Global Panel on Agriculture and Food Systems for Nutrition

Repurposing agriculture support to improve nutrition, health, and the environment

Discussion paper by Marco Springmann, Derek J. Flynn, Niamh Kelly, Sandy M. Thomas, Florian Freund and Patrick Webb

on behalf of the Global Panel on Agriculture and Food Systems for Nutrition (affiliations listed at end of paper).

Worldwide, the agriculture sector receives USD $700 billion or more in annual public financial support. There is considerable potential for this support to be repurposed to promote the health of populations, and to benefit the environment. This paper draws on recent modelling to argue that the many benefits to be had from reallocating agriculture sector support should become a key part of the ongoing dialogue on food system transformation. Given the food system's increasing health and environmental burden, maintaining the status quo is not an option. In determining priorities for change, policy makers will have to adopt a nuanced approach which addresses potential trade-offs among multiple objectives.

1. Introduction

This discussion paper seeks to inform the debate around rebalancing and repurposing today's public sector support for the agricultural sector. It considers the implications of repurposing agricultural subsidies so that they can better contribute to promote both human and environmental health. It uses recent modelling to explore the possible role that repurposed fiscal resources could play to deliver sustainably produced, healthy diets for all, and to consider potential trade-offs. The scope for repurposing subsidies and other forms of public sector support (within the broader range of public-funded support mechanisms), is considerable. Currently, the agricultural sector of the 54 top producing countries, most of which are high or middle-income countries, receive more than US$700 billion in support each year. Part of this comes from budgetary transfers, and part of it from market price support related to border policies and tariffs.[1,2]

There have been arguments made against existing support mechanisms, for example that they 'distort' market prices, and hinder the ability of low- and middle-income countries (LMICs) to compete in global markets. Also, because most (albeit not all) agriculture sector subsidies are for staple commodities and cash crops, they contribute to the imbalance between relative prices, for example, between staple and nutrient-rich foods. It has also been argued that they fail to factor in environmental

externalities, typically act in ways that worsen rather than reduce climate emissions, lead to overuse of fertilisers, and exacerbate water pollution.[3,4] Lastly, other forms of investment may, in certain contexts, be more economically efficient at delivering higher returns than subsidies. For example, analysis from the World Bank and the International Food Policy Research Institute suggests that repurposing agricultural support to fund more research and innovation, infrastructure development and measures to reduce food loss and waste, may yield more benefits than subsidies currently contribute.[5] Such arguments add to the growing realisation within the policy community, of the need to reconsider support for agriculture in general, and the use and allocation of subsidies in particular.

Efforts are being made to reduce the environmental impact of public support programmes, through subsidies, land set-aside and promotion of sustainability. For example, a World Bank report highlighted government support programmes in Kenya which helped dairy farmers increase their use of nitrogen-fixing, high-protein shrubs, an alternative to using fertilizer, to increase the efficiency of their dairy production. Similarly, the Chinese government has phased out subsidies for the production of fertiliser and started to fund improvements in nitrogen and manure management.[6] However, it is important to keep in mind that repurposing agricultural subsidies can be politically sensitive and the various ways they can be repurposed must be carefully considered.[7]

The redirecting of agriculture sector activities raises important questions. For example, to what extent could a realignment of resources deliver significant benefits to making nutrient-rich diets available to all, particularly those in LMICs? At the same time, could subsidies play a significant role in the drive towards sustainable food systems by helping to repair the planet's environmental systems? Also, some producer-focused subsidies may be captured by wealthier farmers with large farms, as in Pakistan and India.[8] Could they be fashioned into a more potent policy tool to address poverty and inequality amongst poorer farming communities?

