

# Realigning Agricultural Support to Promote Climate-Smart Agriculture

## KEY MESSAGES:

- From 2015 to 2017, the group of 51 countries analyzed provided approximately \$570 billion annually in public support for agricultural producers, according to the Organisation for Economic Co-operation and Development (OECD).
- Distortionary agricultural subsidies often result in large negative impacts, worsening rather than improving climate outcomes.
- Significant opportunities exist to realign public support to deliver public-good outcomes and, in particular, promote climate-smart agriculture (CSA).

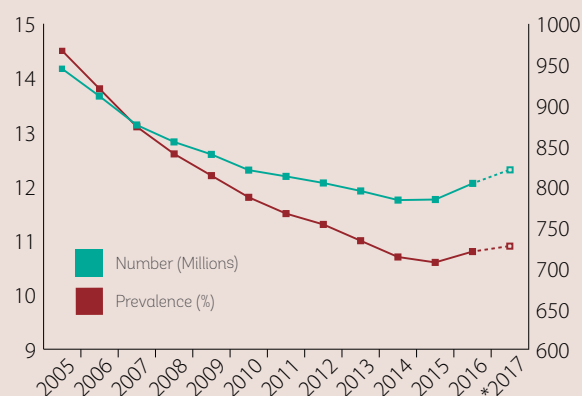
The special report, **Global Warming of 1.5°C**, presented at the 48th session of the Intergovernmental Panel on Climate Change (IPCC), delivered sobering news. Climate impacts are occurring at a faster pace than previously anticipated. Based on the current rate of change, actions pledged for the Paris Agreement will not be sufficient even to prevent a disastrous 2°C increase in average global temperature. The implications are especially dire for the world's poor and undernourished, as the impacts of warming are likely to be felt most prominently through agricultural and food security challenges. A major Food and Agriculture Organization (FAO) report concurrently argues that these impacts are likely already being felt.<sup>1</sup> The FAO report shows an alarming reversal in the global trend in terms of the number of undernourished people—rising for the third year in a row since 2014, reversing the steady decline seen since the early 2000s (Figure 1).

Public support for agriculture in most countries around the world has historically been focused on improving food security and making progress on other socio-economic indicators but has not sufficiently focused on improving climate outcomes. Government policies have achieved or made substantial progress toward their explicit short-term goal of food security. However, a perceived tradeoff exists today between food security and climate outcomes, with traditional crop and animal husbandry ironically putting at risk the sustainability of the outcomes that these policies strive to achieve.

**Agriculture is a direct victim of climate impacts but is also culpable for climate change outcomes.** Agriculture accounts for almost 25 percent of global greenhouse gas (GHG) emissions. A little more than half of these emissions are caused by current crop and livestock husbandry practices. The remainder are the result of converting native forests and other natural landscapes to agricultural land. A business-as-usual approach to agriculture will not meet the challenge facing the global food system, namely to increase food production by another 50 percent by 2050 (compared to 2010) to feed an expected population of almost 10 billion people (up from the current 7 billion) on an increasingly stressed and limited natural resource base, while adapting to inevitable climate change and without adding to GHG emissions.

**While total public support for agriculture provided by the countries included in OECD's annual agriculture policy monitoring and evaluation analysis is large, there is limited support for climate finance.** From 2015 to 2017, as a group the 51 countries analyzed provided an annual average of approximately \$570 billion in public support for agricultural producers, according to the OECD.<sup>2</sup> These countries supply two-thirds of global agricultural output, with public support accounting for 28 percent of the value of agricultural production. In comparison, of the \$391 billion of global climate finance invested in 2014, only \$6 billion to 8 billion was allocated for agriculture, forestry, and land use.<sup>3</sup>

**FIGURE 1: GLOBAL POPULATION OF UNDERNOURISHED PEOPLE, 2005–17**



Source: FAO, *The State of Food Security and Nutrition in the World* (Rome: FAO, 2018). Note: \* = projected values

**How can public support help agriculture become more climate-smart?** A number of CSA technologies are readily available, and much more needs to be done to develop and improve CSA. If extended and adopted by farmers, CSA technologies would make a significant difference in terms of “triple-win” outcomes—higher productivity, lower levels of agriculture-sourced GHG emissions, and greater resiliency. In this context, a relevant question is whether public policies, and in particular public spending, are aligned to achieve these outcomes.

