda, average 2005/06-2007/08



Source: Own calculations based on Government of Uganda (2008)

The agriculture-specific measures are accompanied by expenditures on agricultural supportive policies, also referred to rural development policies, of an equivalent size. Among the latter, by far the largest investments are in rural infrastructure and particularly in rural roads, but also in rural energy and water and sanitation (Figure 3). There are also significant expenditures on rural health and a modest amount of spending on rural education. Whether this level of spending in agriculture supportive policies signifies pro-rural government expenditures depends on the overall expenditures in these areas, and hence the share that occurs in urban areas. Unfortunately, we could not obtain the latter piece of information and this cannot provide an answer to this question. However, this should be further investigated in the public expenditure sections of the in-depth reports.

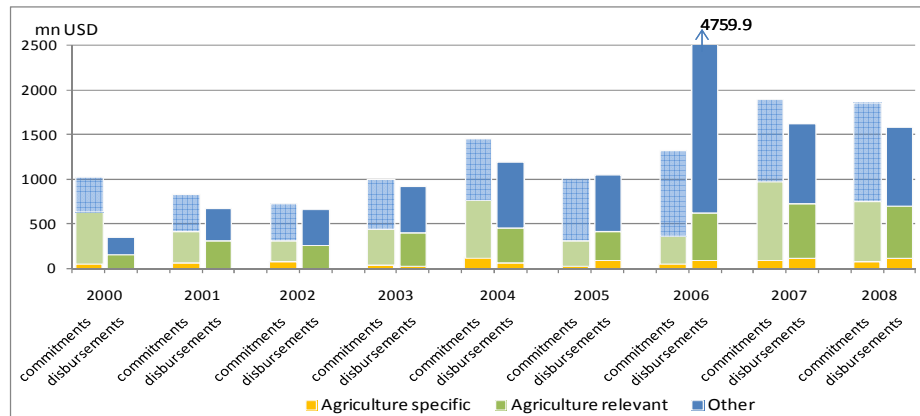
Public expenditures in Uganda have a particularly strong focus on agricultural extension and investments in rural infrastructure. This conclusion is slightly different than in other PER for other African countries that underlined insufficient investments in infrastructure; which by focusing exclusively on agricultural-specific expenditures may have neglected an important part of public investments which is in fact supporting the food and agricultural sector.

The analysis of government expenditures needs to be complemented with the analysis of the contribution of aid flows to the overall public expenditures on food and agriculture sector. The official aid flows to the agriculture sector (as defined by CRS database sector and purpose codes) in Uganda constitute a very small share of donors' commitments and hence disbursements (agriculture specific category in Figure 4). Although the disbursements of agriculture sector aid have been increasing since 2005, they account for only about 7% of overall disbursements in 2008.¹³ Nevertheless, there are numerous other sectors, or purpose codes, that may be of relevance to agriculture. Figure 4 shows the share of all sectors that potentially can be relevant for agriculture supportive spending. The share of the latter is much higher than that of agriculture-defined aid. Unfortunately, at the current stage of the project, we were not able to identify precisely how much of these potentially relevant flows indeed support the agriculture sector. This is because we would need to study individual aid project descriptions

¹³ Note that in 2006 the total disbursements were exceptionally high due to a significant debt relief.

carefully that were not available for many of the aid programmes found in the CRS database. In country work should aim to overcome this limitation. Further, given that we could not establish which projects contribute to agriculture sector development, we were not able to analyse the types of external aid (i.e. loans versus grants).

Figure 4. Agriculture relevant DAC commitments and disbursements in Uganda, 2000-2008 (mn USD)



