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Leibniz Institute of Agricultural Development  
in Transition Economies

# IAMO

## Annual 2023







Leibniz Institute of Agricultural Development  
in Transition Economies



## Welcoming address

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by the German Minister of Education and Research  
Bettina Stark-Watzinger

Dear Readers,

The world's granary – that was what Ukraine was called. The country was one of the largest wheat producers, exporting millions of tonnes of grain to the rest of the world. This was before the Russian invasion. It took lengthy negotiations before part of the harvest was loaded onto freighters and thus made its way to other countries. The situation has been reflected in rising food prices, which are a particular burden for those people in poorer countries.

The states of the Black Sea region have risen to become the most important suppliers of grain to the regions of the Global South. Chinese agricultural imports are also increasingly influencing international markets. New global supply chains have emerged. That is right and proper. After all, the international trade in agricultural products should ensure that as few people as possible are starving and that food security increases. The consequences of the Russian invasion have made governments around the world and international organisations aware of the challenges facing modern agricultural production.

Supply chains had already been interrupted during the Coronavirus pandemic. Extreme weather has destroyed many harvests over the past few years and made sowing in arid soils more difficult. Climate change is leaving its mark throughout the world. Innovations that ensure the supply of food to the world's population are thus even more important. They have to reconcile environmental protection with the interests of society. We need more ecological and economic sustainability,

crisis resistance and resource efficiency in agricultural production and supply chains.

I am banking, therefore, on ideas developed by our systemic agricultural and food research. Currently we fund it under the umbrella of the National Bioeconomy Strategy and the BMBF programme research for sustainability. Our new strategy for the future ties in with this perfectly. Bioeconomic innovations, in particular, in the form of new products and processes allow us to conserve resources and at the same time create prosperity. They take us away from fossil-based raw materials and towards a sustainable, bio-based economic system. In many cases this means changing the way we think.

This is why our ministry supports infrastructures that advance research here and in other countries. Important in this respect are dialogue, exchange and cooperation. The IAMO projects we fund in Ukraine and Central Asia make a substantial contribution here. They open up the possibilities of digitalisation for the agricultural and food sector. They develop solutions that are tailored precisely to those countries. These include agricultural insurance schemes to protect producers against climate risks and innovations for a greater resource efficiency of local production and supply chains, so that all of us together can attain the United Nation's sustainability goals.

Since 2021, for example, the BMBF has been funding the Center for Food and Land Use Research in the pilot project UAFoodTrade at the Kyiv School of Economics. It is facilitating discussion between science, business and politics. The aim is the sustainable internationalisation of Ukrainian research structures. The institution's work

is continuing despite the war, albeit to a limited degree. Through the programme 'Development of German-Ukrainian Centres of Excellence in Ukraine' we are, together with the Ukrainian Ministry of Education and Science, funding the expansion of German-Ukrainian top level research. And we are helping the emergence of networks of experts in Central Asia focusing on the consequences of climate change for agriculture. They are providing a publicly accessible, efficient statistical database on agricultural structures, land and water use as well as agricultural production including livestock farming.

I should like to thank all of those involved in such progressive projects for their commitment. Their research is of considerable relevance for the welfare of humanity. It helps us develop sustainable and dynamic economies and thus achieve food security around the world.



Bettina Stark-Watzinger

Member of the German Parliament  
German Minister of Education and Research



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## Foreword

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The effects of the Coronavirus pandemic, climate change, the war in Ukraine and the growing geopolitical and geoeconomic tension in IAMO's entire research region are having a far-reaching global impact on food security, migration and agricultural development. The Institute is thus facing particular challenges. Not only does 25 per cent of the world's population live in the former planned economies of Europe and Asia, which are IAMO's focus; these countries also account for 27 per cent of the world's farmland. They are responsible for 35 per cent of global agricultural production and carry out more than 17 per cent of international trade in agricultural raw materials and food. The countries of the Black Sea region were and are important grain suppliers for parts of the Global South, with a steeply rising demand once again in crisis-hit regions such as North Africa, East Africa and the Middle East.

The critical developments outlined above are having a substantial impact on global food security and the creation of international food chains. Over recent decades, moreover, agricultural imports, especially into China, have risen massively and are influencing international trade structures correspondingly. New global food chains are also emerging, for example along the expanding land and sea transport networks of China's 'Belt and Road' initiative, which also include the countries of Central Asia. Thus the agricultural and economic

developments in the transition countries of Europe and Asia have direct and indirect global implications.

Another issue is how to secure the urgently needed international cooperation of all countries to solve the climate crisis and also develop economic processes of globalisation and integration. This challenge has to be overcome in the framework of a new, multipolar world, in which actors from Eurasia, most obviously China and Russia, are increasingly casting doubt on the current international order. This has far-reaching implications for the agricultural and food economy in the regions of IAMO's research and beyond.

The development processes in IAMO's area of research are anything but uniform. Even if some regions are noticeably falling behind, on average the global embeddedness of the agricultural and food sector as well as rural areas has progressed in the former planned economies of Europe and Asia. All these countries are facing the challenge of dealing with the transition of their agricultural systems to economic and ecological resilience by diffusing innovation and knowledge. **IAMO'S NEW MEDIUM-TERM RESEARCH AGENDA** reflects this need for research and advice by placing greater emphasis on aspects of sustainability and devising a new set of topic areas to disseminate innovation and research. Greater demands on research and transfer have made IAMO accelerate the development of research structures



directly in its focus regions. Over the last few years particular progress has been made in this respect in Ukraine and Central Asia – especially Uzbekistan – but also in China and the countries of the West Balkans. This includes the establishment of joint research centres and chairs with Ukrainian and Uzbek partners, the development of agricultural insurance products linked to climate change together with domestic and German insurance companies in Central Asia and Mongolia, as well as cooperation in the agricultural policy dialogue formats of the German Ministry of Food and Agriculture (BMEL) in Ukraine, China and most recently the West Balkans. This is an avenue that will be pursued further in the future.

Geopolitical unrest is threatening the current international trade order, begging the question of whether a phase of de-globalisation has begun. The **IAMO FORUM 2023**, which was held in Halle (Saale) from 21–23 June 2023, on the subject of **INTERNATIONAL AGRICULTURAL TRADE, GEOPOLITICS AND GLOBAL FOOD SECURITY**, considered the role of international trade in improving global food security, with a focus on the Institute's regions of study. Particular attention was paid to geopolitical aspects, with a special look at the use, stability and resilience of global and local supply chains in the agricultural and food sector. The Forum addressed the question of whether and how conflicting geopolitical interests and a possible division of the world into economic blocks could lead to a de-globalisation of the established agricultural trade structures. Such processes might disadvantage those living in the Global South, where the threats to food security are currently increasing. In the Eurasian emerging countries, de-globalisation could lead to economic slumps.

Without a highly motivated and flexible administration, IAMO would not be able to implement its research and transfer work in all its various facets and formats with the focus on results that it has today, sometimes under difficult conditions. Then there are the great challenges posed by the digitalisation of administrative processes. We would also like to thank the Saxony-Anhalt Ministry of Science, Energy, Climate Protection and Environment and the German Ministry of Food and Agriculture for their many suggestions and ideas for shaping the Institute's future. The fact the IAMO can continue to act in Germany's vital interests as a building block of a policy geared towards international cooperation is also down to the impetus we get from the members of the Board of Trustees and the Scientific Advisory Board.

The development of international agricultural trade relations, which was a focus of the IAMO Forum 2023, is at the core of the opening article. It would be a big mistake, however, to see IAMO's study countries as nothing but a crisis region. The second paper analyses the impact of Armenia and Kyrgyzstan's membership of the Eurasian Economic Union on their agricultural trade. The third article looks at the impact of social media or rapidly advancing digitalisation on the demand for organic produce in Serbia. The fourth article is about the effects of membership of cooperatives on the spread of modern agricultural technology in the Chinese province of Sichuan. This is followed by an evaluation of the impact of agricultural extension services on the technological level of efficiency of agricultural enterprises in Uzbekistan. Following the CAP reforms does the Common Agricultural Policy have less and less in common? the sixth article asks. In East Central Europe, in particular, EU agricultural policy is crucial

for the development prospects of agriculture and rural areas. The seventh article models the effects of various policy instruments on the transition to a climate-neutral economy in a peripheral bioeconomic cluster. The sustainability of agricultural enterprises that farm non-food crops is the subject of the eighth article. The overview of research projects is then rounded off by a report on the IAMO Forum 2022: 'Enhancing resilience in a post-pandemic era: challenges and opportunities

for rural development'. As ever, this is followed by the IAMO portrait, outlining the Institute's achievements and developments in 2022 with regard to fulfilling its three core tasks: (1) Research including third-party funding and publications, (2) Exchange of ideas between the academic, business and political communities with a focus on our regions of research and (3) Supporting young academics.

Thomas Glauben and Miranda Svanidze

**No trade-off:  
Global agricultural trade as  
a safety net in times of  
crisis**



# No trade-off: Global agricultural trade as a safety net in times of crisis<sup>1</sup>

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Thomas Glauben and Miranda Svanidze

## Hunger: A global threat

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**H**unger, war and climate change exist in a vicious cycle, and most at risk of the consequences are people living in the Global South. That is why the United Nations' sustainable development goals (SDGs) recognise that preventing armed conflict, mitigating climate change and combating hunger and poverty are the most urgent challenges facing the world today.

However, despite great effort and considerable success, it is unlikely that the SDG targets of ending global hunger and poverty by 2030 will be achieved. Although the number of people affected by hunger and malnutrition fell by 25 per cent, from 800 million to just under 600 million, in the first two decades of the 21<sup>st</sup> century (FAO et al., 2022), there have recently been some worrying setbacks. The United Nations Food and Agriculture Organization and others (FAO et al., 2022) estimate that the number of people affected by hunger has recently increased by 150 million, likely due to the

Coronavirus pandemic. It is furthermore expected that 700 million people, or close to 10 per cent of the world's population, will still be undernourished in 2030. This means that the world is currently trending away from the sustainable development goals. Indeed, the Global Hunger Index shows that the steady reduction in hunger over the past two decades has practically come to a standstill.

Southern Asia and sub-Saharan Africa are most affected by hunger and malnutrition. In 2021 just under 300 million people in Africa, or 20 per cent of the population, and more than 400 million people in Asia, or 10 per cent of the population, were affected by hunger (FAO et al., 2022). Countries frequently exposed to armed conflict and/or extreme weather events, such as drought or flooding, are even more vulnerable to food insecurity. These include South Sudan, Somalia, Ethiopia, Yemen, Syria and Afghanistan. In 2021 almost 200 million people

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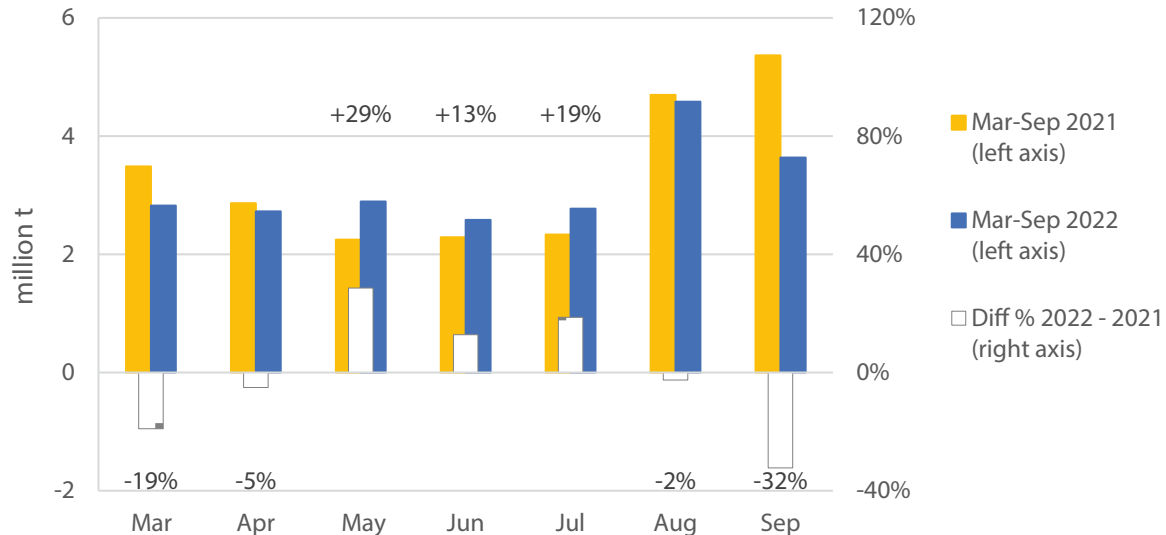
<sup>1</sup> This article is based on information and data up to May 2023.

in 53 countries and regions were affected by severe hunger. War and conflict were the cause of hunger for 140 million people living in 24 countries; economic shocks affected 30 million people living in 21 countries; and extreme weather events pushed 24 million people living in eight countries into food insecurity (FSIN, 2022).

The war in Ukraine has further (temporarily) threatened food security, especially in the poorer countries of the Global South, and FAO estimates that almost eight million more people have been affected by hunger. The global market prices for agricultural commodities such as cereals and vegetable oils, which in autumn 2021 had already reached the peak levels of the food crises of more than a decade ago (2007-08 and 2010-11), again rose in May/June

2022. Major importers of wheat from Russia and Ukraine, especially those in the MENA region and in sub-Saharan Africa, have been particularly affected. Supply shortages from the Black Sea region combined with high prices have compounded issues of food insecurity in these regions. However, as expected, the situation had already begun to ease a few months into the war (Glauben, 2023; Vos et al., 2023). Wheat supply gaps from Ukraine, for example, were largely compensated for by exports from other countries such as France, India and Australia (Glauben et al., 2022; Götz & Svanidze, 2023). Indeed, six months into the war, wheat exports to Africa had almost reached 2021 levels for the same period (March to September) (Eurostat, 2022; UN Comtrade, 2022; Refinitiv-Eikon, 2022).

FIGURE 1: Wheat exports to Africa in March to September 2021 and 2022



**Note:** the data show the percentage change between the two periods. The change over the entire period (March to September 2022 to March to September 2021) is -5%.

In the 2022-23 marketing year, markets stabilised, and Canada, the European Union, Australia and Russia experienced good harvests and were able to increase their exports. This caused wheat prices to fall significantly on international markets, such as EURONEXT, despite a considerable drop in exports from Ukraine and drought-affected Argentina (Vos et al., 2023). Prices fell almost 50 per cent from a peak of EUR 450 per tonne in March 2022 to EUR 230 in May 2023, indicating that grain prices have roughly returned to their pre-war level (with the uncertainties due to developments in Ukraine already priced in).

These developments demonstrate yet again that competitive agricultural trade on global markets is a suitable strategy to overcome the risk of regional supply shortages, whether caused by climate, crisis or politics. Indeed global agricultural markets are proving to be a reliable safety net when it comes to combating hunger.

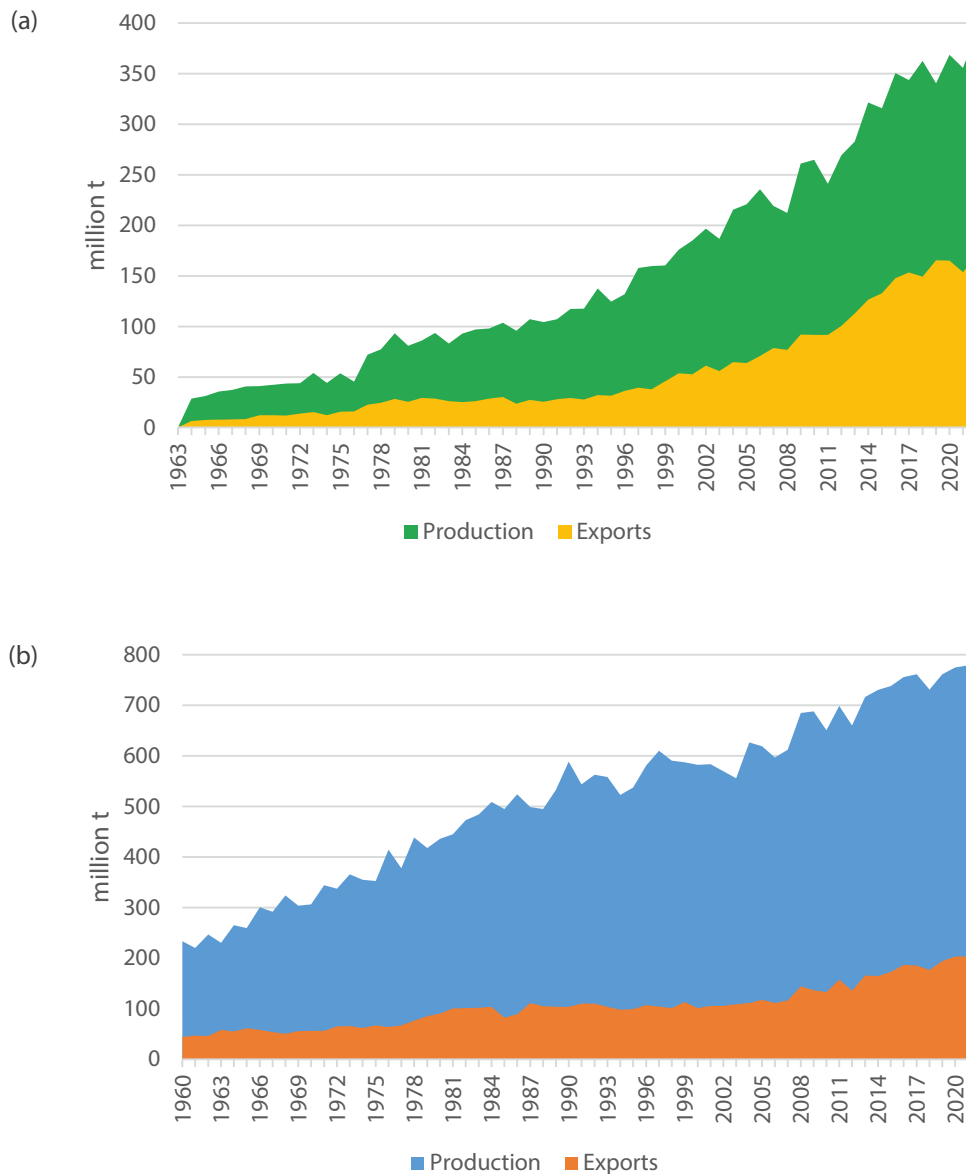
### **Greater agricultural trade meets the rising demand for food in the Global South**

A look to the past will illustrate just how dynamic and adaptable global agricultural trade is. The World Trade Organisation (WTO) has been a major driver of agricultural trade, and, since its founding thirty years ago, global agricultural exports have more than tripled, from USD 450 billion to USD 11.5 trillion (in nominal figures). This corresponds to an average annual growth rate of around five per cent (FAO, 2022). At the same time, real prices have fallen over the longer term, albeit with considerable fluctuations.

As a result, the trade share of production has increased for most agricultural commodities: for wheat it has grown from 18 per cent to 27 per cent; for soybeans it has grown from 25 per cent to 44 per cent; and for rice it has grown from five per cent to 11 per cent. For corn, however, it has remained roughly constant (USDA, 2023). Since the mid-20<sup>th</sup> century, trade and production of key agricultural commodities have been increasing steadily, and this has contributed to the global improvement in food security. Less than one hundred years ago, close to half the world's population was affected by hunger; today that figure is just under 10 per cent. Global wheat trade, for example, has increased fivefold since 1960, while production has quadrupled. For soybeans, an important livestock feed in meat production, the developments have been even more striking. In the mid-20<sup>th</sup> century, soybeans were produced and traded at an insignificant rate; in 2022, around 400 million tonnes were produced, almost half of which was exported.

It is widely acknowledged that high population growth, especially on the African continent, as well as rising incomes in Asia are driving the demand for imports. In terms of exports, increases in production and trade are largely the result of technological advances in production and distribution as well as the opening of international markets, i.e. the constant, though not always smooth, expansion of a largely free and multilateral (agricultural) trade system.

**FIGURE 2: Production and export of soybeans (a) and wheat (b), 1960–2022**





As such, agricultural trade has been an important means of improving the food supply to and reducing hunger in the Global South. At present Europe and America are net exporters of agricultural goods, while Africa and Asia are net importers (OECD/FAO, 2022). For example, the MENA region imports almost 70 per cent of its domestic food requirements, whereas North America imports less than 10 per cent. For most other regions, the proportion of imported foods varies between 20 and 30 per cent. Overall it is evident that, without trade, global hunger would be far worse.

In the future, international trade is expected to play an even greater role in meeting the growing global demand for food, while climate change and the accompanying extreme weather events, as well as armed conflicts in many poorer regions of the world, are expected to exacerbate the risk of hunger in the Global South. In many cases local adaptation will not be sufficient to mitigate these risks (Hornidge & Brüntrup, 2022). In the last 10 years, for example, the number of state and non-state conflicts has more than doubled. Around 60 per cent of people affected by hunger worldwide live in areas ravaged by armed conflict, where the agricultural systems are fragile and unstable (WPF, 2018). Africa, for example, has the highest frequency of armed conflict, and almost 70 per cent of its population is affected by food crises. This is another area where international agricultural trade is expected to play a greater role in the future.

## **Global agricultural trade is reliable and adaptable**

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It is clear that the development of a largely competitive and free global (agricultural) trade system has paid off. It has significantly contributed to better food security, especially in the Global South. This is a considerable achievement, particularly in view of recurring and severe market disruptions caused, for example, by temporary or ad-hoc interventions such as state export/import restrictions, sanctions and excessive bureaucracy and government control. In 2022 alone, such restrictions were introduced in around 30 countries, affecting up to 15 per cent of agricultural trade (Laborde & Mamun, 2022). Within a month of the COVID-19 outbreak being declared a pandemic (mid-March to mid-April), around 20 countries, including Russia, Ukraine, Kazakhstan, Turkey and Vietnam, had introduced restrictions on agricultural trade. At least in the short term, this reduced food availability in some North African countries by up to 40 per cent (Laborde & Mamun, 2022). In this context, as e.g. IAMO studies show, it is important to note that spiralling export restrictions, for example on wheat or rice, during the food price crises of 2008 and 2010 temporarily unsettled markets and drove prices even higher.

Despite these market disruptions and interventions, competitive global agricultural trade has proved to be highly robust. Indeed, over the last few decades, it has to a large extent bridged the (ever) changing supply gaps between producer and consumer regions. The WTO and its predecessors, such as the General Agreement on Tariffs and Trade (GATT), have certainly played a role here





Global Business Logistics concept

too by keeping political threats to open trade in check, facilitating the free movement of goods, and enabling the settlement of disputes.

Good examples of this are the international markets for wheat and soybeans. Both have experienced considerable growth but exhibit very different market configurations. The wheat market has a multipolar structure that is characterised by a very high number of supply and demand regions, while the soybean market is defined by a small number of (significant) regions with a considerable share of the market and shares similarities with a bilateral oligopoly.

Since the mid-20<sup>th</sup> century, regional supply and demand on international wheat markets have been heterogeneous and dynamic. In terms of exports, North

America and Australia have been among the biggest exporters of wheat since the 1960s, while Europe has been gaining market share since the 1980s. Since the beginning of the 2000s, 10 years after the dissolution of the Soviet Union, the Black Sea region has rapidly become a key supplier of wheat on global markets. In terms of imports, however, countries of the former Soviet Union, including the Black Sea region, were among the major wheat importers from the 1970s to the 1990s, which was at the same time as Europe was becoming a net exporter. Now, the populous regions in Africa and Asia, especially China, are driving import demand.

**FIGURES 3 and 4** illustrate the change of market share among wheat exporting countries over time on the world market and on the African market.

FIGURE 3: Wheat exports by main exporters (%), 1991–2021

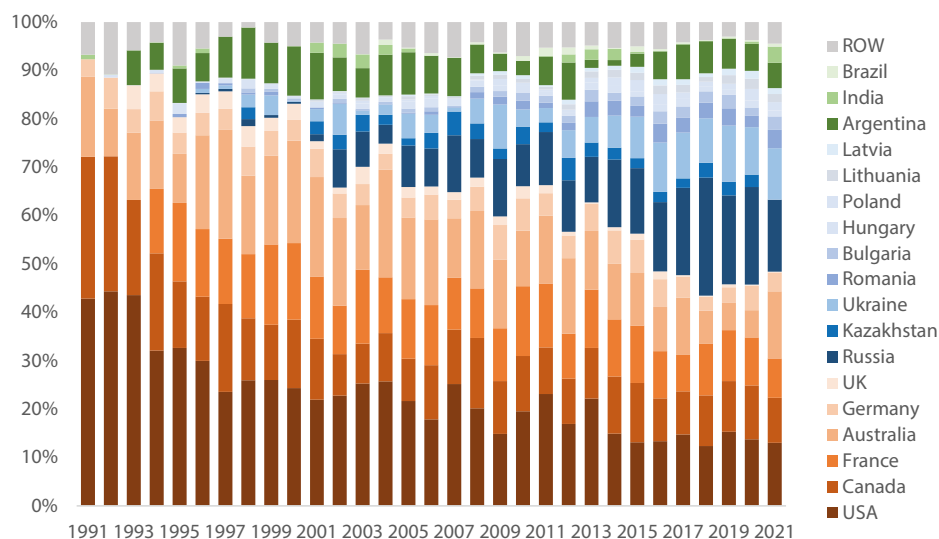
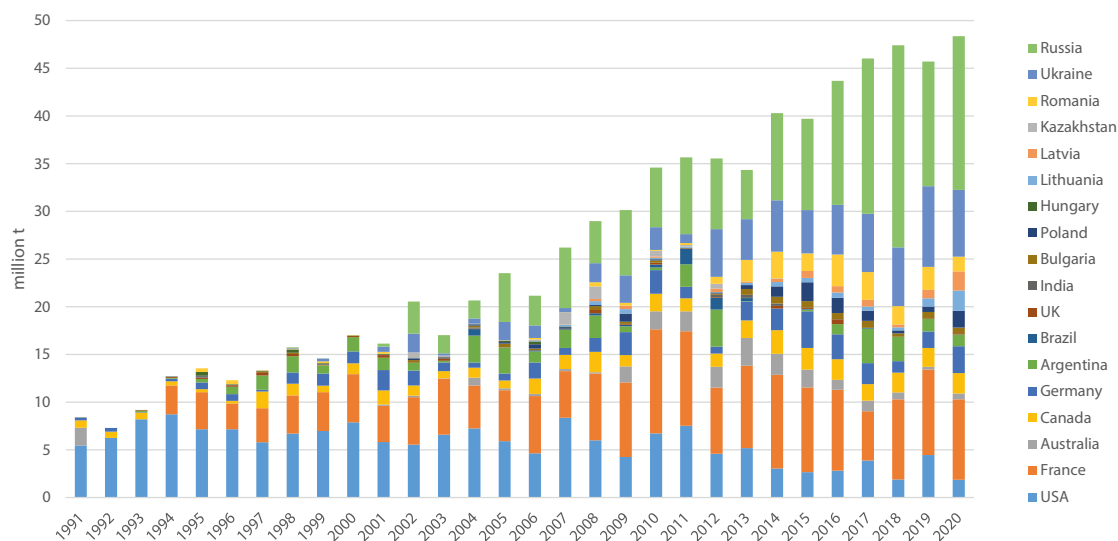


FIGURE 4: Wheat exports to Africa, 1991–2021



Particularly when it comes to supplying wheat to food insecure regions in Africa, it is clear that the former planned economies of Eastern Europe, especially Ukraine and Russia, have massively increased their market share since the start of the 2000s. In contrast, almost all other exporters, such as North America, have reduced their market share.

