Updated Database of National and Global Distortions to Agricultural Incentives, 1955 to 2011

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This Note details the updates to the Distortions to Agricultural Incentives (DAI) database compiled initially by Anderson and Valenzuela (2008), based on the methodology outlined in Anderson et al. (2008). The original dataset covered half of the last century up to the year 2004 for developing countries and up to 2007 for high-income countries, and provided distortion indicators in agricultural markets for 75 high-income and developing countries and for a total of 75 agricultural products. That coverage accounted for two-thirds of the value of global agricultural production and consumption.

The present Update provides these indicators for the more-recent period up to 2011 for high-income countries, Europe's transition economies and a few large developing countries, and to 2010 for other developing countries. It also adds seven additional countries, namely Belgium, Cyprus, Greece, Israel, Luxembourg, Malta and Morocco, which expands the dataset to a total of 82 countries.

This Note provides information on how the distortion indicators have been updated for different country groups. Section (a) explains the methodology applied for countries where PSE spreadsheets are available from the OECD (2012). In Section (b) the update for the remaining developing countries is explained. For this part, data from FAO and the World Bank's pink sheets are used. The remainder includes tables summarizing the list of countries covered (Table 3), the coverage of products in each country (Table 4), the countries by product (Table 5), a concordance table for the products used to update the DAI database from FAO for trade, prices and production (Table 6), and in Table 7, a list of the variables in the authors' Excel spreadsheet (Anderson and Nelgen 2013).

(a) Update for OECD countries

The methodology applied to update the countries for which the OECD provides producer and consumer support estimates (PSEs and CSEs) up to 2011 is as follows. The data cover all OECD countries (with EU 27 treated by the OECD as a single entity), and a few large developing countries, namely Brazil, China, Indonesia, Kazakhstan, Russia, South Africa, and Ukraine. Additionally, this update also extends the coverage of other OECD countries, namely Belgium, Cyprus, Greece,

Israel, Luxembourg and Malta. Similar to the NRAs, the PSE estimates aim to capture the transfer that is made by government policies to the agricultural sector.

The aggregation of the EU 27 countries in the OECD files requires additional information to be downloaded from FAO to split the estimates for those countries into individual country and product estimates for the agricultural distortions database. FAO provides the production volumes for all of those countries at the product level, which is used together with information from OECD to provide estimates of national average NRAs and CTEs using the value of production and consumption at the country and product levels.

OECD provides a distortion measure entitled the producer nominal protection coefficient (PNPC), which is derived from the PSEs. The PNPC is the ratio between the domestic producer price received by farmers (including output transfers) and the border price, measured at the farm gate. It is therefore comparable to the NRA, which is calculated by comparing the domestic producer price plus the per unit transfer received for payments based on output and the border price:

$$PNPC_i=((PP_i+(PO_i/QP_i))/RP_i \quad (1)$$

where PP_i is the producer price of product i, PO_i is the output based transfer to product i (sub-category of A in the table 1), QP_i is the production volume of the product and RP_i is the reference price of product i. The output-based support is added in the numerator to account for direct supplements to the producer price on top of the market price support measures. To derive the NRAs from this measure, one simply needs to subtract unity from the ratio between the market price differential (producer price minus border price) and the border price, which is defined as the NRA. The NRA is based around zero, with negative values for negative support and positive values otherwise.

The NRAs aggregated by country can be refined using the aggregates section of the OECD data set. It is necessary to be particularly careful here, as changes in methodology have been applied by the OECD to this section of its database and the numbering of the different parts of the NRA equivalents has changed over time.

To update to 2011 the equivalent of the decoupled payments in the agricultural distortions data base by Anderson and Valenzuela (2008), three sets of payments are added up: payments based on current and non-current A/An/R/I1 where production is required, payments based on non-current A/An/R/I where production is not required, and payments based on non-commodity criteria (sections C, D, E, F in the last column of Table 1). These are multiplied by the PSE and converted to US dollars. With this dollar value of decoupled payments, the NRA can be calculated by dividing the result by the value of production at undistorted prices. Since the decoupled part of support in agriculture is steadily increasing in high-income countries, it is of particular importance to integrate this part of support, even though it is less market- and resource-distorting than other distortion measures. The different sub-categories of the PSEs have changed over time since they have first been published, as Table 1 demonstrates.

Non-product-specific distortions are accounted for by payments based on input use and miscellaneous payments (section B and G in Table 1), where the first part (accounted for by section B) is the non-product specific input share of the NRA. The same methodology as for the decoupled payments is used here to obtain the

additional distortion that can be added to the aggregated NRA measure at the country level. These different subdivisions of the OECD data allow deriving the different aggregated country level NRA measures that are provided in the DAI database by Anderson and Valenzuela (2008), dependent on the instruments used. There is the version that excludes non-product specific assistance and decoupled payments, the variable that include both, and one where non-product-specific assistance is included but decoupled payments are not. Since decoupled payments do not contribute to inefficiencies in the economy to the same extent as some other distortive measures and are mainly applied in high-income countries, for comparison purposes it is useful to be able to choose the measure that fits the purpose of the analysis (see Table 2).

The aggregated OECD PSEs expressed in percent are similar to the NRAs at the aggregate country level. Both measures include support to input products that are linked to agricultural input prices (e.g. import tariffs on inputs). The market price support component in the numerator of the percentage PSE is based on the market price differential between domestic and border prices. However, the base used to calculate the percentage level of support for PSEs and NRAs is different, as the NRA measure uses producer receipts valued at undistorted (border) prices whereas the PSE uses producer receipts valued at distorted domestic prices as its basis.

Table 1: Development of decoupled and non-product specific PSE categories over time, 1979 to 2011

	1979-85	1986-2004	2005-11
Decoupled Payments	• C. Direct Payments • E. General Services • F. Sub-national Payments • G. Other Payments	• C. Payments based on area planted/animals numbers • D. Payments based on historical entitlements • F. Payments based on input constraints • G. Payments based on overall farming income	• C. Payments based on current A/An/R/I, production required • D. Payments based on non-current A/An/R/I production required • E. Payments based on non-current A/An/R/I, production not required • F. Payments based on no-commodity criteria
NPS	• D. Reduction of Input Costs	• E. Payments based on input use • H. Miscellaneous payments	• B. Payments based on input use • G. Miscellaneous payments
NPS input	na	• E. Payments based on input use	• B. Payments based on input use

Source: Authors' compilation based on OECD (2012).