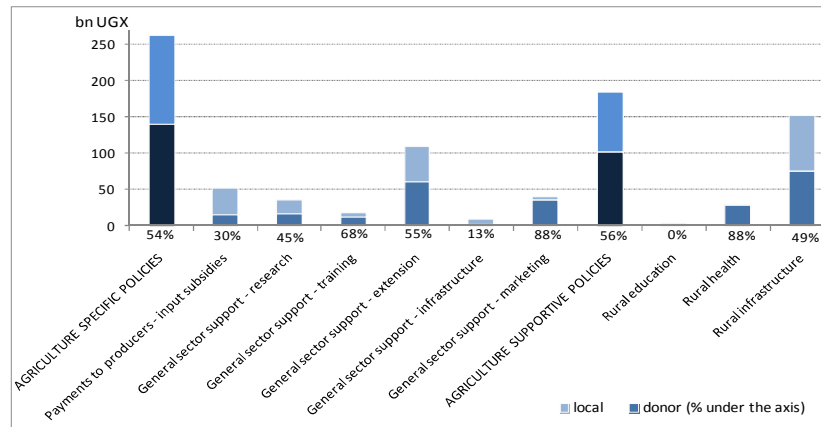
Source: CRS database

Although we were not able to establish exact amount of aid in support of agriculture based on the CRS database, the information on donor contribution to PMA spending was available in the document on PMA expenditures (Government of Uganda, 2008) used to analyze PMA spending by programme and classify the PMA expenditures as shown in the table 1 above. Figure 5 presents the average shares of donor-financed expenditures in the overall spending by classification category. On average, donor spending accounts for about half of overall public expenditures in support of the food and agriculture sector in Uganda. In this sense, although a small part of total overall aid it represents an important part of overall public expenditure in agriculture. Both agriculture-specific and agriculture supportive measures are half-funded by external aid. Within each of the main categories, the distribution of aid varies. Among agriculture-specific expenditures, in terms of proportion of total spending, donors contribute the most to marketing, training and agricultural extension. In terms of the level of spending, agricultural extension services receive highest support from external funds. Among agriculture-supportive expenditures, rural health and rural infrastructure receive the highest proportion of aid, while the highest amount of donor funding goes to rural infrastructure. Further, the latter category is the most donor-supported among all expenditures in support of the food and agriculture sector in Uganda. It is interesting to note that, based on available data, it seems that donors contribute relatively little to infrastructure, while they invest a lot of resources in more broadly defined rural infrastructure. Among all spending categories, rural education seems to be the only one that does not receive any external support.

An additional step for the analysis is to check whether public expenditure is in line with policy objectives. In general, given the available information, aid provided by donors to the government of Uganda seems to be consistent with overall government's objectives, although there are some differences in priorities. However, large donor

disbursements in Uganda are in the form of off-budget support. The 2007 PER of Uganda (OPM, 2007b) has estimated that if off-budget spending of the two main donors was taken into account it would amount to another 15-20% of agriculture-specific public expenditures.

Figure 5. Average shares of aid in total spending in Uganda, 2005/06-2007/08 (bn UGX)



Source: Government of Uganda (2008)

The PER team has concluded that these off-budget expenditures constitute an important obstacle to MAAIF's carrying out key functions and providing support to sectoral development goals as some donor agencies providing significant amounts of money operate completely independently. Clearly, off-budget expenditures play an important role in Uganda and whether overall, donors' contribution to investments in support of agriculture is indeed coherent with Ugandan government's policy objectives, depends crucially on how large they are and how they are spent. When such a situation happens additional efforts are needed to investigate how off-budget expenditures relate to government objectives. Unfortunately, given our limited access to information, we were unable to investigate further. In country insight seems a must, again, in this case.

4.7 Example of a topic for possible in-depth study: cotton in Burkina Faso and international value chains

In some cases it may be useful to consider looking beyond national value chains to better understand the incentives and disincentives faced by agricultural producers. Cotton is the main export crop of Burkina Faso, covering between 50 to 70% of the export revenues, depending on the years. The cotton Value Chain comprises three main stages: Primary production (seed cotton), ginning (cotton fibre), bailing and trading. Seed cotton is essentially a relatively small-scale farm activity (350,000 producers with 8 hectares on average) and is non-tradable internationally. Collection and ginning activities are organized as local monopsonies. Since 2004, a national law attributed to the former national monopsonist SOFITEX, a joint venture of the government Burkinabè with the state-owned French company DAGRIS, the local monopsonies in the west provinces of

the country. Two additional ginning companies were created and were attributed two local monopolies: the FASOCOTON and the SOCOMA, covering the central and eastern provinces respectively. FASOCOTON is controlled by the Swiss multinational company REINHART, one of the major cotton traders world-wide, while SOCOMA is controlled by DAGRIS.

