# Chapter 1.

# Developments in agricultural policy and support

*The key economic and market developments which provide the framework for the implementation of agricultural policies are analysed in the first part of this chapter. The next part presents the main recent changes and new initiatives in agricultural policies 2017-18 in OECD countries and key Emerging Economies. Then the developments in the estimated support (using the OECD Producer Support Estimate methodology) are evaluated in terms of its level, composition and changes over time in the OECD countries and Emerging Economies included in this report. The chapter also focuses on developments in approaches to support and policies related to agricultural innovation for sustainable productivity growth. The chapter ends with an assessment of support and policy reforms and related recommendations.*

## Key economic and market developments

Conditions in agricultural markets are heavily influenced by macro-economic variables such as global gross domestic product (GDP) growth (which supports demand for agricultural commodities) and energy prices, especially for crude oil (which determines the price of inputs into agriculture, such as fuel, chemicals and fertiliser, and influences demand for cereals, sugar crops, and vegetable oils through the market for biofuels).

The global economy strengthened in 2017, growing at 3.6%, its fastest rate since 2011, as economic conditions improved in several regions (Table 1.1). Growth in the OECD economies strengthened to 2.4% in 2017, up from 1.8% in 2016, and the OECD-wide unemployment rate fell below its pre-crisis level (OECD, 2018a). In the United States, economic growth increased in 2017 as the drag of past exchange rate appreciations and oil price movements abated. Unemployment was at its lowest level since 2000. Growth in the Euro area continued steadily in 2017, broadening across sectors and countries, and supported mostly by domestic demand. In Japan, growth rebounded to 1.5% in 2017, aided by stronger international trade and fiscal stimulus (OECD, 2017a).

Growth in the Emerging Economies is lower than in the past. After recessions in 2016, growth in Brazil and the Russian Federation recovered in 2017. Growth has resumed in Brazil – initially driven by agriculture, the recovery is now becoming firmer and more broad-based. In the Russian Federation, investment and consumption picked up on the back of higher oil prices and low inflation, and the economy continued to grow slowly. Growth in the People's Republic of China (hereafter, "China") strengthened somewhat in 2017, driven by services and some strategic industries (OECD, 2017a).

Global trade has rebounded since the first half of 2016 and become increasingly broad-based across economies. Global trade growth was 4.8% in 2017, compared with 2.6% in 2016 and 4.7% on average in the period 2005-14. Key factors underlying this include the recovery in Europe (a relatively trade intensive part of the world economy), the strong pick-up in electronics trade in Asia, and a shift in the composition of demand towards investment, which is more trade intensive (OECD, 2017a).

**Table 1.1. Key economic indicators**

OECD area, unless noted otherwise

| | Average 2005-14 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| | Per cent | | | |
| Real GDP growth[1] | | | | |
| World[2] | 3.8 | 3.3 | 3.1 | 3.6 |
| OECD[2] | 1.5 | 2.4 | 1.8 | 2.4 |
| United States | 1.5 | 2.9 | 1.5 | 2.2 |
| Euro area | 0.8 | 1.5 | 1.8 | 2.4 |
| Japan | 0.6 | 1.1 | 1.0 | 1.5 |
| Non-OECD[2] | 6.2 | 4.0 | 4.1 | 4.6 |
| Brazil | 3.5 | -3.8 | -3.6 | 0.7 |
| China | 10.0 | 6.9 | 6.7 | 6.8 |
| Colombia | 4.7 | 3.1 | 2.0 | 1.7 |
| Russia | 3.5 | -2.8 | -0.2 | 1.9 |
| South Africa | 3.1 | 1.3 | 0.3 | 0.7 |
| Output gap[3] | -0.9 | -1.4 | -1.2 | -0.5 |
| Unemployment rate[4] | 7.2 | 6.8 | 6.3 | 5.8 |
| Inflation[1,5] | 2.0 | 0.8 | 1.1 | 1.9 |
| World real trade growth[1] | 4.7 | 2.7 | 2.6 | 4.8 |

1. Percentage changes; last three columns show the increase over a year earlier.
2. Moving nominal GDP weights, using purchasing power parities.
3. Per cent of potential GDP.
4. Per cent of labour force.
5. Private consumption deflator.

*Source*: OECD (2017a), *OECD Economic Outlook, Volume 2017 Issue2*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eco_outlook-v2017-2-en. Last updated 27 November 2017. OECD Economic Outlook 102 database.

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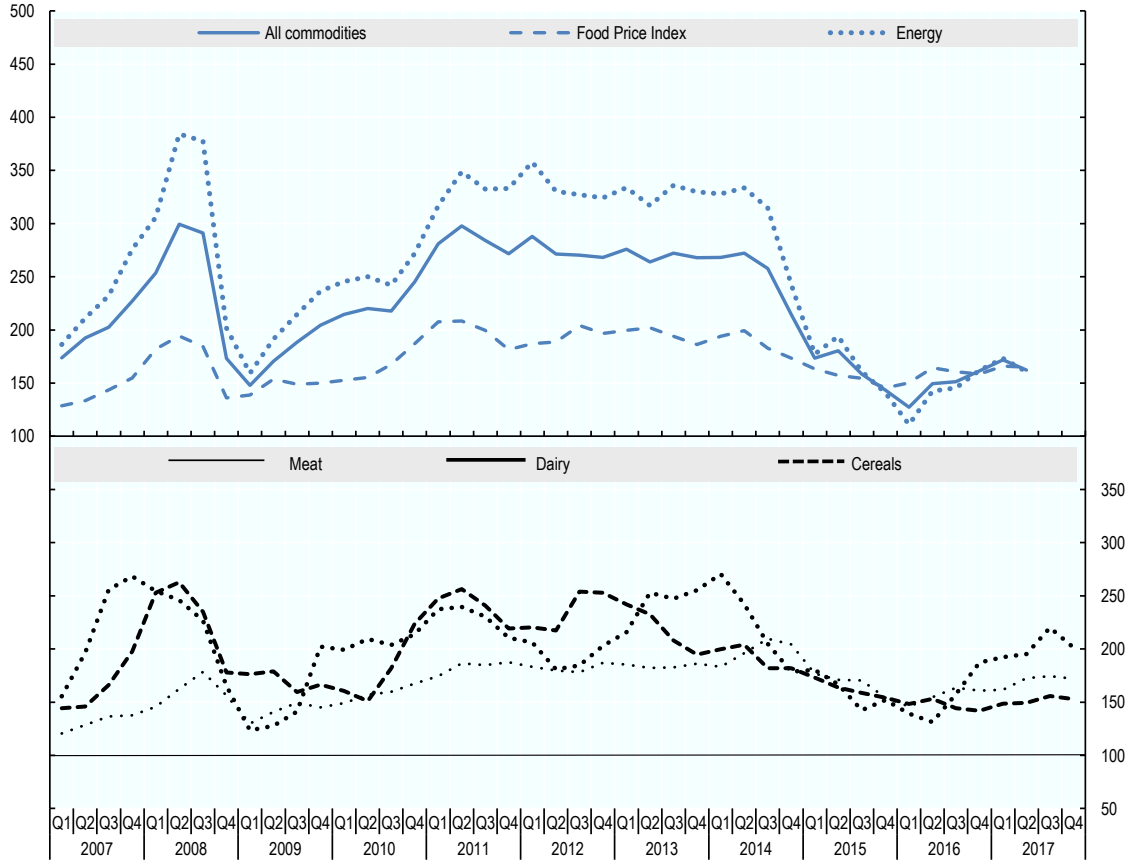
World prices for primary non-agricultural commodities rose in 2017, partly reflecting strong industrial demand as well as geopolitical risks and supply constraints following the agreement amongst Organization of the Petroleum-Exporting Countries (OPEC) and select non-OPEC members to restrict oil production through to March 2018 (Figure 1.1) (OECD, 2017a). Crude oil prices increased by 25% in nominal terms in 2017, however, prices are still considerably below the historical peaks of 2011-2013, and hence did not induce increases in agricultural commodity prices. Demand for biofuels was sustained by obligatory blending and by higher demand for fuel due to lower energy prices, which remained low despite higher crude oil prices (OECD/FAO, 2018). Fertiliser prices were lower during the first 9 months of 2017 as markets continued to face relatively weak global demand due to low crop prices. Markets remain well supplied with adequate stocks and growing low-cost capacity (World Bank Group, 2017).

Food commodity prices increased slightly between January 2016 and January 2017, and saw some further increases thereafter, supported by the global economic recovery and rising production costs (Figure 1.1). In comparison to the preceding years, however, commodity prices remained relatively low. Production in 2017 of most cereals, meat types and dairy products exceeded the already high levels recorded in previous years. Together with high stocks and stagnant demand, this offset the drivers for increased prices discussed above, so that prices for most commodities moved relatively little. Low

prices persisted for cereals as global production, notably of maize and rice, reached historical highs in 2017.

**Figure 1.1. Commodity world price indices, 2007 to 2017**

Index 2002-04=100




*Note*: The top part of the graph relates to the left scale, while the bottom part of the graph to the right scale.
*Source*: IMF (2017), Commodity Market Review, for all commodities, food and energy indices, http://www.imf.org/external/np/res/commod/index.aspx; FAO (2017), FAO Food Price Index dataset, for meat, dairy and cereal indices. Base year is 2002-04 http://www.fao.org/worldfoodsituation/foodpricesindex/en/.

StatLink http://dx.doi.org/10.1787/888933754956

World meat production rose moderately in 2017, driven by increases in the United States mainly, but also in Argentina, China, India, Mexico, Turkey and the Russian Federation. Despite this, world meat prices increased by 9% in 2017, underpinned by increasing import demand for bovine and pig meat and short supplies of sheep meat. The highest price increase was for sheep meat.

Dairy production growth was moderate in 2017, below the average growth rate of the last decade. Prices increased strongly in 2017, driven by declines in milk production in the last quarter of 2016 and first quarter of 2017 (including in major exporters), and by a strong demand for fat solids. This resulted in strongly diverging developments for butter and skim milk powder prices. Butter prices showed a spectacular jump in the first half of

2017, but came down by the end of 2017. On average butter prices were 65% higher than in 2016. Strong demand for milk fats in the form of butter, but also in other products (e.g. cream, full-fat milk and cream yogurts) exceeded the moderate growth in dairy supplies. Constant low prices of skim milk powder (+3% in 2017) were also linked to high stock levels in the European Union (and to a lesser extent in the United States). The price of whole milk powder increased by 46%.

In other commodities, prices of oilseeds did not change, with production remaining broadly at 2016 levels. After increasing strongly in 2016, sugar prices fell sharply in 2017 as production rose in 2017 following two years of shortages. Cotton prices increased even as production continued to recover from the strong drop in 2015. Production grew in all major producing countries except China (OECD/FAO, 2018).

## Recent developments in countries' agricultural policies

This section briefly summarises the main developments in countries' agricultural policies in 2017, as well as key policy developments that will be implemented in 2018. More details on the developments summarised below, and details on adjustments made to policy settings and programmes within countries current agricultural policy frameworks, can be found in the second part of this report. More information is also available in the extended country chapters that are available online.

A number of countries are ***reviewing current agricultural policy frameworks***. **Canada's** Federal, Provincial, and Territorial Ministers of Agriculture reached an agreement on the core elements of the next framework agreement, the *Canadian Agricultural Partnership* (CAP). Canada is also undertaking a Review of its Business Risk Management (BRM) programmes that focuses on the effectiveness of BRM programmes in managing risks and the programmes' impact on innovation and growth. In **Iceland**, the Government and the Farmers' Association concluded new agreements for the ten-year period 2017 to 2026, with extensive reviews scheduled in 2019 and 2023. **Korea's** Development Plan for 2018-22 foresees adjustments to current programmes; investment support for young farmers, for the integration of digital technology into food and agriculture, and for the promotion of renewable energy generation; and measures to further enhance food safety and traceability in the supply chain. In **Norway**, the government and farmers' organisations reached an agreement on various agricultural support measures. Norway also released the White paper No. 11 (2016-17) *Change and development - A future-oriented agricultural production*, which considers plans to reform agricultural policies. **Switzerland** extended the policy framework adopted for the period 2014-17 without significant changes for the period 2018-21.

***Reforms to existing policies and support measures*** occurred in several countries. **China** lowered the 2017/18 minimum support prices for wheat and rice, and replaced the soybeans target price by a "market-oriented soybeans price plus a direct subsidy to soybean farmers" based on area planted. The **European Union** abolished the sugar production quota as initiated in the 2006 reform. **Iceland** began to redeem the milk quota and redistribute it. From 2018, **Japan** abolished its government administered rice production quota and the income support payment for rice producers who meet the rice production target. **Korea** increased the per hectare rate of direct payments for farms and for less-favoured areas. Korea also plans to reduce the area eligible for rice support, by providing a higher payment for diversification along with measures to stimulate demand. **Kazakhstan** eliminated the VAT preference applied to certain agricultural producers and

processors as part of its WTO accession protocol. **Viet Nam** will re-introduce a fee for irrigation services from 2018.

***New support measures*** were introduced into a number of countries. **Canada** established two programmes to help dairy farmers and processors adapt to the anticipated impacts of increased cheese imports from the European Union as a result of the *Canada-European Union Comprehensive Economic and Trade Agreement* (CETA). **Chile** implemented a new programme that targets young farmers (18-35 years old), by providing subsidies for variable and fixed inputs, finance, capacity building, training and the development of networks. **Colombia** implemented a range of new support measures, including a subsidy to rice farmers to store grain; an income compensation payment to cotton producers; and debt rescheduling and debt relief for farmers (from 2018). The **Philippines** abolished the irrigation service fee paid by farmers to increase support for rice producers. The **Russian Federation** announced conditions for intervention purchases of dry milk and butter for the first time. However, no purchases were made as prices remained above the minimum levels. **Ukraine** abolished its VAT accumulation mechanism and introduced a specific "development subsidy". The **United States** authorised a second Cotton Ginning Cost Share (CGCS) programme to help cover cotton ginning costs for the 2017 crop year and made revisions to cotton and dairy programmes. In addition, the 2017 Tax Cuts and Jobs Act includes a number of provisions that will affect agricultural producers, beginning 2018.

There have been ***institutional*** and ***regulatory developments*** in a number of countries. In **Australia**, dairy industry participants signed a voluntary code of conduct to overcome issues surrounding the determination of farm gate prices and perceived unfair practices in the value chain. **Chile's** Ministry of Agriculture created the Ministerial Technical Committee on Climate Change to address the challenges faced by the agriculture sector due to its high vulnerability to weather variability. **Costa Rica** established regulations, general principles and procedures related to chemical registration and use. In the **European Union**, the Omnibus regulation (EU Regulation 2017/2393) amends the financial regulation governing the implementation of the EU budget and 15 sectorial legislative acts, including agriculture. The agreement is aimed at simplifying the CAP. The European Union also renewed the current approval of the herbicide glyphosate for a five-year period. **Israel** introduced several programmes to reduce regulatory burden, facilitate market linkages, and increase competition in the agro-food chain, particularly in the fruit and vegetable sector. In **Kazakhstan**, the partial privatisation of KazAgro was delayed as no buyers came forward at auctions held in 2017 for the privatisation of 11 KazAgro subsidiaries. **Korea** strengthened procedures for product certification and pest and disease control and restructured some of its agricultural organisations. **Turkey** abolished two of its four state-owned marketing boards for agricultural products (for sugar and tobacco), but maintained the Turkish Grain Board, and the Meat and Milk Board. The Ministry of Food, Agriculture and Livestock took over responsibility for administering marketing regulations in 2017. **Ukraine** continued efforts to improve the legislative basis for its food safety, hygiene and quality systems.

On ***risk management***, **Australia** expanded its concessional loans programme, which is used to help producers recover from adverse events and put in place better risk management strategies. In **Brazil**, the Veterinary Inspection system is to be modernised to improve the management of animal disease risks. The government is recruiting six hundred additional sanitary professionals. In the **European Union**, the income stabilisation tool (within the rural development regulation) was amended to include a new sector-specific measure that triggers support if average annual income in the sector drops

by more than 20%. Further, support for insurance contracts becomes available when more than 20% of a farmer's average annual production is destroyed. In **Korea**, the scope and coverage of the agricultural disaster insurance scheme were expanded to three additional products (citron, fig, and crown daisy raised in facilities). **Turkey** extended the coverage of support provided to agricultural insurance in 2018 to more products and risks.

The **European Union**, **New Zealand** and the **United States** implemented measures in response to ***exceptional circumstances*** or ***natural disasters***. Exceptional measures as a result of the Russian embargo were continued in the **European Union** in response to market conditions in the dairy, fruit and vegetables, and pig sectors. **New Zealand** provided relief funding in response to several medium-scale adverse events in 2017. Relief funding was made available for repairing essential infrastructure along with repairs to uninsurable infrastructure. Affected producers could also apply for Rural Assistance Payments. The **United States** implemented a number of measures to provide disaster assistance to producers affected by hurricanes and wildfires in 2017.

On ***land reform and investment***, in **China** a draft of the revised Rural Land Contracting Law plans to extend existing rural land contracts by 30 years upon expiration. Access to land continued to be a priority in **Colombia** and, in 2017, around 3 000 land plots were formalised or legally registered under the auspices of the new ANT Agency. In **New Zealand** rules on access for foreign investors to "sensitive agricultural land" were extended to virtually all agricultural land. In **South Africa** a bill was passed allowing expropriation without compensation of commercial farms owned by white farmers. A change in legislation also prohibits foreigners from buying agricultural land and they can only lease it under long term contracts.

On ***innovation***, **Colombia** approved a law to create a National Agricultural Innovation System. **Costa Rica** is reforming its extension services to better link them with the Innovation and Transfer of Agricultural Technology (INTA), the country's agricultural R&D institution. **Viet Nam** announced a lending programme to promote the development of high-tech, clean agriculture that offers interest rates 0.5-1.5% lower than market interest rates.

On measures and programmes that affect ***agri-environmental and climate outcomes***, **Brazil** passed its national biofuel policy in December 2017. The policy is an attempt to respond to Brazil's Intended Nationally Determined Contribution commitments under the Paris Climate Agreement. Provincial local governments in **China** delineated additional "environmental control zones" – where livestock farming activities are prohibited, in order to address environmental concerns in congested areas and waterways across the South, East and Centre regions of China. **Costa Rica** modified the water pricing system based on consumption at the farm level. **Israel** detailed a new pricing system for freshwater use in agriculture, encompassing two flat rates for agriculture users with or without alternative water sources throughout the country. Countries' progress in implementing greenhouse gas (GHG) mitigation policies in agriculture at a national level are explored in Box 1.1.

On ***trade promotion and market development***, the **Russian Federation** announced the development of agricultural export potential as a new policy orientation. The new Priority Project on Export of Agricultural Products focuses on sanitary and phytosanitary improvements and market research and promotion. **Switzerland's** Ordinance on "Swissness" came into force, which defines the regulations which have to be fulfilled in order to use the Label "Swiss" and the label of the Swiss cross. In **Viet Nam**, the Prime Minister approved a rice export development strategy for 2017-20, with a vision to 2030.

On ***trade***, in March 2018 Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore and Viet Nam signed a new agreement called the **Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CP-TPP)**. Trade negotiations between the **European Union** and **Mexico** and the European Union and the **Mercosur** advanced in 2017. In September 2017, the **Canada-European Union Comprehensive Economic and Trade Agreement (CETA)** entered into force provisionally, allowing application of about 90% of the agreement's provisions pending EU Member States ratification of the agreement by their national parliaments. The negotiation of the Free Trade Agreement between the Central American Republics and Korea was finalised, and the **Korea-Central America Free Trade Agreement** was signed in February 2018. In September 2017, the European Parliament approved two **EU-Iceland** agreements, one on agricultural trade and one on mutual recognition of geographical indications. In December 2017, the Economic Partnership Agreement between the European Union and Japan was finalised. Pending a final agreement on the investment protection chapter, the deal is expected to enter into force in 2019. Australia concluded a free trade agreement with **Peru** in February 2018 and both Australia and **New Zealand** signed the **Pacific Trade and Economic Agreement (PACER Plus)** in June 2017.

**Box 1.1. Climate change mitigation policy progress in agriculture**

The agriculture sector is responsible for a substantial share of global greenhouse gas (GHG) emissions, and this is expected to grow over the course of the next century. Stronger economy-wide mitigation efforts to slow down global warming are being embraced worldwide, and a clear trend towards the inclusion of agricultural emissions in national and regional mitigation efforts is visible. Despite this encouraging momentum, national policies that can incentivise the agriculture sector to make a meaningful contribution to national GHG mitigation goals are still lacking. This box provides a brief snapshot of progress on national level GHG mitigation policies in agriculture, based on the countries reviewed in this report. It is not exhaustive and also does not cover subnational and industry-led initiatives.