**Public spending can yield high returns in agriculture, a sector that needs urgent transformation to produce better livelihoods and better environmental and health outcomes.** Due to limited budgets and political economy considerations, however, countries often favor subsidies over investment in public goods, such as investment in agricultural research and development. Yet agricultural subsidies have typically yielded much lower economic returns. And, the most distortionary subsidies often result in large negative consequences such as promoting excessive use of fertilizers, over-pumping groundwater with cheap or free electricity, inefficient use of underpriced water, or monocultural production systems of targeted outputs.

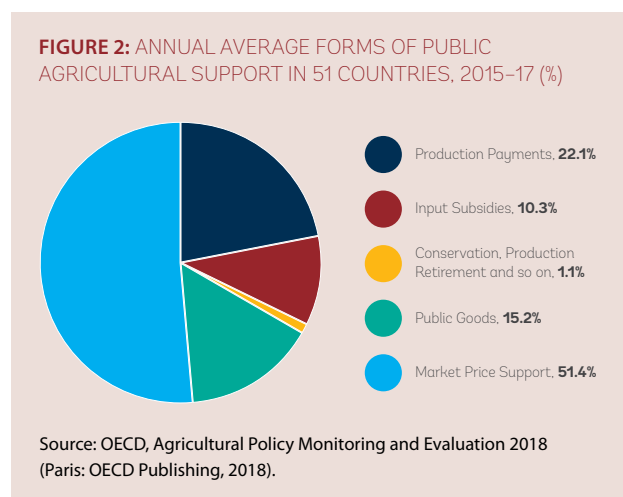
**Current farm support takes multiple forms which may require public budget outlays.** Farm support includes investment in much-needed public goods (such as research and advisory services, public infrastructure, and food safety and standards) and subsidies to agricultural producers. Subsidies take different forms, as follows:

- **Price supports to keep domestic prices for specific outputs higher than equivalent world market prices.** These supports are given either directly through public spending for the public procurement of farm outputs or indirectly through import restrictions and other market barriers that help push producer prices higher. In the case of market barriers, domestic producers receive implicit transfers from consumers through higher prices for agricultural outputs, with no public expenditures.
- **Transfers to producers linked to the type of inputs used or agricultural outputs produced.** These subsidies include lowered interest rates on agricultural credit or lowered prices of specific inputs (either variable or fixed capital) such as fertilizers, pesticides, seeds, water, and electricity. Producers can also receive direct payments tied to the production of specific outputs.
- **Payments to farmers not tied to the outputs produced or inputs used**—often referred to as decoupled payments.

**Several governments, such as the European Union member States, are shifting agricultural policy from market price supports toward less distorting direct payments to farmers.** Market price supports are the easiest to implement and have the lowest public budget outlay. However, these supports are highly distortionary as they restrict imports (to raise domestic prices) or exports (to reduce domestic prices). In the latter case, these supports impose a tax or negative subsidy on farmers. Direct payments linked to the inputs used or types of products produced are less distorting than market price support, but nevertheless encourage excess production of the targeted output, or excessive use of the targeted input. Decoupled payments

are the least distortionary and have less impact on farm prices and associated production decisions. These payments are typically based on current or past land area under crop cultivation, or number of livestock owned.

**Approximately 51 percent of agricultural support is in the form of market price support, about 34 percent are direct payments to producers and input subsidies, and about 15 percent is budgetary spending on public goods** (Figure 2). Of the \$570 billion in total support for agricultural producers (annual average 2015–17), \$484 billion were in the form of producer subsidies (\$294 billion through market price supports, \$126 billion as direct payments to producers, \$59 billion in input subsidies, and about \$6 billion for conservation measures). Only \$86 billion were for public-good type investments such as agricultural research and extension, infrastructure, skills development, and food safety.<sup>4</sup>



**Producer subsidies increased rapidly over the past 15 years, from \$255 billion in 2000–02 to \$484 billion in 2015–17** in the 10 non-OECD (a mix of developing and emerging) economies, and was driven by a 16-fold increase in producer support in China. The remaining nine non-OECD countries included in the analysis also increased their support, from \$11 billion to \$24 billion. Producer subsidies often worsen rather than improve climate outcomes, leading to overuse of fertilizers, higher GHG emissions, and water pollution. In addition, subsidies are often captured by wealthier farmers.