The partial privatization of DAGRIS by the French government in 2008 shifted the control of DAGRIS, as well as SOCOMA, to the French holding GÉOCOTON. This company is controlled by ADVENS (51%), a French multi-national corporation which owns interests in agro-industrial, logistics and transport activities in Senegal and Mali, and participated by CMA-CGM (49%), the world's third-largest container shipping French company (APE 2008). These local monopsonies export their cotton mostly through REINHART and DUNAVANT (an American private-owned cotton merchandiser which is the largest in the world). REINHART, DUNAVANT as well as GÉOCOTON are, directly or indirectly via controlled companies, both cotton processors in various African countries and cotton traders.

Concerning the pricing mechanism, at the beginning of the season, the three monopsonists announce a floor price for the seed cotton, which is the 95% of the “*pivot price*”, a reference price based on the average international price of the cotton fibre of a given quality in the last five years (*Cotlook A index*), taking into account a technical conversion factor between seed cotton and cotton fibre (around 3:1) and some standard processing costs. During the campaign, farmers are paid the floor price at the delivery of the seed cotton, net of the cost of the inputs they received at the beginning of the campaign and related interest. At the end of the campaign, the “ex-post” price of seed cotton is calculated using the same criteria applied for the pivot price but this time, the an average campaign “*Cotlook A index*” is used instead of the 5-year average. If the “Ex-post” price is lower than the floor price, the monopsonists receive a compensating payment from a stabilization fund (“*fond de lissage*”). If the “ex-post” price of the seed cotton is comprised between the “floor price” and 101% of the “*pivot price*”, the monopsonists pay to the farmers the difference between the “ex-post” price and the “floor” price. If the “ex-post” price exceeds 101% of the “*pivot price*”, the part up to the 101% goes to farmers, while the part exceeding the 101% goes partly to the stabilization fund, partly to the monopsonists and partly to the farmers, according to an algorithm which considers the level of the surplus and the needs of the fund.

At the beginning of the season, the cotton companies act under uncertainty. They assume that, on average, a given output price for cotton fibre (P_e) will prevail in the markets where they operate. They will therefore announce a floor price for seed cotton close to P_e , in order to stimulate farmers to produce the quantity Q_e .

Under this market structure, three issues arise: 1) the cotton companies do not pay the producers on the basis of the price they actually receive by the international traders, but on the basis of an index (*Cootlook A*) that is, by construction, a systematic underestimate of the actual market prices. 2) This “*disincentive*” might translate almost exclusively in a reduction of their income, rather than also in a reduction of output, which would affect also the cotton companies. 3) The price actually received by the cotton company might not be the same price received by the international traders (net of a

“normal” trade commission) due to the fact that the sellers are directly or indirectly controlled by the traders¹⁴.

Companies and traders are indeed to a good extent two sides of the same economic subject, due to the substantial (if not formal) vertical integration between them. This vertical integration may constitute a constraint regarding the choice of the international trader¹⁵. This latter point, on conceptual grounds, presents some analogies with the classical “Principal-Agent theory”. Here the principal (the cotton company) relies on the services of the agent (the international trader) while having limited instruments to verify his performances. However, if the cotton company and the trader were completely different economic subjects, the first should be free to choose among traders, the one(s) which maximises the company’s revenue, i.e. who pays the highest price for cotton. On the contrary, in situations where the trader itself has a say on the choice of the trader by means of its control on the company itself, the company may not be free to maximize its revenue.

By lowering the prices paid to domestic companies below those actually received on international markets, foreign investors (i.e. the international traders) generate profits downstream, by shifting losses upstream. This market structure is translated to producers as lower seed cotton prices. All this translates in a further disincentive to producers which is not captured by the gap between the “official” international price and the price actually received by the producers.

