METHODOLOGY FOR THE MEASUREMENT OF SUPPORT AND USE IN POLICY EVALUATION

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Introduction

The OECD has, since 1987, measured support to agriculture using the Producer Support Estimate (PSE) and Consumer Support Estimate (CSE).[1] With the reform of agricultural policies in OECD countries, the number and complexity of policy measures has increased significantly and the OECD classification of policy measures has evolved. The basis of the OECD classification system presented here is the grouping of policy measures according to their implementation criteria — independently of their objectives and effects. A given objective may be achieved through different measures and the economic impacts depend on the way they are implemented.

This document explains the coverage, definitions, criteria of classification and methods of calculating the OECD indicators of support associated with agricultural policies. It elaborates on the meaning and interpretation of the concept of market price support and the main indicators of support, and on the way the PSE and related indicators are used for policy evaluation.

The current classification system was presented for the first time in the 1999 edition of the report *Agricultural Policies in OECD Countries -- Monitoring and Evaluation.* It also provided the opportunity to "clean up" the databases and calculations for each country to improve consistency. A description of the policies covered, and the detailed results for all countries, as well as the documentation of the data sources, are available in the annual *OECD PSE/CSE Databas*e (CD-ROM).

The OECD Secretariat has continually made efforts to ensure consistency in the treatment and completeness of coverage of policies. Revising the calculations and improving consistency in the light of more updated data and information on policy measures is an ongoing process undertaken annually with the preparation of the *Monitoring and Evaluation* report.[2]

1.	Prior to 1999, these indicators were referred to as the Producer Subsidy Equivalent (PSE) and the Consumer Subsidy Equivalent (CSE), respectively.

2 .	Caution should be exercised in building time series with data published in two or more annual *Monitoring and Evaluation* reports.

Classification and definitions

The current OECD classification of total transfers associated with agricultural policies (TSE), groups the policy measures into three main categories; transfers to producers individually (PSE), transfers to consumers individually (CSE) and transfers to general services to agriculture collectively (GSSE), as in Box 1.

I.   Producer Support Estimate (PSE): an indicator of the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income.

The PSE measures support arising from policies targeted at agriculture relative to a situation without such policies, *i.e.* one in which producers are subject only to general policies (including economic, social, environmental and tax policies) of the country. Although the PSE is measured **net** of any producer contributions to help to finance a support policy (*e.g.* through a levy on production) it is fundamentally a **gross** concept because any costs associated with those policies that are incurred by individual producers are not deducted[3]. It is also a measure of **nominal assistance** in the sense that increased costs associated with import duties on inputs are not deducted. The PSE includes both implicit and explicit payments, such as price gaps on outputs or inputs, tax exemptions and budgetary payments, including those for remunerating non-marketed goods and services. Therefore, the indicator measures more than just the "subsidy element". Although **farm receipts** (revenue)[4] are increased (or farm expenditure reduced) by the amount of support, the PSE is not in itself an estimate of the impact on farm production or income. The following paragraphs describe the main components of the PSE.

A.   Market Price Support (MPS): an indicator of the annual monetary value of gross transfers from consumers and taxpayers[5] to agricultural producers arising from policy measures that create a gap between domestic market prices and border prices of a specific agricultural commodity, measured at the farm-gate level.

MPS, which is conditional on the production of a specific commodity, includes the transfer to producers associated with both production for domestic use and export. It is measured by the price gap applied to current unlimited production (a. *Based on unlimited output*); or, where restrictions on output apply, to current limited production (b. *Based on limited output).* The MPS is **net** of financial contributions from individual producers through producer levies on sales of the specific commodity or penalties for not respecting regulations such as production quotas (c. *Price levies).* In the case of livestock production, it is net of the market price support on domestically produced coarse grains and oilseeds used as animal feed (d. *Excess feed cost*).

B.   Payments based on output: an indicator of the annual monetary value of gross transfers from taxpayers to agricultural producers arising from policy measures based on current output of a specific agricultural commodity or a specific group of agricultural commodities.

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3.   Elements in the PSE are gross transfers to producers because in order to receive a given payment, producers have to produce or plant a specific commodity, or use a specific input, and therefore incur costs. These costs are not deducted from the amount of the payment, although they may absorb part of the payment.

4.   Farm *receipts* (revenues) are not the same as farm *income*, which is farm receipts *less* farm costs.

5.   Transfers from taxpayers occur, for example, when subsidies are used to finance exports.

These payments, which are conditional on producing a specific commodity, or a specific group of commodities, include payments per tonne, per hectare or per animal on current unlimited production (a. *Based on unlimited output*), or limited production (b. *Based on limited output*).

C.   Payments based on area planted/animal numbers: an indicator of the annual monetary value of gross transfers from taxpayers to agricultural producers arising from policy measures based on current plantings, or number of animals, in respect of a specific agricultural commodity or a specific group of agricultural commodities.

These payments, which are conditional on planting a specific crop or crops, or maintaining particular number of livestock, include payments per hectare, or per animal , to current unlimited (a. *Based on unlimited area or animal numbers*), or limited (b. *Based on limited area or animal numbers)* area planted or animal numbers.

D.   Payments based on historical entitlements: an indicator of the annual monetary value of gross transfers from taxpayers to agricultural producers arising from policy measures based on historical support, area, animal numbers or production of a specific agricultural commodity, or a specific group of agricultural commodities, without any obligation to continue planting or producing such commodities.

These payments are conditional on being a producer of a specific commodity or a specific group of commodities at the time of the introduction of the payment. The measure includes payments based on historical plantings/animal numbers or production of such commodities (a. *Based on plantings/animal numbers or production*) and payments based on historical support programmes for such commodities (*b. Based on historical support programmes*).[6]

E.   Payments based on input use: an indicator of the annual monetary value of gross transfers from taxpayers to agricultural producers arising from policy measures based on the use of a specific fixed or variable input, or a specific group of inputs or factors of production.

These payments, which are conditional on the on-farm use of specific fixed or variable inputs, include explicit and implicit[7] payments affecting specific variable input costs (a. *Based on use of variable inputs*); the cost of on-farm technical, sanitary and phytosanitary services (b. *Based on use of on-farm services*); or affecting specific fixed input costs, including investment costs (c. *Based on use of fixed inputs)*.

F.   Payments based on input constraints: an indicator of the annual monetary value of gross transfers from taxpayers to agricultural producers arising from policy measures based on constraints on the use of a specific fixed or variable input, or a specific group of inputs, through constraining the choice of production techniques.

These payments are conditional on the application of certain constraints (reduction, replacement, or withdrawal) on the on-farm use of specific variable inputs (a. *Based on constraints on variable inputs*); or fixed inputs (b. *Based on constraints on fixed inputs*); or based on constraints on the use of a set of farm inputs through restricting the choice of production techniques of marketed commodities to reduce negative

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6.   Unlike the others payments to commodities, these payments directly increase farm income by the amount of the payment as producers do not have to incur any specific cost (other than that associated with being a farmer).

7 .   For example, the implicit transfers associated with interest rate or energy tax concessions.

externalities or remunerate farm inputs producing non-market goods and services (*c. Based on constraints on a set of input*s).[8]

G. Payments based on overall farming income: an indicator of the annual monetary value of transfers from taxpayers to agricultural producers arising from policy measures based on overall farming income (or revenue), without constraints or conditions to produce specific commodities, or to use specific fixed or variable inputs.

These payments, which are conditional on being an eligible farming enterprise or farmer, compensate for farm income fluctuations or losses (a. *Based on farm income level*), or for guaranteeing a minimum income (b. *Based on an established minimum income*).[9]

H. Miscellaneous payments: an indicator of the annual monetary value of all transfers from taxpayers to agricultural producers that cannot be disaggregated and allocated to the other categories of transfers to producers.

These are payments to producers which cannot be disaggregated due, for example, to a lack of information, and include payments funded by national governments (a. *National payments*), or state, regional, prefectural or provincial governments (b. *Sub-national payments*).

II. General Services Support Estimate (GSSE): an indicator of the annual monetary value of gross transfers to general services provided to agriculture collectively, arising from policy measures which support agriculture, regardless of their nature, objectives and impacts on farm production, income, or consumption of farm products.

These payments for eligible private or public general service are provided to the agricultural sector generally and not individually to farmers. They include payments for collective agri-environmental action and taxpayer transfers for the following purposes : improving agricultural production (**I.** *Research and development*); agricultural training and education (**J.** *Agricultural schools*); control of quality and safety of food, agricultural inputs and the environment (**K.** *Inspection services*); improvement of off-farm collective infrastructures, including downstream and upstream industry (**L.** *Infrastructures*); marketing and promotion (**M.** *Marketing and promotion*); depreciation and disposal of public storage of agricultural products (**N.** *Public stockholding* and other general services that cannot be disagreggated and allocated to the above categories due, for example, to a lack of information (***O. Miscellaneous***). Unlike the PSE and CSE transfers, these transfers are not received by producers or consumers individually, and do not directly affect **farm receipts** (revenue) or **consumption expenditure**, although they will affect the production and consumption of agricultural commodities.

III. Consumer Support Estimate (CSE): an indicator of the annual monetary value of gross transfers to (from) consumers of agricultural commodities, measured at the farm-gate level, arising from policy measures which support agriculture, regardless of their nature, objectives or impacts on consumption of farm products.

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8.   A payment, which lowers the costs of farm inputs on condition that they are used for producing a non-market good, can be seen as a payment associated with constraints on the use of a set of inputs or on the choice of production techniques.

9.   Unlike most of the others, these payments increase farm income directly by the amount of the payment, as producers do not have to incur any specific cost (other than those necessary to generate an eligible level of farm income).

