

Chapter 6

**UNITED STATES DOMESTIC AND TRADE-RELATED
AGRICULTURAL POLICY**

This chapter provides an overview of agricultural policies, focusing on commodity, crop insurance, conservation and energy programmes, and a brief discussion of agricultural-trade related measures. It also reports trends on the level and composition of support and discusses the likely impacts of agricultural policy measures on structural change, environmental performance and innovation in the sector.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Agricultural policy framework

Agricultural policy in the United States is generally governed by an omnibus legislative package familiarly known as the Farm Bill. The Farm Bill amends previous agricultural and related policies and establishes new policies on a five-year cycle, although that cycle can be extended or foreshortened depending on legislative priorities. The most recent Farm Bill, the Agricultural Act of 2014 (2014 Farm Bill), included 12 titles authorising policies and spending levels for programmes related to commodity support, conservation, trade, nutrition (domestic food assistance), agricultural credit, rural development, research and extension, energy, specialty crops, crop insurance, and miscellaneous administrative and specialised provisions.

This chapter focuses on programme changes under the commodity, crop insurance, conservation, and energy titles. It also includes a brief discussion of several programmes operated by US Department of Agriculture (USDA)'s Agricultural Marketing Service (AMS) that are governed by other legislation and provides details on trade- and energy-related measures, only some of which fall within the scope of the Farm Bill.

The 2014 Farm Bill made some significant policy changes to commodity support and crop insurance, conservation, and bioenergy programmes, while retaining and reorganising some longstanding programmes with minor adjustments. One significant change is the abolition of fixed direct income support based on historical production parameters. Another one is the cascade of choices given to producers under commodity support programmes, including crop insurance. Conservation programmes continued to provide a similar mix of programmes for addressing agri-environmental concerns, but policymakers reduced reliance on land retirement and reorganised programmes for conservation and environmentally enhancing practices on working lands into a smaller number of programmes linked by policy approach and regional priorities.

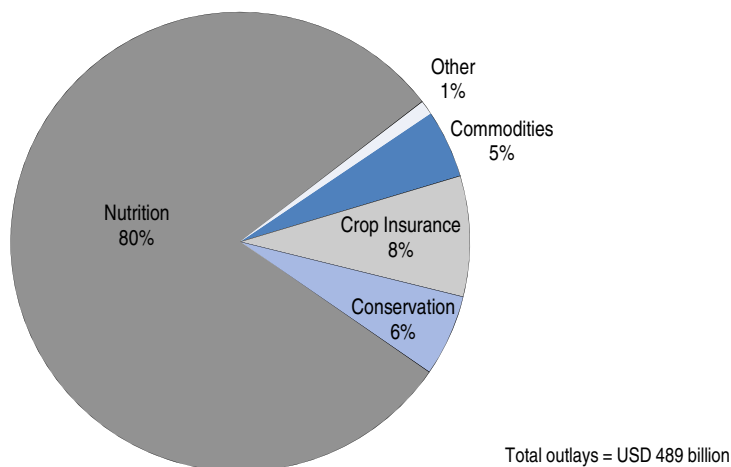
Farm Bill authorised programmes may be funded in two ways, either through mandatory funding or through appropriated funding. Mandatory (often termed “entitlement”) programmes are funded for the life of the Farm Bill and provide programme payments to any recipients who meet eligibility requirements — eligible recipients are “entitled” to payments. Funds are provided through the Commodity Credit Corporation, a government-owned and operated corporation, and other mechanisms that provide for multi-year expenditures independent of annual Congressional appropriations. Discretionary programmes must be funded annually through the appropriations process; the Farm Bill authorises upper limits for these programmes, but annual appropriations may be lower or even zero.

Spending under the 2014 Farm Bill for mandatory programmes was projected at its passage to reach USD 489 billion over five years, 2014-18 (Figure 6.1). The largest share of projected outlays, 80%, will support nutrition programmes, providing vouchers to low-income households for retail food purchases and funding commodity purchases for use in the National School Lunch and other child and elderly feeding programmes. Commodity and crop insurance programmes make up 13% of projected outlays, and 6% of projected outlays support conservation programmes. The remaining 1% of projected outlays provides for mandatory programmes under all other titles. More recent projections that include actual expenditures for 2014 and 2015 raise the estimate for expenditures through 2018 slightly to USD 517 billion, but the shares of different programme types remain the same (US Congressional Budget Office, 2016a).

Outlays by the USDA, which implements most programmes authorised by the Farm Bill, provide a better indication of annual spending on programmes than the projections for mandatory programmes only (Figure 6.2). USDA outlays have increased 46% over the last decade, with the largest percentage increases in nutrition programmes and crop insurance. Nutrition programme increases, concentrated between 2008 and 2013, reflect the greater need and temporary programme expansions during the recent recession. The improving economy and expiration of programme expansions brought outlays down in 2014 from their 2013 peak. Crop insurance outlays also declined in 2014, as the weather events and crop prices behind their increase between 2008 and 2013 moderated. Commodity programme

expenditures decreased over the decade, with most of that change as the result of the sustained rise in commodity prices that began in 2008. Conservation spending has remained steady at 5 to 6% of outlays over the decade. The share of funding provided to programmes authorised under other titles, most of which are subject to annual appropriations, has ranged from 7 to 14%.

Figure 6.1. Projected outlays under the 2014 Farm Bill, 2014-18

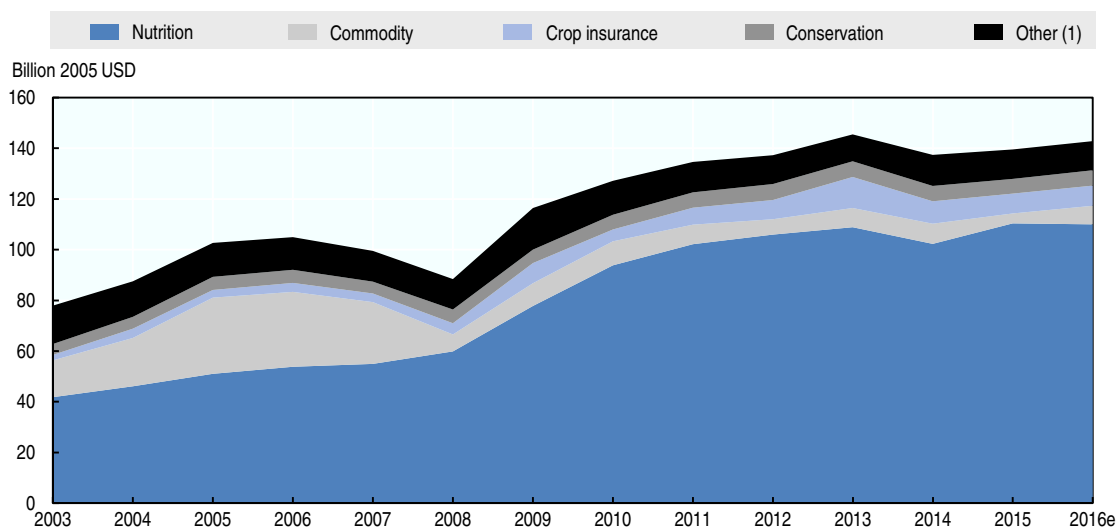


1. Includes foreign agriculture, credit, rural development, research and extension, food safety, and marketing and regulatory programmes.

Source: USDA Economic Research Service using data from US Congressional Budget Office (2014), Cost estimates for the Agricultural Act of 2014, January 2014. www.cbo.gov/sites/default/files/51317-2016-03-USDA.pdf.

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Figure 6.2. USDA budget outlays, 2003-16



e: estimate. Does not include outlays for Forest Service or departmental administration.

1. Includes foreign agriculture, credit, rural development, research and extension, food safety, and marketing and regulatory programmes.

Source: Economic Research Service, using USDA (2015b), Office of Budget and Policy Analysis, Summary and Annual Performance Plans, 2005-2017. www.obpa.usda.gov/.

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Broad-based domestic measures

Under the 2014 Farm Bill, titles with greatest direct impact on agricultural producers include Commodity, Crop Insurance, and Conservation. Some programmes under the Credit, Rural Development, Energy, and Research titles provide additional support, through farm ownership and operating loans, grants and loans to develop value-added agriculture and on-farm renewable energy systems, harvest and transportation assistance for bioenergy crops, research on animal health, pollinators, specialty crops, and organic agriculture, enhanced food assistance purchase programmes for fruits and vegetables, and assistance for local foods marketing.

Commodity programmes fall into three broad categories: market price support, direct income support, and risk management, although some programmes contain elements of more than one category. The 2014 Farm Bill made significant changes in the mix of programmes across these categories for both crops and livestock. These changes reflect developments in policymaker, stakeholder, and public views about the best means to achieve policy objectives. Increased choices for producers provide flexibility for producers to cover differing farm-level risks through different programmes. They are also expected to provide producers in different regions and of different commodities the flexibility to choose programmes best suited to their farm type and agronomic risks.

Commodity support programmes are almost exclusively offered at the federal level, although they are delivered through a system of State and county offices that serve as the local contact point for producers. States are essentially free to provide support to producers and the agriculture sector, but in general focus on technical assistance and education, research, marketing and promotion of State-produced products, and on conservation, farmland preservation, and other environmental programmes.

Market price support

Market price support, among the most distorting agricultural policy types, has become a progressively smaller share of US support to agriculture in recent decades. Market price support maintains the prices received by farmers in domestic markets through a combination of border measures and domestic supply controls. Consumers pay the higher market price, reducing the cost to government of providing commodity support. The 2014 Farm Bill repealed one of the two remaining market price support programmes, the Dairy Product Price Support Program, leaving the sugar programme as the only agricultural market price support programme operating in the United States. Legislative authority for the sugar programme requires USDA to operate the programme at no cost to the Federal Government to the maximum extent possible.

The sugar programme is designed to maintain market prices for sugar above a minimum level through the combination of a tariff rate quota (TRQ), marketing allotments, and a nonrecourse loan programme. The 2014 Farm Bill provides for USDA to make loans available to processors of domestically grown sugarcane and to domestic processors of sugar beets at loan-rate levels set in legislation for fiscal years 2014-18 (18.75 US cents per pound for raw cane sugar, 24.09 US cents per pound for refined beet sugar). Processors must agree to provide payments to producers that are proportional to the value of the loan received by the processor for sugar beets and sugarcane delivered by producers. USDA has the authority to establish minimum producer payment amounts.

Loans are taken for a maximum term of 9 months and must be liquidated along with interest charges by the end of the fiscal year in which the loan was made. When a loan matures, USDA must accept sugar pledged as collateral as payment in full, in lieu of cash repayment of the loan, at the discretion of the processor. Forfeited sugar can be offered to processors in exchange for reductions in production through reduced sugar crop planting. Forfeited sugar may also be sold for ethanol production (under the Feedstock Flexibility Program), or through buyback of TRQ import eligibility certificates.

To help avoid forfeitures, an Overall Allotment Quantity (OAQ) governs the amount of sugar that can be sold by processors in the United States for domestic human consumption. OAQs are set annually to at least 85% of estimated domestic consumption and adjusted throughout the marketing year to

maintain sugar prices above the loan rate. OAQ allowances are then allocated to sugar processors, based on historical production. They are not tradable, but can be reallocated across regions. In recent years, US sugar production has frequently fallen below the OAQ allowance. Imports from Mexico, originally under duty-free/quota-free rules governed by the North American Free Trade Agreement and more recently under an agreement instituting an export limit, and from increased TRQs, have filled the gap to meet domestic demand.

Direct income support

Direct income support in the United States takes several forms, including both benefits based on output and payments based on historical production parameters. Rather than support producers by raising market prices, direct income support policies transfer the cost of support to government (taxpayers), allowing market prices to move freely.

Output-based benefits are provided through the Marketing Assistance Loan (MAL) programme, a low-interest post-harvest loan programme for producers of wheat, feed grains, cotton, rice, oilseeds, peanuts, wool, mohair, honey, and pulses. The MAL programme offers producers of those covered commodities the opportunity to borrow against harvested crops for up to nine months at below-market interest rates. Producers pay loans back in full with interest, or if market prices fall below loan rates, at the market price with interest forgiven, termed a marketing loan gain. Producers may also forfeit their commodity under loan in lieu of repayment. Producers may also choose to forgo taking out a loan and instead apply for a direct payment — loan deficiency payment — equivalent to the value of the marketing loan gain. For most commodities, loan rates have remained well below market prices in recent years.

Box 6.1. US commodity support policies 1996-2013

With the 1996 Farm Bill, the United States made a major change in its commodity policy programmes, decoupling producer support from current production. In place of the previous policy of deficiency payments tied to target prices and acreage controls, producers instead were offered a programme providing fixed payments based on historical acreage and yields (historical base) of programme crops. The 1996 Farm Bill also ended acreage controls, allowing producers to plant any commodity, with some exceptions for fruit and vegetable crops, on their historical base, or to idle that land, without affecting their programme payments.

Fixed decoupled payments continued until repealed by the 2014 Farm Bill. The Production Flexibility Contract (PFC) programme provided fixed payments determined by historical acreage and yields, or base, for wheat, feed grains, upland cotton, and rice until it was superseded in 2002 by the Direct Payment (DP) programme. The 2002 Farm Bill also allowed for readjusting base to more recent plantings and for adding historical base for oilseeds and peanuts. The 2002 Farm Bill ended the peanut price support programme based on peanut marketing quotas and it compensated quota holders through a three-year buyout programme. The tobacco marketing quota system was terminated in 2004 under separate legislation that provided tobacco quota holders with a quota buyout over ten-years.

From 1999-2001, ad hoc Market Loss Assistance (MLA) payments provided supplemental payments on historical base in response to a period of low commodity prices. The 2002 Farm Bill institutionalised these supplemental payments in the Counter-Cyclical Payment (CCP) programme, in which additional payments on historical base were triggered when commodity prices fell below legislated target prices.

Under the 2008 Farm Bill, a new revenue-based programme, the Average Crop Revenue Election (ACRE) programme, offered producers the option to tie commodity programme payments to revenue loss. Producers chose the ACRE programme as an alternative to participating in the CCP programme and also accepted a reduction in their fixed DPs and a lower marketing assistance loan rate. ACRE payments to producers were paid on the basis of a multi-level trigger design: first revenues for a commodity had to fall below a State-level revenue benchmark. If that occurred, participating farmers in that State could be eligible for a payment if their own farm revenues for that commodity fell below the revenue benchmark for their individual farm. Once enrolled, producers remained in the programme for the life of the 2008 Farm Bill. The programme's multiple trigger mechanism and the requirement that both landowners and operators agree to the choice, made the programme relatively complex and few producers chose to enrol in ACRE rather than remain in the CCP programme.

The 2008 Farm Bill also changed the dairy price support programme, replacing the longstanding milk support price with support prices for three dairy products — non-fat skim milk powder, butter, and cheddar cheese. A supplemental support programme, the Milk Income Loss Contract (MILC) programme, also provided direct payments to dairy producers when prices fell below a legislated target price. Payments were made on a limited level of production per farm to offset incentives for herd expansion. The 2014 Farm Bill repealed the Dairy Product Price Support Program and the MILC programme.

Loan rates remained unchanged under the 2014 Farm Bill, except for an adjustment in the upland cotton loan rate. Rather than a fixed loan rate as for other commodities covered by the loan programme, the upland cotton loan rate can vary within a range (USD 0.45-USD 0.52 cents per pound), following an average adjusted world price.