In the MAFAP methodology, measures of incentives and disincentives on producers are essentially based on “price wedges”. In this example three wedges are calculated: total price wedge, border policy price wedge and residual price wedge. The Total wedge is the difference between the observed price received by domestic agents and a reference price. With the available data, total wedge can be decomposed in two parts: a “Border policy price wedge”, reflecting explicit or implicit trade policies (i.e. tariffs explicit or not, quotas, etc.), and a residual price wedge, calculated as residual, after subtracting from the Total wedge the Border policy wedge. This gives rise to the three indicators: Nominal Rate of Protection (NRP), Nominal Rate of Protection border policy (NRP – border policy) and Nominal Rate of Protection Residual (NRP residual). The table below reports the results of the calculations¹⁶.

¹⁴ The case of the cotton value chain in Burkina Faso requires further in depth analysis before coming to conclusive considerations. However, signals of possible collusion are quite apparent.

¹⁵ To this regard, the case of the FASOCOTON, controlled by REINHART, whose fibre is almost totally traded by REINHART is the most striking.

¹⁶ Some parameters have been set only for illustrative purposes. Although an explicit subsidy is not set in Burkina Faso, an implicit subsidy may come from the re-capitalization of the ginning companies in recent years.

Export

**Cotton fibre
in Burkina
Faso**

2007

a	Benchmark price	(FOB, US\$/ton)	1,409.19
b	Official Exchange Rate	OER	479.27
c	Premium	here OER = Shadow Exchange Rate	1.00
d=a*b	Observed Border price		675,382.5
d'=a*b*c	Reference border price		675,382.5
e	Tariff		- 10,000.00
f	export tax rate (ad valorem tax)		0.00%
g=d*f+ e	export tax		- 10,000.00
h=d'+g	Shipped price	Border - Tax	685,382.5
i	Observed Market access costs	Actual costs of: transport, handling, storage, margins	34,439.7
j	efficient component of market access costs		0.90
k=i*j	Efficient market access costs	(wholesale to border)	30,995.7
l=i-k	Excessive market access costs		3,444.0
n	Observed market price		640,943.0
o	Quality adjustment		1.00
p= n*o	Observed Quality Adjusted Parity Price	at wholesale level	640,943
q= d'+k	Adjusted Quality Reference Parity Price	BP+ efficient transaction costs (wholesale market level)	644,387

Price wedges	Total price wedge	Observed Quality Adjusted Parity Price - Adjusted Quality Reference Parity Price	- 3,443.8
	Border policy price wedge	Border Policy price wedge = tariff = -g	10,000.0
	Residual Price Wedge	Total price wedge - Border policy price wedge	- 13,443.8
	Nominal rate of protection	Total price wedge / adjusted quality reference parity price	- 0.0053
RATES	Nominal rate of protection - border policy	Border Policy price wedge / adjusted quality reference parity price	0.01552
	Nominal Rate of protection - residual	Residual price wedge / adjusted quality reference parity price	-0.0209

Under the assumptions contained in the table, the cotton fibre sub-sector is discouraged (NRP <0), although it is supported by an implicit policy (recapitalization of ginneries) signalled by a positive NRP border policy. However, most likely, in absence of the (implicit) policy, the gap between the reference price and the price enjoyed by domestic processors would be negative (residual price wedge = -13,433.8) as signalled by the NRP – residual policy <0). This market development gap arises from the fact that, in spite of the fact that the cotton is subsidized at 10,000 FCFA per ton, still the price enjoyed by processors is lower than the reference price at wholesale level (total price wedge = -3,443.8).

Regarding the incentives-disincentives received by the farmers producing seed-cotton, no benchmark and reference prices are available. Incentives or disincentives to farmers have to be calculated assuming some sort of “pass-through” mechanism of incentives-disincentives received by processors (traders) of cotton fibre to primary producers. Otherwise, the full analysis of processing and primary production has to be carried out and the private profitability of processors and producers has to be assessed. Therefore the calculations of the incentives-disincentives at the processor level has to be complemented by indicators of private profitability, i.e. profitability calculated at “observed” prices of inputs and outputs of processors and producers, to detect which agent actually suffers from the negative total wedge¹⁷.