Table 2: Aggregate NRA variables derived from OECD files

nra_totp	NRA aggregate, excl. NPS
nra_tott	NRA aggregate, incl. NPS
nra_totd	NRA aggregate, incl. NPS and decoupled payments
decpay	Decoupled payments as a share of VOP
rra	RRA
nra_agtrad	NRA, agricultural tradables, incl. NPS
rra_decpay	RRA using a version of nra_agtrad that includes decoupled payments
nps	NPS, $US
nps_input	NPS to inputs, $US

Source: Authors' compilation.

The self-sufficiency ratios (SSRs) need to be calculated to define the trade status of each product. They can be calculated from OECD production and consumption volumes. A product will be defined as an exportable if the SSR as the ratio of production to consumption is greater than one, and as an importable if it is smaller than one.

(b) Update for remaining developing countries

The methodology used to update the NRA as an indicator of distortions to agricultural markets for the developing countries, where no OECD estimates were available, is based on data from the FAO (2013) and the World Bank (2012).[1]

For the update of national commodity level NRAs, the domestic producer price for each country's individual list of products, and the product-specific border price are collected (see table 3 for concordance of FAO and DAI products). The FAO recently made price, production and trade data available up to the year 2010 (2011 for production). Since border prices are not provided as such in the data set, they are calculated from trade values and volumes. This requires as a first step to define a product as an exportable product or an import-competing product. To do so, the self-sufficiency ratios (SSRs) of each country's list of products are assessed, using FAO's food balance sheets.[2]

However, in specific cases, the border prices computed with the trade data did not provide sensible results, often because small volumes of trade caused unrepresentative unit values. After identifying those cases, the border prices of the

[1] If both data sources are not able to provide (parts of) the data that are necessary for the update of a certain country and/or commodity and where national agency provide those data, the gaps are filled with the latter values. Taiwan is such an example.

[2] Since the food balance sheets only provide consumption and production data up to 2007, the SSRs are updated to 2010 in the following way: apparent consumption is calculated using production and trade data from FAO (2013) and SSRs are computed using the values of this calculation. To avoid breaks in the series, an index of those SSRs is used to update the SSRs of the remaining two years up to 2010 and to define the trade status from those.

affected country and product combinations were replaced with a reference price from the World Bank's Pink Sheets (World Bank 2013). The World Bank's Pink Sheet data also allowed filling some gaps by providing international reference price data where country-specific trade data are missing but production volume and prices were available.

FAO producer prices used for the purpose of the update are not as accurate as the more refined price data from national statistical agencies that were previously used in the data set of Anderson and Valenzuela (2008). An index methodology was applied for the update to smooth the breaks that could occur in the time series if the absolute values from FAO were to be used. The FAO domestic producer price in current US dollars for each country and product is converted into an index, and set at 100 for the last year for which there were domestic producer prices covered in the Anderson and Valenzuela (2008) database. The changes in this index are applied to the most recently available producer price to update each country's domestic price up to 2009 at the commodity level.

After the border prices are assigned to each country's products according to their trade status for each product, the same index methodology as used for the domestic price is applied to the border price.

Since the NRA can be simply defined as:

$$NRA = (Pd\_us/Bp)-1 \qquad (1)$$

with pd_us being the domestic producer price in current US dollars, and Bp being the border price in current US dollars, the data needed for the computation of commodity level NRAs by country are available.

As a next step, production volume data at the country and commodity levels need to be incorporated into the database to update the value of production at undistorted prices through multiplication of the border price and production volume. The value of consumption at undistorted prices can be added by using the formula:

$$voc\_prod = vop\_prod*(1+NRA)/(SSR*(1+CTE)) \qquad (2)$$

where vop_prod is the volume of production at undistorted prices.

Since the coefficient of correlation between the CTEs and the NRAs has been 0.9 over the whole of the Anderson and Valenzuela (2008) database, and with this value being identical to the correlation coefficient of the OECD's equivalent of CTEs and NRAs for the countries and years where the update is taken from the OECD spreadsheets,[3] it is not unreasonable to assume the CTEs to be identical to the NRAs for the developing countries' update, where more-detailed information is missing. This assumption seems reasonable when the OECD estimates for the updated years are split into developing countries and high-income countries: the correlation coefficient for the first set of countries is 0.98 and for the high-income countries it is 0.86.

Furthermore, the FAO's value of production data are used to calculate each country's coverage in terms of agricultural production for the updated years. This is

[3] The years after 2004 are used for developing countries of the OECD countries subset and after 2007 for the remaining countries to ensure a significant reflection of the correlation for both country sets. Japan has been excluded from those calculations as an extreme outlier.

needed to get an estimate for the non-covered part of each country's agricultural sctor. For the computation of the total value of production by country at undistorted prices, the covered value of production and the non-covered part are added up. In the case of developing countries that are updated using FAO (2013) and World Bank (2013) data, the total value of production at undistorted prices can be replaced by using the formula:

$$vop\_tot = vop\_covt/(percentcov/100) \quad (3)$$

where vop_covt is the covered part of the value of production and percentcov is the coverage ratio in percent, calculated from the value of production in current US dollars as an approximate measure for the coverage achieved in the updated years.

To get an estimate of the non-covered NRAs for this update, the assumption is made for NRAs of those products to be the same share of the covered NRAs as the 2000-04 average and the same methodology applies where the non-covered part of the production value at undistorted prices is missing.

The non-product-specific part of the NRAs is assumed to be zero in the updated years for the developing country group included in this update, since it is very small in the earlier period covered by Anderson and Valenzuela (2008).

Another important indicator to measure distortions in agriculture is provided by comparing the support to agricultural tradables and non-agricultural tradables. The indicator is called relative rate of assistance (RRA) and is defined as:

$$RRA= (1+nra\_agtrad)/(1+nra\_nonagtrad)-1 \quad (4)$$

where nra_agtrad is the NRA for agricultural tradables and nra_nonagtrad the NRA for non-agricultural tradables. To calculate this measure, non-agricultural tradables support is assumed to be unchanged since the last available year in the database.[4]

The high correlation between NRAs and CTEs indicates that most of the distortions in agricultural markets happen at a country's border. If there are no domestic distortions, the NRA is equal to the CTE. Because of the lack of more-detailed information by FAO, the NRAs for domestic support are assumed to be zero and the border measures for tradables are assumed to be equal to the product-specific NRAs in the updated years for developing countries. In those cases where the trade status is defined as non-tradable, the NRA is set to zero. The distinction between support to exportables or import-competing products is made according to the product's trade status.