The CSE includes the following explicit and implicit consumer transfers measured at the farm-gate (first consumer) level and associated with market price support: transfers to producers of agricultural commodities associated with the domestically produced consumption (*P. Transfers to producers from consumers*); transfers to the budget or to importers, or to both, on the share of consumption that is imported (*Q. Other transfers from consumer*s); **net** of any transfers to consumers that offsets their contribution to market price support of a specific commodity (*R. Transfers to consumers from taxpayers)*; and the producer contribution (as consumers of domestically produced crops) to the market price support on crops used in animal feed (*S. Excess feed cost*). When negative, this indicates transfers from consumers and measures the implicit tax on consumption associated with policies to the agricultural sector. Although consumption expenditure is increased (reduced) by the amount of the implicit tax (payments), this indicator is not, in itself, an estimate of the impact on consumption expenditure.

IV.   Total Support Estimate (TSE): an indicator of the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of the associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products.

The TSE is the sum of the following (see Box 1 for details): the explicit and implicit gross transfers from consumers of agricultural commodities to agricultural producers net of producer financial contributions (which appear in MPS and CSE); the gross transfers from taxpayers to agricultural producers (in the PSE); the gross transfers from taxpayers to general services provided to agriculture (GSSE) and the gross transfers from taxpayers to consumers of agricultural commodities (in the CSE). As the transfers from consumers to producers are included in the MPS, the TSE is also the sum of the PSE, the GSSE and the transfers from taxpayers to consumers (in CSE). The TSE measures the overall cost of agricultural support financed by consumers (*T. Transfers from consumers*) and taxpayers (*U. Transfers from taxpayers*) net of import receipts (*V. Budget revenue*s).

Criteria for classification

Defining measures included in the PSE, CSE or GSSE

The general criterion to determine whether to include policy measures in the *PSE, CSE* or *GSSE* is if the measure provides transfers to agricultural producers individually *(PSE)*, to (from) consumers of agricultural commodities individually *(CSE)*, or to the general services provided to agriculture collectively *(GSSE)*. The *TSE* includes all transfers included in the PSE, CSE and GSSE (adjusted to exclude double-accounting).

In the case of the *PSE* (transfers to producers), it is necessary for an individual farmer to take actions to produce goods or services to use factors of production, or to be defined as an eligible farming enterprise, or farmer, to receive a transfer. The actions change gross farm receipts (revenue) by the amount of the transfer. In the case of the *CSE* (transfers to/or from consumers), it is necessary for consumers to take actions to consume agricultural commodities to provide (or receive) a transfer. These decisions change gross consumer expenditure by the amount of the transfer. The *GSSE* transfers do not depend on actions of individual farmers or consumers, are not received by individual producers or individual consumers and do not affect farm receipts (revenue) or consumption expenditure.

The **general criteria** for classifying policy measures included in each of the indicators composing the *TSE* requires responses to the following sequence of questions:

− *First*, does the policy measure create a transfer to (from) consumers of agricultural commodities? If yes, consider it under *CSE* and proceed to the following question. If no, proceed also to the following question;

Box 1. Classification of policy measures included in the OECD indicators of support

I. Producer Support Estimate (PSE) [Total of A -- H]
   A. *Market Price Support*
      a. Based on unlimited output
      b. Based on limited output
      c. Price levies
      d. Excess feed cost
   B. *Payments based on output*
      a. Based on unlimited output
      b. Based on limited output
   C. *Payments based on area planted/animal numbers*
      a. Based on unlimited area or animal numbers
      b. Based on limited area or animal numbers
   D. *Payments based on historical entitlements*
      a. Based on historical plantings/animal numbers or production
      b. Based on historical support programmes
   E. *Payments based on input use*
      a. Based on use of variable inputs
      b. Based on use of on-farm services
      c. Based on use of fixed inputs
   F. *Payments based on input constraints*
      a. Based on constraints on variable inputs
      b. Based on constraints on fixed inputs
      c. Based on constraints on a set of inputs
   G. *Payments based on overall farming income*
      a. Based on farm income level
      b. Based on established minimum income
   H. *Miscellaneous payments*
      a. National payments
      b. Sub-national payments

II. General Services Support Estimate (GSSE) [Total of *I -- O*]
   I. *Research and development*
   J. *Agricultural schools*
   K. *Inspection services*
   L. *Infrastructure*
   M. *Marketing and promotion*
   N. *Public stockholding*
   O. *Miscellaneous*

III. Consumer Support Estimate (CSE) [Total of P -- S]
   P. *Transfers to producers from consumers*
   Q. *Other transfers from consumers*
   R. *Transfers to consumers from taxpayers*
   S. *Excess Feed Cost*

IV. Total Support Estimate (TSE) [I + II + III R]
   T. *Transfers from consumers*
   U. *Transfers from taxpayers*
   V. *Budget revenues*

- **Second**, does the policy measure (including those creating a transfer to (from) consumers) create a transfer to producers individually based on goods and services produced, on inputs used or on being a farming enterprise or farmer? If yes, consider it under *PS*E. If no, proceed to the following question;

- **Third**, does the policy measure create a transfer to general services provided to agriculture collectively? If yes, consider it under the *GSSE*. If no, do not consider it in the *TSE* calculation.

Classifying transfers to producers in the PSE

The implications of policy measures on variables, such as production, consumption, trade, income, employment and the environment, depend primarily on the way policy measures are implemented. Therefore, to be helpful for policy analysis, policy measures included in the PSE are classified according to implementation criteria. For a given policy measure, the **implementation criteria** are defined as *the conditions under which the associated transfers are provided to farmers or the conditions of eligibility for the payment*. However, these conditions are often multiple. Thus, the criteria used to classify payments to producers are defined in a way that facilitate: (i) the analysis of policies in the light of the "operational criteria" for policies defined by OECD Ministers of Agriculture in 1998; and (ii) the assessment of their impact (on, for example, production, consumption, income, employment and the environment) through, for example, the policy models and the classification of new policy measures in a consistent way across countries, policy measures and over time.

Policy measures with environmental eligibility conditions illustrate the importance of the PSE classification based on implementation criteria. Payments with *cross-compliance* conditions are defined as measures to support specific agricultural commodities conditional upon respecting certain environmental constraints. *Cost-sharing* payments are defined as measures to support specific environmental activities, or outcomes, through constraints on agricultural production or pollution. Although, in both cases, the payments may be provided per farm, per hectare or per animal, their main implementation criteria are not the same Thus cross-compliance and cost-sharing payments should not be considered under the same category.[10]

The **criteria** for classifying each of the policy measures included in the *PSE* into a specific category of measures requires responding to the following sequence of questions:

- **First**, does the policy measure provide an implicit or explicit payment to individual producers on the basis of their overall farming receipts or income and is this independent of the commodities they produce or the fixed and variable inputs they use? If yes, consider it under *G. Payments based on overall farming income;* if no, proceed to the following question;

- **Second**, does the policy measure affect the domestic market price (to consumers and producers) of a specific commodity? If yes, consider it under *A. Market price suppor*t; if no, proceed to the following question;

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10. This also shows that a classification only based on payments per tonne, per hectare or per animal would not be helpful for policy analysis.

- ***Third***, does the policy measure provide a payment to agricultural producers conditional on production of a specific commodity or a specific group of commodities? If yes, consider it under *B. Payments based on output;* if no, proceed to the following question;

- ***Fourth***, does the policy measure provide a payment to agricultural producers conditional on planting a specific crop or maintaining a herd of livestock or a specific group of crops (or animals)? If yes, consider it under *C. Payments based on area planted/animal numbers;* if no, proceed to the following question;

- ***Fifth***, does the policy measure provide a payment to agricultural producers based on historical support, on area, on animal numbers or on production of a specific commodity or a specific group of commodities without obligation to continue planting or producing such commodities? If yes, consider it under *D. Payments based on historical entitlements;* if no, proceed to the following question;

- ***Sixth,*** does the policy measure provide an explicit or implicit payment to individual producers using a specific input (variable or fixed) or a specific group of inputs to produce agricultural commodities? If yes, consider it under *E. Payments based on input use;* if no, proceed to the following question;

- ***Seventh***, does the policy measure provide an explicit or implicit payment to individual producers conditional on the application of certain constraints (reduction, replacement, or withdrawal) on the use of specific variable or fixed inputs, or based on constraints on the use of a set of inputs through limiting the choice of production techniques, including remuneration for farm inputs used to produce non-market goods and services? If yes, consider it under *F. Payments based on input constraints;* if no, consider it under *G. Payments based on overall farming income*. The latter includes transfers to individual producers conditional on being an eligible farming enterprise, or farmer, but without any requirement to produce specific commodities or use specific fixed or variable inputs.

These criteria are mutually exclusive and are applied to each policy measure in the order set out above.[11] Although a given policy measure may be conditional on several of the above criteria, it is classified under the first applicable criteria. The following section includes some classification rules, which help to implement these general criteria.

Rules for classification

Classifying transfers associated with market price support

Border measures on imports and exports, together with on-farm and public stockholding, domestic and foreign food-aid measures, and consumption subsidies create a price gap between domestic and border prices.[12] Transfers to producers (from consumers), created by a situation in which domestic prices for commodities are maintained at a higher level than border prices *(price gap)*, are included (+) under the *PSE*, and (-) under the *CSE*. Transfers to producers (from taxpayers) through **export subsidies** (the same price gap) are included in the PSE (see section on MPS).

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11. If transfers to agricultural producers provided through two (or more) policy measures are only available as aggregate amounts, an appropriate allocation key is used to assign them to the appropriate categories. If such a key cannot be found, the total is assigned to *H. Miscellaneous payments*.

12. Border prices are world market prices: f.o.b. for exported commodities and c.i.f. for imported commodities.

While transfers from taxpayers for **on-farm stockholding** are transfers to producers, and are included in the *PSE*, transfers from taxpayers for the operational costs of public purchasing agencies and the depreciation and disposal costs associated with **public stocks** are *not* in themselves transfers to producers.[13] Such transfers are, therefore, included in the *GSSE*. **Transfers to processors** (first consumers) to compensate them for paying domestic prices higher than border prices, and **consumption subsidies** in cash or in kind to support various consumption levels, are included under the *CSE*. However, when these subsidies also cover imported food, only the share attributable to domestic production is included under the *CSE* (see Box 2).