Direct income support based on historical production parameters, which began in 1996, saw significant changes under the 2014 Farm Bill, which repealed the Direct Payment (DP) and Counter-Cyclical Payment (CCP) programs, as well as the Average Crop Revenue Election (ACRE) programme.

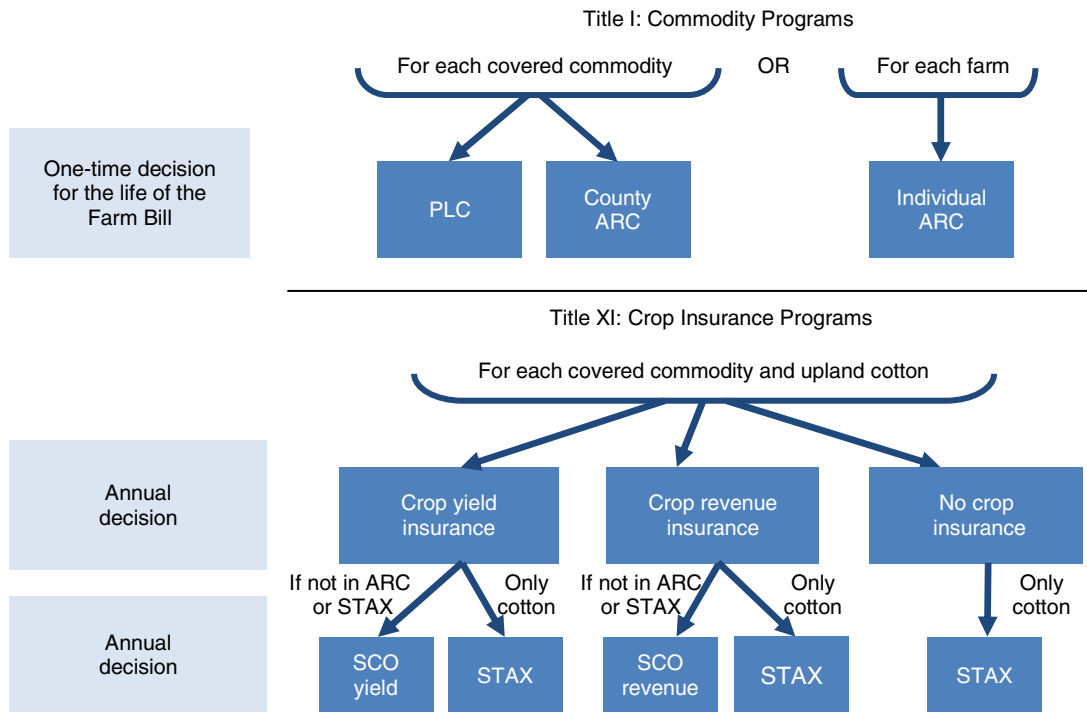
New programmes tied to historical acreage and yields (historical base) include the Price Loss Coverage (PLC) and Agriculture Risk Coverage (ARC) programmes. Covered commodities under the new programmes include wheat, feed grains, rice, oilseeds, peanuts, and pulses. PLC provides direct payments to producers with historical base when the national average market price falls below the legislated reference price for the enrolled commodity. Much like the repealed CCP programme but with higher target reference prices, PLC provides a predictable level of price protection, although it is paid on a share of fixed historical base (85%), not on current production.

The ARC programme offers producers revenue, rather than price, protection, using a rolling average revenue guarantee based on national prices and either county yields (ARC-CO) or individual farm yields (ARC-IC). The ARC revenue guarantee offers producers some protection against multi-year yield and price volatility. As with PLC, the payments are made on a share of fixed historical base, not current production (85% for ARC-CO, 65% for ARC-IC).

Producers could choose either PLC or ARC-CO separately for each covered commodity on their farm. Alternatively, producers could choose ARC-IC, which then applied on a whole-farm basis to all covered commodities on the farm. Producers made these choices in 2014 to remain in place through 2018 without opportunity to make changes in the intervening years. As Figure 6.3 illustrates, producers faced a cascade of choices posed by the variety of commodity programme and crop insurance options offered in the 2014 Farm Bill. Producers holding historical base first faced the choice of whether to elect the PLC or ARC programs for each of their commodity bases. Those choices then affected annual choices they could make regarding purchase of crop insurance coverage. If they chose PLC for some of their historical base commodities, then they could purchase traditional crop yield or revenue insurance, as well as the new Supplemental Coverage Option (SCO) insurance that offered protection against small losses that would normally fall within the traditional crop insurance deductible. If they chose ARC, however, they would not be eligible for the SCO coverage, but could still choose traditional crop yield or revenue insurance coverage.

Upland cotton is not a covered commodity under the PLC and ARC programs. The Cotton Transition Payment (CTP) programme provided direct payments to holders of historical upland cotton base in 2014 and for some areas in 2015, until the new risk management programme for upland cotton, the Stacked Income Protection Plan (STAX), could be fully implemented. In addition, former upland cotton base became “generic” base under the PLC/ARC programme. Producers are not eligible for PLC or ARC payments on that base except in years when they plant it to a covered commodity.

Distinct differences by historical commodity base emerged in producer elections. For example, while producers elected ARC for 93% of maize and soybean base acres, producers elected ARC-CO for only 58% of wheat base and 33% of sorghum base. Conversely, producers elected PLC for 100% of long-grain rice and peanut base acres (USDA FSA, 2015). Choices were more mixed for other historical commodities. Only 1% of all participating farms elected ARC-IC, although farms electing ARC-IC accounted for 6 to 11% of pulse crop base acres.

Figure 6.3. 2014 Farm Bill offers producers both income support and risk management options

Source: USDA Economic Research Service.

Payments under the ARC and PLC programs have totalled USD 5.2 billion as of February 2016, with USD 4.4 billion in ARC payments and USD 0.8 billion in PLC payments (USDA FSA, 2016).

The move away from fixed direct payments on historical base towards programmes that make direct payments on historical base only when revenue or prices fall responded to the public debate that called for commodity programmes to provide support only in times of economic stress. In effect, the new programmes provide support during periods when it is most likely to be needed. The policy design that ties payments to historical base without production requirements does not allow producers to affect the level of their payments through planting decisions. As a result, these programmes avoid creating incentives for producers to make production choices to maximise programme payments.

Table 6.1. Producers' choice of programme, 2014-18
Percentage of base area covered by each programme

	PLC	ARC-CO	ARC-IC
Barley	75%	22%	4%
Canola	97%	2%	1%
Maize	7%	93%	0%
Crambe ¹	65%	34%	1%
Dry peas	44%	50%	6%
Flaxseed	63%	36%	1%
Grain sorghum	66%	33%	0%
Lentils	53%	41%	7%
Large chickpeas	23%	66%	11%
Long grain rice	100%	0%	0%
Medium grain rice (southern)	96%	4%	0%
Mustard	56%	38%	6%
Oats	32%	67%	1%
Peanuts	100%	0%	0%
Rapeseed	44%	54%	2%
Safflower	63%	34%	3%
Sesame	84%	16%	0%
Small chickpeas	23%	68%	9%
Soybeans	3%	97%	0%
Sunflowers	56%	43%	1%
Temperate japonica rice	62%	34%	4%
Wheat	42%	56%	2%
US total	23%	76%	1%

Farms elect ARC-CO and PLC on a commodity-by-commodity basis. A given farm may have elected PLC for some commodities and ARC-CO for other commodities. Thus, calculating percent of farms electing PLC or ARC-CO at the US level is not possible.

1. Crambe is an oilseed, which produces oil mostly for industrial uses.

Source: USDA (2016b), Farm Service Agency, ARC/PLC Program, ARC/PLC Election Data (www.fsa.usda.gov/programs-and-services/arcplc_program/).

Risk management

US farm policy has become increasingly oriented to risk management, even as more traditional programmes continue. US producers use a combination of strategies and tools to manage risk, most of which are not government-based. Among private risk management tools, producers have access to futures and options contracts for major commodities offered on commodity exchanges, as well as opportunities for forward contracting for delivery of grain through local elevators and processors. Among producers of maize, soybeans, and wheat who use contracting in their operations, around 30% participate in hedging their risks through futures contracts and 15% do so through options. These tools are more limited for minor crops and to some extent for livestock. However, some of those producers can also use production contracts or marketing contracts with downstream firms as a risk management strategy. More than 40% of US production is under some form of production or marketing contract (MacDonald and Korb, 2011).

Many producers also use on-farm storage or marketing through cooperatives to manage price risk by delaying sales in expectation of higher prices. Producers may also diversify their operations between livestock and crops, for example, to balance risk. Incomes from different crops and from livestock generally do not follow the same cycles, allowing low income from one to be offset by higher income from the other. Double cropping and diversification across different crops and types of livestock may accomplish similar results. Credit can also provide a strategy for managing risk, and US farm

households also often manage risk through off-farm income sources, including off-farm jobs, farm-related and non-farm businesses, investment income, and social insurance transfers (e.g. social security).

The ARC programme offers producers an option to link their historically based income support to a rolling-average revenue guarantee as an alternative to a fixed reference price. The 2014 Farm Bill also increased the risk management options available to producers through insurance programmes, which are available for purchase annually. The Supplemental Coverage Option (SCO) offers policies in conjunction with traditional crop insurance policies for commodities that producers have elected to enrol in PLC. Producers cannot purchase SCO policies for commodities they have elected to enrol in ARC. Producers typically purchase crop insurance policies to cover around 70-75% of yield or revenue; SCO policies provide an option for additional area-based coverage between the underlying insurance policy and 86% of yield or revenue. SCO policies will cover either yield or revenue risk to match the underlying crop insurance policy. Because SCO covers the most active layer of losses, it can have a higher premium rate than many traditional insurance policies for the same coverage level, but also has a higher premium subsidy rate (65%) than most traditional crop insurance policies. SCO policies have not been a popular option with producers.

Producers of upland cotton may purchase SCO coverage but are alternatively eligible for the STAX programme. STAX is an upland cotton-only revenue insurance option similar to SCO in that coverage is based on county revenue averages. It does not require purchase of an underlying traditional policy, although it offers protection only for losses between 10 and 30%. Premium subsidies are higher for STAX (80%) than for SCO. Like SCO, few producers have shown interest in purchasing these policies.

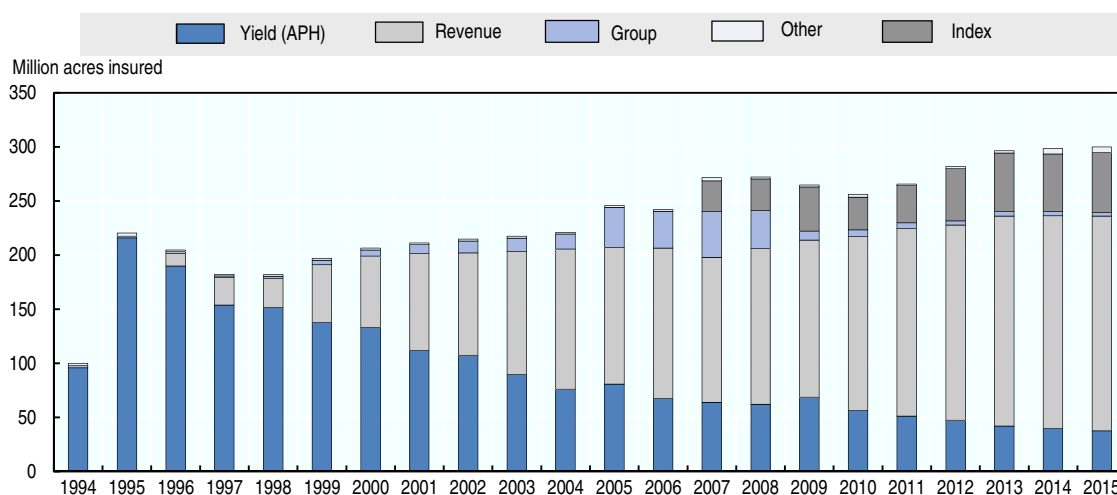
Traditional crop insurance, which provides the bulk of federal crop insurance coverage, is purchased through private insurance companies at a subsidised rate (on average, producers pay only about 40% of their premiums). USDA's Risk Management Agency (RMA) subsidises the insurance premiums as well as a portion of the companies' administrative and operating expenses and shares underwriting gains and losses with the companies under the Standard Reinsurance Agreement. Insurance policies make indemnity payments to producers based on current losses related to either lower than expected yields (crop yield insurance) or lower than expected revenue (revenue insurance). Farmers purchase insurance before planting, but usually pay premiums near harvest.

Crop insurance options have offered expanding risk management choices over time (Figure 6.4). Producers may choose from among a variety of yield and revenue insurance products, although not all policy types are available for all crops in all areas. The increasing availability of revenue insurance products has steadily expanded their share of all crop insurance policies; by 2015, more than 75% of all crop insurance policies were revenue products. Revenue products lower insurance costs when natural (price-yield) hedge reduces revenue variability.

Actual Production History (APH) yield protection is the oldest and most widely available crop insurance product. It protects farmers against yield losses due to natural causes such as drought, excessive moisture, hail, wind, frost, insects, and disease. Yield coverage levels are based on a producer's expected yield, which is calculated from the farm's actual production history (average yields over the last four to ten years). The farmer can select a coverage level from 50 to 75% of average yield (up to 85% in some areas), and a guarantee price, ranging from 60 to 100% of the crop price established annually by RMA.

Catastrophic Risk Protection Endorsement (CAT) coverage provides a lower level of coverage on yield losses at a low cost to producers. It pays indemnities at a rate of 55% of the established price of the commodity when farm yield losses are more than 50%. Producers pay an administrative fee for each crop insured. Coverage above the CAT level is often referred to as “buy-up” coverage.

Figure 6.4. Crop insurance coverage, by option, 1994-2015



APH: Actual Production History (farm or sub-farm unit level).
 Revenue: APH yield x national price (farm or sub-farm unit level).
 Group: County yield (GRP) or country revenue (GRIP).
 Index: Rainfall or Vegetation (pasture, rangeland and forage).

Source: USDA (2015c), *Economic Research Service compilation of Risk Management Agency data* www.rma.usda.gov/.

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Dollar Plan coverage pays for both quantity and quality yield losses and is limited to some high-value crops (e.g. fresh market tomatoes and strawberries). It guarantees a dollar amount per acre rather than a particular yield level. Index insurance, which offers area coverage based on estimated production losses related to indexed levels of vegetation or rainfall, is available for the Pasture, Rangeland, and Forage pilot programme and the Apiculture pilot programme.

Area Risk Protection Insurance (ARPI) policies may cover either yield or revenue and use county yields as the basis for determining a yield loss or calculating revenue coverage levels and actual revenue loss (similar to the SCO and STAX programs). When the county yield for the insured crop falls below the trigger level chosen by the farmer, an indemnity is paid. Yield coverage is available for up to 90% of the expected county yield; producers may select revenue coverage levels from 70 to 90% of expected county revenue. ARPI premiums are usually lower than those for individual insurance.