In order to account for incentives or disincentives to producers derived from rents generated in global value chains, one needs to look both at the segment in the producing and exporting country as well as the segment in the importing one. In the MAFAP methodology paper detailed formulas on how to include this segment are provided. In this framework, the price received by the producer is expressed as function of the price paid by the final consumer P_c net of some processing, handling, transport costs, converted by an appropriate exchange rate whenever required and some fiscal charges, minus extra-profits (rents) of the up-stream (domestic) and down-stream (foreign) agents. On the one hand, the international price, (and the related FOB - CIF derived prices) becomes irrelevant for the calculation of incentives and disincentives to producers, provided that the above-mentioned variables have been determined. The international price becomes a simple device to transfer profits from upstream to downstream agents (or vice-versa) and/or an accounting element to calculate fiscal charges. On the other hand, all the other variables look relevant for policy monitoring, as all them are affected by existing policies, missing policies and/or policy changes in origin but also destination countries.

It is apparent that in the context of global value chain, specific investigation and analysis is required both for diagnosis and calculation performance-monitoring indicators. Concentration indexes and other indexes related to monopoly-monopsony rents are useful. However, information on agents, including trans-national ones, has to be worked out looking at different information sources, such as income statements, balance sheets, analysis of production processes, investigations on final markets for consumer prices and quantities etc. If the analyst wants to investigate incentives-disincentives arising to national producers by rent-seeking behaviour or other market imperfections in the international segment of the chain, the benchmark price to be used should be a “*internationally adjusted benchmark price*” embodying the rent component originated on international markets. In absence of relevant quantitative information, sensitivity tests based on qualitative information regarding the likelihood of rent-seeking behaviour and the magnitude of its impacts on prices should be carried out.

Indicators calculated with “modified” benchmark prices have to be used to inform policies which could modify the appropriation by the country of these rents, such as: negotiations of national agreements with international operators, regulations regarding transparency in accounting, income statements, custom operations, agreements on foreign

¹⁷ Refer to the sugarcane case in section 4.5 to address the issue of pass-through of incentives-disincentives and the joint use of protection indicators at value chain level and private profitability indicators.

investment and earnings repatriation etc. Omitting to consider whole global value chains and the way normal and extra-profits are generated and distributed along them would result in poor information to producers and consumers decision makers in both producing and consuming countries. This appears to be particularly relevant for commodities constituting the backbone of whole economic systems, or, at least the backbone of their international trade.

Annex I. Glossary of terms used for the analysis of incentives and disincentives.

I. Definitions of data needed for calculation of Reference Prices

- **Observed Benchmark Price** – This price reflects the market price for a product as a result of the functioning of international markets at the entry point of the domestic market. It would be a CIF price for imported products, a FOB for exported products; and a substitute or an implicit price for products which are not traded internationally.
- **Internationally Adjusted Benchmark Price** – If the observed benchmark price does not reflect an efficient functioning of international markets (i.e. prices at the entry point of the country are significantly lower or higher due to market power). This price is the result of correcting the CIF or FOB price based on assumptions on how the international markets and/or international agents distort the observed benchmark price.
- **Official Exchange Rate** – price of unit of foreign currency (FC) in which the observed benchmark price is obtained (usually USD) in terms of units of Local Currency (LC).
- **Shadow Exchange Rate** – In some cases the official exchange rate is fixed as a policy intervention itself. The shadow exchange rate, if lower than the official one, implies subsidies on imports and/or taxes on exports and vice versa. Shadow exchange rates can be obtained from informal market data or using international databases such as those of the IMF.
- **Tariffs** - Taxes levied on imports or exports. If quotas and other non-tariff barriers are in place, their tariff equivalent should be considered.
- **Share of Transfer of Tariffs** – In some cases tariff are not just taxes but also include the provision of some service (i.e. Phytosanitary or veterinary inspections). This figure reflects the share of tariffs that can be considered pure tax and is defined as a percentage of the tariff.
- **Market Access Costs** – Also referred to transaction costs and reflect all costs that are involved for the product to reach a specific point in the value chain (i.e. wholesale, retail, farm gate). They should include all concepts related to market access such as storage, handling, transport and the different margins applied by the economic agents.
- **Forex Components of the Market Access Costs** – This percentage shows the part of market access costs that need to be paid for in foreign currency.