On-farm services included in the PSE or in services to agriculture in the GSSE?

On-farm services in the PSE are explicit or implicit payments reducing the prices paid by farmers for services provided to them individually and therefore affecting farm receipts by the amount of the payment. This category includes, typically, extension services and technical assistance to farmers, as well as pest and disease control on farmers' crops and livestock, through, for example, animal vaccination. **General services to agriculture** in the GSSE are explicit or implicit payments to general services provided to agriculture as a whole, which are not received by producers or consumers individually, and therefore do not affect farm receipts or consumption expenditure by the amount of the payment. This includes payments to institutions for research, the control of quality of food and agricultural inputs (through, for example, quarantine) or the control of environmental quality in agriculture.

Input subsidies included in the PSE or in transfers for infrastructure in the GSSE?

Input subsidies are typically explicit or implicit payments reducing the price paid by farmers for variable inputs (for example, fertilisers, feed, seeds, energy, water, transportation, insurance), which are provided to farmers through policy instruments, including interest concessions, tax rebates and budgetary transfers to input industries to provide lower input prices paid by farmers.

In the absence of such instruments, and with input industries (or services) providing inputs at prices fully reflecting depreciation and operational costs, there are neither input subsidies (in the PSE) nor transfers for infrastructure (in the GSSE). **PSE transfers to producers** associated with the policy measures are, for example, the budget receipts forgone in the case of tax rebates and interest concessions (implicit payment), or the annual budgetary expenditure to compensate industry (banks) for losses associated with lower input prices paid by farmers (explicit payment). Such transfers could, in principle, also be measured by the gap between the price (interest or tax rate) actually paid by farmers and the price (rates) paid by others in the domestic market.[14]

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13 .   Whatever the cost of the public stockholding of a given commodity, farmers only benefit from the associated price gap which is included in Market Price Support.

14.   Sometimes, part of the budgetary transfer is retained by industry or the service sector (*e.g.* banks) and not transferred to farmers. This part should, strictly speaking, be included in the GSSE. However, as it is not always possible to identify the part that does not accrue to producers, the PSE (GSSE) is over (under)-evaluated to some extent. The same could also be said in the case of other programmes, such as certain deficiency payments schemes. That is one of the reasons why a price-gap calculation would, in many cases, be the most appropriate. However, the choice of the method used will often be dictated by data quality and availability.

However, public expenditure is sometimes also used with the intention of increasing the competitiveness of the sector as a whole through improving infrastructure related to input, processing and marketing industries. It is, for example, the case that Regulation 355/77 (replaced by Regulations 866/90 and 867/90) is designed to improve the infrastructure related to processing and marketing of agricultural products in the European Union. Such transfers are not received as such by farmers and are included in **Infrastructures** in the GSSE.

Box 2. Transfers associated with market price support

Consider the case of a country where there are border measures and government purchasing agencies (GPAs) importing, buying and selling in the domestic market, in order to maintain the domestic price close to an administered domestic price higher than the border price (reference price).

In the case of exported commodities (Figure 1), farmers sell all their production ($S2$) to domestic consumers ($D2$) and GPAs ($S2$-$D2$) at an average producer price (Pp) that is higher than the world reference price (Pr). The quantities purchased by the GPAs are sold in the same year in the domestic market at the average price Pp, offered as domestic food aid at the opportunity cost of Pp, sold in the world market (with export subsidies) at the average price Pr, offered as foreign food aid at an opportunity cost of Pr, or kept in public storage for later sale.

As, in a given year, domestic consumers and GPAs purchase all domestic production at an average price (Pp) that is higher than the price at which the GPAs export the commodity (Pr), the transfer to producers associated with MPS to the commodity is measured by the area *abcd* = (Pp-Pr)•S2 and considered under **I.A.** *Market Price Support*. The area *abfg* = (Pp-Pr)•D2 measures the share of MPS financed by consumers and is considered under **I.A MPS** in the PSE and **III.P.** *Transfers to producers from consumers* in the CSE. The area *gfcd* = (Pp-Pr)•($S2$-$D2$) measures transfers to producers from taxpayers The share of MPS financed by taxpayers is considered under **I.A MPS** in the PSE (through food aid, export subsidies or public storage).

The CSE is the share of MPS financed by consumers [area *abfg* = (Pp-Pr)•D2] minus consumption subsidies, in cash or in kind, and price compensating aids paid to processors financed by taxpayers (**III.R.** *Transfers to consumers from taxpayers*). The total of the transfers associated with MPS are therefore obtained by adding to the MPS in the PSE [area *abcd* = (Pp-Pr)•S2], transfers under marketing and stockholding in the GSSE, consumption subsidies in cash and price compensation in the CSE.

Figure 1. Export Commodities
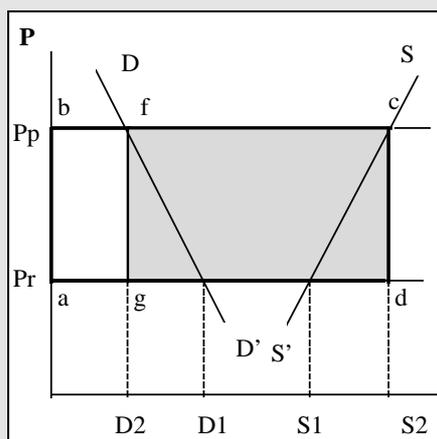
(continued on next page)

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In the case of imported commodities (Figure 2), both domestic production (*S2*) and imports (*D2-S2*) are sold in the domestic market at the average producer price (*Pp*). But in both cases, price compensation is provided by government to processors (first consumers) to help them to stay competitive in the world market for processed products and some consumption subsidies in cash and in kind are also provided. The quantities domestically produced, and those imported by the GPAs, are sold in the same year in the domestic market at the average price *Pp*. *They are also* offered as domestic food aid at the opportunity cost of *Pp*. as foreign food aid at the opportunity cost of *Pr* or kept in public storage for later sale.

Figure 2. Import Commodities
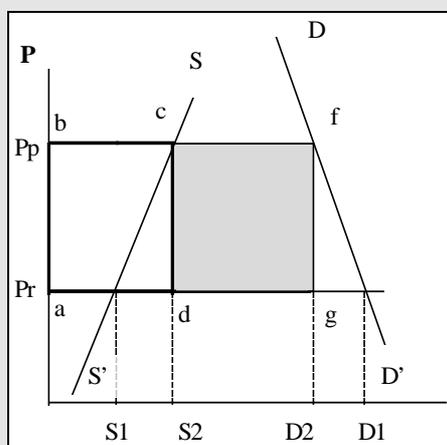
Under these conditions, the transfer to producers associated with MPS for a particular commodity is measured by the area *abcd* = (*Pp-Pr*)•*S2*. *This is* considered under **I.A Market Price Support** in the PSE and **III.P. Transfers to producers from consumers** in the CSE. While this area also represents the transfers from consumers to producers, the area *dcfg* = (*Pp-Pr*) • (*D2-S2*) measures the transfers from consumers to the budget through import receipts or as rents to importers or exporters due to tariff quotas (**III. Q. Other transfers from consumers or IV.V. Budget revenues**).

The CSE is measured by the area *abfg* = (*Pp-Pr*)•*D2* (**III.P. Transfers from producers from consumers and III.Q. Other transfers from consumers**) minus the consumption subsidies, in cash or in kind, or price compensation financed by taxpayers (**III.R. Transfers to consumers from taxpayers**). The total of transfer associated with MPS is therefore obtained by adding to the MPS in the PSE [area *abcd*=(*Pp-Pr*)•*S2*], those transfers under marketing and stockholding in the GSSE and the consumption subsidies in cash and price compensating aids in the CSE minus the transfers from consumers to the budget importers, or to both.

In both cases — exported and imported commodities — to provide such transfers to producers through MPS, other transfers are generated These are mainly in the form of operational costs of GPAs and the stock depreciation and disposal costs of public stockholding. However, although these transfers contribute to create the price gap received by producers, they are not in themselves a transfer to producers. They are transfers to general services provided to agriculture considered in the GSSE under II.M. *Marketing and promotion* (in the case of the operational costs of GPAs) and II.N. *Public stockholding* (in the case of the stock depreciation and disposal costs) These are considered in most cases to be dead-weight losses.

While most agricultural inputs in the OECD are provided through private enterprises, the off-farm provision of water for irrigation is usually provided through public enterprises. Although, in this case, the initial investment is financed by taxpayers, it is not included in the PSE or GSSE. In both cases of public or private investment — and as for any other input — the question is whether the price for water paid by farmers covers all the industry costs or not.[15] If the answer is no, the annual budgetary expenditure to compensate industry for operational costs associated with lower input prices for farmers is included in the PSE. On the other hand, public expenditure for maintaining or improving collective infrastructure related to the input, processing and marketing industries is included in the GSSE.

Treatment of taxes and levies

The PSE and CSE are defined as *net* of producer contributions which help finance policy measures providing support to them. This is one of the reasons why the **excess feed cost** is calculated and deducted from the market transfers to producers and to (from) consumers. The PSE and CSE are calculated relative to total production and consumption— *i.e.* including quantities domestically produced and used as feed. Therefore, the MPS for feed crops domestically produced and consumed by livestock producers is *negative* in the PSE for livestock and included in the CSE for crops. This avoids double counting when aggregating the PSE and CSE for crops and livestock.[16]

In the same way, the receipts from **production taxes and levies** which finance a given measure are also deducted from the total amount of the payment provided to producers through such policy measures. However, the receipts from taxes and levies on purchases of inputs or penalties on farmers resulting from economy-wide regulations — for example, for reducing environmental pollution — are not considered in the PSE calculation. This is because the PSE as noted earlier is a "nominal assistance" concept, meaning that increased costs associated with import duties on inputs are not deducted. The PSE is also a "gross" concept, meaning that increased costs to farmers associated with the policy measure are not deducted. Where achieving the level of environmental quality (through good agricultural practices) is required by regulations this should be at the expense of farmers and a payment for reducing pollution is considered as a support to help farmers to reach the required environmental quality (Box 3).