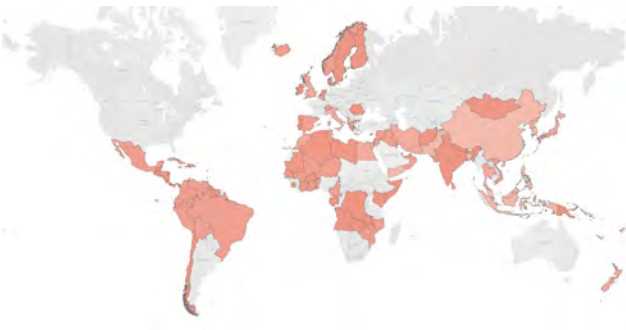
At the same time, the huge growth in international wheat trade, which has not been restricted to established markets, has led to a noticeable and gradual diversification of regional import and export structures, i.e. the market has become less concentrated. This may have further contributed to the resilience of trade and supply. As can be seen in **FIGURES 5 and 6**, the number of export countries per import country has significantly risen over the past 30 years from between one and five in 1991 to between five and 18 in 2020. This is particularly true of Africa and Asia. As a result, the largest wheat exporter's share of global trade has halved from about 12 per cent to six per cent. At the same time, the share of the largest wheat exporter to any particular importing country has fallen from an average of about 45 per cent to 20 per cent. On the South American continent and in Central Asia, in contrast, the diversification of trade partners is comparatively low. It is certainly of interest that the most extensive (annual) bilateral trade flow has fallen from 12 per cent to four per cent of overall trade in the past 20 years.



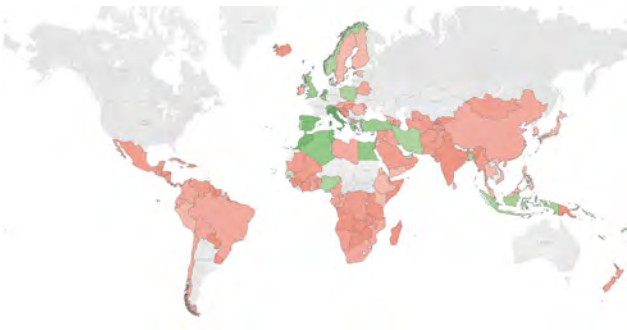
In the global grain trade, Ukraine and Russia in particular have become increasingly important as export nations since the early 2000s.

FIGURE 5: Number of wheat trading partners on average per import country for the years 1991 to 2020

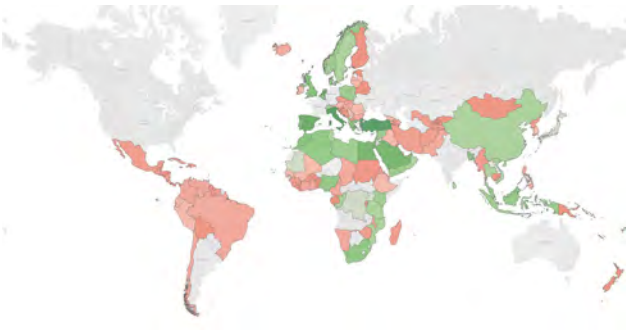
1991



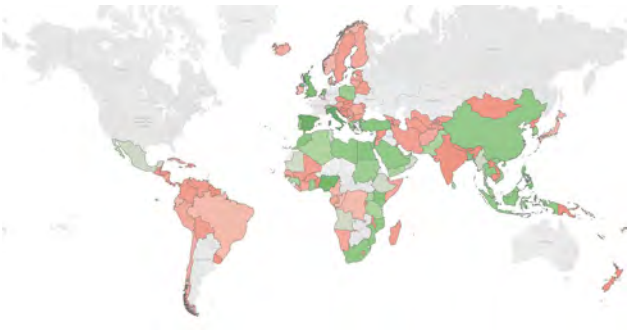
2001



2011



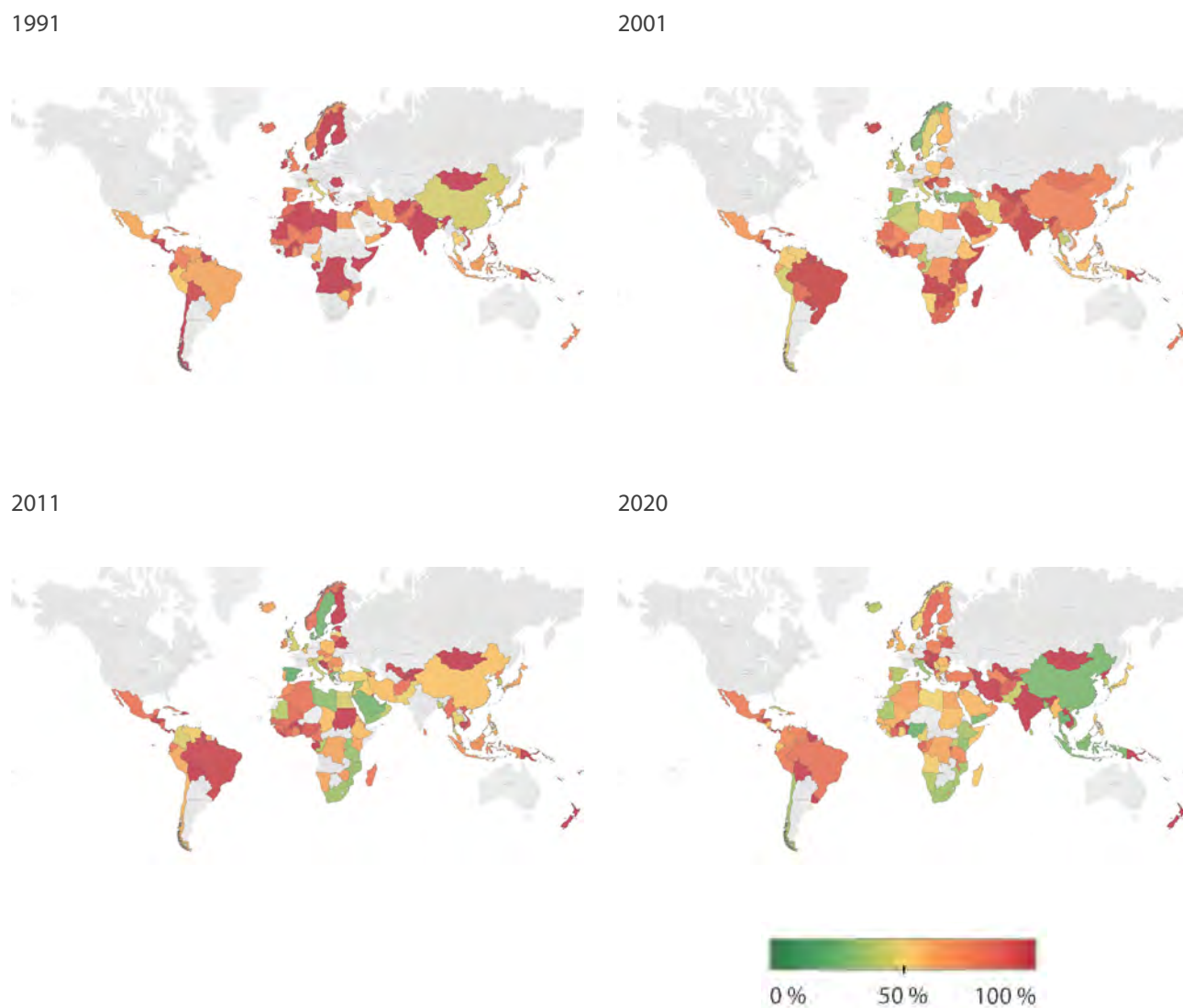
2020



**Note:** wheat trade between countries under 1,000 tonnes was left out.



FIGURE 6: Share of the largest wheat supplier to destination country (%), for the years 1991 to 2020



**Note:** wheat trade between countries under 1,000 tonnes was omitted from the calculations.

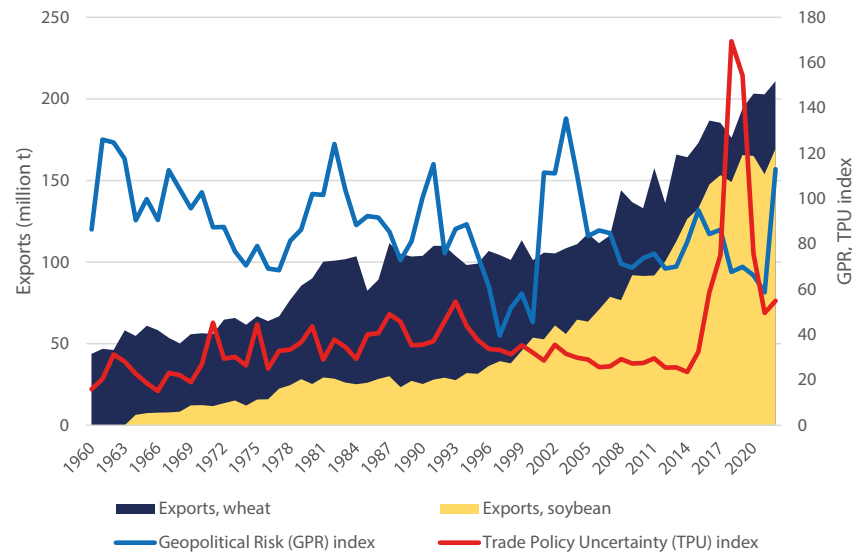
As mentioned above, soybean trade grew even more than wheat trade, and, like with wheat, real prices also fell over the long term. However, despite the considerable growth in production and trade, the soybean market remains highly concentrated on both the supply side and the demand side. Global soybean exports are dominated by the US and Brazil, while China, which uses soybeans mainly as feed for animal production (soybean meal) or in the form of soybean oil for human consumption, is by far the largest import market. Over the past 20 years China's share of global soybean imports has almost doubled from 35 per cent to 60 per cent. The largest exporter's share of global trade has remained roughly constant at 40 per cent, although Brazilian exports have overtaken US exports in recent years. A significant contributing factor is the recent trade conflict between the USA and China. Whereas in the past, the USA and Brazil would meet China's soybean demand in a 'complementary' way, Brazil now makes up for the USA's 'deficits'. Therefore, even thin markets are able to compensate for supply shortages from one region with additional supplies from other regions.

What conclusions can be drawn from this? All in all, these observations point to a highly reliable and functioning market-driven system, which, through a combination of more stable export relations and flexible adjustment processes, is able to balance supply in certain regions with demand in other regions. Measured against realistic performance criteria rather than ideal targets, it is clear that the agricultural trade is performing well.

A recent econometric analysis of the stability of the global wheat market from 2001 to 2021 supports this assessment (Jaghdani et al., 2023). The study comes to

the conclusion that at the end of the observation period (2021) both 'old' and 'new' actors demonstrated different probabilities of continuing with, i.e. maintaining the stability of, their wheat exports. This is indicative of a good mix, so to speak, of trade relations. The stability of supplies from Canada, Australia, the USA and Russia was found to be high; the stability of supplies from Romania, Ukraine and Germany was found to be mid-level; and the stability of supplies from Kazakhstan and Argentina was found to be low. It must be noted here that events in 2022-23, such as the war in Ukraine and the escalating trade conflict between the USA and China, cannot yet be factored in due to a lack of available data, even though they will presumably have a direct or indirect impact on future agricultural trade relations. Even findings of older econometric analyses, including IAMO studies, on the pricing behaviour of large wheat exporters do not indicate the exercise of market power, i.e. market disruptions, on a large and worrying scale in international trade.

If we look at long-term developments in wheat and soybean trade over the past 60 years and overlay them with the potential risks to trading, as depicted in **FIGURE 7**, we can see that trade has proved to be highly robust in the face of geopolitical risks and trade policy uncertainties.

**FIGURE 7: Geopolitical risk, trade policy uncertainty and wheat and soybean trade, 1960–2022**

### **Black Swan: Free markets are not the problem; they are part of the solution**

Despite this, global (agricultural) trade still faces threats that could significantly impact food security in the Global South. Geopolitical posturing, political power plays, competition between (political and economic) systems, cold and hot conflicts, and wars are all threatening to divide the world into (new) blocs. Isolation, planned economies and ambitions of autarky seem once again to be routine political ideas. In addition, climate change is threatening to complicate things further. This evokes the idea of a black swan—a rare and unpredictable event that could have widespread consequences (Taleb, 2007).

The WTO's global rules of trade, based on the GATT principles, are now at risk of becoming obsolete.

Traditionally these have focused on a shallow integration. In addition to adhering to principles such as transparency, most-favoured nation treatment and reciprocity, they promote the removal of trade barriers such as tariffs, subsidies and discriminatory protective regulations.

Currently a number of voices are calling for social values, domestic supply and, more recently, national security to be considered when it comes to global (agricultural) trade and business relations. The idea is to reduce dependency on nations that are not like-minded. Demands are increasingly being made for isolation and the (micro) control of international markets—all in the name of sovereignty. The voices of planned-economy enthusiasts and so-called geopolitical strategists are becoming more prevalent in public discourse as they call for state intervention to promote greater regional

diversification of trade relations and higher levels of self-sufficiency. There is no lack of proponents advocating for transnational trade relations to be based on social values, *sine qua non*.

However understandable the desire to ensure domestic supply, these objectives and demands are questionable and poorly weighed. At their core is the misguided hope that isolation from, or state control of, international (agricultural) trade could be key to reducing future supply risks (Bentley et al., 2022). However, the real concern is that the exact opposite could happen if we move away from the tried and tested principles of a free market to a sort of (partially) planned global economy. In terms of agricultural trade, this could provoke food shortages in the Global North and trigger a complete breakdown of food supply chains in the Global South—with all the consequences that go with that. Politically motivated agricultural trade structures will not (be able to) replace the free market. In fact, they will impede rather than improve food security.

It is clear that such ideas of a planned-economy nature will only hurt the market's ability to freely regulate supply, price and innovation. Any cost advantages will be quickly absorbed. Furthermore, supply disruptions caused by weather, crisis or politics in certain regions will no longer be able to be mitigated by imports from other regions. The predictable consequence of this is that prices will skyrocket, assuming goods are still available, and the 'safety net of global agricultural trade' will be weakened. Furthermore, natural resources used in agricultural production could go to waste, which would be to the detriment of environmental goals and progress.

Given the way the wheat and soybean markets have developed, it is clear that the more or less open

trading system of the past few decades has proved to be robust and adaptable to shocks and (sometimes dramatically) changing circumstances. Supply and demand on the wheat market has diversified according to market conditions and risk factors. What bureaucratic institution would be able to regulate such complex systems anywhere near as efficiently and accurately as the free market? At any rate, experiences from formerly planned economies or even the highly interventionist EU taxonomy give no cause to trust the state control of trade.

The real absurdity comes when vague geopolitical considerations call for (agricultural) trade to be carried out only with nations that share the same social norms and values, such as (purely) democratic regimes. This has nothing to do with the admirable wish to ensure that trade partners who, for example, observe minimum social or environmental protection standards are not disadvantaged. Rather, it reaches further into trade partners' political and social structures. If (agricultural) trade were forced to adhere to such normative and moral-driven principles, there would be hardly anyone to trade with, especially in the Global South. Furthermore, there is no way to enforce these ideas without creating a bureaucratic planned-economy monster. It is clear that this would massively increase hunger in the Global South, where the high social costs of such dangerous geopolitical "gimmicks" would be predominantly borne by the poorest of the poor.

In simple terms, state controlled agricultural trade structures do not improve food security. On the contrary, all experiences show that predominantly free and competitive trade in essential agricultural commodities works to overcome supply disruptions and hunger in the Global South.



It goes without saying that trade alone is not a panacea to reduce the risk of hunger in vulnerable regions. Despite many successes in the past, we cannot expect miracles. Local and regional development processes are also very important, but these will take time and patience. Neither hunger nor poverty can be rapidly transformed away by ideas plucked out of the air. At local level there are promising, innovative approaches to organising food production in ways that are more sustainable, climate adaptive and less resource intensive. This will also allow us to adhere to environmental requirements and meet the challenges of climate change, such as regular droughts and extreme weather events (Kray et al., 2022). Investment in research, education and extension services is necessary for the (further) development of modern agricultural systems. Especially in research and education, the international exchange of ideas is crucial to regional development.

Competitive agricultural trade is also a means to promote efficiency, particularly in the age of digitisation. Further increases in efficiency can improve allocation in global and local value chains (Barrett et al., 2022). Studies, including IAMO papers, suggest that investment in market infrastructure as well as physical structures, such as transport, and information structures is key to the

regional and vertical integration of market actors at the various stages of value chains (Svanidze and Götz, 2019). Moreover a (more) widespread use of international futures markets by traders and farmers could bolster protection against price risks (Pies et al., 2015).

Our final observation goes beyond the scope of this paper: regardless of how it is structured, a centrally controlled trade system is no way to improve national and internal security. Dealing with international or intergovernmental conflict and promoting political interests and values is a job for diplomats and politicians, especially in foreign policy and defence. (Sinn quoted according to ZDF heute, 2022).

If diplomats truly believe that politically motivated interventions at the expense of global trade relations or partnerships in science and culture are a sensible way of solving or mitigating (geo)political conflicts—and this is highly questionable—then there should be clear expectations as to the effectiveness and foreseeable costs of such interventions. Reversing global relations will come at immense risk and great social cost, not only with regard to ensuring that the global population has access to goods and services but also with regard to the possibility of ever overcoming global challenges such as climate change and poverty.

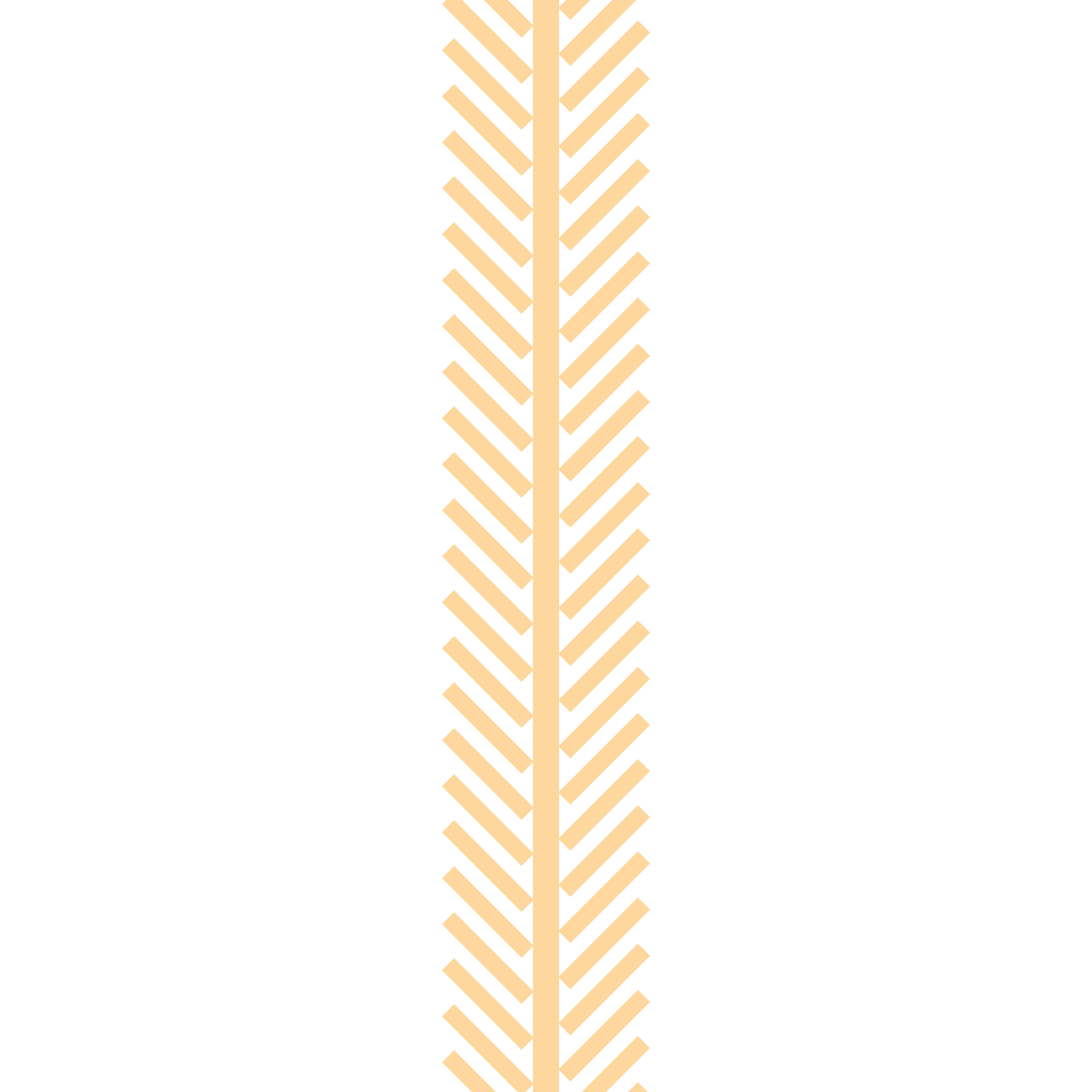
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## Diagram sources and acknowledgements

- TITLE** Price growth chart against the background of wheat ears and hands with digital tablet © scharfsinn86 – stock.adobe.com
- FIG. 1** Wheat exports to Africa in March to September 2021 and 2022 © Own illustration. Data: Eurostat (2022) for EU exports, Refinitiv-Eikon (2022) for exports from Russia and Argentina, UN Comtrade (2022) for the rest.
- FIG. 2** Production and export of soybeans (a) and wheat (b), 1960–2022 © Own illustrations. Data: USDA (2023)
- P. 15** Business Logistics concept, Global network coverage world map, Truck with Industrial Container Cargo for Logistic Import Export at yard © Pugu & Photo Studio – stock.adobe.com
- FIG. 3** Wheat exports by main exporters (%), 1991–2021 © Own illustration. Data: UN Comtrade (2022)
- FIG. 4** Wheat exports to Africa, 1991–2021 © Own illustration. Data: UN Comtrade (2022)
- P. 17** Dollar banknotes, calculator and wheat grains on wooden background. Agricultural income concept © Africa Studio – stock.adobe.com
- FIG. 5** Number of wheat trading partners on average per import country for the years 1991 to 2020 © Original depiction and accompanying data are available at the data visualisation platform Tableau Public (<https://rb.gy/utymrx>). Data: UN Comtrade (2022)
- FIG. 6** Share of the largest wheat supplier to destination country (%), for the years 1991 to 2020 © Original depiction and accompanying data are available at the data visualisation platform Tableau Public (<https://rb.gy/wf3lyg>). Data: UN Comtrade (2022)
- FIG. 7** Geopolitical risk, trade policy uncertainty and wheat and soybean trade, 1960–2022 © Own illustration. Daten: USDA (2023); Caldara und Iacoviello (2022); Caldara et al. (2022)





Salima Bekbolotova, Nodir Djanibekov,  
and Thomas Herzfeld

**The impact of EAEU membership on the agri-food  
trade of Armenia and Kyrgyzstan**

# The impact of EAEU membership on the agri-food trade of Armenia and Kyrgyzstan

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Salima Bekbolotova, Nodir Djanibekov, and Thomas Herzfeld

## Introduction

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The customs union of the Russian Federation, Kazakhstan, and Belarus, formed back in 2010, developed into the Eurasian Economic Union (EAEU) to promote free movement of goods, services, capital, and labor and pursue a coordinated, harmonized, and uniform policy in the sectors determined by the Treaty and international agreements within the Union (EAEU, 2022). In 2015, Armenia and Kyrgyzstan acceded to the EAEU. Both in terms of size and export potential these two new members are very different from the founding members of the union.

Economic integration theories assume that regional integration can generate opportunities for trade creation and lead to trade diversion for member countries (Viner, 1950; Balassa, 1961). Countries engaging in an integration process can benefit from developing new industries, specialization in sectors with a competitive advantage, increasing bargaining power with respect to third countries, and reduced external vulnerability (Balassa, 1961). Economic integration theories also warn of negative aspects, however, such as increasing regional inequality or uneven distribution of gains (Nader et al.,

1993), deterioration of living standards, political, and macroeconomic vulnerabilities (Viner, 1950; Balassa, 1961).

Although diverse in their predictions, the studies agree on the following: (1) an intensification of integration processes has reshaped the global economic landscape during the past quarter century; (2) the impact of integration processes on a member country's well-being is not straightforward. To date, no reliable ex-post quantitative evaluation of the economic impacts of the EAEU membership on small economies is available. The provision of evidence and information is critical for making decisions on trade policy. Adarov (2022) conducts a robust economic evaluation of the impact of the EAEU but focuses on bilateral trade between Russia, Belarus, and Kazakhstan. This study, therefore, aims to contribute empirical evidence to the ongoing discussions about the impact of EAEU membership by identifying the scale and the causal inference on changes in external trade by Armenia and Kyrgyzstan. The hypothesis implies that accession to the regional economic union brings trade creation benefits for its new members.

## Evaluation model

To evaluate the causal relationship between accession to the EAEU and the observed development of external agricultural trade of the two countries Armenia and Kyrgyzstan, we applied the Dynamic Multilevel Model with a Latent Factor term (DM-LFM) proposed by Pang et al., (2021) as an alternative to the synthetic control method for comparative case studies, like ours with Armenia and Kyrgyzstan, using time-series cross-sectional data. The DM-LFM model treats the causal inference as the “missing not at random” data problem and relies on the posterior predictive distribution of treated counterfactuals to draw inferences about the treatment effects on the treated (Pang et al., 2021).

The dataset represents a panel of 16 countries for a total period of 25 years. Four indices are assessed as outcome variables: total export value index, total import value index (World Bank, 2022), export value index of agricultural products, and import value index of agricultural products (FAO, 2022).

The group of untreated countries, i.e. states which are not members of the EAEU or any other economic union, is selected based on the similarity of economic processes to those in Armenia and Kyrgyzstan. It includes seven post-Soviet countries (Azerbaijan, Georgia, Moldova, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan), four transition Southeast European countries (Albania, Bosnia and Herzegovina, North Macedonia, and Serbia), and three nearby Asian countries (China, Mongolia, Turkey). Other post-socialist countries had to be excluded as either they are part of the EAEU, joined other economic/customs unions before 2015, or do not report



Wheat production in Kyrgyzstan

data to international platforms. Armenia and Kyrgyzstan represent the two countries for which a treatment effect will be quantified.

The predictors of trade were selected based on the factor endowment theory of international trade and recent studies on common determinants of trade. Each country's exports and imports are explained by the EAEU membership status and other trade predictors, which reflect countries' volume of land, resources, capital, and labor, including the following indicators: agricultural land, GDP, gross fixed capital formation, and population growth. We also added other common trade determinants, such as foreign direct investments (Zhang, 2006), the rule of law (Ewing-Chow et al., 2014), and exchange rates (Haberler, 1961).



## Preliminary findings

The treatment effect estimates within the statistical model (DM-LFM) represent the difference between Armenia and Kyrgyzstan's observed exports and imports compared to their synthetic counterfactual after treatment. The gap between both curves shows how much higher or lower exports and imports would be than without treatment. **FIGURE 1** presents the estimated results for total trade in the upper panels and for agricultural trade in the lower panels. The diagram shows that the estimated counterfactuals closely reproduce the export and import trajectories of actual values before 2015 (the pre-treatment period). After 2015, predicted trade is below observed trade in almost all years. The case of agricultural imports (lower-right panel) represents an exception: here, predicted trade outperforms observed trade. The decline in agricultural imports as a result of accession could be explained by the import substitution strategies in agriculture and import quotas applied by the target countries.

