



LOOKING BACK, MOVING FORWARD: A SUMMARY OF OECD WORK SINCE THE 2016 AGRICULTURE MINISTERS MEETING

Highlights

In 2016, 46 Ministers of Agriculture from OECD and partner countries adopted the Declaration on Better Policies to Achieve a Productive, Sustainable and Resilient Global Food System. This Declaration invited the OECD to accelerate efforts to build evidence-based policy mixes to achieve shared goals:

- To provide all consumers with reliable access to safe, healthy and nutritious food.
- To enable producers everywhere, big and small, male and female, to operate in an open and transparent global trading system and to seize available market opportunities to improve their standards of living.
- To contribute to sustainable productivity and resource use, solutions to climate change, resilience in the face of risk, and the provision of public goods and ecosystem services.
- To contribute to inclusive growth, and development, within and across countries.

Over the past six years, OECD research has been guided by the vision articulated in the 2016 Declaration. The OECD has developed work programmes focusing on these themes, including by investing in measurement, monitoring and analysis that can enhance the ability of policy makers to take informed, concrete actions. The OECD is an established thought leader with respect to sustainable agricultural productivity growth and is well placed to support members in their efforts to ensure that the food and agriculture sector contributes to sustainable solutions to pressing global challenges, including food security and climate change. This Stocktaking report summarises how work in the OECD Committee for Agriculture has delivered on the mandates expressed by Ministers in 2016 (outlined in the eight priorities from 2016 listed below) and highlights the advances made in order to inform the future work agenda.

In 2016, Ministers emphasised that the well-established work on agriculture policy monitoring and market outlook (which are considered international references and provide data underpinning many other OECD reports) should remain a high priority and be complemented by advice tailored to specific countries. Consistent with their status as flagships, OECD has continued to invest in the OECD Agricultural Policy Monitoring and Evaluation report and the OECD-FAO Agricultural Outlook. Moreover, both publications have evolved to take into account a broader perspective on agriculture's contribution to well-being. Both reports now provide greater consideration of environmental and wider socio-economic impacts, such as effects on food security and environmental outcomes.

Ministers also agreed in 2016, to a set of eight priorities for OECD's urgent attention in several key market and policy areas:

1. *Comprehensive and consistent policy packages that target development of productive, sustainable and resilient food systems, capable of delivering food security for all, reflecting the needs of countries at different stages of development and with different resource endowments, encompassing economy-wide measures as well as measures specific to the agriculture and food sector.*
2. *Innovation policies and systems that include basic and applied scientific research & development; technology adaptation, transfer and adoption; public-private partnerships; intellectual property rights; and education, skills, and advisory & extension services; institutional change.*
3. *Integrated policies which improve agricultural productivity to foster sustainable use of water, land, forest, energy, soil and biodiversity resources, to promote improved economic and environmental performance and preservation of ecosystems, as well as to enable effective climate change adaptation and mitigation.*

4. *Risk management policies to enhance both individual and sector-wide resilience, with an appropriate balance between private, market and public actions.*
5. *Policies to promote the development of well-functioning, competitive, and transparent food systems and responsible business conduct, along the food chain.*
6. *Policies to promote human, animal, and plant health throughout the food supply chain.*
7. *Trade and domestic policies that foster well-functioning and more integrated international and domestic markets, including through Global Value Chains, and that contribute to more widespread inclusive growth, sustainable development, and global food security.*
8. *Practical actions to foster increased international cooperation, in particular through regulatory cooperation, trade, investment, open data and knowledge and technology sharing*

An evolving international context

While responding to the Ministerial requests mentioned above, the work of the Committee for Agriculture has also adapted to an evolving international context. This includes a growing emphasis on the wider linkages between agriculture and other societal issues and policies, as well as dramatic developments caused by the COVID-19 pandemic and Russia's unprovoked large-scale aggression against Ukraine.

Food systems' performance is increasingly viewed in a wider context as non-agricultural policies also influence outcomes, reflecting a shift in emphasis from a narrower agricultural production focus to broader consumer and societal issues. The transformation of the agricultural sector can thus be accelerated by external drivers – such as innovation and enabling technological transformations such as digital and pressures from private sector initiatives to reduce GHG emissions or raise farming standards – and non-agricultural policies. Conversely, pressures for innovation and structural change can be counteracted by a lack of progress in structural reforms. Of importance too, the evolution of food systems in any country is impacted by global developments in trade, technology, and incomes.

The food and agriculture sector faces a “triple challenge” of providing food security and nutrition for a growing population; ensuring livelihoods for millions of people involved in farming and along the food chain and contributing to environmental sustainability. Achieving these goals, requires evidence-based investments in productivity, sustainability, and resilience and actions to build on synergies and manage trade-offs inherent in these complex systems. Agriculture is at the heart of potential policy solutions – as a guarantor of food security and provider of safe and nutritious food; as a source of livelihoods for more than 600 million farmers worldwide; and with the potential to contribute to the more sustainable use of land and water resources, to curb greenhouse gas (GHG) emissions and sequester carbon.

To assist policy makers with analysis about the evolving situation and impacts, the Committee for Agriculture reacted rapidly to two recent global crises: the COVID-19 pandemic and Russia's unprovoked large-scale aggression against Ukraine. In both cases the implications for the agro-food system, supply chains and trade were – and continue to be – significant and OECD work has been instrumental in informing policy responses. Both the [OECD-FAO Agricultural Outlook](#) and the [OECD Agricultural Policy Monitoring and Evaluation](#) reports have analysed these events and outlined the policy implications. In addition, specific studies and briefs on COVID-19 and Russia's war in Ukraine were undertaken, with particular focus on the policy implications of [transparency in market conditions and policies to avoid a global food crisis](#) and [rapid responses by policy makers](#) to ensure food security; as well as on specific topics such as COVID-19's impacts on [global seed markets](#) and [the impacts and policy implications of Russia's aggression against Ukraine on agricultural markets](#).