Revenue Protection (RP) provides protection against a farmer's gross revenue for an individual crop falling below a guaranteed level. Farmers elect a coverage level (50-85%), which is multiplied by their APH yield and the higher of 1) the base market price, which is an average of the harvest-time futures price for a month prior to planting; or 2) the month-long harvest market price for the last month of the contract to determine the revenue guarantee.

Whole Farm Revenue Protection, established in 2015 from the previous Adjusted Gross Revenue (AGR) pilot programs, insures the revenue of the entire farm rather than an individual crop by guaranteeing a percentage of average gross farm revenue, a share of which may come from livestock revenue. The plan uses information from a producer's farm business income tax forms to calculate the policy revenue guarantee.

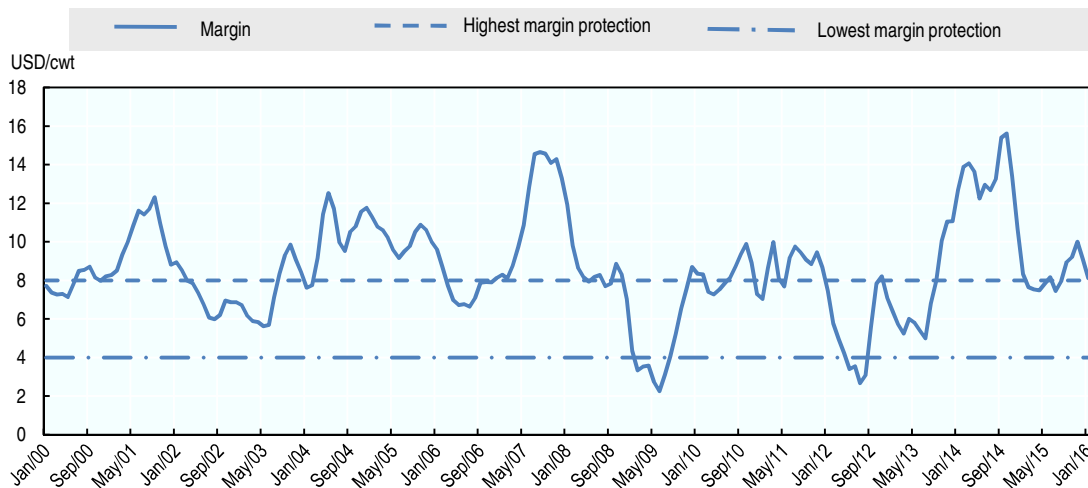
Crop insurance is widely available, but coverage is not available for all crops in all areas. Crops for which insurance products are not available, generally specialty crops, previously could secure only catastrophic coverage for yield losses (50% loss at 55% of average market price) under the Noninsured Crop Disaster Assistance Program (NAP). The 2014 Farm Bill provided for an expansion of NAP that

allows producers to buy additional yield loss coverage for some or all of their eligible commodities (up to 65% of losses at 100% of average market price).

The new Margin Protection Program (MPP-Dairy) for dairy provides a risk management alternative to former price support and income stabilisation programmes. Dairy producers can purchase coverage under MPP-Dairy to insure their operations at a selected level of average national dairy production margin (the difference between the US all-milk price and average feed cost). On enrolment, operations register their recent production history as the basis for coverage, then choose annually the share (25-90%) of that historical production (adjusted annually for national average milk production increases) to cover and at what margin level (USD 4.00-USD 8.00 per hundredweight (cwt) of milk). Coverage at the lowest margin level (USD 4.00) is available for a USD 100 annual administrative fee; coverage at higher levels requires a premium in addition to the administrative fee. Premiums range depending on the margin level selected and the amount of production covered (premiums are higher for production above 4 million pounds annually).

This programme provides payments to producers when the difference between milk prices and feed prices falls below USD 4.00-USD 8.00, depending on chosen coverage level. Since 2000 milk margins have been more often above the upper protected margin than below, and have fallen below the minimum protection margin only twice (Figure 6.5). In 2015, payments triggered for only a few months at the USD 8.00 margin level, totalling payments of only about USD 700 000.

Figure 6.5. Historical dairy margins in relation to MPP bounds, 2000-16



Source: USDA (2016c), Farm Service Agency. www.fsa.usda.gov/.

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The 2014 Farm Bill permanently authorised four of the five standing disaster assistance programmes under the previous Farm Bill that help livestock producers and orchard, vineyard, and nursery tree growers manage the risk of loss from natural disasters — the Livestock Indemnity Program (LIP), Livestock Forage Program (LFP), Emergency Assistance for Livestock, Honeybees and Farm-Raised Fish Program (ELAP) — and the Tree Assistance Program (TAP). The reinstated programmes included provisions for retroactive coverage to 1 October 2011, when the programmes had expired. The 2014 Farm Bill did not re-authorise the expired whole-farm revenue-based crop disaster assistance programme, Supplemental Revenue Assurance (SURE).

LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire on land that is native or improved pastureland with permanent vegetative cover or that is planted specifically for grazing. LIP provides benefits to livestock producers for livestock deaths in

excess of normal mortality caused by adverse weather or by attacks by animals reintroduced into the wild by the federal government. ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease and costs incurred for some disease prevention, adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP. TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters

Market-related support

Several other programmes provide indirect market-related support to producers through government purchases or government oversight of marketing programmes. These include both emergency, short-term demand-enhancing programmes and industry-requested programmes to stabilise marketing of specialty commodities. The Dairy Product Donation Program (DPDP) requires the Secretary of Agriculture to purchase dairy products for donation to low-income groups when dairy margins, as determined under the MPP-Dairy, fall below USD 4.00 per cwt the two preceding months. The programme remains in effect until specified margin or product price levels are met or until purchases have been made for three consecutive months. Dairy products will be purchased at prevailing market prices in consultation with public and private non-profit organisations serving the nutrition needs of low-income populations, which will distribute the donations through food banks and other feeding programmes. The DPDP programme has never been triggered.

USDA's Agricultural Marketing Service (AMS) administers the programme "Funds for Strengthening Markets, Income and Supply", which is authorised under Section 32 of the Agricultural Adjustment Act of 1935, as amended. Section 32 authority provides funding both for cash child nutrition subsidies and the acquisition of perishable food commodities for distribution to child nutrition programmes, a small share of which are made as emergency surplus removals for disaster relief and short-term market stabilisation. Purchases are made at current market prices through a transparent bid process.

The Agricultural Marketing Agreement Act of 1937 authorised federal milk marketing orders, which have been modified many times since then. A classified pricing system and revenue pooling are two key elements of milk marketing orders. Milk marketing orders set minimum prices paid by milk processors for milk used for fluid beverage purposes and manufactured dairy products. These minimum milk prices are set by formulas and change each month with changes in prices of major dairy products. They are not set to provide price support, but rather to improve availability of fluid milk for consumers in deficit production regions. Minimum prices of milk used for fluid beverage purposes differ according to a geographic price structure. While most US milk is marketed through federal milk marketing orders, some milk is marketed through similar State programmes, and some is marketed outside both federal and state programmes.

More than 20 fruit and vegetable commodities are covered by marketing orders administered by the USDA's Agricultural Marketing Service (AMS). Marketing orders are operated at the request of the industries, which agree voluntarily to federal oversight of certain aspects of their operations. Once established, marketing orders become binding on all individuals or businesses handling the commodity in a geographic area covered by the order, including importers, who must comply with grade, size, quality, and/or maturity regulations under the order. Marketing orders enforce product quality standards, regulate the flow of product to markets, standardise packages and containers, create reserve pools for storable commodities, and authorise production and marketing research and advertising. About one-third of fruit and vegetable marketing orders (ten) have authority to control volume, but that authority has been rarely used in recent years (see section on regulations in Chapter 4).

Domestic measures targeting specific issues

Agri-environmental programmes

Agri-environmental programmes, generally governed by the Conservation Title of the Farm Bill, have multiple objectives. Originally focused primarily on soil quality and water quality and conservation, these objectives have expanded to include wildlife habitat, air quality, carbon sequestration, energy conservation, and preserving farm and ranch lands. At the same time, programmes have become increasingly focused on working lands and away from land retirement, although targeted land retirement remains an important programme component.

While most of these conservation issues occur in some form across the United States, specific problems are often regionally concentrated. For example, water quality and conservation are a critical focus in California, while in the Northern Great Plains wetlands and grassland preservation rank high among environmental concerns. Soil erosion problems, the historical core of USDA conservation programmes, differ regionally as well, with wind the primary concern across the Great Plains and other open lands with little forest cover, and water the greater concern in hilly or mountainous topographies. The Secretary of Agriculture has designated eight critical conservation areas for concentrated attention under the 2014 Farm Bill's Regional Conservation Partnership Program:

- Chesapeake Bay Watershed — water quality, agricultural soil erosion and nutrient runoff;
- Great Lakes Region — water quality, agricultural soil erosion and nutrient runoff;
- Mississippi River Basin — water quality, agricultural soil erosion and nutrient runoff;
- Colorado River Basin — water conservation and sustainable use of water resources;
- Longleaf Pine Range — long-term sustainability of pine forest ecosystems;
- Columbia River Basin — water quality and quantity for salmon habitat;
- Prairie Grasslands Region — flood mitigation, irrigation efficiency and water conservation, wildlife habitat conservation;
- California Bay Delta — water quality and conservation, wildlife habitat conservation.

Conservation programmes in the United States are operated at the federal, state, and local levels. Federal programmes are operated by USDA through the Farm Service Agency and the Natural Resources Conservation Service. At the state and local level, a system of field offices and local conservation districts interacts directly with producers to implement federal programmes, which may be supplemented by additional funds from the State and county and from local conservation districts. Conservation districts are special districts authorised by the States to organise producer cooperation with federal agricultural conservation programmes. They are generally contiguous with counties, but in some cases may be at a sub-county scale.

Many states and some counties also operate agricultural conservation programmes that are independent of federal programmes. These may address more local conservation issues or may reflect heightened public concerns in some States about broader environmental problems. For example, California operates a greenhouse gas cap-and-trade programme that recently linked with a similar programme operated by the Canadian Province of Québec; both New York and Massachusetts offer assistance for production of renewable energy from agricultural sources using anaerobic digester technologies; and a large number of States and some counties operate farmland preservation programmes.

At the federal level, the United States operates two types of agri-environmental programmes — mandatory conservation compliance for participants in most farm programmes, and voluntary conservation programmes that may involve land rental, cost-share for implementation of conservation

practices, and incentive payments. Producers may receive technical assistance to implement both types of programmes.

Mandatory conservation compliance requires that producers apply a soil conservation system on highly erodible cropland and refrain from draining wetlands in order to benefit from other farm programmes, including both income support and risk management and insurance programmes. For example, under Highly Erodible Land Conservation (HELIC) provisions — often referred to as “sodbuster” provisions — farmers who crop highly erodible land must apply an approved soil conservation system or risk becoming ineligible for nearly all agriculture-related farm programme benefits, including farm commodity programmes, crop insurance premium subsidies, conservation programmes, disaster assistance, farm loan programmes, and other benefits. Under Wetland Conservation provisions (often referred to as “swampbuster”), producers must refrain from draining wetlands or face the loss of farm programme benefits. Cross compliance requirements have been in place since 1985, but the 2014 Farm Bill reinstated the requirements for producers receiving crop insurance premium subsidies, which were in place from 1985-96.

Voluntary conservation programmes include both land retirement and programmes on working farmland, including agricultural land preservation and adoption of environmentally friendly production practices. The 2014 Farm Bill consolidated voluntary conservation programmes into a smaller number, but most previous options remain in place. Federal conservation spending includes financial assistance to farmers as well as spending on services provided by federal agencies.

Five programmes presented in Box 6.2 account for more than 95% of spending on voluntary programmes that provide financial assistance to farmers in exchange for either retiring land from crop production or adopting more environmentally benign practices on land that is in production. In 2015, the five programmes received budget authority amounting to USD 1.81 billion for the CRP (or 37.5% of total funding for these programmes), USD 1.35 billion (28%) for the EQIP, USD 1.18 billion (24.4%) for the CSP, USD 394 million (8.2%) for the ACEP; and USD 93 million (1.9%) for the RCPP.

Box 6.2. Conservation programmes in the 2014 Farm Bill

Land retirement programmes

The Conservation Reserve Program (CRP) generally provides 10-15 year contracts to remove land from agricultural production and place it in grass or tree cover. A large majority of CRP contracts enrolled whole fields or whole farms. Increasingly, however, CRP contracts fund high-priority, partial-field practices such as filter strips and grass waterways, rather than whole-field or whole-farm enrolments. Up to 2 million acres of grassland can also be enrolled in CRP if landowners agree to keep the land in grazing use. CRP enrollees receive land rental payments, and additional payments reflecting a share of the costs of installing various conserving practices on their land.

The Agricultural Conservation Easement Program (ACEP) provides long term or permanent easements for preservation of wetlands and the protection of agricultural land (cropland, grazing land, etc.) from commercial or residential development. It includes the former Wetland Reserve Program and the Farm and Ranchland Preservation Program. The Grassland Reserve Program was split between the CRP and ACEP.

Working land programmes

The Environmental Quality Incentives Program (EQIP) provides financial assistance to farmers who adopt or install conservation practices on land in agricultural production. Common practices include nutrient management, conservation tillage, field-edge filter strips, and livestock exclusion from streams. Sixty percent of programme funds are targeted to livestock related practices and at least 5% are targeted to wildlife-related practices.

The Conservation Stewardship Program (CSP) supports ongoing and new conservation efforts for producers who meet stewardship requirements on working agricultural and forest lands. CSP provides two types of payments through five-year contracts: annual payments for installing new conservation activities and maintaining existing practices; and supplemental payments for adopting a resource-conserving crop rotation.

The new Regional Conservation Partnership Program (RCPP) is designed to coordinate conservation programme assistance with partners to solve problems on a regional or watershed scale. Financial assistance is coordinated through RCPP but provided to producers largely through “covered” programmes: EQIP, CSP, ACEP, and Healthy Forests Reserve Program. Up to 7% of the dollars or acres available under each of these programmes will be allocated through RCPP.

Conservation Technical Assistance (CTA), also a voluntary programme, provides ongoing technical assistance to agricultural producers who seek to improve the environmental performance of their farms. The assistance is provided through a system of professional conservationists based in most US counties to help farmers and other landowners manage natural resources on their land. Conservationists provide individual on-farm review of conservation problems, helping producers develop conservation plans that incorporate practices and technologies to meet required standards under cross-compliance and other federal, state, and local environmental regulations. CTA also provides area-wide, community, and watershed plans in cooperation with local leadership to identify resource conservation priorities and methods and funding sources for addressing those needs. Spending on CTA has remained between USD 700 and USD 800 million per year over the last ten years (USDA, 2016a).

Producers can also receive technical assistance to prepare the specialised conservation plans required for financial assistance under voluntary USDA conservation programmes to implement environmentally friendly practices.