To generate the country level aggregates, the value of production at undistorted prices for each product is used as a weight for all NRA measures and the value of consumption at undistorted prices is used for all CTE measures.

[4] An attempt was made to incorporate WTO manufacturing tariff rates in the update, but these were not sufficiently representative of the previous data series. There is thus scope for future work to find a more appropriate and comparable measure for the support to non-agricultural tradables for the updated years.

References

Anderson, K., M. Kurzweil, W. Martin, D. Sandri, and E. Valenzuela (2008), 'Measuring Distortions to Agricultural Incentives, Revisited', *World Trade Review* 7(4): 675–704.

Anderson, K. and S. Nelgen (2013), *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011*, Data spreadsheet at www.worldbank.org/agdistortions.

Anderson, K. and E. Valenzuela (2008), *Global Estimates of Distortions to Agricultural Incentives, 1955 to 2007*, data spreadsheet at www.worldbank.org/agdistortions

FAO (2013), FAOSTAT, Rome, at www.fao.org

OECD (2012), *Producer and Consumer Support Estimates, OECD Database 1986-2011*, http://www.oecd.org, accessed 30 September.

World Bank (2013), *Pink Sheets*, http://econ.worldbank.org, accessed 18 February.

Table 3: List of 82 countries in the updated agricultural distortions database

Sub-Saharan African developing
Benin
Burkina Faso
Cameroon
Chad
Côte d'Ivoire
Ethiopia
Ghana
Kenya
Madagascar
Mali
Mozambique
Nigeria
Senegal
South Africa
Sudan
Tanzania
Togo
Uganda
Zambia
Zimbabwe

Asian developing
Bangladesh
China
India
Indonesia
Korea, Rep. of
Malaysia
Pakistan
Philippines
Sri Lanka
Taiwan, China
Thailand
Vietnam

Latin American developing
Argentina
Brazil
Chile
Colombia
Dominican Republic
Ecuador
Mexico
Nicaragua

European transition & Mediterranean
Bulgaria
Czech Republic
Egypt, Arab Rep. of
Estonia
Hungary
Israel
Kazakhstan
Latvia
Lithuania
Morocco
Poland
Romania
Russian Federation
Slovak Republic
Slovenia
Turkey
Ukraine

Other high-income countries
Australia
Austria
Belgium
Canada
Cyprus
Denmark
Finland
France
Germany
Greece
Iceland
Ireland
Italy
Japan
Luxembourg
Malta
Netherlands
New Zealand
Norway
Portugal
Spain
Sweden
Switzerland
United Kingdom
United States

Table 4: Focus countries and covered products

Argentina	**Bangladesh**	**Burkina Faso**	**Colombia**	**Denmark**	**Ethiopia**
beef	jute	cassava	beef	barley	chat
maize	potato	cotton	coffee	beef	coffee
milk	rice	millet	cotton	egg	hides&skins
soybean	sugar	sorghum	maize	milk	maize
sunflower	tea	yam	milk	oat	oilseed
wheat	wheat	**Cameroon**	palmoil	pigmeat	pulse
Australia	**Belgium**	banana	rice	potato	teff
apple	barley	cassava	sorghum	poultry	wheat
banana	beef	cocoa	soybean	rapeseed	**Finland**
barley	egg	coffee	sugar	sheepmeat	barley
beef	maize	cotton	wheat	sugar	beef
cotton	milk	maize	**Cote d'Ivoire**	tomato	egg
egg	oat	millet	cassava	wheat	milk
grape	pigmeat	otherroots&tubers	cocoa	**Dom Rep**	oat
maize	potato	plantain	coffee	banana	pigmeat
milk	poultry	sorghum	cotton	bean	potato
oat	rapeseed	**Canada**	plantain	cassava	poultry
oilseeds	sheepmeat	barley	rice	coffee	sheepmeat
olive	sugar	beef	yam	garlic	sugar
orange	tomato	egg	**Cyprus**	onion	wheat
pigmeat	wheat	maize	barley	poultry	**France**
potato	wine	milk	beef	rice	barley
poultry	**Benin**	peas	egg	sugar	beef
rapeseed	cassava	pigmeat	milk	tomato	egg
rice	cotton	potato	oat	**Ecuador**	maize
sheepmeat	millet	poultry	pigmeat	banana	milk
sorghum	sorghum	rapeseed	potato	beef	oat
soybean	yam	soybean	poultry	cocoa	pigmeat
sugar	**Brazil**	sugar	sheepmeat	coffee	potato
sunflower	beef	wheat	tomato	maize	poultry
tobacco	coffee	**Chad**	wheat	milk	rapeseed
wheat	cotton	cassava	wine	pigmeat	rice
wool	maize	cotton	**Czech Rep**	poultry	sheepmeat
Austria	pigmeat	millet	**Czech Rep**	rice	soybean
barley	poultry	sorghum	barley	soybean	sugar
beef	rice	yam	beef	sugar	sunflower
egg	soybean	**Chile**	egg	**Egypt**	tomato
maize	sugar	apple	maize	beef	wheat
milk	wheat	beef	milk	cotton	wine
oat	**Bulgaria**	grape	oat	maize	**Germany**
pigmeat	barley	maize	pigmeat	milk	barley
potato	beef	milk	potato	rice	beef
poultry	egg	sugar	poultry	sugar	egg
rapeseed	maize	wheat	rapeseed	wheat	maize
sheepmeat	milk	**China**	sheepmeat	**Estonia**	milk
sugar	oat	cotton	soybean	barley	oat
sunflower	pigmeat	fruits	sugar	beef	pigmeat
wheat	potato	maize	sunflower	egg	potato
wine	poultry	milk	tomato	milk	poultry
	rapeseed	pigmeat	wheat	oat	rapeseed
	rice	poultry		oilseed	sheepmeat
	sheepmeat	rice		pigmeat	soybean
	soybean	soybean		potato	sugar
	sugar	sugar		poultry	Sunflower
	sunflower	vegetables		rye	tomato
	tomato	wheat		sheepmeat	wheat
	wheat			tomato	wine
	wine			wheat	