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15. Sometimes, part of the price gap for farmers is paid by other consumers of the input. For example, other consumers of water finance the price gap for farmers through higher water prices. That is another reason why the price gap calculation is, in many cases, the most appropriate.

16. The CSE for crops is therefore calculated net of producer contributions or, in other words, does not include the share of domestic production used as feed in the sector. In the same way, the aggregate PSE for crops and livestock does not include the share of domestic production used as feed in the sector, but the method shows that the associated support to crops is an implicit tax on livestock products.

Main indicators: meaning, calculation and interpretation

What does the PSE/TSE cover?

The PSE is a static measure of support provided to agricultural producers in a given time period (*e.g.* one year or season) in the context of general macro-economic conditions and economy-wide policies. A situation of zero support to agriculture would occur when there are only general economy-wide policies in place with no policies specifically altering the transmission of the general macroeconomic conditions for agriculture. In such a situation, current total farm receipts would entirely be generated in the market without any policy-linked transfers to farmers. This can be seen as an extreme situation. To improve welfare or to address market failure, policies provide transfers although their efficiency depends on their effects on production, consumption, trade, incomes and the environment. These effects depend on the way policies are implemented, which is the criterion used to group transfers under the PSE, CSE, GSSE and TSE, and the basis for any cost/benefit analysis of policies.

For example, to protect the natural habitat, one country applies SPS measures to avoid infestation with pests or diseases that do not exist in the country. A second country grants a payment to farmers to share the costs of changing farming practices, and a third country finances collective actions in favour of such protection. All these cases involve costs and benefits. In the first case, SPS measures may create transfers from consumers to producers through, for example, a domestic price higher than the export price, and is included in MPS in the PSE. In the second case, the transfers are also included in the PSE, but under payments based on input constraints while, in the third case, the transfers are included under the GSSE.

The PSE identifies policies which specifically alter the transmission of general macro-economic conditions (for example, changes in exchange rates) and measures the associated transfers to agriculture. For example, a "double price" occurs when the f.o.b./c.i.f. border price is adjusted for the exchange rate variation, while the domestic price is not adjusted. This can happen only if a specific policy exists for allowing it. There are two main categories of policies affecting price transmission to farmers directly. These are payments based

on current output ("deficiency payments") and MPS and both are included in the PSE. While deficiency payments do not affect domestic consumers and are explicit transfers included in the budget, MPS includes a wide range of measures generating implicit transfers paid by consumers, which are included in the PSE and CSE.

Calculating the MPS

Market price support is only calculated where there are policies that alter the transmission of the general macro-economic conditions to agricultural producers and create a "price gap" with transfers from consumers to producers. There is a range of policies that create transfers from consumers to producers. For example, MPS is calculated for a country that has no border measures for imports and exports of a commodity, but has state (or monopoly) marketing structures that control the domestic market, or applies sanitary and phytosanitary barriers. Although MPS policies are usually easy to identify, when applied simultaneously their individual contribution to the price change might be difficult to calculate.

It is also important to recognise that a price gap (positive or negative) can exist in the absence of any policy measures that affect the transmission of prices. This may occur in the short term due to impediments to the adjustment of domestic marketing structures, and thus to profit from foreign market conditions by importing or exporting. However, over the medium or long term, in the absence of policy constraints, it is expected that domestic or foreign enterprises would raise profits by increasing their imports or exports.

The types of MPS transfers are identified in Box 2, but the method of calculating these transfers varies depending on the country's trade position and the type of policies in place. ***In a net exporting country,*** with no policy specifically affecting the imports or exports of a given commodity, domestically produced commodities are exported at an f.o.b. price, which is also the domestic price, *i.e.* the producer price plus marketing margins, or the wholesale price plus internal transportation costs (Figure 3). This corresponds to the case of zero MPS.

However, when a country applies explicit export subsidies it creates a "double price", with the export price lower than the domestic price, and the (average) export subsidy (*i.e.* total expenditure on export subsidies divided by total exports) providing a measurement of the price gap. If other policy measures (for example, import tariffs, export credits, foreign food aid, public stockholding, sanitary barriers, state-trading enterprises) are in place alone, or in a package, they create implicit (or explicit) export subsidies. This can only be measured by comparing the effective export and domestic prices. A positive difference means an implicit tax on consumption financing exports through an implicit export subsidy, while a negative difference means an implicit consumption subsidy.[17]

In a net importing country, where there is no policy specifically affecting the imports or exports of a given commodity, domestically produced commodities and imports are consumed at a c.i.f. price, which is the domestic price, *i.e.* the producer price plus marketing margins or the wholesale price plus internal transportation costs (see Figure 3). This corresponds to the case of zero MPS, *i.e.* the price paid by consumers for the quantities imported and produced domestically is the same with both quantities defined at the same marketing and geographical level.

However, when, for example, a country applies import tariffs, it creates a "double price" with the c.i.f. import price lower than the domestic price. The applied tariff rate average (*i.e.* total receipts from import tariffs divided by total imports) measures the price gap. But, if other policy measures (for example, tariff

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17. An STE is seen as any private, co-operative or public entity with monopoly, or quasi-monopoly, powers over imports, exports or domestic purchases and sales of a given commodity.

import quotas, public stockholding, sanitary barriers, state-trading enterprises) are in place, alone or in a package, they may create an implicit import tax. This can also be measured only by comparing the effective import and domestic prices.

Comparing prices for the price gap

The method for calculating the price gap varies depending on the policies in place. In all cases, the accuracy of the calculation depends on the data quality and availability and the definition of the prices compared. Figure 3 helps to clarify the relationships between the prices that can be used to calculate the MPS. The prices are adjusted to take in to account different marketing and geographical levels of the prices in order to compare "like with like". This is to ensure that the price gap covers only policies specifically affecting the price paid by domestic consumers to domestic producers and does not include factors such as:

- *Natural Protection* — This results in higher (lower) producer prices in the importing (exporting) country in comparison to those in the supplier (purchaser) country due to the transportation costs between the two countries. As the international transportation costs are (not) included in the c.i.f. (f.o.b.) prices with which the producer prices are compared, the resulting price gap excludes natural protection (handicap) as a positive (negative) support to producers of the country.

- *Quality differences* — While, for a net exporter, the f.o.b. price for a commodity generally corresponds to the quality of the commodity produced domestically, this may be not the case of a c.i.f. price for a commodity imported by a net importer country. In this case, the c.i.f. price has to be adjusted to avoid a price gap that included quality differences.

- *Marketing margins and internal transportation costs* — These costs may vary significantly between countries and are much higher in countries with poor transportation, processing and marketing infrastructures. So it is important to deduct the marketing margins and internal transportation costs of the country importing or exporting the commodity and not the costs reflecting marketing structures of another country.

Potential for error in the MPS calculation can arise from not comparing "like with like". A lack of information relating to some commodities means that, sometimes, second best solutions have to be found. The MPS is calculated at the farm gate level, when there is inadequate information on the marketing margins. In this case, the domestic wholesale price can be compared with the f.o.b. (or c.i.f.) price as both prices are at a similar marketing level with the only difference being in terms of the internal transportation costs. Internal transportation costs refer to the costs from the factory to the port in the case of the f.o.b. price and, in the case of a c.i.f. price, they refer to the costs from the port to the place of domestic consumption. Because, in both cases, transportation costs also exist between the factory and the place of domestic consumption, it is considered in some of the current MPS calculations that the costs offset each other.

Figure 3

MPS Calculation : Marketing and geographical levels of commodity prices
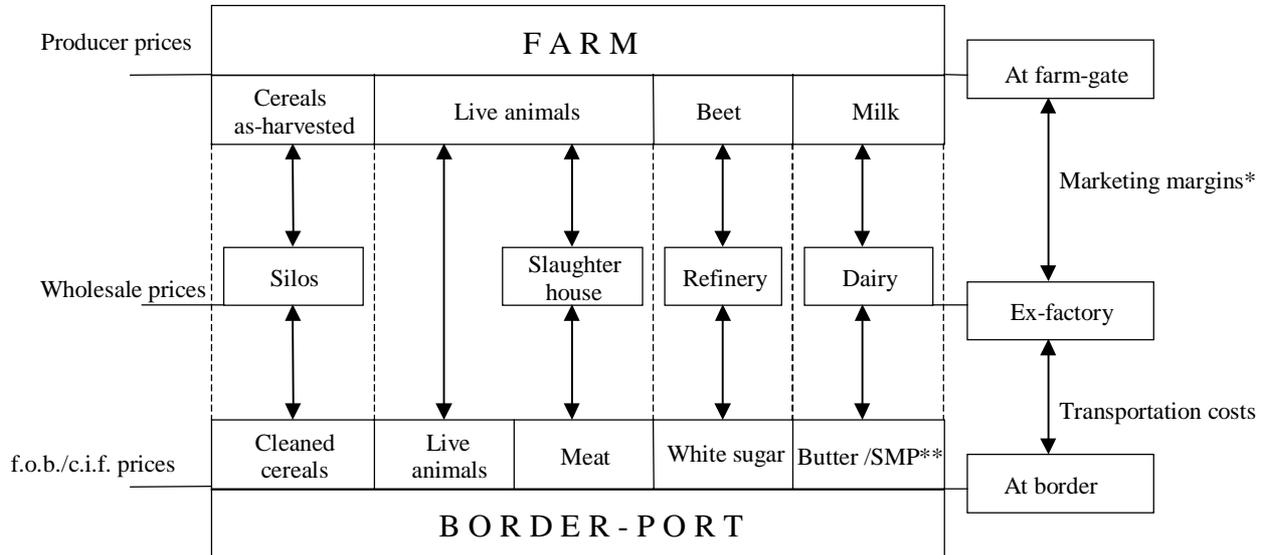
*Marketing margins = handling margin + processing margin + transaction margin + transportation costs
** Skim Milk Powder

Main indicators: methods of calculation

PSE and TSE by country

To calculate the PSE and the TSE for a given country, the only component that has to be calculated for each *commodity* is that part of market price support which is financed by consumers. This is because all the other PSE and TSE components are recorded, explicitly or implicitly, as budgetary expenditure. Input subsidies in the form of interest concessions and tax rebates are budget revenue forgone that have also to calculated, but an estimate often appears in the budget.