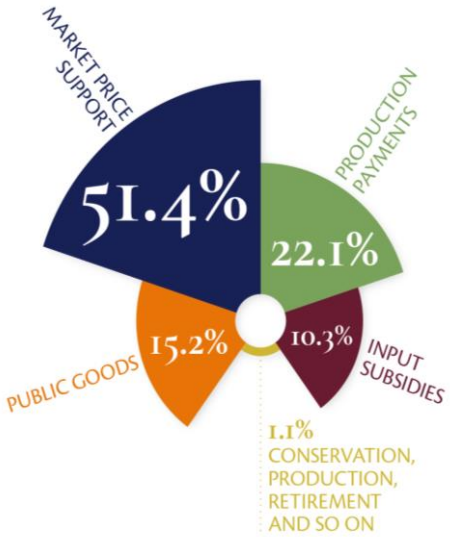
Building on existing analyses, this paper reports on preliminary findings from modelling[9] commissioned by the Global Panel at the scale of geographic regions and countries. The focus of this work is on producer subsidies. It considers global scenarios for reforming agricultural subsidies, and, based on a model-based analysis, discusses how different subsidy regimes could affect human health, environmental impacts and the economy. The issues raised in this brief support the argument that more needs to be known about the pros and cons of subsidies and other support systems, more effort is needed to consider scenarios of change, and much more needs to be done to determine how the repurposing of resources used to support the agriculture sector could be aligned with other transformative policy changes to support the goal of achieving healthy and sustainable diets for all.

Maintaining the status quo is not an option. Without change, existing patterns of financial support for agriculture could impede the necessary reform of food systems to deliver healthy diets for all through sustainable production systems, or even drive change in the wrong direction.[10]The modelling results suggests that repurposing a fraction of agricultural subsidies towards health and environmental objectives could be both economically feasible and contribute substantially to transitions towards healthy and sustainable food systems. However, policy makers need to take a careful and nuanced approach. Different subsidy scenarios can have very different effects on the production of different foods, the health of populations, and the planet. It is imperative to repurpose agricultural support in a way which reduce emissions while simultaneously supporting progress on other key goals such as improving nutrition and reducing poverty.[11] Difficult trade-offs will need to be weighed - choosing an inappropriate subsidy regime could yield little benefit or even be counterproductive, depending on local circumstances.

2. Subsidies today – a subset of agricultural support

The approximately US$700 billion per year of support for a range of agriculture sector activities takes many forms (see Box 1). Figure 1 shows how various categories of public agricultural support are distributed across 51 countries (2015 – 17).

Figure 1. Annual average forms of public agricultural support in 51 countries, 2015-17



Source: World Bank 2018[4]

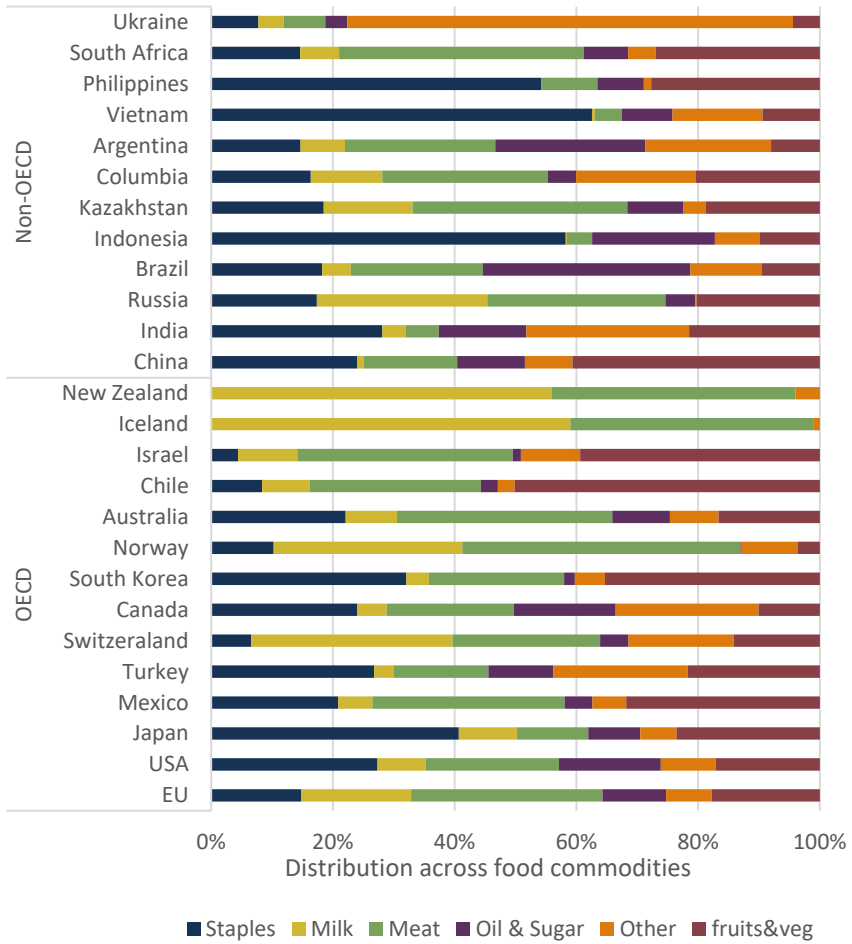
The model-based analysis presented in this paper focused on 26 countries and regions which disbursed US$233 billion in 2017 as budgetary transfers, excluding tariffs and subsidies linked with trade.[9] Of these, more than half of the transfers (55%) were spent by OECD countries, in particular the EU (32%), USA (12%), and Japan (3%), and the remainder by non-OECD countries (45%), including China (25%), India (15%), and Russia (1%). Globally, about 8% of the budgetary transfers were directly coupled to a single commodity or output, and the remaining share benefited either particular groups of commodities (29%), all commodities without differentiation (31%), or farmers directly, without requiring production (31%). Analysed by final use, a fifth to a quarter of all agricultural support measures were used to grow staple crops (22%), meat products (22%), and fruits and vegetables (24%), and about a tenth each for milk and dairy (10%), oils and sugar (11%), and other crops (11%).[9]