- **Efficient Component of the Market Access Costs** – This percentage would reflect the difference between the observed market access costs and those that would prevail in an efficient functioning economy. They would reflect the inefficiencies that raise market access costs above an efficiency benchmark.
- **Quality Adjustment** – Difference in price that would cover the fact that the imported (or good trade in international markets if the product is exported) and local products are not exactly comparable. If the quality of the imported good is higher, then it would be deducted from it to make it comparable with the local good.
- **Production Externalities** - An externality is a cost (negative externality) or a benefit (positive externality) accruing to an agent who does not pay-a-price/receive-compensation for it and who is not involved in the decision process regarding the generation of such cost or benefit. Externalities may arise because of incompleteness of markets, undefined property rights, joint consumption/production activities. The value of these externalities has to be taken into account in order to make products comparable.
- **Observed Market Price** – This is price observed in domestic markets at a certain defined level in the value chain (i.e. farm gate, retail, wholesale). It is also the revenue in the Policy Analysis Matrix.
- **Budgetary and Other Payments (BOT)** – This component reflects a monetary item not specifically related to a commodity (or even an activity) but used in the context of the production. It has a positive value when it adds to revenue, negative if reduces revenue. It will be very difficult to identify a BOT used for a single crop, however when accounting for the whole incentive and disincentive structure of the agricultural sector, a BOT can be present.

II. Calculation of Reference Prices

The proposed methodology for calculating incentives and disincentives generates two sets of prices using the data from section I. Calculations start with the benchmark price, or the internationally adjusted benchmark price (see below).

- **Observed prices**
 - **Border Price** – The observed benchmark price in local currency obtained with the official exchange rate.
 - **Observed Landed/Shipped Price** – The border price plus tariffs or taxes observed.
 - **Parity Price** – The observed landed price plus the observed market access costs up to a certain point in the value chain.

- **Quality Adjusted Parity Price** – The parity price plus or minus the necessary quality adjustments.
- **Reference prices**
 - **Reference Border Price** – The observed benchmark price in local currency obtained with a shadow exchange rate.
 - **Reference Landed/Shipped Price** – The reference border price plus the non-transfer component of tariffs or taxes.
 - **Reference Parity Price** – The reference landed price plus the efficient component of market access costs up to a certain point in the value chain.
 - **Adjusted Quality Reference Parity Price** – The reference parity price plus quality adjustment up to a certain point in the value chain.
 - **Adjusted Quality and Externality Reference Parity Price** - The adjusted quality reference parity price plus quality adjustment up to a certain point in the value chain.

If there is need to calculate an internationally adjusted benchmark price, then the reference price family calculated using the internationally adjusted reference price (i.e. the price taking into account the market distortions at international level) generates a third set of prices which have the same name as the Reference price family but with the “internationally adjusted” prefix.

III. Policy Analysis Matrix

Policy Analysis Matrix (PAM) is a tool that allows examining the impact of policy by constructing two enterprise budgets, one valued at market prices and the other valued at social prices. The MAFAP logic also uses two sets of prices to examining the impact of policies (observed and reference prices) and therefore the PAM logic can be applied to it. The PAM provides an adequate method of measuring policy effects, competitiveness and economic comparative advantage or efficiency. Policies give protection or not, which can be measured by using nominal and effective protection rates as indicators. This framework is particularly useful in identifying the appropriate direction of change in policy. In the MAFAP particular attention is given, however, to competitiveness and economic efficiency in domestic resources by using a PAM framework.

The PAM here is based on seven price definitions¹⁸ and provides six cumulated balances (price wedges) and seven single factors. With this structure the following two levels of analysis are possible: absolute differences (price wedges) or relative differences (indicators).