The OECD method of calculating the TSE starts with the actual total budget transfers associated with agricultural policies. Market price support is calculated for a number of commodities, and the MPS average for these commodities is then applied to all commodities (*i.e.* to the total value of production of the whole agricultural sector) according to their share in the value of production.[18] This method, even when consistently applied across countries, may over-estimate or under-estimate the MPS for particular countries. The larger the share of production covered by the MPS calculation, the smaller the risk of error. Thus, the error can be reduced by increasing the commodities specifically covered by MPS calculations — the "MPS commodities" as referred in this report.

The share of MPS commodities in the total value of production varies across countries (Table 1). To reduce potential error, efforts have been made to extend the MPS calculation for countries where MPS

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18.   Tables in Part III show, for each country, the list of commodities for which MPS is explicitly calculated, the amount of the MPS for these commodities and the shares of these commodities in the total value of agricultural production.

commodities represent less than 70% of the total value of agricultural production for the past three years. OECD Member countries agreed that the MPS calculations should aim for a commodity coverage of at least 70% of total value of agricultural production. Table 2 shows the MPS commodities by country, *i.e.* those from a standard list for which PSE/CSE/NPC/NAC are calculated by commodity, plus those (in bold) specific to the country (chosen on the basis of their contribution to the total value of agricultural production) for which only MPS is calculated.

Table 1. Coverage of MPS as a percentage of the total value of production in 1999-2001

Country	% coverage	Country	% coverage
Norway	82	New Zealand	73
Switzerland	80	European Union	72
Hungary	78	Mexico	67
Australia	77	Japan	66
Slovak Republic	77	United States	65
Canada	76	Korea	64
Iceland	75	Turkey	63
Czech Republic	73	Poland	58

Table 2. List of "MPS commodities" by country

Australia	Wheat, Barley, Oats, Sorghum, Rice, Soyabean, Rapeseed, Sunflower, Sugar, Milk, Beef and Veal, Sheepmeat, Wool, Pigmeat, Poultry, Eggs, **Cotton**
Canada	Wheat, Maize, Barley, Rice, Soyabean, Rapeseed, Milk, Beef and Veal, Pigmeat, Poultry, Eggs
Czech Republic	Wheat, Maize, Barley, Rapeseed, Sugar, Milk, Beef and Veal, Pigmeat, Poultry, Eggs
European Union	Common Wheat, Durum Wheat, Maize, Barley, Oats, Rice, Soyabean, Rapeseed, Sunflower, Sugar, Milk, Beef and Veal, Sheepmeat, Pigmeat, Poultry, Eggs, **Potatoes**
Hungary	Wheat, Maize, Barley, Sunflower, Sugar, Milk, Beef and Veal, Sheepmeat, Pigmeat, Poultry, Eggs, **Potatoes**
Iceland	Milk, Beef and Veal, Sheepmeat, Pigmeat, Poultry, Eggs
Japan	Wheat, Barley, Rice, Soyabean, Sugar, Milk, Beef and Veal, Pigmeat, Poultry, Eggs, **Apples, Cabbage, Cucumbers, Grapes, Mandarins, Pears, Spinach, Strawberries, Welsh onions**
Korea	Barley, Rice, Soyabean, Milk, Beef and Veal, Pigmeat, Poultry, Eggs, **Red pepper, Garlic**
Mexico	Wheat, Maize, Barley, Sorghum, Rice, Soyabean, Sugar, Milk, Beef and Veal, Pigmeat, Poultry, Eggs, **Tomatoes, Beans, Coffee**
New Zealand	Wheat, Maize, Barley, Oats, Milk, Beef and Veal, Sheepmeat, Wool, Pigmeat, Poultry, Eggs
Norway	Wheat, Barley, Oats, Milk, Beef and Veal, Sheepmeat, Wool, Pigmeat, Poultry, Eggs
Poland	Wheat, Maize, Barley, Oats, Rapeseed, Sugar, Milk, Beef and Veal, Sheepmeat, Pigmeat, Poultry, Eggs
Slovakia	Wheat, Maize, Barley, Oats, Rye, Sunflower, Rapeseed, Sugar, Milk, Beef and Veal, Pigmeat, Poultry, Eggs
Switzerland	Wheat, Maize, Barley, Oats, Rapeseed, Sugar, Milk, Beef and Veal, Sheepmeat, Pigmeat, Poultry, Eggs
Turkey	Wheat, Maize, Barley, Sunflower, Sugar, Milk, Beef and Veal, Sheepmeat, Poultry, Eggs, **Potatoes, Tomatoes, Tobacco, Grapes, Apples, Cotton**
United States	Wheat, Maize, Barley, Sorghum, Rice, Soyabean, Sugar, Milk, Beef and Veal, Sheepmeat, Wool, Pigmeat, Poultry, Eggs

PSE per hectare and full-time farmer equivalent

PSE by country is also expressed in terms of full-time farmer equivalent and per hectare of agricultural land. All forms of farm labour — farmers, hired employees and unpaid family workers — are included in the calculation of the PSE *per full-time farmer equivalents (FFE).* The FFE numbers are standardised to the European Union Annual Work Unit definition of 2 200 hours of working time in agriculture per year. For most countries, the FFE data is taken directly from national data. However, where data for the most recent year, or for earlier years, are not available they are estimated by the OECD Secretariat, but due to lack of information FFE numbers are not calculated for Turkey.

In the calculation of the PSE *per hectare of agricultural lan*d, the agricultural land area in each country is measured as the sum of the area of arable land, land under permanent crops and permanent meadows and pastures (from FAO data). Where data for the most recent year, or for earlier years, are not available, they are estimated by the OECD Secretariat.

PSE and CSE by commodity

The calculation of any indicator by commodity needs to have a precise meaning to be useful for policy analysis. In a given year, the allocation of a transfer to specific commodities has a meaning for policy analysis only when such a transfer depends on individual farmers' or consumers' decisions or actions and affects, to some extent, commodity production or consumption. This is the case for transfers in the PSE and CSE, but not for transfers in the GSSE and the TSE.

All transfers included in the CSE are transfers to (from) individual consumers of a specific commodity and affect consumption decisions relating to that commodity. Therefore, there is no specific conceptual or practical difficulty in the CSE calculation by commodity. All transfers included in the PSE of a given country are transfers to agricultural producers individually that implicitly or explicitly increase gross farm receipts. Some of these transfers are not commodity specific but increase overall farming receipts across many or all commodities and thus have to be allocated by commodity. Such allocations are made on a case-by-case basis according to the specific implementation criteria of the policy measure in question. In general, the allocation coefficients are the shares of each commodity in the total value, area, or animal number of all relevant commodities.

Market price support, payments based on output and payments based on planted area or animal numbers are, by definition, commodity-specific. Payments based on historical entitlements are provided to producers of a specific commodity, or a specific group of commodities, at the moment of introduction of the payment. In some cases, the payment rates are specific to particular livestock or crops, and by farm.

Payments based on input use and *payments based on input constraints* also affect production decisions concerning the limited group of commodities that a given farm can produce using the inputs in question. As most of these programmes are input-specific (and often specific to regions), they are allocated to the limited group of commodities that can be produced from the inputs and in the regions in question. *Payments based on overall farming income* allow farmers to produce any agricultural commodity. However, by increasing overall farm receipts, they also influence farmers' decisions to stay in the sector. As most of the programmes in this category are, in practice, region-specific in their basic conditions or implementation requirements, they are, as far as possible, allocated to the relevant commodities.

It should be made clear that some of these allocations to commodities are only a proxy for the payments received by producers of such commodities in a given year. That is especially the case of the *payments based on historical entitlements* and the *payments based on overall farming income.* Therefore, more than for any other group of payments in the PSE by commodity, attention should be drawn to the fact that there

18

is no direct link between the amount allocated to each commodity and the level of production of that commodity.

Finally, transfers included in the *TSE* of a given country include those to individual producers and consumers, and transfers to general services provided to agriculture collectively *(GSSE)*. Although some of the *GSSE* transfers (for example, for research) may be intended for work relating to specific commodities, they do not affect farm receipts or consumer expenditure in such a way that the amounts involved can be directly attributed to producers or consumers. Therefore, the *GSSE* transfers are not allocated to commodities, as such transfers do not depend on the decisions or actions of any individual farmer or consumer affecting the production or consumption of specific commodities in a given year.

Percentage PSE/CSE and Producer/Consumer NAC

The PSE by country and by commodity can be expressed in monetary terms — the **PSE**; as a ratio of the value of total gross farm receipts,[19] measured by the value of total production (at farm-gate prices), plus budgetary support — the **percentage PSE**; or a ratio between the value of total gross farm receipts including support, and production valued at world market prices without support — the **producer NAC** (Nominal Assistance Coefficient).