Each year (with the exception of 2020) the OECD Committee for Agriculture has convened the [Global Forum on Agriculture](#) (GFA) that brings together OECD and partner countries, as well as international experts, to share experiences and discuss key issues. Topics since 2016 have included: Integrating Global Goals for Sustainable Development, Climate Change and Trade (2016), Building Food Security and Managing Risks – A focus on South East Asia (2017), [Digital Technologies in Food and Agriculture](#) (2018), Policy Priorities for

the Global Food System (2019), and [Policies for a More Resilient Agro-Food Sector](#) (2021, held using a virtual format). In 2022, the theme of the GFA meeting is Enhancing Agriculture and Food Systems' Contribution to Climate Mitigation.

The OECD Committee for Agriculture has strengthened its partnerships and collaboration with other international organisations. Its long-established partnership with the FAO in co-producing the [OECD-FAO Agricultural Outlook](#) is complemented with co-operation in projects including the [Agricultural Market Information System \(AMIS\)](#), workshops and other events of mutual interest. The OECD engages with the World Bank, International Fund for Agricultural Development (IFAD), the United Nations World Food Program (WFP), the International Food Policy Research Institute (IFPRI), and regional development banks. It contributes to the World Trade Organization (WTO) through the provision of data and analysis of multiple issues, including domestic policy reforms, that can support ongoing multilateral trade negotiations. Multi-disciplinary work on human and animal health issues, in particular concerning antimicrobial resistance (AMR), is undertaken in collaboration with the World Health Organization (WHO) and the World Organisation for Animal Health (WOAH). The OECD's active involvement in the UN Food Systems Summit in 2021 contributed to international dialogues on making better policies for food systems. The Trade and Agriculture Directorate (TAD) works closely with the OECD Environment and Development Cooperation Directorates in providing input into other relevant international fora, addressing issues such as climate change, water, hunger, and development. TAD also maintains links with private sector organisations such as the International Dairy Federation, International Meat Secretariat, CropLife International, as well as consumer and environmental NGOs.

The remainder of this stocktaking report highlights OECD work under each of the eight priorities.

1. “Comprehensive and consistent policy packages that target development of productive, sustainable, and resilient food systems, capable of delivering food security for all, reflecting the needs of countries at different stages of development and with different resource endowments, encompassing economy-wide measures as well as measures specific to the agriculture and food sector”

The Committee has addressed the issue by developing an innovative policy framework able to guide policy makers in the design of comprehensive policy packages for the development of productive, sustainable and resilient food systems.

In 2020 the OECD published its revised [OECD Agro-Food Productivity-Sustainability-Resilience \(PSR\) Policy Framework](#), a tool to assess policies in a specific country and reorient them towards a more efficient and comprehensive approach. This is the reference OECD framework for monitoring, evaluating and assessing policy performance, and providing country-specific policy advice. The framework emphasises the importance of focusing agricultural policy on measures that strengthen the long-term productivity and sustainability of the sector.

The PSR framework has been successfully applied in the [in-depth country reviews for: Australia, Brazil, Canada, China, Estonia, Japan, Korea, Latvia, Netherlands, Norway, Sweden, Türkiye, the United States and Viet Nam.](#)

The revised PSR framework strengthened an approach based on indicators and evidence and incorporates resilience as main policy goal, while keeping a strong focus on innovation as the way forward to make progress simultaneously on productivity, sustainability and resilience. It has already been applied to [Policies for the Future of Farming and Food in Norway](#) and to the on-going country reviews on the European Union, the Netherlands and Spain. The framework is also being applied in the [Agricultural Policy Monitoring and Evaluation](#) reports.

Application of the framework requires systematically analysing the full range of policy incentives and disincentives at a country level. These policies were described in the 2019 synthesis report, [Innovation, Productivity and Sustainability in Food and Agriculture: Main Findings from Country Reviews and Policy Lessons](#).

Policies that support productivity, sustainability and resilience in food and agriculture are key requirements for meeting the “triple challenge” facing food systems described in a landmark study published in January 2021, [Making Better Policies for Food Systems](#). The report noted that coherent policies hold tremendous promise for making progress in meeting the triple challenge. This requires greater coordination of agriculture, health, and environmental policies and processes. In addition, the report highlighted frictions related to facts, interests, and values. Addressing these requires overcoming knowledge gaps and resistance from interest groups, while reflecting differing values across and within countries. OECD expertise places it in a leading position to advance this agenda. Follow-up work on [Overcoming Evidence Gaps in Food Systems](#) highlighted the constraint of gaps in data and evidence, while arguing that policy makers and researchers need to adopt a pragmatic approach, focusing on where good but incomplete evidence can make the biggest difference.

Diet and health issues are also increasingly relevant for discussions aimed at improving the performance of food systems. These issues are discussed in section 6 below.

The report “[Potential Impact of Dietary Changes on the Triple Challenge Facing Food Systems: Three Stylised Scenarios](#)” explores whether a shift towards healthier diets would have positive effects on supporting livelihoods for those working along the food supply chain and contributing to environmental sustainability. The report finds that aligning diets with World Health Organisation guidelines on sugar and fat consumption would have the expected positive effects on nutrition and food security and would also positively affect environmental sustainability. These dietary changes would, however, have an overall negative effect on livelihoods along the food value chain.