Some 11% of global anthropogenic GHG emissions are directly attributed to primary agriculture, with another significant share related to increases in agricultural land use. Agriculture's share of total national GHG emissions varies considerably among the countries reviewed in this report, from 3% (Japan and Israel) to 48% (New Zealand).

The Paris Agreement, negotiated at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), provides the framework for co-ordinated global action on climate change. It allows Parties to set their own emission reduction targets set out in their Nationally Determined Contributions (NDCs), to try and meet the Agreement's goal of keeping global warming to well below 2°C while pursuing efforts to limit warming to 1.5°C above pre-industrial levels, by the end of the century (UNFCCC, 2015). To date, the agreement has been ratified by 175 of the 195 signatories. All 23 countries and the European Union which feature in this report are signatories, with only the Russian Federation, Turkey and Colombia[1] yet to ratify. However, since ratifying the Paris Agreement in 2016, the United States has announced its intention to withdraw.

There is growing recognition that agriculture must play its part in contributing to the goal of the Paris Agreement to limit global warming, with scenarios showing that methane and

nitrous oxide emissions, mainly from agriculture, could become the largest source of global emissions by mid-century (Gernaat et al., 2015; Wollenberg et al., 2016). This recognition is reflected in the inclusion of agriculture in the majority of the NDCs submitted by signatories of the Paris Agreement. However, as very few NDCs include sector-specific targets, the contribution of agricultural emission reductions to achieving these pledges remains unclear, and very few national level policies have been implemented to date. Where national policies do exist, these are voluntary and are mostly designed to encourage research, development and the transfer of knowledge about low emission practices and technologies. Several countries also have policies in place that address multiple environmental impacts from agriculture, which may help lower GHG emissions.

Among the countries reviewed in this report, **Australia**'s Emission Reduction Fund (ERF) and **Brazil**'s Low Carbon Agriculture (ABC) Plan most directly target emission reductions in agriculture. Both of these policies pre-date the signing of the Paris Agreement, but are central to their pledged GHG mitigation goals under the Agreement. The Emission Reduction Fund in Australia uses an auction mechanism to allocate government funds primarily to land use sectors, including agriculture. Since 2015, the Fund has been used to contract 18 million tonnes $CO_2$-eq of abatement in the agricultural sector, with a further 124 and 14 million tonnes $CO_2$-eq contracted in land vegetation and savannah burning projects, respectively (Clean Energy Regulator, 2018). The ABC plan in Brazil provides a substantial amount of credit to finance the implementation of sustainable practices in agriculture, including carbon sequestration from restoring 15 million hectares of degraded pasturelands, by 2030. While the ambition of these national policies is promising, concerns have been raised about their effectiveness, which can only be judged in the future if and when they can deliver their scheduled targets.

Some countries have also specified national targets for GHG emission reductions in agriculture. **Switzerland**, for example, has proposed to reduce agricultural emissions by one-third by 2050, contributing to a two-thirds reduction of emissions across the whole agro-food chain. **Viet Nam** proposes to reduce emissions by 20% every ten years, while increasing production by 20%, prioritising research on range of measures, while **China** has a specific target for achieving zero growth in fertiliser (a major source of nitrous oxide emissions) and pesticide use by 2020.

Most national policies for emission reductions in the agriculture sector rely on research, development (R&D) and the transfer of knowledge regarding low emission practices and technologies. **New Zealand** is a notable example, with these activities supported through national research programmes and its leading role in co-ordination with the 49 member countries of the Global Research Alliance on Agricultural Greenhouse Gases (GRA) (see also section on Innovation). Several other reviewed countries have indicated that R&D and the promotion of low emission practices are central to their national ambitions to lower agricultural emissions, including **Canada, Costa Rica, Japan, Mexico, Viet Nam** and a number of **European Union** Member States.

A number of the countries included within this report have agri-environmental policies in place that contribute to the abatement of agricultural GHG emissions. For the **European Union**, GHG abatement is mainly addressed through Common Agricultural Policy (CAP) elements that aim to improve environmental performance such as cross-compliance and greening under Pillar 1, and agri-environmental and climatic measures under Pillar 2. EU Member States have also developed specific national policies to tackle climate change, including **Germany, France, Hungary** and **Sweden** among others provide support for

technologies that reduce GHGs and ammonia from manure handling and storage. While the **United States** does not have a specific national mitigation programme for agriculture, the United States Department of Agriculture (USDA) does provide some incentives to producers through various conservation practices and programmes, some of which have mitigation benefits. Similarly, environmental programmes in **Canada** (such as the Environmental Farm Plans and the Environmental Stewardship Incentive) deliver multiple environmental outcomes, including some related to climate change mitigation.

Finally, it is worth noting that the state pledges made under the Paris Agreement are only expected to deliver around one-third of the emission reductions required to reach the goal of keeping global warming well below 2°C, by the end of the Century (UNEP, 2017). With agriculture's share of global GHG emissions likely to increase over time, mitigation policies to reduce this growing emissions source will become increasingly urgent.

*Note*: 1. The Colombian Congress has passed a bill that ratifies the Paris Agreement, but the process of ratification is not yet completed.
*Source*: Clean Energy Regulator (2018), "Emissions Reduction Fund", http://www.cleanenergyregulator.gov.au/ERF; Gernaat et al. (2015), "Understanding the contribution of non-carbon dioxide gases in deep mitigation scenarios", *Global Environmental Change;* Wollenberg et al. (2016) "Reducing emissions from agriculture to meet the 2oC target", *Global Change Biology;* UNEP (2017), "The Emissions Gap Report 2017", United Nations Environment Programme (UNEP), Nairobi; UNFCCC (2015), *Adoption of the Paris Agreement*, United Nations Framework Convention on Climate Change, Paris.

## Developments in agricultural support

This section provides a quantitative assessment of developments in policy support to agriculture in 2017, and compares policy support in recent years (2015-17) with support provided to the agricultural sector in the mid-1990s (1995-97). It covers the 35 OECD countries as well as the six non-OECD EU Member States and ten emerging and developing economies. In much of this report, the European Union is presented as one economic region. The assessment is based on a set of OECD indicators that express the diversity of support measures applied in different countries in a few simple numbers that are comparable across countries and over time, where different indicators focus on different dimensions of countries' support policies. Annex A provides definitions of the indicators used in the report. The OECD is also a key member of the International Organisations Consortium for Measuring the Policy Environment for Agriculture (the Consortium), an initiative that aims to develop a global picture of the distortions introduced by agricultural policies (Box 1.2).

### *The burden of agricultural support on countries' economies has generally declined, but public support is still important for the agricultural sectors of some countries*

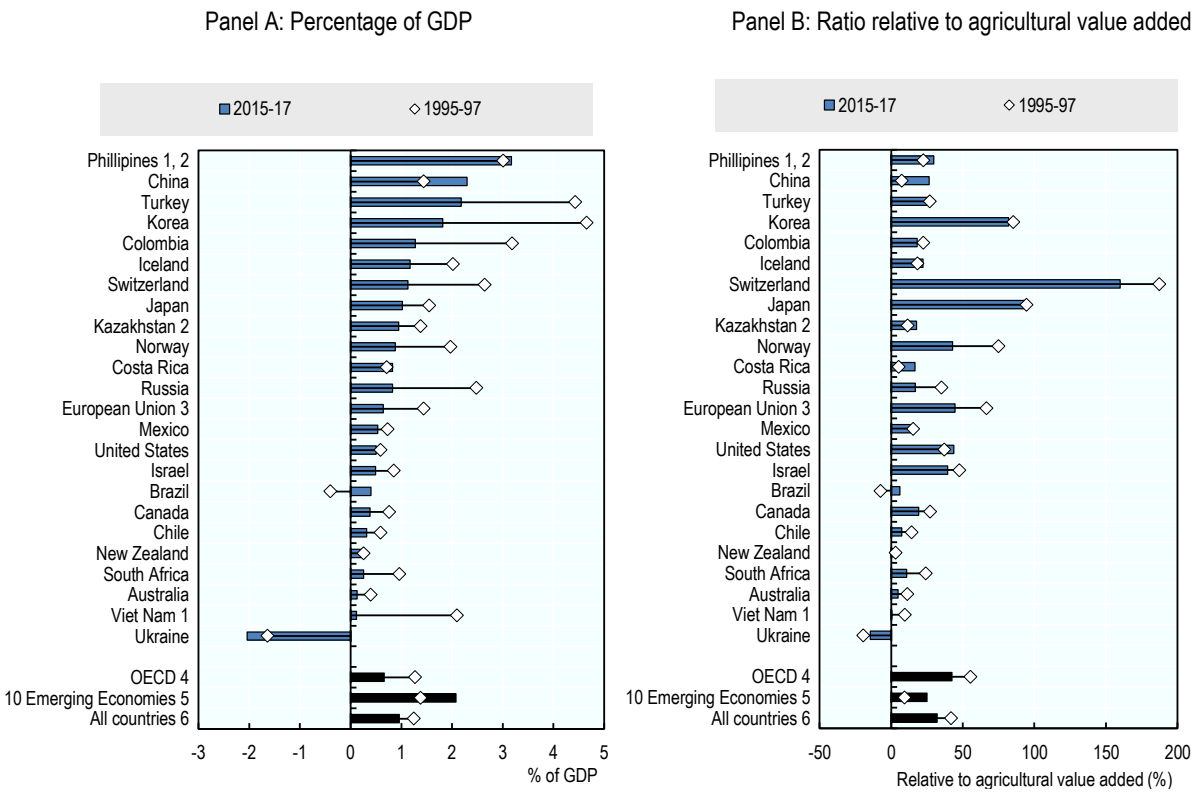
The Total Support Estimate (TSE) is the OECD's broadest indicator of agricultural support. The TSE combines transfers to agricultural producers individually (measured by the Producer Support Estimate, the PSE); policy expenditures that have primary agriculture as the main beneficiary, but do not go to individual producers (measured by the General Services Support Estimate, the GSSE); and budgetary support to consumers of agricultural commodities (the Consumer Support Estimate, the CSE, measured at the farm gate level and net of the market price support element).

The overall burden of agricultural support on the OECD countries' economies has declined since the mid-1990s, as measured by total support as percentage of GDP (%TSE, Panel A of Figure 1.2). In the OECD countries on average, total support to agriculture declined from 1.3% of OECD aggregate GDP in 1995-97 to 0.7% in 2015-17. Significant reductions have occurred in countries where the relative cost to the economy of agricultural support was highest, including Korea, Turkey, Switzerland and Iceland. Nevertheless, the %TSE is high in these countries – between 1.1% and 2.2% of GDP – despite the fact that agriculture is an important part of the economy only in Turkey.

There are contrasting trends in the overall burden of agricultural support on the emerging and developing economies covered in this report. The %TSE has declined significantly in Colombia, the Russian Federation and South Africa. In the mid-1990s, Brazil and Ukraine effectively taxed their agricultural sectors on average. In 2015-17, Brazil provided positive support to the sector of around 0.4% of GDP, while Ukraine is again taxing the sector after providing positive support in the late 1990s and 2000s. Total support as a percentage of GDP has increased substantially in China (from 1.4% to 2.3%) and the Philippines (from 3.0% to 4.7%), and to a lesser extent in Costa Rica and the Philippines, despite the declining importance of agriculture to the economy.

**Public policy support continues to be important for the agricultural sector in some countries**. In 2015-17, total support relative to the size of countries' agricultural sectors varied widely across the OECD countries, from 160% of agricultural value added[1] in Switzerland, 93% in Japan and 82% in Korea, to less than 15% of agricultural value added in Australia, Chile and New Zealand (Panel B of Figure 1.2). In the European Union, Israel and Norway, TSE relative to agricultural value added was close to the OECD average of 42%. In the emerging and developing countries, total support relative to the size of the agricultural sector ranges from 1% of agricultural value added in Viet Nam to 30% in the Philippines. For most countries, total support has declined relative to the size of the agricultural sector.

**Figure 1.2. Total Support Estimate by country, 1995-97 and 2015-17**




*Notes*: Countries are ranked according to the %TSE in 2015-17.
1. For the Philippines and Viet Nam, 1995-97 is replaced by 2000-02.
2. For Kazakhstan and the Philippines, 2015-17 is replaced by 2015-16, due to missing GDP and agricultural value added in 2017.
3. EU15 for 1995-97 and EU28 for 2015-17.
4. The OECD total does not include the non-OECD EU Member States. The Czech Republic, Estonia, Hungary, Poland, the Slovak Republic and Slovenia are included in the OECD total for both periods and in the EU for 2015-17. Latvia is included in the OECD and in the EU only for 2015-17.
5. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included only for 2015-17. Indonesia is not included in this report.
6. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

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**Total support to agriculture averaged USD 620 billion (EUR 556 billion) a year in 2015-17 over all the countries covered in the report**. The monetary value of agricultural support in OECD countries and in the emerging and developing economies covered by this report is roughly the same – in 2015-17 total support to agriculture in the OECD countries averaged USD 317 billion (EUR 285 billion) a year on average (51% of total support), compared with USD 297 billion (EUR 266 billion) a year on average in the emerging and developing countries.

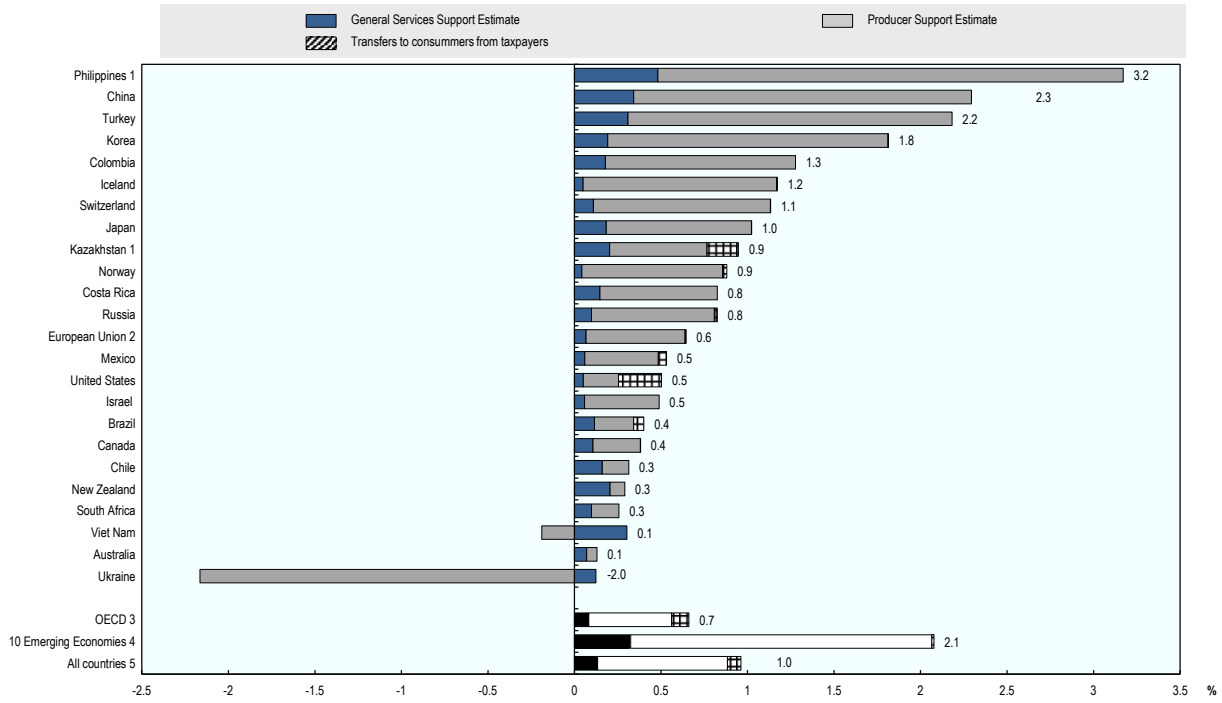
**Policy transfers to individual producers dominate total support in almost all countries**. As measured by the PSE, around 78% of total support was provided to

individual agricultural producers – USD 484 billion (EUR 434 billion) a year on average in 2015-17. In contrast, only a small share of total support was provided for general services across all the countries examined – 14% of total support or USD 86 billion (EUR 78 billion) a year in 2015-17 (Figure 1.3).

For the OECD countries on average, the PSE accounted for around 72% of total support provided to the agricultural sector in 2015-17, with support for general services that create enabling conditions for the agricultural sector accounting for almost 13% of total support. As exceptions to this, support to general services accounted for over 70% of total support in New Zealand, and over 50% of total support in Australia and Chile. In these countries, %TSE is around 0.3% of GDP. In the United States, around 49% of total support is provided to consumers. In most other countries, 80% or more of support is provided directly to producers.

**Figure 1.3. Composition of the Total Support Estimate by country, 2015-17**

Percentage of GDP




1. For Kazakhstan and the Philippines, 2015-17 is replaced by 2015-16.
2. EU28.
3. The OECD total does not include the non-OECD EU Member States.
4. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. Indonesia is not included in this report.
5. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.

*Source*: OECD (2018), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933754994

**Box 1.2. The International Organisations Consortium for Measuring Policy Environment for Agriculture**

The OECD is a key member of the International Organisations Consortium for Measuring Policy Environment for Agriculture (the Consortium), an initiative that aims to provide continually-updated estimates of agricultural support (or incentives) across a range of countries. Together with the OECD's monitoring and evaluation reports and indicators, this initiative is expanding the information available for analysing the impacts of agricultural policies and reforms.

There have been many attempts to measure and monitor agricultural policies in the past, from the seminal efforts of the FAO in the early 1970s, the OECD's PSE/CSE exercise since the early 1980s, and different efforts by other international institutions involved in agricultural policy and development, through to the most recent efforts of the Asian Productivity Organisation (APO), the Food and Agriculture Organisation of the United Nations (FAO), the Inter-American Development Bank (IDB), the International Food Policy Research Institute (IFPRI), and the World Bank (WB). The Consortium builds on these individual efforts to improve knowledge of agricultural policies worldwide and feed more complete information into national policy processes and inter-country dialogue, including at a regional level. By joining forces, the Consortium aims to increase the geographic coverage of policy information, based on a common methodology that assures quality, consistency and comparability across countries and time.

The OECD Global Forum on Agriculture held in December 2013 marked the launch of the Consortium. While FAO, IDB, IFPRI, OECD and the WB are the active members, participation in the Consortium is open to all organisations that wish to contribute their data and analytical resources.

To date, one policy indicator has been derived from the various contributing data sources: the Nominal Rate of Protection (NRP). This measure is the proportional difference between the Producer Price and border prices adjusted for distribution, storage, transport, and other marketing costs, and conceptually equivalent to the OECD's Nominal Protection Coefficient (NPC). Like the OECD's NPC, it measures the extent to which policies result in a divergence between domestic and international prices, and thus provide production incentives. The current dataset covers 58 economies (counting the European Union as one), starting from the year 2005 (Table 1.2). The database was officially released to the public during the OECD Committee for Agriculture in May 2017. Incorporating other indicators of agricultural support and updating and extending the time series is foreseen as work develops.

**Table 1.2. Country and commodity coverage by International Organisations**

| International organisation | Region covered | Number of countries | Time period | Number of individual commodities |
|---|---|---|---|---|
| OECD | OECD countries and 11 Emerging Economies | 25* | 1986-2015 | 58 |
| FAO-MAFAP | Sub-Saharan Africa | 13 | 2005-14 | 26 |
| IDB-AGRIMONITOR | Latin America and Caribbean | 17 | 2004-15 | 34 |
| World Bank | South Asia | 3 | 2004-14 | 19 |

*Notes*: Not all countries report all data for all commodities listed and all years. *EU treated as one.

The new database helps to shed light on producer support policies across many countries at different levels of income and development. While the development of support in OECD economies and selected Emerging Economies is well documented in the OECD PSE/CSE data, the data assembled by the Consortium reveal fresh insights on policies in low income countries. For example, during 2005-15, the NRPs of low income countries oscillated around zero, indicating no or little price support to agriculture producers. However, this average hides many countries with negative NRPs, i.e., countries that tax agricultural producer prices, especially for export commodities. The taxation in many cases was driven by high levels of world prices and the use of the agricultural sector as a source of government revenue.

The database of the Consortium is available on a common data platform developed by IFPRI. The address of the platform is www.ag-incentives.org/. The website also contains descriptive information about the Consortium, its members and its organisation.