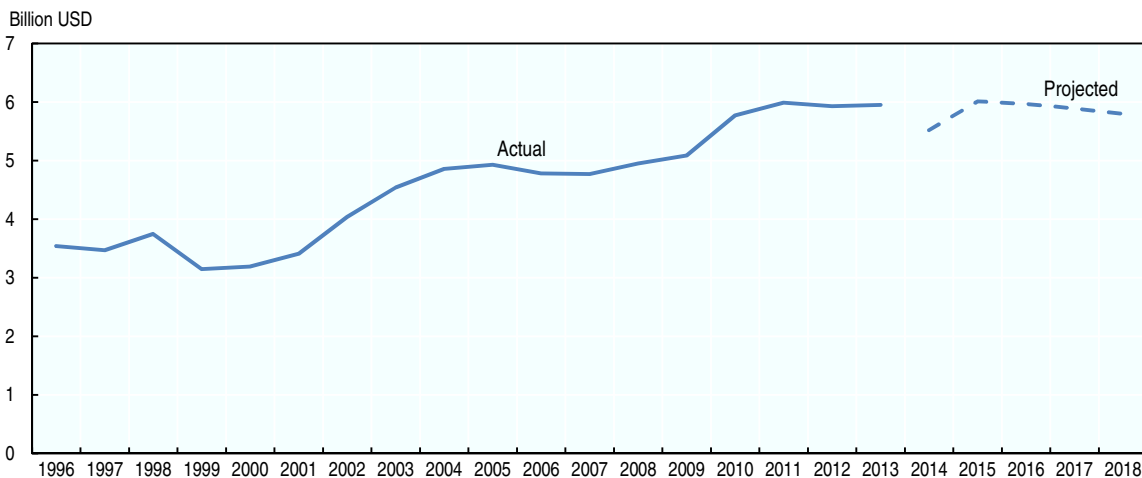
Conservation Innovation Grants (CIG), a sub-programme of EQIP, encourages innovative approaches and knowledge and technology transfer for conservation on agricultural land. CIG leverages federal funding by partnering with other public and private entities through a competitive grants programme. Funding is targeted to small projects that demonstrate opportunities for application of proven and emerging technologies for a wide range of users through on-the-ground pilot projects, field demonstrations, and on-farm conservation research. CIG provides 50% of project costs, which must be matched by funds from other sources secured by the grant recipients. The programme is funded at USD 20 million annually (accounting for 0.35% of all conservation spending) and has distributed USD 234 million in grants since it began in 2004. CIGs have supported very specific innovations, most of which have been only recently introduced.

USDA undertakes research on the economic productivity and environmental impacts of various pest management and nutrient strategies. In certain circumstances, farmers can improve on-farm productivity and financial performance through practices that also reduce the use of agricultural chemicals, and USDA education and technical assistance programmes support those actions. However, education alone is unlikely to be sufficient to incentivise practices to protect environmental quality, because most environmental benefits occur off the farm.

Conservation programme spending overall has seen substantial increases since 1985, when the Conservation Reserve Program (CRP) was first introduced (Figure 6.6). After more than a decade of rapid growth, projections based on the 2014 Farm Bill indicate a levelling off in funding for conservation programmes (Figure 6.7). Between 2014 and 2018, the Congressional Budget office (CBO) estimates mandatory conservation spending of USD 28 billion, about USD 200 million less than CBO's projection of 2014-18 spending if the programmes and provisions of the 2008 Farm Bill had been extended.

Programmes on working farmland have increased markedly since 2002. Under the 2014 Farm Bill, this transition will continue (Figure 6.8). The CRP will be reduced from its previous cap of 32 million acres to the new maximum limit of 24 million acres in 2017, and combined funding for EQIP and CSP is projected to rise above 50% of conservation spending for 2014-18. EQIP, CSP, and their predecessor programmes accounted for only 11% of funding in 1996-2002, 32% in 2003-2007, and just over 40% in 2008-13 (Claassen, 2014) (Figure 6.9).

Figure 6.6. Annual spending on major USDA conservation programmes, 1996-2018

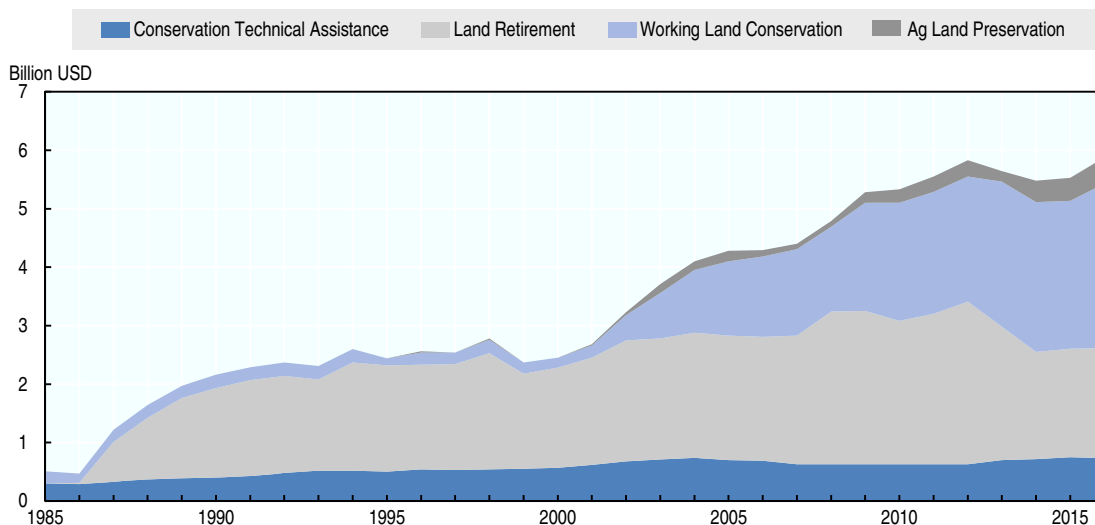


Includes the Conservation Reserve Program (CRP), the Agricultural Conservation Easement Program (ACEP), the Environmental Quality Incentives Program (EQIP), the Conservation Stewardship Program (CSP), the Regional Conservation Partnership Program (RCPP), the Conservation Technical Assistance (CTA) and predecessor programmes. Spending is adjusted to constant (2012) USD, assuming annual inflation of 2% for 2014-18. CTA funding is assumed flat for 2014-2018 at USD 714 million (nominal).

Sources: USDA Economic Research Service analysis of USDA (2015b), Office of Budget and Policy Analysis (OBPA) data on actual funding for 1996-2013; OBPA projections for 2014, Congressional Budget office projections for 2015-18 for CRP and CSP, and funding specified in the 2014 Farm Act for 2015-18 for ACEP, EQIP, and RCPP. www.cbo.gov/sites/default/files/51317-2016-03-USDA.pdf.

StatLink <http://dx.doi.org/10.1787/888933408788>

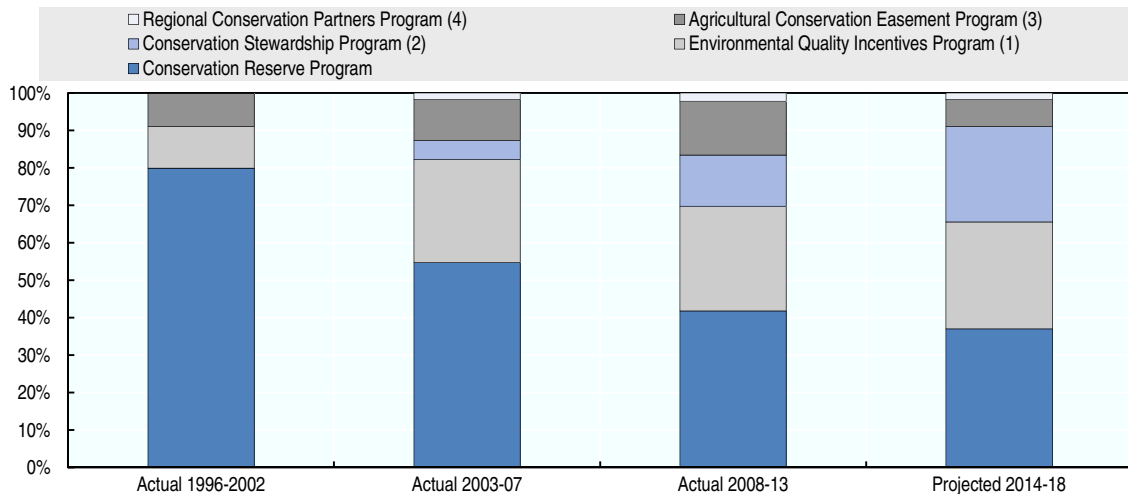
Figure 6.7. Evolution of conservation spending, 1980-2016



The years 2015 and 2016 data reflect 2014 Farm Bill programs; 2015 budget authority estimated; 2016 budget authority proposed.

Source: USDA (2015b), Office of Budget and Policy Analysis, Summary and Annual Performance Plans, 2005-2017; and Congressional Budget Office.

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Figure 6.8. Conservation programmes in the 2014 Farm Bill

1. Includes EQIP and the Wildlife Habitat Incentive Program (WHIP) for 1996-2013.
2. Includes the Conservation Security Program for 2002-07.
3. Includes the Wetland Reserve Program, Farmland Protection Program, and Grassland Reserve Program (easement portion) for 1996-2013.
4. Includes the Agricultural Water Enhancement Program, Chesapeake Bay Watershed Program, Cooperative Conservation Partnership Initiative, and Great Lakes Basin Program for 1996-2013.

Source: USDA, Economic Research Service, using data from Congressional Budget Office (2014), *Cost Estimates for the Agricultural Act of 2014*, www.cbo.gov/sites/default/files/51317-2016-03-USDA.pdf.

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Conservation programme spending has also become increasingly targeted to land where retirement or enhanced practices can have the greatest environmental benefit. Whole-field and whole-farm CRP expenditures, for example, are awarded on the basis of expected environmental benefits and increasingly CRP funds have been reoriented to support high-value partial field land retirements that provide riparian buffers, field-edge filter strips, wetland restoration, and wildlife habitat. While most conservation programme spending is mandatory, it is subject to budget or area caps. As a result, enrolment is competitive — for some programmes, fewer than 50% of prospective participants are accepted.

Competition for participation is generally managed through a bidding process. In most cases, eligible producers submit offers for participation, specifying the practices they are interested in applying and details of the land to which they would apply them, as well as, in some cases, what payment they are willing to accept. These offers are scored on potential environmental benefits and ranked according to the value of benefits against the cost of payments producers are willing to accept to achieve them. The primary ranking mechanism is the Environmental Benefits Index, which scores bids on the practices offered and the payments required to reach a composite score that can rank all bids on a single scale (Box 6.3).

Box 6.3. The Environmental Benefits Index

The Environmental Benefits Index (EBI) is a ranking system used by USDA's Farm Service Agency (FSA) for enrolling land in the Conservation Reserve Program (CRP). The CRP offers long-term rental payments, and technical and cost-share assistance for establishing conserving practices (generally cover plantings) to control soil erosion and improve water quality and wildlife habitat on environmentally sensitive farmland. The EBI is a mechanism for determining which contract offers from agricultural landowners provide the greatest environmental benefits at the least cost, in order to assure that programme funds are used most effectively. FSA assesses data on 5 environmental factors plus cost to competitively rank CRP contract offers:

- Wildlife habitat benefits that will result from the cover plantings offered;
- Water quality benefits from reduced erosion, runoff, and leaching;
- On-farm benefits from reduced erosion;
- Benefits that are likely to endure beyond the contract;
- Air quality benefits from reduced wind erosion; and
- Cost (rental rate offered)

Each contract offer is scored according to the benefits provided in each of these categories, which can be affected by both planned practices and by the location and environmental sensitivity of the land offered. All offers in the same signup period are comparatively ranked and selections for CRP contracts are made based on this ranking.

Adaptation to climate change

At the federal level, efforts to prepare for adaptation to climate change started with the launch of the Interagency Climate Change Adaptation Task Force in 2009 to provide “federal support and coordination for adaptation planning at federal, state, local, and tribal levels of government”. Each federal agency was required to develop a specific plan addressing the challenge of climate change adaptation in the frame of its goals and activities.

The USDA Climate Change Adaptation Plan provides “a vulnerability assessment, reviews the elements of USDA’s mission that are at risk from climate change, and provides actions and steps being taken to build resilience to climate change.” (USDA, 2014b) The USDA released a study reviewing climate change impacts on agriculture, and analysing adaptation and policy responses in this area (Walthall et al., 2013). It also launched seven Regional Climate Hubs, and included inputs from each USDA sub-agency into the USDA Plan.

The Regional Climate Hubs are expected to help farmers in their choices for adapting to climate change. They have three main purposes: 1) provide farmers with technical assistance for climate change, based on the most updated scientific knowledge on the subject; 2) regularly assess the risks and vulnerabilities associated with climate change for regional agriculture, and disseminate information useful to farmers' choices in this regard; and 3) raise awareness and educate farmers on issues of climate change adaptation. For these missions, Regional Climate Hubs may work with other federal agencies, as well as universities.

USDA also aims at developing capacity building in the area of climate change in all sub-agencies. A USDA Global Change Task Force that includes representatives from each agency of the USDA concerned by climate change meets monthly to set the course and coordination of adaptation activities related to climate change.

Bioenergy policies

Bioenergy policies form a component of the US government’s overall energy strategy, which aims to support economic growth, improve energy security by reducing net oil imports, and address the challenges of climate change (US Council of Economic Advisors, 2015). The strategy also includes the application of new energy efficiency standards in transportation and in certain energy-using products; support for alternative energy sources such as wind and solar power through tax incentives, direct

support, and mandates; support for improvements in energy infrastructure for better alignment with emerging energy sources; and support for research on energy. Energy sector innovations — particularly the development of new technologies for mining natural gas and oil as well as improvements in solar and wind technologies — and bioenergy policy initiatives have combined to lead to a substantial shift away from coal as a source for electricity generation and toward natural gas and renewables (Figure 5.8), and to sharp reductions in net oil imports (Council of Economic Advisors, 2015).

The Renewable Fuel Standard (RFS), which sets annual mandates for blending biofuels with gasoline for transportation fuel use, functions as the primary policy supporting biofuels use and development in the United States. The RFS was first enacted in the Energy Policy Act of 2005 and was revised under the Energy Independence and Security Act of 2007 (EISA). The EISA also set new standards for average fuel economy in motor vehicles; set new energy efficiency standards for ten major household appliances and light bulbs; provided new initiatives aimed at reducing energy use in federal buildings; and provided support for R&D. The EISA aims to create incentives for research spending, innovation, and technology adoption through the imposition of product standards.