2. “Innovation policies and systems that include basic and applied scientific research and development; technology adaptation, transfer and adoption; public-private partnerships; intellectual property rights; and education, skills, and advisory and extension services; institutional change”

Improving productivity is a key requirement to ensure productive, sustainable, and resilient food systems. However, as highlighted in the latest [OECD-FAO Agricultural Outlook](#) and [Agricultural Policy Monitoring and Evaluation](#) annual flagship reports, agricultural productivity will need to increase at triple the rate recorded during the last decade to meet the UN Sustainable Development Goal to reach zero hunger by 2030 and meet the Paris Agreement reductions in greenhouse gas emissions. Nevertheless, only 13% of the USD 817 billion of annual government support in 2019-21 is targeted to investment to underpin a more productive, sustainable, and resilient food system, a share which has moreover fallen over time.

OECD work has explored in depth how policy makers can create more effective innovation systems using tools such as digitalisation in agriculture.

Innovation systems

Enhancing productivity depends on a range of interacting factors including technologies, education and information, cooperative and legal structures, and institutions, within a framework of appropriate incentives. The main findings and policy lessons gained from the country reviews are provided in [Innovation, Productivity and Sustainability in Food and Agriculture: Main Findings from Country Reviews and Policy Lessons](#) (mentioned above), which points out that well-functioning markets within a stable regulatory and policy environment are key to improving the productivity and sustainability of the food and agriculture sector. Improving the policy environment would require rolling back policies that significantly distort markets, retain farmers in uncompetitive and low-income activities, harm the environment, stifle innovation, slow structural and generational change, and weaken resilience. Instead, policy should focus on measures that facilitate the uptake of technologies and practices that use resources more efficiently and sustainably and contribute to reducing

greenhouse gas emissions. In addition, more collaborative approaches, more effective governance systems, the development of long-term strategies, strengthened linkages between national and international actors, and comprehensive and coherent evaluation procedures are needed. Public funding of food and agricultural research is also crucial, and private efforts need to be strengthened, including through public-private partnerships. Moreover, improving overall policy coherence would contribute to building trust, and increase policy effectiveness.

Digitalisation

Digital technologies provide an opportunity to re-think the way policies and regulations are made. This may create new roles for governments in facilitating digital infrastructure, or it may reduce government involvement if technology reduces information asymmetries and transaction costs. But digital technologies also raise questions about privacy, interoperability, and potential liability issues, all of which will need careful consideration. Reaping the benefits of digital technologies in agriculture requires the participation and co-operation of farmers, other stakeholders, and government.

Drawing on illustrative case studies and new data gathered via an OECD questionnaire on agri-environmental policy, [Digital Opportunities for Better Agricultural Policies](#) explored opportunities to improve agricultural and agri-environmental policies, and to deliver new, digitally enabled and information-rich policy approaches. Governments could support the digital transition of the sector to improve effectiveness of existing policies by enabling policy measures that are more results-based, more collaborative, or less compliance-driven; and by addressing challenges to the adoption of digital technologies. A key requirement is to ensure access (connectivity) to services and data flows. Digitalisation of the agriculture sector should be coherent with the broader regulatory and policy environment underpinning the overall digitalisation of agriculture.

The 2022 report [The Digitalisation of Agriculture: A Literature Review and Emerging Policy Issues](#) provided evidence on the adoption and impacts of digital agriculture in OECD countries indicating broad use of digital technologies in row crop farms, but less uptake for livestock and speciality crops. Common barriers to adoption include costs, relevance, and limited experiences, user-friendliness, high operator skill requirements, mistrust of algorithms, and technological risk. Governments can ensure better information about costs and benefits of various technologies, facilitating data-sharing to spur inclusive, and secure data ecosystems and competitive markets.

The lack of trust in new technologies is found to be an important constraint to farmers' adoption of digital technologies. The issues note [Policies to Bolster Trust in Agricultural Digitalisation](#) discusses how governments can help through strengthening public sector extension services and farmers' technological learning; facilitating the development of risk-sharing arrangements between technology providers and farmers; and exploring ways to promote the standardisation of certification of digital agricultural technologies.

Agricultural data and their use for better decision-making and innovation are at the core of the digital transformation of agriculture, as discussed in the report [Issues Around Data Governance in the Digital Transformation of Agriculture: The Farmers' Perspective](#). But fragmented and unclear data governance arrangements may weaken farmers' willingness to adopt digital solutions. Fostering greater trust among farmers on access, sharing and use of agricultural data is essential.

The role of digital technologies is not limited to the agricultural sector, however [Digital Opportunities for Demand-Side Policies to Improve Consumer Health and the Sustainability of Food Systems](#) demonstrates how digital tools and technologies can assist governments to improve consumer health and the sustainability of food systems by encouraging consumers to buy healthy and nutritious foods produced through sustainable farming practices, as well as to reduce asymmetries of food labelling schemes. More effective food data collection systems can inform policy decisions, including combining commercial sales information with national dietary intake survey data. Given the diverse approaches to adopting digital tools, there is scope for cross-country learning. While these tools offer useful mechanisms for advancing policy objectives, they need to be carefully designed to maximise their effectiveness. Work by the Committee for Agriculture has also investigated the role of digital technologies in agricultural trade; this is discussed in more detail in Section 7.