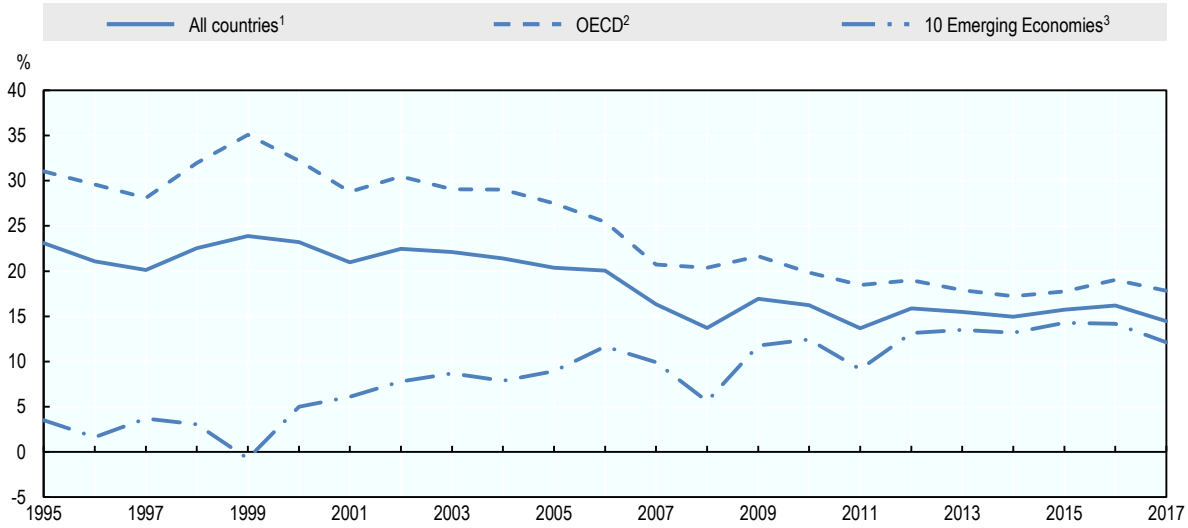
### *Support to producers in the OECD area and Emerging Economies has converged, and follows a similar trend in recent years*

On average, the level of support provided to individual producers in the countries covered by this report has followed a declining trend over time, although changes in the average %PSE have been marginal in recent years (Figure 1.4). In 2017, around 14.5% of gross farm receipts were due to policies that support farmers, down from 16% in 2016. The monetary value of this support was USD 461 billion (EUR 409 billion) in 2017, down from USD 499 billion (EUR 451 billion) in 2016. The moderate year-on-year change is mainly due to market developments, including movements in world prices for agricultural commodities and exchange rates, rather than changes in policy.

The trend in the average %PSE masks differences between the OECD countries and the emerging and developing economies (Figure 1.4). The average level of producer support in the OECD countries has followed a declining trend, from just under 30% of gross farm receipts in 1995-97 to around 18% in 2015-17. In the mid-1990s the emerging and developing economies on average provided very low levels of support to agricultural producers. Since then, the level of producer support in the emerging and developing economies has increased to around 14% of gross farm receipts in 2015-17, with lower levels of support in 2008 and 2011 reflecting periods of higher world commodity prices. In large part, the %PSE change in the emerging and developing economies is driven by producer support in China.

**Figure 1.4. Evolution of the Producer Support Estimate, 1995 to 2017**

Percentage of gross farm receipts




1. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.
2. The OECD total does not include the non-OECD EU Member States. Latvia is included only from 2004.
3. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included from 2000 onwards. Indonesia is not included in this report.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

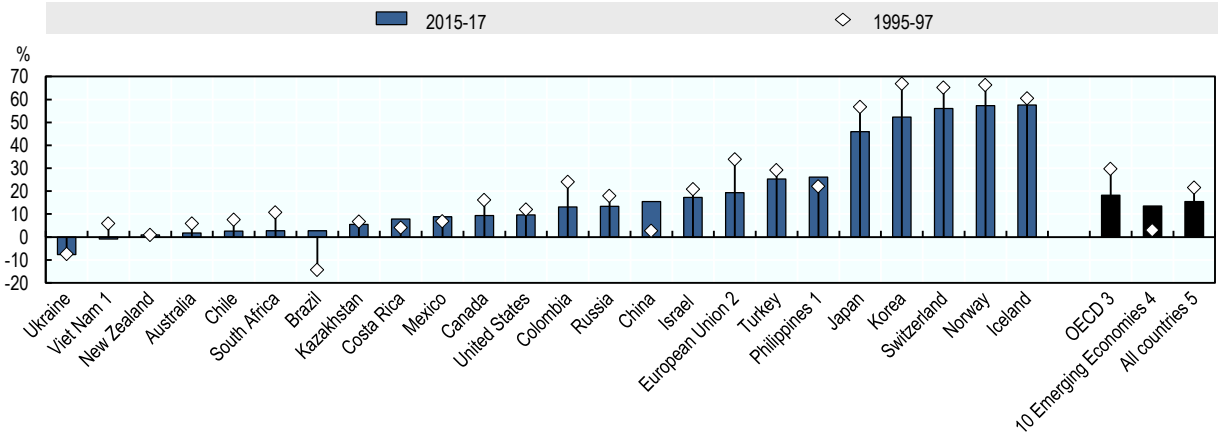
StatLink http://dx.doi.org/10.1787/888933755013

These broad trends are also evident when looking at countries individually (Figure 1.5). In most countries, producer support has declined since the mid-1990s, although the extent varies across countries. Levels of producer support have fallen by two-thirds or more in Australia, Chile and South Africa, while producer support in Canada, Colombia and the European Union fell by over 40%. However, producer support has increased since the mid-1990s in some emerging and developing countries, including China, Costa Rica and the Philippines, and also in Mexico. Producer support has also increased in Brazil, but from negative levels in the mid-1990s.

Nevertheless, current levels of producer support continue to vary widely across countries (Figure 1.5). New Zealand, Australia, South Africa, Chile and Brazil provide very low levels of support to producers, with %PSEs below 3% in 2015-17. In contrast, Japan, Korea, Switzerland, Norway and Iceland support their producers at levels above 45% of gross farm receipts, despite reductions in support since the mid-1990s. Of the emerging and developing economies, only the Philippines provides support at higher levels than the OECD average (PSE of 26% in 2015-17 compared with the OECD average of 18%).

**Figure 1.5. Producer Support Estimate by country, 1995-97 and 2015-17**

Percentage of gross farm receipts




*Notes*: Countries are ranked according to the 2015-17 levels.
1. For the Philippines and Viet Nam, 1995-97 is replaced by 2000-02.
2. EU15 for 1995-97 and EU28 for 2015-17.
3. The OECD total does not include the non-OECD EU Member States. The Czech Republic, Estonia, Hungary, Poland, the Slovak Republic and Slovenia are included in the OECD total for both periods and in the EU for 2015-17. Latvia is included in the OECD and in the EU only for 2015-17.
4. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included only for 2015-17. Indonesia is not included in this report.
5. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

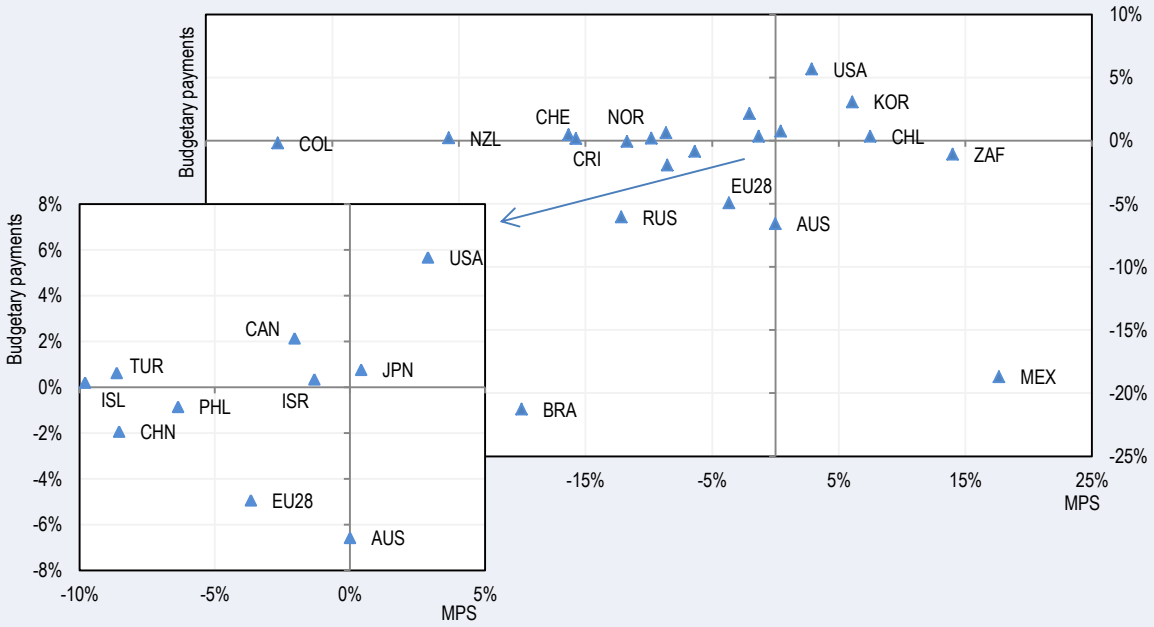
StatLink http://dx.doi.org/10.1787/888933755032

**Producer support declined in 2017 in most of the countries covered in the report**. In the majority of countries, the observed change in the PSE was largely driven by the change in market price support (MPS) – more specifically, by a widening or narrowing of the gap between domestic and border prices. Exceptions included Australia, where producer support fell due to lower budgetary payments only, and Brazil, Canada and Mexico, where budgetary payments were equally important in driving the year-on-year change (Box 1.3). On average, producer support in OECD countries fell from 19% of gross farm receipts in 2016 to 18% in 2017.

**Box 1.3. What drove changes in the monetary value of producer support in 2017?**

Figure 1.6 shows the contributions of market price support (MPS, horizontal axis) and budgetary payments (BP, vertical axis) to the annual change in the monetary value of support to farmers (PSE, expressed in local currencies) between 2016 and 2017. Country points farther from the vertical axis indicate a higher contribution of changes in MPS to the change in PSE. Points farther from the horizontal axis indicate a higher contribution of budgetary payments. As an example, the point for Canada indicates that changes in MPS decreased the monetary value of Canada's PSE by around 2% while changes in budgetary payments increased the monetary value of Canada's PSE by a similar amount, resulting in Canada's level of support (in CAD) in the most recent year remaining almost unchanged.

**Figure 1.6. Contribution of MPS and budgetary payments to the change in PSE, 2016 to 2017**




*Notes*: Kazakhstan, Ukraine and Viet Nam not shown due to negative MPS data. Indonesia is not included in this report.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755051

Changes in the monetary value of support to farmers in 2017 were driven mainly by changes in MPS, although changes in budgetary support were also important in some countries. Lower MPS drove changes in the monetary value of support in Colombia, New Zealand,[1] Norway, Turkey and Switzerland, with changes in budgetary payments playing a much smaller role. Higher MPS increased producer support in Chile and South Africa; however, producer support remained at very low levels in both countries (less than 3% of gross farm receipts).

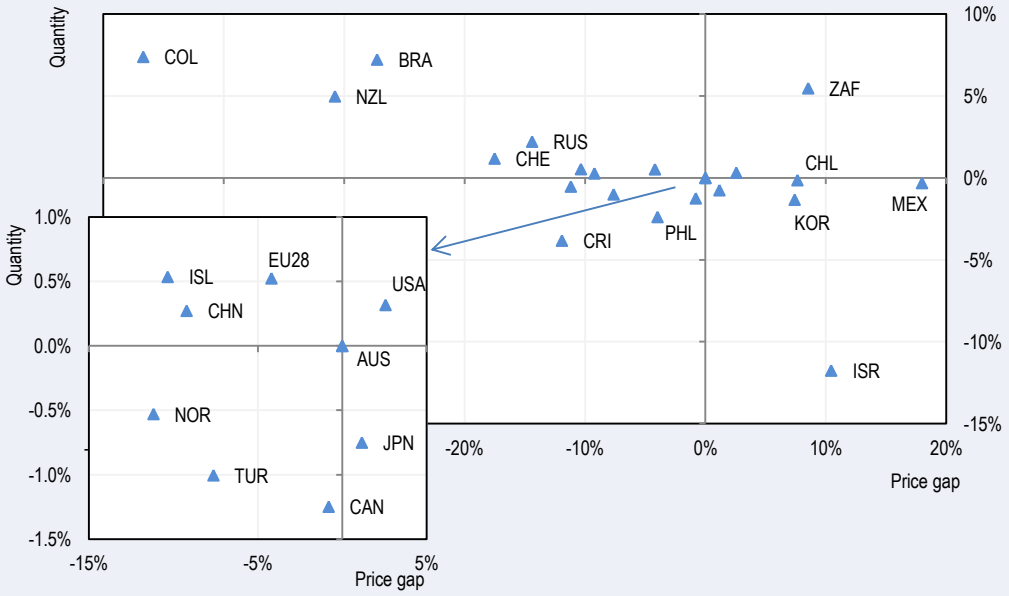
Lower MPS and budgetary payments reduced producer support in Brazil, the Russian

Federation and, to a lesser extent, the European Union. In contrast, producer support increased in Korea and the United States as a result of an increase in MPS and budgetary payments. In Mexico, lower budgetary payments offset an increase in MPS.

Figure 1.7 further disaggregates the change in MPS into its two components: the gap between domestic and border prices (horizontal axis) and the quantities of production which receive support (vertical axis). In most countries, year-on-year developments in MPS were driven by changes in price gaps, with changes in production quantities having a smaller effect. Moreover, as border prices increased on average for most countries, changes in the price gap depended on relative movements in domestic (producer) prices. In the OECD countries on average, producer prices increased relatively less than border prices, contributing to a decline in MPS in 2017. Exceptions were Chile and Japan, where border prices declined on average, contributing to a small increase in MPS. Producer prices declined on average in in the emerging and developing economies, resulting in a relatively larger decline in MPS between 2016 and 2017. While border prices declined on average in Brazil, Kazakhstan and the Philippines, producer prices declined by relatively more.

On average, currencies depreciated against the US dollar, which also contributed to lower price gaps, in the OECD countries in particular. This is because a weaker local currency will, all other factors being equal, increase reference (border) prices expressed in local currencies for a given country, reducing the country's MPS and overall support level.

**Figure 1.7. Contribution of price gaps and output quantities to the change in PSE, 2016 to 2017**




*Notes*: Kazakhstan, Ukraine and Viet Nam not shown due to negative MPS data. Indonesia is not included in this report.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755070

*Note*: 1. In New Zealand, price support is measured only for poultry and eggs and is due to non-tariff protection applied on SPS grounds.

### *In most countries, support is predominantly provided through measures that are most distorting to production and trade*

The way in which countries provide support to farmers is as important as the overall level of that support. Governments have a large portfolio of measures at their disposal: they can raise domestic prices by intervening directly in markets or by limiting imports through tariffs or other border measures; they can provide subsidies to reduce farmers' input costs; or they can provide payments to farmers on the basis of farm output, area, animal numbers, or as a top-up to farmers' income. Payments may be conditional on specific production practices, for example, to achieve environmental protection objectives.

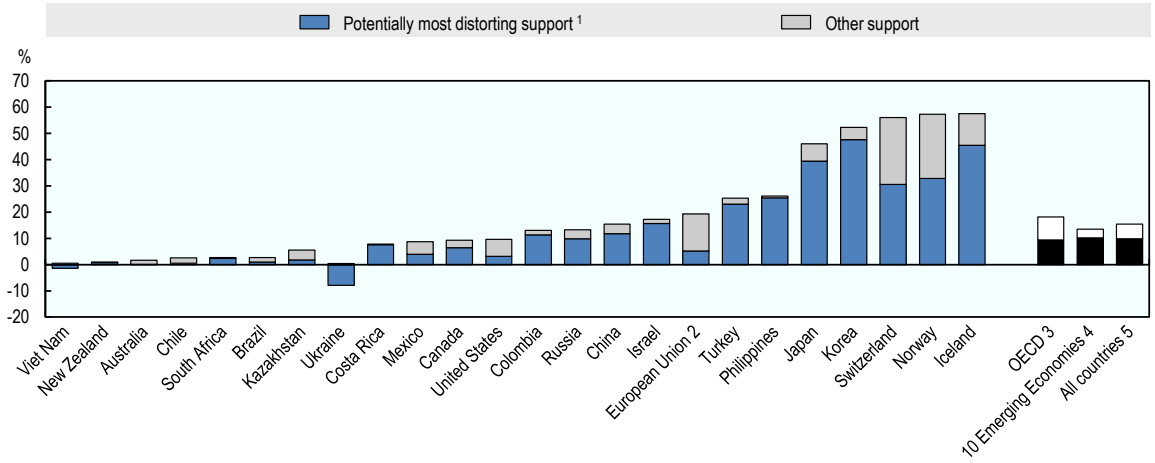
These distinctions are important. The measures listed above will affect agricultural production, incomes, trade and other outcomes differently. For example, MPS has negative impacts on world markets and distorts price signals faced by farmers, reducing incentives to improve efficiency in agricultural production. Moreover, the way in which producer support is provided also influences the ability of agricultural producers to participate in agriculture and food global value chains (GVCs), and the benefits obtained from participation (Box 1.4). Some measures may target specific policy objectives or beneficiaries more effectively than others. For example, unlike MPS, payments per hectare, per animal or based on farm incomes can be targeted to specific locations or groups of farms, and tailored to specific policy objectives. These considerations highlight the need for a more detailed analysis of the measures through which producer support is provided.

Most countries provide the majority of producer support through measures that are most distorting for production and trade (Figure 1.8). OECD analysis has shown that MPS, payments based on output, and payments based on unconstrained variable input use have a significantly higher potential to distort agricultural production and trade than payments based on other criteria (OECD, 2001). The effects of these types of policies are explored below. Moreover, depending on the exact policy design, this type of support tends to have negative impacts on the environment as it gives additional incentives to expand and intensify land use.

On average, support provided through measures that are most distorting for production and trade accounted for almost two-thirds of the support provided to farmers in 2015-17. In general, such measures are more important in the emerging and developing economies, where they account for over 75% of producer support, compared with 52% of producer support in OECD countries. On the other hand, a larger share of producer support is provided through less-distorting measures in Australia, Brazil, Chile, the European Union, Kazakhstan and the United States.

**Figure 1.8. Composition of the Producer Support Estimate by country, 2015-17**

Percentage of gross farm receipts




*Notes*: Countries are ranked according to the absolute values of the 2015-17 levels.
1. Support based on output (including market price support and output payments) and on the unconstrained use of variable inputs
2. EU28.
3. The OECD total does not include the non-OECD EU Member States.
4. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included from 2000 onwards. Indonesia is not included in this report.
5. The All countries total includes all OECD countries, non-OECD EU Member States, and the Emerging Economies.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755089

**In many OECD countries – as well as in most Emerging Economies – MPS makes up the largest part of support to producers (PSE)**. However, this also includes some countries with very low levels of support. MPS allows policy makers to support producers without directly burdening the public budget, as support to farmers is paid by consumers of protected products, some of whom may be poor and food insecure. Moreover, importing countries often generate some of their public revenues from import tariffs on agricultural commodities. But market price support does not allow policy makers to discriminate between beneficiaries or target non-farm income objectives. Moreover, the income transfer efficiency of border protection is low, limiting its effectiveness as a measure for raising farm incomes (OECD, 2003).

For the OECD as a whole, MPS was around 45% of the PSE in 2015-17. MPS represents a significant component of producer support in Israel, Japan and Turkey (more than 80% of the PSE) and more than 90% of the PSE in Korea. However, the share of MPS is notably less in countries that rely to a greater extent on direct payments to support producers like Mexico, the United States, the European Union, and also high support countries like Norway and Switzerland. MPS is also significant in the emerging and developing economies, accounting for over 90% of producer support in Costa Rica, the Philippines, more than 80% in Colombia, and more than 50% in China, the Russian

Federation and South Africa (although as noted previously, South Africa's PSE is low at less than 3% of producer support).

In contrast, MPS was negative in Ukraine and Viet Nam as producers of some commodities receive prices below those on world markets. However, in some cases the implicit taxation of producers is not exclusively a policy outcome but reflects what can be broadly termed a 'market development gap'. This can arise from underdeveloped physical infrastructure and institutional deficiencies in emerging and developing economies, which can impede market adjustment and exacerbate the impacts of policies on prices, contributing to the negative results. For example, in Viet Nam producers of export-competing commodities receive prices that are lower than international prices, resulting in negative MPS in some years. However, poor infrastructure contributes to the negative results (OECD, 2015a). Similarly, the forthcoming OECD Review of Agricultural Policies in India finds that negative producer support was due to a combination of factors, as discussed in Box 1.5.