A review of agricultural support undertaken by Chatham House estimated that between 2000 and 2017 producer support accounted for about 10-15% of farmers' incomes in China.[12] This is a similar range to that of US, Indonesia, Mexico, Russia and Canada. However, in Japan and South Korea, these supports represented over half of farmers' incomes, whereas in Brazil, South Africa and Vietnam less than 5% of farmers' income was provided by agriculture supports.[12]

The 2021 State of Food Security and Nutrition in the World report looked at the impact of the COVID-19 pandemic on food subsidies in 36 countries. Almost half of the countries reported an increase in food subsidies during the pandemic[13] while only about 5% of countries reported a 50-74% drop in food subsidies as a result of COVID-19.[13]

Figure 2 provides a breakdown of where public agricultural subsidies were targeted across 26 countries and regions in 2017, and further illustrates the considerable difference between OECD and non-OECD countries in terms of the distribution.

Figure 2. Distribution of subsidies across food commodities



Source: Freund and Springmann (awaiting publication)[9]

Box 1: Different forms of support to agriculture

The World Bank categorises producer subsidies into three broad categories[4]:

1. **Price supports to keep domestic prices for specific outputs higher than equivalent world market prices.** These supports are given directly through public spending for the public procurement of farm outputs, or indirectly through import restrictions and other market barriers that help push producer prices higher. In the case of market barriers, no public expenditures are involved.

2. **Transfers to producers linked to the type of inputs used or agricultural outputs produced.** These subsidies include lowered interest rates on agricultural credit or lowered prices of specific inputs (either variable or fixed capital) such as fertilisers, pesticides, seeds, water, and electricity. Producers can also receive direct payments tied to the production of specific outputs.

3. **Payments to farmers not tied to the outputs produced or inputs used.** This is often referred to as 'decoupled' payments. These may, for example, be linked to public goods such as biodiversity and other environmental concerns.

In addition, countries may provide substantial indirect support – for example through investment in areas such as research and advisory services, transport infrastructure, and food safety regulations.

Three general points may be made about subsidies today:

1. ***The current subsidy regime is complex, both in terms of the many forms of subsidies, their objective, and the variation between countries. However, they seldom relate to healthy diets or planetary health.*** This reflects their development over decades in support of other objectives. This situation is unlikely to change without sustained political will. The challenges and difficulties around reforming subsidy policies need to be recognised and addressed head on.
2. ***The imbalance between the support provided by HICs and MICs, compared with LMICs, demonstrates how subsidies today operate in ways that place farmers in the latter group at a substantial and continuing disadvantage. However, they may benefit poor consumers in LMICs, for example in urban settings, if they keep food prices low.*** This imbalance matters on two counts. Unless addressed, subsidies could continue to perpetuate, or even increase global inequality and inequity for specific communities. Also, agricultural production and associated activities (e.g. deforestation for animal rearing) in one country can affect global public goods – whether greenhouse gas emissions (GHGs), biodiversity loss, or eco-system services which cross national boundaries. Everyone stands to benefit from farmers in LMICs being able to access future support that is linked to these public goods in particular.
3. **Countries need to work together in reform of subsidies, rather than adopting an approach that is narrowly constrained by political boundaries.** There is a mismatch between natural geography and natural environmental systems on the one hand, and artificial (geo-political) boundaries on the other. This means that the benefits across human and planetary health are not always aligned by natural geography; and a reason why the benefits for environmental and human health are higher or lower in different locations.