3. “Integrated policies which improve agricultural productivity to foster sustainable use of water, land, forest, energy, soil and biodiversity resources, to promote improved economic and environmental performance and preservation of ecosystems, as well as to enable effective climate change adaptation and mitigation”

Measuring and monitoring sustainable productivity growth and the environmental performance of agriculture

Assessing improvements in sustainable agricultural productivity is challenging. The first challenge is to measure agricultural productivity performance accurately for international comparisons. The second challenge is accounting for the sector's use of natural resources and its environmental performance. Building on the collaboration with two international expert networks, the OECD has produced pathbreaking work towards the development of an international measure for sustainable agricultural productivity growth.

Measuring sustainable productivity growth

Traditional productivity measures do not capture the environmental impacts of agriculture and may hence give a misleading image. Work by the OECD has investigated whether and how productivity measures can be modified or complemented to better measure sustainable productivity growth. The report [Agricultural Total Factor Productivity and the Environment: A Guide to Emerging Best Practices in Measurement](#) presents the state-of-the-art measurement of sustainable productivity of the agricultural sector, analysing sources of growth in a reliable and comparable manner across countries. It draws on the contributions from members of the [OECD Network on Agricultural Total Factor Productivity \(TFP\) and the Environment](#) that brings together relevant experts from academia and national statistical agencies. The report makes recommendations on how to improve the traditional calculation of TFP based on market prices inputs and outputs, proposing harmonised methods on capital measurement, land pricing, output aggregation and quality adjustment; and how to account for environmental outcomes, considering a reduction in pollution or emissions as a productivity gain, but increased use of natural capital as a productivity loss. It recommends pursuing three complementary avenues: (i) investing in improving TFP methodologies and data and in the estimation of “shadow prices” for non-market inputs and outputs; (ii) continuing expansion to include environmental outcomes; (iii) and mapping traditional TFP with other indicators of agri-environmental performance.

Evidence at the farm level of the productivity and sustainability performance of different types of farms is also the focus of the work by the [OECD Farm Level Analysis Network](#) and reports like [Drivers of Farm Performance: Empirical Country Case Studies](#) and [Dynamics of Farm Performance and Policy Impacts](#). A key finding is that policy changes increasing the decoupling of payments have a positive impact on productivity. Furthermore, with the right incentives, productivity growth can be more locally sustainable insofar as farms can produce more output with less inputs that harm the environment.

Agri-environmental indicators

Agriculture has significant impacts on the environment. While negative impacts include pollution and degradation of soil, water, and air, agriculture can also sequester greenhouse gases within crops and soils or mitigate flood risks through appropriate farming practices.

Over several decades, the OECD has developed methodologies that allow consistent and comparable measurement of key environmental outcomes in the agricultural sector.

The [agri-environmental indicators \(AIE\) database](#) brings together data from 1990 to the present on 62 indicators (classified into 11 broad themes) for all OECD countries, Argentina, Brazil, Bulgaria, China, Colombia, Costa Rica, Croatia, Cyprus¹, Indonesia, India, Kazakhstan, Malta, the Philippines, Romania, Russian Federation, South Africa, Ukraine and Viet Nam. The AIEs can be used to monitor environmental performance at the country level.

The latest report, [Measuring the Environmental Performance of Agriculture Across OECD Countries](#), contains updated agri-environmental indicators which provide a snapshot of the current state and trends of environmental conditions in agriculture. These indicators help identify where policy responses are required and highlight where new environmental challenges are emerging. They also allow comparing trends in performance across time and between countries and help project future trends. This can assist policy makers in meeting environmental targets, and in monitoring and evaluating policies. Covering OECD countries over the period 1990-2018, the data show that, while most OECD countries increased their agricultural production in the last decade, the environmental performance of the agriculture sector registered mixed results. Progress was achieved in reducing emissions of phosphorus, ammonia, and nitrogen into the environment, and in lowering greenhouse gas (GHG) emissions intensities, but not in reducing overall GHG emissions and improving biodiversity.

Policies for environmental sustainability

The agriculture and food sector needs to address the challenges of climate change, enhance biodiversity and improve the sustainable use of land and water resources, without impeding on other food system challenges. Towards this aim, the Committee for Agriculture has conducted work to monitor and evaluate the environmental impact of existing policies, including climate mitigation commitments and targets to achieve the Paris Agreement. It analysed policy alternatives to improve agriculture's environmental performance, including those aiming to improve water use under increasing water stress, in coherence with the OECD Council Water Recommendation. Lastly, it has also discussed emerging policy issues, such as policies to facilitate soil carbon sequestration.

Agri-environmental policy design

To help countries improve the sustainability of agriculture, the OECD has made recommendations on cost-effective agri-environmental policies, how to preserve biodiversity and manage ecosystem services related to agriculture, and on addressing possible misalignments between agriculture and agri-environmental policies. This work contributes to informing countries' agriculture-specific commitments under the Paris process and their water policy development – policy priorities.

The report [Characterising Agri-Environmental Policies: Towards Measuring Their Progress](#) proposes a taxonomy of policy design features for agri-environmental payment schemes, with a focus on those features that are conducive to policy cost-effectiveness. An application of the taxonomy to all agri-environmental payment schemes in Argentina, Australia, Estonia, Finland, Korea, and Portugal reveals that more than 70% of 85 agri-environmental payment schemes have some of these key design features, including establishment of baselines; rates based on estimated or actual implementation costs; inspections and penalties; contract flexibility; and technical assistance. However, at least 80% of the schemes could be improved, including by using of cost-effectiveness criteria for selecting recipients; moving from supporting the adoption of specific practices to focusing on achievement of environmental outcomes; more regular policy evaluations; and comprehensive collection of information on policy characteristics.