In algebraic form, these PSE expressions can be written as follows:

$$\%PSE = PSE / (Q \bullet Pp + PP) \times 100 \tag{1}$$

$$(100 - \%PSE) = Q \bullet Pb / (Q \bullet Pp + PP) \times 100 \tag{2}$$

$$[100 \times 1/(100 - \%PSE)] = [\%PSE/(100-\%PSE) + 1] = [(PSE/Q \bullet Pb) + 1] = NACp \tag{3}$$

Where,

PP = Payments to producers = PSE – *Market Price Support* = $\sum$*I.B to I.H* (Box 1)

Q•Pp = value of production at producer prices (not including output payments)

Q•Pb = value of production at border prices

For example, a %PSE of 60%, expresses the share of transfers to agricultural producers in the total value of gross farm receipts (as measured by the PSE), or the share of gross farm receipts derived from policies [equation (1)]. Hence, some 40% of gross farm receipts is derived from the market without any support [equation (2)]. The value of gross farm receipts is two and a half times (or 150% higher than) what it would be if entirely obtained at world prices without any budgetary support [equation (3)] — a producer NAC of 2.5.

When the producer NAC is equal to one, this means that gross farm receipts are entirely derived from the market without any support. Therefore, the higher the producer NAC, the lower (greater) the share of gross farm receipts derived from the market (support). This can be seen as an indicator of *market orientation*, *i.e.* the degree to which production is influenced by market signals (relative to those from government intervention).

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19.   Gross farm receipts are not the same as farm income, which is farm receipts less farm costs.

All transfers included in the CSE are implicit taxes or explicit budgetary transfers to consumers of agricultural commodities affecting consumer expenditure (valued at the farm gate) of agricultural commodities. Therefore, the CSE by country and by commodity can be expressed in monetary terms — the **CSE** as a ratio of the total value of consumption expenditure on commodities domestically produced, measured by the value of total consumption (at farm-gate prices), minus budgetary support to consumers (the **percentage CSE**); or a ratio between the total value of consumption expenditure on commodities domestically produced, including support to producers, and consumption valued at world market prices, without budgetary support to consumers (**consumer NAC**).

In algebraic form, the CSE expressions can be written as follows:

$$\%CSE = .CSE/(Qc{\bullet}Pd - TC) \times 100 \tag{4}$$

$$(100 + \%CSE) = Qc{\bullet}Pb/(Qc{\bullet}Pd - TC) \times 100 \tag{5}$$

$$[100 \times 1/(100 + \%CSE)] = [\%CSE/(100 + \%CSE) + 1] = [(CSE/Qc{\bullet}Pb) + 1] = NACc \tag{6}$$

Where,

TC = taxpayer transfers to consumers = *III.R. Transfers to consumers from taxpayers* (Box 1)

$Qc{\bullet}Pd$ = value of consumption at domestic prices (at the farm gate)

$Qc{\bullet}Pb$ = value of consumption at border prices

For example, a %CSE of –60% indicates that 60% of total consumption expenditure on agricultural commodities represents a transfer from consumers to producers or the share of the consumption expenditure created by policies [equation (4)]. A consumer NAC of 2.5 indicates that expenditure by primary consumers is two-and-a-half times, or 150%, higher than it would have been if it had been conducted entirely at world market prices without any budgetary support to consumers [equation (6)].

When the consumer NAC is equal to one, this means that total consumer expenditure on agricultural commodities is at market prices, without any support to producers and consumers. Therefore, the higher the consumer NAC, the less (more) the share of consumer expenditure reflects the market. The NAC can be seen as an indicator of *market orientation*, *i.e.* the degree to which consumption of agricultural commodities is influenced by market signals (relative to those from government intervention).

Producer/Consumer Nominal Protection Coefficient (NPC)

The **producer NPC** measures the ratio between the average price received by producers (at the farm gate), including payments based on output (PO/tonne), and the border price (at the farm gate). In algebraic form this can be expressed as follows:

$$NPCp = (Pp + PO/tonne) / Pb = [(Pp - Pb) + PO/tonne] / Pb +1 \tag{7}$$

For example, an NPCp of 2 shows that the price received by farmers is twice the border price. The **producer NPC** can be seen, therefore, as an estimate of the *nominal rate of market protection* for producers, or the rate of the implicit export subsidy necessary to export any quantity produced.

The **consumer NPC** measures the ratio between the domestic price paid by consumer (at the farm gate) and the border price (at the farm gate). In algebraic form this can be expressed as follows:

$$NPCc = (Pd / Pb) = (Pp - Pb) / Pb +1 \qquad\qquad (8)$$

For example, an NPCc of 2 shows that the price paid by consumers is twice the border price. The **consumer NPC** can be seen, therefore, as an estimate of the *nominal rate of market protection* for consumers, or the average rate of the implicit import tax applied in the domestic market.

Percentage GSSE and TSE

For a given country or commodity, the calculation of any of the indicators in percentage terms has a precise meaning. This is the case of the %PSE and %CSE in which both the numerator and the denominator have an economic meaning, and the value of the transfers in the numerator can be seen as an integral part of the denominator.[20] Moreover, as both the numerator and the denominator are in value, the %PSE and %CSE eliminate the effect of inflation. As a result, percentage indicators are more representative and more appropriate measures of support for analysis over time and across countries.

The **percentage GSSE** is defined as the share of support to general services provided to agriculture in the total support to agriculture (TSE), the rest being the support to individual producers and consumers of domestic agricultural commodities. In a situation of public support to agriculture, the higher the percentage GSSE, the lower the share of support affecting individual decisions on domestic production and consumption of agricultural commodities.

The TSE includes transfers from taxpayers (which are a component of total current government expenditure) and transfers from consumers (which are a component of total domestic consumption expenditure). Both of these transfers, from taxpayers and consumers, are included in Gross Domestic Product (GDP). Therefore, the **percentage TSE** is defined as the share of total support to agriculture in the total GDP. The higher the percentage TSE, the larger the share of national income used to support agriculture.

Main indicators: general interpretation

Highlighting the use of some other well-known economic indicators in policy analysis may assist a better understanding of the general interpretation given to the PSE and related indicators in evaluating agricultural policy developments. For example, while the annual variation in gross domestic product (GDP) gives an indication of a country's economic performance, by itself, it does not show the causes and consequences of the economic situation. Other related indicators, such as the rates of inflation and economic growth help in understanding the economy better, although each of these related indicators measures a particular trend in the economy. Thus, it is the analysis of all these indicators combined that allows a comprehensive evaluation of the economic situation of the country.

Like the PSE and CSE, the GDP price index measures inflation in a production perspective, while the CPI measures inflation in a consumption perspective. The analysis of the components of the GDP price index, and those of the CPI, can help to identify distortions in production and consumption and the need to adjust certain policies. The analysis of the effects of factors, such as the effects of exchange rates on the rate of inflation, may help in the evaluation of policies. The analysis is not concerned, however, with "factoring out" the effects of exchanges rate variations on the inflation indicators for policy analysis. On the contrary,

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20.   The GSSE and the TSE are not a part of the total value of farm receipts (as is the PSE) nor a part of the total value of consumption expenditure of agricultural commodities (as is the CSE).

exchange rate and inflation affect all economic activities and eliminating them would result in the loss of a major source of information needed for assessing the effects of inflation.

Do these indicators help to assess progress in policy reform?

There is a recognised need to manage the economy to keep inflation and associated distortions low. In this sense, the inflation rate can be seen as an indicator of the need for policy reform. The annual variation in inflation does not necessarily measure progress in reform. However, after a period of policy reform, a sustained and significant reduction in the average rate of inflation could indicate progress in reform. The same could not be said if the average inflation rate remains unchanged or higher. Any judgement on the effects of inflation changes on production, consumption and wealth of the country needs the use of other economic indicators and tools.

The PSE/CSE and related indicators provide measures of the level of support, and the degree of protection and market orientation, which are the basis to identify the associated production, consumption and trade effects (or distortions). The analysis of these indicators provides an assessment of the need for, and progress in, policy reform. Although these indicators do not measure, by themselves, the effects or distortions, they provide the necessary data and information for the quantification of such effects. The calculation of the "subsidy element or equivalent" of each policy measure is achieved through the use of other economic tools, such as the OECD Policy Evaluation Matrix.

Method of policy evaluation

Since 1987, the PSE and related indicators have been used as the principal tools to monitor and evaluate agricultural policy developments in the light of the policy reform principles. The PSE and related indicators are estimates of the costs (monetary transfers) for consumers and taxpayers of support arising from agricultural policies, but do not themselves quantify the impacts of policy measures on such variables as production, consumption, trade, farm income or the environment. Those impacts depend on the *level of support*, the *nature of support* in terms of the way policy measures are implemented, and the *responsiveness* of those variables to changes in support. Moreover, policy measures are rarely applied in isolation and their impacts depend also on the policy mix or *composition of support*. The impacts or distortions associated with agricultural support are also the result of different *rates of support* among agricultural commodities and between commodity and non-commodity based support. Finally, the extent of such impacts and distortions may be limited through constraints imposed on production, on factors of production or on farming methods and technologies. The quantification of these impacts (distortions) requires economic models such as the *Policy Evaluation Matrix* (PEM) developed by OECD, and data such as Agri-Environmental Indicators.

To contribute to a better quantitative or qualitative evaluation of policy impacts, the policy measures included in the TSE are grouped according to the conditions under which the associated transfers are provided, *i.e.* to producers (PSE), to consumers (CSE), or to general services provided to agriculture (GSSE). Policy measures within the PSE are classified in terms of how policies providing transfers to farmers are implemented. This composition of support allows a ranking of categories of PSE measures according to their *potential* impacts on production, consumption, trade, income, or the environment. The relative impacts of the different categories of PSE measures on each of these variables are important elements used to evaluate policy developments in OECD countries.