1. First level of analysis for MAFAP (price wedges)

- **International price wedge** – Is the difference between the internationally adjusted reference border price and the reference border price. It reflects the incentive or disincentive due to the international context (what happens beyond the border).
- **Border Policy price wedge** - Is the difference between the landed price and the reference landed price. It shows the part of the incentive or disincentive due to policies at border (Incentive due to border policies).
- **Efficiency price wedge** – Is the difference between the parity price and the reference parity price minus the difference between landed price and reference landed price. This shows the incentives or disincentives due to infrastructural inefficiencies.
- **Quality price wedge** – Is the difference between the quality adjusted reference parity price and the reference parity price. It is the incentive from lower domestic quality (disincentive if the quality wedge is negative) NB: higher quality is a disincentive because raises the value to the society with respect to the observed price
- **Externality price wedge** - Is the difference between the quality externality adjusted reference parity price and the quality adjusted reference parity price. It shows the incentive or disincentive (if negative) from negative production externalities.
- **Residual price wedge** – Is the difference between the parity price and the observed market price. It indicates the incentive from other factors (disincentive if negative).
- **Total price wedge** - Is the difference between the observed market price and the adjusted reference price. In the case of the MAFAP it corresponds to the market development gap.
- **BOT** - is an incentive or a disincentive due to Budgetary and other transfers not directly related to a product or input.

¹⁸ (i) Benchmark price, (ii) Internationally adjusted benchmark price, (iii) reference border price, (iv) reference landed price, (v) reference parity price, (vi) quality adjusted reference parity price and (vii) quality and externality adjusted reference parity price.

- **Total Price wedge + BOT** – Is the difference between observed market price and the internationally adjusted quality externality adjusted reference parity price plus any BOT. It indicates the total incentives or disincentives which a product or group of products face in a particular country.

2. Second level of analysis (Indicators for MAFAP)

- **Nominal Rate of Protection (NRP)** represents the increase in gross revenue from sales of product or commodity relative to no policy situation. It is the difference between observed prices as a fraction of reference price. As with wedges, the MAFAP methodology aims at splitting the total NRP into different components.
 - **NRP total** - Is the total price wedge divided by the internationally quality externality adjusted reference parity price.
 - **NRP International markets**– Is the international price wedge divided by the internationally quality externality adjusted reference parity price.
 - **NRP Border** – Is the policy price wedge divided by the internationally quality externality adjusted reference parity price.
 - **NRP inefficiencies** - Is the efficiency price wedge divided by the internationally quality externality adjusted reference parity price.
 - **NRP Quality** - Is the quality price wedge divided by the internationally quality externality adjusted reference parity price.
 - **NRP Externalities** - Is the externality price wedge divided by the internationally quality externality adjusted reference parity price.
 - **NRP Residual** - Is the residual price wedge divided by the internationally quality externality adjusted reference parity price.
- **Nominal Rate of Protection on Inputs (NRPI)*** - Is the total price wedge on inputs divided by the internationally quality externality adjusted reference parity price of inputs. It shows how much domestic prices for tradable inputs differ from their social prices.
- **Nominal Rate of Assistance (NRA)** – Is the total price wedge plus BOT divided by the internationally quality externality adjusted reference parity price. This indicates an increase in revenue including payments not tied to production.
- **Effective Rate of Protection (ERP)*** - Is the division of the total price wedge plus BOT (output) minus the total price wedge plus BOT on tradable inputs and the observed market price (output) plus BOT and the observed market price of tradable inputs. It is a net incentive or disincentive from combined output and input incentives/disincentives.

* As with the NRP these indicators can be calculated at any point of the analysis (i.e. using the different reference and observed prices).

- **Domestic Resources Costs (DRC)*** - Is the internationally quality externality adjusted reference parity price of non tradable inputs minus the difference between the internationally quality externality adjusted reference parity price (outputs) and the internationally quality externality adjusted reference parity price on tradable inputs, and then the overall is divided by that same difference.
- **Benefit Cost ratio** – Is the observed market price plus BOT (outputs) minus the sum up of the observed market price plus BOT for tradable inputs and the observed market price plus BOT of the non tradable inputs, then the overall is divided by the same sum up. This benefit cost ratio can be computed at both market and reference prices. It allows capturing how protection spreads over agents (changing their profitability). If it is positive there is a positive private profitability.

IV. Taking into account the role of value chains in the analysis of incentives and disincentives.

Incentives-disincentives can vary along the different steps in a value chain. The MAFAP approach can be applied at any level of the value chain. A downstream agent in a value chain may receive by policies or missing policies incentives or disincentives to produce. Upstream agents could be affected by these incentives-disincentives, provided that some transmission mechanisms exist to convey incentives disincentives. Comparing the price wedges and indicators at different steps of the value chain allows identifying whether this happens or not.