Box 2: Modelling scenarios considered

There are many possible scenarios for repurposed subsidies – these may embody new objectives, different recipients, and different delivery mechanisms. The research reported in this paper used models of the economy, the agricultural system, and population health to analyse global scenarios of repurposing domestic agricultural subsidies towards supporting transitions towards sustainable and healthy diets:[9]

- **Removal of subsidy payments (RMV):** All subsidy payments are removed in this scenario to analyse the impacts of the existing subsidy scheme as a counterfactual.
- **Repurpose subsidy payments (S25, S50, S75, S100):** Different shares of the overall subsidy budget are redirected to low-emitting and nutrition-sensitive food commodities (vegetables, fruits, pulses, and nuts) in a budget neutral manner.
- **Repurpose subsidy payments and redirect them globally (GDP, POP):** Here subsidy budgets are maintained at 2017 levels, but allocated across all countries according to either their gross domestic product (GDP) or population (POP) share to support domestic production of nutrition-sensitive and low-emitting foods. This implies that countries that did not formerly subsidise agriculture will now implement some support payments.

A detailed description of the different scenarios and important caveats on their outputs, may be found in Freund and Springmann (2021).[9]

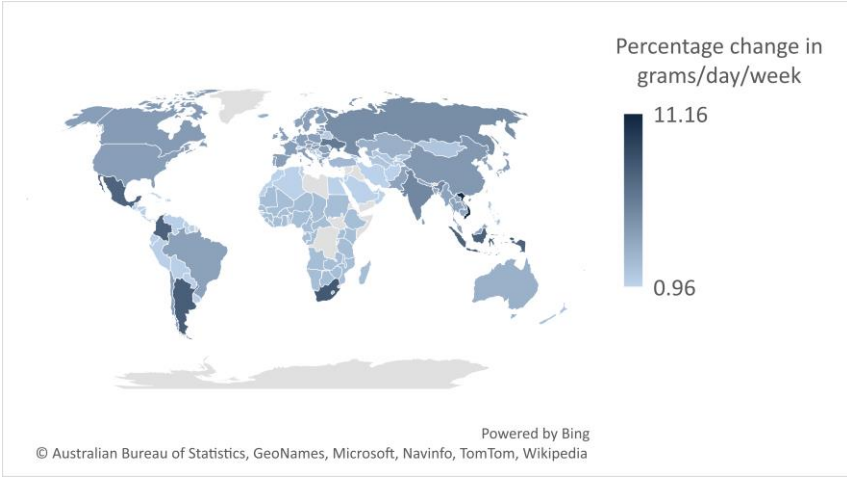
3. Repurposing subsidies at a global scale

The following discussion considers the results of recent modelling[9] of seven contrasting scenarios – each of which embodies a different potential subsidy regime. (See Box 2 for a description of each scenario and Annex A for a more detailed outline of the modelling). It uses the OECD's data on producer support estimates and specifically focusses on budgetary transfers, excluding components classified as market price support related to border policies and tariffs. The modelled outcomes illustrate the broad influence that the repurposing of subsidies could have on global consumption patterns and health, macroeconomic impacts, and the environment.

Implications for food production patterns: The subsidy scenario which represents a 100% removal of subsidies (RMV) reduced agricultural output by 66 million tonnes (Mt) per year. The fall was particularly large for highly subsidised commodities in OECD countries, such as grains and oilseeds (-21 Mt), but also for fruits and vegetables in OECD (-15 Mt) and non-OECD countries (-23 Mt) alike. Parts of the world that already lacked subsidies increased domestic production to compensate, but their output could not make up for overall losses, resulting in a net decline in supply. Subsidies, in some form, have an important role to play in stimulating future food production.