Table 4 (continued): Focus countries and covered products

Ghana	**India**	**Italy**	**Korea**	**Mali**	**Morocco**	**New Zealand**
cassava	chickpea	barley	barley	cassava	apple	barley
cocoa	cotton	beef	beef	cotton	banana	beef
groundnut	fruit&veg	egg	cabbage	millet	barley	coarsegrains
maize	groundnut	maize	egg	sorghum	beef	egg
plantain	maize	milk	garlic	yam	clementine	fruit&veg
rice	milk	oat	milk	**Malta**	egg	grape
yam	rapeseed	pigmeat	pepper	barley	maize	maize
Greece	rice	potato	pigmeat	beef	melon	milk
barley	sorghum	poultry	poultry	egg	milk	oat
beef	soybean	rapeseed	rice	milk	olive	othercrops
egg	sugar	rice	soybean	pigmeat	orange	pigmeat
maize	sunflower	sheepmeat	wheat	potato	potato	poultry
milk	wheat	soybean	**Latvia**	poultry	poultry	sheepmeat
oat	**Indonesia**	sugar	barley	sheepmeat	rice	wheat
pigmeat	coconut	sunflower	beef	tomato	sheepmeat	wool
potato	coffee	tomato	egg	wheat	soybean	**Nicaragua**
poultry	maize	wheat	milk	wine	strawberry	bean
rapeseed	palmoil	wine	oat	**Madagascar**	sugar	beef
rice	poultry	**Japan**	oilseed	cassava	tomato	coffee
sheepmeat	rice	apple	pigmeat	clove	wheat	groundnut
soybean	rubber	barley	potato	cocoa	**Mozambique**	maize
sugar	soybean	beef	poultry	coffee	bean	milk
sunflower	sugar	cabbage	rye	maize	cashew	poultry
tomato	tea	cucumber	sheepmeat	pepper	cassava	rice
wheat	**Ireland**	egg	sugar	rice	cotton	sesame
wine	barley	grape	tomato	sugar	groundnut	sorghum
Hungary	beef	mandarin	wheat	sweetpotato	maize	soybean
barley	egg	milk	**Lithuania**	vanilla	millet	sugar
beef	milk	onion	barley	**Malaysia**	potato	**Nigeria**
egg	oat	pear	beef	cocoa	rice	cassava
maize	pigmeat	pigmeat	egg	palmoil	sorghum	cocoa
milk	potato	poultry	maize	rice	sugar	cotton
oat	poultry	rice	milk	rubber	sweetpotato	groundnut
pigmeat	rapeseed	soybean	oat	**Mexico**	tobacco	maize
potato	sheepmeat	spinach	oilseed	barley	**Netherlands**	millet
poultry	sugar	strawberry	pigmeat	bean	barley	palmoil
rapeseed	tomato	sugar	potato	beef	beef	rice
rice	wheat	wheat	poultry	coffee	egg	sorghum
sheepmeat	**Israel**	**Kazakhstan**	rye	egg	maize	yam
soybean	apple	barley	sheepmeat	maize	milk	**Norway**
sugar	avocado	beef	sugar	milk	oat	barley
sunflower	banana	cotton	tomato	pigmeat	pigmeat	beef
tomato	beef	egg	wheat	poultry	potato	egg
wheat	cotton	maize	**Luxembourg**	rice	poultry	milk
wine	egg	milk	barley	sorghum	rapeseed	oat
Iceland	grape	pigmeat	beef	soybean	sheepmeat	pigmeat
beef	grapefruit	potato	egg	sugar	sugar	poultry
egg	groundnut	poultry	maize	tomato	tomato	sheepmeat
milk	milk	rice	milk	wheat	wheat	wheat
pigmeat	orange	sheepmeant	oat			wool
poultry	pepper	sugar	pigmeat			
sheepmeat	potato	sunflower	potato			
wool	poultry	wheat	poultry			
	sheepmeat	**Kenya**	rapeseed			
	tomato	coffee	sheepmeat			
	wheat	fruit&veg	sugar			
		maize	tomato			
		sugar	wheat			
		tea	wine			
		wheat				

Table 4 (continued): Focus countries and covered products

Pakistan	**Romania**	**Slovakia**	**Sri Lanka**	**Taiwan**	**Turkey**	**Ukraine**
cotton	barley	barley	chillies	beef	apple	barley
maize	beef	beef	coconut	egg	barley	beef
milk	egg	egg	onion	milk	beef	egg
rice	maize	maize	potato	pigmeat	cotton	maize
sugar	milk	milk	rice	poultry	egg	milk
wheat	oat	oat	rubber	rice	grape	oat
Philippines	pigmeat	pigmeat	tea	wheat	hazelnut	pigmeat
banana	potato	potato	**Sudan**	**Tanzania**	maize	potato
beef	poultry	poultry	beef	bean	milk	poultry
coconut	rapeseed	rapeseed	camel	cashew	potato	rye
maize	rice	rye	cotton	cassava	poultry	sugar
pigmeat	sheepmeat	sheepmeat	groundnut	coffee	rice	sunflower
poultry	soybean	soybean	gumarabic	cotton	sheepmeat	wheat
rice	sugar	sugar	milk	maize	sugar	**United States**
sugar	sunflower	sunflower	millet	millet	sunflower	barley
Poland	tomato	tomato	sesame	plantain	tobacco	beef
barley	wheat	wheat	sheepmeat	potato	tomato	cotton
beef	wine	wine	sorghum	pyrethrum	wheat	egg
egg	**South Africa**	**Slovenia**	sugar	rice	**Uganda**	maize
maize	apple	barley	wheat	sisal	bean	milk
milk	beef	beef	**Sweden**	sorghum	cassava	pigmeat
oat	grape	egg	barley	sugar	coffee	potato
oilseed	maize	maize	beef	sweetpotato	cotton	poultry
othergrains	orange	milk	egg	tea	groundnut	rice
pigmeat	poultry	pigmeat	milk	tobacco	maize	sheepmeat
potato	sheepmeat	poultry	oat	wheat	millet	sorghum
poultry	sugar	sheepmeat	pigmeat	**Thailand**	plantain	soybean
sheepmeat	sunflower	sugar	potato	cassava	rice	sugar
soybean	wheat	wheat	poultry	maize	sorghum	wheat
sugar	**Russia**	**Spain**	rapeseed	palmoil	sugar	wool
sunflower	barley	barley	sheepmeat	pigmeat	sweetpotato	**Vietnam**
tomato	beef	beef	sugar	poultry	tea	coffee
wheat	egg	egg	wheat	rice	**UK**	pigmeat
Portugal	maize	maize	**Switzerland**	rubber	barley	poultry
barley	milk	milk	barley	soybean	beef	rice
beef	oat	oat	beef	sugar	egg	rubber
egg	pigmeat	pigmeat	egg	**Togo**	milk	sugar
maize	poultry	potato	maize	cassava	oat	**Zambia**
milk	rye	poultry	milk	cotton	pigmeat	cotton
oat	sugar	rapeseed	oat	millet	potato	groundnut
pigmeat	sunflower	rice	oilseed	sorghum	poultry	maize
potato	wheat	sheepmeat	pigmeat	yam	rapeseed	millet
poultry	**Senegal**	soybean	poultry		sheepmeat	rice
rice	cotton	sugar	sheepmeat		sugar	sorghum
sheepmeat	groundnut	sunflower	sugar		tomato	soybean
sugar	millet	tomato	wheat		wheat	sunflower
sunflower	rice	wheat				tobacco
tomato		wine				wheat
wheat						**Zimbabwe**
wine						cotton
						groundnut
						maize
						sorghum
						soybean
						sunflower
						tobacco
						wheat