Annex II. Glossary of terms used in the analysis of public expenditure.

Expenditure measures are classified *according to their economic characteristics i.e. they way they are implemented*, distinguishing between payments that are specific to agriculture and agriculture supportive payments. Within the agriculture-specific category, further distinction is made between support to producers and other agents in the value chain individually (payments to the producers, input suppliers, processors, consumers, traders, transporters) and to the agents in the sector collectively (general sector support). Public expenditures supporting individual agents are further disaggregated to distinguish the basis upon which support is provided e.g., in case of producers, a unit of output, variable input unit, a unit of capital or a unit of income.

The following classification is put forward, however it should be adapted if needed once we have a better understanding of the full picture of how public support is granted to agriculture in the selected countries.

I. Agriculture-specific policies – monetary transfers that are specific to agriculture sector i.e. agriculture is the only, or major, beneficiary of a given expenditure measure

1.1. Payments to the agents in the agro-food sector – monetary transfers to the agents of agro-food sector **individually**

A. Payments to producers – monetary transfers to individual agricultural producers (farmers)

Production subsidies and payments to farmers via development projects – monetary transfers to agricultural producers that are based on current output of a specific agricultural commodity

Input subsidies – monetary transfers to agricultural producers that are based on on-farm use of inputs:

- **variable inputs** (seeds, fertiliser, energy, credit, other) – monetary transfers reducing the on-farm cost of a specific variable input or a mix of variable inputs
- **capital** (machinery and equipment, on-farm irrigation, other basic on-farm infrastructure) – monetary transfers reducing the on-farm investment cost of farm buildings, equipment, plantations, irrigation, drainage and soil improvements
- **on-farm services** (pest and disease control/veterinary services, on-farm training, technical assistance, extension etc., other) – monetary transfers reducing the cost of technical

assistance and training provided to individual farmers

Income support – monetary transfers to agricultural producers based on their level of income

Other – monetary transfers to agricultural producers individually for which there is insufficient information to allocate them into above listed categories

B. Payments to consumers – monetary transfers to final consumers of agricultural commodities individually in form of:

- **food aid** – monetary transfers to final consumers reducing the cost of food
- **cash transfers** – monetary transfers to final consumers to increase their food consumption expenditure
- **school feeding programmes** – monetary transfers to final consumers providing free or reduced-cost food in schools
- **other** – monetary transfers to final consumers individually for which there is insufficient information to allocate them into above listed categories

C. Payments to input suppliers – monetary transfers to agricultural inputs suppliers individually

D. Payments to processors – monetary transfers to agricultural commodities processors individually

E. Payments to traders – monetary transfers to agricultural traders individually

F. Payments to transporters – monetary transfers to agricultural commodities transporters individually

1.2. General sector support – public expenditures generating monetary transfers to the agro-food sector agents **collectively**

Agricultural research – public expenditures financing research activities improving agricultural production

Technical assistance – public expenditures financing technical assistance agricultural sector agents collectively

Training – public expenditures financing agricultural training

Extension/technology transfer – public expenditures financing provision of extension services

Inspection (veterinary/plant) – public expenditures payments financing control of quality and safety of food, agricultural inputs and the environment

Infrastructure (roads, non-farm irrigation infrastructure, other) – public expenditures financing off-farm collective infrastructure

Storage/public stockholding – public expenditures financing public storage of agro-food products

Marketing – public expenditures financing assistance in marketing of agro-food products

Other – other transfers to the agro-food agents collectively for which there is insufficient information to allocate them into above listed categories

II. Agriculture supportive policies – public expenditures that are not specific to agriculture, but which have a positive impact on agricultural sector development

Rural education – public expenditures on education in rural areas

Rural health – public expenditures on health services in rural areas

Rural infrastructure (rural roads, rural water) – public expenditures on rural infrastructure

Other – other public expenditures on rural areas benefiting agricultural sector development for which there is insufficient information to allocate them into above listed categories