Several reports investigated the environmental impact of agricultural policies. A first report, [Impacts of Agricultural Policies on Productivity and Sustainability Performance in Agriculture: A Literature Review](#), assessed the impacts of agricultural policies on environmental sustainability and productivity based on a review of more than 160 studies. Another report, [Economic and Environmental Sustainability Performance of Environmental Policies in Agriculture](#), reviewed the evidence on the effects of environmental policies on innovation, structural adjustment, productivity and sustainability in agriculture, covering around 260 studies. These literature reviews were complemented with model-based analysis. In the study [Evaluating the Environmental Impact of Agricultural Policies](#), the authors analyse the relationship between agricultural support policies and a selection of environmental impacts in a range of country settings, using a farm-level and a market-level model. Based on the methods and environmental indicators used, market price support and payments based on unconstrained variable input use were the most environmentally harmful among the various support (PSE) measures. Decoupled support payments based on non-current crop area were the least harmful,

even when considering their impacts on the behaviour of risk averse farmers. The impacts of measures that clearly change the competitiveness of one production activity in relation to another, such as payments based on current crop area or on animal numbers, were less clear. Support payments subject to environmental constraints can improve environmental outcomes compared to coupled support without restrictions but can have unintended environmental impacts.

Climate change and agriculture

Climate change poses major challenges to global agriculture. Rising temperatures and sea levels, changes in rainfall patterns and water temperatures, ocean acidification and more frequent and intense extreme weather events affect how and where food is produced. At the same time, the sector is also an important contributor to climate change, with agriculture, forestry, and other land use (AFOLU) representing around one-fifth (22%) of global anthropogenic GHG emissions.¹ Half of this share comes from direct agricultural emissions, mainly from livestock, with most of the rest from deforestation (land use change) of which agriculture is the main driver.

Climate change will increase pressure on land and water while reducing yield growth, except in a few regions. OECD work is examining how policies can help to mitigate agriculture's contribution to GHG emissions, adapt to changing climate, address catastrophic events, as well as improving co-operation, preparedness, and resilience. The report [Enhancing Climate Change Mitigation through Agriculture](#) shows how agriculture can harness opportunities to mitigate emissions, and help close the gap between existing global mitigation efforts and those that are needed to keep global warming to the 2015 Paris Agreement targets of well below 2°C and preferably to 1.5°C above pre-industrial levels. The report evaluates both the effectiveness of different policy options to reduce emissions, and the impact on competitiveness, farm income, food security, and government budgets. An important lesson is that countries will need to design agricultural policy measures that can navigate these trade-offs within the context of their national policy priorities. Most countries have not yet implemented policies to reduce emissions from agriculture, so the analyses come at an opportune time to inform policy approaches.

The mitigation potential and land and food security implications of global policy changes is further explored in the report [Policy Strategies and Challenges for Climate Change Mitigation in the Agriculture, Forestry and Other Land Use \(Afolu\) Sector](#). A full complement of policy options, comprising emission taxes for emitting AFOLU activities and subsidies rewarding carbon sequestration. Using a carbon price consistent with the 2°C target, is projected to mitigate 89% reduction in net AFOLU emissions, and 12% of total anthropogenic GHG emissions. A global carbon tax on AFOLU is found to be twice as effective in lowering emissions as an equivalently priced emission abatement subsidy. However, a tax has trade-offs in terms of lower agricultural production and food consumption, which a subsidy avoids. A shift to lower emission diets by consumers has a much smaller impact on reducing agricultural emissions than any of the policy packages involving taxes on emissions.

The 2022 edition of the [OECD Agricultural Policy Monitoring and Evaluation](#) report focuses on how reforming agricultural policies could contribute to climate change mitigation. In many countries covered by the report, agricultural mitigation policies focus on innovation-led productivity growth and improved production methods to reduce the emissions intensity of agriculture. These are likely not sufficient to achieve the overall emission reductions required. In contrast, use of direct incentives for reducing agricultural emissions, either through carbon pricing or equivalent regulatory measures, remains limited, even where pricing schemes have been developed for other sectors. Existing support policies can also contribute to increasing agricultural emissions. Most producer support also continues to be provided through measures that have the greatest potential to harm the environment, including through higher GHG emissions.

¹ Adding in the emissions of other stages in the supply chain (including fertiliser production, food processing and distribution) brings the estimated share of food systems to about one-third of total anthropogenic emissions.

The recent report on [Soil Carbon Sequestration by Agriculture: Policy Options](#) shows how net soil carbon sequestration on agricultural lands could offset 4% of annual global human-induced GHG emissions over the rest of the century and make an important contribution to meeting the targets of the Paris Agreement. To this end, a package of policies is needed to enhance global soil carbon stocks. This would include regulations to prevent the loss of soil carbon, knowledge transfer policies to promote “win-win” solutions, and incentives via market-based policies, supported by innovative contracting solutions to address concerns about the non-permanence of carbon stocks and to reduce transaction costs.

The report [The Impacts of Agricultural Trade and Support Policy Reform on Climate Change Adaptation and environmental Performance: A model-based analysis](#) investigates whether agricultural policy reforms could help cushion the impacts of climate change on agriculture by facilitating the relocation of production and international trade. Using a quantitative model to assess the economic and environmental effects of removing market distorting policies, the results suggest that policy reforms could reduce the extent to which climate change increases agricultural commodity prices and undernourishment and contribute to global adaptation to climate change. However, accompanying measures may be required to prevent increases in land use change emissions.