Patterns of consumption: Because of the net production loss associated with a 100% subsidy removal, intake of all nutrient-rich foods would fall in that scenario, with predictable health outcomes. For the consumption of horticultural products (e.g. fruits and vegetables, legumes and nuts) the greatest impacts linked to 100% removal would be seen in Europe and China. In the case of a 50% or 100% reallocation of subsidies to nutrient-rich foods, the rises in consumption would be highest in OECD and middle-income non-OECD countries, and much less in low-income countries which do not currently subsidise domestic production. Figure 4 shows that if nations were subsidising horticultural production at rates relative to the size of their population (the POP scenario), then low- and middle-income countries would see their overall intake of products such as fruits, vegetables, legumes and nuts rise. This matters especially for such countries where malnutrition and diet quality are a particular concern. However, the POP scenario (as well as the GDP scenario) raises questions around how increases in subsidy levels would be funded in such resource-constrained countries.

Figure 4. Increase in horticulture* consumption when production is subsidised at a rate relative to population



Data source: Freund and Springmann (awaiting publication)[9]
*Includes fruit, vegetables, legumes and nuts

Human health: Removal of all agricultural subsidies was associated in the models with an *increase* of 75,000 diet-related deaths per year, representing an increase in mortality of 0.1% on average. Most of this was due to reduced supply and intake of fruits and vegetables, nuts and seeds, and pulses where those are benefitting from subsidy support. In

other words, simply taking away subsidies on the grounds of net economic gain would not help from a nutrition or health perspective. But repurposing half or all subsidies led to 225,000-444,000 fewer diet-related deaths per year, respectively.[9] Premature mortality was reduced by up to 1.5% in the OECD, 0.8% in non-OECD countries with subsidies, and by 0.1% in countries without subsidies. Table 1 shows the possible number of lives saved each year under each scenario – for sub-Saharan Africa (excluding South Africa), China and the European Union.

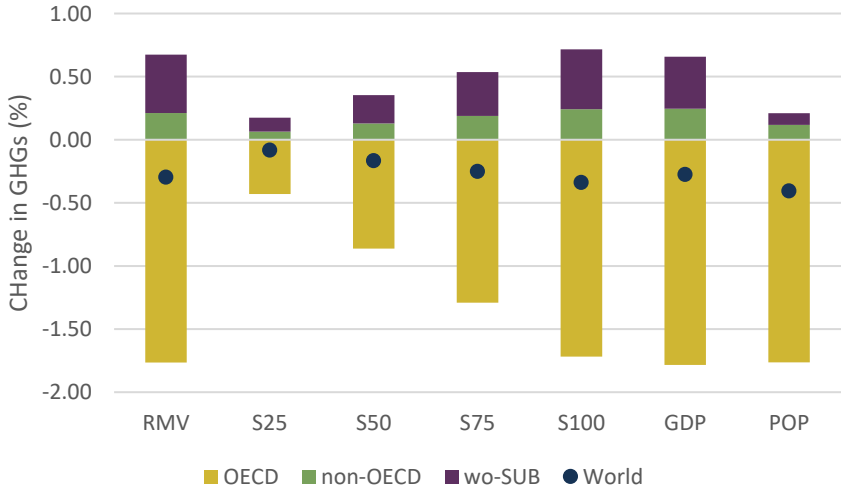
Table 1. Lives saved per year for each scenario (thousands – negative values indicate a rise in deaths)

	RMV	S25	S50	S75	S100	GDP	POP
Africa	0.03	0.23	0.45	0.65	0.85	2.56	8.61
China	-48.24	39.14	77.58	116.81	156.31	85.29	109.01
EU	-6.38	37.41	73.49	108.77	143.65	86.70	41.97

Data source: Freund and Springmann (awaiting publication)[9]

Environmental impacts: The picture is mixed depending on whether GHG emissions or demands on freshwater, nitrogen and phosphorous and land are considered. Figure 5 illustrates the changes for greenhouse gasses (GHGs). Removing all subsidies is associated with moderate falls in GHGs in OECD countries, but with modest increases in other regions, particularly those without agricultural subsidies (of 0.4-0.6%). Similar reductions in GHG emissions are obtained for OECD countries when 100% of subsidies (S100 scenario) are allocated to nutrition-sensitive crops, and also under the GDP and POP scenarios. Modelling shows that shifts in resource demand for water, land, nitrogen and phosphorus are generally modest, and changes in management practices may arguably be more effective in moderating water and land use.[14] Thus, environmental impacts and resource demand can likely be reduced most effectively when subsidy reforms include incentives for adopting sustainable management practices, in addition to encouraging changes in the mix of production.