The GSSE transfers are collectively provided to the sector as a whole, while the PSE/CSE transfers are provided to individual farmers/consumers. Contrary to the PSE transfers, GSSE transfers do not depend on any individual framers' decisions or actions to produce goods or services, or use factors of production, and

do not affect farm receipts directly. Therefore, all other things equal, although GSSE transfers can in the long run contribute to improve or expand the sector's production capacity of the country, in the short run their commodity production, trade and farmers' income impacts are lower than those associated with PSE transfers. However, environmentally targeted measures implemented through GSSE measures may be the most effective and less costly way to achieve specific environmental goals.

In summary, there is no single indicator to evaluate a policy change. The PSE/CSE, NPC, NAC, GSSE and TSE are interrelated indicators of the main elements that determine the impacts of policies on production, consumption, trade, income, and the environment. Any quantitative or qualitative evaluation of policies needs to use all of these indicators.

Relative impacts of producer support measures on production and trade.

The impacts of a policy measure on production and trade of a commodity depend on both, the degree to which extra resources are attracted to produce that commodity and the degree it affects consumption of the commodity. In general, the more a policy measure provides specific support to a commodity, the greater the impacts on production and trade of that commodity, although restrictions or constraints on providing support will generally limit these impacts.

All other things being equal, the main categories of PSE measures can be ranked according to their relative impacts on production and trade as follows:[21]

- *Market Price Support (MPS)* is by definition commodity specific. Support is provided through the higher price received by producers and paid by consumers for the commodity in the domestic market compared with the border price. The more the commodity is produced, the higher will be the total support paid and the consumer burden. MPS is the only form of support that simultaneously affects production and consumption of a commodity and as such has the greatest impacts on production, consumption and trade.

- *Payments based on output* are budget financed and raise the price received by producers, thus having the same impact on current production as MPS, but with no direct impact on consumption.[22] Thus they have a smaller impact on trade than MPS. This is why a USD 1 of MPS and a USD 1 payment per tonne have the same effect on production and on the Nominal Protection Coefficient (NPC) for producers, but not on consumption and on the NPC for consumers.

- *Payments based on use of inputs* are budget financed and reduce the cost of inputs used by producers. An input payment may have a higher, the same, or a lower effect on production and trade than an output payment depending on the type of input. The more the payment is specific to a variable input necessary to obtain a given commodity the greater the incentive for production intensification (input use or yield raising) and the impacts on production and trade of the commodity. With limited resources the production impacts of payments based on *fixed* inputs are potentially lower than those based on *variable* inputs, because of the mobility of the latter.

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21. This ranking is consistent with the results of the work on *A matrix approach to evaluating policy: preliminary findings from PEM pilot studies of crops policy in the EU, the US, Canada and Mexico*, OECD 2000; on *Market Effects of Crop Support Measures*, OECD, 2001; and on *Decoupling: A Conceptual Overview*, OECD, 2001.

22. Although market prices may be driven down due to extra production.

- ***Payments based on area planted/animal numbers*** are budget financed and based on *current* plantings or animal numbers. Although producers have to plant specific crops or own specific animals, they are not encouraged to produce as intensively or sell the commodity, as they are with the others forms of support outlined above. Therefore the production and trade impacts of these payments are lower than those of the forms of support listed above.

- ***Payments based on historical entitlements*** are budget financed but based on *historical* parameters (*i.e.*, past support, area, animal numbers, production, or income associated with specific commodities). As producers are not obliged to plant, own animals, or produce any particular commodities in order to receive the payments, their impacts are lower than those of the previous forms of support.

- ***Payments based on input constraints*** are budget financed and paid on the condition that farmers respect certain constraints (reduction, replacement or withdrawal) on the use of inputs, including changing farm practices often for environmental purposes. These payments may be targeted to specific situations and reduce production or have impacts on production and trade lower than the previous forms of support, depending on the type of constraint.

- ***Payments based on overall farming income*** are budget financed and paid on the condition that the overall farm income (or revenue) is below a pre-defined level. These payments can be targeted to the situation of specific farmers, and although they have the potential to retain resources in the sector and thus the capacity to produce, their production and trade impacts are the least compared with other forms of support to producers.

Relative impacts of producer support measures on farmers' income

The relative impacts of producer support (PSE) measures on farmer's income largely depend on the degree to which the associated payments are retained by farmers to remunerate their own resources[23] rather than transferred to other sectors to remunerate purchased inputs or rented land. In general, the more the policy measure compensates for an income gap or loss in the remuneration of farmer-owned resources, the greater is the effectiveness (impact) in achieving a given income goal (outcome) and in transferring income to farmers.

All other things being equal, the main categories of PSE measures can be ranked according to their relative impacts on raising farmer's income as follows:[24]

- ***Payments based on overall farming income*** are entirely received and kept by farmers because they are paid on the condition of being a farmer to compensate for an income gap, measured by the difference between current overall farmer's income and a pre-defined income level. Thus, these payments compensate for the difference in the remuneration of farmers' owned resources after changes in farming practices and/or market and natural conditions. Translating dollar-for-dollar into additional farmer's income, these payments have the greatest effectiveness in transferring income to farmers and in achieving an income objective.

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23. Farmers' income is in fact the remuneration of the farmers' owned resources.

24. This ranking is consistent with the results of the work on *The Incidence and Transfer Efficiency of Farm Support Measures*, OECD, 2001 (unpublished).

- ***Payments based on input constraints*** are paid on the condition of respecting certain constraints (reduction, replacement or withdrawal) on the use of inputs, which impose changes in farming practices generally for environmental purposes. Like the above form of support these payments can compensate for an income gap, measured by the difference in costs or the remuneration of farmers' owned resources after the changes in farming practices. However, the more the payments encourage the use of farmers' owned resources, the greater is the impact on their income.[25] The more the payments cover the costs of purchased inputs or resources owned by others, for example rented land in the case of payments made to withdrawal, the lower (greater) is the share of the payments received by farmers (landowners).

- ***Payments based on historical entitlements*** (*i.e.* past support, area, animal numbers, production or income associated with specific commodities), often paid by hectare, may be entirely retained by farmers because they are not obliged to plant, own animals, or produce any specific commodities in order to receive the payment. When paid per hectare, the more the eligible land is rented, the lower (greater) is the share of the payments received by farmers (landowners). Therefore, these payments may have the same or a lower raising impact on farmer's income than the previous form of support, depending on the entitlement basis and the extent to which the beneficiaries are current farmers.

- ***Payments based on area planted/animal numbers*** are generally not entirely retained by farmers because in order to receive the payment they are obliged to plant specific crops or own specific animals and thus remunerate purchased inputs. The more purchased inputs and/or rented land are used to plant crops or keep animals, the lower (greater) is the share of the payments received by farmers (input suppliers and landowners). Therefore, these payments have a lower impact on farmer's income than the previous form of support.[26]

- ***Payments based on output*** and ***market price support*** are not entirely retained by farmers because in order to receive any of these forms of support farmers have to produce and sell the eligible commodity and thus remunerate purchase inputs and/or extra land. The more the commodity is produced intensively, the greater is the use of purchased inputs, and the smaller (larger) is the share of support transferred to farmers (input suppliers). Moreover, the more the land used is rented, the lower (greater) the share of the payment kept (transferred to) by farmers (landowners).

- ***Payments based on use of inputs*** are paid to compensate for a share of the cost of purchased inputs (*i.e.* fertilisers, machinery, credit, and on-farm services). They may be entirely transferred to input suppliers because farmers have to buy the input to receive the payment. The income impact of these payments depends on the productivity of input on which the payment is based. The more output is obtained per unit of subsidised input, the greater is the raising impact on farmer's income. Therefore, the income impact of these payments may be equal or lower than the previous two forms of support depending on the eligible inputs.

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25.   For example, a USDA study analyses the income impacts of three different types of agri-environmental payments: "improve performance" payments under which farmers must reduce soil erosion or nutrient runoff to receive payments; "good performance" payments tied to a specific threshold of estimated soil erosion or nutrient runoff; and "good practices" requiring the use of specific conservation practices to contain soil erosion or nutrient runoff. The study concludes that while the first type of payments "provides the largest farm income boost per dollar of payment", the last two types "offer significant income support to farmers". See *Agri-Environmental Policy at the Crossroads: Guideposts on a Changing Landscape*. Agricultural Economic Report No. 794, ERS, USDA, January 2001.

26.   The same impact would occur where no purchased inputs and land rented are used to plant or keep animals.

Relative impacts of producer support measures on the environment[27]

The impacts of producer support (PSE) measures on the environment (Box 4) largely depend on their effects on farm-level decision-making concerning the *intensive* (input use) or *extensive* (land use) degree of agricultural production. These impacts result from the relationships linking land quality, production practices, input use, and environmental quality defined in terms of, for example erosion, chemical run-off, leaching, landscape and biodiversity or wildlife habitats. In general, the more a policy measure provides an incentive to increase production of specific agricultural commodities — the greater is the incentive for *monoculture*, intensification (greater yields), or using marginal (environmental sensitive) land — and the higher is the pressure on the environment. However, some restrictions or constraints on providing support (*e.g.* environmental cross-compliance[28] and regulations) may attenuate the environmental impacts of support measures. Moreover, the more a policy measure can be targeted to a specific environmental goal and situation, the greater is its potential *effectiveness* in achieving such a goal.

Box 4. Environmental impacts of agricultural policies: Interpreting directions of change[29]

All production and consumption activities have an impact on the environment, which are accentuated or attenuated by policies. Impacts of agricultural policy measures on the environment largely depend on the degree to which such measures encourage (discourage) the use of inputs (especially farm chemicals and machinery), environmentally sensitive land, or farm practices and systems.

The natural environment has a "carrying capacity" in relation to the economic activities on which it depends, but is dynamic and changes through time, including through the influence of technologies. The sustainability of agriculture may be considered as the process in which food and fibre is produced in economically efficient ways within the evolving carrying capacity of the environment. The state of the environment may be measured through indicators defining a scale of values of environmental quality or sustainability/unsustainability in a given area or region.