**CSA requires more support for sustainable intensification.**

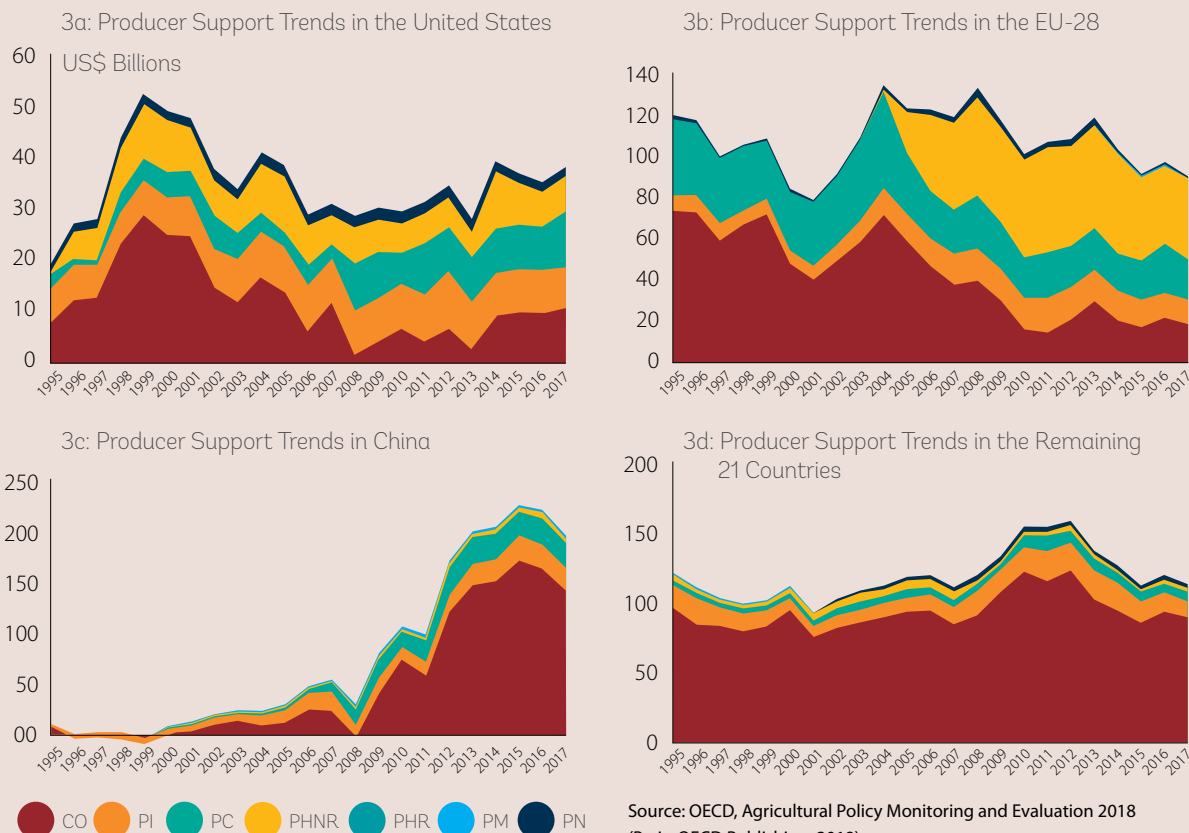
CSA involves adopting agricultural practices that can meet rising global food demand, mitigate agriculture’s GHG emissions, and adapt to inevitable climate change. The key to making agriculture climate-smart is increasing land-use efficiency through higher productivity, which reduces the need for clearing more land for agricultural production.<sup>5</sup> These productivity gains must also be rooted in using inputs such as water and chemicals more efficiently to reduce any negative environmental impacts. Actions and activities to pursue this sustainable intensification offer the greatest synergy between mitigation, production, and adaptation. Critical to achieving these outcomes is an enabling environment that provides efficiency-enhancing public goods while reforming policies that distort market prices and associated input use and production decisions.

**In some countries, reforms to producer subsidy programs are starting to take shape but much remains to be done.** While spending that directly targets environmental outcomes such as conservation or restoration remains limited (currently at about 1 percent of the total support to agriculture), an increasingly significant share of agricultural subsidies is being delivered in the form of less distortionary decoupled payments in the 28 European Union (EU) countries, and to a lesser extent in the United States (Figure 3). It is important to note that this change in *how* support is delivered has not meant a decline in the *level* of support, which has remained more or less the same in the past 15 years. In China and in the aggregate of all the remaining 21 countries in the analysis, market price supports and other forms of direct subsidies continue to be the dominant form of public support.