Figure 5. Global changes in GHG emissions under different scenarios



Data source: Freund and Springmann (awaiting publication)[9]

Macroeconomic impacts: Complete removal of agricultural subsidies increased global economic output, measured as equivalent variation of income, by US$10 billion. This suggests that removing subsidies has an

overall economic efficiency gain. A 100% redirection to fruits and vegetables would result in a global net loss of US$7.6 billion, in large part because factors of production can be employed more profitably in other sectors. However, reducing the reallocation of subsidies to 50% mitigated most of the losses as reductions in allocative efficiency were compensated by labour market benefits associated with improved health from greater consumption of fruits, vegetables, and other horticultural products. These results underscore the need for careful analysis to determine net outcomes when considering how subsidies are repurposed.

Complete removal of agricultural subsidies could result in economic and environmental benefits. However, population health and also food production would be negatively impacted. Subsidies (in some form) have a role to play in the years ahead. The question is whether, when choosing a subsidy regime for the future, policy makers will be faced with difficult trade-offs, or whether particular scenarios could be chosen to simultaneously deliver on multiple policy agendas – e.g. food production, health, the environment and wealth creation. These issues are considered in the next section.

4. Choosing support policies to deliver multiple benefits

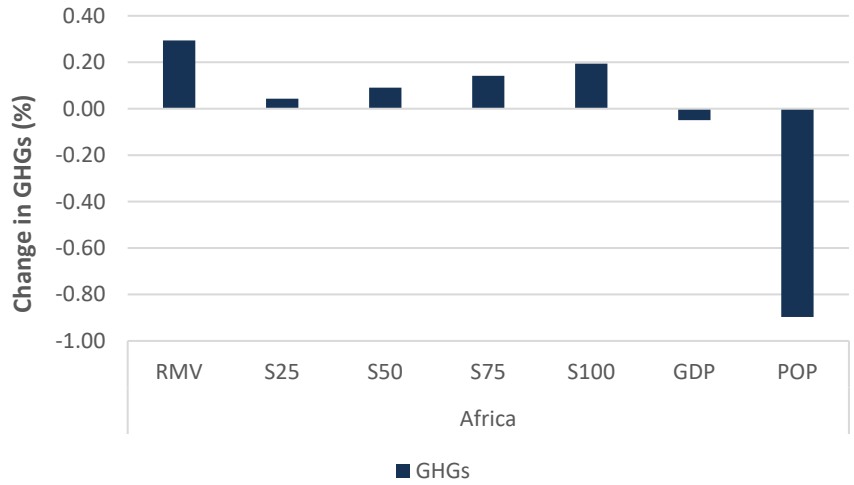
A key issue for policy makers is whether specific subsidy regimes could be selected to deliver simultaneously in multiple policy domains. It is difficult to provide definitive advice which is generally applicable, since the choice of subsidy regime will need to be conditioned on local priorities. Also, the outcomes for a particular country will depend heavily on local circumstances, as well as the subsidies provided by other, possibly competing, countries. However, the following observations arising from existing modelling analyses can be made:[9]

In purely environmental terms, for all the scenarios, the effects on different environmental footprints are typically beneficial for HICs. For LMICs the effects are generally smaller and mixed although local effects could be greater. Figures 6 and 7, for example, contrast the GHG outcomes for the different subsidy scenarios for Africa and the EU. The relatively small effects for the former are largely a reflection of the current low levels of subsidies across the continent. Potential benefits for the EU are substantially larger. Overall, the modelling indicates that in certain circumstances, specific subsidy regimes could yield a useful mix of benefits.

Redirecting all subsidies to the production of foods with beneficial health and environmental characteristics (scenario S100) was found to improve population health and reduce GHG emissions. However, it also had negative economic impacts. In contrast, the partial repurposing of subsidies (scenario S50) was found to mitigate economic losses and lead to gains in some circumstances, but it would also be associated with lower health and environmental benefits.