Regarding the other measures that are potentially most distorting for agricultural production and trade, payments based on output are provided to farmers in Iceland (23% of the PSE in 2015-17) and Kazakhstan (15%), and account for 5% to 8% of the PSE in Norway, Turkey and Brazil. Support for variable inputs without constraints (e.g. without conditions on how inputs are used or on any other farming practices) is provided to farmers in Kazakhstan, Mexico and South Africa (20% or more of the PSE in 2015-17), as well as in Chile, Israel and the Russian Federation. In the European Union, around 6% of producer support is provided as support for variable inputs without constraints, where it is mostly provided within the national programmes of the Member States. While such measures reduce the impact on consumers relative to market price support (as they are transfers to producers from taxpayers), they also fail to target the market failures or policy objectives at the heart of government intervention in agricultural markets. Moreover, support for specific production inputs increases the risk of their over- or misuse, with potentially harmful consequences for farmers' and consumers' health and the environment.

Less distorting forms of support include two broad categories of (tax-financed) payments. First, payments based on other inputs (mostly support for on-farm investments) or on variable inputs with constraints (e.g. restrictions on specific farming practices allowed) are used in a number of countries. Such payments account for more than 70% of producer support in Chile and Kazakhstan, and more than 60% in South Africa, and also a significant share of producer support in Australia (41%) and Mexico (35%).

Second, payments based on area, animal numbers, farm receipts or farm income are increasing in the OECD countries (Figure 1.9). In 2015-17, such payments accounted for a large share of producer support in the European Union (64% of the PSE in 2015-17), the United States (45% of the PSE), Norway (40%), Australia (54%) and Switzerland (32%), among other countries. These types of payments are also increasing in China and Kazakhstan, where they represented 14% and 15% of the PSE in 2015-17. However, they are less common in the other emerging and developing economies, accounting for less than 5% of the PSE on average.

**Box 1.4. Domestic support and global value chain development and benefits**

Agricultural support, and the way that support is provided, can influence the ability of agricultural producers to participate in agriculture and food global value chains (GVCs). It also influences the benefits obtained from participation. GVC participation can be summarised in two ways. First, through looking at purchases of foreign inputs (value added) to be converted into exports – backward participation in GVCs. For example, a flour miller buys foreign wheat to produce exports, or a fruit grower uses imported machinery to help produce exports. Second, through looking at the use of domestic production (value added) in other country exports – forward participation in GVCs. This includes, for example, the use of exports of flour in another country's exports of biscuits. The benefits from GVC participation are measured by domestic value added – the returns to land, labour and capital (including taxes paid and excluding subsidies). Participation in agro-food GVCs can lead to sector growth through both export growth and through influencing overall sector performance (Greenville, Kawasaki and Jouanjean, 2018). Thus, measures to enhance GVC participation can have longer run payoffs. More immediately, policies can also influence the gains from current participation in GVCs through influencing the returns (domestic value added) created.

Policies that influence market prices and confer market price support, such as tariffs, have been found to negatively influence both backward and forward participation. Specifically, countries' own tariffs reduce backward participation, while forward participation is reduced by trading partners' tariffs (Greenville, Kawasaki and Beaujeu, 2017). Furthermore, these policies and other aspects of market openness (such as the ability to import inputs from a wide range of sources) enhance the potential benefits from GVC participation (Greenville, Kawasaki, Jouanjean, forthcoming; Greenville, Kawasaki and Beaujeu, 2017).

General support measures can have a positive influence on backward participation (Greenville, Kawasaki and Beaujeu, 2017). While each general support measure needs to be evaluated on its merits to ensure that it addresses market failures, agricultural support policies that are geared towards general support payments – measured as the share of general services support in total support – are likely to promote backwards participation through providing public services and inputs that promote competitiveness and access to international markets without overly creating distortions in the domestic economy and sector that may negatively affect competiveness (in contrast with some PSE-related measures). Looking at specific aspects of general support, agricultural research and development was found to enhance backward participation. On the forward participation side, the level of general services payments overall was found to enhance forward participation in agro-food GVCs. Specific elements of general support – research and development and infrastructure – were also found to enhance the benefits from GVC participation by leading to higher levels of domestic value added earned from exports into GVCs. These elements can provide producers with the skills and economic capacities to adopt new techniques and technology, often sourced internationally. These factors underpin competitive access to foreign markets through GVCs.

The influences of producer support on participation and domestic value added creation are more complex. For forward participation, all types of support (potentially most-distorting and less-distorting ones) were correlated with higher levels of participation. However, higher levels of most-distorting payments were also found to decrease domestic

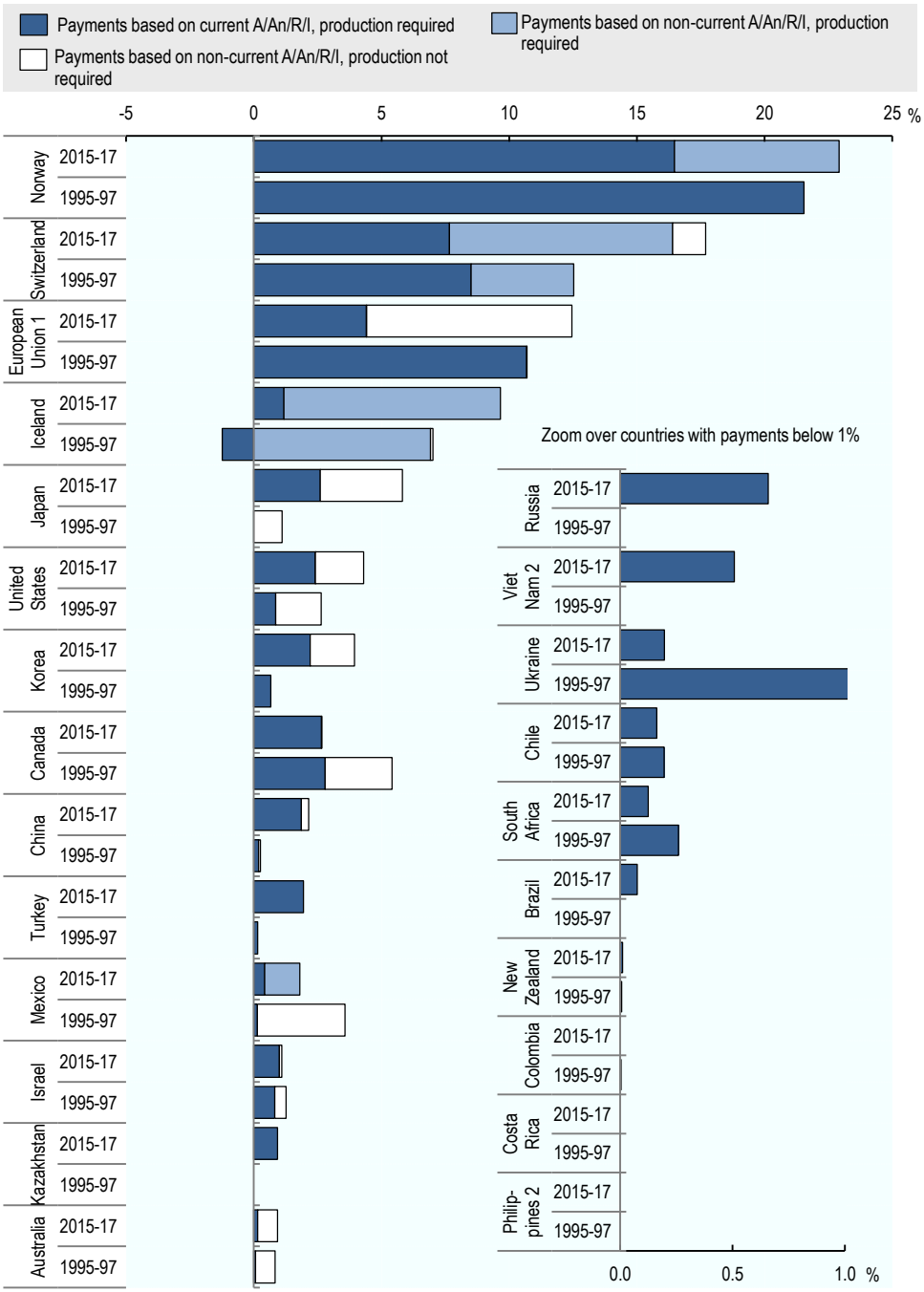
value added from GVC participation. That is, while increasing forward participation, they decrease the domestic returns from being part of GVCs, so while a country may see greater participation from this form of support, it is worse off for doing so (in terms of total domestic returns) – the country pays to participate in GVCs rather than earning from it. In contrast for less-distorting payments, the positive impact on forward participation is not accompanied with a negative effect on domestic value added creation. Thus it can enhance this type of participation without the costs seen for most distorting forms of support – possibly through allowing producers to enter value chains by correcting market failures or by allowing them to produce in a more sustainable and traceable fashion.

*Sources*: Greenville, Kawasaki and Jouanjean (2018), "Dynamic changes and effects of agro-food GVCs", *OECD Food, Agriculture and Fisheries Papers* (forthcoming); Greenville, J., K. Kawasaki and R. Beaujeu (2017), "How policies shape global food and agriculture value chains", *OECD Food, Agriculture and Fisheries Papers*, No. 100, OECD Publishing, Paris, http://dx.doi.org/10.1787/aaf0763a-en.

**There is a trend towards payments that are less coupled with production decisions** (Figure 1.9). Increasingly, payments are provided on the basis of historical criteria, in some cases without the need for recipient farmers to produce. In the European Union, Iceland, Norway and Switzerland, such payments accounted for between 6% and 10% of gross farm receipts in 2015-17. In the European Union, payments based on current area, animal numbers, farm receipts or incomes have been cut by almost two-thirds since the mid-1990s in favour of direct payments based on non-current criteria without production requirements. Similar programmes also exist in Australia, Japan, Korea, Mexico and the United States, among others, although their importance as a share of producer support varies between those countries.

**Figure 1.9. Use and composition of support based on area, animal numbers, receipts and income, by country, 1995-97 and 2015-17**

Percentage of gross farm receipts




*Notes*: Countries are ranked according to the 2015-17 levels.
1. EU15 for 1995-97 and EU28 for 2015-17.
2. For the Philippines and Viet Nam, 1995-97 is replaced by 2000-02.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755108

**Box 1.5. Insights from the Review of Agricultural Policies in India**

The Review of Agricultural Policies in India (OECD, forthcoming) has been undertaken jointly by the OECD and the Indian Council for Research on International Economic Relations (ICRIER). Agriculture is a key sector in India, at around 47% of total employment and 17% of GDP. The study analyses structural change and performance in India's agricultural sector over the past decades. Sustained by an improved access to inputs such as fertilisers and seeds, as well as better irrigation and credit coverage, production has been increasing and diversifying towards fruit, vegetables and livestock products. India also emerged as a major agricultural exporter of several key commodities, currently being the largest exporter of rice and the second largest of cotton.

Despite these notable achievements, challenges remain; among them, the prevalence of very large numbers of smallholders, low productivity, climate change, pressure on natural resources such as water, persistent food insecurity, and an under-developed food processing and retail sector.

The Review also explores India's agricultural policy settings and calculates support indicators covering 2000-16, comparable to those presented for OECD members and a number of non-OECD economies in this report. Throughout the last decades, agricultural policies in India have sought to achieve food security, often interpreted as self-sufficiency, while ensuring remunerative prices to producers and safeguarding the interest of consumers by making supplies available at affordable prices. As reflected in the analysis based on the support indicators - and in the context of the pressing structural challenges hampering the sustainable growth of the sector the policy instruments applied with the view to achieve these objectives have had mixed results, with farm incomes at less than one-third of those of non-agricultural households.

The level of support to producers as measured by the share of transfers from consumers and taxpayers in gross farm revenues (the %PSE) averaged -6.2% in 2014-16 (equivalent to INR -1 643 billion) made up of budgetary spending corresponding to 6.9% of gross farm receipts (INR 1 816 billion) and market price support of -13.1% of gross farm receipts (INR -3 458 billion). This negative %PSE, made up from negative and positive components, needs careful interpretation.

Almost all commodities examined experienced at least one year of negative market price support in the 2000 to 2016 period, and several commodities registered negative market price support in all years. In other words, producer prices have for many years and for many commodities remained below comparable reference prices in international markets and domestic producers were implicitly taxed. This is partly policy-induced, partly related to other inefficiencies in the marketing chain and partly due to minimum support prices being set below international prices for several commodities at different periods between 2000 and 2016. Policy-induced inefficiencies result from both domestic regulations and trade policy measures. Policies that govern the marketing of agricultural commodities in India include the Essential Commodities Act (ECA) and the Agricultural Produce Market Committee Acts (APMC). Through these Acts, producer prices are affected by regulations influencing pricing, procuring, stocking, moving, and trading commodities. Restrictions stemming from the ECA and APMC Acts also deter private sector investment in marketing infrastructure. Differences among the states in the status of their respective APMC Acts and in how these acts are implemented add to the uncertainties in

supply chains and drive up transaction costs. Overall, the combination of market regulations and infrastructure deficiencies has had a price depressing effect.

In addition, a variety of trade policy measures - such as export prohibitions, export quotas, export duties, and minimum export prices - impede the export of several key commodities and contribute to depressed producer prices. For example, export restrictions or export bans were applied to wheat, non-basmati rice, chickpeas, sugar and milk at different times over the course of the period studied.

Virtually all of the budgetary transfers to agricultural producers in India are accounted for by payments based on variable input use, with overwhelmingly subsidised fertilisers, electricity, and irrigation water. In turn, public expenditures financing general services to the sector (GSSE) have declined over the last decades. Most of this expenditure is in development and maintenance of infrastructure (particularly hydrological infrastructure), followed by the cost of public stockholding and expenditure on the agricultural innovation system.

A corollary to the farm price-depressing effect of the policy set is the resulting support to consumers, as reflected by the %Consumer Support Estimate (%CSE) of 24.7% on average across all commodities in 2014-16. This support is made up of low prices and government subsidies. With producer prices for many commodities below the border reference prices, consumers are paying less for food than they otherwise would. An additional important component of consumer support in India is the food subsidy, which allows large segments of the population to purchase food grains at prices that are much lower than their already low domestic market prices.

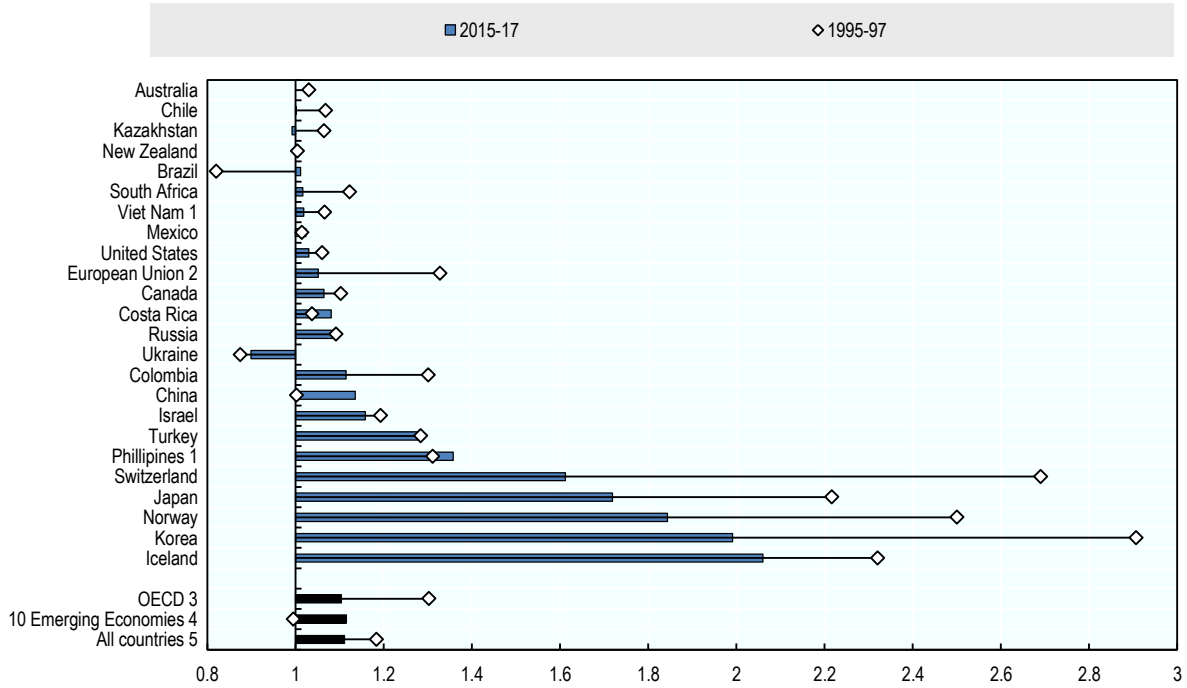
The sum of all positive transfers (i.e. budgetary transfers to producers, to agriculture as a whole, and transfers to consumers from taxpayers), without accounting for the negative market price support, amounts to 1.9% of GDP in 2014-16. This shows the high cost to the Indian economy and contrasts with the sector's relatively poor performance in productivity growth, highlighting the need for resources to be used more effectively.

*Source*: OECD (2018c), *Agricultural Policies in India,* OECD Food and Agricultural Reviews, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264302334-en.

### *The level of price distortions is generally falling, although there are large gaps between domestic and world prices in some countries*

**Prices received by producers have become more closely aligned with those prevailing on world markets**, as countries provide a larger share of support through less distorting measures. The Nominal Protection Coefficient (NPC) in Figure 1.10 compares effective prices received by producers – including per unit output payments – with world market prices. In a number of countries, the gap between domestic and world market prices has narrowed considerably, meaning that market signals are becoming more important for producers' decisions. For the OECD countries, effective producer prices were, on average, 10% higher than world market prices in 2015-17, compared with around 30% higher in the mid-1990s. Countries that have made substantial progress in aligning effective producer prices with world market prices include Chile, Colombia, the European Union, Korea, South Africa and Switzerland.

**Figure 1.10. Producer Nominal Protection Coefficient by country, 1995-97 and 2015-17**




*Notes*: Countries are ranked according to the distance of 2015-17 NPC levels to a neutral NPC of 1.
1. For the Philippines and Viet Nam, 1995-97 is replaced by 2000-02.
2. EU15 for 1995-97 and EU28 for 2015-17.
3. The OECD total does not include the non-OECD EU Member States. The Czech Republic, Estonia, Hungary, Poland, the Slovak Republic and Slovenia are included in the OECD total for both periods and in the EU for 2015-17. Latvia is included in the OECD and in the EU only for 2015-17.
4. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included only for 2015-17. Indonesia is not included in this report.
5. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755127

As with the other indicators of producer support, there are significant differences between countries. Effective prices received by producers are closely aligned with international levels only in Australia, Brazil, Chile and New Zealand. Effective producer prices are less than 3% above world market prices in Mexico, South Africa and the United States. In almost all other countries, effective prices received by producers are, on average, higher than world prices. Effective producer prices are 28% higher than world prices in Turkey and 36% higher in the Philippines, whereas effective producer prices in Iceland, Japan, Korea, Norway and Switzerland are 60% to 100% higher than world prices, suggesting that producer support plays an important role in guiding producers' decisions. Nevertheless, gaps between domestic and world price have narrowed also in those countries since the mid-1990s.

A number of the emerging and developing economies have increased their price support, widening the gap between domestic and world market prices. Effective producer prices in

China were, on average, close to world price levels in the mid-1990s, but 14% higher than world market prices in 2015-17. Effective producer prices have also increased in Costa Rica and the Philippines. As noted above, in Brazil prices received by farmers have increased since 1995-97, bringing them into alignment with world prices. There are exceptions, most notably Ukraine, where effective producer prices were around 10% lower than their international benchmarks in 2015-17.