**How can agricultural subsidies be realigned to better deliver CSA outcomes?** The EU's Common Agriculture Policy (CAP) provides an illustrative example of an approach that leads to improved environmental outcomes. The composition of subsidies (the split between market price supports and direct budgetary payments) in many countries today is similar to the composition of support that the EU had in place at the start of its reform process in the early 1990s (Figure 3), providing a baseline for comparison:

- **Prior to the 1992 CAP reforms, price supports had kept farm prices in the EU above world prices, encouraging excess fertilizer use.** Price guarantees backed by import tariffs, large government purchases, and export subsidies to help dispose of resulting surpluses kept farm prices above international levels. For example, the 1987–89 EU intervention price for wheat was more than 60 percent higher than the average farm price for wheat in the United States.<sup>6</sup> As a result, the fertilizer-to-grain price ratio was significantly lower in the EU, resulting in EU fertilizer application rates over twice the level of the United States.
- **In 1992, EU reforms shifted from market price support to direct producer payments, decoupled from crop choice and input use.** Price guarantees were scaled down for crops (but remain to date for some beef and veal products), and replaced with direct payments to farmers. For example, by the late 1990s, the intervention price for wheat had been reduced by about one-third, increasing the ratio of fertilizer-to-grain prices by about 60 percent. This change increased the incentives to use fertilizer more efficiently and economically.<sup>7</sup>

**FIGURE 3:**  
AGRICULTURAL PRODUCER SUPPORT TRENDS IN 51 COUNTRIES, 1995–2017



Source: OECD, *Agricultural Policy Monitoring and Evaluation 2018* (Paris: OECD Publishing, 2018).

Note on figure 3: CO = support based on commodity outputs, predominantly market price support; EU-28 = EU's 28 member states; PC = direct payments based on current area/animals, production required; PHNR = direct payments with no production required; PHR = direct payments based on non-current area/animals, production required; PI = payments based on input use; PM = miscellaneous payments; PN = payments based on non-commodity criteria and include payments for conservation, land retirement, and so on.

- **These reforms were accelerated in 2003 with more decoupling and direct farm payments.**<sup>8</sup> An OECD evaluation concluded that the share of potentially market-distorting support (as a share of producer support) decreased from 92 percent in 1986–88 to 27 percent in 2015–17.<sup>9</sup> The shift toward direct payments decoupled from production has increased rapidly since 2004 and now accounts for nearly half of total agricultural subsidies, as shown in Figure 3. Support was also provided for agricultural research to help develop improved crop varieties.
- **In addition, two other important regulations were adopted that helped to reduce the negative impacts associated with agricultural input use.** The 1991 Nitrates Directive was introduced to reduce nitrate pollution of ground and surface water. The 2006 Groundwater Directive also set limits on nitrate concentrations in groundwater.
- **Reforms led to improved environmental outcomes while crop yields increased.** During the period of these policy reforms (1990–2015), nitrogen fertilizer use in the EU-28 countries declined by 20 percent, leading to a 17 percent decline in nitrous oxide emissions from agricultural soil.<sup>10</sup> There were also significant declines in the use of phosphate and potash fertilizers. In the same period, cereal yields in the EU-28 countries increased.
- **CAP reforms have also been inclusive.** A recent World Bank study showed that CAP reaches the poorer regions in EU member states and is associated with poverty reduction and decreasing inequality at a subnational level.<sup>11</sup> The transition toward decoupled direct payments and rural development support has enabled this favorable trend. While starting at lower levels, incomes are growing faster in the new member states. The CAP is supporting convergence in agricultural performance across member states.
- **Even more can be done to improve CSA outcomes.** For example, about 10 percent of direct payments to EU farmers are still coupled to production. Approximately 70 percent of this amount is used to support livestock and livestock products (mainly beef and veal).<sup>12</sup> Redirecting these funds to decoupled payments or narrowing the eligible crops (excluding livestock) could further improve environmental outcomes. In addition, strengthening the greening requirements for producer budgetary payments and their implementation could help improve environmental impacts.<sup>13</sup>

**The United States and EU have moved to impose environmental conditions on the receipt of farm payments.** The last round of European agricultural reforms made 30 percent of payments to farmers conditional upon additional conservation measures. The criteria for meeting these measures are low, thus it is likely they have only had small effects beyond existing environmental cross-compliance measures.<sup>14</sup> However, environmental conditions do hold some promise. Although enforcement appears to be limited in the United States, conditional payments have likely helped protect some wetlands and modestly reduced soil erosion. Conditional payments in the EU have helped to protect the most valuable grasslands.<sup>15</sup>