Defining and evaluating the environmental quality of agriculture in principle needs as many indicators as environmental features or qualities defined in terms of for example erosion, soil or water nutrient loading, chemical run-off, leaching, and biodiversity or wildlife habitats. For each indicator there is a *point* in the scale of values defining the frontier between environmental sustainability and unsustainability, or a *band* of sustainable (or unsustainable) values, which depend on specific ecological states.

No environmental outcome should be seen as intrinsically harmful/unsustainable (e.g. soil erosion or water pollution) or beneficial/sustainable (e.g. biodiversity, landscape) as it depends on the degree and direction of change in the quality (indicator) of the particular environmental feature. However, the introduction of (or change in) a policy measure influences farming practices and thus has a beneficial or harmful environmental impact as it reduces or increases environmental pressure. In other words, it enhances or damages the *existing* state of the environment corresponding to a certain degree of environmental quality or sustainability.

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27.   This section is consistent with the results of the work on *Improving the Environmental Performance of Agriculture: Policy Options and Market Approaches,* OECD, 2001; and on *The Environmental Effects of Reforming Agricultural Policies*, OECD, 1998.

28.   Support conditional upon farmers undertaking some type of environmental compliance.

29.   This box is consistent with the results of the work on *Improving the Environmental Performance of Agriculture: Policy Options and Market Approaches,* OECD, 2001.

All other things being equal, the main categories of PSE measures can be ranked according to their relative impacts on the environment as follows:

- *Market price support* and *payments based on output* both increase the price received by producers for a specific commodity such that the more the commodity is produced, the higher will be the support. Thus, the higher the support, the greater is the incentive for monoculture, for increasing the use of inputs (such as chemicals), and/or for using environmentally sensitive land, and the greater is the pressure on the environment. Moreover, these payments have the lowest effectiveness in achieving environmental goals, as they are production-wide payments that can not be targeted to any environmental goal or situation, which are generally local in nature.

- *Payments based on input use* reduce the cost of inputs used by producers such that the more the input is used the higher will be the support. Thus, the higher these payments, the greater the incentive to use the input, and the greater the impact on production and the environment. The more the payment is specific to a variable input (*e.g.* fertiliser, pesticide) the greater the incentive for production intensification, and the pressure on the environment. For example, the environmental impact of a credit subsidy for purchasing fertilisers or pesticides is potentially higher than a credit subsidy for acquiring farm land or extending farm buildings. Therefore, these payments may have a higher, the same, or a lower effect on production and the environment than an output payment depending on the type of input on which the payment is based.

- *Payments based on area planted/animal numbers* reduce the cost of land/livestock for current plantings/ animal numbers. As producers have to plant a specific crop or own specific animals, these payments may be an incentive for keeping environmental sensitive land producing commodities non-environmentally-friendly in such land. Although these payments may be targeted to a specific environmental goal or situation, they provide an incentive to bring additional land or animals into specific production and encourage monoculture in the same way as the payments based on output. However, as producers are not encouraged to increase yields and to produce as intensively as they are with the forms of support outlined above, the environmental impact of these payments is potentially lower.

- *Payments based on historical entitlements* (*i.e.* past support, area, animal numbers, production, or income) and *payments based on overall farming income* (paid on the condition that the overall level of farmers' income is below a pre-defined level) also have the potential for retaining environmentally sensitive areas under production. However, in receiving these payments producers are not obliged to plant, own animals, or produce any particular commodities, thus they allow for individual choices on environmentally friendly production techniques, and do not encourage production intensification and/or monoculture. Therefore, the impact of these payments on the environment are relatively benign or lower than the previous forms of support.

- *Payments based on input constraints* are provided on the condition that farmers respect certain constraints (reduction, replacement or withdrawal) on the use of inputs often for environmental purposes. These payments may be targeted to address specific environmental issues associated with agriculture. Through constraining production intensity, these payments encourage production diversification, or remove environmentally sensitive land from production relative to what would otherwise occur. These payments may thus contribute to offset the harmful environmental impacts arising fully or partly from one or more of the previous forms of support. The environmental impacts of these payments depend on the type of constraint, but they have the potential for reducing environmental pressure and for being the most environmentally effective PSE measures.

How are support indicators used to evaluate policy changes?

The *TSE* in percentage measures the share of total support to agriculture in the GDP of a country, which is the share of the country's income used to support agriculture. Although the percentage TSE is influenced by the size of agriculture in the economy, the higher it is the greater the cost of agricultural policy to the economy. The *GSSE* in percentage measures the share of transfers to general services provided to agriculture in the TSE, and therefore gives a measure of the relative importance of PSE and GSSE transfers in each country. All other things equal, the lower the percentage GSSE, the greater the share of PSE transfers in the TSE and the associated impacts on production, trade, income, and the environment. In other words, all other things being equal, a change in a policy granting transfers to individual producers has potentially greater short run impacts than a change in a policy offering transfers to general services provided to agriculture.

A key reform principle is to reduce market protection and improve market orientation through policies that result in lower support delivered in less distorting ways. *Market protection* measures the degree to which domestic markets are insulated from world markets. *Market orientation* is a more comprehensive concept and refers to the degree to which the signals guiding production, consumption and trade come from the market (relative to those from policy intervention). Market protection may be measured by the prices received by farmers and those paid by consumers at farm gate in relation to world (border) prices. Market orientation is therefore associated not only with such "price gaps", but also with other forms of government intervention influencing production and consumption.

One indicator of the degree of market protection is the *nominal rate of protection*, as measured by the NPC, while the degree of market orientation may be expressed through the *nominal rate of assistance*, as measured by the NAC. The higher the rates of (explicit or implicit) export subsidies or import duties and the associated support prices, the greater the NPC and the producer or market protection. And the higher the share of farm receipts resulting from government intervention, the more the producer NAC is above one and the lower the degree of market orientation. All other things being equal, the higher the market protection (and the NPC) the greater the impacts on production and trade. And with a given level of market protection, the lower the degree of market orientation (the higher the NAC) the greater are those impacts.

Therefore, *NPC* and *NAC* indicators provide the specific information that is used to evaluate changes in policy measures in light of the policy reform principles. Using these indicators, the evaluation of policy changes in relation to this principle is based on the following guidelines:

- A permanent decrease in the producer/consumer NPC indicates lower market protection — a closer alignment of domestic and world prices through a lower nominal rate of protection to producers/imports and a reduced implicit rate of export subsidy/import tax applied to export/import commodities — and thus a reduction in the most production/consumption and trade distorting measures;

- A permanent decrease in the producer/consumer NAC indicates lower support and greater market orientation — a higher share of farm receipts generated in the market at unsupported prices — and thus lower government intervention and risk of production/consumption distortions.

Both reducing market protection together with improving market orientation, and ensuring policy effectiveness in achieving income and environmental objectives are key reform principles. Changes in the level and composition of *PSE* together with the rankings of measures according to their relative impacts on production, trade, income and the environment are also used to evaluate policy changes in relation to the reform principles.

These rankings show at one extreme market price support, payments based on output, and payments based on input use ("output/input-linked support") as the PSE measures that potentially have the greatest effects in stimulating production and input use, which distort trade and often contribute to raise environmental pressure[30]. Moreover, these measures are the least effective in transferring income to farmers or targeting the provision of environmental benefits.

Payments based on input constraints and payments based on overall farming income are at the other extreme of the ranking. Therefore, the greater the movement in policy change from market price support, payments based on output, and payments based on input use to payments based on input constraints and payments based on overall farming income, the lower the policy distorting impacts on production and trade, and the greater the policy effectiveness in transferring income to farmers or the potential to target environmental goals.

A comprehensive evaluation of policy changes needs to include the following guidelines:

- A permanent reduction in the rate of support (% PSE) with a reduction in output/input-linked support is a step in the direction of policy reform — lower costs for consumers (%CSE) and/or taxpayers and potentially less impacts on production and trade, lower environmental pressure and less support induced income discrepancies;

- A permanent reduction in the rate of support (% PSE) with an increase in output/input-linked support is a move away from policy reform — although overall less costly for taxpayers and/or consumers (%CSE), it increases the measures that are the most production and trade distorting, with the greatest environmental pressure and the lowest effectiveness in transferring income to farmers or targeting the provision of environmental benefits;

- A permanent increase in the rate of support (% PSE) with an increase in output/input-linked support is a move away from policy reform — higher costs for taxpayers and/or consumers (%CSE) and an increase in the measures that are the most production and trade distorting, with the greatest environmental pressure and lowest effectiveness in transferring income to farmers or targeting the provision of environmental benefits;

- A permanent increase in the rate of support (% PSE) with a decrease in output/input-linked support is ambiguous with respect to reform — higher costs for taxpayers, possibly higher costs for consumers (% CSE) depending on the rate of the PSE rise, with more or less impacts on production and trade (depending on the relative magnitudes of changes), and on farmers' income and the environment (depending on the type of measures benefiting from a greater share of support).

The country-wide averages of the above indicators may in some cases hide a wide variation across commodities and regions. In some countries, price support — through MPS, or payments per tonne — exists for many commodities, while in others it only exists for a few. Therefore, it is important to complement the evaluation with a reference to the number of commodities eligible to receive price support and the range of each of the above indicators across commodities. As the OECD Ministers agreed to initiate the reform in 1987, it is appropriate to monitor and evaluate the progress in reform relative to the 1986-1988 average. Although the annual monitoring and evaluation report monitors and evaluates policy developments in the year under review, the evaluation also assesses the contribution of the annual policy developments to the long-term trend on the main indicators, in particular because year-on-year changes are often small and the effects take time to appear.

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30.   But it is also recognised that policies can enable agricultural production to take place in some areas of high nature value.