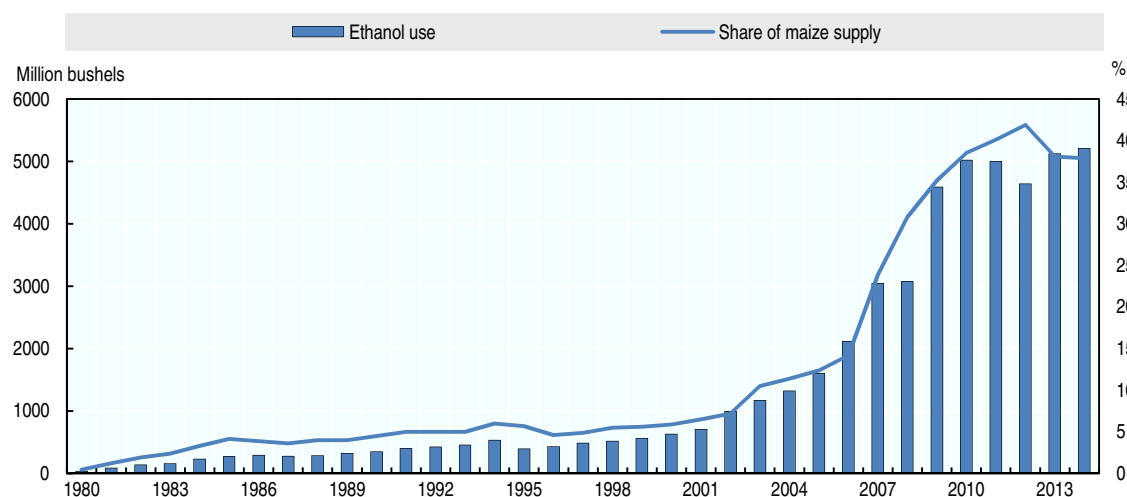
The 2007 EISA RFS established a progressively growing mandate for the use of renewable biofuels in the United States, from 9 billion gallons in 2008 to 36 billion in 2022, drawing on four nested categories of biofuels, based on their greenhouse gas (GHG) reduction rating (relative to a 2005 baseline of 100% gasoline or 100% diesel) and feedstock: conventional renewable fuel, advanced biofuel, biomass-based diesel, and cellulosic biofuel. The advanced category includes biomass-based diesel, cellulosic, and other advanced biofuels. Feedstocks for other advanced biofuels include sugarcane and biogas from waste materials; for biomass-based diesel, they include oil crops, animal fats, recycled cooking oil, and non-food grade maize oil (a by-product of the dry mill ethanol production process). Cellulosic ethanol feedstocks include agricultural and forestry residues, dedicated energy crops (e.g. switchgrass, miscanthus), and urban waste (e.g. food waste and municipal solid waste). (Bracmort, 2016; Duffield et al., 2015).

The RFS established a complex nested structure among the four biofuel categories. Ethanol from maize starch and grain sorghum qualifies as conventional renewable fuel, with a minimum GHG reduction of 20%.¹ While the 9 billion gallon RFS for 2008 could be met entirely from conventional renewable fuels, their use was capped at 15 billion gallons in 2015, and later increases in the RFS were to be met primarily from advanced biofuels (with a minimum GHG reduction of 50%), which were to provide at least 21 billion gallons by 2022. Of that total, 1.28 gallons must be from biomass-based diesel fuels² and 16 billion gallons must be from cellulosic biofuels (which must meet a GHG reduction requirement of 60%).

To date, conventional renewable fuel in the form of maize-based ethanol has made up around 98% of blended biofuels, which has had an impact on maize production in the United States. Maize used for ethanol more than tripled over 2005-13, with an annual growth rate of nearly 24% per year from 2005-11 and reaching a peak of 43% of production in 2012 (a drought year with unusually low maize production). Maize production has also risen over that period, posting record highs in 2004, 2007, 2009, and 2013. At the same time, use of distillers dried grains (DDGs), a co-product of the ethanol dry-milling process, has increased as a partial off-set to maize use in feed for dairy and beef cattle.

Most vehicles in the United States run on a mixture of gasoline with 10% ethanol (E10), as infrastructure, liability, and automotive design constraints limit the use of higher ethanol blends. Practically, this practice links ethanol use to total US gasoline consumption, which has declined since 2008, in part due to the effects of the recession but in part due to policies regarding fuel efficiency standards. Because of this “blend wall” imposed by total gasoline consumption, and the RFS cap on conventional biofuels, the share of maize used for ethanol fell to 37% by 2015, and is projected to fall to 34% by 2025 (Westcott and Hansen, 2016). In contrast, while biodiesel use lags behind maize-based ethanol in the United States, production increased between 2005 and 2015 from 90 million to 1.27 billion gallons and makes up about 25% of soybean oil use.

Figure 6.9. Share of maize used for ethanol, 1980-2014



Source: USDA (2015a), Economic Research Service, Feed Grains database. www.ers.usda.gov/data-products/feed-grains-database.aspx.

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The EISA, and other statutes supporting bioenergy, was intended to encourage greater research investments on bioenergy projects, and to lead to expanded innovation. Globally, public R&D expenditures in support of bioenergy rose from around USD 200 million in 2000 to USD 600 million in 2007; global expenditures fell in the wake of the 2008-09 economic crisis, but US expenditures were increased again as part of fiscal stimulus initiatives in 2009-10 (Fuglie et al., 2011). Private firms also expanded their research on biofuels, and in 2009 global private biofuels R&D expenditures were estimated at USD 1.47 billion (Fuglie et al., 2011).

However, the EISA also set an aggressive mandate for the growing use of cellulosic biofuels, but the necessary developments in infrastructure, processing, and efficient feedstock production have not been forthcoming, despite significant investments in research. As a result, the US Environmental Protection Agency (EPA), which develops the specific rules to implement the RFS, has waived all or part of the cellulosic component of the RFS in each year. The agency has not adjusted the overall annual target for renewable fuel use, thereby effectively increasing the mandate for other advanced biofuels, primarily sugarcane ethanol and biodiesel (Tyner, 2013).

The RFS is enforced by creating blending obligations for each type of biofuel, based on refiners' and importers' fuel volumes. For example, a refiner with a volume of 1 billion gallons of gasoline would have to provide the EPA with certificates showing that it blended 100 million gallons of ethanol (10%) in its production. These certificates are called Renewable Identification Numbers (RINs), and they are transferable among firms— if firms use more renewable fuels than required, they can sell their surplus RINs to other blenders. The EISA also provides for a RIN credit trading system that allows some flexibility for shifting obligations across years. The transferable RIN market allows for increased efficiency in meeting the RFS, and positive RIN prices for various biofuel categories indicate that the RFS is binding, and is driving marketplace behaviour.

Certain other federal ethanol support policies, including tax credits and import tariffs, were ended or allowed to expire in 2012. Ethanol remains competitive as an octane enhancer, however, which likely will keep ethanol production at or above RFS mandate levels even without those additional supports (Irwin and Good, 2015). Additional support beyond the RFS continues for biodiesel production through a USD 1.00 per gallon tax credit for blenders of biodiesel fuel.

The 2014 Farm Bill also provides authority for additional bioenergy programmes, primarily through providing incentives for research, development and adoption of renewable energy, including solar, wind, and anaerobic digesters, as well as cellulosic ethanol, and soy-based biodiesel (Schnepf, 2014). Programmes provide assistance for research and development of advanced biofuel feedstocks, conversion of energy systems to use alternative feedstocks, and assistance to producers to establish and maintain production of non-commodity biomass feedstocks and biobased products. USDA has implemented these provisions through a number of separate programmes.

The Biomass Crop Assistance Program (BCAP) provides financial assistance to producers to produce and deliver non-commodity biomass feedstocks for qualified biomass conversion facilities that use biomass feedstocks to produce heat, power, biobased products or advance biofuels. Assistance may be provided as matching payments for delivery of eligible material by producers to conversion facilities or as establishment and annual payments for some producers who contract to produce eligible biomass crops in specific BCAP project areas.

The Rural Energy for America Program (REAP), administered by USDA's Rural Business and Cooperatives Service, provides grants and loan guarantees to agricultural producers and small businesses to purchase or install renewable energy systems or to make energy efficiency improvements. To be eligible for assistance, agricultural producers must earn at least 50% of their gross income from agricultural operations and small businesses must be in rural areas. The funds may be used for a variety of renewable energy systems, including biomass, geothermal, small-scale hydropower, hydrogen, solar, and ocean tidal, current, or thermal energy, and for increasing the efficiency of existing energy systems.

The Feedstock Flexibility Program for Bioenergy Producers encourages the domestic production of biofuels from surplus sugar. Bioenergy producers may purchase surplus sugar from the Commodity Credit Corporation during years when USDA has determined that CCC sugar purchases are required to avoid forfeiture of sugar held as loan collateral under the sugar nonrecourse loan programme.

The Biomass Research and Development Initiative funds research and development and demonstration projects in the areas of feedstocks development, including feedstocks logistics systems; biofuels and biobased products development; and biofuels development analysis focused on life-cycle environmental, social, and economic impacts of projects. Universities and other higher education institutions, national laboratories and other federal and state research agencies, non-profit organisations, and small businesses may be funded for 80% of research and development costs or 50% of demonstration project costs. The initiative is jointly administered by the Department of Energy and USDA. Funding for the research programme was significantly reduced from a high of USD 40 million in mandated funds annually to USD 3 million under the 2014 Farm Bill.

The Biofuels Infrastructure Partnership awards competitive grants, matched by States, to expand the infrastructure for distribution of higher fuel blends of ethanol. Commodity Credit Corporation funds must be used to pay a portion of the costs related to the installation of fuel pumps and related infrastructure dedicated to the distribution of higher ethanol blends, for example E15 and E85, at vehicle fuelling locations. The matching contributions may be used for these items or for related costs such as additional infrastructure to support pumps, marketing, education, data collection programme evaluation and administrative costs.

The Advanced Biofuel Payments Program provides quarterly payments to advanced biofuel producers based on the quantity produced in the quarter. Annual payments for increases in advanced biofuel production over the previous year are also available.

The Biobased Markets Program, also known as the Biopreferred Program, is intended to assist in developing and expanding markets for biobased products. The programme includes mandatory biobased supplies and services procurement requirements for federal agencies and federal contractors and a voluntary product certification and labelling programme. The "USDA Certified Biobased Product" label verifies the product meets the required standard for renewable biological ingredients.

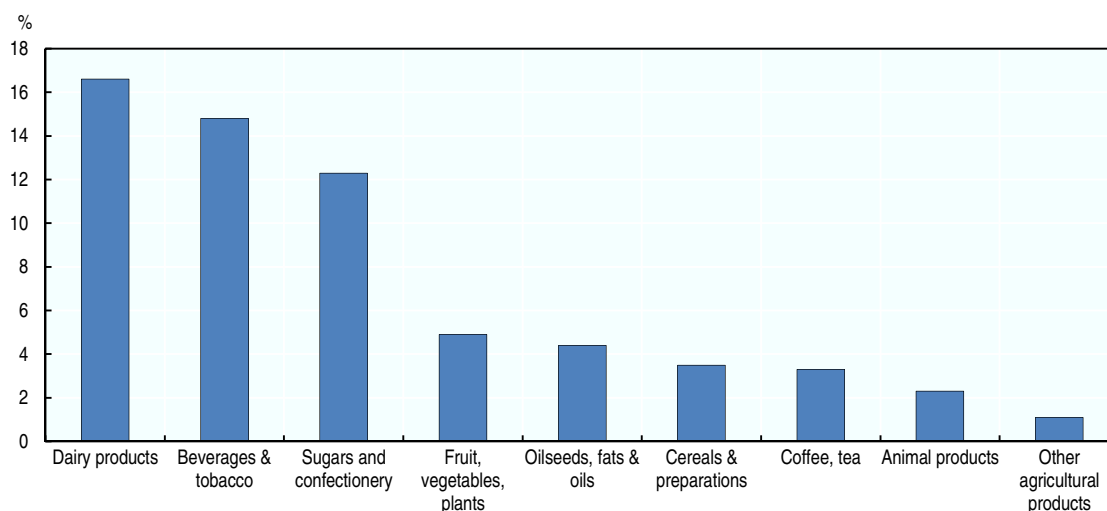
The Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program offers loan guarantees for the development, construction, and retrofitting of new and emerging technologies for the development of advanced biofuels, renewable chemicals, and biobased products manufacturing facilities. Loans are available through USDA’s Rural Business and Cooperatives Service for up to USD 250 million (but not more than 80% of eligible project costs) for the development, construction, and retrofitting of new and emerging technologies for biorefineries and biobased manufacturing facilities. Biorefinery facilities may also be eligible for funds under the Repowering Assistance Program, which offers grants to biorefinery facilities for up to half the costs of installing renewable biomass systems for heating and powering their facilities, or for producing new energy from renewable biomass.

Trade-related measures

US tariffs are relatively low by international standards, in particular for capital goods (Figure 6.11). Agricultural tariffs are slightly above the average for non-agricultural products, but the majority are quite low (Figures 6.10 and 6.11). Applied tariffs³ averaged 5.1% for agricultural products and 3.5% for non-agricultural products in 2014 (WTO, 2015). For agricultural products, 77.2% of tariff lines have applied tariffs less than or equal to 5%. However, tariffs in certain agricultural commodities are higher than the national average, most notably dairy products (17.2%), sugar and confectionery products (11.7%), and beverages and tobacco (18.6%).

The United States employs many simple tariffs, but there are some agricultural sectors for which it employs a tariff rate quota (TRQ). These two-tiered tariffs apply one rate to a certain amount of the imported good, and a considerably higher tariff on any further imports in excess of the initial quota. If the out-of-quota tariff rate is high enough, this has the effect of behaving as a quota or quantity limit on imports. There are tariff rate quotas on certain dairy products, certain meats, sugar and sweeteners, cotton, tobacco, animal feed, and certain fruits (US Customs and Border Protection, 2015)

Figure 6.10. US tariffs on agricultural commodities, 2015



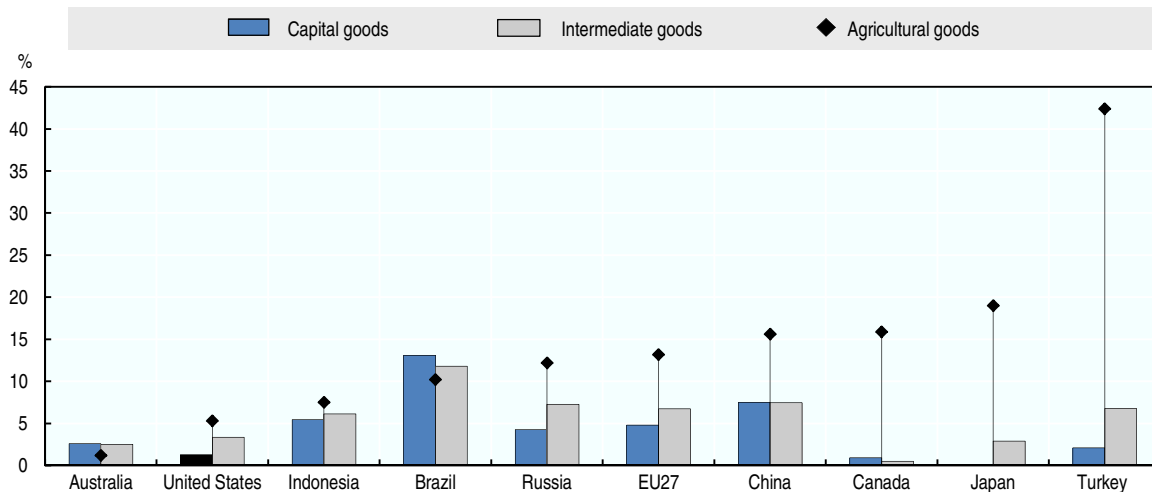
1. Simple average MFN tariffs, specific duties in *ad valorem* equivalents included. Tariff rates for non-agricultural products do not include *ad valorem* duties.

Source: WTO (2015a), “Tariff Profiles – United States”. http://stat.wto.org/TariffProfiles/US_e.htm.

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Industries that use commodities as inputs may face higher tariffs for imported inputs than those that use imported machinery. Average applied MFN tariffs for machinery and manufactures range from 1.3% to 2.5%, while tariffs for commodity inputs are somewhat higher, at 7.3% for oilseeds, 11.7% for sugars, and 3.0% for cereals. As Figure 6.12 shows, tariffs on capital and intermediate goods do not raise significantly the costs of imported farm inputs.