**TABLE 1** summarizes the joint and individual effects of accession to the EAEU on trade for Armenia and Kyrgyzstan. Given the observed data, the effect of economic integration on the total exports of two countries has a 95 per cent probability of falling within the range between 82 and 176 index points. Armenia's EAEU accession tends to have a higher trade-increasing effect than Kyrgyzstan. The results show that agricultural exports of Armenia and Kyrgyzstan increase due to accession and with a 95 per cent probability fall in the range between 6 and 37 index points. While the individual effect for Armenia is positive, the estimated treatment effect for Kyrgyz agricultural

exports has a range that includes zero, suggesting that the effect could be even slightly negative. With respect to agricultural imports, the results do not reveal strong evidence of increasing trade. Looking at both countries separately shows that Armenia's agricultural imports change only slightly and Kyrgyzstan's imports decline between -38 and -4 index points, which may be caused by import-substitution strategy, import quotas, and higher barriers for imports from non-EAEU countries.

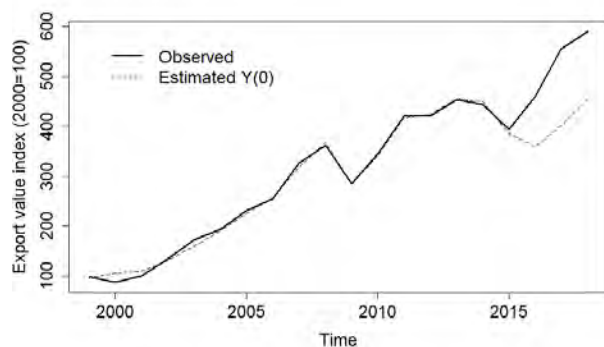
## Discussion

The results of our study for Armenia and Kyrgyzstan coincide with a previous study by Adarov (2022). However, while the author identified trade creation and trade diversion effects for the EAEU's founding members, these effects are quite heterogeneous across sectors and diminish over time. Thus, the variation in (potential) gains from agricultural trade within the customs union depends on a country's trade structure, size, and competition from other member countries.

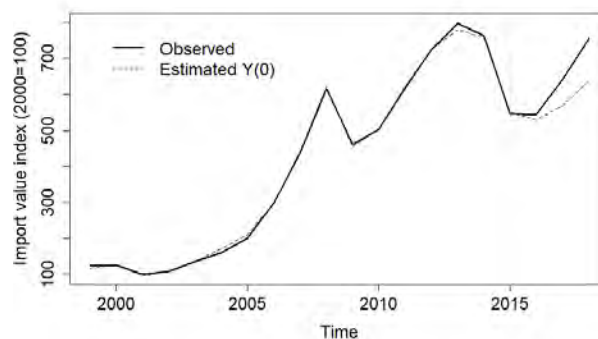
The EAEU market accounts for nearly 57 per cent of total Armenian and Kyrgyz agricultural exports in 2020. Within the 5 years of EAEU membership, however, Armenian exports to Russia diversified. The share of agricultural products decreased from 75.6 to 59 per cent of Russia's total imports from Armenia. But agriculture still represents the most important sector for Armenian exports to Russia. The share of Kyrgyz agricultural exports flowing to Russia increased from 8.9 to 32.6 per cent, climbing to the leading position across all sectors (The Growth Lab at Harvard University, 2022).



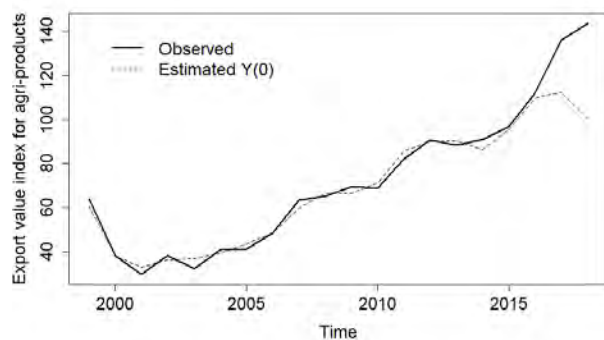
FIGURE 1: EAEU effect on exports and imports of Armenia and Kyrgyzstan



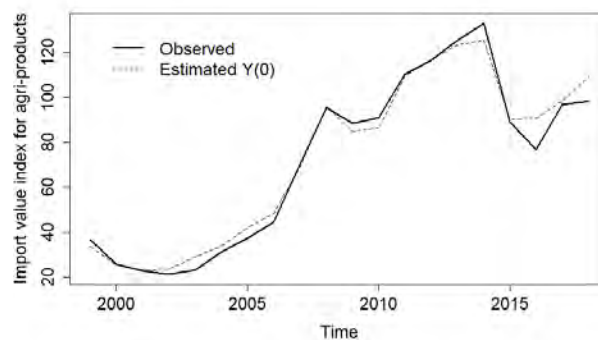
- a) Joint effect of accession to the EAEU on **total exports** of Armenia and Kyrgyzstan in 2015-2020



- b) Joint effect of accession to the EAEU on **total imports** of Armenia and Kyrgyzstan in 2015-2020



- c) Joint effect of accession to the EAEU on **agricultural exports** in Armenia and Kyrgyzstan in 2015-2020



- d) Joint effect of accession to the EAEU on **agricultural imports** in Armenia and Kyrgyzstan in 2015-2020

Both countries improved their relative positions in the Russian import of agri-food products after joining the EAEU (TABLE 2). Armenia stayed in, or entered, the top 10 import origins for beverages, vegetables, and fish and the top 21 import origins for the remaining principal export items to the Russian market. Although the ranking of Kyrgyz agri-food exports increased substantially, it still is not in the top 10 countries of origin from Russia's perspective.

Several issues related to the functioning of the EAEU and the trade data quality might have affected the estimation results:

- **Depth and completion of the EAEU integration.**

Armenia accelerated export processing through online submission of customs declarations in 2018-2019 (World Bank Group, 2020a). Kyrgyzstan did not significantly improve its customs procedures and other administrative processes. In 2019, the countries' ranking according to the 'trading across borders' indicator, measuring time and cost of logistics of exports and imports, was 43 in the case of Armenia vs. 89 for Kyrgyzstan (out of 188 economies globally). The time to export/import in terms of documentary compliance (in hours) is 35 times higher than in Armenia and the costs of export/import is 2 to 4 times lower in Armenia than in Kyrgyzstan (World Bank Group, 2020b). Depending on the sector, export procedures can take up to one month, mainly because of certification processing in Kyrgyzstan (UNECE, 2021). By contrast, a 10 per cent increase in customs delays is expected to result in a 4 per cent drop in exports (World Bank Group, 2020a).

- **Fair border statistics or unrecorded trade.** The concerns of unrecorded trade, smuggling, and corruption in customs administration are serious in Kyrgyzstan. Corruption scandals around former customs officials provoked social unrest and revolution in 2020. The scale of trade discrepancies is subject to sector specificity, i.e. 'bazaar goods' are underreported in official statistics due to simplified regulations at the single-digit level and because small import quantities are exempted from declaration (Mogilevskii, 2012).
- **Re-exports.** The share of Kyrgyz re-exports increased 14.5 times in the first five years after EAEU accession, reaching 43.6 per cent of total exports in 2020. By contrast, Armenia's share of re-exports fell from 12.3 to 8.5 per cent (United Nations Statistics Division, 2022). Since export statistics include re-exports, the value of Kyrgyz exports is probably overstated. Thus the findings of the study on the impact of the EAEU accession on total exports might be overstated.

## Conclusions

This study supports the initial hypothesis that economic integration brings trade creation benefits for newly joined member countries. However, the effect is case specific at country and export-type levels. Our results indicate that accession to the EAEU produced: (a) a positive joint effect for Armenia and Kyrgyzstan on total exports and agricultural exports, (b) positive effects on total and agricultural exports of Armenia individually, (c) a positive effect on Kyrgyzstan's total exports, and (d) negative effect on Kyrgyzstan's agricultural imports.

**TABLE 1: Average Treatment of Armenia's and Kyrgyzstan's EAEU membership**

	Joint effect			Individual effect for Armenia			Individual effect for Kyrgyzstan		
	ATT avg.	Lower bound	Upper bound	ATT avg.	Lower bound	Upper bound	ATT avg.	Lower bound	Upper bound
<i>Trade indices</i>									
Export value index	<b>128.90</b>	82.61	175.78	<b>245.66</b>	184.97	312.5	<b>116.98</b>	22.17	215.2
Import value index	<b>47.72</b>	-24.83	123.28	<b>85.27</b>	-2.20	164.02	<b>-10.49</b>	-117.37	100.61
Export value index for agri-products	<b>21.43</b>	5.60	36.69	<b>41.46</b>	17.73	68.30	<b>22.07</b>	-28.41	73.80
Import value index for agri-products	<b>-9.13</b>	-20.40	2.42	<b>4.63</b>	-7.63	17.28	<b>-20.80</b>	-37.61	-4.03

**TABLE 2: Russia's principal agricultural import items from Armenia and Kyrgyzstan**

Principal agri-import item, 2020	Importer ranking to total importers of the imported item			Principal agri-import item, 2020	Importer ranking to total importers of the imported item		
	2015	2020	Δ		2015	2020	Δ
Beverages	7/90	3/88	+4	Diary products	51/53	12/56	+39
Fish	18/58	10/57	+8	Vegetables	26/86	14/73	+12
Fruits and Nuts	31/94	21/91	+10	Fruits and Nuts	52/94	37/91	+15
Vegetables	18/86	9/73	+9	Paper and paperboard	71/82	31/82	+40
Prep. of vegetables, fruit or nuts	23/86	11/89	+12	Articles of leather	75/86	17/86	+58
Tobacco	29/74	17/74	+12	Fish	-	25/57	+25
Diary products	13/53	16/56	-3				



Armenian agriculture is mainly based on the cultivation of fruit and vegetables as well as tobacco.

## Literature

Given the evidence provided by the observed data, however, (e) no conclusive effects are derived for both countries' agricultural imports, Kyrgyzstan's agricultural exports or Armenia's total imports.

The Armenian case suggests that success, i.e. gains from trade, is pre-determined by the ability of the country to secure its market niche and low trade barriers. Kyrgyzstan's agriculture can benefit from regional integration by promoting the country's export potential by establishing niche products for the EAEU market and eliminating the internal barriers to trade at the Kyrgyz-Kazakh border.

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- TITLE** Wheat field for a mountain range in Kyrgyzstan, photo: L. Kuhn © IAMO
- P. 29** Wheat production in Kyrgyzstan, photo: L. Kuhn © IAMO
- FIG. 1** **a)** Joint effect of accession to the EAEU on **total exports** of Armenia and Kyrgyzstan in 2015-2020, **b)** Joint effect of accession to the EAEU on **total imports** of Armenia and Kyrgyzstan in 2015-2020, **c)** Joint effect of accession to the EAEU on **agricultural exports** in Armenia and Kyrgyzstan in 2015-2020, **d)** Joint effect of accession to the EAEU on **agricultural imports** in Armenia and Kyrgyzstan in 2015-2020 © Own illustrations. Data: Own calculations
- TAB. 1** Average Treatment of Armenia's and Kyrgyzstan's EAEU membership © Own calculations
- TAB. 2** Russia's principal agricultural import items from Armenia and Kyrgyzstan © Own elaboration. Data: Atlas of Economic Complexity Database, The Harvard Growth Lab (2022)
- P. 34** Tobacco field, Armenian agricultural landscape © Crazy nook – stock.adobe.com







Borislav Rajković, Ivan Đurić, Vlade Zarić,  
and Thomas Glauben

**Reconsidering consumer  
preferences for organic food  
in Serbia: Does farmers' social  
media presence play a role?**

# Reconsidering consumer preferences for organic food in Serbia: Does farmers' social media presence play a role?

Borislav Rajković, Ivan Đurić, Vlade Zarić<sup>1</sup>, and Thomas Glauben

## Introduction

Substantial changes in the European agricultural landscape are anticipated for the next decade. Policies formulated in the form of Green Deal, Farm to Fork and Biodiversity Strategies should pave the way to more environmentally and economically sustainable agricultural production (European Commission, 2021). In line with the predicted changes and the existing emphasis on organic production, the profile of the European food market is also expected to change (Mazurek-Kusiak et al., 2021; Prandecki et al., 2021), redefining attributes that determine producers' competitiveness. The effects of such changes impact not only EU members but also candidate countries such as Serbia. As of 2019, import tariffs for agricultural products between Serbia and the EU are practically non-existent, demonstrating that the level of integration of Serbia's food market into the wider European market is already high.

Because of this high level of integration, the urgent need to make supply chain members in Serbia more resilient is driven by the wide-scale market changes in the EU. A potential failure to compete in the new market conditions could have far-reaching negative consequences both economically and socially, as agriculture still plays a significant role in gross domestic production and employment in Serbia. Ultimately, the adverse effects of such developments would be antagonistic to the aims of the aforementioned EU policies in shaping future EU market developments.

In light of this urgency, we are exploring the idea of using social media to improve the resilience of small family producers in Serbia. The information revolution and the rise of social media mean that it has never been easier to generate and transfer information more cheaply and rapidly. Furthermore, the benefits of such information transfer are not tied to investment cycles or

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variable costs – i.e. after the infrastructure requirements (internet access) are met, the creation and transfer of (valuable) information are mostly self-sustainable (Bakshy et al., 2012). Finally, internet communication and social media are global phenomena present in both developed and developing countries. The differences between these two groups of countries do exist, but they are relatively small, with a trend of shrinking (Kemp, 2023).

We consider farms' social media presence as a suitable approach in a time of significant market changes. Such an approach is also complementary to existing strategies aimed at meeting the challenges of agricultural production scattered over small production units. Obtaining price premiums via organic products has been recognized as a viable way for small family farms in Serbia to achieve economic sustainability (e.g. Ministry of Agriculture Forestry and Water Economy of Serbia, 2014). Building on that, we perceive the social media approach as appropriate for small producers as there are no high implementation costs. Moreover, as mentioned above, creating and exchanging information online is practically without variable costs and thus affordable for many small producers.

Obtaining price premiums for such producers mainly depends on credence attributes (i.e. attributes that consumers cannot detect before or after the moment of consumption). Organically produced is the best-known credence attribute, and in that case producers usually opt for trustable third-party certificates to obtain price premiums. However, the number of credence characteristics plausible for consumers is rising (e.g. locally produced from family farms) at a speed that certification regulations cannot keep pace with. Because

of this, we regard social media as a suitable way of presenting the whole "picture" of complementary and plausible characteristics that can be both certifiable and non-certifiable: organically produced and originating from small farms.

To capture the effects of small producers' social media presence, consumers' initial trust is defined as a variable of interest. The relationship between consumer trust towards the producer and the producer's social media presence has already been substantiated in the literature (e.g. See-To & Ho, 2014). This study aligns with such literature examples, with a focus on consumer trust effects in a short-term dimension (initial trust). In a controlled experiment, therefore, we needed to simulate a situation where a consumer has no previous experience of a product or a producer.

By using a mixed logit (MXL) model and hybrid choice models (HCMs), we need to address the following questions:

1. What are the differences in consumers' preferences and willingness to pay (WTP) considering product types and different ways of the farm's social media presence?
2. Does the farm's social media presence affect initial consumer trust, and is it related to the estimated consumer preferences?
3. How do the effects of the farm's social media presence and consumer trust differ between different types of products (conventional, from conversion process and organic)?

In the analysis, the effects of three attributes were considered: (1) production type attribute with levels: (a) conventional, (b) produced in conversion process (conventional to organic), and (c) organic; (2) online presence attribute with three levels: (a) no online presence, (b) web page, and (c) social media page; (3) price attribute with five levels.

## **Data collection**

The questionnaire consisted of three parts: (1) consumer trust-related questions, (2) discrete choice experiment sets, and (3) socio-demographic questions. There were nine segments of the questions related to consumer trust (Morgan & Hunt, 1994; Walsh & Beatty, 2007), as the attributes of product type and online presence each have three levels (TABLE 1).

Mockups of web and social media pages were used to simulate farms' online presence to respondents. In all cases, the mockups represented small family farms, which are very common in Serbia and relevant for the expected practical outcomes of this paper. As certain advantages exist in providing a sense of interaction when using social media (Labrecque, 2014), simulated communication between the producer and consumers was added to the social media (Facebook) page mockups (FIGURE 1).

## **Design of the choice experiments and the sampling process**

We have used a Bayesian D-efficient sample design (Rose & Bliemer, 2005). The final design of discrete choice experiment is obtained by using a sequential approach based on multinomial logit probabilities. The applied sequential approach consists of three steps (FIGURE 2). The final survey included 15 unlabelled choice sets per respondent. Every choice set consisted of two products (tomato) plus an opt-out option. Products were presented with three attributes: (1) online presence (levels: offline, web page and social media page), (2) production type (conventional, in conversion to organic and organic) and (3) price (one out of the five price levels).

The data for 140 respondents were collected in autumn 2021 from the population of university students who are also social media users. The process was carried out with a self-administered online survey. The online survey type was selected because of the difficult COVID-19 situation in Serbia at the time, but also because of certain advantages the online environment can provide for a topic like this (i.e. simulation of the online pages). The data collection was conducted in two steps (FIGURE 2). All those who validly filled out the questionnaire in the second phase were given a payment of about 500 Serbian Dinars (500 RSD = 4.25 EUR).

During the online application process, students had to answer questions about the university where they study, their gender and their age. Later, we were sending invitation emails based on these characteristics in order to obtain a sample properly reflecting the gender and age structure of students at all four main university centres in Serbia. Also, when necessary, additional

TABLE 1: Latent variables of trust and variables in the discrete choice experiments

Latent variables describing consumer's trust towards a producer of tomato that is:		
Conventionally produced, and there is no producer's online page		Six questions (7-point Likert scale) per latent (trust) variable.
Conventionally produced, and there is a producer's web page		
Conventionally produced, and there is a producer's Facebook page		
Produced in a conversion process, and there is no producer's online page		
Produced in a conversion process, and there is a producer's web page		
Produced in a conversion process, and there is a producer's Facebook page		
Organically produced, and there is no producer's online page		
Organically produced, and there is a producer's web page		
Organically produced, and there is a producer's Facebook page		
Directly measured variables		Levels
Product type		Conventional, from a conversion process, organic
Online presence of a producer		None, web page, Facebook page
Prices		120, 150, 180, 210 and 240 RSD/kg

FIGURE 1: Screenshots of website page and social media page mockups

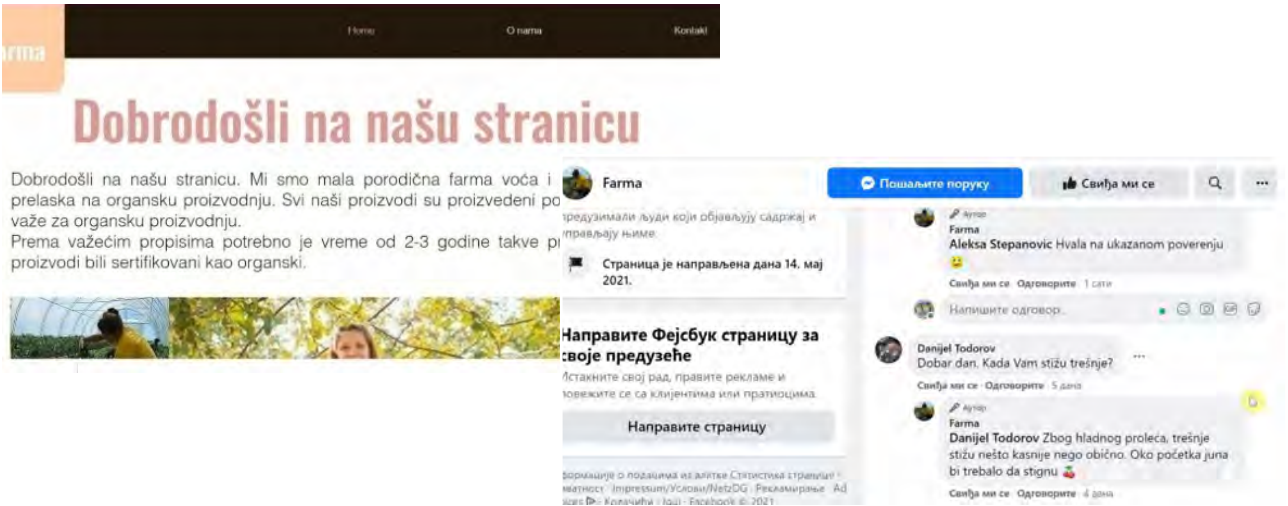
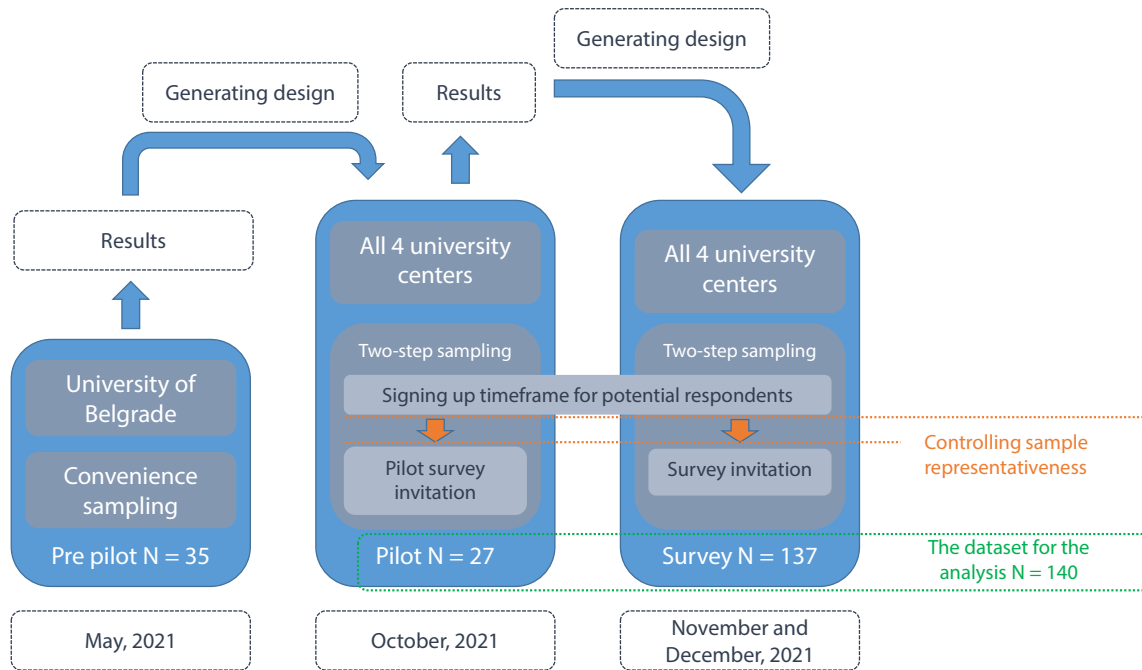


FIGURE 2: Design generation and sampling procedure



invitations were sent (for the underrepresented age groups in the sample).

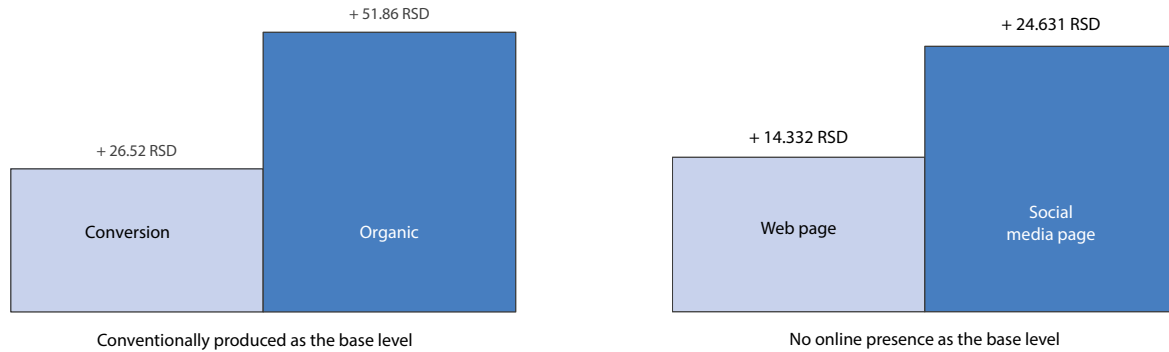
## Results

As far as production type is concerned, the MXL model results show that tomatoes produced on farms in conversion to organic and organically produced tomatoes are preferred to conventionally grown ones. Similarly, when it comes to online presence, tomatoes that originate from a farm with a web page and from a

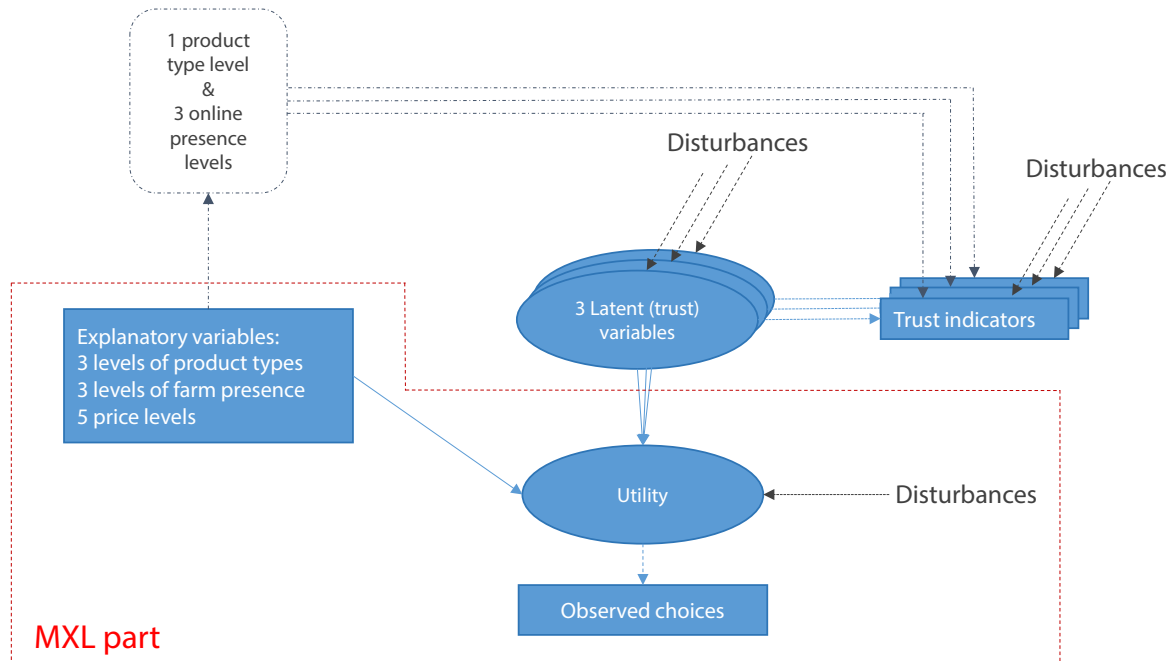
farm with a social media presence are preferred to those produced on a farm that does not use online mediums. The MXL model has also been estimated in the WTP space, and the simplified results for the estimated means of the respective distributions of WTP increase can be seen in **FIGURE 3**.

Hybrid choice models have been used to explain the hypothesized effects of consumer trust related to producers' online presence. By introducing three latent trust variables related to one production type level and three different online presence levels (**FIGURE 4**), the previously detected random heterogeneity (in the MXL

**FIGURE 3: Estimated means of WTP increase for different levels of attributes in question (in Serbian Dinars, 118 RSD = 1 EUR)**



**FIGURE 4: Graphical representation of one of three used HCMs, with a marked portion of what would typically be an MXL model**



model) has been partially explained (FIGURE 5). In this way three HCMs were specified, acknowledging three levels of online presence per every of the three product types.