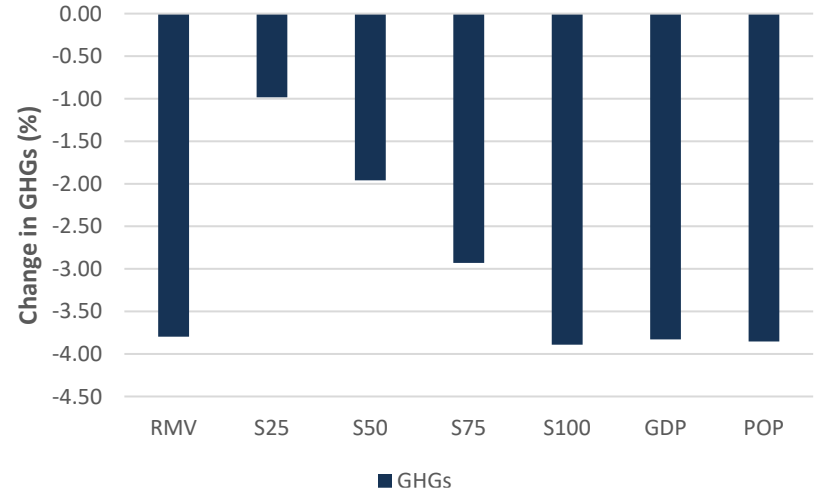
Combining the repurposing of subsidies with a global restructuring of subsidy levels according to GDP or population levels (GDP and POP scenarios respectively) was found to lead to health benefits which were comparable to a repurposing-only approach, but with a more equal distribution across regions, similar or greater reductions in GHG emissions, as well as global economic benefits. However, newly subsidising countries would have to be compensated in part to share in those gains.

Figure 6. Changes in GHG emissions under different scenarios in Africa



Data source: Freund and Springmann (awaiting publication)[9]

Figure 7. Changes in GHG emissions under different scenarios in the EU



Data source: Freund and Springmann (awaiting publication)[9]

5. Challenges inherent in repurposing public support to the agriculture sector

Policy makers considering the repurposing of public resources will be faced with several broad challenges, including the following:

Resolving trade-offs. While modelling might be able to identify a support regime that delivers multiple benefits, in reality, the choice of subsidy regime for an individual country may involve difficult decisions around trade-offs between the production of different foods and the overall environmental footprint. Also, policy makers will need to weigh implications for local environmental goods (such as the use of water, chemical inputs and land) and also for global goods (such as greenhouse gas emissions). It will also be important to weigh the political and economic costs of change against the varied projected outcomes of different shifts in support. In some contexts, particular scenarios may result in relatively small (or even negative) outcomes. An assessment of the opportunity costs inherent in different subsidy regimes should be an important consideration.

Overcoming resistance to change. Any existing subsidy regime may benefit powerful individuals and organisations who have vested interests in maintaining the status quo and who oppose change. This may be the case even if the current regime would be replaced with another policy/public expenditure programme that would provide greater benefits both to them as producers and contribute to the larger global public good - perceived "loss" is a major driver for human behaviour.[15] Robust evidence (including modelling results) could play a role in engendering the support of producers and other relevant actors. The priorities of the public must also be taken into account as public support is important for the success of food policy changes. For examples, cuts to

bread subsidies in Egypt in both 1977 and 2010 sparked public outrage.[16,17]

The need to monitor and actively manage the transition. Changes in subsidies in particular regions or countries are likely to have complex implications which may not be easily predicted. There could be short term fluctuations in terms of price and availability of specific food commodities as farmers and markets adjust to the new subsidy regime. Other external factors may also be influential during transition – for example geo-political developments, pandemics, and extreme weather events. There may also be limited experience within a country in making substantial changes to subsidies. For such reasons, it makes sense for policy makers to monitor the situation during the transition period, and plan to adjust policy in the light of this monitoring. This implies the need for appropriate levels of data collection on different geographic scales to monitor both short- and longer-term effects of resource realignments. Pilots may also be needed to test and evaluate changes.

6. Conclusions

Subsidies to agriculture have been widely used as a policy instrument to stimulate and encourage food production and support producers. But they now need to fundamentally change in three respects. With the UN Food Systems Summit on the horizon, now is the time for policy makers to tackle the issue head on and seize the opportunity for change.

First, policy makers need to fundamentally rethink what they use subsidies for and repurpose them accordingly. If they are serious about delivering sustainable and healthy diets, then they need to commit to recasting their subsidies around those objectives. Left unchanged, today's subsidies could substantially impede the global effort to deliver these goals.

Second, policy makers need to think through the implications of the disparity between the high level of subsidies in OECD countries, and the low level in LICs – and how that might be redressed. Arguably, this is perpetuating inequality between countries (particularly for the agriculture sector), and at worst, it is driving it in the wrong direction.