Table 5: Covered products and focus countries

Apple	**Barley**	**Beef**	**Cabbage**	**Coffee**	**Egg**	**Fruit&veg**
australia	australia	argentina	japan	brazil	australia	india
chile	austria	australia	korea	cameroon	austria	kenya
israel	belgium	austria	**Camel**	colombia	belgium	newzealand
japan	bulgaria	belgium	sudan	coted'ivoire	bulgaria	**Fruits**
morocco	canada	brazil	**Cashew**	dominicanrep	canada	china
rsa	cyprus	bulgaria	mozambique	ecuador	cyprus	**Garlic**
turkey	czechrep	canada	tanzania	ethiopia	czechrep	dominicanrep
Banana	denmark	chile	**Cassava**	indonesia	denmark	korea
australia	estonia	colombia	benin	kenya	estonia	**Grape**
cameroon	finland	cyprus	burkinafaso	madagascar	finland	australia
dominicanrep	france	czechrep	cameroon	mexico	france	chile
ecuador	germany	denmark	chad	nicaragua	greece	israel
israel	greece	ecuador	coted'ivoire	tanzania	germany	japan
morocco	hungary	egypt	dominicanrep	uganda	hungary	newzealand
philippines	ireland	estonia	ghana	vietnam	iceland	rsa
Bean	italy	finland	madagascar	**Cotton**	ireland	turkey
dominicanrep	japan	france	mali	australia	israel	**Ground nut**
mexico	kazakhstan	greece	mozambique	benin	italy	ghana
mozambique	korea	hungary	nigeria	brazil	japan	india
nicaragua	latvia	iceland	tanzania	burkinafaso	kazakhstan	israel
tanzania	lithuania	ireland	thailand	cameroon	korea	mozambique
uganda	luxembourg	israel	togo	chad	latvia	nicaragua
	malta	italy	uganda	china	lithuania	nigeria
	mexico	japan	**Chat**	colombia	luxembourg	senegal
	morocco	kazakhstan	germany	coted'ivoire	malta	sudan
	netherlands	korea	**Chick pea**	ethiopia	mexico	uganda
	newzealand	latvia	india	egypt	morocco	zambia
	norway	lithuania	**Chilies**	india	netherlands	zimbabwe
	poland	luxembourg	srilanka	israel	newzealand	**Gum arabic**
	portugal	malta	**Clove**	kazakhstan	norway	sudan
	romania	mexico	madagascar	mali	poland	**Hazelnut**
	russia	morocco	**Coarse grains**	mozambique	portugal	turkey
	slovakia	netherlands	newzealand	nigeria	romania	**Hides&skins**
	slovenia	newzealand	**Cocoa**	pakistan	russia	ethiopia
	spain	nicaragua	cameroon	senegal	slovakia	**Jute**
	sweden	norway	coted'ivoire	sudan	slovenia	bangladesh
	switzerland	philippines	ecuador	tanzania	spain	
	turkey	poland	ghana	togo	sweden	
	uk	portugal	madagascar	turkey	switzerland	
	ukraine	romania	malaysia	uganda	taiwan	
	us	rsa	nigeria	us	turkey	
		russia	**Coconut**	zambia	uk	
		slovakia	indonesia	zimbabwe	ukraine	
		slovenia	philippines	**Cucumber**	us	
		spain	srilanka	japan		
		sudan				
		sweden				
		switzerland				
		taiwan				
		turkey				
		uk				
		ukraine				
		us				