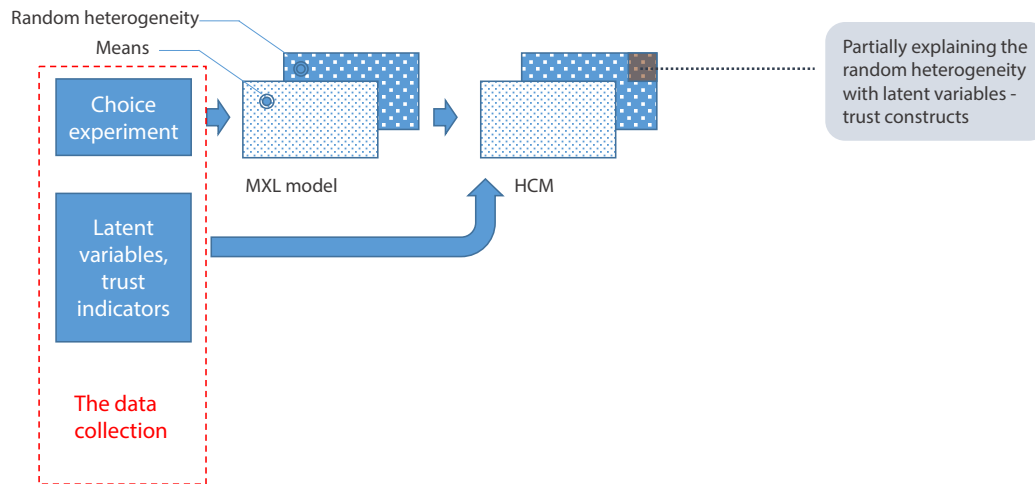
The results indicate that the increased consumer trust due to the social media presence, positively influences the purchase intention of conventional tomatoes and tomatoes from a conversion process. On the contrary, similar effects in case of producers' web page use were absent. For the organically produced tomato, there were no effects of trust related to online presence on recorded choices. An occurrence like that should not be acknowledged as a general lack of consumer trust towards organic tomato or as a lack of consumer trust effects on recorded choices. Such results imply that the differences in trust effects due to the different ways of producers' online presence are negligible, as a consequence of dominant effects of "organically produced" certificate on consumer trust.

## Conclusions

The initial findings of the study regarding the differences between different production types are as expected: the conventionally produced tomato is the least, and organically produced tomato is the most preferred. The results also indicate that compared to tomato originating from a farm with no online presence, consumers have higher preferences for tomato originating from farm with web page presence, and even higher for tomato originating from a farm with a social media presence.

The study offers a novel perspective to the existing literature by examining the relationship between online presence and consumer behavior, particularly when observed through the prism of consumer trust. The findings suggest that initial trust might play a pivotal role in understanding the effects of farms' online presence on consumer choices during discrete choice experiments.

In relation to the previously said, our results imply that leveraging consumer trust can influence preferences, emphasizing the potential value of an online presence. Specifically, a social media presence could be a promising and cost-effective strategy for small local producers in Serbia, allowing them to enhance their competitiveness in the market. Furthermore, it might be worth considering, in future studies, the extent to which the recent pandemic conditions have potentially accelerated this trend towards online and social media prominence.

**FIGURE 5: Explaining the random heterogeneity at the respondent level using trust constructs****TABLE 2: An overview of cut down HCMs results**

Hybrid choice models for a product type (1)	...in combination with one of the three ways of the online presence (2)	A sign and a significance level of the estimated effect of a trust variable determined by (1) and (2)
HCM1: Conventionally produced tomato	...with no producer online presence	Not statistically significant
	...with producer web page	Not statistically significant
	...with producer social media page	+ ; 5%
HCM2: Tomato produced on farm converting to organic	...with no producer online presence	+ ; 1%
	...with producer web page	Not identified as a factor
	...with producer social media page	+ ; 1%
HCM3: Organically produced tomato	...with no producer online presence	Not statistically significant
	...with producer web page	Not identified as a factor
	...with producer social media page	Not statistically significant



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## Diagram sources and acknowledgements

- TITLE** Fresh vegetables © Viktor Pravdica – stock.adobe.com & Young woman shopping healthy food in supermarket blur background © A\_B\_C – stock.adobe.com
- TAB. 1** Latent variables of trust and variables in the discrete choice experiments © Own representation
- FIG. 1** Screenshots of website page and social media page mockups © Own illustrations
- FIG. 2** Design generation and sampling procedure © Own representation
- FIG. 3** Estimated means of WTP increase for different levels of attributes in question (in Serbian Dinars, 118 RSD = 1 EUR) © Own calculations
- FIG. 4** Graphical representation of one of three used HCMs, with a marked portion of what would typically be an MXL model © Own illustration
- FIG. 5** Explaining the random heterogeneity at the respondent level using trust constructs © Own illustration
- TAB. 2** Brief overview of HCMs results © Own calculations
- P. 47** Stand on Small Serbian Farmers Market With Cabbage, Cucumber, Tomatoes, Marrow Squash © bojanzivkovic – stock.adobe.com





A photograph of a middle-aged man in a rural setting, carrying a large wooden hoe over his shoulder and a sleeping baby in a colorful, patterned sling on his back. He is walking through a field with a terraced hillside in the background. The image is framed by a large, stylized circular graphic with orange and grey segments.

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Vladislav Valentinov

**Do farmer cooperatives  
promote agricultural  
technology adoption?  
A case study in Sichuan, China**

# Do farmer cooperatives promote agricultural technology adoption? A case study in Sichuan, China

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Shemei Zhang<sup>1</sup>, Zhanli Sun, Wanglin Ma<sup>2</sup> and Vladislav Valentinov

## Introduction

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Agricultural technologies play a vital role in increasing food production and the welfare of farmers. However, smallholder farmers in many developing countries have relatively low adoption rates of agricultural technologies. One primary reason for the low rate of technology adoption in smallholder farming systems is the high transaction costs involved in accessing new technologies (Feleke & Zegeye, 2006; Ma et al., 2018; Pamuk et al., 2013; Valentinov, 2007). Transaction costs are the observable and unobservable costs associated with the exchange of goods and services (Key et al., 2000), including farmers' costs of searching for the right technology to adopt, negotiating with suppliers of new technologies, and enforcing contractual services. Some of these transaction costs can be economized by farmer cooperatives, which have been widely promoted and have experienced rapid growth in many developing

countries (Francesconi & Heerink, 2011; Ito et al., 2012; Ma & Abdulai, 2017; Verhofstadt & Maertens, 2014).

New institutional economics theories explain the existence of cooperatives in terms of their ability "to economize on transaction costs and to develop 'countervailing power'" (Bonus, 1986; Valentinov, 2007). Yet these arguments are mainly focused on protecting farmers from the opportunistic behavior of their contractual partners who seek to siphon off quasi-rents on farmers' specific assets. Although this is a fundamental problem, it seems to have only a minor effect on the adoption of technology because, in many cases, there is little scope for opportunistic behavior. Farmer cooperatives also frequently serve as intermediaries and platforms for promoting technology adoption by facilitating information exchanges between smallholder farmers and technology suppliers. In all

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these cases, it seems more plausible to see the rationale for cooperative activities in helping farmers to enhance value creation and to secure greater profit margins along the supply chain than in preventing opportunism on the part of farmers' contractual partners.

Despite the wealth of literature on the relationship between cooperative membership and farmers' adoption of technology, what remains less clear in empirical terms is how farmer cooperative membership affects the intensity of technology adoption, defined here as the number of technologies adopted by a farmer from a wide range of technologies.

This study aims to explore the relationship between farmer cooperative membership and the extent of a farmer's technology adoption. Specifically, we want to answer two research questions: Does cooperative membership have a positive effect on the number of technologies adopted by smallholder farmers? How does cooperative membership affect the adoption of production and post-harvest technologies?

## **Data**

### **Data collection**

We investigate the effects of farmer cooperatives on technology adoption in Sichuan Province in southwestern China, one of the largest agricultural provinces in the country. Agricultural and rural development in Sichuan resembles the broader state of Chinese agriculture, dominated by a smallholder farming structure, a large

share of the rural population, and high rural-to-urban migration rates. Small family-based farming is the dominant farming system, with an average farm size of less than 0.5 hectares.

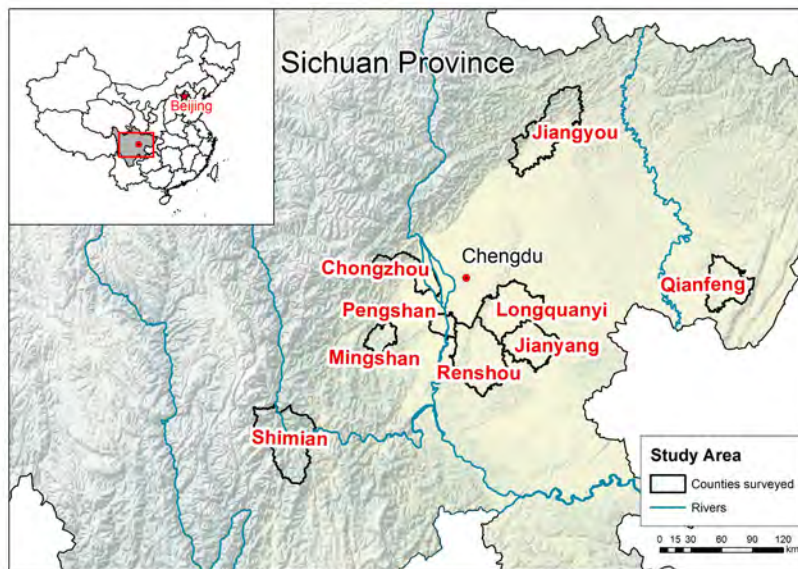
We randomly selected 413 farm households from 108 villages, including 212 cooperative members and 201 non-members. We conducted face-to-face interviews with farm households using a structured questionnaire to collect information on personal and household characteristics, access to and use of extension services, geographic location, and cooperative membership status, and the adoption of technologies, including production and post-harvest technologies.

We compiled a comprehensive list of agricultural technologies that farmers have been using in both the production and post-harvest stages and asked them to select the technologies they had adopted. The list of relevant technologies was based on our extensive literature review, frequent field visits, and the technology information that we obtained from farmers in the questionnaire pre-tests. The final list of technologies includes 13 technologies, which consist of six production technologies and seven post-harvest technologies. With this list, we attempt to cover all types of technologies that farmers in this region could adopt, from land preparation to the marketing of produce.

The dependent variable considered in this study refers to the number of technologies adopted by a farm household. It is a count variable which can be used to approximate the extent of farmers' technology adoption. We do not take into account qualitative differences between the technologies nor the scale, or the level of sophistication of a particular technology.



FIGURE 1: Map of survey regions



The key explanatory variable used in this study is cooperative membership. The variable assumes a value of one if a farm household is a cooperative member; otherwise zero. In our empirical analysis, we also include the other socioeconomic variables including age, education, full-time farming, village cadre status of household head, labor force ratio, farm size, and distance to market. In addition, we include location dummy variables, plains, hilly, and mountainous, to capture the unobserved effects resulting from differences in agro-climatic, institutional, and socioeconomic conditions. Finally, a variable representing whether a household's neighbor is a member of a farm cooperative is used as an instrumental variable.

## Empirical models

### Count data models

As the dependent variable is a count variable that takes a non-negative integer value from 0 to 13, indicating the number of technologies adopted, we used count data models to estimate the effects of the explanatory variables on the number of technologies adopted. The negative binomial (NB) model and the Poisson regression model for count dependent variables are used. In the case of excessive zeros, a zero-inflated negative binomial regression (ZINB) model is used.

### Correction of selection bias

Selection bias may arise from both observable and unobservable factors, and it may bias the impact of cooperative membership on the extent of farmers' technical adoption. In the absence of panel data, we use a propensity score matching (PSM) model to correct for selection bias stemming from observable factors and an instrumental variable (IV) approach to correct for selection bias arising from unobserved factors (Wan et al., 2015).

The application of the PSM model makes it possible to match farmers who are members of farmer cooperatives and those who are not members based on observed



characteristics. Within the PSM estimation framework, a propensity score for each farmer in the sample is estimated. Based on the propensity scores, cooperative members are matched with non-members who are similar in observed characteristics. The matched samples mitigate the selection bias issue arising from observable factors.

In addition to the selection bias issue associated with observed factors, unobserved factors may also result in a selection bias. To mitigate the sample selection bias stemming from unobserved factors, we adopt a two-stage instrumental variable approach as an empirical strategy. The approach involves specifying the endogenous variable, cooperative membership in our case, as a function of all other explanatory variables used in the cooperative membership choice equation in the first stage regression and at least one instrumental variable. The instrumental variable must be correlated with the choice of cooperative membership but not correlated with technology adoption variables. In this research, we follow Ma & Abdulai (2016) and use a neighbor membership variable that identifies whether or not a farmer's neighbor has cooperative membership as the instrumental variable.

## **Results and discussion**

### **Descriptive results**

The adoption rates of post-harvest technologies were substantially lower than the adoption rates of production technologies. An average of 3.3 production

technologies were adopted compared with 0.6 post-harvest technologies. Pesticides and fertilizer were the most frequently adopted technologies amongst farmers surveyed. In the post-harvest stage, standardization and marketing were the most common technologies adopted by farmers. Moreover, cooperative members adopted more production and post-harvest technologies, suggesting that cooperative membership enhances the intensity of technology adoption.

### **Empirical results**

We used both matched and unmatched samples to estimate the impact of cooperative membership on the intensity of technology adoption, distinguishing production technologies and post-harvest technologies. Results showed that cooperative membership significantly increases the mean number of all technologies adopted by smallholder farmers by a factor of 1.449, or 44.9 per cent more, holding all variables constant. Farmer cooperatives therefore indeed seem to boost technological progress and technology diffusion among smallholder farmers in our study areas.

Cooperative membership has no significant impact on the adoption of production technologies while it significantly increases the mean number of post-harvest technologies adopted by smallholder farmers by a factor of 4.187 – cooperative members adopt more than 4 times as many post-harvest technologies as non-members. Cooperative membership affects farmers' decisions to adopt production technologies and post-harvest technologies differently.



Chinese farmers thresh wheat by letting cars drive over the ears of corn.

The reason why cooperative membership has no significant effect on production technologies in our study area may be twofold. First, many production technologies, such as improved seeds, fertilizer, and pesticides, can be easily accessed by farmers. Participation in cooperatives, therefore, does not provide clear advantages in accessing production technologies. Second, most cooperatives in our study areas have not yet developed sophisticated support mechanisms for providing production technologies to members.

The finding of the significant and positive effects of cooperative membership on the adoption of post-harvest technologies highlights the importance of cooperatives in promoting the adoption of post-harvest technologies. The positive effect of cooperative membership on the adoption of more post-harvest technologies is likely due to the nature of the post-harvest technologies themselves, which necessitate distinct diffusion channels and demand higher organizational competence. By bringing together individual farmers, cooperatives presumably stimulate collective learning processes that enable

the accumulation of this competence. Many of these processes resonate with classic theories of enterprise growth (Penrose, 1959). For example, storage and post-processing technologies cannot be directly purchased from the input markets, and many technologies, such as branding and transportation, need cooperation and coordination among farmers (Penrose, 1959). Thus, in line with the competence-based rationale, cooperatives can play a critical role in facilitating such exchanges and in organizing technology diffusion among smallholder farmers. Moreover, many post-harvest technologies, such as marketing, standardization and financing, require more operation and management skills and benefit from systematic and frequent training as well as regular collaborations.

## Conclusion

This research has shown that cooperative membership has a positive and statistically significant impact on farmers' adoption of all 13 types of technologies. The disaggregated analyses revealed, however, that cooperative membership has little impact on the adoption of production technologies, but significantly increases the adoption of post-harvest technologies. Post-harvest technologies necessitate collaboration and an advisory service; here cooperatives can play a distinct role. A better understanding of the functions of cooperatives in promoting the diffusion of agricultural technologies can improve the designation and targeting of policy measures, which is particularly important for countries with large rural populations dominated by smallholder farming system, such as China.

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<https://doi.org/10.1002%2Fsim.6470>


## Diagram sources and acknowledgements

**TITLE** Chinese farmer, photo: B. Castro Campos © IAMO

**FIG. 1** Map of survey regions © IAMO

**P. 54** Chinese farmers thresh wheat by letting cars drive over the ears of corn., photo: B. Castro Campos © IAMO



A photograph of two men in a rural field. One man, wearing a white cap and a dark jacket, is sitting on a large metal pipe. The other man, wearing a black cap and a patterned jacket, is kneeling and holding a tablet. They are both looking at the tablet. The background shows a green field and a clear blue sky. A decorative green and white striped arc is on the left side of the image.

Mukhayyo Djuraeva, Lena Kuhn, and Ihtiyor Bobojonov

**Evaluating the impact of agricultural extension  
on technical efficiency level of  
farms in Uzbekistan**

# Evaluating the impact of agricultural extension on technical efficiency level of farms in Uzbekistan

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Mukhayyo Djuraeva, Lena Kuhn, and Ihtiyor Bobojonov

## Introduction

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Many countries worldwide are encouraging the effective utilization of agricultural resources as part of national development schemes to cope with the increasing scarcity of natural resources. In particular, agricultural extension and support programs have been promoted as an effective engine for enhancing the technical efficiency of farmers, making it easier for them to adopt Best Management Practices (BMPs). Agricultural Extension Services (AES) are crucial for addressing the inefficiencies of resource-use management, particularly in developing countries, where small-scale farms are mostly disadvantaged and highly vulnerable to technical inefficiencies in crop production. An “agricultural extension” is defined as an out-of-school learning experience for rural communities, where farmers benefit from a systematic exchange of knowledge and skills (Nagel, 1997).

At a theoretical level, a large body of research acknowledges the ability of AES to facilitate the process of technology diffusion in the subsistence sector. Empirical studies support this view, finding positive effects of extension services on output productivity.

Apparently, the intensity and type of extension services, the cooperation membership status of a farmer and the participatory approaches of agricultural extension all have an impact on farmers’ knowledge and skills, as well as on their technical efficiency. The same is true of interactive processes such as farmer-to-farmer exchanges and other types of extension approaches, which facilitate the transfer of knowledge and help farmers to make their own decisions. Participatory development approaches in extension can help rural communities identify issues of concern, assess their needs, and draw on resources available to accomplish social and environmental changes. By contrast, bureaucratic or institutional constraints and a poor organizational structure of existing extension systems, which do not rely on research-based and demand-driven participatory approaches, can weaken the effects of agricultural extension on technical efficiency. In a recent project, IAMO researchers have been analyzing the combined impact of agricultural extension on variations in technical efficiency.



Extension meeting in Uzbekistan

## Study site and sample

Uzbekistan is one of IAMO's study countries, in which state-organized extension services have only recently been complemented by private extension services. Agricultural modernization is still underway and the agricultural system as a whole remains characterized by low efficiency levels. Our work uses data from a comprehensive survey on the analysis of supply chain developments in Uzbekistan's agricultural sector for the 2014–2015 growing season. The selected three provinces of Uzbekistan, namely Samarkand, Kashkadarya, and Surkhandarya (FIGURE 1) are the country's leading provinces in terms of wheat production,

together accounting for one third of national wheat production. The production structure of these regions can be considered representative for the whole country. Using a three-stage random sampling scheme within the provinces, a total of 405 individual and household farmers from 17 villages were randomly selected to participate in the survey. The survey is based on a quantitative, structured questionnaire on production, demographic and socioeconomic characteristics of farms, and many other specific micro-level data. A more detailed description of the data is presented in Bobojonov et al. (2016). After removing incomplete records and outliers, the total sample consisted of 323 observations of wheat-producing farms.

The study includes both commercial and household farms that produced wheat in the 2014–2015 growing season. At 95 per cent, commercial farmers dominate the sample, representing the contribution of commercial farms to overall wheat production. Average wheat production is approximately 3.25 tons per hectare. The farm size is highly heterogeneous, ranging between 1 and 350 hectares for commercial farms and 0.5 and

**FIGURE 1: The location of the study regions**





11 hectares for family household farms, equating to 27.4 ha of a wheat-planted area on average for both types of farmers. On average, 1,541.498 work days, including family and hired labor, are spent on producing wheat for the survey period. Intermediate inputs used in wheat production are seeds and fertilizers, both measured in kg. On average, 3.8 million Uzbek Soums (UZS) or 1,499 US Dollars were spent on machinery, equipment, irrigation, transportation, and other costs.

About two thirds (65 per cent) of the farmers in the sample received extension services at least once in the reporting year. On average, a farmer contacted extension agents seven times either via the phone, face-to-face for consulting purposes on specific issues, or by participating in an extension activity. Of those who had accessed extension services, only 50 farmers, or 16 per cent of the total, dealt with state extension services, whereas 157 used the services offered by private companies and non-governmental organizations (accounting for a total of 48 per cent). In the delivery of these services, six categories of participatory extension approaches were considered. During the survey period, the most used extension participatory activities were farm visits and farmer-to-farmer exchange visits, accounting for 35 and 36 per cent respectively, whereas 110 farms did not use any of these approaches.

### **Technical efficiency levels**

Technical efficiency is measured via a score that ranges between 0 and 100 per cent, where 100 per cent indicates the highest efficiency level within the sample ("frontier"), following Battese & Coelli (1988). The stochastic

production frontier model in this study is estimated under three specifications in order to capture direct and indirect effects of extension participation. The presented model is expressed through the Translog production function and captures the direct effect of agricultural extension through a binary variable for extension use incorporated directly in the production function, accounting for the heterogeneity effects (for another model with endogeneity see Djuraeva et al. 2023).

Overall the farmers in the sample have a mean technical efficiency of 68 per cent. This value means that a 32 per cent increase in wheat production would be viable with the current state of technology and inputs if inefficiency was fully eliminated.

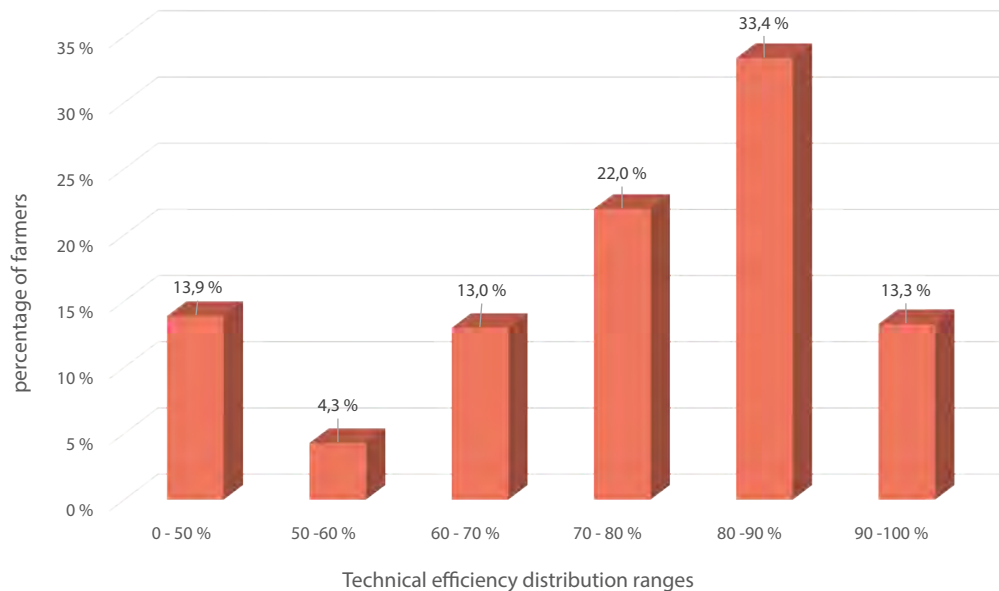
### **Technical efficiency and extension services**

This analysis has also aimed to explain factors associated with different efficiency levels along a so-called Maximum Likelihood Estimation (MLE) method (Coelli, 1995). The estimations clearly show that TE is positively influenced by agricultural extension variables. The indirect impact of extension adoption on wheat production is found to be statistically significant. The direct positive effect can be explained by the yield-increasing effect of classic inputs through closing the management gap, whereas the indirect effect given in the inefficiency effects function is stronger in closing the technology gap. Generally, the results estimated from separate models suggest that extension users are likely to use their resources more efficiently than passive users or non-users in terms of their respective technologies. In analyzing the farmers' management skills, we found that

the irrigated farms appear to be essential in materializing higher efficiency levels, having statistically significant parameter estimates from both models. Farmers with

irrigated plots are likely to make the best use of the benefits of adoption techniques and demonstrate better management practices in general.

**FIGURE 2: Percentage of technical efficiency distribution ranges**



The estimated coefficient for extension visits is found to have a highly positive and statistically significant impact on TE scores, indicating that access to extension services does matter in overcoming potential production inefficiency issues. Farmers' efficiency scores tend to improve in proportion to the number of such visits, thus explaining the existing gaps in the TE distribution scores. Besides, the frequency of visits might also be correlated with the distance to the farmers' plots, which is found to have an inverse relationship with TE, although it is not uniformly significant. But the greater the distance, the

fewer visits by extension agents in the sample, indicating an obstacle to a farmer to become more efficient.

Finally, a selection of participatory approaches for adopting agricultural extension is found to be important in explaining the variations in the efficiency of resource-use technologies. The level of effectiveness of extension activities is highly dependent on the type and quality of such approaches that are implemented during extension visits. The signs of the estimated coefficients on extension delivery approaches meet our expectations and strongly suggest that each visit by extension agents



Irrigation field cultivation in Samarkand Province

should be followed by some of the ‘learning by doing’ methods. Having statistically significant indicators in the model for extension users, farmer research groups, farmer field schools, farmer-to-farmer exchange visits, and common interest groups can significantly increase the effectiveness level of extension services on TE scores, whereas methods such as official farm visits or virtual devices may not be sufficient to increase farmers’ technical capacities. This indicates that farmers receiving agricultural extension services in the form of farmer-led research and field schools, and civil society or common interest groups, do have statistically different efficiency scores from the farmers who do not engage in active participatory approaches. In particular, farmer-to-farmer extension is a participatory tool in which farmers, not extensionists, are the primary agents of change.

## Conclusions

Agriculture is a key sector in the economies of Central Asian countries. It is not feasible to achieve full efficiency levels in crop productivity without promoting sustainable production technologies. The role of agricultural extension services is crucial to address the resource efficiency issues in developing countries. Here, small-scale farms are mostly disadvantaged and at great risk of inefficiency, which can, however be mitigated or even eliminated by agricultural extension services. Technical efficiency gaps exist in each step of the production process. An important, still unknown question is whether this gap is driven by the use of agricultural extension services combined with other farm characteristics and demographics.

Access to extension services has a significant impact on TE across the models. Our study infers that the direct effect of extension is complementary to traditional wheat production inputs. The significant contributions of farm managerial factors, including frequency of extension visits, irrigation technology, the cooperation status of a farmer, and all participatory extension methods strongly enhance TE scores in addition to some of the farm characteristics. This provides evidence that well-structured systems of extension services based on participatory methods such as farmer research groups, farmer field schools, farmer-to-farmer exchange visits, and common interest groups could be an important policy tool for encouraging inclusive economic growth in agriculture-led countries.