### *Nevertheless, a large share of support targets individual commodities, which distorts the production mix in the sector*

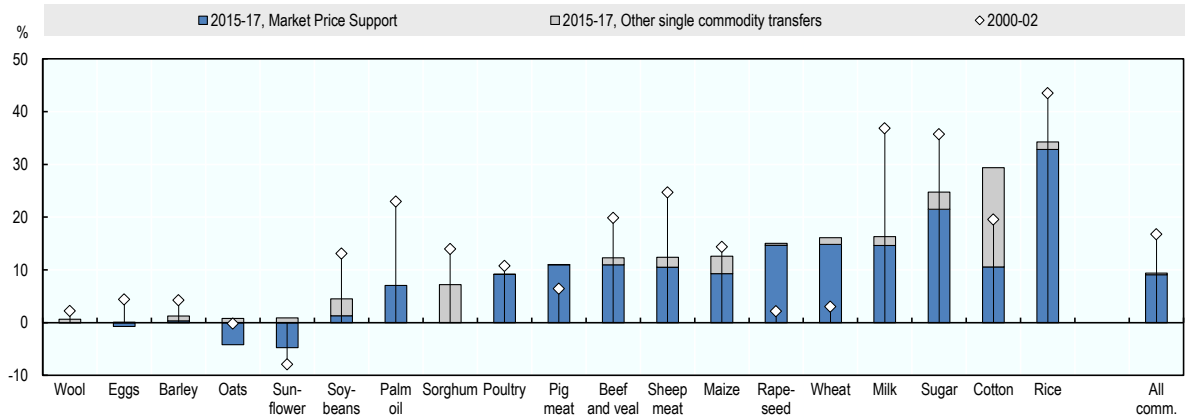
While the NPC in Figure 1.10 indicates that many countries are moving away from MPS and output related support that increases (or decreases) effective prices relative to world market prices, a large share of producer support in 2015-17 was provided to individual commodities. The use of single commodity support is considered to be one of the most production and trade distorting forms of support. The reason for this is that the measures employed are, by definition, targeted to the production of specific products or the use of specific inputs into the targeted sectors. This can create allocative inefficiencies within countries' agricultural sectors by biasing production and resources towards certain commodities at the expense of others.[2] It can also reduce resilience and adaptation to climate change by encouraging farmers to plant specific crops, even if they are not well suited to local climate conditions (OECD, 2017b).

On average, single commodity transfers (SCTs) have declined from 17% of the gross farm receipts for each commodity in 2000-02[3] to 11% in 2015-17 (Figure 1.11). Importantly, variability across commodities has also declined – significant differences in SCTs across commodities can impede adjustment in the agricultural sector and efficient resource use. Support has declined for some of the commodities that received the highest relative levels of support in 2000-02, such as rice, milk, sugar, sheep meat and palm oil. However, support for some heavily supported commodities has trended up over time compared with 2000-02, in particular cotton, rapeseed and wheat. The reforms and policy developments underlying these trends are discussed in more detail in OECD (2017c).

Because market price support represents the largest share of SCT (Figure 1.11), trends in SCTs tend to move with developments in international markets. As discussed in OECD (2017c), SCTs have declined as a share of the PSE since the early 2000s. However, the fall was uneven – after falling between 2000 and 2008 (the height of the food price spike), SCTs subsequently increased. This suggests that in aggregate, the policies directed at isolating domestic markets from international prices for individual commodities have not changed significantly over the period.

**Figure 1.11. Single Commodity Transfers, all countries, 2000-02 and 2015-17**

Percentage of gross receipts for each commodity




*Notes*: Commodities are ranked according to the absolute value of % SCT in 2015-17. Not all commodities are relevant for all countries. Indonesia is not included in this report.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755146

## *Payments are increasingly tied to specific production practices, reflecting the importance of objectives related to society at large*

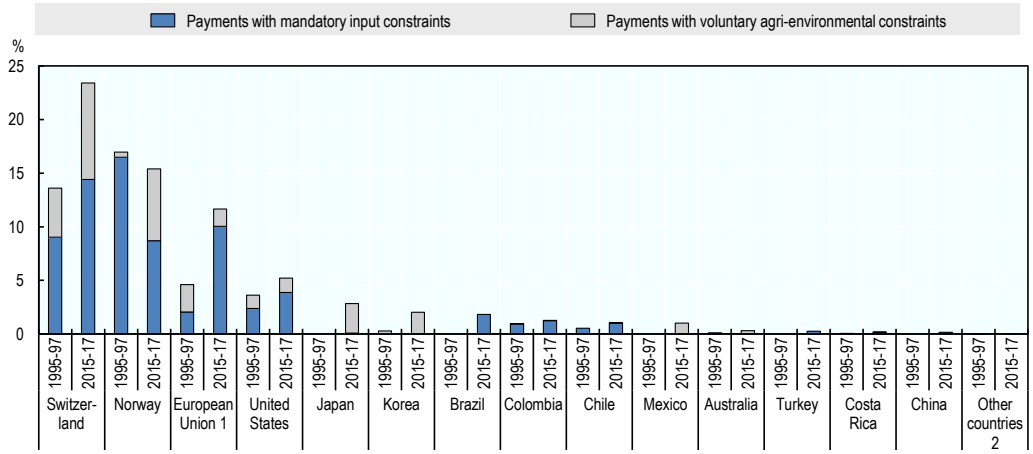
In some countries, payments are increasingly tied to specific production practices to encourage producers to adopt specific production practices that may improve the environmental performance of farming or animal welfare. Input subsidies may be subject to mandatory constraints on their use, or receipt of payments may be conditional on the adoption of specific production practices. Payments may also be linked to agri-environmental constraints or to programmes to which farmers can opt-in on a voluntary basis. The number of countries using these approaches and the levels of these payments has increased in recent decades, reflecting the growing importance of objectives for the sector that reflect societal concerns and the expectation that agriculture will provide various public goods, such as the maintenance of agricultural landscapes and biodiversity.

Payments linked to mandatory production practices have become more important in Chile, the European Union, Switzerland and the United States (Figure 1.12). In these countries, up to half of the total support to farmers is provided in the form of direct payments that are subject to "cross-compliance" with environmental conditions. Some support to fixed capital formation is also tied to investments in facilities for environmental and animal welfare friendly production. Brazil has made all its credit and insurance programmes subject to complying with an elaborate zoning scheme which determines planting times based on weather, soil and crop cycle related criteria; today these programmes make up over two-thirds of Brazil's support to farmers. Payments linked to the adoption of voluntary agri-environmental constraints and programmes are increasingly used in Japan, Korea and Norway. Other countries also use these types of payments to promote environmental objectives, including Australia, the European Union, Switzerland and the United States.

In some countries, this form of support has become more important for farmers as well, including in countries with high levels of support overall. Over 15% of gross farm receipts derive from such conditional payments in Norway, 23% in Switzerland, and almost 12% in the European Union. In contrast, payments tied to specific production practices are not widely used in the emerging and developing economies.

**Figure 1.12. Support conditional on the adoption of specific production practices, 1995-97 and 2015-17**

Percentage of gross farm receipts




*Notes*: Countries are ranked according to 2015-17 levels.
1. EU15 for 1995-97 and EU28 for 2015-17.
2. Other countries include Canada, Iceland, Israel, Kazakhstan, New Zealand, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. Indonesia is not included in this report.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

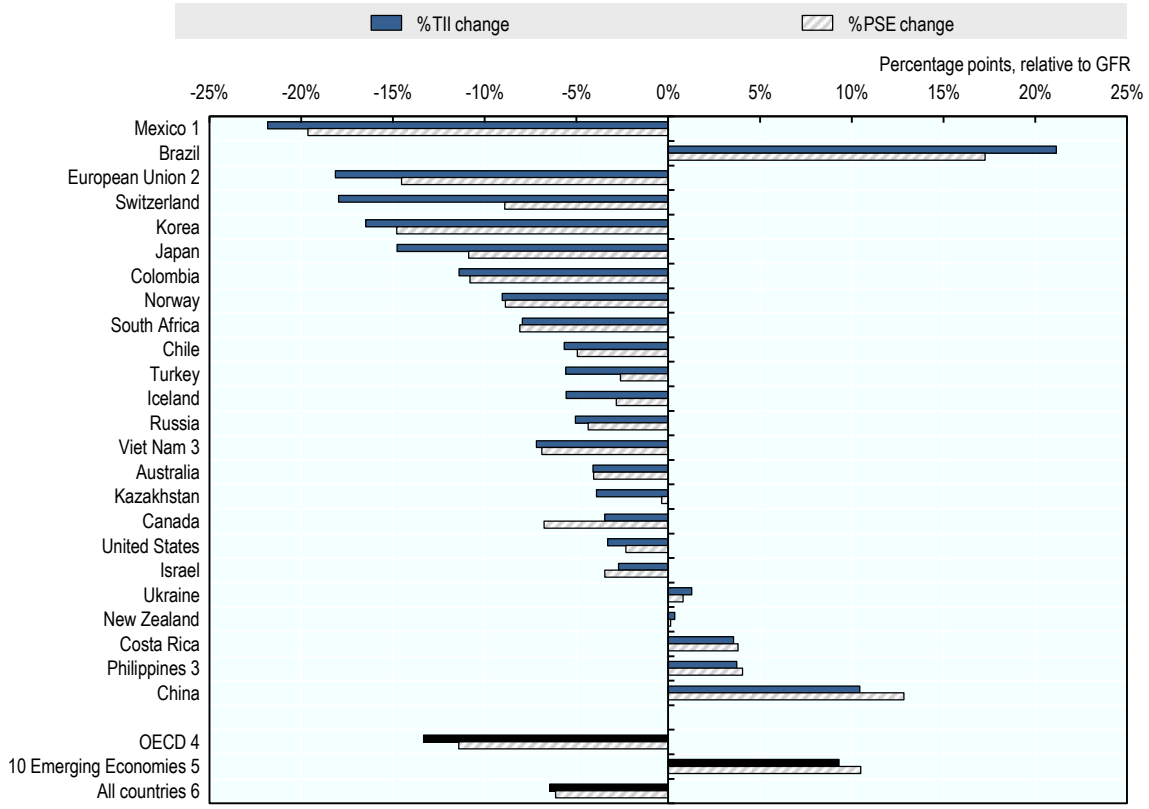
StatLink http://dx.doi.org/10.1787/888933755165

## *The trade distortive effects of support has often declined more strongly than support levels*

Lower levels of farm support, as well as the shift towards less-distorting measures, has helped to make agricultural policy packages more market oriented in many countries. To show this, this section discusses changes in the Trade Impact Index over the past two decades and compares these across countries. The Trade Impact Index and the %PSE are both expressed relative to gross farm receipts (GFR), but rather than being a measure of transfers to producers, the %TII measures distortions to international markets through the trade effects of the policies in place. Box 1.6 provides details on the way the Trade Impact Index is generated.

Figure 1.13 shows that in most countries, the trade impact of their portfolio of agricultural policies has declined more strongly over the past two decades than the reduction in support levels alone would suggest. For the OECD as a whole, while the %PSE declined by about 11 percentage points between 1995-97 and 2015-17, its Trade Impact Index declined by 13 percentage points during the same period. This section explores this further by considering changes in the Trade Impact Index of individual countries' policies, given changes in the level and structure of their support.

**Figure 1.13. Percentage point changes in %PSE and Trade Impact Index, 1995-97 to 2015-17**




*Notes*: Countries are ranked according to the Trade Impact Index (TII) changes towards zero. Positive bars show increases in the trade impacts of policies, which in some cases indicate reduced distortions. For example, Brazil's %PSE increased from strongly negative to slightly positive, a policy change that eliminated most of the trade distortive effect that arose from the negative support; hence the increase in the country's Trade Impact Index indicates a removal of an originally negative trade impact in favour of a small positive one.

1. For Mexico, 1995-97 is replaced by 1991-93.
2. EU15 for 1995-97 and EU28 for 2015-17.
3. For the Philippines and Viet Nam, 1995-97 is replaced by 2000-02.
4. The OECD total does not include the non-OECD EU Member States. The Czech Republic, Estonia, Hungary, Poland, the Slovak Republic and Slovenia are included in the OECD total for both periods and in the EU for 2015-17. Latvia is included in the OECD and in the EU only for 2015-17.
5. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included only for 2015-17. Indonesia is not included in this report.
6. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.

*Source*: OECD calculations based on PEM model results and OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755184

For some countries, the difference between the PSE reduction and the decline in the associated trade impact is particularly strong. **Switzerland**, for instance, has reduced its level of farm support by 9 percentage points, from 65% in the mid-1990s to 56% in 2015-17. At -18 percentage points, the reduction in its Trade Impact Index was much greater, falling from almost 50% in the mid-1990s to less than 32% in the most recent period.

This is because the reduction in the level of support was mainly driven by the decline in market price support, which was almost halved during these twenty years (from 47% to 28% of gross farm receipts). In turn, there was an increase in support provided through: payments based on historical entitlements, which rose from 4% of gross farm receipts (GFR) in 1995-97 to 10% of GFR in 2015-17; and payments for non-commodity outputs, which increased from less than half a percent of GFR to almost 6% of GFR during the same period. As payments based on historical entitlement have a very small trade impact relative to that of MPS (according to PEM simulations, less than 1%) and given that payments for non-commodity outputs are presumed to have none (Box 1.6), this has little effect on trade even though the payments partially offset lower producer support from MPS, and hence only very partially offsets the liberalising effect of the MPS cut. Other categories saw additional minor changes, including a small increase in output payments and some reductions in payments for cereal land and for inputs subject to input constraints and others. But changes in these components alter the overall outcomes for %PSE and Trade Impact Index very little and tend to cancel each other out.

Other countries show similar differences between the change in the %PSE and that in the Trade Impact Index, though in most cases these are smaller than in the case of Switzerland. In the case of the **European Union**, the reduction in the Trade Impact Index is similar to that of Switzerland in percentage points (down from an equivalent of just under 25% of GFR to less than 7% over the two decades), while that of the %PSE was more pronounced (falling from 34% to 19% of GFR). Here too, the principal changes were the reduction in MPS and an increase in payments based on historical entitlements, with the increase in the latter partly offsetting the MPS. Lower MPS in the European Union, from 19% to 4% of GFR, was complemented by the virtual elimination of other distorting support measures: small output payments, worth more than 1% of GFR in 1995-97; headage payments in different forms (3%); and area payments for individual crops (1%) or all cereals (3%). Such payments tend to have trade-distorting effects below those of MPS, but well above those of some of the more decoupled payments. **Japan** is a similar case, although support levels in Japan are closer to those in Switzerland than the European Union: reductions in (highly-distorting) market price support were partly compensated by increased payments of a much less distorting nature, thus reducing the %PSE by less than the Trade Impact Index. Most other OECD countries (as well as a few Emerging Economies) show reductions in the Trade Impact Index that also go beyond those in the %PSE.

In contrast, the change in **Canada's** Trade Impact Index is much less pronounced (-3.5 percentage points) than the reduction in its %PSE would suggest (-6.8%, down from 16% to 9% of gross farm receipts). This is because a reduction in payments based on historical entitlements, worth 2.6% of GFR in 1995-97, accounted for a large part of the decline in producer support. Therefore, a significant part of the PSE reduction affected support with very little trade effect.

**Israel**, too, has seen its Trade Impact Index change by less than the PSE. While Israel has reduced support for variable inputs without constraints to their use, which is found to have a particularly high potential to distort production and trade, MPS actually increased as a share of gross farm receipts. More importantly for the difference in support and trade impact, and similar to Canada, some of the reduction in support concerned measures that were less trade distorting, such as payments based on farm income or on historical entitlements.

For different reasons, several of the Emerging Economies show different patterns from those discussed above. **China** has increased its levels of support over the past two decades from less than 3% to more than 15% of gross farm receipts. However, the increase in its trade impact was somewhat less pronounced. Because some of the increase in support was in the form of less-distorting policies, including area payments (both to individual crops and to crop groups), payments based on farm income and, to a small extent, historical entitlements, China's Trade Impact Index 'only' increased from 2% to 12.5% relative to GFR. The **Philippines** and **Costa Rica** also show increases in their trade impacts that are smaller than those in their %PSEs, though these changes are much smaller than for China.

**Brazil's** development tells a very different story. While Brazil also increased support to farmers, this was from a negative overall level (-15% of GFR), to slightly positive support (3%). In particular, strongly negative MPS became slightly positive. However, given that negative MPS is as distortive as positive MPS, the increase in the Trade Impact Index associated with this increase in the PSE and visible in Figure 1.13 indicates significantly reduced distortions.

**Ukraine** also slightly increased its farm support from negative levels. However, by moving from -8.5% to -7.7% of GFR, its PSE remained strictly negative due to continued (although shrinking) negative MPS. Here again, the positive change in the Trade Impact Index indicates that the trade distortive impact of Ukraine's policies was actually reduced, as average MPS relative to GFR became less negative and hence less distorting.

**Kazakhstan**, in contrast, has barely changed its overall level of farm support, but strongly changed its composition. Although MPS was eliminated on average (in fact, MPS was marginally negative during 2015-17), this was almost completely compensated by other, less-distorting forms of support, such as support for fixed capital formation and support based on farm incomes.

Finally, in **South Africa**, the level of support and the Trade Impact Index both declined by about 8 percentage points relative to gross farm receipts. Here, almost all of the change in support concerned MPS, while some increased support in less-distorting forms (based on farm incomes) is associated with an increase in payments based on unconstrained input use, which is more distorting than MPS.

On average over the past two decades, the Emerging Economies covered in this report have increased their level of support by more than 10 percentage points relative to gross farm receipts, while the aggregate Trade Impact Index increased by 9 percentage points. The comparatively small difference between these changes is due to the fact that in the mid-1990s, negative support in Brazil offset some of the effects on international markets of positive support in other Emerging Economies. In both periods, however, the Trade Impact Index was smaller than the average %PSE.

This is even more so in the aggregate of all countries covered in this report: while the change in the average Trade Impact Index is similar to that of the average %PSE, the Trade Impact Index is about 5 percentage points below the %PSE in both periods.

To assess agricultural policies in terms of their impacts on markets and, notably, on trade, it is therefore important to carefully examine not only the level of support but also the *composition* of the policy bundle. In addition to the different trade impacts that alternative policy categories can have, negative MPS is as trade-distorting as positive MPS. While positive and negative MPS estimates may cancel each other out in the aggregate, their trade impact does not necessarily do so. This in particular holds for the combination of

positive and negative MPS across commodities within individual countries. Future work could deepen the analysis by exploring the details of commodity-specific support further.

**Box 1.6. How were the Trade Impact Indices generated?**

The Trade Impact Index, an indicator of the relative trade distortion generated by policy packages, is based on the estimated trade impact of individual policies relative to that of market price support. The Policy Evaluation Model (PEM) provides a means to estimate the trade impact of various policies by simulating alternative policy mixes resulting in the same trade outcomes. The trade impact ratio of policy support compares the transfers provided through a given policy measure to the monetary value of market price support (MPS) that would generate the same trade effect. This approach is rooted in the derivation of summary indexes of trade policy pioneered by Anderson and Neary (1996), taking it to a detailed measuring and modelling of agricultural policies. A trade impact ratio greater (or smaller) than 1 suggests that a measure has a stronger (weaker) trade effect than MPS. Previous analyses have shown that the trade impact of support linked to the unconstrained use of variable inputs is greater than that of MPS (a trade impact ratio greater than 1), while the trade impact of other measures tends to be smaller, ranging from a few percent of the trade impact of MPS in the case of area payments based on non-current parameters, to close to the trade impact of MPS in the case of output payments (Martini, 2011).

The trade impact ratios obtained from PEM for each of the two periods (1995-97 and 2013-15) and for each of the PEM countries[1] in which a given policy category was present in those years. Rations are then averaged across countries and years. For instance, in the three years 1995-97 and across PEM countries, single-commodity area payments were applied in Canada, Switzerland and the EU; these were found to have a trade effect of between 11.8% and 23.7% across countries and years. This results in an average of 19.3% for that period, similar to the 17.0% for the 2013-15 period. The resulting ratios for the 1995-97 and 2013-15 periods are then applied to the support data for all countries in the PSE database associated with this report, reported for the 1995-97 and 2015-17 periods, respectively. As in the example given above, trade impact ratios for a given policy category generally differ to a certain extent across countries and time, and further research may be required to better understand the exact reasons for these differences. To avoid spurious differences across countries, averages are used for the relative trade impacts across policy categories.

The trade impact ratios thus obtained for individual forms of support represented in the PEM are then used to calculate the countries' trade impact equivalents. These equivalents represent the level (or value) of MPS that would generate the same trade effect as a country's entire policy package. This method, updating and extending previous PEM applications including Martini (2011), allows a comparison of the trade impact of the policy packages across countries and time, by extrapolating PEM results (available only for a limited set of jurisdictions and commodities) to all countries and products covered by this report, based on the level and type of support provided in existing policy mixes.

Several policy categories, such as support for non-commodity outputs, are not reflected in PEM. These are implicitly assumed to not affect market decisions. For most of them, this probably underestimates their trade effect, while some forms of support may in reality may have a negative effect on agricultural output and, hence, on trade (for example, if some productive land is used for amenities such as hedges or green strips). As most of the

policies not covered by PEM are unlikely to have a strong trade impact of either sign, and as they represent only a small share of countries' PSE, the error in the estimation of the overall trade effect is probably small.