Table 5 (continued): Covered products and focus countries

Maize	**Mandarin**	**Millet**	**Oil seeds**	**Pig meat**	**Plantain**
argentina	japan	benin	australia	australia	cameroon
australia	**Milk**	burkinafaso	**Olive**	austria	coted'ivoire
austria	argentina	cameroon	australia	belgium	ghana
belgium	australia	chad	morocco	brazil	tanzania
brazil	austria	mali	**Onion**	bulgaria	uganda
bulgaria	belgium	mozambique	dominicanrepublic	canada	**Potato**
cameroon	bulgaria	nigeria	japan	china	australia
canada	canada	senegal	srilanka	cyprus	austria
chile	chile	sudan	**Orange**	czechrep	bangladesh
china	china	tanzania	australia	denmark	belgium
colombia	colombia	togo	israel	ecuador	bulgaria
czechrep	cyprus	uganda	morocco	estonia	canada
ecuador	czechrep	zambia	rsa	finland	cyprus
egypt	denmark	**Oat**	**Other crops**	france	czechrep
ethiopia	ecuador	australia	newzealand	greece	denmark
france	egypt	austria	**Other grains**	germany	estonia
greece	estonia	belgium	poland	hungary	finland
germany	finland	bulgaria	**Other roots&tubers**	iceland	france
ghana	france	cyprus	cameroon	ireland	greece
hungary	greece	czechrep	**Palm oil**	italy	germany
india	germany	denmark	colombia	japan	hungary
indonesia	hungary	estonia	indonesia	kazakhstan	ireland
italy	iceland	finland	malaysia	korea	israel
kazakhstan	india	france	nigeria	latvia	italy
kenya	ireland	greece	thailand	lithuania	kazakhstan
lithuania	israel	germany	**Pear**	luxembourg	latvia
luxembourg	italy	hungary	japan	malta	lithuania
madagascar	japan	ireland	**Peas**	mexico	luxembourg
mexico	kazakhstan	italy	canada	netherlands	malta
morocco	korea	latvia	**Pepper**	newzealand	morocco
mozambique	latvia	lithuania	israel	norway	mozambique
netherlands	lithuania	luxembourg	korea	philippines	netherlands
newzealand	luxembourg	netherlands	madagascar	poland	poland
nicaragua	malta	newzealand		portugal	portugal
nigeria	mexico	norway		romania	romania
pakistan	morocco	poland		russia	slovakia
philippines	netherlands	portugal		slovakia	spain
poland	newzealand	romania		slovenia	srilanka
portugal	nicaragua	russia		spain	sweden
romania	norway	slovakia		sweden	tanzania
rsa	pakistan	spain		switzerland	turkey
russia	poland	sweden		taiwan	uk
slovakia	portugal	switzerland		thailand	ukraine
slovenia	romania	uk		uk	us
spain	russia	ukraine		ukraine	
switzerland	slovakia	**Oil seed**		us	
tanzania	slovenia	estonia		vietnam	
thailand	spain	ethiopia			
turkey	sudan	latvia			
uganda	sweden	lithuania			
ukraine	switzerland	poland			
us	taiwan	switzerland			
zambia	turkey				
zimbabwe	uk				
	ukraine				
	us				

Table 5 (continued): Covered products and focus countries

Poultry	**Pulse**	**Rice**	**Sesame**	**Sorghum**	**Sugar**
australia	ethiopia	australia	nicaragua	australia	australia
austria	**Pyrethrum**	bangladesh	sudan	benin	austria
belgium	tanzania	brazil	**Sheep meat**	burkinafaso	bangladesh
brazil	**Rapeseed**	bulgaria	australia	cameroon	belgium
bulgaria	australia	china	austria	chad	brazil
canada	austria	colombia	belgium	colombia	bulgaria
china	belgium	coted'ivoire	bulgaria	india	canada
cyprus	bulgaria	dominicanrep	cyprus	mali	chile
czechrep	canada	ecuador	czechrep	mexico	china
denmark	czechrep	egypt	denmark	mozambique	colombia
dominicanrep	denmark	france	estonia	nicaragua	czechrep
ecuador	france	ghana	finland	nigeria	denmark
estonia	germany	greece	france	sudan	dominicanrep
finland	greece	hungary	greece	tanzania	ecuador
france	hungary	india	germany	togo	egypt
greece	india	indonesia	hungary	uganda	finland
germany	ireland	italy	iceland	us	france
hungary	italy	japan	ireland	zambia	greece
iceland	luxembourg	kazakhstan	israel	zimbabwe	germany
indonesia	netherlands	korea	italy	**Soybean**	hungary
ireland	romania	madagascar	kazakhstan	argentina	india
israel	slovakia	malaysia	latvia	australia	indonesia
italy	spain	mexico	lithuania	brazil	ireland
japan	sweden	morocco	luxembourg	bulgaria	italy
kazakhstan	uk	mozambique	malta	canada	japan
korea		nicaragua	morocco	china	kazakhstan
latvia		nigeria	netherlands	colombia	kenya
lithuania		pakistan	newzealand	czechrep	latvia
luxembourg		philippines	norway	ecuador	lithuania
malta		portugal	poland	france	luxembourg
mexico		romania	portugal	greece	madagascar
morocco		senegal	romania	germany	mexico
netherlands		spain	rsa	hungary	morocco
newzealand		srilanka	slovakia	india	mozambique
nicaragua		taiwan	slovenia	indonesia	netherlands
norway		tanzania	spain	italy	nicaragua
philippines		thailand	sudan	japan	pakistan
poland		turkey	sweden	korea	philippines
portugal		uganda	switzerland	mexico	poland
romania		us	turkey	morocco	portugal
rsa		vietnam	uk	nicaragua	romania
russia		zambia	us	poland	rsa
slovakia		**Rubber**	**Sisal**	romania	russia
slovenia		indonesia	tanzania	slovakia	slovakia
spain		malaysia		spain	slovenia
sweden		srilanka		thailand	spain
switzerland		thailand		us	sudan
taiwan		vietnam		zambia	sweden
thailand		**Rye**		zimbabwe	switzerland
turkey		estonia		**Spinach**	tanzania
uk		latvia		japan	thailand
ukraine		lithuania		**Strawberry**	turkey
us		russia		japan	uganda
vietnam		slovakia		morocco	uk
		ukraine			ukraine
					us
					vietnam

Table 5 (continued): Covered products and focus countries

Sunflower	**Tomato**	**Wheat**	**Wine**
argentina	belgium	argentina	austria
australia	bulgaria	australia	belgium
austria	cyprus	austria	bulgaria
bulgaria	czechrep	bangladesh	cyprus
czechrep	denmark	belgium	france
	dominicanrep		
france	ublic	brazil	greece
greece	estonia	bulgaria	germany
germany	france	canada	hungary
hungary	greece	chile	italy
india	germany	china	luxembourg
italy	hungary	colombia	malta
kazakhstan	ireland	cyprus	portugal
poland	israel	czechrep	romania
portugal	italy	denmark	slovakia
romania	latvia	egypt	spain
rsa	lithuania	estonia	**Wool**
russia	luxembourg	ethiopia	australia
slovakia	malta	finland	iceland
spain	mexico	france	newzealand
turkey	morocco	greece	norway
ukraine	netherlands	germany	us
zambia	poland	hungary	**Yam**
zimbabwe	portugal	india	benin
Sweet potato	romania	ireland	burkinafaso
madagascar	slovakia	israel	chad
mozambique	spain	italy	coted'ivoire
tanzania	turkey	japan	ghana
uganda	uk	kazakhstan	mali
Tea	**Vanilla**	kenya	nigeria
bangladesh	madagascar	korea	togo
indonesia	**Vegetables**	latvia	
kenya	china	lithuania	
srilanka		luxembourg	
tanzania		malta	
uganda		mexico	
Teff		morocco	
ethiopia		netherlands	
Tobacco		newzealand	
australia		norway	
mozambique		pakistan	
tanzania		poland	
turkey		portugal	
zambia		romania	
zimbabwe		rsa	
		russia	
		slovakia	
		slovenia	
		spain	
		sudan	
		sweden	
		switzerland	
		taiwan	
		tanzania	
		turkey	
		uk	
		ukraine	
		us	
		zambia	
		zimbabwe	