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## Diagram sources and acknowledgements

- TITLE** Two farmers in front of a wheat field in Samarkand Province, photo: A. Tadjiev © IAMO
- P. 59** Extension meeting in Uzbekistan, photo: I. Rudenko © Krass.uz
- FIG. 1** The location of the study regions © Own illustration
- FIG. 2** Percentage of technical efficiency distribution ranges © Own survey
- P. 62** Irrigation field cultivation in Samarkand Province, photo: I. Amirova © IAMO





**Flexibilization and differentiation within the European  
Union's Common Agricultural Policy (CAP):  
Is the CAP becoming less common?**

Jana Demoustier



# Flexibilization and differentiation within the European Union's Common Agricultural Policy (CAP): Is the CAP becoming less common?

Jana Demoustier

The Common Agricultural Policy (CAP) is one of the oldest and most integrated policies of the European Union (EU). Over the last 30 years, it has experienced a series of reforms that have gradually transformed its objectives and instruments, as well as the way it is implemented. Most analyses of CAP reform focus on the former changes and neglect the latter. However, a few scholars notice that the leeway granted to member states in CAP implementation has constantly increased over the course of reform. Some conclude that the CAP is becoming less common or even heading toward renationalization (Grochowska & Kosior 2008, Terluin et al., 2017, Henke et al., 2018). This article will assess these claims.

## Is the CAP becoming less common in terms of design?

When the Treaty of Rome established the Common Market in 1958, the agricultural policies of most founding member states were characterized by strong market intervention in the form of price support and

border measures. Since these were incompatible with Common Market principles, the founding member states decided to replace them through a supranational policy financed from a common budget. Given differences in agricultural structures and policy legacies, the member states' interests with respect to the instrumentation and calibration of this policy differed widely. This led to fierce bargaining within the Council of Ministers (e.g. Tracy, 1982). The so-called *Luxembourg Compromise*, according to which decisions could only be taken unanimously, raised the hurdles for policy adoption. Under these circumstances, a highly differentiated policy emerged. This policy consisted primarily of market interventions, the calibration of which varied across commodities. Due to structural cross-country variation in commodity portfolios, commodity-based differentiation translated into cross-country discrimination. Temporary derogations granted to individual member states with regard to the prohibition of national market interventions and the system of monetary compensatory amounts, which used so-called "green rates" rather than real exchange rates for the conversion of supranational support prices into national currencies, added further layers of differentiation.



Differentiation also characterized the EU's early structural policy. Several structural regulations explicitly targeted only specified regions within a subset of member states. Unlike the market policy, the structural policy was moreover characterized by flexibility. The implementation of measures was not mandatory; member states could decide whether they wanted to adopt them or not. If they decided to adopt a measure, they could receive funding from the EU budget only if they matched supranational with national funds. The minimum requirements regarding co-funding varied according to the target region's level of economic development.

CAP reforms between 1992 and 2013 gradually abolished market interventions and replaced them with direct per-hectare payments. The legacy of differentiation by commodity was first continued – under the legislation adopted in 1992 the size of per hectare payments varied according to the type of commodity and the historic quantity produced – but gradually abandoned after the adoption of the *Fischler Reform* in 2003. However, within the 2004 to 2013 funding period, the amount of funds allocated to member states from the EU budget for financing per-hectare payments relative to the number of eligible hectares varied substantially. Subsequent reforms reduced this differentiation. Simultaneously, they increased flexibility with regard to the targeting and scaling of direct payments.

The *Agenda 2000* adopted in 1999 bundled structural, agri-environmental, and rural development measures within the so-called *second pillar* of the CAP. It also introduced a new governance framework, which was refined within subsequent reforms. Under this framework, the EU adopted a rural development program lasting

seven years, defining common objectives and a menu of measures grouped within priority areas. From this menu, member states (or regions) selected measures according to their individual needs and preferences. A maximum threshold of EU funds was determined for financing these measures. Co-funding requirements differed by measure, as well as the target region's level of economic development. In allocating funds to measures, national authorities had to respect rules on the minimum percentage of funds to be spent on specified priority areas. They needed to submit strategic plans, explaining their choices and specifying national policy targets. These plans required Commission approval. In annual reports, member states had to report on the progress of policy implementation. Furthermore, they were required to evaluate their programs (ex-ante, interim, and ex-post) based on common guidelines and indicators. The Commission had the responsibility to ensure coherence between national plans and European objectives, provide strategic and managerial advice, and monitor compliance with procedural requirements. Under the *New Delivery Model* adopted in 2021, this governance framework is also applied to the CAP's first pillar (market measures and direct payments). National strategic plans, progress reports, and evaluations now have to cover all areas of the CAP. This is supposed to improve coherence between CAP measures and result orientation within CAP implementation.

To summarize, in terms of design, the CAP has never been as common as its name may suggest. Over the course of reforms, differentiation has been replaced by flexibility. Over the decades, the EU has gathered experience with regard to the management of flexibility within the CAP's second pillar. This experience is now

being applied to the CAP as a whole in an attempt to establish a CAP that guarantees *unity in diversity*.

### **Is flexibilization a logical consequence of CAP re-instrumentation?**

According to economic theories of federalism, the centralization of policy-making competencies leads to improvements in policy efficiency only if substantial scale effects or transregional externalities exist. Based on this proposition, Grochowska & Kosior (2008) argue that the shift within CAP instrumentation from market intervention towards less trade-distorting direct payments and regional development programs logically leads to flexibilization and ultimately to renationalization. Political scientists put forward two alternative explanations. First, decision-making within multilevel polities is prone to deadlock, in particular when different levels of government are intertwined (Scharpf, 1988). This is the case within the EU, where member state governments can block the adoption as well as the implementation of supranational policies, often at relatively low cost. Under these circumstances, differentiation and flexibilization serve as bargaining chips, which can resolve the deadlock. Second, governments with limited hierarchical “command-and-control” capacities search for alternative strategies for exercising influence (Mayntz, 2006). Two strategies are of particular importance: network-building and market-creation. In the case of the EU, the Commission has an incentive to create linkages with, as well as between, national stakeholders in order to minimize information asymmetries between itself and national governments, to influence coalition building within national arenas, or

to foster yardstick competition between member states through monitoring and benchmarking activities. Both strategies require a certain degree of flexibility within the supranational policy framework.

Based on these theories, I propose that differentiation and flexibilization within the CAP’s first pillar have primarily been driven by political conflict. As bargaining chips, they have facilitated conflict resolution and thereby have contributed to reform progress, but have also encouraged pork-barrel politics. Until recently, the Commission opposed flexibilization within the CAP’s first pillar, but within its proposal for the 2021 reform, it promoted flexibilization as a way of rendering the CAP more efficient. This change in strategy can be interpreted as an attempt to regain control over CAP design and implementation by forcing member states to formally justify individual implementation choices and encouraging peer- and stakeholder review.

### **Is the CAP becoming less common in terms of implementation?**

Based on a cluster analysis of national choices under flexibility clauses within CAP 2013 legislation, Henke et al. (2018) conclude that “national path dependencies emerge”, which implies that domestic CAP outcomes are likely to diverge over time. In my research, I look at variation in CAP implementation from a more distant *bird’s-eye* perspective. In the previous section, I argued that the introduction of flexibility clauses has facilitated agreement on major reform packages. These have led to substantial changes in the level and composition of CAP-related transfers. First, the overall level of public

transfers to agricultural producers has declined. Second, the share of transfers that are fully decoupled from production has gradually increased. Third, the share of transfers targeted at environmental measures or community development has increased.

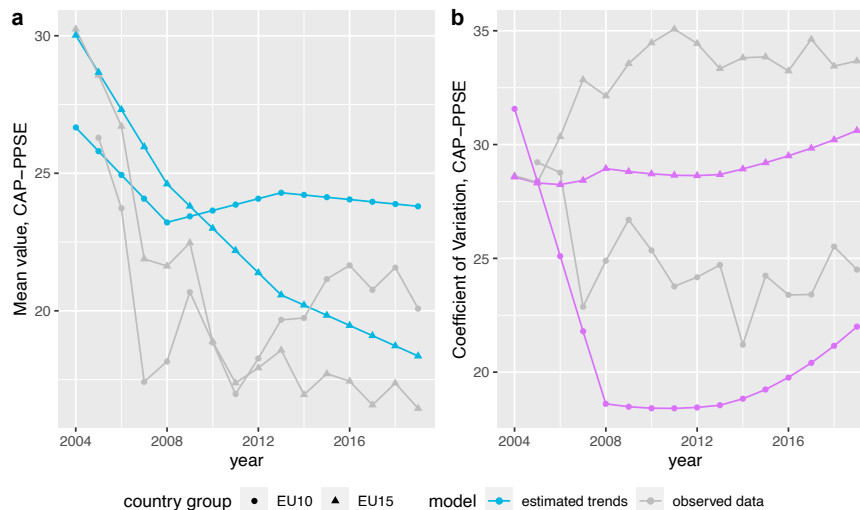
By using a *Multilevel Growth Curve Analysis* (MGCA), I examine to what extent the reform trajectories of member states diverge with respect to these three dimensions of reform. In the following, I present some of the findings of the analysis.

**FIGURE 1 a** compares mean change in the level of total CAP transfers to agricultural producers (*CAP-PPSE: Common Agricultural Policy-Percentage Producer Support Estimate*), defined in accordance with OECD (2016) as the share of gross CAP-induced price and budgetary transfers relative to gross agricultural revenue (transfers under national policies excluded), within the group of *old* EU15 member states with mean change in

*CAP-PPSE* within the group of *new* EU10 member states. A piecewise MGCA controlling for annual changes in world market prices was used to estimate the coloured trends. Between 2004 and 2011, mean *CAP-PPSE* decreased within the EU15 group but increased within the EU10 group. The mean trajectories of both groups met between 2009 and 2010 and afterward diverged again, with the EU10's mean surpassing the EU15's mean.

**FIGURE 1 b** depicts the evolution of within-group, between-country variation in *CAP-PPSE* (the Coefficient of Variation is defined as the standard deviation relative to the mean expressed in percentages). Within both groups, cross-country variation was substantial. Within the EU10 group, it dropped between 2004 to 2008. It increased again during the period 2014-2019 but to a lower extent. Within the EU15 group, it slightly increased during the 2014-2019 period, but overall remained relatively stable.

**FIGURE 1: Between-country mean and variation in the level of CAP transfers, 2004 to 2019**

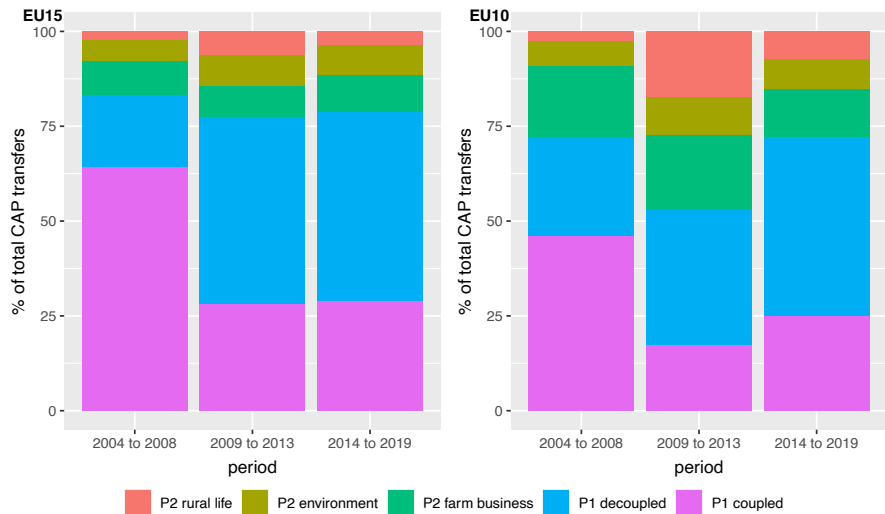


**FIGURE 2** compares the composition of CAP transfers (observed data) across country groups and reform periods. It distinguishes between five categories of transfers. The first two relate to transfers within the context of the CAP's first pillar (*P1*), i.e. market transfers and direct payments targeted at specific sectors or products (coupled); or direct payments that do not require commodity production, but the maintenance of agricultural land (decoupled). The other three relate to budgetary payments under the second pillar (*P2*) aimed at farm modernization, extension services or knowledge transfer, the improvement of marketing or processing, early retirement, or the cessation of production (*farm business*); afforestation, environmental action, or animal

welfare (*environment*); rural infrastructures, civil engagement (*LEADER*), or administrative capacity building (*rural life*).

Within both country groups, we can observe a decrease in the average share of *P1* coupled from the period 2004–2008 to 2009–2013. Within the EU10 group, the composition of transfers within the period 2009–2013 was characterized by a large average share of *P2* rural life. But in the period 2014–2019, *P2* transfers were replaced by decoupled *P1* payments. Within both groups, the average share of *P2* rural life and *P2* environment increased from the period 2004–2008 to 2009–2013, but then slightly decreased again.

**FIGURE 2: Composition of CAP transfers by country group (within-group mean) and reform period**



Overall, the *bird's-eye* perspective suggests that there has always been substantial between-country variation in the direct outcomes of CAP implementation in terms of financial transfers. Over the course of CAP reforms, we can observe an alignment of the transfer level between the country groups, and a process of convergence with regard to the composition of support. However, within-group variation within the level and the composition (FIGURES 3 und 4) of transfers remains high.

### Data sources

To estimate gross market-price transfers, I used the following data sources: Eurostat production data, JRC balance sheet data, and OECD data on the price gap between the European and the world market. The accounting of budgetary transfers was based on EAGF- and EAFRD-budget reports published by the Commission and the European Network for Rural Development (ENRD). Please get in touch with the author for more information.

FIGURE 3: Composition of CAP transfers by member state, period 2004 to 2008

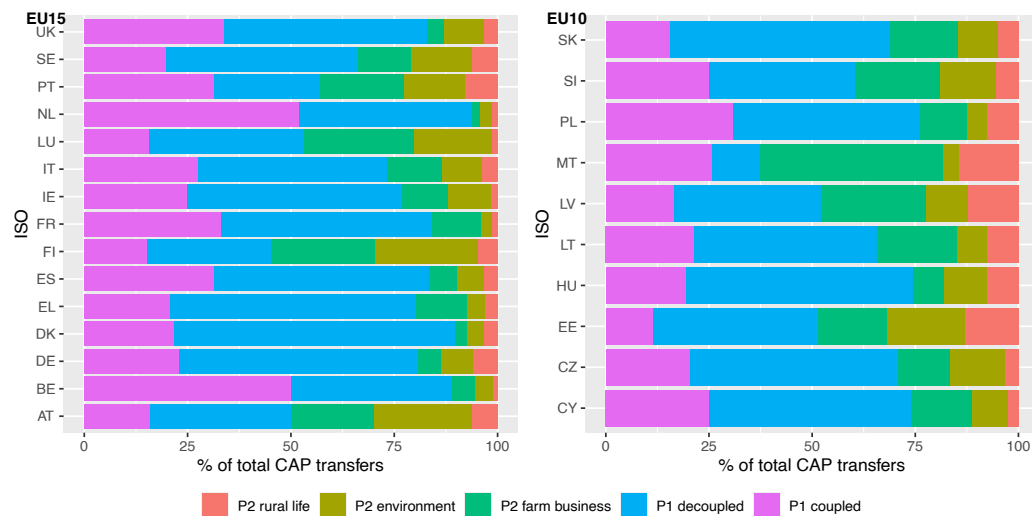
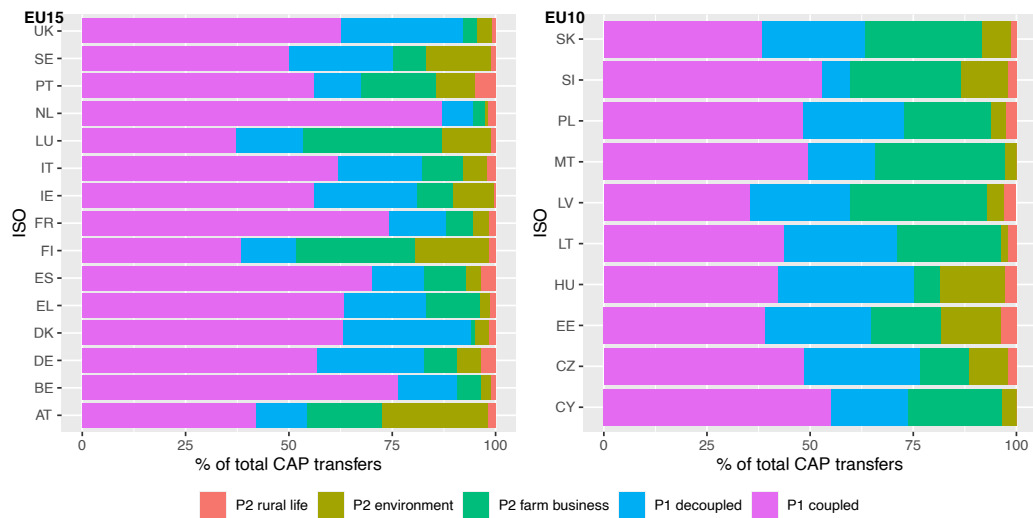


FIGURE 4: Composition of CAP transfers by member state, period 2014 to 2019



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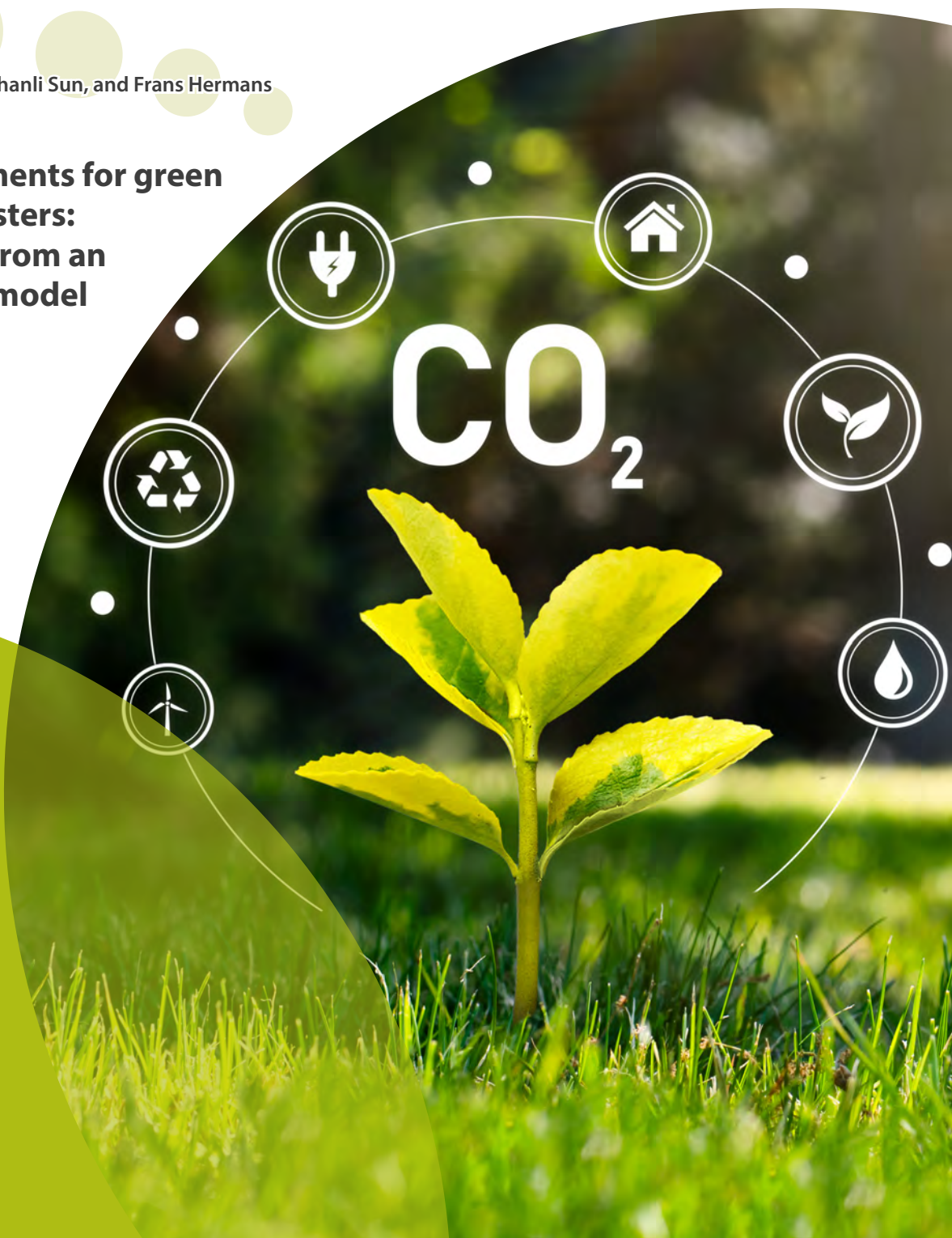
- TITLE** Europe Nutrition Concept Corn field with fabric Flag © Sehenswerk – stock.adobe.com & Farmer and buyer holding Euro banknote with corn field with tractor and combine in background © sima – stock.adobe.com
- FIG. 1** Between-country mean and variation in the level of CAP transfers, 2004 to 2019 © Own illustration
- FIG. 2** Composition of CAP transfers by country group (within-group mean) and reform period © Own illustration
- FIG. 3** Composition of CAP transfers by member state, period 2004 to 2008 © Own illustration
- FIG. 4** Composition of CAP transfers by member state, period 2014 to 2019 © Own illustration





Rammohan Kamath, Zhanli Sun, and Frans Hermans

## Policy instruments for green growth of clusters: Implications from an agent-based model



# Policy instruments for green growth of clusters: Implications from an agent-based model

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Rammohan Kamath, Zhanli Sun, and Frans Hermans

## Green growth through green clusters

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**G**reen growth has become a dominant feature of discussions regarding policy responses to climate change. Green-growth theory asserts that green technological innovation will allow us to decouple economic growth either totally or partially from resource use and carbon emissions (Hickel & Kallis, 2020).

While clusters were envisaged as tools to achieve competitiveness and economic targets, policymakers are increasingly interested in how *green clusters* can be used as catalysts for sustainable innovation and for the green restructuring of economies (Hansen & Coenen, 2015). The decoupled growth of green clusters occurs by developing and selling products or technologies that “reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services” (UNEP, 2011: 16). The central argument in support of establishing green clusters is that the resulting geographical proximity facilitates knowledge spillovers, which increase the chances of the green innovation required to instigate

greening of regional and national economies. However, to provide more targeted solutions for the green restructuring of clusters, new theoretical and methodological approaches are necessary.

### Ongoing debates regarding cluster restructuring

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### Cluster development in peripheral regions

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Despite the progress in delineating how place-based structures influence the evolution of clusters and regions, multiple studies have argued that there is still a need for greater clarity about the effects of place dependency. We have a limited understanding of the development of clusters particularly in peripheral regions, and of the differences in the policies required. Evolutionary Economic Geography (EEG) research has traditionally focused on the evolution of metropolitan or specialised

regions, implicitly assuming that there is no innovation in peripheral areas. Growth of any form is difficult in peripheral regions because they are characterised by a lack of critical mass in any industrial specialisation, and by the lack of high-value, knowledge-intensive activities (Isaksen & Trippel, 2014).

### **The role of agency**

Regional and cluster paths may deviate from the paths they were expected to take, given regional pre-conditions. Clusters within similar regional innovation systems (RIS) may experience different paths. This open-ended nature of cluster restructuring results from strategic, distributed agency. Micro-/actor-level dynamics are, therefore, crucial in explaining restructuring processes. The realisation that paths of structural change are constructed by agency has led to criticism of extant cluster-evolution models, and of regional development studies, for paying insufficient attention to agency (Trippel et al., 2015).

### **Green restructuring of clusters**

Green clusters, such as bioclusters, are not intrinsically sustainable. If green clusters are to help achieve a sustainable economy, they must undergo green restructuring.

While EEG literature has elaborated on green regional development, the focus is still on the parameters of clusters and on normative aspects. Cluster research has not sufficiently emphasised how clusters move into

greener industries, and EEG lacks a discussion of how policy can support this process (Sjøtun & Njøs, 2019).

### **Agent-based modelling to identify the future green growth of clusters**

To contribute to the above debates, we attempt to answer the question, What policy instruments are most effective in causing the green growth of clusters in a peripheral region? To answer this question, we built an agent-based model (ABM) to simulate the green restructuring of a peripheral cluster of firms. With this ABM, we aim to advance understanding of policy instruments that promote green growth and innovation, and of the emerging practice of modelling green transitions. The simulations are based on the idea that the emergence of green growth in peripheral regions commonly involves deploying green technologies developed elsewhere, i.e. greening through importation.

### **Simulating a “sustainability treadmill”**

In our ABM, the agents are essentially on a type of technological treadmill (Cochrane, 1958). In its original form, the treadmill theory explains the constant pressure to lower production costs with ever-greater technological progress, failing which they become bankrupt. In our model, we apply this idea with a modification – agents are in a race to continually innovate, update green knowledge and green technologies, lower pollution and become more sustainable (while raising their income). If they fail to innovate, they generate

more pollution, as the performance of their green technologies deteriorates over time. With the failure to innovate, the agents become “dirtier”, fall behind on the sustainability treadmill and possibly go under (as their “dirtier” products lose their market share).

In the ABM, there are a number of agents (i.e., firms) clustered in an “arena” with the characteristics of a peripheral region. The behaviours of these agents are governed by two sets of variables – agents’ own and global variables. The main agent variables are:

- (1) **Financial capital,**
- (2) **Knowledge capital,**
- (3) **Reputational capital,**
- (4) **Degree of pollution,**
- (5) **Experience of projects with radical change, and**
- (6) **Experience of projects with incremental change.**

The main global variables are

- (1) **Probability of collaboration,**
- (2) **Probability of taking radical steps,**
- (3) **Probability of innovation,**
- (4) **Innovation potential,**
- (5) **Cluster size, and**
- (6) **Decay rate.**

The first five global variables are informed by the claims of Tödtling & Trippl (2005) and Isaksen & Trippl (2016), and data from the European Innovation scoreboard for 2019–2020. Both sets of variables are defined in **TABLE 1** below.

We operationalise the features of the periphery by controlling values for the global-variables probability of radical innovations, probability of innovation in general, and probability of collaboration. For these variables, we use data for “moderate innovator regions” from the European Innovation scoreboard, because they most closely resemble peripheral regions. Moderate regions have overall innovation scores that are below 50 per cent of the European average.

### **Modelling policy-driven green growth of a peripheral cluster**

Using the ABM, we explore the effectiveness of three individual instruments and a mixed instrument on the green growth of a peripheral cluster. The instruments are:

- (1) **Financial incentives to attract external actors in a green industry,**
- (2) **Grants provided to qualifying innovation projects being run by local cluster actors, and**
- (3) **the Imposition of fines on firms that exceed a certain threshold of pollution.**

We chose these instruments because we wanted a group of instruments with different purposes. While grants and incentives for foreign actors are both economic instruments for technology push, fines are a regulatory instrument for demand pull.

**TABLE 1: Agent-specific and global variables that guide agent behaviour**

Variable	Definition
<b>Agent-specific</b>	
Financial capital	Agent's financial capital.
Knowledge capital	Agent's green knowledge and green technology.
Reputational capital	Agent's reputation, and sustainability credentials.
Pollution level	Represents how much pollution is linked to an agent's operations.
Radical project experience	The number of successful radical innovation projects an agent has participated in.
Incremental project experience	The number of successful incremental innovation projects an agent has participated in.
<b>Global</b>	
Probability of collaboration	Probability of firms collaborating in a (green) innovation project. Defined as the proportion of the total number of firms collaborating in an innovation project.
Probability of radical innovation	Probability of a (green) innovation project being a radical one. Defined as the proportion of the total number of successful projects being radical.
Probability of innovation	Probability of a (green) innovation project succeeding. Defined as the proportion of innovation projects that are successful.
Innovation potential	The ratio of the number of successful projects to the total number of firms at a point in time.
Cluster size	Number of agents in the cluster at any given point in time (note: split agents are counted as one agent).
Decay rate	The rate at which agents' three capital asset stocks decline with each time period, and also the rate at which agents' pollution increases with each time period.