**Other countries are adopting innovations with potentially significant CSA outcomes.** As in the EU and United States, Brazilian policy has sought to link subsidized farm credit to forest protection (to avoid deforestation), while increasing the efficient use of land for cattle grazing. In prior years, China's subsidies have contributed to the overuse of both nitrogen fertilizer and groundwater, high levels of GHG emissions, and other environmental problems. Recently, China has phased out fertilizer subsidies and is now piloting a program to shift to organic fertilizers. It has also scaled up programs to improve water-use efficiency and soil quality, and has a large conservation program for converting steep-sloped and degraded land back to its natural ecosystem. Recognizing the damage done by imbalanced and overuse of nitrogen fertilizers, recently India promoted coating urea fertilizers with neem oil to slow the release of nitrogen. This process increases fertilizer efficiency by making nitrogen available to the crop when needed. Lastly, specific efforts in Kenya have sought to increase dairy efficiency by improving forage quality.

An important emerging lesson is that the political economy plays a role in determining the pace and extent of the subsidy-reform process. For those who may lose due to the removal of subsidies, bargained compromise and compensation are often required for reforms to move ahead. Maintaining the overall level of public support for agriculture is both politically and socio-economically important. But significant opportunity exists to realign this support for better public-good outcomes and in particular, more CSA.

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Footnotes:

<sup>1</sup> FAO (Food and Agriculture Organization of the U.N.), *The State of Food Security and Nutrition in the World* (Rome: FAO, 2018).

<sup>2</sup> OECD (Organisation for Economic Co-operation and Development), *Agricultural Policy Monitoring and Evaluation 2018* (Paris: OECD Publishing, 2018). The data cover all OECD members, plus 10 of the largest agricultural producers among the remaining countries, with the notable exception of India and Indonesia.

<sup>3</sup> World Bank, 2016, "Making Climate Finance Work in Agriculture," Discussion Paper, <http://documents.worldbank.org/curated/en/986961467721999165/pdf/ACS19080-REVISED-OUO-9-Making-Climate-Finance-Work-in-Agriculture-Final-Version.pdf>.

<sup>4</sup> OECD, *Agricultural Policy Monitoring and Evaluation 2018* (Paris: OECD Publishing, 2018).

<sup>5</sup> WRI (World Resources Institute), 2013, *World Resources Report: Creating a Sustainable Food Future: Interim Findings*, <https://www.wri.org/publication/creating-sustainable-food-future-interim-findings>.

<sup>6</sup> S. Leetmaa, C. Arnade, and D. Kelch, 2004. "A Comparison of US and EU Agricultural Productivity with Implications for the EU Enlargement," WRS-04-04, Economic Research Service, United States Department of Agriculture, Washington, DC.

<sup>7</sup> Leetmaa et al. 2004.

<sup>8</sup> European Commission, 2013, "Overview of CAP Reform 2014–2020," *Agricultural Policy Perspectives Brief No. 5*, [https://ec.europa.eu/agriculture/sites/agriculture/files/policy-perspectives/policy-briefs/05\\_en.pdf](https://ec.europa.eu/agriculture/sites/agriculture/files/policy-perspectives/policy-briefs/05_en.pdf).

<sup>9</sup> OECD, *Evaluation of Agricultural Policy Reforms in the European Union: The Common Agricultural Policy 2014–2020* (Paris: OECD Publishing, 2017).

<sup>10</sup> Eurostat data.

<sup>11</sup> World Bank, *Thinking CAP: Supporting Agricultural Jobs and Incomes in the EU* (Washington, DC: World Bank, 2017).

<sup>12</sup> OECD 2017.

<sup>13</sup> European Commission, 2017, "Evaluation of the CAP Greening Measures," European Commission.

<sup>14</sup> OECD 2017.

<sup>15</sup> R. Jongeneel, K. Hart, M.-J. Zondag, and M. Bocci, 2016, "Mapping and Analysis of the Implementation of the CAP," EUR 2016.1365 EN, European Commission.

<sup>16</sup> Neem oil is extracted from the fruit and seed of neem (*Azadirachta indica*), an evergreen tree endemic to the Indian sub-continent.