Figure 6.11. Import tariffs for industrial and agricultural goods¹, 2012



1. Simple average MFN tariffs, specific duties in *ad valorem* equivalents included. Tariff rates for non-agricultural products do not include *ad valorem* duties.

Source: UNCTAD (2013), Trade Analysis Information System (TRAINS) and WTO (2015b), www.wto.org/english/res_e/publications_e/world_tariff_profiles15_e.htm.

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Other barriers to trade may exist in the form of non-tariff measures (NTMs), which are any policies or standards that may restrict trade. These may include sanitary and phytosanitary regulations that differ from production processes used by trading partners, different product standards (for example, railroad gauges sizes that differ or the use of right hand vs left hand drive cars), or outright import bans based on concerns about invasive plant pests or animal diseases. In the United States, imported agri-food products require import licences and are subject to quarantine and inspection in order to protect domestic agriculture from the entry of pests and diseases, and to protect endangered plant species (Chapter 4). Bilateral and multilateral trade agreements often include mutual recognition of agri-food standards.

The United States has negotiated a number of trade treaties with its partners, and these treaties generally have the goal of reducing barriers to trade, such as tariffs, TRQs, and non-tariff measures (NTMs). Agricultural trade barriers are often more difficult to negotiate than barriers in other sectors of the economy, as agricultural barriers govern sensitive goods like foodstuffs and complicated sanitary and phytosanitary regulations. The United States is currently evaluating the Trans-Pacific Partnership (TPP) agreement, a trade treaty proposed by a group of Pacific Rim countries, and is negotiating the Trans-Atlantic Trade and Investment Partnership (TTIP) agreement with the European Union. USDA and other analysis indicate that these agreements may lead to modest gains in overall agricultural trade.

The 2014 Farm Bill continues authorisation for several export assistance and development programmes administered by USDA's Foreign Agricultural Service (FAS). The Market Access Program, the Foreign Market Development Program, the Emerging Markets Program, and the Technical Assistance for Specialty Crops Program partner with US producers, exporters, private companies, and other trade organisations to finance activities promoting generic US agricultural commodities. Activities

include consumer promotions, market research, technical assistance, and trade servicing for agricultural products, as well as technical assistance to US exporters in addressing phytosanitary or other technical barriers that inhibit trade. FAS also administers the Export Credit Guarantee (GSM-102) programme that provides credit guarantees for financing of commercial exports of US agricultural products.

Several food security programmes provide for the donation of US agricultural commodities for feeding and to be sold to support agriculture and food-related development programmes. The McGovern–Dole International Food for Education and Child Nutrition Program provides for the donation of US agricultural commodities, as well as financial and technical assistance, to support school feeding and maternal and child nutrition projects. The Bill Emerson Humanitarian Trust makes funds available in crisis situations to purchase appropriate US commodities based on availability and specific needs. The Food for Progress Program donates US agricultural commodities to recipient countries to be sold on the local market, with proceeds used to support agricultural, economic or infrastructure development programmes. The Food for Peace Program, administered in conjunction with the US Agency for International Development, provides US commodities, as well as local and regionally procured foods, cash transfers and vouchers for emergency feeding and for use in supporting related food security development programmes.

Agricultural support level and composition

Level and composition of support to producers

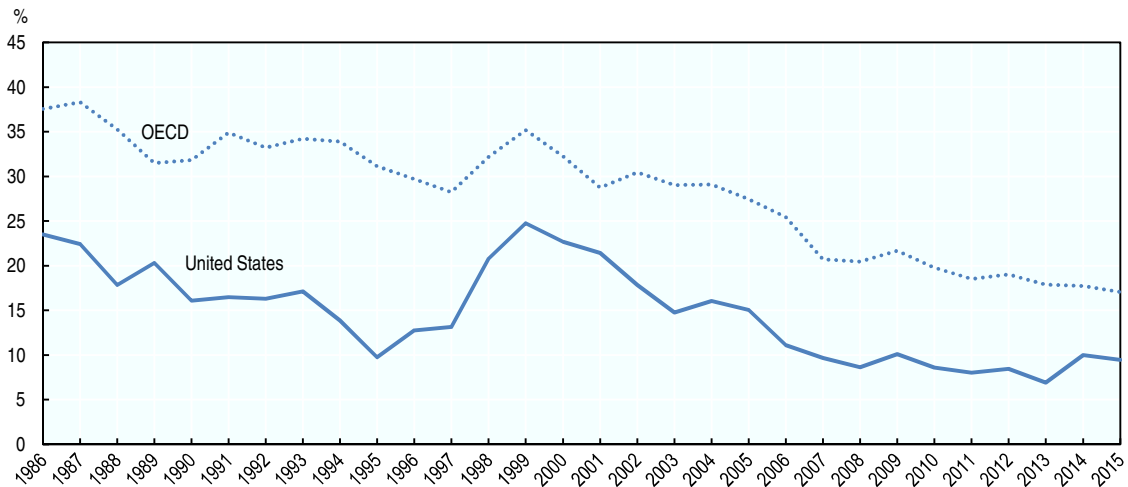
OECD indicators of support to agriculture offer a means of identifying the amount of support to producers and share of producer receipts provided by government policies (the Producer Support Estimate, or PSE, and the PSE as a percentage of gross farm receipts, or %PSE). The US %PSE has been consistently below the OECD average, peaking at 25% in 1999, when the OECD average was 35%, and falling steadily since then to a low 7% in 2013 and 9% in 2013-15, compared to the OECD average of 18% (Figure 6.12). As a number of US commodity programmes are countercyclical, years of high commodity prices result in lower levels of support, which accounts in part for the low %PSE levels since 2007 (Figure 6.13).

The PSE classifies policies providing transfers to producers on the basis of implementation criteria, which are recognised as having varied impacts on production, trade, income, and the environment. While the PSE categories do not measure the impacts of different policy types, they identify criteria generally considered to be of economic significance. Examining the composition of the PSE reveals the extent to which producers are supported through policies with the strongest influence on production incentives and thus most likely to distort markets, which include support based on commodity output and input use without constraints on agricultural practices.

US support to producers based on commodity outputs has fallen markedly over the last several decades, from a high of 16% of the value of agricultural production to a recent average of 1.5% (Figure 6.14). Output-based and input-based support accounted for an average of 48% of the US PSE in recent years (2013-15), compared with an OECD average of 60%. A growing share of input-based payments in the United States is tied to adoption of practices to reduce agri-environmental impacts, which are considered to be among payments less likely to distort markets. If those input payments are removed from the input-based support total, the share of potentially most trade distorting support falls to 31% of the US PSE, compared to 51% of the OECD average (Figure 6.15).

Figure 6.12. US Producer Support Estimate (PSE) compared to OECD average, 1986-2015

PSE as a percentage of gross farm receipts

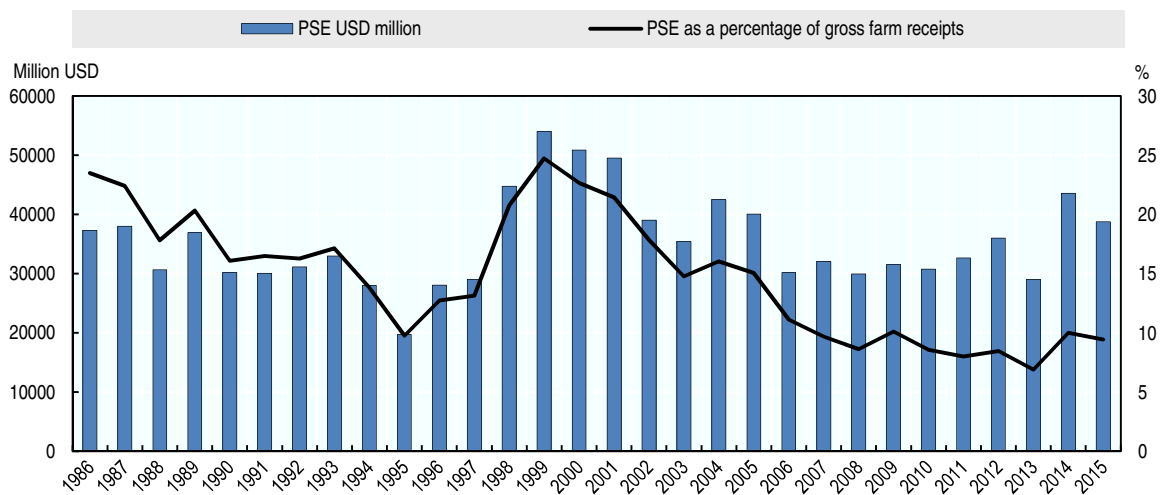


Source: OECD (2016a), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>.

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Figure 6.13. Variations in US Producer Support Estimate (PSE) over 1986-2015

In million USD and as a percentage of gross farm receipts



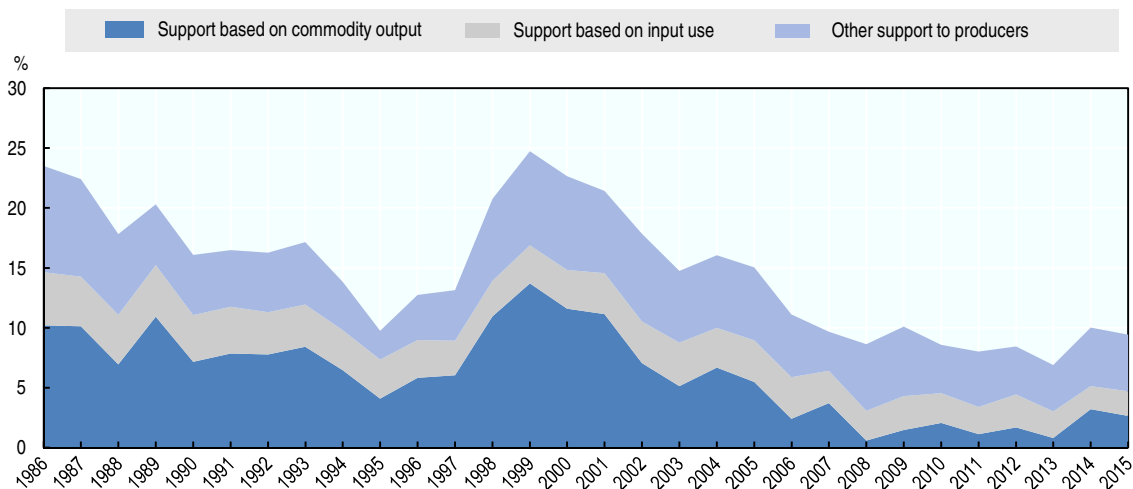
%PSE is the Producer Support Estimate (PSE) as a percentage of gross farm receipts.

Source: OECD (2016a), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>.

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Figure 6.14. Composition of support to US producers, 1986-2015

PSE as a percentage of gross farm receipts

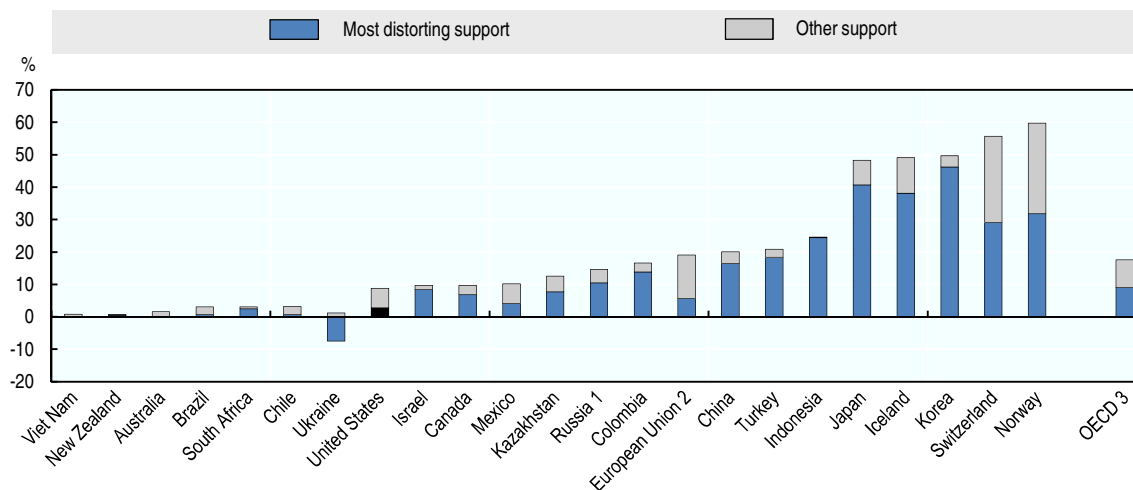


Source: OECD (2016a), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>.

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Figure 6.15. Composition of Producer Support Estimate by country, 2013-15

As a percentage of gross farm receipts



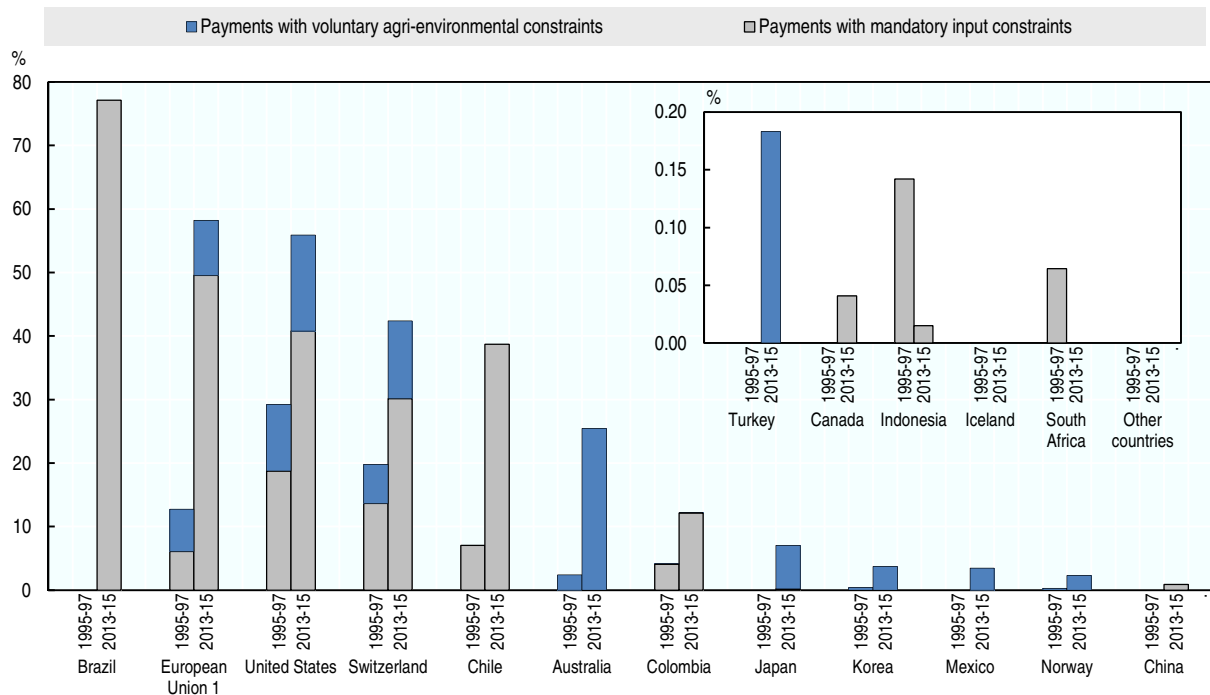
1. For Russia, 2013-15 is replaced by 2012-14.
2. EU27 for 2012-2013; and EU28 from 2014 when available.
3. The OECD total does not include the non-OECD EU member states.