We track the following cluster-level variables to gauge the progress of the cluster's policy-driven green growth:

- (1) **Pollution levels:** The sum of the pollution levels of all the agents that make up the cluster.
- (2) **Cluster size:** The number of agents existing at any point in time
- (3) **Knowledge capital:** The sum of the knowledge capital stock of every agent in the cluster.
- (4) **Financial capital:** The sum of the financial capital stock of every agent in the cluster.
- (5) **Reputational capital:** The sum of the reputational capital stock of every agent in the cluster.
- (6) **The ratio of pollution to financial capital:** green growth requires economic growth to decouple from pollution. We track this ratio to see if a cluster's financial capital stock goes up as its pollution levels go down.

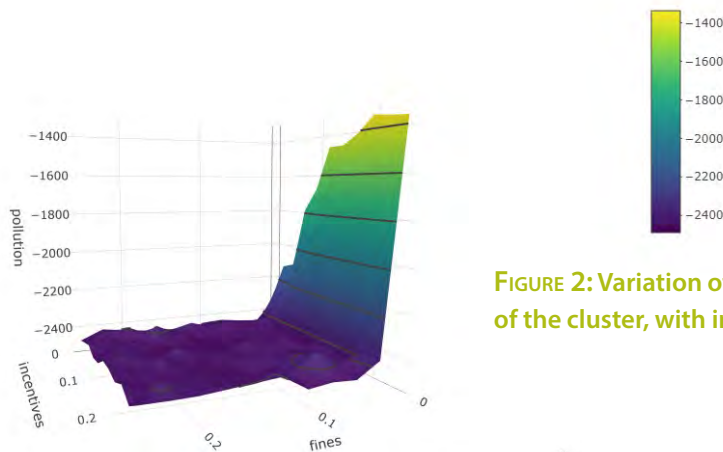


Besides these six parameters, we also track the number of successful projects and the number of successful radical projects. The desired end state, where the simulated cluster has transitioned and decoupled, is one where pollution has declined, cluster size has increased or at least remained the same, capital stocks have increased, and the ratio of pollution to financial capital is on a downward trend. The least desirable state is where the agents have vanished as pollution has increased, and capital stocks have been depleted.

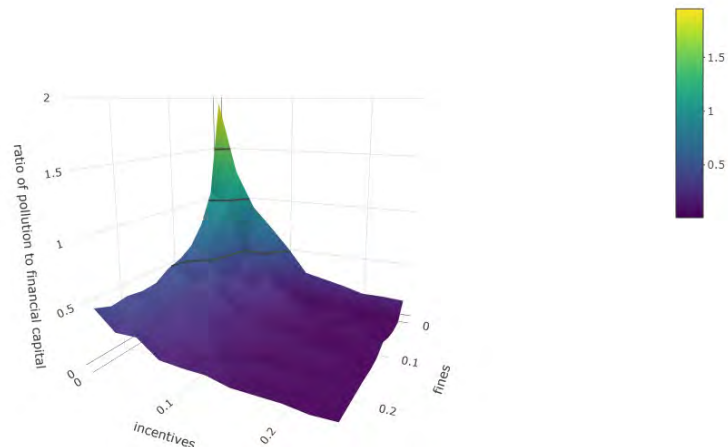
### Is there an effective instrument mix for the green growth of clusters?

The most important results of this simulation are the variations in the cluster-level properties, when the cluster's green growth is being shaped by the instrument mix of incentives for entrants, and fines for polluting firms. FIGURES 1, 2 and 3 below depict how these parameters change with fines and incentives.

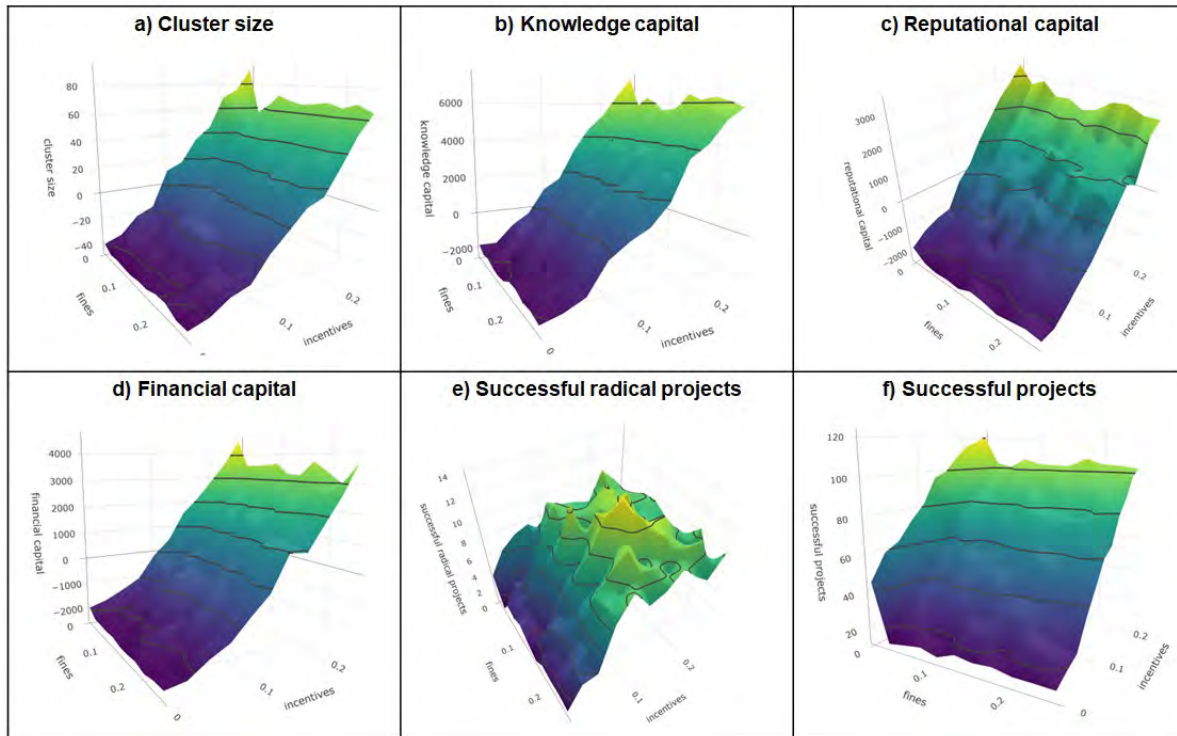
**FIGURE 1: Variation of pollution in the cluster, with increasing levels of incentives and fines**



**FIGURE 2: Variation of the ratio of pollution levels to financial capital of the cluster, with increasing levels of incentives and fines**



**FIGURE 3: Variation of cluster size, knowledge capital of the cluster, financial capital of the cluster, reputational capital of the cluster, number of successful radical projects, and number of successful projects, with increasing levels of incentives and fines**



What we saw from the simulation of green growth shaped by the instrument mix is that it can be optimised for each macro-variable (TABLE 2); there is no one combination of incentives and fines that optimises for all of the macro-variables simultaneously. These results indicate that total decoupled growth of peripheral-region clusters is close to impossible. Rather, it is possible to achieve various states of partial decoupling. However, optimising for decoupling (low ratio of pollution to financial capital)

requires the prior optimisation of some other macro-variables.

Our results demonstrate the complexity of designing an effective instrument mix for the green growth of clusters. We see the inherent trade-offs in designing an instrument mix for the relatively decoupled growth of clusters. There is no way to maximize reduction in pollution, or augmentation of assets, without sacrificing some capital or some pollution reduction.

TABLE 2: How various instrument combinations optimise for different macro-variables

	High Incentives	Low Incentives
Low Fines	Optimise for augmentation of capital and cluster size, total innovation success	
High Fines	Optimise for pollution reduction, pollution to financial capital ratio, and radical innovation success	Optimise for pollution reduction

Implications for policymakers

ABMs cannot be prescriptive tools; rather, they provide us with a landscape of possibilities. The results of our instrument mix simulation show that there is a landscape of several possible states of partial decoupling. Policymakers will first have to figure out what the inflection points are for their region. The next challenge is to gauge if there is a better local optimum, or a global optimum. This can be done by closely studying and comparing with other peripheral clusters that have enjoyed relatively greater decoupling.

Alkemade et al., 2009, recommend that while attempting to move through such landscapes, authorities should ensure that the combination of instruments can be adjusted as soon as there are signs of policy ineffectiveness. Without a timely modification, the cluster may get locked into a particular growth path and find it very difficult to move towards better optima. Authorities must, for instance, avoid focusing grants on projects innovating with one particular technology because future performance and externalities can be unclear.

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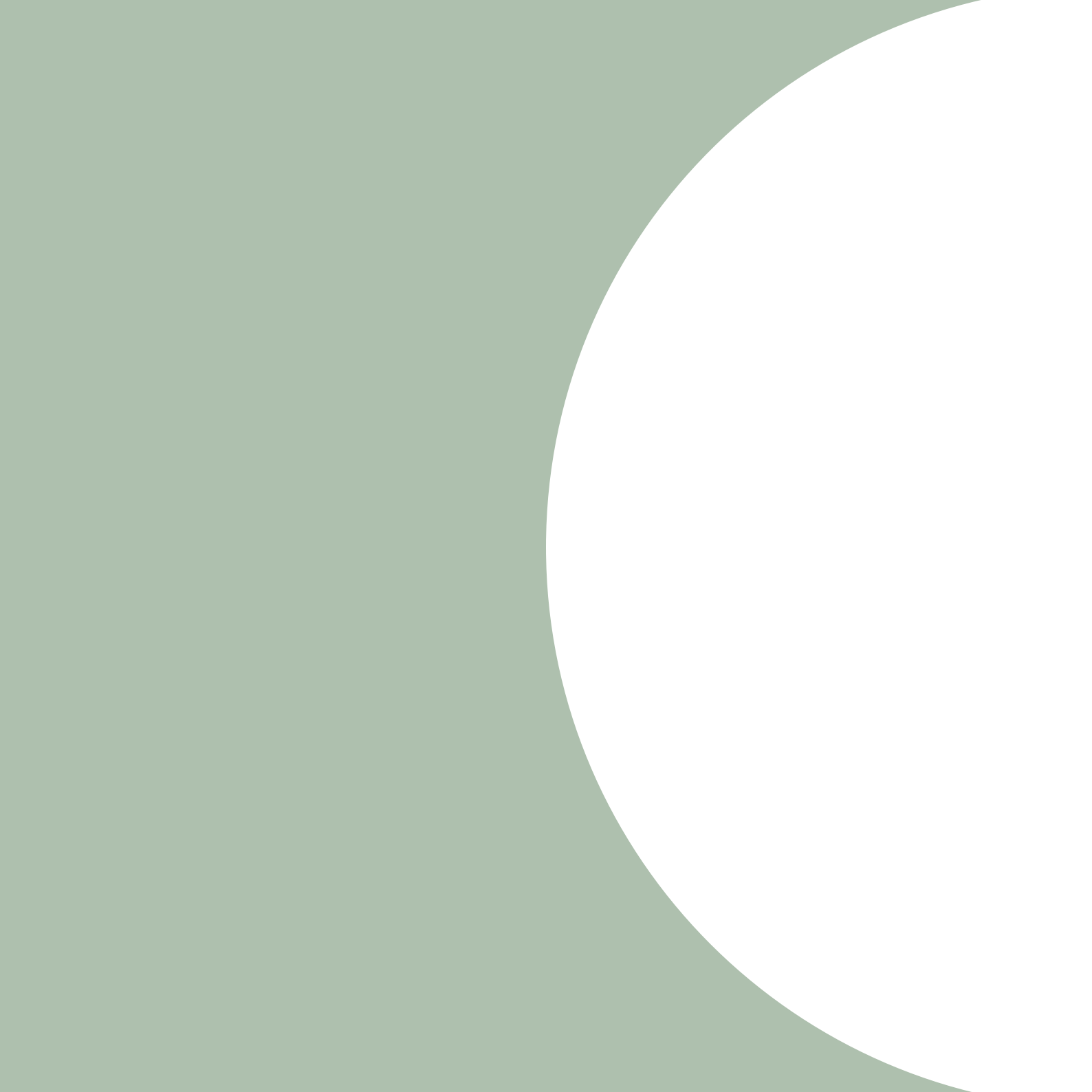
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## Diagram sources and acknowledgements

- TITLE** Carbon dioxide emissions, carbon footprint concept © Proxima Studio – stock.adobe.com
- TAB. 1** Agent-specific and global variables that guide agent behaviour © Own compilation. Data: Tödtling & Trippl (2005); Isaksen & Trippl (2016); European Innovation Scoreboard
- FIG. 1** Variation of pollution in the cluster, with increasing levels of incentives and fines © Own illustration
- FIG. 2** Variation of the ratio of pollution levels to financial capital of the cluster, with increasing levels of incentives and fines © Own illustration
- FIG. 3** Variation of cluster size, knowledge capital of the cluster, financial capital of the cluster, reputational capital of the cluster, number of successful radical projects, and number of successful projects, with increasing levels of incentives and fines © Own illustration
- TAB. 2** How various instrument combinations optimise for different macro-variables © Own compilation





Brian Beadle, Stephan Brosig,  
and Christoph Wunder

# **Sustainability of farms producing non-food crops**





# Sustainability of farms producing non-food crops

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Brian Beadle, Stephan Brosig, and Christoph Wunder<sup>1</sup>

## Introduction

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In recent decades many governments have been developing bioeconomy strategies (e.g. The White House, 2012, European Commission, 2012) as a means to reduce dependence on fossil fuels and mitigate the consequences of greenhouse gas (GHG) emissions. The concept behind these strategies is the development of an economy centered around the use of renewable biological resources for materials, chemicals, and energy (McCormick & Kuatto, 2013). Furthermore, the strategies accommodate the economic, social, and environmental aspects of sustainability (D'Amato et al., 2017) by aiming to improve rural economies, employment, growth, and the environment (Gawel et al., 2019). The National Bioeconomy Strategy (BMBF, 2020) in Germany, for example, promotes the objectives of the 2030 Agenda for Sustainable Development by focusing on an innovation-based economic model that incorporates society into the model and operates within ecological boundaries.

A central focus of the bioeconomy strategies is the extensive production and use of non-food crops (NFCs). At its core, the bioeconomy aims to expand the agricultural sector to include a vast array of NFC products previously made with fossil fuels (Bastos Lima, 2018), thus evolving the agro-industry into the primary producer in the value chain (Efken et al., 2016). However, recent years have witnessed the emergence of unintended side effects in the bioeconomy (Egenolf & Bringesu, 2019). What is more, many of the side effects are the direct result of NFC production and include, as examples, concerns over increased chemical usage, threats to biodiversity, and land availability (Pfau et al., 2014). In response to the latter, authors such as Fu et al. (2022) and Mitchell et al. (2016) promote the use of marginal land for NFC production, though this also has potential negative implications for sustainability (Raghu et al., 2011).

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Rapeseed for the production of biodiesel is one of the most important NFCs in Central Europe

This research asks the following questions:

- (1) Are there observable differences in the sustainability of farms producing NFCs versus the farms that only produce food crops?
- (2) Further, are there observable differences between these production types when accounting for whether or not the farm is on marginal land?

To answer this question, we specify a farm-level index of agricultural sustainability (the AS index) using item response theory. Such an approach has advantages over existing methods in that it offers more flexibility in terms of data requirements, and duly takes account of the economic, environmental, and social aspects of sustainable development. We estimate the AS index for a large sample of German farms and examine associations between the AS index and the extent of NFC production, as well as production on marginal land.

Data and methods

The sample of farms comes from the Farm Accountancy Data Network (FADN). We use all farms reporting to FADN in Germany for the accounting year of 2013, as it is the latest year available in the data set. The total sample size is 8,928 farms, and we further supplement the FADN data by using additional sources for emissions and regional wage estimations.

The sustainability of each farm is captured as a single comprehensive measure using item response theory. The method has origins in education and psychological

testing (van der Linden & Hambleton, 1997, Cai et al., 2016), and has more recently been used in socioeconomic studies in the development of a deprivation scale (Cappellari & Jenkins, 2007) and wealth estimates (e.g. Vandemoortele, 2014). The basic idea is that the model is used to estimate an unobserved latent trait (i.e. the sustainability of the farm) based on a set of observed characteristics. We use the graded response model (GRM) (Samejima, 1969), which allows for ordinal items with more than two categories. Details on model structure and calculations are provided by Bürkner (2017) and Samejima (1997). In developing the model, we assume that (a) farm sustainability is a continuous unobserved

TABLE 1: List of variables used

Variable	Description
<i>Agricultural sustainability index items</i>	
Profitability	Farm net income less an allowance for unpaid labor
Solvency	Ratio of total debts to total assets
Wage ratio	Ratio of average wages on the farm to the median wage in the region
Economic diversity	The maximum percentage of a single agricultural product to total output
Provision of employment	Ratio of total expenditure on wages and contract work to total output of the farm
Expenditure on pesticides	Ratio of total pesticide expenditure to total utilized agricultural area (UAA)
GHG emissions	CO <sub>2</sub> intensity on the farm: ratio of annual CO <sub>2</sub> equivalent gases emitted/absorbed to gross value added
Multi-factor productivity	Ratio of total value added to factor inputs for land, labor and capital
Land ecosystem quality	Estimated quality of land as a percent relative to pristine (untouched) natural landscape
<i>Explanatory variables</i>	
Energy crop production	Ratio of energy crop output to total output
Industrial crop production	Ratio of industrial crop output to total output
Marginal land classification	Binary variable equal to 1 if farm is located in less favored area (LFA)

latent trait that cannot be measured directly, and (b) this trait influences the observed items of the index. In this context, the items are considered as reflective indicators of agricultural sustainability.

The agricultural sustainability index items presented in **TABLE 1** are the basis of the item response theory model. We select the items based on their ability to reflect the potential for the farm to be profitable, environmentally sound, and to contribute to rural development (Keeney, 1989, Schaller, 1993). Each item is first calculated as a continuous variable using the aforementioned data sources, then transformed into 4-category Likert-type ordinal items for the model. The ordinal scale reflects the relative performance of the farm using the labels of “low”, “mid”, “high”, and “very high” sustainability.

We extend the GRM to estimate differences in agricultural sustainability across six different farm categories: we compartmentalize the sample into (1) farms producing energy crops, (2) farms producing industrial crops, and (3) farms that do not produce

any NFCs, where we subdivide each group into farms that produce on marginal land and those that do not produce on marginal land, thereby creating six categories in total for sustainability comparisons. Furthermore, we are interested in looking at potential differences in farm sustainability relative to the total share of NFC output to total output on the farm. This is done using a flexible, non-parametric function to capture any nonlinear trends between the AS index and the explanatory variables.

**TABLE 1** also provides an overview of the explanatory variables used in the analysis. NFCs are divided into two categories in the FADN data set: energy crops, which are generally used for fuels and include crops such as maize and woody plants; and industrial crops, which are primarily comprised of plants used for oil and fiber. We measure these as a ratio of each respective crop's output value relative to the total output value of the farm (measured in euros). Marginal land classification is measured using a proxy variable of the farm's less

**TABLE 2: Parametric regression results for farm type and marginal land classification**

	Category	Mean	SD	95% lower	95% upper
<b>Not on marginal land</b>					
No NFC production (baseline category)	A	-	-	-	-
Energy crop output	B	1.89	0.19	1.53	2.27
Industrial crop output	C	1.93	0.31	1.32	2.54
<b>On marginal land</b>					
No NFC production	D	0.12	0.07	-0.02	0.27
Energy crop output	E	1.32	0.24	0.87	1.8
Industrial crop output	F	1.68	0.41	0.89	2.47

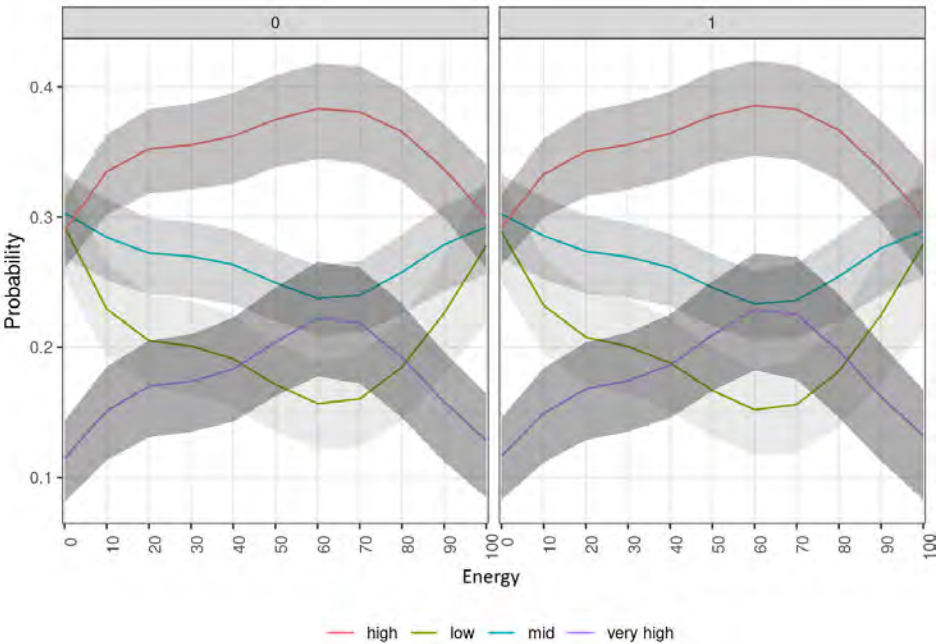
favorable area (LFA) classification, which signals if the farm is in an area suffering from low productivity or a dwindling agriculturally dependent population. The variable is a binary value equal to 1 if the farm is on marginal land, and 0 otherwise.

Results and discussion

We look first into the relative sustainability levels of each subgroup using the mean values and 95 per cent credible intervals shown in TABLE 2. The results suggest that in the absence of NFCs (categories A and D), there is

no evidence for differences in farm sustainability when producing on marginal land. However, we do find that average farm sustainability is higher when NFCs are produced on the farm, regardless of the marginal land classification. This pattern holds for both energy crop farms (category A versus B, or D versus E) and industrial crop farms (category A versus C, or D versus F). It is also noted that while the mean values are higher for NFC production on non-marginal land compared to the same type of production on marginal land (B versus E, or C versus F), we cannot say with reasonable certainty that marginal land production is less sustainable given the overlap in the 95 per cent credible intervals.

FIGURE 1: Predicted probabilities of sustainability categories with 50% Bayesian credible intervals (shaded area), based on the proportion of energy crop output

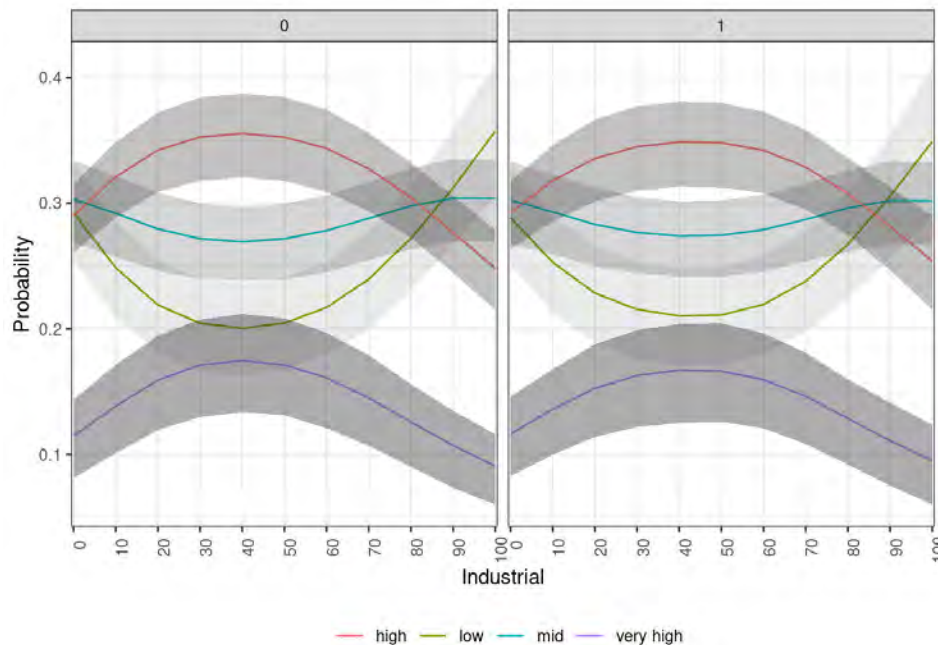


Next, we assess the sustainability of NFC production using predicted probabilities. These are defined as the probability for a particular sustainability category based on a given NFC output ratio. FIGURES 1 and 2 show the predicted probabilities for energy and industrial crops, respectively, with the left and right panels of each figure differentiating between the marginal land classifications. In line with the findings from TABLE 2, we do not find any evidence to suggest that there is a difference in sustainability when producing on marginal land. With respect to both crop types, we find that the relationship between the probability of being classified as “highly” or “very highly” sustainable and the proportion of NFC

output to total output follows a nonlinear inverted u-shape. This means that farms are most likely to achieve a high sustainability category when producing a mix of NFCs and food crops, regardless of the specific NFC type.

Interestingly, in the case of energy crops the predicted probabilities are essentially identical at the extremes (i.e. no energy crops versus 100 per cent energy crops). At any given proportion between the extremes, however, farms are more likely to achieve a higher sustainability category, with peak sustainability levels predicted at about 60 per cent energy crop output to total output. At this level, farms have approximately a 38 per cent chance of achieving the sustainability category labeled as “high”,

**FIGURE 2: Predicted probabilities of sustainability categories with 50% Bayesian credible intervals (shaded area), based on the proportion of industrial crop output**





and a 22 per cent chance of being classified in the “very high” category.

Looking next at industrial crops, we find that the peak sustainability predictions occur at much lower NFC proportions compared to the energy crop estimates. In this case, the probability of achieving the highest sustainability categories reaches its maximum at about 40 per cent industrial crop output to total output. At this point, farms have approximately a 36 per cent chance of achieving the category “high”, and a 18 per cent chance of achieving “very high”. As the proportion of industrial crops reaches the maximum, the farms are actually most likely to be classified in the “low” sustainability category, suggesting that there may be consequences for sustainability should farms choose to specialize in industrial crops.

Our results have implications for potential ways to maximize the sustainability of current and future bioeconomy strategies. Germany’s bioeconomy strategy (BMBF, 2020), for example, aims to improve the sustainability of agriculture using innovation-based methods such as vertical farming and location-based smart farming. While these methods are indeed promising solutions to sustainability issues in agriculture, our research suggests that sustainability could be maximized in simpler and more cost-effective ways. Because of the nonlinear relationships between NFC output and farm sustainability, bioeconomy strategies could promote mixed farming systems comprising both food crops and NFCs. We suggest that target proportions for this mix should be about 60% in the case of farms producing energy crops, and 40% in the case of industrial crops. We further suggest that while there appear to be no negative consequences from specializing in energy

crop production, bioeconomy strategies could advise against farms specializing only in industrial crops.