Water in agriculture

Agriculture production is highly dependent on water and increasingly subject to water risks. Irrigated agriculture remains the largest user of water globally, a trend encouraged by the fact that farmers in most countries do not pay for the full cost of the water they use. Agriculture irrigation accounts for 70% of water use worldwide and over 40% in many OECD countries. Intensive groundwater pumping for irrigation depletes aquifers and can lead to negative environmental externalities, causing significant economic implications for the agri-food sector. In addition, agriculture remains a major source of water pollution from agricultural fertiliser run-off, pesticide use, and livestock effluents.

Work in this area has looked at response to water risks, reform processes and measurement of policy performance. Water challenges are expected to strongly affect agriculture and could in turn affect markets, trade, and broader food security. The report [Water Risk Hotspots for Agriculture](#) identifies future water risk hotspots globally. It projects that without further action, Northeast China, Northwest India, and the Southwest United States will be among the most severely affected regions, with domestic and global repercussions. The report also offers a comprehensive policy plan to address these risks.

Tackling these growing challenges require agriculture and water policy changes, which are not easy to undertake. The study [Reforming Water Policies in Agriculture: Lessons From Past Reforms](#) looked at conditions enabling some key reforms in this area, and the subsequent study [Navigating Pathways to Reform Water Policies in Agriculture](#) discusses how to set up a path towards effective reforms. The work suggests the importance of preparing for political windows of opportunities, and to draw on processes that combine evidence with strategic stakeholder engagement, align institutions with the political change, rebalance incentives, and adopt an adjustable reform sequencing.

One of the key triggers to effective policy reform is to evaluate the performance of policies. The study [Agriculture and Water Policy Changes: Stocktaking and Alignment with OECD and G20 Recommendations](#) analyses progress in agriculture and water management in OECD countries from 2009 to 2019, and constructs an index measuring relative alignment of policies in this area with the [OECD Council Recommendation on Water](#). The complementary study [Measuring Progress in Agricultural Water Management: Challenges and Practical Options](#) then seeks to help policy makers make progress in improving agricultural water management more generally, distinguishing progress in policy design, progress in policy implementation capacity, and progress in policy results. The study identifies key principles to measure progress in these three dimensions and applies these principles to the cases of sustainable management of irrigation water under climate change and in controlling nutrient pollution.

4. “Risk management policies to enhance both individual and sector-wide resilience, with an appropriate balance between private, market and public actions”

Risk management in the agricultural sector is of growing concern to governments, insurance companies and producers given heightened risk events associated with climate change and animal diseases. A challenge is to find a balance between public policy and private actions. Earlier work by the OECD led to the development of a holistic approach to agricultural risk management, clarifying the different roles of producers, markets, and governments. Building on this foundation, more recent work has looked at resilience.

[Strengthening Agricultural Resilience in the Face of Multiple Risks](#) argues that governments should consider a number of actions to build resilience to agricultural risks. These include adopting a holistic approach to risk management, but also viewing risk over the long-term and emphasising ex ante measures to reduce risk exposure and preparedness. It is also important to assess all risks and their relationships to each other, as this can help identify the trade-offs between different risk management strategies and policies. In turn, this helps determine how each approach affects the sector’s capacity to absorb, adapt and transform in response to risk. Effective action requires strong co-operation and communication with stakeholders; these discussions should also help identify responsibilities for managing risks. Policies should focus on catastrophic risks that are rare but cause significant damage. The procedures, responsibilities, and criteria for assistance should be defined in advance of the event and policies should avoid crowding out the development of private insurance markets. Policies should provide an enabling environment for investments that strengthen resilience to risk, including regulation of insurance, cross-cutting investments in information, training and advice for farmers, and the development of on-farm and market-based risk management tools.

This approach was taken forward in the report [Building Agricultural Resilience to Natural Hazard-Induced Disasters: Insights from Country Case Studies](#), which noted that natural hazard-induced disasters (NHID) such as floods, droughts, severe storms, and animal pests and diseases have significant, widespread, and long-lasting impacts on the agricultural sector. With climate change set to amplify many of these impacts, a “business-as-usual” approach to disaster risk management in agriculture cannot continue. Drawing on seven country case studies, the report argues for a new approach to building resilience to NHID, highlighting emerging good practices, taking an ex-ante approach that focuses on preventing and mitigating the impacts of disasters, and helping the sector be better prepared to respond to disasters and to adapt and transform to be better positioned for future disasters.

Analysis contained in the report [Design Principles for Agricultural Risk Management Policies](#) pointed out that policy design is critical to maximise effectiveness and minimise unintended consequences. Based on the accumulated experience on four types of publicly supported agricultural risk management tools (ex post disaster aid, agricultural insurance, income stabilisation schemes and tax and savings measures) the report suggests how countries can improve the design and transparency of their agricultural risk management policies, using a holistic approach and focusing on market failures.

5. “Policies to promote the development of well-functioning, competitive, and transparent food systems and responsible business conduct along the food chain”

OECD analysis contributes to understanding and promoting competitive and transparent food systems. Long standing concerns about market power and competition in the agri-food sector are discussed in [Concentration and Market Power in The Food Chain](#). This report examines the evidence and finds that, while downstream segments of agri-food chains are typically more concentrated than farm-level production, the current evidence does not support the claim that stronger actors in the chain systematically abuse their stronger position at the expense of farmers. However, the specific architecture of value chains matters a great deal, and further research could provide a better understanding of how value chains are organised.