Similar to the PSE, the value of an MPS equivalent is difficult to compare across countries and time, as it tends to be larger for large agricultural sectors than for smaller ones. As in the case of the %PSE, the Trade Impact Index therefore expresses the value of the MPS equivalents as a percentage of gross farm receipts (GFR). As opposed to the %PSE, which is a measure of transfers, the Trade Impact Index is a measure for the distorting trade impact generated by the policy mix. As negative support can result in distortions worth eliminating just as much as positive support, a negative Trade Impact Index may be considered as much of a problem as a positive one. An increase of a negative Trade Impact Index towards zero therefore indicates a decline in the distorting effects of the policy package.

Due to the uncertainties around country-specific trade-impact ratios, a caveat on the precision of the results shown above applies: these should be seen as indications of relative changes rather than as exact in their magnitudes.

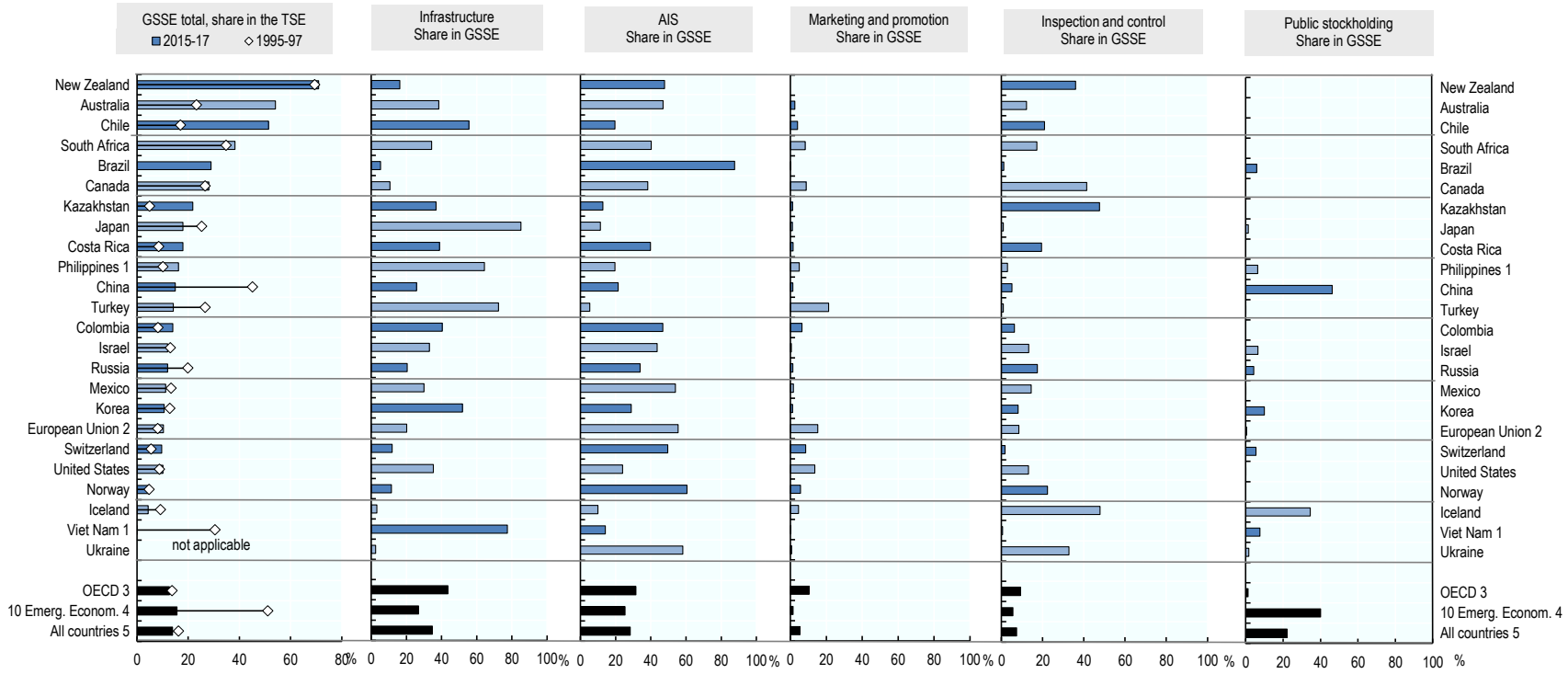
1. Countries covered by PEM currently include Canada, the European Union, Japan, Korea, Mexico, Switzerland and the United States.
*Sources*: Anderson, J. and J.P. Neary (1996), "A New Approach to Evaluating Trade Policy", *Review of Economic Studies*, Vol 63 pp. 107-125; Martini, R. (2011), "Long Term Trends in Agricultural Policy Impacts", *OECD Food, Agriculture and Fisheries Papers*, No. 45, OECD Publishing, Paris, http://dx.doi.org/10.1787/5kgdp5zw179q-en.

### *Support to general services varies significantly across countries in both importance and priorities*

Beyond support provided to individual producers, governments also support agriculture through public financing of services that create enabling conditions for the agricultural sector, measured by the General Services Support Estimate (GSSE). As described previously, on average, support for general services accounts for a much smaller share of total support than support provided directly to producers, averaging 14% of the TSE for all countries covered in this report in 2015-17.

The relative importance of general services in total support varies across countries. As shown in the first panel of Figure 1.14, Australia (54% of total support), Chile (51%) and New Zealand (71%) provide most of their support to agriculture through financing sector-wide services, while South Africa provides 38% of total support, and Brazil and Canada just under 30% of total support. General services account for a much smaller share of total support in most other countries. In some countries, the %GSSE has declined since the mid-1990s, most significantly in China (from almost 45% of total support in the mid-1990s to 15% in 2015-17) but also in Iceland, Japan, Korea, Mexico, the Russian Federation and Turkey.

**Figure 1.14. General Services Support Estimate: Share in TSE and composition**




*Notes*: Countries are ranked according to 2015-17 GSSE shares in the TSE. The residual "miscellaneous" category is not shown. AIS = Agricultural Innovation System.1. For the Philippines and Viet Nam, 1995-97 is replaced by 2000-02. Data is not applicable for Viet Nam in 2015-17. 2. EU15 for 1995-97 and EU28 for 2015-17. 3. The OECD total does not include the non-OECD EU Member States. The Czech Republic, Estonia, Hungary, Poland, the Slovak Republic and Slovenia are included in the OECD total for both periods and in the EU for 2015-17. Latvia is included in the OECD and in the EU only for 2015-17. 4. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included from 2000 onwards. Indonesia is not included in this report. 5. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.

*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755203

Countries also emphasise different elements of general services to the agricultural sector. Investments in agricultural infrastructure are prioritised in a number of countries. More than 70% of expenditure on general services is on infrastructure in Japan, Turkey and Viet Nam, and infrastructure represents more than half of general services expenditure in Chile, Korea and the Philippines – often to improve irrigation coverage and quality. The agricultural innovation system (AIS) is prioritised in Australia, Brazil, Colombia, the European Union, Israel, Mexico, New Zealand, Norway, Switzerland and Ukraine, and plays a key role in many other countries as well. For the OECD countries on average, infrastructure (44% of the GSSE) and the AIS (32% of the GSSE) accounted for more than three-quarters of all expenditures on general services. Expenditures on inspection and control systems accounted for between 30% and 50% of general services expenditure in Canada, Iceland, Kazakhstan, New Zealand and Ukraine. Expenditures on public stockholding accounted for a significant share of the GSSE in China and Iceland. Public support for the agricultural innovation system is explored further in the following section on ***Developments in approaches to support and policies***.

### *Consumers continue to bear most of the costs of producer support in many countries*

Producer support also affects consumers of agricultural commodities, namely food processors, livestock producers and final consumers. In most of the countries covered in this report, domestic prices are higher than world market prices, which increases costs for consumers. In some countries, other policies may provide compensation for some or all of these additional costs, for example, through budgetary subsidies to food processors or through domestic food assistance programmes. The percentage Consumer Support Estimate (%CSE) expresses the monetary value of the transfers to consumers as a percentage of consumption expenditures (measured at the farm gate). When domestic prices are higher than those on the world market, they contribute negatively to the %CSE, indicating an implicit tax imposed on consumers.

This implies an important redistribution, which burdens poor consumers relatively more than rich ones, as the share of food expenditures in household budgets tends to fall with rising incomes. Moreover, small agricultural producers may be net buyers of agricultural products, meaning that price support is ineffective in helping those most in need – this is particularly the case in emerging and developing economies. It also disadvantages food processing industries, which have to pay higher prices for their material inputs, making them less competitive on international markets. Finally, such support often creates significant distortions to markets and economies, reducing economic welfare.

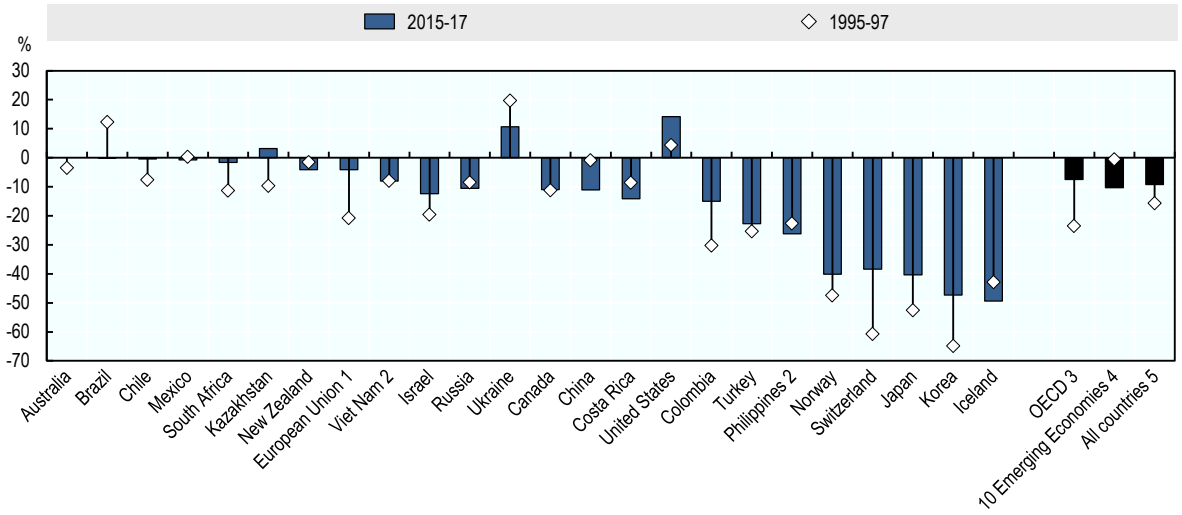
Consumers in almost all countries are harmed by agricultural policies, although to different degrees (Figure 1.15). In 2015-17, the implicit tax on consumers – as indicated by a negative %CSE – ranged from less than one percent in Brazil, Chile and Mexico, to more than 40% in Iceland, Japan, Korea and Norway. In all cases, this negative CSE is due to market price support, implying transfers from consumers to domestic producers and, for importing countries, to taxpayers. In some emerging and developing countries, increasing use of market price support has increased the implicit taxation of consumers. In China, Costa Rica, the Philippines and the Russian Federation, the %CSE is more negative in 2015-17 relative to its value in the mid-1990s.

A minority of countries provide positive net-support to their consumers, specifically Ukraine (%CSE of 11% in 2015-17), the United States (14%) and, to a lesser extent, Kazakhstan (3%). However, they do so in very different ways. In Ukraine and

Kazakhstan, domestic market prices are, on average, below prices on world markets, which benefits consumers at the expense of agricultural producers. In contrast, the United States has significant domestic food assistance programmes for specific groups of the population, more than offsetting the somewhat higher domestic prices. The %CSE has more than tripled since the mid-1990s, as a result of declining market price support and the expansion of the nutrition programmes, making it the highest consumer support among the countries covered in this report – in value terms, relative to consumer expenditures, and as a share of the Total Support Estimate.

**Figure 1.15. Consumer Support Estimate by country, 1995-97 and 2015-17**

Percentage of consumption expenditure at farm gate




*Notes*: Countries are ranked according to absolute values of the 2015-17 levels. A negative percentage CSE is an implicit tax on consumption.
1. EU15 for 1995-97 and EU28 for 2015-17.
2. For the Philippines and Viet Nam, 1995-97 is replaced by 2000-02.
3. The OECD total does not include the non-OECD EU Member States. The Czech Republic, Estonia, Hungary, Poland, the Slovak Republic and Slovenia are included in the OECD total for both periods and in the EU for 2015-17. Latvia is included in the OECD and in the EU only for 2015-17.
4. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included from 2000 onwards. Indonesia is not included in this report.
5. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

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## Developments in approaches to support and policies: A closer look at agricultural innovation for sustainable productivity growth

Notwithstanding the diversity of countries featured within this report, the challenges facing their agricultural sectors – and motivating their agricultural policies – are broadly the same. These include ensuring the economic viability of the sector; responding to growing demand for food and non-food uses of agricultural commodities; using available

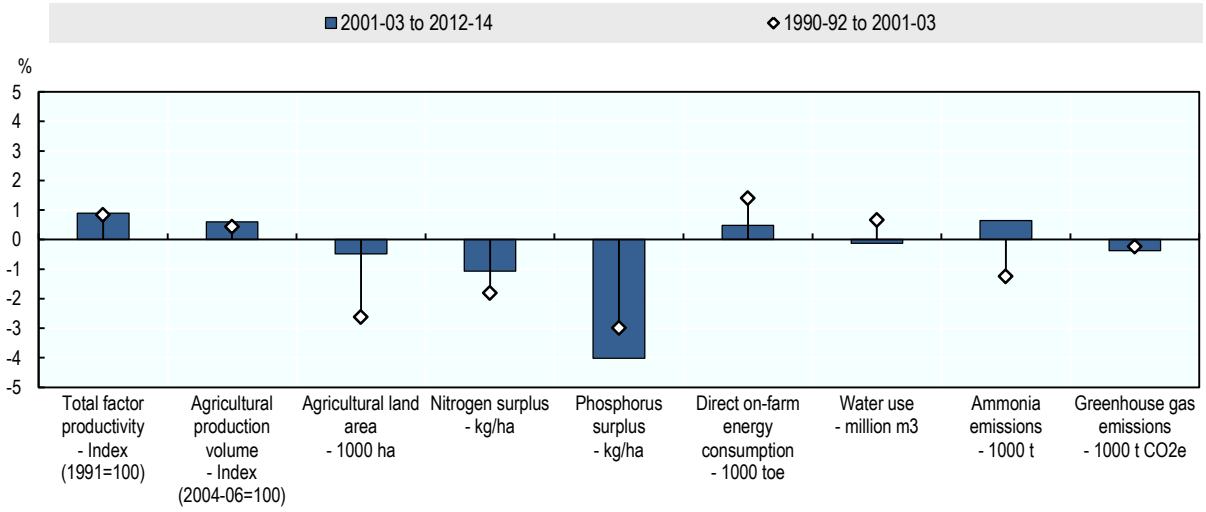
land, water and biodiversity resources more sustainably; and adapting to and mitigating climate change effects. This section takes a closer look at the extent to which the innovation policy environment in the countries included within this report fosters the creation and adoption of appropriate agricultural innovation that can potentially contribute to sustainable productivity growth. To this end, it highlights two key elements of agricultural innovation systems: knowledge *generation* (agricultural research and development) and knowledge *transfer* (agricultural extension, training and agricultural education).

### *The agricultural sector faces significant challenges*

In recent years, significant productivity improvements in agriculture have enabled the sector to rise to the abovementioned challenges. Nevertheless, global productivity growth figures mask significant differences across regions, with lagging growth in some countries (OECD, 2016a; USDA, 2017b). In addition, while the sustainability performance of the sector in OECD countries has improved in some respects – reflecting declining trends in nutrient surpluses, for example (Figure 1.16) – trends in sustainability performance vary across countries, and national averages mask serious local problems. Unsustainable agricultural practices persist, potentially constraining long-term sustainable productivity growth. Environmental conditions may also pose obstacles to sustainable productivity growth in the long term (OECD, 2016a). Countries in emerging and developing regions, Southeast Asia, for example, also face pressing challenges with respect to both the sustainability of current agricultural practices and changing environmental conditions (OECD, 2017e).

**Figure 1.16. OECD agri-environmental performance**

Average annual percent change 1990-92 to 2001-03 and 2001-03 to 2012-14, or nearest available period




*Source*: OECD (2018d), *Agri-environmental Indicators* (database), http://www.oecd.org/tad/sustainable-agriculture/agri-environmentalindicators.htm; IEA (2016), *World Energy Balances* (database), http://www.iea.org/statistics/topics/energybalances/; USDA (2017a), USDA Economic Research Service *International Agricultural Productivity* (database), www.ers.usda.gov/data-products/international-agricultural-productivity.aspx.

StatLink http://dx.doi.org/10.1787/888933755241

### *Innovation is a key driver of sustainable productivity growth*

A large body of work suggests that innovation – the generation and application of new knowledge to productive or organisational processes – can be crucial to achieving the necessary sustainable productivity growth of the sector in the face of climate change and resource pressures (IO, 2012; OECD, 2015b). Appropriate innovation can drive productivity growth by enabling farmers to increase their efficiency through the adoption of new technologies and practices (OECD, 2013). It can also play an important role in ensuring the long-term sustainability of that growth by increasing the resilience of the sector to environmental challenges that may constrain growth, and by allowing for the more sustainable use of resources.

Governments and the international community have recognised the importance of innovation for sustainable productivity growth. The United Nations sustainable development goals (SDGs), for example, which were adopted in 2015, highlight the need for investment in innovation and in the agricultural innovation system in particular. This message was reiterated at the Ministerial Meeting of the OECD Committee for Agriculture in 2016, where 46 countries, together with the European Union, agreed that innovation should be prioritised in order to achieve sustainable productivity growth, including through organisational change, cross-sectoral co-operation, greater public and private investment in research and development (R&D), technology transfer and adoption, education and training, and advisory services (OECD, 2016b).

As the challenges faced by the sector become increasingly important, so too will knowledge generation and knowledge transfer that can lead to appropriate changes in farm practices. And as agricultural systems become more complex, farmers will require more advanced innovation skills. While large improvements in sustainable productivity could be achieved with greater adoption of current technologies, shifting challenges require the continuous creation of innovative solutions that are better adapted to evolving and diverse demands. However, this poses a challenge for agricultural innovation systems (networks of actors that contribute to the development, diffusion and use of new agricultural technologies and institutional innovations), which may struggle with limited resources to find an appropriate balance between investment in research in new innovations (and in the anticipation of future research needs) and in training and advisory services that enable adoption and diffusion of innovation by farmers (OECD, 2016c).

### *Agricultural innovation can be influenced by a range of policy areas*

Innovation in agriculture is influenced by a broad range of policies, both economy-wide and agriculture-specific, in addition to measures explicitly focused on innovation. These are identified within an OECD framework for the review of policy incentives and disincentives to innovation (OECD, 2015b). **Economy-wide** policies that affect innovation choices include macro-economic policy-settings; institutional governance; environmental standards; investment, land, labour and education policies; and incentives for investment, such as a predictable regulatory environment and robust intellectual property rights. **Agricultural** policies, broadly defined, can also stimulate or inhibit agricultural innovation. As discussed earlier in this report, agricultural domestic and trade-related policies that distort markets reduce producers' incentives to use production factors more productively, thus potentially discouraging innovation. On the other hand, allowing producers to face production risks and access appropriate risk management systems, where applicable, is essential to improve the adoption of innovation. Finally, **innovation** policies directly support and guide the development and diffusion of

technologies and practices related to management, and the production, processing and marketing of food and agricultural products. These include policies that contribute to agricultural knowledge generation, such as direct investments in public and private research and development (R&D) and R&D institutions, as well as indirect support to private R&D through tax rebates, credit guarantees, competitive grants and funding of public-private partnerships. They also include measures that facilitate agricultural knowledge transfer, such as agricultural education, extension and advisory services, in addition to data collection and dissemination networks related to agricultural production and marketing. Robust governance of agricultural innovation systems is also important to ensure optimal use of resources for the provision and adoption of needed information.