Source: OECD (2016a), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>.

StatLink <http://dx.doi.org/10.1787/888933408870>

Figure 6.16. Support conditional on the adoption of environmentally friendly production practices, 1995-97 and 2013-15

As a percentage of total PSE



Countries are ranked according to 2013-15 levels.

1. EU15 for 1995-97; EU27 for 2012-13 and EU28 from 2015 when available.

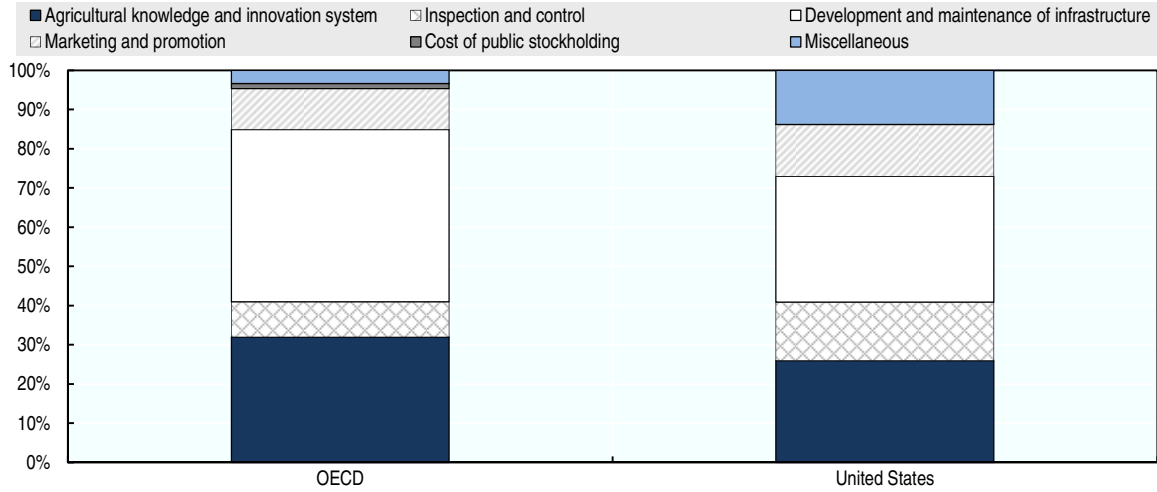
Source: OECD (2016a), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>.

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Support conditional on the adoption of environmentally-friendly production practices has increased as a share of total support to producers, reaching 56% in 2013-15, close to that in the European Union, and much higher than in other OECD countries. With the European Union and Switzerland, the United States is one of the countries that use both mandatory and voluntary programmes to incentivise environmentally-friendly production practices (Figure 6.16).

Support to producers based on policies that require the production of a specific commodity can also introduce distortions by encouraging producers to plant the supported commodities rather than other commodities that might be in more demand. OECD's single commodity transfer (SCT) indicator measures the share of producer support provided on the basis of production of a specific commodity.⁴ US SCT support has fallen from 16% of gross farm receipts in 1986-88 to 4% in 2013-15. However, the share of commodity-specific transfers in the gross farm receipts of each commodity varies across commodities. In 2013-15, sugar had the highest share, around 25%, with milk and cotton having shares higher than 10%. The US %SCT remains low compared to the overall OECD average, which was 10% for 2013-15. However, the SCT represented 43% of the total PSE in 2013-15, primarily as a result of premium subsidies under insurance programmes, which are commodity-specific, but also because of price support in the case of sugar, milk, beef and sheep meat. The average share is higher than in the European Union (28%), but lower than the OECD average of 53%.

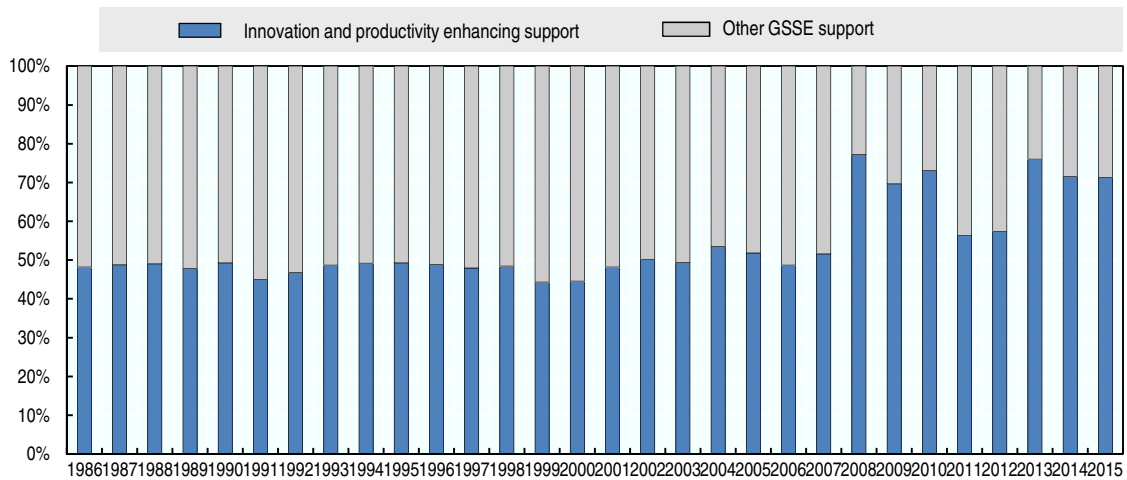
Figure 6.17. Composition of US GSSE compared with OECD average, 2013-15



Source: OECD (2016a), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>.

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Figure 6.18. Composition of US Estimate of Support to General Services, 1986-2015



Innovation and productivity enhancing support include agricultural knowledge systems, inspection and control, and infrastructure; other GSSE support includes marketing and promotion, public stockholding, and miscellaneous.

Source: OECD (2016a), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>.

StatLink <http://dx.doi.org/10.1787/888933408900>

Two other indicators reflect the share of producer receipts that result from market prices that are higher than they would be without domestic support and border policies. The Nominal Protection Coefficient (NPC) compares the prices received by domestic producers with unsupported, or world, prices (farm-level equivalent border prices), while the Nominal Assistance Coefficient (NAC) compares producer gross receipts with what they would be at unsupported, or world, prices (farm-level equivalent border prices). The closer the NPC is to 1.0, the closer prices received by farmers are to global prices, and the closer the NAC is to 1.0, the less farm receipts are supported by domestic policies. For 2013-15, the US NAC averaged 1.10 and the NPC 1.02, compared with the OECD average of 1.21 and 1.10 (OECD, 2016b). Most commodity prices are aligned with world prices, with the exception of sugar prices (25% higher in 2013-15, milk prices (11%), sheep meat prices (9%) and to a lesser extent beef prices (3%).

The General Services Support Estimate (GSSE), companion to the PSE's measure of support to individual producers, identifies support by government to the farm-level agriculture sector more generally. Much of this support works to enhance innovation and productivity, improving the long-term competitiveness of the sector by supporting agricultural knowledge and innovation systems, inspection and control systems, and infrastructure. The US GSSE has provided the largest share of GSSE support to the agricultural knowledge and transfer system in recent years — 26%, compared to support 15% for inspection and control, 32% for infrastructure development, and 13% for marketing and promotion on average for 2013-15 (Figure 6.18). The United States provided less than 1% of GSSE support for the cost of public stockholding. For the OECD as a whole, the average shares for 2013-15 were 32% for agricultural knowledge transfer, 9% for inspection and control, 44% for infrastructure development, 10% for marketing and promotion and 1% for stockholding (Figure 6.17).

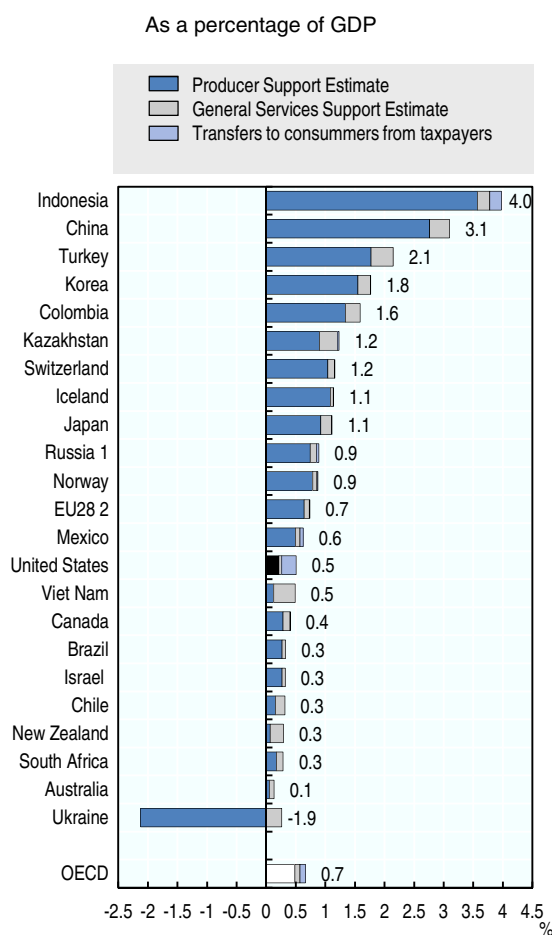
Agricultural knowledge and innovation, inspection and control, and infrastructure are services enhancing innovation and productivity in agriculture. Agricultural knowledge and innovation and some infrastructure can also improve sustainability. These services accounted for about half of GSSE expenditure until 2008 when their share increased significantly (Figure 6.19). It remains, however below the OECD average (Figure 6.19B) Moreover, the GSSE accounts for a relatively small share of total support to agriculture as shown in Figure 6.19A and discussed below.

Total support to agriculture is measured by the Total Support Estimate (TSE), which includes the PSE and GSSE already discussed above, as well as an estimate of transfers from taxpayers to consumers through consumer support policies, which may include support to first handlers of commodities as well as social assistance programmes that provide direct support for food purchases, which may enhance demand for agricultural commodities. US TSE represents 0.5% of GDP in 2013-15, compared to 0.7% in the European Union and the OECD average (Figure 6.19A). This means support to agriculture places a lower burden on the US economy than in these groups of countries.

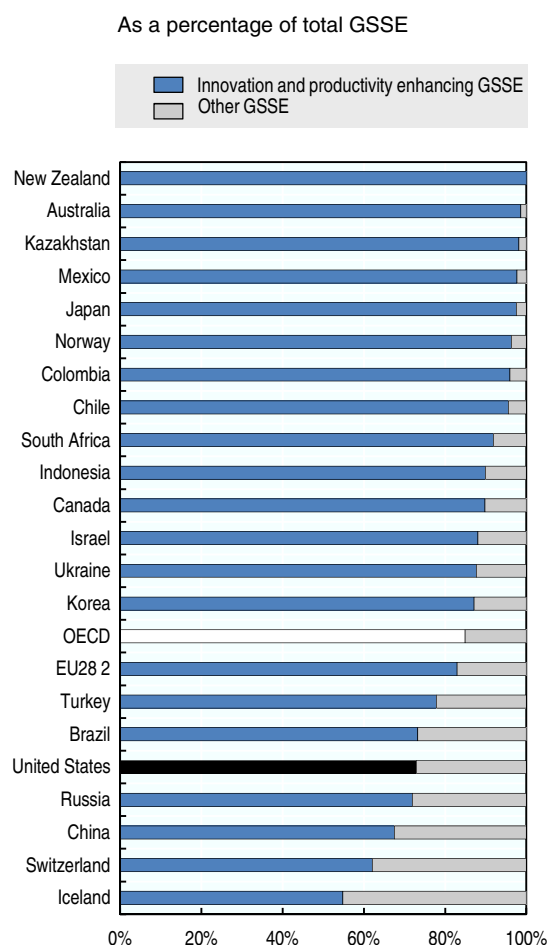
In the United States, the share of transfers from taxpayers to consumers in the TSE is unusually large — 48% compared to 14% on average in the OECD area in 2013-15, as a result of US domestic food assistance programmes, especially the Supplemental Nutrition Assistance Program (SNAP), which are reported in this category (Figure 6.19A). Conversely, the PSE is a smaller component of the TSE in the United States (43%) than in the OECD average (73%). The GSSE accounts for a modest share in both cases: 10% in the United States and 14% in the OECD area. In countries with a larger share of GSSE in the TSE such as Australia, Chile and New Zealand, this is associated with low PSE levels.

Figure 6.19. Total support to agriculture (TSE) and general services (GSSE) by country, 2013-15

A. Composition of total support to agriculture (TSE)



B. Share of innovation and productivity enhancing services in the GSSE



1. For Russia, 2013-15 is replaced by 2012-14.

2. EU27 for 2012-13 and EU28 from 2014 when available.

3. Innovation and productivity enhancing support include agricultural knowledge systems, inspection and control, and infrastructure; other GSSE support includes marketing and promotion, public stockholding, and miscellaneous.

Source: OECD (2016a), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-pcse-data-en>.

StatLink  <http://dx.doi.org/10.1787/888933408916>

Discussion of likely impact

Domestic agricultural and associated trade measures affect farm investments and practices through a variety of instruments, with different impacts on structural change, sustainability and innovation.

OECD analysis has shown that measures that distort input and output markets, such as border protection, supply controls, output-based payments and variable input subsidies, reduce producers' incentives to use production factors more productively (OECD, 2012). As such, they hinder structural adjustment and discourage producers for innovating to become more competitive. These distorting measures can maintain resources in the sector that would otherwise be reallocated to more productive uses; they can encourage more intensive production, sometimes on marginal or fragile land; and they

can encourage production practises that do not always take adequate consideration of longer term environmental sustainability.

Broad-based income support decoupled from commodity production is more effective in transferring income to producers and thus increasing their capacity to invest and innovate. It also leaves more flexibility to producers to undertake new activities and switch to new products. However, even if decoupled from production choices and targeted, income support slows structural adjustment needed to facilitate economies of scale, attract new entrants and thus foster innovation and productivity growth. If conditional on the adoption of environmentally-friendly practices, this support can improve sustainable resource use.

Agricultural measures that support innovation directly are likely to create stronger incentives and capacity for innovation among agricultural producers and will help structural change. Similarly, agri-environmental payments that target explicitly the desired environmental outcome would steer farmers towards innovative sustainable practices more effectively (OECD, 2015).

US farm policies may affect farm structure, innovation, and resource use, but overall impacts are difficult to measure, not only because of changes in policy designs, but also because market and other factors also affect farmers' behaviour. Structural change has been ongoing in the United States since the 19th century at least, resulting first from land availability through westward expansion and later from productivity growth and non-farm economic opportunities that attracted labour away from farming (Dimitri et al., 2005). Farm consolidation and productivity growth accelerated in the mid-20th century at about the same time that US price support programmes began, leading some to argue that policy supported structural change and productivity growth. However, research suggests that policies have been secondary to the impacts of science on innovations that spurred each (Gardner, 2002).