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## Diagram sources and acknowledgements

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**FIG. 1** Predicted probabilities of sustainability categories with 50% Bayesian credible intervals (shaded area), based on the proportion of energy crop output © Own illustration

**FIG. 2** Predicted probabilities of sustainability categories with 50% Bayesian credible intervals (shaded area), based on the proportion of industrial crop output © Own illustration

22-24 JUNE  
**IAMO 2022**  
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Rural Resilience  
in a Post-  
pandemic Era

Christa Gotter,  
Thomas Herzfeld,  
Sina Lehmann,  
and Anna Czenthe

**Challenges and opportunities for  
more resilient rural development  
after the pandemic:  
Report on IAMO Forum 2022**



# Challenges and opportunities for more resilient rural development after the pandemic: Report on IAMO Forum 2022

Christa Gotter, Thomas Herzfeld, Sina Lehmann, and Anna Czenthe

From 22–24 June, the IAMO Forum 2022 was held in Halle (Saale) as an in-person event again after two years. The conference examined the impact of the Coronavirus pandemic and the war in Ukraine on rural development in transition regions such as Southeast Europe or Central and Southeast Asia. The discussions focused on developing strategies allowing agricultural systems to react better to future crises.



For the first time since 2019, IAMO had the pleasure of welcoming the Forum participants in person again.



Opening of the Forum by Thomas Herzfeld

The spread of the new Coronavirus and national measures introduced to counter it have highlighted the weaknesses and vulnerability of economic interrelations in a heavily globalised world. This became apparent in the agricultural sector as well as rural areas. Whereas the impact on agricultural production in 2020 was only slight, there was a short-term change in demand for certain foods, which in some cases was huge. Over the course of 2021, there were growing signs that uncertainty

over crop planning, ongoing logistical problems due to Coronavirus, short-term export restrictions for agricultural products, global increases in food prices and rising inflation in many countries will have a noticeable impact on agricultural production, food markets and food marketing chains. The extent and nature of these effects differ according to the context and starting situation. For example, the agricultural sector in transition countries, with medium and low per-capita incomes and a well-developed system of informal markets, will be affected in a different way and to a different extent than countries with high per-capita incomes and a very high proportion of agricultural products traded and processed on formal markets with many intermediate stages.

The Coronavirus pandemic also impacted rural households and rural development. In many transition countries, rural households depend on family members migrating to urban centres or abroad to earn their living there and support the family members who have stayed behind. As many migrants are employed in the service sector or construction, they were hit particularly hard by the lockdowns. Reports from some countries in Central Asia, the Caucasus, the Western Balkans or poorer regions of China documented the return of migrants when employment opportunities disappeared. Lockdowns and (temporary) restrictions on mobility between regions and countries also prevented more people from migrating. There is little statistically-grounded evidence of potential growth in poverty and inequality or the development of financial transfers to the countries of origin, especially as many transfers are made through informal channels and even under more challenging conditions.

As arrangements were being made for the IAMO Forum 2022, the original planning was greatly eclipsed by the Russian attack on Ukraine on 24 February 2022. The effects on agricultural markets, migration flows, and markets for production factors and energy sources considerably exceeded the impact of the Coronavirus pandemic. The rise in global food prices accelerated dramatically, and food security prognoses worsened. At the same time, it is also one of the IAMO Forum's objectives to respond to current events in the Institute's focus countries and address related issues.

The IAMO Forum 2022 in Halle (Saale) from 22–24 June 2022 provided a platform for 151 participants from 24 countries to discuss the effects of national measures to combat the Coronavirus pandemic on the development of the agricultural sector and rural areas. A special session was also included in the programme for presentations on the impact of the war. As in previous IAMO Forums, parallel sessions offered the opportunity to present other current research projects on the development of the agricultural sector and rural areas in transition countries in Europe and Asia. The conference was organised by IAMO and the International Food Policy Research Institute (IFPRI).

The presentations and discussions of the four plenaries and seventeen parallel sessions, as well as the panel discussion, focused on the impact of the Coronavirus pandemic on agricultural markets and rural households, the lessons for rural households from the consequences of the 2008 financial crisis, the concept of resilience and its function in policy advice, and the role of international organisations in strengthening rural resilience.



## Effects of current and past crises on the agricultural sector and rural households



Stephan Hubertus Gay from the OECD

**STEPHAN HUBERTUS GAY** (Organisation for Economic Co-operation and Development, OECD, Paris) gave an insight into the current situation on the most important global agricultural markets.

He presented the findings of the FAO-OECD Agricultural Outlook, which had just appeared at the time of the conference. The OECD analyst highlighted the existence of various overlapping crises: the Coronavirus pandemic, the war in Ukraine, the continual progression of climate change and African swine fever, which is threatening animal production in many countries, are creating uncertainty for market actors. Even though in the medium term, real agricultural prices are expected to fall again, in the short term, particularly the poorest people are suffering from the substantial rise in food prices. Therefore, income growth in this group will be crucial for future food security. This conclusion goes

beyond the traditional approach focusing only on the rise in average incomes.

The secondary plenary speaker, **WILLIAM HUTCHINSON SEITZ** (World Bank, Central Asia Office, Kazakhstan), spoke about the regular surveys of people in various Central Asian countries, entitled 'Listening to the citizens of...'. The World Bank has been conducting these monthly surveys for several years in Kazakhstan, Tajikistan and Uzbekistan. The Coronavirus pandemic has led to a rise in poverty in the region. Those worst affected included people active in the informal sector, who are least protected by labour market and social security measures. State-financed stimulation measures, e.g. in Tajikistan, have also led, however, to an increase in employment in construction and engagement in the informal sector.



William Hutchinson Seitz spoke about the citizen surveys in the countries of Central Asia conducted by the World Bank.

## Policy interventions and lessons from past global crises to strengthen resilience

A highlight of the second day of the conference was the special event on 'Effects of the war in Ukraine'. In this session, organised in cooperation with the German-Ukrainian Agricultural Policy Dialogue (APD Ukraine), speakers highlighted the consequences of the war on Ukrainian agriculture and education and other countries in the region. Besides IAMO Forum attendees, who listened to the presentations in the IAMO auditorium, more than 100 others followed them online. The discussion focused on aspects that have received less attention in the media.



The special event „Effects of the war in Ukraine“ could be followed both on-site ...



... as well as online

destroyed, teaching continues online where necessary. **MARIIA BOGONOS** (Center for Food and Land Use Research, Kyiv School of Economics, Ukraine) presented simulation model-based estimates for determining war damage in Ukrainian agriculture. Besides direct damage, the findings also considered the loss of production on land that cannot be cultivated in the long term. At the time of the Forum, total war damage to agriculture was estimated at 28 billion US dollars. Two presentations by **ROMAN MOGILEVSKII** (University of Central Asia, Bishkek, Kyrgyz Republic) and **ALEXANDRU STRATAN** (Academy of Economic Studies of Moldova, Chisinau, Republic of Moldova) drew attention to migration flows and the threats to agricultural trade in Southeast Europe and Central Asia. Besides a very high rate of inflation, the geographical location of the Central Asian economies presents particular challenges.

For example, **OLEH SKYDAN** (rector of Polissia National University, Zhytomyr, Ukraine) talked about the severe damage to education and research. Although hundreds of schools and other educational institutions have been



Looking back at the financial crisis of 2008–09, the Istanbul-based researcher **FATMA NIL DÖNER** (Istanbul Medeniyet University) pointed to the slump in tourist income in the Mediterranean in those years. More recently, the same happened during the COVID lockdowns. Basing her presentation on a publication by a working group of the European Society for Rural Sociology (ESRS), she spoke of the challenges facing rural areas, which keep being exacerbated by crises. At the same time, however, she underlined the ‘learning effect’ for rural households, which often opt to grow their food, thus allowing them to make up for losses in income.



Fatma Nil Döner drew a comparison between the lockdowns and the financial crisis of 2008–09 with regard to the lack of income from tourism in the Mediterranean region.

## Building bridges between science, politics, and international cooperation

The question of how to strengthen the resilience of rural households and farms was at the centre of the third and final day of the conference. The creation of resilient, sustainable agricultural systems that are fit for the future needs more than just farmers, **MIRANDA MEUWISSEN** from Wageningen University & Research (WUR, The Netherlands) insisted.



According to Miranda Meuwissen (WUR), building resilient and sustainable agricultural systems requires the participation of all stakeholders.

In her talk, she presented findings from various research projects looking at, amongst other things, the perspectives of several stakeholders regarding the resilience and sustainability of the entire food system. This must integrate all actors, including traders, processors, administrators and consumers. She said

that new technologies, diversification of income opportunities in rural areas, and a better balance between economic and ecological objectives would offer the potential for development strategies adapted to individual locales.



Panel discussion on rural development

The panel discussion following the lecture offered a platform for international organisations to present their work in the field of rural development. The organisations were represented by **YASMIN SADIA SIDDIQI** (Asian Development Bank, attending online), Doris Marquardt (European Commission, Directorate-General for Agriculture and Rural Development), **PEDRO ARIAS** (Food and Agriculture Organization of the UN) and **PETRA JACOBI** (German Association for International Cooperation, GIZ). The panel discussion was moderated by **GEMMA PÖRZGEN**.

Beginning with the observation that productivity in many agricultural sectors of poorer countries continues to be relatively low, Yasmin Siddiqi emphasised that ADB's goal was to use its funding instruments to increase agricultural productivity and reduce poverty

in rural areas. With a different geographical focus, Doris Marquardt outlined the European Commission's objective to support economic recovery after the Coronavirus pandemic by better exploiting the potential of digital technologies. Pedro Arias clarified the role of the FAO as a platform and moderator for discussion between experts and governments and for providing technical expertise. From another perspective, Petra Jacobi described the work of GIZ, which focuses on capacity building. All participants agreed that the crises made achieving global sustainability goals more difficult. Restrictions on access to food, in particular, might lead to severe food crises in the future.



The forum was complemented by public relations efforts conducted by colleagues from the Press and Public Relations staff unit.

## Impressions of IAMO Forum 2022



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*The participants of the IAMO Forum knew how to use the face-to-face event for lively discussions.*

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## Enhancing resilience in a post-pandemic era



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*Between the individual sessions, there was enough time for networking and professional exchange.*

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## Parallel sessions



Organised session with William Meyers, Ekaterina Krivonos and Nodir Djanibekov, as well as Thomas Reardon and Kateryna Schroeder on the topic of challenges for trade and food security after the pandemic



Organised session with Moritz Egger on ways to resilience among smallholder farmers

Besides the plenary sessions, there were also seventeen parallel sessions during the IAMO Forum 2022. These consisted of six organised sessions and eleven sessions with thirty-one individual papers. All the organised sessions and individual papers were subject to a blind peer-review-based selection process. In addition to the presentation of various theoretical, methodological and empirical approaches reflecting the current status of research, there was repeated discussion of whether and how the individual research findings can be transferred to other transition countries and regions. Lively discussions took place on issues such as:

- Can different effects of the Coronavirus pandemic be observed in different population groups?
- Which effects on global agricultural markets can be observed due to the overlapping crises?
- How has food security at the household level developed for different population groups and in different regions?
- Besides classic income-based indicators, how can the living conditions of rural households be captured quantitatively and qualitatively?

The Agricultural Policy Dialogue Germany – Western Balkans (APD Westbalkan) set up an organised working-group session, presenting the work of the multilateral cooperation project, which is aimed at supporting agricultural-policy exchange between Germany and five countries in the Western Balkans.

The entire conference was funded by the German Research Foundation (DFG) and the Landwirtschaftliche Rentenbank. Financial support from the German Academic Exchange Service (DAAD) also made it possible

to reimburse alums' travel costs and organise a working group session with papers given by international alumni.

Detailed information on the IAMO Forum 2022 can be found at:

 <https://www.iamo.de/forum/2022>

## Sources and picture references

**TITLE** Latina woman in mask for protect Coronavirus in garden caring for beds © JackF – stock.adobe.com

**P. 96** Thomas Herzfeld, photo: M. Scholz © IAMO

**P. 96** View into the lecture hall during the opening of the IAMO Forum 2022, photo: M. Scholz © IAMO

**P. 98** Stephan Hubertus Gay, photo: M. Scholz © IAMO

**P. 98** William Hutchinson Seitz, photo: M. Scholz © IAMO

**P. 99** View into the lecture hall during the special event "Effects of the war in Ukraine", photo: M. Scholz © IAMO

**P. 99** Mariya Yaroshko takes part in special event "Effects of the war in Ukraine" via Zoom., photo: M. Scholz © IAMO

**P. 100** Fatma Nil Döner, photo: M. Scholz © IAMO

**P. 100** IAMO scientist Lena Kuhn asks Miranda Meuwissen a question., photo: H.-J. Franke © IAMO

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**P. 103** Coffee break talk, photo: M. Scholz © IAMO

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**P. 104** Organised session with William Meyers, Ekaterina Krivonos and Nodir Djanibekov, as well as Thomas Reardon and Kateryna Schroeder on the topic of challenges for trade and food security after the pandemic, photo: M. Scholz © IAMO

**P. 104** Organised session with Moritz Egger on ways to resilience among smallholder farmers, photo: M. Scholz © IAMO







Michael Kopsidis

**IAMO –  
a brief portrait**

## IAMO – a brief portrait

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Michael Kopsidis

### Aims and tasks

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Since 1994 the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) has been investigating the far-reaching economic, social and political processes of change in the agricultural and food sector, and in the rural areas of its geographical area of research. This extends across Central, Eastern and South-Eastern Europe. The transition countries of Central and Eastern Asia, especially China, have been added to this remit. Research into Central Asia, Ukraine and the West Balkans in particular, has been intensified over the past few years.

In spite of great efforts and much success, the development of the agricultural and food sector in many of these regions still lags far behind that of Western industrial nations, and some of them are following their own, very specific development paths. Furthermore, a huge gulf is emerging between successful and stagnating regions within individual countries, as well as between states themselves. Beside a wide variety of structural factors, the different transition processes, which still have an effect today, go a long way to explain the divergence.

Large emerging nations such as Russia and China, as well as Ukraine and Kazakhstan, have risen to become ‘global players’ on world agricultural markets. We need to determine what must happen in these key economies to boost environmentally sustainable economic growth in agriculture and the food sector, and ensure long-term national and global food security despite the growing demands being placed on agricultural resources. In the countries we cover, but not only in these, adapting agriculture and land use to climate change in a globalising economy also represents a major challenge. Digitalisation is now also a factor for the agricultural and food sector in our partner countries. Efficient strategies for successful rural development must be devised to combat, for example, unregulated economic migration from rural areas. All these factors ensure that IAMO’s research brief is very broad, both thematically and regionally.

IAMO has considerably boosted the **IMPACT** of its research on decision makers in agricultural policy, administration, business and science in its partner countries. In this respect particular emphasis is placed on the Institute’s transfer activities, which have gained

substantially in importance over the years. Increasingly, IAMO is no longer just focusing on policy advice in its target regions, a classic area of applied (agro-) economic research, but shaping development in all its

various facets with research that is firmly embedded in agricultural practice, and in coordination with the most diverse local actors.

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*A key element of the Institute's research and transfer strategy is intensified scientific capacity building, including the establishment of permanent research, advisory and dialogue infrastructures in the target regions themselves.*

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With its thematic and geographical focus, IAMO is a unique global research institution. Since its establishment in 1994 it has been a member of the Leibniz Association as a non-university research centre. The Leibniz Association includes research institutes which are scientifically, legally and commercially independent, together with service institutions. Both these are jointly funded by the federal administration and the Länder to address current problems of national interest.

 <https://www.leibniz-gemeinschaft.de/en>

As mentioned above, the aim of IAMO's work is not just to help understand, but also overcome the major challenges and ongoing development deficits in the agricultural and food sector, as well as in the rural areas of the Institute's geographical area of research. This goal gives rise to the **THREE CORE TASKS** of the Institute:

- **Internationally oriented research into agricultural and food economics including the development of rural areas.**
- **Exchange of ideas between the academic, business and political communities.**
- **Support for young academics.**

The Institute sees itself as a driving force of international research into agricultural economics. Outstanding research is the engine of the Institute's development, and it creates the conditions in which the other two core tasks can be performed. For instance, IAMO acts as a forum for exchange, and in this way it supports the international cross-linking of German research and dialogue between decision makers from the academic, political and business communities.

The Institute also uses its expertise and capacities to help academic scholars become fully qualified. Here there is a particular focus on supporting young academics from partner countries. Through its international orientation and cooperation with other teaching and

research institutes, IAMO is helping to strengthen the profile of Halle (Saale) as a centre of science and research in Central Germany. Our close cooperation with **MARTIN LUTHER UNIVERSITY OF HALLE–WITTENBERG (MLU)** especially with the Institute of Agricultural and Food Sciences at the Faculty of Natural Sciences III, and with the Economic Sciences Department at the Faculty of Law and Economics – is an important factor here.

#### **Academic departments, research fields and key topic areas**

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IAMO's threefold research structure with the departments **AGRICULTURAL POLICY**, **AGRICULTURAL MARKETS** and **STRUCTURAL CHANGE** (abbreviated titles) is derived from the orientation of its research. The basic conditions of agricultural policy and opportunities for shaping policy, markets in the agricultural and food sector, and the development of farms and structures in rural areas are all analysed by the Institute. Developments at individual farm level and in rural areas, the creation of functioning agricultural markets, and the shaping of agricultural policy are all closely interlinked. Decisions relating to farm development and agricultural policy, as well as market processes also have an impact on human–environment interaction in rural areas. In addition, they have an effect on the two key issues of the future: food security and food safety.

In 2023, following on from the Institute's former medium-term agenda (2016–22), IAMO's academic work is now organised interdepartmentally into six essential thematic complexes focusing on major problem areas of agricultural development in Eurasian transition countries and emerging nations. The more intensive level of com-

munication in theme centered groups counteracts any possible fragmentation of research. Besides positive bundling effects, greater individual responsibility of the theme centered groups allows efficient, result-oriented research management.

#### **The six new thematic complexes are:**

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- I. Designing appropriate regulatory frameworks and institutions (T1)**
- II. Creating resilient agricultural systems (T2)**
- III. Reduction of and adaptation to environmental risks (T3)**
- IV. Fostering sustainable rural livelihoods in the age of migration (T4)**
- V. Securing the world's food supply and competitive supply chains (T5)**
- VI. Diffusion of innovations and knowledge (T6)**

#### **In the new medium-term agenda 2023–30 the following will receive greater consideration than before:**

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- Digitalisation processes in the agricultural enterprises and value chains of IAMO's target regions**
- Developments in the West Balkans, the successor states of the Soviet Union and in China**
- Transfer, capacity building and the development of sustainable infrastructure in the countries under research**



The Directorate (from left to right): Prof. Dr Dr h.c. mult. Thomas Glauben, Katja Guhr, Prof. Dr Thomas Herzfeld, Prof. Dr Alfons Balmann

## Institutional structure

IAMO is a public foundation. Its bodies are the **BOARD OF TRUSTEES**, the **DIRECTORATE** and the **SCIENTIFIC ADVISORY BOARD**.

### The Institute is divided into three academic departments:

- **External Environment for Agriculture and Policy Analysis; Head of Department**  
**PROF. DR THOMAS HERZFELD**
- **Agricultural Markets, Marketing and World Agricultural Trade; Head of Department**  
**PROF. DR DR H.C. MULT. THOMAS GLAUBEN**

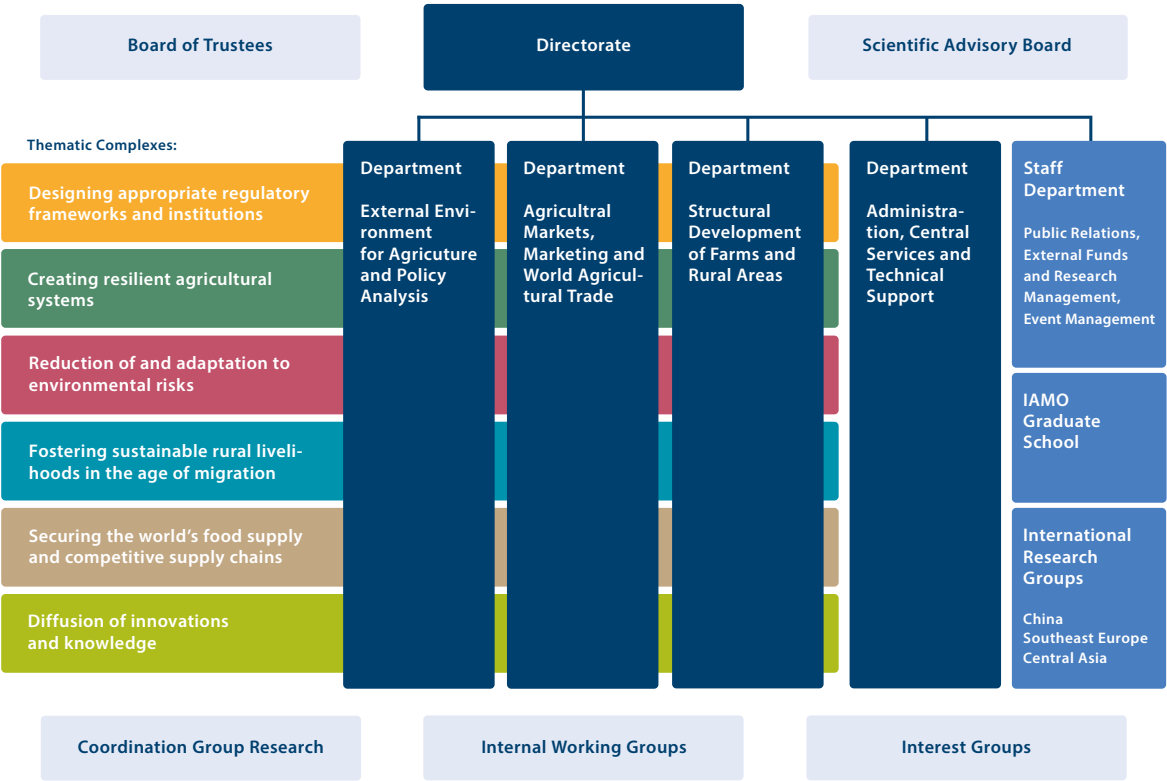
- **Structural Development of Farms and Rural Areas; Head of Department**  
**PROF. DR ALFONS BALMANN**

The heads of the academic departments, together with the head of Administration and Central Services/Technology, **KATJA GUHR** form the Directorate of the Institute. Since January 2013, all four directors of the Institute have been on an equal footing as managing directors with collective responsibility.

In coordination with the Board of Trustees, this collegiate body manages the Institute's business and directs the long-term research and development planning at IAMO. The Scientific Advisory Board advises the Directorate and the Board of Trustees on academic matters and carries out regular evaluations of the Institute's work.



Organigram



**On 1/1/2023 the following were members  
of the Board of Trustees:**

- **Dr Michael Lehmann**, Chair, Ministry of Science, Energy, Climate Protection and the Environment of the Federal State of Saxony-Anhalt
- **MinDirig'n Cornelia Berns**, Deputy chair, German Federal Ministry of Food and Agriculture
- **N. N.**, Ministry of Science, Energy, Climate Protection and the Environment of the Federal State of Saxony-Anhalt
- **Dr Lothar Hövelmann**, German Agricultural Society (DLG), Centre of Expertise for Agriculture
- **RD Christoph Burose**, German Federal Ministry of Food and Agriculture
- **Prof. Dr Sebastian Lentz**, Leibniz Institute for Regional Geography, Vice-President of the Leibniz Association
- **Prof. Dr Martin Odening**, Humboldt University, Berlin, Department of Agricultural Economics
- **Prof. Dr Christine Fürst**, Martin Luther University Halle–Wittenberg, Prorector for Research, Internationalisation and Transfer

**On 1/1/2023 the following were members  
of the Scientific Advisory Board**

- **Prof. Dr Gertrud Buchenrieder**, Chair, University of the Bundeswehr Munich, Germany
  - **Prof. Dr Jens-Peter Loy**, Vice-Chair, Christian-Albrechts-University of Kiel (CAU), Germany
  - **Prof Dr. Štefan Bojnec**, University of Primorska, Slovenia
  - **Prof. Dr Robert Finger**, ETH Zurich, Switzerland
  - **Stephan Hubertus Gay, Ph.D.**, Organisation for Economic Co-operation and Development (OECD), France
- **Prof. Dr Sebastian Hess**, University of Hohenheim, Germany
  - **Prof. Miranda Meuwissen, Ph.D.**, Wageningen University and Research, Netherlands
  - **Prof. Dr Patrick Meyfroidt**, Catholic University Leuven, Belgium
- **Veronika Movchan**, Institute for Economic Research and Policy Consulting (IER), Ukraine
  - **Prof. Dr Insa Theesfeld**, Martin Luther University, Halle–Wittenberg (MLU), Germany
  - **Prof. Xiaohua Yu, Ph.D.**, Georg-August-Universität Göttingen, Germany
- **Prof. Dr Katarzyna Zawalińska**, University of Warsaw, Poland



## Cooperation with university institutions



MARTIN-LUTHER-UNIVERSITÄT  
HALLE-WITTENBERG

Since February 1998 IAMO and **MARTIN LUTHER UNIVERSITY OF HALLE-WITTENBERG (MLU)** have been working together under a comprehensive cooperation agreement, which includes joint appointments. IAMO's work is especially closely linked with the Institute of Agricultural and Food Sciences, which is part of the Faculty of Natural Sciences III at MLU, and the Economic Sciences Department at the Faculty of Law and Economics. The heads of IAMO's academic departments take part in MLU's teaching and committee work. Several academic members of staff from IAMO with post-doctoral and doctoral qualifications are also involved in university teaching, and in the running of a nationwide PhD student programme. Staff links between MLU and IAMO are also strengthened by the fact that MLU's Prorector of Research, Internationalisation and Transfer, Prof. Dr Christine Fürst, represents MLU on IAMO's Board of Trustees.

Cooperation between MLU and IAMO assumed a new dimension when the **SCIENCECAMPUS – PLANT-BASED BIOECONOMY (WCH)** was opened in Halle in June 2012. The ScienceCampus aims to strengthen the interdisciplinary collaboration between the Halle-based Leibniz Institutes and the corresponding academic departments at Martin Luther University Halle-Wittenberg in the sphere of plant-based bioeconomy.



There is also close cooperation with MLU in the **LEIBNIZ SCIENCECAMPUS EASTERN EUROPE – GLOBAL AREAS (EEGA)**, which was officially opened in January 2017. EEGA is supported by Leibniz Association institutions, the Max Planck Society, the Fraunhofer Society and several universities in Central Germany. Both campuses will boost higher education in the Halle (Saale) region, as well as supporting knowledge and technology transfer in politics, business and public life.

One element of IAMO's intense academic capacity building in its partner regions has been the establishment of permanent local structures integrated into universities. As part of the **IPReS** project (An Innovative Pilot Program on the Re-Integration of Scientists to Central Asia: Research and Capacity Building on Food Chains under Climate Change) a joint Uzbek-German chair was founded at Tashkent State Agrarian University. Within the **UaFOODTRADE** project (Pilot Project for the Sustainable Internationalization of Ukrainian Research Structures in the Context of the Globalization of the Ukrainian Food Sector), financed by the BMBF, in 2021 the Center for Food and Land Use Research was established, a joint office between IAMO and the Kyiv School of Economics (KSE) at KSE with six staff members at the time.