### *Agricultural innovation features within many country policy frameworks*

Agricultural innovation is referred to – albeit with varying degrees of emphasis – within the policy frameworks of a large number of countries and regions featured in this report, including **Australia, Canada, Costa Rica, the European Union, Japan, Korea, Norway, Switzerland** and **Turkey**. In the **European Union**, for example, fostering knowledge transfer and innovation, and the promotion of resource efficiency are two of the six priority areas of Pillar 2 of the Common Agricultural Policy for 2014-20, which funds programmes specifically dedicated to research and innovation in agriculture. In addition, a Strategic Approach to EU Agricultural Research and Innovation was developed in 2016, in consultation with stakeholders (European Commission, 2016). **Canada**'s agricultural policy framework until 2018, Growing Forward 2 (GF2), stresses three broad priority areas, one of which is innovation. Provinces must spend a minimum of 25% of their funding envelope on innovation programming. The agricultural policy framework for the 2018-22 period, the Canadian Agriculture Partnership, will focus on enhancing the competitiveness of the sector through research, science and innovation, and the adoption of innovative products and practices, with an emphasis on sustainable growth (AAFC, 2018). In **Costa Rica**, the State Policy for the Costa Rican Agri-food Sector and Rural Development 2010-2021 emphasises innovation and technological development, in addition to competitiveness and sustainability objectives (OECD, 2017f). In **Australia**, the Agricultural Competitiveness White Paper aims to boost innovation within the sector, amongst other objectives.

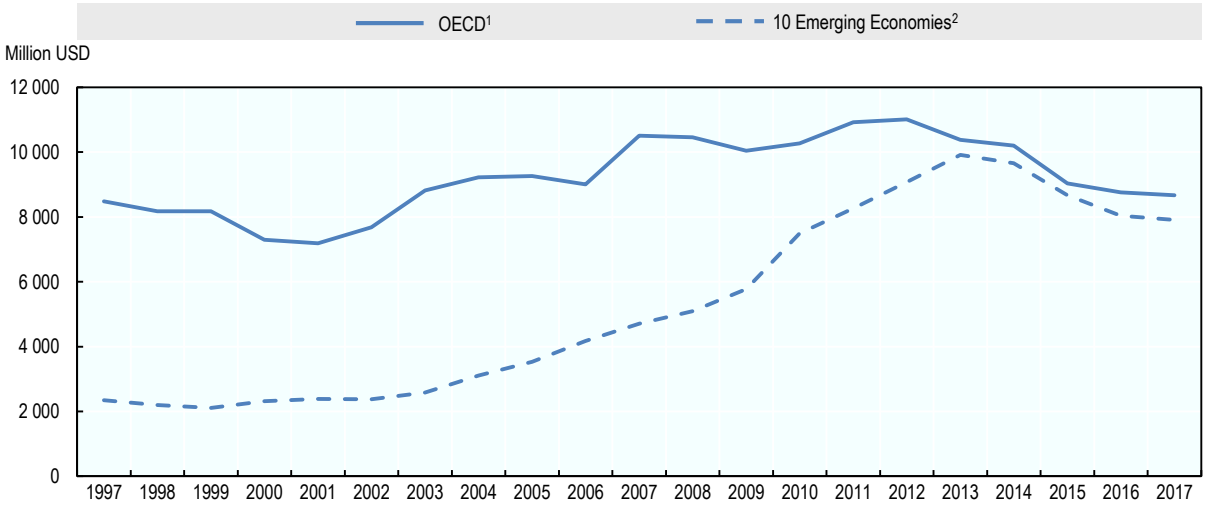
Agriculture is also an explicit priority of a number of national innovation strategies, such as the National Science and Technology Plan 2002–20 (NSTP) in the **Philippines** (OECD, 2017e) and the 13th Five Year Plan for Science and Technology Innovation in **China**.

### *Public expenditure on AIS is increasing, yet accounts for a decreasing share of total support for agriculture in some regions*

While the role of governments in AIS is not limited to the provision of budgetary support, public expenditure data can provide an indication of the engagement of governments in knowledge generation and transfer. Indeed, it would appear that the increasing emphasis of agricultural innovation systems within policy frameworks has largely been reflected in increases in public expenditure allocated to AIS over the last 20-year period. Although expenditure in both OECD and developing and emerging regions has fallen slightly in the most recent years, both have generally increased over the 1997-2017 period, with increases in expenditure of emerging and developing regions particularly significant, and largely driven by developments in China (Figure 1.17).

**Figure 1.17. Government expenditure on Agricultural Innovation Systems, 1997 to 2017**

Real USD




*Notes*: Absolute dollar values are expressed in real 1997 USD using United States GDP deflator.
1. The OECD total does not include the non-OECD EU Member States. Latvia is included only from 2004.
2. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included from 2000 onwards. Indonesia is not included in this report.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

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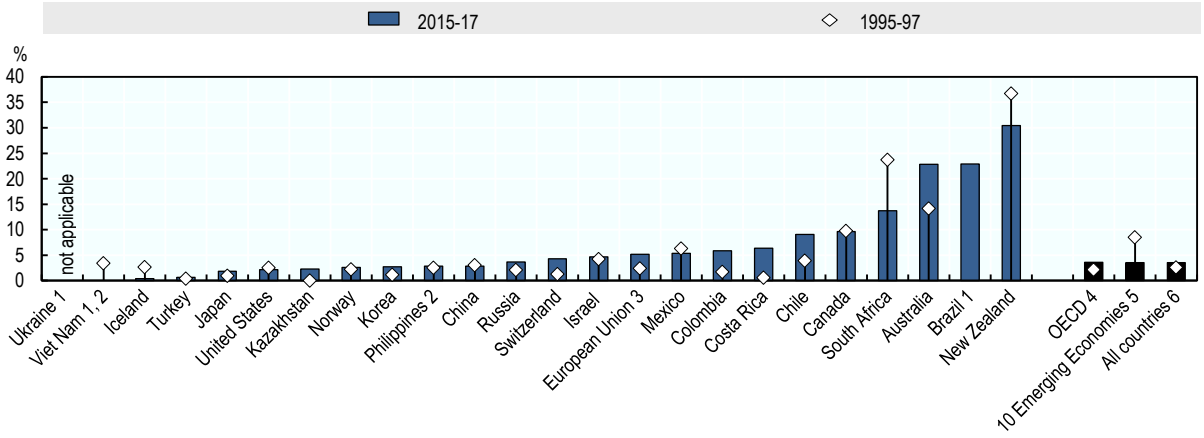
As a *share of total support* to the sector, however, a slightly different picture emerges, with AIS expenditure in developing and emerging regions representing a decreasing share of the TSE in the last 20-year period, falling from 8.4% in 1995-97 to 3.5% in 2015-17. In contrast, the share has increased slightly in the OECD region as a whole, rising from 2.1% of TSE in 1995-97 to converge with developing and emerging region levels in 2015-17. Of all countries included within this report, expenditure as a share of TSE increased the most in Australia, while South Africa decreased the most (Figure 1.18). These differences between actual expenditure and expenditure as a share of TSE may be due to the fact that, as mentioned earlier, support to individual producers remains an important feature of the policy landscape in a number of countries.

Differences in government expenditure on AIS across countries are explained by a number of factors. With respect to knowledge generation, these include: 1) different ambitions and scope of agricultural research across countries, with emerging and smaller countries tending to focus on adaptive research, while larger and more affluent countries are active in all research fields and stages; and 2) the extent of private research and its complementarity with public efforts. With regard to knowledge transfer, the respective roles of private and public actors in funding and delivering advice to farmers differ widely (see section on Extension, below). In many economies, moreover, the funding of agricultural education cannot be distinguished from general funding for education, posing difficulties for the accurate comparison of countries.

**Figure 1.18. Government expenditure on Agricultural Innovation Systems as a share of TSE by country, 1995-97 and 2015-17**




*Notes*: Countries are ranked according to the 2015-17 levels.
1. Brazil 1995-97, Ukraine 1995-97 and 2015-17, and Viet Nam 2015-17 are not applicable due to negative TSEs.
2. For the Philippines and Viet Nam, 1995-97 is replaced by 2000-2002.
3. EU15 for 1995-97 and EU28 for 2015-17.
4. The OECD total does not include the non-OECD EU Member States. The Czech Republic, Estonia, Hungary, Poland, the Slovak Republic and Slovenia are included in the OECD total for both periods and in the EU for 2015-17. Latvia is included in the OECD and in the EU only for 2015-17.
5. The 10 Emerging Economies are Brazil, China, Colombia, Costa Rica, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. The Philippines and Viet Nam are included only for 2015-17. Indonesia is not included in this report.
6. The All countries total includes all OECD countries, non-OECD EU Member States, and the 10 Emerging Economies.
*Source*: OECD (2018b), "Producer and Consumer Support Estimates", *OECD Agriculture statistics* (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

StatLink http://dx.doi.org/10.1787/888933755279

### *R&D accounts for the majority of public expenditure on AIS in many regions*

With respect to the components of AIS, governments have an important role to play in both knowledge generation and transfer, in addition to the maintenance of knowledge infrastructure (such as life science infrastructure - e.g. gene banks -, agricultural research institutions, networks and centres of excellence, and databases) that can enable collaborative efforts both with the private sector and internationally (OECD, 2013; OECD, 2015b). The appropriate mix of knowledge generation and transfer components will inevitably differ across countries, with some necessarily prioritising research and development (R&D) and others public education or extension.

Public engagement in **Research and Development (R&D)**, either as a performer of R&D, a funder, or both, can play a vital role in innovation that can contribute to sustainable productivity growth. As a performer of R&D, the public sector tends to focus on basic research with a long-term horizon and uncertain returns. It also often focuses on areas with "public good" aspects, such as environmental and natural resources benefits (OECD, 2013). Moreover, because of the public good nature of public research, it encourages the diffusion and transmission of knowledge to farmers. Public engagement in R&D can also serve to incentivise private investment, either by the co-financing of

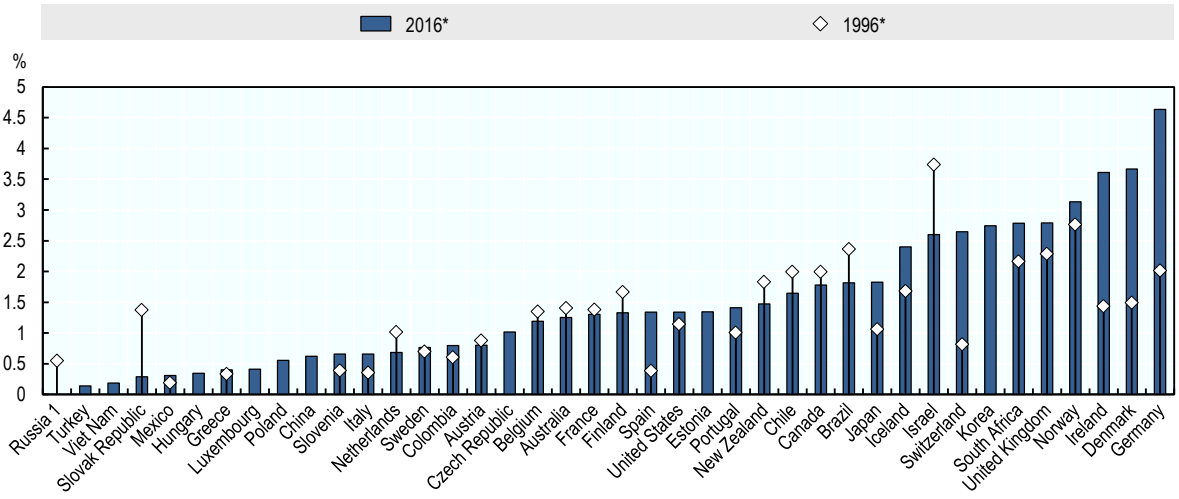
research projects, by public-private partnerships, or by stimulating R&D in projects that capitalise on the knowledge spillovers generated by public R&D. In addition, public investment in agricultural R&D is estimated to have significant impacts on agricultural TFP growth and competitiveness (Alston, 2010). Indeed, public spending on agricultural R&D has been found to be more effective at raising sustainable agricultural productivity than other public expenditures in agriculture, such as irrigation and fertiliser subsidies (Diaz-Bonilla, Orden and Kwiecinski, 2014).

The public sector continues to be the main **source of funding** for agricultural R&D, whether performed in public or private organisations (OECD, 2015b; OECD, 2013). In a number of countries, the public research mandate has been broadened to include environmental, food and other issues. The focus has also shifted away from primary agriculture to innovation along the food chain and to non-technological innovations, such as institutional or marketing innovations (OECD, 2013). In both the OECD and emerging and developing regions, R&D accounts for the majority of public expenditure on AIS as a share of total support. In the OECD region in 2015-17, agricultural R&D accounted for 2% of total support, marginally higher than that of developing and Emerging Economies (1.9%) during the same period.

R&D intensity figures (the share of budget appropriations on agricultural R&D as a share of agricultural value added) at country level can shed further light on government efforts. Between 1996 and 2016, R&D intensities increased for a number of countries for which comparable data are available, including **Germany, Denmark, Ireland,** the **United Kingdom, Norway, Switzerland, Spain** and **Japan**, but decreased in others, suggesting that in some countries, public funding is not keeping pace with agricultural sector growth (Figure 1.19). In some cases where public expenditure declined, agricultural sciences R&D has nevertheless benefited from increased private sector funding, as has been the case with producer levy co-funded Rural R&D Corporations (RDCs) in **Australia**, for example (OECD, 2013; see also section below), although this has not been sufficient to prevent total expenditure from decreasing. In the **United States**, the share of public expenditure has decreased due to significant increases in private efforts, with the result that public funding accounted for less than a quarter of the total in 2016 (OECD, 2016d).

**Figure 1.19. Public R&D intensity of agricultural sciences, 1996 and 2016**

Government budget appropriations or outlays for research and development (GBAORD) on agricultural sciences as a percentage of agricultural value added




*Notes*: Countries are ranked according to the 2016 levels.
* or nearest available year: 2016 is replaced by 2015 for Belgium, Estonia, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Poland, Slovenia, Spain, Sweden, Turkey, the United Kingdom, and the United States; by 2014 for Iceland, New Zealand, South Africa, Switzerland; by 2013 for Brazil, Canada, Chile, China, Colombia; and by 2010 for Viet Nam. 1996 is replaced by 1995 for New Zealand.
1. For the Russian Federation, recent data are not available.
*Source*: OECD (2017d), "Research and Development", *OECD Statistics* (database), http://stats.oecd.org/; and for Brazil, Chile, China, Colombia, South Africa and Viet Nam: ASTI (2017), *Agricultural Science and Technology Indicators* (database), www.asti.cgiar.org/data.

StatLink http://dx.doi.org/10.1787/888933755298

## *Public support is increasingly used to leverage private engagement in R&D*

In addition to funding public research, governments also play an important role in providing direct and indirect **support for *private* investment and participation** in agricultural R&D. Private investment is lower in agriculture than other sectors, due to the small-scale nature of farms and agri-food firms, and tends to take place in large input and food processing companies, and in areas such as farm equipment and seeds (OECD, 2015d).

A variety of measures are adopted by governments to encourage greater participation of private actors in R&D. Public funds are often allocated directly to a range of **projects** of different scales that are selected in a competitive manner, including the **United States-Israel** Binational Agricultural Research and Development (BARD) fund (BARD, 2012), the Centres of Scientific Excellence and Competence Centre programmes in **Estonia** (OECD, 2018e) and the Conservation Innovation Grants in the **United States**. The latter aim to stimulate public and private innovation, farmers included, in resource cultivation (USDA NRCS, n.d.). Other direct funding arrangements include **public-private partnerships (PPPs)**, which are increasingly used to capitalise on synergies between private and public research capacities and stimulate private investment in innovations that have a public goods nature (OECD, 2013). **Chile** favours PPP and competitive funding

for agricultural R&D. In **Brazil**, the research agency of the Ministry of Agriculture, Embrapa, is expanding its partnerships with both private and public actors, including a recent agreement with the association of cotton producers. In the **Netherlands**, the national R&D strategy involves the funding of PPPs in the "top sectors" of the economy, agriculture included (OECD, 2015f).

In countries such as Australia and New Zealand, co-funding instruments, with contributions from producers, are also used to leverage private participation in R&D. In **New Zealand**, for example, 29% of public expenditure on agricultural R&D in 2017 was directed to Primary Growth Partnerships (PGP) schemes, which normally receive 50-50 matching funds from the industry. PGP schemes aim to boost the productivity, economic growth and sustainability of the primary, forestry and food sectors (OECD, 2013). Investments cover education and skills development, R&D, commercialisation, commercial development, and technology transfer. In **Australia**, rural research and development corporations (RDCs) are the Australian Government's primary vehicle for supporting rural innovation and drive agricultural productivity growth. RDCs are a partnership between the government and industry created to share the funding and strategic direction setting for primary industry R&D, investment in R&D and the subsequent adoption of R&D outputs. A levy system provides for the collection of contributions from farmers to finance RDCs, and the Australian Government provides matching funding for the levies, up to legislated caps.

In addition to direct forms of funding, a variety of funding mechanisms such as **R&D tax rebates** and **credit guarantees** to industry, **venture capital**, and "pull mechanisms" such as **innovation prizes** or **Advance Market Commitments (AMCs)** have been adopted by governments (OECD, 2013). R&D tax concessions are provided by the majority of countries, including the **Philippines, Viet Nam, Canada** and **Korea**, for example (OECD, 2013; OECD, 2017e). In **Korea**, the national food cluster FOODPOLIS, an R&D-focused and export-oriented platform, offers tax exemptions to participating companies.

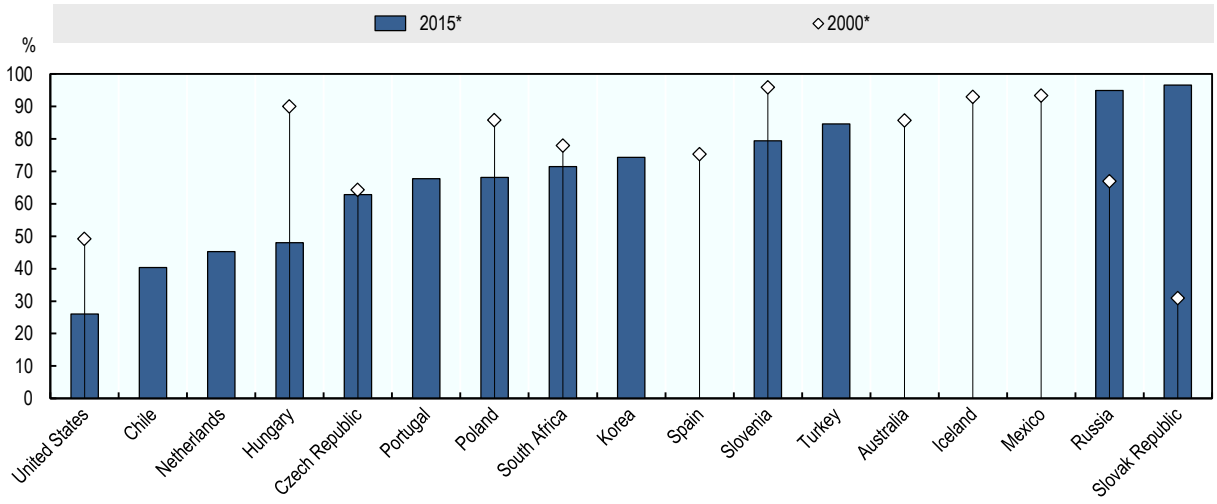
### *The public sector nevertheless remains a key performer of agricultural R&D in most countries*

In most countries featured in this report, the public sector also plays a leading role in performing agricultural R&D. Generally speaking, the share of R&D performed by governments is higher for agricultural sciences and agricultural R&D than for total R&D (OECD, 2013). In 2015, agricultural R&D performed by government and higher education institutions accounted for 60% of total (public and private) expenditure on agricultural sciences in the majority of countries for which data are available, and for over 90% of total expenditure in some cases (Figure 1.20). While there may be inconsistencies in data across time, trends in this share between 2000 and 2015 appear to be mixed, reflecting the stronger involvement of the private sector in certain countries or the decrease in public R&D in some cases. Private sector efforts tend to concentrate on seed sectors and food processing (OECD, 2016d). Nevertheless, data on the shares of public and private involvement are limited for the majority of countries, and it is likely that the government share is even higher in emerging and developing economies. Examples of agricultural R&D performed by governments include the development of new rice varieties in **Viet Nam** (OECD, 2017e), research on agricultural soils and agriculture and climate in **France** (the Agriculture-Innovation 2025 programme), the development of climate adaptation technologies in the **United States** (via a network of Regional Climate Hubs) and, in **New Zealand**, the R&D of mitigation technologies to reduce agricultural

greenhouse gas emissions at the New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC).