Third, there needs to be a rethink how subsidies across the world can better support global public goods - and how that can be made to work for all countries. This is a particular challenge for countries that are heavily resource-constrained and which already have limited scope to provide subsidies.

Recent modelling presented in this paper argues that the realignment of agricultural subsidies has the potential to be a powerful lever that might, depending on circumstances, address multiple policy challenges simultaneously. For example, it was found that it could be possible to repurpose subsidies in ways that stimulate the production of nutrition-sensitive crops, such as fruits and vegetables. Simultaneous reductions in the environmental footprint of agricultural production may also be possible. Here the overall reductions modelled are relatively modest, although greater (or lesser) benefits might occur at smaller scales, or when new subsidy regimes are combined with changes in farm-level management and other technological innovations. At a global level, the scenarios for repurposing subsidies suggested that up to 444,000 diet-related deaths per year could be saved.[9]

However, the complex interactions between subsidies and food systems mean that policy makers need to adopt a nuanced approach to their repurposing. At the national scale, different subsidy regimes have varied effects (both positive and negative, and potentially unexpected) in terms of production of different foods, and for the environment, with differentiated outcomes between countries and across regions. Modelling offers an opportunity to assist policy makers in making decisions which are tailored to individual circumstances and priorities (see Annex A).

Finally, the possible repurposing of subsidies needs to be considered within the wider context of other forms of agricultural support. In particular, there is a case for programmes to include more support for research and development to promote innovation for sustainable agri-food systems. It has been suggested that current subsidy programmes in most OECD countries and in China largely hinder necessary innovations towards more sustainable, resilient, inclusive, and equitable agri-food systems.[6,18] Only one eighth of total government support of agriculture presently goes to R&D, inspection and control systems, and rural infrastructure, which specifically promote beneficial innovation. This compares with three quarters provided as financial transfers to individual producers, mostly in a regressive manner which reinforces income inequality.[18]

Annex A.

Modelling to inform decision making.

This paper draws on a model-based analysis of different options for reforming agricultural subsidies which are in line with health and environmental objectives (scenarios - See Box 2).[9] For building the modelling framework, a detailed economic representation of agricultural subsidies[19] was combined with region and commodity-specific environmental footprints[14] and with a health assessment of the burden of diet-related diseases which are associated with dietary risk factors, such as low intake of fruits and vegetables, and high intake of red meat.[20] Within the framework, certain dynamic interactions were accounted for: e.g., how changes in diet-related diseases impact the labour force and thus economic output, and how price and supply-demand reactions influence production, consumption, trade, and the distribution of environmental impacts.

This paper also demonstrates the potential for modelling to assist policy makers when assessing which subsidy scenario best fits their priorities and circumstances. However, there are several ways in which the support for policy makers can be enhanced in this important area:

- The provision of expert advice to guide policy makers as they consider the outputs of the models and weigh their policy choices. This is needed to ensure the correct interpretation of what the models are saying, and to fully understand their strengths and limitations.
- Further refine and improve modelling of global, regional and national trade dynamics and efficiency gains. The aim would be to shed more light on the positives and negatives associated with policy choices at different scales, but also to expose how policy changes in one country will interact dynamically with those of other.
- Improving advice and guidance relating to the transition during which new subsidy policies would be implemented. This recognises that policy makers will need to develop a clear plan for the transition – one which navigates a path through the inherent challenges of the change process and the powerful vested interests at play, while protecting the interests of the poor during the process.

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Author affiliations

Derek J. Flynn – Senior Consultant to the Global Panel on Agriculture and Food Systems for Nutrition

Florian Freund – Researcher, Johann Heinrich von Thünen Institute

Niamh Kelly – Policy Research Officer for the Global Panel on Agriculture and Food Systems for Nutrition

Marco Springmann – Senior Researcher on Environmental Sustainability and Public Health, Nuffield Department of Population Health, University of Oxford

Sandy M. Thomas – Director of the Global Panel on Agriculture and Food Systems for Nutrition

Patrick Webb – Technical Adviser to the Global Panel on Agriculture and Food Systems for Nutrition, and Professor in the School of Nutrition Science and Policy at Tufts University.

Funding

The Global Panel is grateful for the support from the following sponsors, whose funding has made the production of this paper possible:
the African Development Bank, Irish Aid, the Children's Investment Fund Foundation and the Rockefeller Foundation.