As the 2018 mergers in the global seed and biotech industry were unfolding, [Concentration in Seed Markets: Potential Effects and Policy Responses](#) studied the concerns about growing market concentration and its potential effects on price, product choice and innovation. It suggests policy options to help safeguard and stimulate competition and innovation in plant breeding by avoiding unnecessary regulatory barriers, by facilitating access to genetic resources and intellectual property, as well as by stimulating public and private R&D, using policy levers besides competition policy.

A recent report on [Maritime Transportation Costs in the Grains and Oilseeds Sector Trends, Determinants and Network Analysis](#) provides an in-depth analysis of ocean freight rates, examining their evolution, volatility, and how they influence port networks. This analysis is significant given that more than 80% of global trade in grains and oilseeds occurs by maritime transport. Freight rates accounted on average for 11% of the cost and freight price, but this share ranges widely with potentially large impacts of freight rates on consumer prices. The analysis also shows that a 10% increase in the distance between two ports is estimated to lead to a 2.5% increase in freight rates.

OECD also contributes to greater transparency of global agricultural trade through the [Agricultural Market Information System](#) (AMIS) (see below).

The Committee for Agriculture continues to promote the implementation by countries of the [OECD-FAO Guidance for Responsible Agricultural Supply Chains](#), as per the OECD Council's [2016 recommendation](#) and often collaborates with DAF colleagues on this topic, including in forthcoming work on environmental impacts along food supply chains.

6. “Policies to promote human, animal, and plant health throughout the food supply chain”

Antimicrobial resistance

The pressure to feed a growing and richer global population, combined with climate change, the movement of commodities and people, and the emergence of new or latent strains of bacteria and viruses, are placing enormous challenges on researchers, pharmaceutical companies, and the agro-food sector to find and implement solutions to ensure the safety of plants, animals, and humans. In this context, anti-microbial resistance (AMR) is a global challenge for food systems.

Globally, antimicrobials are widely used in animal production not only to improve animal health and animal welfare, but also to enhance animal growth rates and raise animal productivity. Access to effective and cost-efficient antimicrobials is critical for human and animal health, animal welfare and food security. The potential consequences of antimicrobial resistance include reduced food production, reduced food security, greater food safety concerns, higher economic losses to farmers, and contamination of the environment.

The report [Evaluating the Economic Benefits and Costs of Antimicrobial Use in Food-Producing Animals](#) indicates that the economic benefits are modest in livestock systems when good production facilities, biosecurity measures, and management practices are in place. Some countries use antimicrobials to enhance the competitiveness of the industry while others use them as a substitute for less sanitary animal production facilities and the lack of appropriate biosecurity on the farm. Policies and practices promoting alternative interventions could reduce antimicrobial resistance.

Synthesising the evidence on the potential modes of transmission of antimicrobial resistance between humans and animals and vice versa, the report [Transmission of Antimicrobial Resistance from Livestock Agriculture to Humans and from Humans to Animals](#) argues that there is an important role of the environment in the transmission chain, as well as practices to break this link. While information on transmission of resistance is sparse, the report highlights several priority areas where future research could focus to bring a greater understanding of these interactions.

While the use of antibiotics in animal production has fallen dramatically in most European countries, in large emerging livestock-producing countries such as [Brazil](#) and [China](#) usage continues to be high and for some species increasing. This is largely due to the positive impact on animal growth and profit margins on the farm, and to lower biosecurity measures in some production systems, as well as a lack of access to alternative interventions for farmers at affordable prices.

The report [Assessing National Action Plans on Antimicrobial Resistance in Animal Production: What Lessons Can Be Drawn?](#) notes that global efforts to combat the risks posed by AMR depend on effective implementation of national action plans. Most countries have taken a (UN) One Health approach in developing their national action plans covering human health, animal health and the environment. Evidence highlights the need to develop integrated surveillance and monitoring systems, and improve regulations on the availability of antibiotics, on-farm biosecurity practices. Enhancing public awareness, education and training, and exploring alternative interventions and innovations to antimicrobials in animal health and animal welfare could also improve outcomes, but lack of long-term funding hinders the implementation of national action plans.

Nutrition and human health

Significant shares of the world's population are malnourished, either in lacking calories and protein, consuming excessive calories, or adopting unbalanced diets. The study [Policies for Encouraging Healthier Food Choices](#) examined the role of government policies in encouraging healthier food choices to fight the current overweight and obesity epidemics. It proposes a four-track policy approach to encourage healthier food choices consistent with wider objectives for the food and agriculture sector. This includes demand side public interventions, voluntary collaboration with the food industry at the supply-demand interface, firmer regulations when public-private incentives are misaligned, and fiscal measures. The report underscores the importance of a robust evidence base for developing effective policies, which in turn requires investments in data systems, with recommendations on how to move forward. Related work has also explored [Socio-Economic and demographic Aspects of Food Security and Nutrition](#).

As noted above, the study [Potential impact of dietary changes on the triple challenge facing food systems: Three stylised scenarios](#) found that aligning diets with World Health Organisation guidelines on sugar and fat consumption would have positive effects on nutrition and food security as well as environmental sustainability, but would negatively affect livelihoods along the food value chain.

Another study, [Meat Protein Alternatives: Opportunities and Challenges for Food Systems' Transformation](#), examined the impacts of evolving consumer dietary preferences through a food systems lens. The analysis looked at the potential implications of a growing market in meat alternatives for food systems' ability to address the triple challenge of providing food security and nutrition, contributing to environmental sustainability, and supporting livelihoods along the food supply chain.

7. “Trade and domestic policies that foster well-functioning and more integrated international and domestic markets, including through global value chains, and that contribute to more widespread inclusive growth, sustainable development, and global food security”

Trade in agricultural and food products has changed over time, with food increasingly being delivered by global production systems that cross many borders.