Table 6: FAOSTAT concordance table for trade and production

Ag distortion	FAO Production + Prices	FAO Trade Names	FAO Trade Codes
apple	Apples	Apples	515
banana	Bananas	Bananas	486
barley	Barley	Barley	44
bean	Beans, dry	Beans, dry	176
	Beans, green	Beans, green	414
beef	Cattle meat	Bovine Meat >	2071
	Buffalo meat		
cabbage	Cabbages and other brassicas	Cabbages and other brassicas	358
camel	Camel meat	Camel meat	1127
cashew		Cashew nuts, with shell	217
cassava	Cassava	Cassava	125
chat			
chickpea	Chick peas	Chick peas	191
chillies	Chillies and peppers, dry	Chillies and peppers, dry	689
	Chillies and peppers, green	Chillies and peppers, green	401
clove		Cloves	698
coarsegrains			
cocoa	Cocoa beans	Cocoa beans	661
	Coconuts	Coconuts	249
coconut		Coconuts, Desiccated	250
coffee	Coffee, green	Coffee, green	656
cotton	Seed cotton	Cotton lint	767
		Cottonseed	329
cucumber	Cucumbers and gherkins	Cucumbers and gherkins	397
egg	Hen eggs, in shell	Hen eggs, in shell	1062
fruit&veg			
fruits			
garlic		Garlic	406
grape	Grapes	Grapes	560
groundnut	Groundnuts, with shell	Groundnuts, with shell	242
gumarabic		Gums Natural	839
hazelnut	Hazelnuts, with shell	Hazelnuts, with shell	225
hides&skins		Hides + Skins -21 >	1898
jute		Jute	780
maize	Maize	Maize	56
mandarin	Tangerines, mandarins, clem.	Tangerines, mandarins, clem.	495
milk	Cow milk, whole, fresh	Cow milk, whole, fresh	882
	Sheep milk, whole, fresh	Sheep milk, whole, fresh	982
	Buffolo milk, whole, fresh		
	Camel milk, whole, fresh		
	Goat milk, whole, fresh		
millet	Millet	Millet	79
oat	Oats	Oats	75
oilseed		Oilseeds -22 >	1899
olive	Olives	Olive Oil, Total >	1999

Table 6 (continued): FAOSTAT concordance table for trade and production

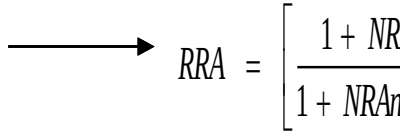
Ag distortion	FAO Production + Prices	FAO Trade Names	FAO Trade Codes
onion	Onions, dry	Onions, dry	403
		Onions, green	492
orange	Oranges	Oranges	490
othercrops			
othergrains			
otherroots&tubers		Roots and Tubers, nes	149
palmoil	Oil palm fruit	Palm oil	257
pear		Pears	521
peas	Cow peas, dry	Cow peas, dry	195
	Peas, dry	Peas, dry	187
	Peas, green	Peas, green	417
pepper	Pepper (Piper spp.)	Pepper (Piper spp.)	687
pigmeat	Pig meat	Pig meat	1035
plantain	Plantains	Plantains	489
potato	Potatoes	Potatoes	116
poultry	Chicken meat	Poultry Meat >	2074
	Turkey meat		
pulse	Pulses, nes	Pulses, nes	211
pyrethrum		Pyrethrum Extr	755
rapeseed	Rapeseed	Rapeseed	270
rice	Rice, paddy	Rice >	1946
rubber	Natural rubber	Rubber Nat Dry	837
rye	Rye	Rye	71
sesame		Sesame seed	289
sheepmeat	Sheep meat	Sheep meat	977
	Goat meat	Goat meat	1017
sisal		Sisal	789
sorghum	Sorghum	Sorghum	83
soybean	Soybeans	Soybeans	236
spinach		Spinach	373
strawberry	Strawberries	Strawberries	544
sugar	Sugar beet	Sugar, Total (Raw Equiv.) >	1955
	Sugar cane		
sunflower	Sunflower seed	Sunflower seed	267
sweetpotato	Sweet potatoes	Sweet potatoes	122
tea	Tea	Tea	667
teff			
tobacco	Tobacco, unmanufactured	Tobacco, unmanufactured	826
tomato	Tomatoes	Tomatoes	388
vanilla		Vanilla	692
vegetables			
wheat	Wheat	Wheat	15
wine		Wine	564
wool	Wool, greasy	Wool, greasy	987
yam	Yams	Yams	137
	Taro (cocoyam)	Taro (cocoyam)	136
	Yautia (cocoyam)	Yautia (cocoyam)	135

Table 7: Variable names used in the Excel Spreadsheet in Anderson and Nelgen (2012)