Agricultural policy places few restrictions on structural adjustment in farming, with some exceptions: Marketing orders apply for a number of commodities, notably milk, and some fruits and vegetable: Ten retain volume control options, but only one has had active volume controls in recent years (Box 4.1). Sugar marketing allotments place limits on production, which have not been binding in recent years. Supply controls were more widely applied in the past. Federal peanut and tobacco programmes relied on marketing quotas to regulate production and to support prices paid to producers. The transfer of the rights among farmers was restricted to narrow geographic areas, and after the programmes were terminated in the early 2000s, production shifted rapidly to different geographic areas and consolidated onto larger farms (Box 4.1).

NPCs show that sugar and milk policies still raise domestic prices above world level (by 18% for milk and 78% for sugar in 2015, a year characterised by lower world prices). These distorting measures can maintain resources in less productive areas, as shown in the case of peanuts and tobacco. As they distort incentives across commodities, they also maintain resources in supported commodity sectors, as does all commodity-specific support.

Direct income support programmes have evolved historically to reduce the effects of programmes on markets, by linking a larger share of support to historical rather than current parameters. At the same time, crop insurance programmes have offered more coverage options to producers to take account of diverse risk exposure and behaviour.

As most support is linked to planted or historical area, a greater share of farm programme benefits accrues to larger producers who farm more land (White and Hoppe, 2012; MacDonald et al., 2013). Since most cropland is rented, especially on larger farms, payments based on land are capitalised into land values, leading to a shift of benefits from farm operators to landowners.

Some research has investigated the impact of broad-based commodity support on farm consolidation. Cropland consolidation, summarised at the national level in Table 2.3, has proceeded more rapidly in those US counties with higher levels of commodity programme support, measured in terms of average payments per cropland acre in the county (Key and Roberts, 2007). Farms in those counties have also been less likely to exit farming than farms in other counties. However, counties with

high levels of payments also have large, relatively flat, and contiguous fields where the labour-saving mechanical and chemical technologies on the last 40 years have been most effective (MacDonald et al., 2013). In addition, consolidation has also proceeded rapidly in livestock and in specialty crop commodities, which receive no support under commodity programs (Table 2.3). At the least, research has so far not successfully identified impacts of commodity policies separate from the impacts of labour-saving innovations on consolidation.

Policy measures that reduce income variability may have encouraged risk-averse farmers to innovate in response to market incentives, as incomplete risk markets are expected to prevent them from making optimal decisions. Conversely, these measures may crowd-out prevention efforts, which may include innovation (e.g. drought-resistant seeds). The net effect would be difficult or impossible to assess, all the more because attitudes to risk vary among farmers.

Programme benefits may have provided resources for adopting new technologies,⁵ but not necessarily to those who needed assistance to invest, as payments are not linked to income needs (OECD, 2003). It would be difficult to assess the share of investment in new technologies that would not have occurred in the absence of policies. Moreover, programme benefits may not have been used to invest in the farm business, and some may have even left the sector.⁶ US data on investment by farmers receiving decoupled payments (Production Flexibility Contracts) over 1996-2001 show no evidence of higher rates of on-farm investment or capital replacement compared to farmers, who did not participate in the programme (Burfisher and Hopkins, 2003). Further research found that US decoupled payments have increased household wealth, but have led to no or very modest changes in farm operating decisions (Goodwin and Mishra, 2006; Weber and Key, 2014 and 2015). It seems thus that they had negligible effects on the adoption of innovations or farm productivity.

Historically, US farmers have readily adopted new technologies, both to improve yields and to reduce costs and dependence on often scarce farm labour (Wang et al., 2015). These developments have occurred alongside a variety of types of producer support — from market price supports, to target price/deficiency payments that separated assistance from market prices, to decoupled income support that made assistance independent of production decisions, and to crop insurance programmes that tailor support to farm-level losses and producer risk preferences. Besides possible income and risk effects, perhaps key to this continuing openness to innovation and the high productivity achievements has been the very low barriers to expanding production in response to market signals. While programmes included acreage reduction provisions until 1996, producers have continually retained the freedom to increase yields and alter input choices on active acreage without affecting commodity or income support levels.

Government support may also have facilitated further expansion of farm operations. US evidence shows that cropland consolidation has proceeded more rapidly in those counties with higher levels of government commodity programme payments per acre (Key and Roberts, 2007). However, consolidation has proceeded rapidly in livestock and specialty crop commodities that receive no support, and counties with high levels of payments also have large, relatively flat, and contiguous fields where labour-saving technologies are best placed (MacDonald et al., 2013).

The impacts of farm programmes on resource use are mixed, affecting both extensive (expansion or reduction of cultivated land) and intensive margins (input use intensity); and these impacts themselves likely interact through price effects. From a historical perspective, soil conservation provisions have been an integral part of US farm programmes since they began in the 1930s. On the other hand, unrestricted production intensification —through adoption of new technologies—have frequently included expanded use of resources, especially of manufactured inputs and energy.

Crop insurance programmes may have specific environmental impacts through their effects on input use (e.g. fertilisers and chemicals), crop acreage, and decisions to expand cultivation to marginal land. In particular, crop insurance subsidies, by reducing the cost of the risk born by farmers, may in principle increase the incentive to adopt risky practices, such as monoculture or high risk crop varieties. Several studies conducted in the United States tend to confirm the existence of such effects, although

they suggest their magnitude may be small (Horowitz and Lichtenberg, 1993; Smith and Baquet, 1996; Wu, 1999; Goodwin et al., 2004; O’Donoghue et al., 2009; Walters et al., 2012; Claassen et al., 2015; Weber et al., 2015). Implementation provisions of crop insurance programmes may influence production practices through control of moral hazard and claims verification and by reducing insurance costs through reinsurance and reimbursement of administrative and operating expenses for providers. These potential influences are difficult to include in assessments, complicating interpretation of the effects of crop insurance programmes.

The development of cross-compliance and voluntary conservation programmes has partly contributed to reduce soil erosion and environmental impacts of agriculture since the 1980s.⁷ There exists quantitative evidence that both cross-compliance and voluntary conservation programmes have indeed encouraged the adoption of environmentally-friendly practices, although several other explanatory factors have also been pointed such as technology, information and markets (Claassen et al., 2004; Claassen et al., 2014).

Cross-compliance mechanisms have partly contributed to reduce soil erosion since the 1980s by encouraging farmers to use less erosive cropping practices (e.g. conservation tillage, conservation crop rotations) and to retire particularly erosive land (CRP). Cropland soil erosion declined by 40% between 1982 and 1997 (Figure 2.15), and it is estimated 25% of this decline is directly attributable to cross-compliance incentives (Claassen et al., 2004). Erosion reduction on land subject to cross-compliance erosion mitigation requirements (28% of all cropland) accounted for more than 50% of the soil erosion reduction on land that was continuously cropped during that period (i.e., not entered into CRP or otherwise removed from crop production) (Claassen et al., 2004).⁸

Voluntary conservation programmes have encouraged farmers to adopt more environmentally-friendly practices, and address a broader set of environmental objectives. Analysis of conservation practices added by farms participating in voluntary conservation programmes indicated probabilities of around 80% that these producers would not otherwise have adopted conservation structures and buffer practices. However, additionality is closer to 50% for conservation tillage and there is less clear evidence regarding adoption of nutrient management plans and their practical implementations (Claassen et al., 2014). Conservation programmes not only address soil erosion but also manure management and nutrient runoff, air quality, wildlife habitat, and preservation and restoration of wetlands, grasslands, and riparian buffers.

Despite these encouraging results, there are still several issues and challenges regarding the design and performance of agri-environmental programmes: 1) There exists evidence that sustainability performances could be further improved, in particular in terms water use, and pollution, and that market mechanisms, regulations and incentives used to promote more sustainable use of resources have not solved acute local problems; 2) Additionality of conservation programmes may be lower for certain practices; 3) Conservation programmes, by increasing profitability of farming, may have indirect land-use and input use effects, which can in turn worsen environmental performances — the so-called “slippage effect” (Wu, 2000; Roberts and Bucholz, 2005; Lichtenberg and Smith-Ramirez, 2011; Fleming, 2014; Uchida, 2014; Lichtenberg, 2014); 4) Targeting and tailoring mechanisms such as the Environmental Benefit Index could be further refined and expanded; and 5) research continues to suggest that commodity and crop insurance programmes encourage crop production on a small but measurable amount of land that would otherwise not be used for crop production (Claassen et al., 2011).

Summary

- Agricultural legislation (Farm Bill) includes programmes related to commodity support, conservation, trade, nutrition (domestic food assistance), agricultural credit, rural development, research and extension, energy, specialty crops, and crop insurance. It is established for five years, but can be extended.

- The largest and growing share government expenditure under the Farm Bill supports nutrition programmes, which are projected to receive 80% of projected outlays over 2014-18 (2014 Farm Bill).
- Commodity programmes fall into three broad categories: market price support, direct income support, and risk management. Since the reform of dairy policies in 2014, sugar is the only market price support programme remaining. Sugar price support is maintained through a system of marketing allotments, nonrecourse loans, and tariff-rate quotas on imports.
- Direct income support includes both benefits based on output and payments based on historical production parameters. They are designed to reduce farm revenue annual variability by offering payments when prices or revenues based on historical production parameters fall below the minimum coverage. Risk management programmes include crop yield or revenue insurance schemes, where government subsidises premiums and reinsures private insurance providers. Direct income support programmes have evolved historically to reduce the effects of programmes on markets, by linking a larger share of support to historical rather than current parameters. Over the same period, crop insurance programmes have offered more coverage options to producers to take account of diverse risk exposure and behaviour.
- Marketing orders remain for milk and more than 20 fruits and vegetable, but marketing allotments that limit marketing volumes have not been used in recent years, except for one product.
- Agri-environmental incentives include mandatory conservation compliance for participants in most farm programmes, and voluntary programmes that include both land retirement and the adoption of land preservation and environmentally-friendly production practices on working land. Producers may receive technical assistance to implement conservation practices. Innovation grants are also available to fund innovative projects as part of one programme (EQIP)
- Agri-environmental programmes originally focused on soil quality and water quality and conservation. These objectives have expanded to include wildlife habitat, air quality, carbon sequestration, energy conservation, and preserving farm and ranch lands. At the same time, programmes have become increasingly focused on working lands and away from land retirement, although targeted land retirement remains an important programme component. Conservation spending on working land are planned to rise above 50% of all conservation spending over 2014-18. These programmes have encouraged farmers to adopt more environmentally-friendly practices, but there remains room for improving policy design and environmental performances in this area.
- As part of federal efforts to prepare for adaptation to climate change, each federal agency is required to develop a specific plan addressing the challenge of climate change adaptation in the frame of its goals and activities. USDA reviewed climate change impacts on agriculture, and analysed adaptation and policy responses in this area. It also launched seven Regional Climate Hubs, which are expected to help farmers in their choices for adapting to climate change.
- Bioenergy programmes are designed to provide incentives for research, development and adoption of renewable energy, including solar, wind, and anaerobic digesters, but primarily biofuels. Programmes provide assistance for research and development of advanced biofuel feedstocks, conversion of energy systems to use alternative feedstocks, and assistance to producers to establish and maintain production of non-commodity biomass feedstocks and biobased products, using establishment and annual payments, and investment loans and grants depending on the programme. Assistance to developing and expanding markets for biobased products include mandatory biobased supplies and services procurement, and mandates for blending biofuels, as well as loan guarantee for biobased production facilities and tax credit for biodiesel blenders.

- Agricultural tariffs are slightly above the average for non-agricultural products but more than three-quarters of applied tariffs are under 5%. Higher tariffs (between 10 and 20%) apply to dairy products, sugar and confectionary products and beverages and tobacco, and tariff rate quotas for certain products in these categories, and for animal feed and certain fruits, impose much higher tariffs for quantities above the import quota.
- Non-tariff measures include import licencing and quarantine and inspection of imported agri-food products, aiming to protect domestic agriculture from the entry of pests and diseases, and to protect endangered plant species.
- Several trade assistance and development programmes fund export promotion, market research, technical assistance (including to manage sanitary and phytosanitary requirements in other countries) and trade services, and credit guarantee is available for financing commercial exports of US agri-food products. In addition, several food security programmes provide for the donation of US agricultural commodities. The share of US agri-food trade exported under these programmes has significantly declined since 1995.
- Close to half of total support to agriculture as measured by the OECD's Total Support Estimate accrues to consumers via Farm Bill nutrition programmes, which are hardly linked to farm productivity and sustainability performance.
- Support to agricultural producers accounts for over 40%, while support to general services such as research, education and extension, inspection, agriculture-related infrastructure and promotion of agricultural products account for about 10% of the total. Among general services, those enhancing innovation and productivity account for about three-quarters of the total.
- Support to producers varies over time, reflecting the counter-cyclical nature of US programmes, but it consistently accounts for a lower share of gross farm receipts than the OECD average. Most of US support is conditional on the adoption of conservation practices and over 40% is commodity-specific.

Notes

1. Ethanol plants in operation or under construction by the end of 2007 are not required to meet the 20% reduction requirement.
2. In the 2014-16 Final Rule, the biomass-based diesel mandate was raised to 1.63 billion gallons for 2014, 1.73 billion gallons for 2015, 1.90 billion gallons for 2016, and 2.0 billion gallons for 2018. While the mandate in 2022 could be lower than it is currently, that seems unlikely.
3. Tariffs rates are simple averages across tariff lines.
4. The SCT measures support for wheat, barley, maize, sorghum, alfalfa, cotton, rice, soybeans, refined sugar, milk, beef and veal, pigmeat, poultry meat, sheepmeat, eggs, and wool.
5. OECD work on decoupling (OECD, 2006) suggests that agricultural support that raises and stabilise income affects investment. More decoupled payments were found to have more impact on investment than price, mainly through risk-reduction, but the relative impact of different types of measures on investment is difficult to assess.
6. USDA data on Farm Household Income and Characteristics show that, on average, US principal farm operator household hold significant non-farm assets. Non-farm net worth has increased faster than farm net worth between 2010 and 2014, and accounted for over 40% of US principal farm operator household total net worth in 2014.

7. The HELC provisions and the CRP were enacted in 1985. The CRP began enrolling land in 1986 and reached full enrolment by the early 1990s. Although CRP did not focus exclusively on reducing soil erosion, a great deal of erosion-prone cropland was enrolled. By 1995, HELC required the application of an approved soil conservation system on “highly erodible” cropland as a condition of continued eligibility for most Federal agriculture-related benefits.
8. Roughly 30% of US cropland is defined as “highly erodible” for wind or rainfall erosion based on soil, topography, and climatic conditions. A large majority of this land (roughly 85%) is located on farms that receive some type of payment that could be denied under HELC (Claassen et al., 2004). Claassen et al. (2004) estimate that 56% of that reduction occurred on land that was subject to HELC or retired from crop production through CRP enrolment. Another 11% was due to the overall net reduction in cropland area (other than through CRP enrolment). The remaining erosion reduction (33%) occurred on cropland not subject to HELC but continued in crop production.

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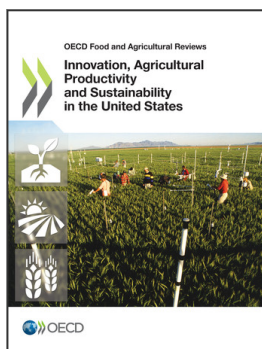
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