**Figure 1.20. Expenditure on agricultural sciences R&D performed by government and higher institutions, selected countries, 2000 and 2015**

Percentage of Gross Domestic Expenditure (GERD) on agricultural sciences R&D




*Notes*: Countries are ranked according to the levels of the most recent presented year.
* or nearest available year: 2015 is replaced by 2014 for the Czech Republic, the Netherlands, Poland, Portugal, the Slovak Republic, Slovenia, Turkey and the United States; and by 2013 for Hungary and South Africa. 2000 is replaced by 2003 for Mexico; by 2002 for Australia; by 2001 for South Africa; and by 1999 for Iceland.
*Source*: OECD (2017d), "Research and Development", *OECD Statistics* (database), http://stats.oecd.org/; For the United States: USDA (2017a), *Agricultural Research Funding in the Public and Private Sectors*, https://www.ers.usda.gov/data-products/agricultural-research-funding-in-the-public-and-private-sectors/.

StatLink http://dx.doi.org/10.1787/888933755317

## *Regional and international research collaboration is important to overcome regional and global challenges*

Governments also play a key role in the facilitation of **regional and international research collaboration** in projects, networks and capacity building. R&D collaboration is a valuable means for countries to optimise their domestic research resources and benefit from specialisation and international research spillovers, and thus more efficiently address mutual challenges (OECD, 2013). The Consultative Group on International Agricultural Research (CGIAR), the Global Forum for Agricultural Research (GFAR), the Global Research Alliance on Agricultural Greenhouse Gases, the INNOVAGRO Network and the Global Conference on Agricultural Research for Development (GCARD) are just a few notable examples (OECD, 2013). In some regions, cross-country research collaboration is explicitly required by innovation policy – the **European Union** is one such example. While the main objective of this policy is the co-ordination of research across EU Member States, third countries can also participate in some cases.

### *A broad variety of models exist for the funding and delivery of extension, training and advisory services*

Beyond agricultural R&D, the capacity of AIS to contribute to sustainable agricultural productivity growth depends on the availability of effective **extension, training** and **advisory services** from a diversity of actors. These are important for the facilitation of farmers' access to and adoption of technology and knowledge, in addition to their participation in innovation networks and ability to formulate their specific demands (OECD, 2013). Advisory services can also to some extent compensate for farmers' lack of skills or training by providing information that supports innovation (OECD, 2016c).

Governments can play an important role in ensuring that extension and advisory services continue to respond to demands from an increasingly diverse farm population on a wide range of topics. Where advisory services are important for the provision of public goods, but not necessarily financially rewarding for the private sector, public financing may be required. In some countries, advisory services that combine public and private providers may be optimal. Even when agricultural extension is farmer-led, however, governments have a role to play in encouraging environmentally-friendly technologies and practices (OECD, 2013).

While the public sector plays a major advisory role in some countries, producer organisations traditionally play a major role in others, occasionally with public co-funding. In some countries, the public sector has either reduced the direct provision of advice or now focuses solely on ensuring access to advice from diverse sources (OECD, 2016c).

One area generally focused on by the public extension system is **agri-environmental management**. Estimates of public expenditure for services in this area, where data are available, are significant, even if they remain a very small proportion of total public support for the sector (OECD, 2015c). Nevertheless, public investment in training, extension and advisory services, while important, is only one tool that governments have at their disposal to foster effective extension for sustainable productivity growth. The creation of broader policy incentives that exist for the adoption of practices and technologies, referred to earlier, is also key.

Current extension systems provide an increasing number of services, ranging from technical and financial advice to implementation of policy. Diverse models also exist for financing and providing these services, and there can be broad variations in the mix of options that is best suited to support the agricultural development strategy of countries (OECD, 2015c). The last two decades have witnessed a shift away from the delivery of advice by governments to various combinations of private and public funding of services delivered by private sector organisations. While some extension systems are entirely publicly financed and managed (e.g. in **Belgium, Italy, Greece, Slovenia, Sweden, Spain, Portugal, Luxembourg, Japan**, and **Poland**), in other countries (e.g. **England**, **the Netherlands** and **New Zealand**), systems are privately funded and delivered. In countries such as **Canada, Chile** and **Ireland**, services are provided by both public institutions and private companies, and farmers finance part or all of the cost. Finally, there are systems co-managed by farmers' organisations (e.g. in **Austria**, **Denmark**, **France** and **Finland**), with funding from the government, farmers' organisations and individual farmers. In the **United States**, all four arrangements can be found (OECD, 2015c). Although concerns have been raised as to whether the trend towards privatisation of extension is constraining the effectiveness of AIS (OECD, 2015c), both public and private funding of initiatives have roles to play in many cases, and will reflect

government policies and resources, the nature of the issues, the type of provider, and the purpose of the measure.

One of the innovative forms of extension delivery that has emerged in recent years has been the **peer group initiative**. Group initiatives encourage dialogue between facilitators and farmers, allowing facilitators to gain insight into what makes farmers most receptive to advice. Farmer-to-farmer extension is also considered to result in more efficient information dissemination (OECD, 2015c). Experience of predominantly local peer group or co-operative initiatives is growing in Europe in particular. In **Ireland**, for example, farmer discussion groups, or "knowledge transfer groups", have become an important means of interaction between public sector advisers and farmers. In 2015, the Irish government launched the latest Knowledge Transfer Group scheme with a focus on profitability, breeding, animal health and environmental sustainability (Teagasc, 2017). **Sweden** also operates a peer group initiative focused on nutrient use (OECD, 2015c). Another method of extension delivery that is becoming increasingly widespread is information and communications technology (ICT)-based extension and information provision, such as the e-Extension programme in the **Philippines** (OECD, 2017e).

Subject areas addressed by extension are varied, including advisory services for sustainable land use in **Iceland** (Stjornarradid, 2016) and **Australia** (OECD, 2015c; Landcare, 2017); training and extension in water-saving practices in **Turkey**; extension programmes explicitly targeting smaller-scale and impoverished farmers, such as in **Chile** (OECD, 2015c), **Mexico** and **South Africa** (DAFF, n.d.); risk management training in the **United Kingdom (Northern Ireland)**; and training on climate change adaptation in **Chile**, **Costa Rica** (OECD, 2017f), **New Zealand** (MPI, 2017) and a number of **European Union** Member States, for example. The **United States** provides public technical assistance to land owners through various conservation practices and programmes, such as the Conservation Stewardship Program (CSP), which aim to help producers to conserve and enhance soil, water, air, and related natural resources.

### *Agricultural education needs to better reflect changing needs*

In addition to extension provision, agricultural education is key to ensure that farmers have the necessary skills, understanding and innovative capacity to foster future sustainable productivity growth, and to train agricultural specialists, scientists and service providers who can enhance the relevance and efficiency of agricultural innovation systems. Aside from technical knowledge in areas such as production, processing, agribusiness and biotechnology, graduates require professional skills, such as leadership, communication, facilitation, and organisational capabilities that are important for AIS.

In many countries included within this report, higher education in agriculture is dominated by public (often regional) universities, which may receive some private funding. In some countries, both agricultural universities and agricultural departments in general universities exist. Applied agricultural education is provided through public and private technical (vocational) schools (OECD, 2013).

Generally speaking, however, specialised agricultural education has become less attractive for students in many developed countries, potentially slowing the adoption of innovation in the sector (OECD, 2013). Exceptions include the **Netherlands**, which has successfully adapted and broadened curricula to meet emerging needs (OECD, 2015f). In contrast, agricultural education continues to attract students from emerging and developing economies, who also represent a significant share of agricultural students in

some OECD countries (such as the **United States**, **Australia**, **Canada** and the **Netherlands**) (OECD, 2015e; 2016d; 2015f; 2015g).

## Assessing support and reforms

In 2015-17, agricultural support policies in the 51 countries covered in this report provided a total of USD 620 billion (EUR 556 billion) a year on average to their agricultural sectors. Around 78% of this, USD 484 billion (EUR 434 billion) a year, was transferred directly to individual producers. In 2015-17, 15% of gross farm receipts were due to policies that support agricultural producers.

Future growth in demand for diverse and high-quality food offers significant opportunities for agriculture. However, the sector faces a number of challenges in meeting future demand sustainably in the context of a changing climate. These include the need to be more responsive to the uncertainties ahead, to increase resilience to weather, market or other shocks, and to enhance the environmental performance of the sector. With respect to climate, for example, agricultural production is responsible for a significant share of anthropogenic greenhouse gas emissions. While this share varies significantly across the countries covered in this report, efforts to reduce emissions from farming are indispensable for achieving the goals set by the Paris Agreement of the COP21. In most countries, clear strategies for agricultural contributions to emission reductions have yet to be developed and implemented. Faced with opportunities and challenges such as the above, it is important that agricultural policy packages are efficient and effective, and promote a productive, sustainable and resilient sector.

### *Appropriate general services are needed to equip the agricultural sector for future challenges*

To strengthen the sector's capacity to respond to future challenges and opportunities, a variety of general services will be crucial. This includes various forms of sector-specific hard and soft infrastructure, appropriate biosecurity efforts, and a well-functioning agricultural innovation system adapted to the needs of the sector. On average, countries spent around 14% of total support or USD 86 billion (EUR 78 billion) a year in 2015-17 on general services for the sector. Given the dominance of transfers to individual producers, there is scope in many countries to shift the focus away from direct support of producers and towards general services for the sector that can foster its long-term performance, in order to better capitalise on opportunities and address challenges.

In addition to ensuring sufficient and stable funding of AIS, governance systems need to ensure that funding is both effective and relevant. This has been achieved in some cases by means of collaboration between public and private actors on extension and advisory services, as well as in research and development (R&D). Collaboration across national systems, regions and internationally, can also serve to maximise the gains from domestic resources and benefit from specialisation and knowledge spillovers, as demonstrated by a number of ongoing regional and international research collaboration efforts. International co-operation could be facilitated via the removal of institutional constraints, for example. The effectiveness of public funding for the AIS could also be improved by focusing on areas that are not covered by private sector efforts.

In terms of other general services to the sector, appropriate investments in physical and knowledge infrastructure, from ICT to transportation facilities, are vital to the delivery of, and access to, important services, and have an important role in improving farmers'

connectedness to markets, knowledge and other services. Similarly, biosecurity efforts are important for maintaining access to valuable export markets and reducing the risk of pest and disease outbreaks that can cause harm and damage to agricultural industries. Appropriate investments in animal and plant health systems that create incentives for producers' own prevention measures are also key.

- Countries should therefore **shift the focus of agricultural support to general services** for the sector, where there is a net benefit to society from doing so. In particular, well-functioning agricultural innovation systems, appropriate science-based biosecurity efforts, and investments in adapted physical and other infrastructure are required to enhance the preparedness of their agricultural sectors to respond to future challenges and opportunities. Redirecting producer support to general services can also provide a pathway to transition the sector away from distorting forms of support.
- In particular, **appropriate investments in research, together with efforts to ensure that the outputs of this research reach farmers**, can go a long way to ensure that the sector has the capacity to respond to evolving needs and challenges. While the appropriate mix of knowledge generation and transfer efforts will inevitably differ across countries, with some necessarily prioritising R&D and others public education or extension, governments should strive for balance between investments in knowledge generation and transfer where possible. Collaboration on knowledge generation and transfer with public and private actors – nationally, regionally and internationally, where relevant and possible – should be encouraged. Public funds should primarily target innovations that the private sector does not deliver, typically those with long-term impacts such as on sustainability or those related to the creation of positive externalities or avoidance of negative ones. Countries should also evaluate innovation systems to ensure that these maximise payoffs to investments, and do not crowd out private efforts.

### *Improved targeting of producer support is also vital to achieve sector goals*

Within the envelope of transfers to individual producers, there are also opportunities to improve the targeting of support, to better align the measures used with countries' goals for the sector. In a number of OECD countries, payments tied to specific production practices, or associated with mandatory or voluntary agri-environmental constraints, are increasing as a share of producer support, albeit from a low base. Their use reflects the growing importance of societal concerns about the environmental performance of farming or animal welfare, and the expectation that agriculture will provide various public goods, such as the maintenance of agricultural landscapes and biodiversity. Such payments are a more effective instrument for achieving policy objectives if they target the intended beneficiaries and specific investments where market failures prevent an efficient allocation of resources (such as those addressing agriculture's environmental externalities and public goods).

There is significant scope within budgets to reorient transfers to individual producers towards payments that target well defined and measurable objectives for the sector, as well as broader societal objectives. Tax-financed support to farmers is predominantly provided via payments that are untargeted to beneficiaries or outcomes, reducing their effectiveness. This includes direct payments based on area, animal numbers, farm receipts or farm income, which are increasing in the OECD countries, as well as payments based

on outputs and on variable inputs without constraints. These payments are often used to support farm incomes. However, farm income support is not generally well-targeted to those farm households in need, and often privileges large farms if linked to historical production data.

- Governments should therefore **identify and target the market failures that lead to persistent low incomes** in agriculture. A better understanding of the financial situation of farm households – and how this differs from non-agricultural households – is essential in order to define specific policy objectives for farm income levels and related policy instruments.
- Ideally, payments to farmers should **target the production of the non-market goods and services sought by society (for instance improving environmental performance, animal welfare, or addressing other societal concerns)**. Tailoring the payments requires information on both the size of the problem at hand and the marginal costs of reducing it. Such information may not always be readily available or prohibitively costly to obtain. However, both appropriate proxies (often already applied for objectives related to natural resources) and the improvements in data availability that come with modern information technology should help to overcome such shortcomings.
- **Payments should also be conditional on delivery of the outcomes and public goods demanded** by society. Current cross-compliance requirements could be made mandatory, to provide a baseline for delivering new and more ambitious public good and environmental outcomes linked to support payments.

### *Continued reliance on most-distorting support undermines efforts to improve agricultural productivity and sustainability*

Shifting the focus of support towards general services for the sector and targeted producer support will help the sector to address challenges related to sustainable productivity growth in the context of a changing and uncertain climate. However, these efforts are undermined by countries' continued reliance on measures that strongly distort production and trade. In 2015-17, almost two-thirds of producer support was provided via measures that distort production and trade particularly strongly.

For example, innovation will be important for achieving sustainable productivity growth in the face of climate change and resource pressures. But by disconnecting farmers from market signals, countries also obstruct efforts to strengthen their agricultural innovation systems. The payoff to public investments in knowledge generation and transfer, as well as to efforts to leverage greater private sector engagement, will not be maximised if producers lack the right incentives to adopt innovations.

This is because support provided through measures that distort production and trade is inconsistent with the goal of competitive, sustainable, productive and resilient farm and food businesses. Exposure to competition in domestic and world markets plays a fundamental role in encouraging on-farm innovation. Yet almost 60% of support to individual producers is provided by maintaining higher prices on domestic markets compared with those on international markets. Market price support shields producers from market signals and impedes adjustments within the sector by biasing production and resources towards more heavily-protected commodities. This in turn weakens incentives for innovation – not only to adopt more efficient and sustainable technologies, but to improve product quality and develop new markets.

Most-distorting forms of support are also inconsistent with the goal of improving the environmental sustainability of the sector and can increase pressures on the environment. By encouraging production, market price support and payments based on outputs can lead to more intensive use of inputs, while support for variable inputs without constraints increases the risk of their over- or misuse. Support targeted to specific commodities can also reduce resilience and adaptation to climate change by encouraging farmers to plant specific crops, even if they are not well-suited to local climate conditions. Finally, while the existence of environmental externalities and public goods linked to agricultural activities can justify some form of public policies, the most-distorting forms of support discussed here are blunt instruments that fail to target the underlying market failures and often worsen the situation.

Market price support is also an ineffective instrument for providing income support. On the producer side, such support is disproportionally captured by large producers who are arguably not in need of support. Moreover, the income transfer efficiency of border protection is low, limiting its effectiveness as a measure for raising farm incomes. When it comes to food security, the use of market price support is most often counterproductive. Driven through a push for food self-sufficiency, higher market prices act as a regressive tax on households – disproportionally hurting poorer vulnerable households due to the greater relative importance of food in their budgets.

Some progress has been made in a number of countries to reduce the trade distorting effects of policy packages, by both reducing support levels and by shifting support to less distorting (and generally more targeted) forms. This has resulted in Trade Impact Indices often falling more significantly than support levels over the past two decades. This progress is, however, not shared across all countries and often has remained partial, with significant trade distortions remaining and increasing in several countries.

On these grounds, there is a need for countries to re-orient their agricultural support policies from an approach that emphasises direct and untargeted support to producers – particularly support provided through highly distorting measures – to one that directly addresses the recognised opportunities and challenges facing the sector.

- **Market price support should be reduced and eliminated**, including the negative market price support that is still prevalent in some countries. Market price support is a non-transparent and untargeted measure that is inconsistent with the goals of enhancing innovation and improving productivity and the environmental sustainability of the sector. A well-functioning domestic market and international trading system is important to connect producers to market opportunities, to enhance the food security of the poorest, and to maximise the payoffs to public investments in agricultural innovation systems.
- Similarly, **output payments and** distorting **input subsidies should also be reduced** with a view to eventual elimination. They represent an inefficient use of government budgets, generally fail to appropriately target specific policy outcomes, and increase the risk of environmental damage. Scaling down these forms of support can help to free public funds for more targeted farm support and for better funding of needed general services.

### *Risk management systems should increase producers' resilience to weather, market and other shocks*

Helping producers to better manage risk is a key policy objective for a number of countries. As an alternative to more distorting forms of support, facilitating access to risk management tools can improve producers' resilience to risks emanating from both domestic and international sources, and provide a more stable operating environment for investment in innovation. Current support systems for risk management tools involve a large range of insurance and stabilisation schemes, as well as *ad hoc* assistance in response to extreme weather events. This can blur the borders between the normal business risks, medium-size marketable risks and those of catastrophic nature, reducing incentives for on-farm or market-based risk management options.

There are also strong links between risk management policies and on-farm adaptation to climate change. Government initiatives to protect farmers from climate change risks can affect farmers' choice of strategies. For example, public support for insurance schemes and for *ex post* payments may reduce the incentive to diversify farm production away from more climate sensitive crops and farm practices. In this sense, government-supported instruments can potentially crowd out appropriate adaptation strategies by farmers (Antón et al., 2012).

The OECD has proposed a three-tier risk management system that distinguishes normal business risks (to be borne and managed by farmers) from larger risks suitable for market solutions (such as insurance systems and futures markets) and infrequent catastrophic risks requiring public engagement (OECD, 2011). Countries should clarify and streamline their risk management policies accordingly to increase producers' prevention measures and resilience to risk:

- First, the **limits between normal business risks, risks for which market solutions can be developed, and catastrophic risks requiring public engagement should be clearly defined**, to avoid crowding out market solutions and farmers' own risk management practices. These definitions will allow administrations to become active when public involvement is required, while sending clear signals to farmers and other private agents for developing relevant on-farm and market-based, privately-organised risk management tools for non-catastrophic risks.
- Second, **government support should focus only on managing catastrophic risks** for which private solutions cannot be developed. Care should be taken that public support does not crowd out private solutions based on market tools. Disaster assistance criteria should adapt to changing temperatures and precipitation patterns that may characterise the new "normal" due to climate change, keeping farmers' incentives to increase self-reliance and improve preparedness.
- Thirdly, **governments should play a proactive role in providing information and other general services** for farmers and the private sector to facilitate the development of risk management strategies and tools. Governments should facilitate the provision of information on market risks, animal and plant health risks, climate risks and adaptation solutions.

To conclude, while some progress is evident in a number of the abovementioned areas, greater efforts are needed to align agricultural policies with the emerging needs of the sector. Indeed, the current structure of agricultural support suggests that there is scope

within the budgets of many countries to ensure that policy settings effectively promote the productivity, sustainability and resilience of agriculture. This will require greater focus of support on the provision of general services – notably appropriate agricultural innovation systems, biosecurity efforts, and sector-specific infrastructure – and the improved and consistent targeting of producer support. There is an urgent need to shift away from most production- and trade-distorting forms of support that can also harm the environment and reduce incentives for innovation. Appropriate risk management systems that improve the resilience of farmers to market, climate and other shocks are a valuable alternative to more-distorting forms of support.

## Notes

[1] Value added is the value of the gross output of producers less the value of intermediate goods and services consumed in production, before accounting for consumption of fixed capital in production (World Bank, 2017).

[2] In some countries, programmes applied broadly across commodities are captured in SCT – such as the crop insurance programmes in the United States. In such instances, the distorting effect on production will be less.

[3] Commitments made under the Agreement on Agriculture were completed in 2000, and a new and unfinished round of negotiations commenced in Doha in 2001. This section assesses developments in single commodity transfers since 2000-02 to coincide with this period.

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# Developments in Agricultural Policy and Support by Country

*This part contains an overview of the developments of support in the OECD area and selected Emerging Economies overall, followed by chapters on agricultural policy developments and support to agriculture in each of the countries covered in this report. Each country chapter includes a brief summary of policy developments and support to agriculture and related assessments and recommendations; information on the context in which agricultural policies are implemented; and a description of the main policy developments in 2017-18.*