Variable name	**Description**
region	Region
ccode	Country code
country	Country
year	Year
product	Product, the word "GENERAL' refers to aggregate information
trade_status	Product trade status
nra	NRA, Nominal Rate of Assistance, by product
$NRA = NRA_{bms} + NRA_{dms} + NRA_{inputs}$,	**where NRAoutput = NRAbms + NRAdms**
nra_o	NRAo, Nominal Rate of Assistance to output, by product
nra_i	NRAi, Nominal Rate of Assistance to input, by product
nra_bms	NRAbms, Nominal Rate of Assistance to output conferred by border market price support, by product
nra_bms_x	NRAbms (Exportable product), Nominal Rate of Assistance to output conferred by border market price support, by product
nra_bms_m	NRAbms (importable product), Nominal Rate of Assistance to output conferred by border market price support, by product
nra_dms	NRAdms, Nominal Rate of Assistance to output conferred by domestic price support, by product
nra_covt	NRA_covered_products, Value of production-weighted average of covered products
NRA to covered products can be decomposed into:	
$NRA\_COVT = NRA\_cov\_bms + NRA\_cov\_dms + NRA\_cov\_inputs$,	**where NRA_covered_output = NRA_cov_bms + NRA_cov_dms**
nra_cov_i	NRA to inputs, value of production-weighted average of covered products
nra_cov_o	NRA to output, value of production-weighted average of covered products
nra_cov_dms	NRA to output conferred by domestic market price support, value of production-weighted average of covered products
nra_cov_bms	NRA to output conferred by border market price support, value of production-weighted average of covered products
nra_bms_covm	NRA to output conferred by border market price support, value of production-weighted average of covered products, only IMPORTABLES
nra_bms_covx	NRA to output conferred by border market price support, value of production-weighted average of covered products, only EXPORTABLES
nra_bms_covh	NRA to output conferred by border market price support, value of production-weighted average of covered products, only Non-Tradables
nra_covh	NRA covered products, value of production-weighted average, Nontradables
nra_covm	NRA covered products, value of production-weighted average, Importables
nra_covx	NRA covered products, value of production-weighted average, Exportables
nra_ncm	NRA Non Covered products, Value of production-weighted average, Importables
nra_ncx	NRA Non Covered products, Value of production-weighted average, Exportables
nra_nch	NRA Non Covered products, Value of production-weighted average, Nontradables
nra_nct	NRA non-covered products (total), Value of production-weighted average
nps	Non-product-specific assistance (NPSA), in current USD

NRA_TOTAL accounts for Covered and Non-Covered products

nra_tott	NRA All (primary) Agriculture, TOTAL for covered and non-covered and NPSA, Value of production-weighted average.
nra_totp	NRA All (primary) Agriculture, TOTAL excluding NPSA
nra_totm	NRA All (primary) Agriculture, Value of production-weighted average, Importables
nra_totx	NRA All (primary) Agriculture, Value of production-weighted average, Exportables
nra_toth	NRA All (primary) Agriculture, Value of production-weighted average, Nontradables
nra_agtrad	NRA Tradables-only in (primary) Agriculture, Value of production-weighted average.
nra_nonagtrad	NRA Non-Agricultural Sectors, Tradables
rra	RRA, Relative Rate of Assistance
TBI	Trade Bias Index= [(1+NRA_X) / (1+NRA_M) -1]
nra_totd	NRA Total Ag., including NPSA and decoupled payment (in high-income and other relevant countries)
nra_agtrad_decpay	NRA Ag Tradables, including decoupled support in high-income and other relevant countires
decpay	Decoupled paymets as % of total value of production (at undistorted values)
nps_input	Non Product Specific payments (only) to inputs, high-income and other relevant countries
rra_decpay	RRA with decoupled payments included, high-income and other relevant countries
er_prod	Exchange Rate, estimated equilibrium by product accounting for distortions in currency markets, used in calculations, product level (LC/USD)
er_econ	Exchange Rate, estimated equilibrium economy-wide accounting for distortions in currency markets, used in calculations, (LC/USD)
officialERproduct	Official Exchange Rate by product, (LC/USD)
q	Volume of Production, MT
pd	Producer farmgate price, LC/MT
pd_us	Producer farmgate price, USD/MT
Bp	UNDISTORTED farm domestic price in USD/MT (refer as Border price, USD/MT)
vop_prod	Value of production (at undistorted farmgate price), by product, current USD
vop_covt	Value of production total COVERED products (at undistorted farmgate price), current USD
vop_covh	Value of production COVERED products Non-tradables (at undistorted farmgate price), current USD
vop_covm	Value of production COVERED products Importables (at undistorted farmgate price), current USD
vop_covx	Value of production COVERED products Exportables (at undistorted farmgate price), current USD
vop_nch	Value of production NON-COVERED products Non-tradables (at undistorted farmgate price), current USD
vop_ncm	Value of production NON-COVERED products Importables (at undistorted farmgate price), current USD
vop_ncx	Value of production NON-COVERED products Exportables (at undistorted farmgate price), current USD
vop_nct	Value of production NON-COVERED products TOTAL (at undistorted farmgate price), current USD
vop_tot	Value of production TOTAL Agriculture (at undistorted farmgate price), current USD
cte	CTE , Consumer Tax Equivalent, by product
cte_covh	CTE , for all covered products , Value of consumption-weighted average, Non-Tradables



cte_covm	CTE , for all covered products , Value of consumption-weighted average, Importables
cte_covx	CTE , for all covered products , Value of consumption-weighted average, Exportables
cte_covt	CTE , TOTAL for all covered products , Value of consumption-weighted average
voc_prod	Value of consumption (at undistorted farm price), by product, current USD
voc_covh	Value of consumption COVERED products Non-tradables (at undistorted farm price), current USD
voc_covm	Value of consumption COVERED products Importables (at undistorted farm price), current USD
voc_covx	Value of consumption COVERED products Exportables (at undistorted farm price), current USD
voc_covt	Value of consumption total COVERED products (at undistorted farm price), current USD
Derived variables to estimate trade flows	
ssr	Self Sufficiency ratio, from FAO (= Q/C (vol.)) or from OECD (= Q/C (value at undistorted prices))
shrimp	Share of imports in consumption, FAOSTAT
shrexp	Share of exports in production, FAOSTAT
ac_prod	Apparent consumption (volume, MT)
R_and_D	Research and Development Expenditures, current USD
pop_agreconact	Pop. total economically active in Agr (from FAOSTAT)
pop_agric	Pop. agricultural (FAOSTAT)
pop_nonagric	Pop. non-agricultural (FAOSTAT)
pop_rural	Pop. rural (FAOSTAT)
pop_total	Pop. total (FAOSTAT)
pop_urban	Pop. urban (FAOSTAT)
pop_toteconact	Pop. total economically active (FAOSTAT)
gdppcp00	GDP per capita (constant year 2000 USD), source: WDI
gdpdeflator	US GDP Deflator (year 2000 = 100)
gse	Gross subsidy equivalent to farmers, total AGRICULTURE, (in current USD)
gse_constant	Gross subsidy equivalent to farmers, total AGRICULTURE, (constant year 2000 USD)
cte_dollar	Consumer tax equivalent of assistance to farmers of covered products (in current USD)
cte_dollar_constant	Consumer tax equivalent of assistance to farmers of covered products (constant year 2000 USD)