Over the period 2016-2022 the OECD undertook much work on Global Value Chains (GVCs) in agriculture and food. The report [Global Value Chains in Agriculture and Food: A Synthesis of OECD Analysis](#) brings together the key findings and policy messages from this research. Agro-food GVCs have broadened the gains from specialisation and trade through stronger sector and employment growth. Openness to trade can positively influence domestic value-added creation but trade protection and distorting agricultural support policies can reduce the gains from GVC and impose costs along the value chain. Government policies need to focus on facilitating participation in GVCs and help manage any adjustments required in the food and agriculture sector.

Policies that allow for continued production and movement of agro-food products are key to ensuring resilient supply chains.

The OECD-FAO Aglink-Cosimo model has been used to understand [The Impact of the African Swine Fever Outbreak in China on Global Agricultural Markets](#) specifically the impact of this production shortfall on global markets for livestock products and animal feed over the short and the medium term. African Swine Fever was expected to result in a 27% drop in the production of pigmeat, China's most consumed meat product. The model compared outcomes if the changes induced by the ASF outbreak in China are temporary with those that could result if current changes lead to a restructuring of China's protein demand.

A study in 2019 on [Digital Opportunities for Trade in the Agriculture and Food Sectors](#) focused on cross-border trade aspects along the global agriculture and food value chain, and looks at how changes brought about by digital technologies can influence who participates in the value chain, where value added is created, and how value is distributed between actors in the chain. Digital technologies present a potential to reduce trade and transaction costs, including those related to identifying and negotiating deals, proving compliance with standards and delivering products across borders quickly and efficiently.

Countries are increasingly using digital tools in their Sanitary and Phytosanitary (SPS) systems. TAD undertook research on the [Digital opportunities for Sanitary and Phytosanitary \(SPS\) Systems and the trade facilitation effects of SPS Electronic Certification](#) and modelled the trade effects of adopting SPS e-certification, the first time any quantitative analysis has been undertaken. Quantitative analysis shows that digital technologies such as SPS electronic certificates have positive effects on trade volumes, notably for plant-based, vegetables and processed food products sectors where the use of SPS e-certification is more frequent. However, significant challenges remain in expanding the use of such technologies in agro-food trade, including mixed adoption capacities.

Work is continuing on SPS e-certification, specifically analysing why e-certification for the trade in animals and animal products (electronic sanitary or electronic veterinary certification) is lagging behind. To explore this aspect a [virtual workshop on electronic sanitary certification](#) was held in February 2022 with participation from the WTO, WOH, Codex, IPPC, WCO and UNECE.

8. “Practical actions to foster increased international cooperation, in particular through regulatory cooperation, trade, investment, open data and knowledge and technology sharing”

The OECD increasingly contributes to open data and knowledge sharing through various channels, including reports, data, expert groups, briefings and social media. This is an important outreach activity that goes beyond servicing only the demands of OECD and partner governments and is used by actors in the food system, researchers, NGOs and the wider public. Open data and knowledge sharing is fundamental to the design and delivery of better policies.

The Committee for Agriculture continued to work on trade and domestic policies that foster well-functioning and more integrated international and domestic markets with a focus on Global Value Chains and digitalisation. Ongoing contributions and support of the OECD to the [Agricultural Market Information System](#) (AMIS) have been acknowledged by leaders in particular with regard to recent food supply disruptions due to COVID-19 and the situation in the Ukraine making accurate information about global food supplies critically important. The OECD hosts the AMIS policy database, developed by OECD, which gathers information on trade and domestic policies, including export restrictions, for staple crops.

Both the flagship [OECD-FAO Agricultural Outlook](#) and [Agricultural Policy Monitoring and Evaluation](#) reports provide a wealth of consistent and comparable data and analysis over more than 30 years that have helped to inform domestic policy reforms and multilateral trade negotiations, as well as providing valuable input for businesses in the food supply chain.

The OECD's [Co-operative Research Programme](#) has supported a wide variety of fellowships and conferences that enhance knowledge and technology sharing on current research on sustainable, productive, resilient agriculture and food systems. It continues to strengthen scientific knowledge and provide relevant scientific information and advice to inform future policy decisions related to the sustainable use of natural resources in the areas of agriculture, food, fisheries and forests.

Increasingly, the OECD is engaged in and/or facilitates expert network mechanisms. These include the [Food Chain Analysis Network](#) (an OECD expert group specialised in food systems' analysis), the [Farm-level Analysis Network](#), and the [Network on Agricultural Total Factor Productivity and the Environment](#).

Codes and schemes

The long-standing [OECD Agricultural Codes and Schemes](#) have continued to evolve in the light of new technologies (including digitalisation) in order to facilitate trade at a very practical level. They facilitate international trade through the simplification and harmonisation of documentary, inspection and testing procedures. For [seeds](#) and [forests](#), the Schemes encourage the production and use of seeds or plants of consistently high quality for which trueness to name or source is guaranteed. For [tractors](#), the Codes enable an importing country to accept with confidence the results of tests carried out in another country, and in the case of [fruit and vegetables](#), the Scheme promotes uniform classification and quality control procedures. The programmes are open to any OECD or non-OECD country that is a member of the United Nations or the World Trade Organization. The work is achieved through dialogue with the designated authorities of Member Countries, Observers and stakeholders, including farmers, industry and the trade.

Note

¹ Note by the Republic of Türkiye

The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Türkiye recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Türkiye shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union

The Republic of Cyprus is recognised by all members of the United Nations with the exception of Türkiye. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.