Despite difficult conditions throughout IAMO's entire research area, such as the Coronavirus pandemic and then the war in Ukraine, we have been able to launch important new joint initiatives, significant for

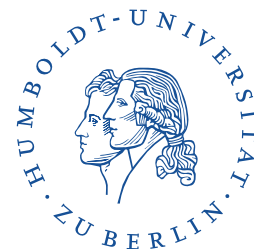
our research, mostly with university institutions in the countries we cover. For example, since 2020 cooperation agreements have been concluded with the **UZBEKISTAN MINISTRY OF AGRICULTURE**, the National University of Life and Environmental Sciences of Ukraine (**NUBiP**, Ukraine), **TASHKENT STATE AGRARIAN UNIVERSITY** (Uzbekistan) and the Ural State Economic University (UrSEU) in Yekaterinburg (Russia, currently suspended).

IAMO works in close conjunction with many other universities, mainly with faculties of agriculture and economics. Depending on the requirements of interdisciplinary research, other social science and humanities subjects may be brought in, e.g. human geography and history. As far as our partners in Germany are concerned, we have strong links with **BERLIN**, **BONN**, **GÖTTINGEN**, **GIESSEN**, **HOHENHEIM**, **KIEL**, **MUNICH** and **MÜNSTER**.

In addition to its collaboration with Martin Luther University Halle–Wittenberg, IAMO has had a comprehensive cooperation agreement with the **HUMBOLDT UNIVERSITY IN BERLIN** since 2010. There are close relationships, too, with chairs of agricultural economics and institutes at agricultural and economics colleges and universities in our partner countries.

Amongst our partner universities abroad we should give special mention to: in **CHINA**, Beijing University, Beijing Normal University, China Agricultural University (CAU), all three in Beijing, Sichuan Agricultural University (SAU) in Chengdu, Huazhong Agricultural University (HZAU) in Wuhan, Northwest A&F University in Xianyang and Nanjing Agricultural University; in **RUSSIA**, the Higher School of Economics (HSE) and the New Economic School (NES), both in Moscow, and the Ural State Economic University (UrSEU) in Yekaterinburg; in **UKRAINE**, the

Kyiv School of Economics (KSE), the National University of Life and Environmental Sciences of Ukraine (NUBiP) – Kiev, and Zhytomyr National Agro-Ecological University (ZNAU); in **UZBEKISTAN**, Tashkent State Agrarian University (TDAU), Westminster International University Tashkent (WIUT), the Samarkand Veterinary Medicine Institute (SamVMI), the National University of Uzbekistan (NUU), Karakalpak State University (KSU), Tashkent, and the Tashkent State University of Economics (TSUE); in **KAZAKHSTAN**, the Kazakh National Agrarian University (KazNAU) and the Kazakh Agro Technical University; in Kyrgyzstan, the University of Central Asia (UCA); in **EGYPT**, Cairo University (CU); in **SLOVENIA**, the University of Primorska, Koper; in **SERBIA**, the University of Belgrade and the University of Novi Sad; in **ROMANIA**, the University of Agronomic Sciences and Veterinary Medicine of Bucharest (UASMV); in **MOLDOVA**, the State Agrarian University of Moldova; in **KOSOVO**, the University of Pristina; and in the **CZECH REPUBLIC**, the Czech University of Life Sciences Prague (CZU), Charles University Prague and Masaryk University in Brno. In addition, IAMO maintains a wide range of scientific exchange with Wageningen University & Research and Erasmus University Rotterdam, both in **THE NETHERLANDS**; in **DENMARK**, the University of Copenhagen; and in **SWEDEN**, the Swedish University of Agricultural Sciences (SLU) in Uppsala. Other partners are the Catholic University in Leuven, **BELGIUM**; the University of Natural Resources and Life Sciences (BOKU), **AUSTRIA**; the University Institute of Lisbon, Center for Psychological Research and Intervention (ISCTE), **PORTUGAL**; the University of Bologna,



**ITALY**; the University of Iceland in Reykjavik, **ICELAND**; in **BRITAIN**, the University of Kent, the University of Bath, the University of East Anglia and the University of Glasgow; and in **FRANCE**, the La Rochelle School of Business and NEOMA Business School, Reims. In the **USA** we have close contacts with Stanford University, the University of Missouri (Mizzou), Pennsylvania State University (PSU) and the University of Wisconsin-Madison. In South America, our partners are the University of Buenos Aires (FAUBA) and the National University of Tucumán (UNT), **ARGENTINA**; and the University of São Paulo, Ribeirão Preto in **BRAZIL**.

### Cooperation with non-university institutions

The extensive contacts with non-university institutions are also very important for IAMO's work. In Germany we maintain intensive collaboration with the **POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH (PIK)**; the Leipzig-based **LEIBNIZ INSTITUTE FOR REGIONAL GEOGRAPHY (IfL)**; the **LEIBNIZ INSTITUTE FOR EAST AND SOUTHEAST EUROPEAN STUDIES (IOS)**; the **GERMAN COMMITTEE ON EASTERN EUROPEAN ECONOMIC RELATIONS**; the **HALLE INSTITUTE FOR ECONOMIC RESEARCH (IWH)** in Halle; **IAK AGRAR CONSULTING GMBH**, Leipzig; **AGRICULTURE AND FINANCE CONSULTANTS GMBH (AFC)**; the **BioECONOMY** leading-edge cluster in Halle; and the **LEIBNIZ INSTITUTE FOR THE HISTORY AND CULTURE OF EASTERN EUROPE (GWZO)**.

There are close relations with many non-university research institutions abroad, especially in **CENTRAL AND EASTERN EUROPE**, **SOUTHERN EUROPE**, and **CENTRAL AND EASTERN ASIA**. We have excellent and regular

professional contact with institutes in academies of sciences or agricultural sciences, regional research institutes and advisory boards, as well as agricultural economics research institutes that are subordinate to the corresponding ministries of agriculture.

**OF NOTE HERE ARE:** in China, the Center for Chinese Agricultural Policy (CCAP) and the Institute of Geographical Sciences and Natural Resources Research, both at the **CHINESE** Academy of Sciences in Beijing, and the Institute of Agricultural Economics and Development at the Chinese Academy of Agricultural Sciences; in **UKRAINE**, the Ukrainian Agribusiness Club (UCAB), the Ukrainian Agricultural Confederation and the Ukrainian Agricultural Council; in **RUSSIA**, the All-Russian Institute for Agrarian Problems and Informatics (VIAP) in Moscow, and the North-Western Research Institute of Economy and Organization of Agriculture, Saint Petersburg-Pushkin; in **KAZAKHSTAN**, the Analytical Center of Economic Policy in the Agricultural Sector (ACEPAS) and the Public Fund Center of Applied Research TALAP, both in Astana, the Kazakh Scientific Research Institute of Cattle Breeding and Fodder Production (KAZNIIZHik) and the Regional Environmental Centre for Central Asia; in **UZBEKISTAN**, the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIAME), the Tashkent Institute of Architecture and Civil Engineering (TIACE) and the Samarkand State Architectural and Civil Engineering Institute (SamSACEI); in **KYRGYZSTAN**, the National Statistical Committee of the Republic of Kyrgyzstan; in **ARMENIA**, the International Center for Agribusiness Research and Education (ICARE); in **GEORGIA**, the Georgian Center for Agribusiness Development (GCAD); in **AZERBAIJAN**, the Institute of Scientific Research on Economic Reforms (ISRER); in **KOSOVO**, the Ministry

of Agriculture, Forestry and Rural Development; in the Czech Republic, the Institute of Agricultural Economics and Information (UZEL), Prague; and in [SERBIA](#), the Institute of Agricultural Economics, Belgrade.

Our partners amongst [INTERNATIONAL ORGANISATIONS](#) are: the [FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS \(FAO\)](#), especially the FAO Regional Office for Europe and Central Asia in Budapest; the [WORLD BANK](#); the [INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE \(IFPRI\)](#); the [INTERNATIONAL WATER MANAGEMENT INSTITUTE \(IMWI-CGIAR\)](#), the [INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH IN THE DRY AREAS \(ICARDA\)](#) and [ICRISAT \(INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS\)](#).

### **Leibniz ScienceCampus 'Eastern Europe – Global Area' (EEGA)**



The [LEIBNIZ SCIENCECAMPUS 'EASTERN EUROPE – GLOBAL AREA' \(EEGA\)](#) has been up and running in Central Germany since July 2016. In May 2020

the senate of the Leibniz Association agreed to continue funding EEGA for a further four years. In the context of global challenges the aim of the EEGA is to improve research about and in the countries of Eastern Europe. In cooperation with other research institutions, IAMO is investigating the globalisation of Eastern European and Central Asian regions through economic ties, geopolitical changes, cultural exchange and migration flows. The EEGA offers the participating institutes excellent interdisciplinary opportunities for cooperation

in their research and transfer activities as well as in further academic education and training. There is a particular focus on communicating research findings to the media and wider public. Under the leadership of the Leibniz Institute for Regional Geography (IfL), the other institutions involved are IAMO, the Universities of Leipzig, Halle–Wittenberg and Jena, the Max Planck Institute for Social Anthropology in Halle, the Fraunhofer Center for International Management and Knowledge Economy (IMW), the Leibniz Institute for Jewish History and Culture – Simon Dubnow (DI) and the Leibniz Institute for the History and Culture of Eastern Europe (GWZO). Ever since its founding, EEGA has been financially supporting IAMO's activities. These include the financing of research visits lasting several months, as well as supporting IAMO Forum workshops.

### **Supporting young academics**

Supporting young academics is one of IAMO's three core tasks, and is carried out at a variety of levels, some of which are interlinked.

**Training for doctoral students:  
IAMO Graduate School, seminars  
and Doctoral Certificate Programme**



At the end of 2022, 52 PhDs were being supervised, of which 25 were written by women. The majority of

doctoral students are from IAMO's partner countries. Two individuals are working on their post-doctoral degrees. As part of the **PACT FOR INNOVATION AND DEVELOPMENT**, which corresponds to the excellence initiative of the German government and the Länder to promote science and research at German universities, the Institute established the **IAMO GRADUATE SCHOOL** in 2007. Starting out for four years as a pilot measure, since 2011 the Graduate School has become a fixed and permanent component of PhD training at IAMO. All doctoral students at IAMO are automatically members of the Graduate School. With its systematic support for PhD students the IAMO Graduate School is the central element of the **EARLY-CAREER SCIENTIST PROGRAMME (ECSP)**, which since 2019 has combined IAMO's varied activities in supporting young academics. The Graduate School is also the link to the **DOCTORAL CERTIFICATE PROGRAMME OF AGRICULTURAL ECONOMICS** institutes in Germany, Austria and Switzerland. Since 2012 the IAMO Graduate School has also been a member of the **INTERNATIONAL GRADUATE ACADEMY (InGRA)** of Martin Luther University Halle-Wittenberg, which has further extended the close cooperation between IAMO and MLU.

In 2022 there was a series of events in the IAMO Graduate School on the subject of 'Doctoral Supervision'

(January–May 2022) for supervisors and PhD students, as well as an immersion workshop on the subject of 'Media Training for Researchers – Camera Coaching' in March 2022. There were also two courses, supported by the **FEM-POWER** project, on the topic of conflict management (September–October 2022) and training for moderating academic events (October 2022). The last quarter of 2022 also saw the start of a series of workshops on applying for third-party funding. Doctoral students can also apply for funding for specific specialist training or for attending external courses. In addition the Graduate School helps doctoral students with enrolment, applying to faculties and with administrative aspects of the PhD programme and provides information on university opportunities and initiatives or workshop opportunities from IAMO partner institutions.

The **DOCTORAL CERTIFICATE PROGRAMME IN AGRICULTURAL ECONOMICS** was established in 2005 by IAMO, the Johann Heinrich von Thünen Institute (TI) and institutes of agricultural economics at several German universities.

 <https://www.agrarökonomik.de>

It offers the first structured training in Germany – and now in Austria and Switzerland as well – for doctoral students in the areas of agricultural and food economics and rural development. The systematic teaching of essential theory and method aims to increase the quality of students' education and improve efficiency when working on dissertation topics. Doctoral study is the third stage of a consecutive study programme, following bachelor's and master's degrees in agriculture, food and the environment. The Doctoral Certificate Programme is jointly run by the Agricultural and Food Economics

Faculty at Christian Albrecht University in Kiel, the Faculty of Agriculture at the Rhine Friedrich Wilhelm University of Bonn, the Institute of Agriculture and Horticulture at the Humboldt University in Berlin, the departments of Agricultural Sciences, Ecotrophology and Environmental Management at Justus Liebig University Giessen, IAMO, the Faculty of Agricultural Sciences at the University of Hohenheim, the Institute of Agricultural and Food Sciences at Martin Luther University Halle–Wittenberg, the Department of Ecological Agricultural Sciences at Kassel University, the Faculty of Agricultural Sciences at Georg August University in Göttingen, the Faculty of Economic Sciences and Center of Life and Food Sciences Weihenstephan at Munich Technical University, the Faculty of Agricultural and Environmental Sciences at the University of Rostock, the University of Natural Resources and Life Sciences (BOKU) in Vienna, ETH Zürich, and the Thünen Institute, Brunswick. The PhD course is based on a modular system.

**In 2022 IAMO professors and staff collaborated in sessions relating to the following modules:**

- ‘The Political Economy of Agriculture in Developing and Emerging Countries’
- ‘Introduction to Geographic Information Systems and Spatial Data Analysis’
- ‘Agent-based Modelling in Agricultural and Resource Economics’
- ‘High Quality Research Data – Sources, Collection and Processing’
- ‘Household Behaviour’

The teaching programme is continually being developed. With an eye on possible gaps in the current programme, supplementary sessions on theory and method are specifically offered to ensure that doctoral students have a comprehensive, international-standard education.

Since March 2012 IAMO has also been a full member of the **INTERNATIONAL GRADUATE ACADEMY (InGrA)** at Martin Luther University Halle–Wittenberg. InGrA supports the establishment of all forms of structured doctoral programmes, coordinates existing programmes, thereby helping create a productive research environment taking into account the university’s internationalisation and equality strategies.

 <https://www.ingra.uni-halle.de/?lang=en>

Together with the agricultural economics professors of business, agricultural market theory, agricultural business management, and agricultural, food and environmental policy at MLU’s Institute of Agricultural and Food Sciences, the IAMO Graduate School also runs a PhD student seminar. This seminar acts as a forum for scientific exchange about research questions, methodological approaches and findings.

**In 2022 four academics who had been working at IAMO for several years successfully defended their theses at MLU:**

- **Zarema Akhmadiyeva:** Institutional change and agricultural land use in transition countries: Understanding institutional constraints of farmers’ decision making. (Institute of Agricultural and Food Sciences)



**Michel Kabirigi:** The diffusion and adoption of crop disease management among banana farmers in Rwanda. (Institute of Agricultural and Food Sciences)

**Christine Pitson:** Labour supply, resilience, and European agriculture: Generational renewal in the Altmark and Flanders. (Faculty of Law, Economics and Business)

- **Alisher Tleubayev:** Corporate governance and financial performance of agri-food enterprises in Russia: Three essays. (Institute of Agricultural and Food Sciences)

**In addition, IAMO staff assessed five theses that were defended at other universities besides MLU:**

- **Sherzod Babakholov:** Economic assessment of climate change impacts and adaptations on agricultural production: The case study of Samarkand region. (Tashkent State Agrarian University, Uzbekistan)
- **Lucie Louise Maruejols:** Economic implications of household management of basic needs for poverty alleviation and sustainability. (Faculty of Agricultural Sciences, Georg-August-Universität Göttingen)
- **Florence Pendrill:** Where have all the forests gone? Quantifying pantropical deforestation drivers. (Department of Space, Earth and Environment, Chalmers University of Technology, Gothenburg, Sweden)
- **Abdulla Primov:** Assessing the impact of agricultural crop diversification on farm economic efficiency (Tashkent State Agrarian University, Uzbekistan)

- **Saskia Wolff:** Analyzing spatial patterns and dynamics of landscapes and ecosystem services – Exploring fine-scale data and indicators. (Geography Department, Humboldt-Universität zu Berlin)

Whereas the Graduate School focuses on training PhD students, in 2022 young academics and guest researchers on the aforementioned Early-Career Scientist Programme (ECSP) also enjoyed wide-ranging help in dealing with organisational issues relating to the connection with MLU and bureaucratic matters. In addition the ECSP gives advice on mentoring programmes run by partner institutions, supports the Graduate School in developing additional study skills courses for methodology, is expanding the Institute's welcome service and providing a large volume of information. IAMO's alumni work was also expanded by the ECSP in 2022.


**Equal opportunities at IAMO**

At IAMO, measures for promoting equal opportunities and ensuring the compatibility of family and career are first and foremost aimed at creating a working environment which taps and boosts the potential of all staff. For many years IAMO has satisfied the research-oriented equality standard and implemented a family-friendly staff policy. The formal basis for the equality of the sexes is the Saxony-Anhalt law on the promotion of women and a 2019 individual agreement signed with the Saxony-Anhalt Ministry of Economics, Science and Digitalisation. Adjusted to the Institute's circumstances, the GWK's 'Equality Agreement' and the DFG's 'Research-Oriented Equality Standard' are the basis for formulating

new objectives. Correspondingly, IAMO has an honorary equality officer and a deputy – both women. In conjunction with the Directorate they are devising an **EQUALITY POLICY** as well as an **INTERNAL PLAN FOR SUPPORTING WOMEN**. All members of the Institute can access these via the intranet.


Besides professional equality of opportunity for all sexes based on talent, potential and skills, the Institute places great emphasis on ensuring the **COMPATIBILITY OF FAMILY AND CAREER** and developing this further. Making equality of opportunity and compatibility of family and career fundamental elements of working life comes from conscious personnel management, career development and promoting young academics, as well as from being part of the **DUAL CAREER NETWORK OF CENTRAL GERMANY (DCNM)**. IAMO has also reinforced its family friendly staff policy through its membership of the **FAMILY SUCCESS FACTOR BUSINESS NETWORK**.

Having been awarded a positive **TOTAL E-QUALITY** rating for equal opportunities in 2013 and 2016, both valid for three years, in 2020 the Institute opted for certification by the **AUDIT BERUFUNDFAMILIE (BUF)** (career and family audit). This seal of quality is awarded by the advisory board berufundfamilie Service GmbH for three years, recognising the commitment of businesses, institutes and universities that have a personnel policy sensitive to family and different phases of life. Certification is awarded for successfully completing an audit process in which, besides an inventory of measures already in place, strategic goals are developed and adhered to. The implementation of these agreed targets and programmes for action are reviewed annually during the certification period. The Institute has been certified since its successful audit in December 2020.

To accelerate equality measures and embed them institutionally, IAMO, through the programme **SUPPORTING THE CREATION OF EQUAL OPPORTUNITIES BETWEEN WOMEN AND MEN IN SCIENCE AND RESEARCH (FEM-POWER)**, which is financed by the European Social Fund (ESF) and Saxony-Anhalt, has successfully gained funding for the post of an equal opportunities and diversity coordinator. The project is running for five years. At the centre of the FEM-Power programme is promoting women's careers in the so-called MINT field (Maths, IT, Natural Sciences and Technology), in which women are underrepresented. Since 1/5/2021  [Kristin Leimer](#) has been the equality and diversity coordinator at IAMO. At the heart of her work is supporting female staff in career planning and advancement. Besides organising workshops on career-related topics and setting up a coaching programme, she also provides individual advice and guidance for female staff, and gives information about other opportunities, such as participation in mentoring programmes. To strengthen networks and ensure the visibility of female staff, events are organised such as Career Talks and Female Expert Talks. The FEM-Power appointee also supports female staff when they arrive at the Institute. The equality officer, personnel department and Directorate are together drawing up a Gender Equality Plan, which will be published on the Institute's website.


After consideration of qualification requirements, IAMO is committed to embracing factors of diversity (equality, internationality, inclusion) when filling jobs and aiming for a balance of men and women. The necessary parameters for this are the cascade model taken from the DFG and adopted by the Joint Science Conference (GWK) of the central government and Länder in 2011. For posts within the Institute's budget, in 2022

IAMO broadly managed to adhere to guidelines of the cascade model, but if the posts covered by third-party funding are included, there was a short-term drop in the proportion of female researchers due to many third-party funded projects coming to an end as well as successfully completed PhDs. Nonetheless, the Institute has been able to maintain the level of equality in key areas, even though more measures need to be taken and arrangements have been made to do so.

 **Franziska Appel**, IAMO's equality officer, who was re-elected in December 2020, is part of the Leibniz Association's equal opportunities and diversity working group. Since March 2018 she has been IAMO's equality officer in the Leibniz Association's council of equality officers, and its deputy chair since March 2020.

## Prizes and awards

For her master's thesis entitled, 'Opportunities for, and obstacles to, cooperation between small farmers, looking at Kosovan raspberry producers', **IAMO ALUMNA** Theresa Bäuml won the **GENO-WISSENSCHAFTSPREIS** in 2022. This prize is awarded by the Baden-Württemberg Association of Cooperatives (bwgv) for young academics.

At an official event on 29 April 2022 the IAMO researcher  **Antje Jantsch** was awarded the **LUTHER-URKUNDE** of Martin Luther University of Halle-Wittenberg. This prize is given to young academics whose PhDs are given the highest distinction 'summa cum laude'.

## International China Research Group at IAMO

The IAMO China Research Group 'Economic Growth and Social Equilibrium in Rural China' now has 39 members which, besides researchers from IAMO, include cooperation partners from China, the US, Great Britain, the Netherlands and colleges in Germany. In 2022 the research group was working on thirteen projects over four topic areas: **(1) AGRICULTURAL STRUCTURE AND PRODUCTION**, **(2) DIGITALISATION OF AGRICULTURE AND THE FOOD ECONOMY**, **(3) THE USE OF NATURAL RESOURCES** and **(4) FOOD, FOOD SECURITY AND RURAL WELFARE**. The China Research Group looks at issues relating to the sustainability of land and water use, the development of land market policy, digitalisation strategies in food-sector value chains, social security, and the organisation and efficiency of agricultural markets and value chains in the food sector. The members of the research group are also looking at structures of consumption and issues of education and health policy. The output of the group in 2022 included ten reviewed journal articles.

The new focus on digitalisation is indicative of the Research Group's future work. In 2021 the research project 'Digital Transformation of China's Agriculture – Resources, Trade and Food Security (DITAC)' was launched. This project is analysing the status quo, mechanisms and impact of digitalisation processes on resource use, trade and food security. It is being financed by the German Ministry of Education and Research. Two



Chinese students have embarked on their PhDs within the DITAC project.

The Research Group maintains intensive **ACADEMIC EXCHANGE AND COOPERATION** with various research institutions in China, especially Beijing University, the Chinese Agricultural University, Sichuan Agricultural University in Chengdu, Nanjing Agricultural University, Northwestern A&F and Huazhong Agricultural University. An IAMO researcher is also an associate partner of Stanford University's Rural Education Action Project (REAP), which analyses education in rural China and ways of improving it.



Since April 2018, together with consortium partner IAK Consulting GmbH, IAMO has been running the second phase, and since the start of 2022 the third phase of the **SINO-GERMAN AGRICULTURAL CENTRE (DCZ)**. Within this project the International China Research Group took part in DCZ's Agri-Business weeks in December 2021.

Because of the Coronavirus pandemic the **8<sup>th</sup> SINO-GERMAN AGRICULTURAL WEEK (SGAW)** took place online in Beijing from 21–25 November 2022. As the flagship event of the Sino-German Agricultural Centre (DCZ) the DCZ has become established as an important platform for discussion within the bilateral cooperation between the German Ministry of Food and Agriculture (BMEL) and the Chinese Ministry of Agriculture and Rural Affairs (MARA). The focus of the five-day event was how to overcome current and future challenges facing Chinese and global food security. The online conference was followed by an audience of over 1,000 people on Chinese livestreaming platforms and around 250 participants on Zoom.

More information on the IAMO China Research Group can be found at:

 <https://china.iamo.de/home>

### International Central Asia Research Group at IAMO

IAMO's Central Asia Research Group is a network of academics set up in 2019, using an interdisciplinary approach to research agricultural, socioeconomic, and environmental transition processes in Tajikistan, Turkmenistan, Kazakhstan, Kyrgyzstan and Uzbekistan. There are also individual studies on neighbouring countries, such as Iran and Afghanistan if the specific skills of the Central Asia Research Group are needed. The Central Asia Group consists of 36 researchers, around 20 of which are IAMO doctoral students.



**MODERN, MULTIDISCIPLINARY RESEARCH** is not just aimed at an academic audience, but is geared towards influencing policy and the **TRANSFER OF SCIENTIFIC FINDINGS** to business. Besides research and transfer to society as a whole, a particular focus is on **SCIENTIFIC CAPACITY BUILDING**. The Research Group carries out intensive academic exchange and collaboration with various research institutions in Central Asia including, in Uzbekistan, Tashkent State Agrarian University (TSAU), Tashkent State Economics University (TSEU), Tashkent State Institute of Irrigation and Agricultural Mechanization Engineers (TIAME),

Westminster International University in Tashkent (WIUT) and, in Tajikistan, the University of Central Asia (UCA).

In 2022 a new three-year project began, financed by the Volkswagen Foundation, on water governance and peacebuilding in Afghanistan (**AWAGO**). This project is also allowing an Afghan doctoral student to complete his PhD at IAMO. At the end of 2022 two large projects were running within the research group on academic capacity building in Central Asia, which include the creation of a chair and doctoral study programme (**IPReS** – An Innovative Pilot Program on the Re-Integration of Scientists to Central Asia: Research and Capacity Building on Food Chains under Climate Change; and **SUSADICA** – Structured Doctoral Programme on Sustainable Agricultural Development in Central Asia). For the first time since the outbreak of the Coronavirus pandemic a workshop was held at IAMO presenting new project findings and giving an overview of future research.

One large project, **KLIMALEZ**, is aiming to help develop agricultural insurance schemes in the region. As part of this project, on 2 November 2022 IAMO and the national Uzbek Insurance Company Uzagrosugurta signed a **MEMORANDUM OF UNDERSTANDING** directed at the detailed communication of research findings and knowledge relating to index-based insurance schemes to Uzbek farmers.

More information on the IAMO Central Asia Research Group can be found at:

 <https://centralasia.iamo.de/home>

## International Southeast Europe Research Group at IAMO

Since 2022 this regional research group has been enriching IAMO's interdisciplinary work. The focus areas of research are **RURAL DEVELOPMENT** and **AGRICULTURAL TRANSITION** in the **WEST BALKAN COUNTRIES** of Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro and Serbia. The network of researchers includes cooperation partners in almost all of these countries. There are also eighteen IAMO researchers in the group. The Research Group is currently working on ten research projects, including a **DFG PROJECT**, a **LEIBNIZ BEST MINDS JUNIOR RESEARCH GROUP**, a **LEIBNIZ COLLABORATIVE EXCELLENCE** and the newly established Agricultural Policy Dialogue Germany - Western Balkans (**APD WESTBALKAN**). The Research Group's projects are looking at living conditions in rural areas, questions of agricultural structure, aspects of migration, digitalisation and the competitiveness of value chains, but also the influence of elections on agricultural policy.



More information on the IAMO Southeast Europe Research Group can be found at:

 <https://southeasteurope.iamo.de/home>



IAMO supports young academics within the framework of numerous international projects.

## Guests and fellowships at IAMO

The further training and education of academic scholars is one of IAMO's core tasks. As mentioned above, IAMO focuses chiefly on supporting young academics from its partner countries. Of great importance in this regard are study visits by researchers, which can range from a few weeks to two years. Besides being involved in joint publications, those who come for long-term visits also concentrate on their doctoral studies, financed by external and IAMO grants, and third-party funded projects. In 2022 IAMO had 40 fellows who were predominantly working on their theses. Over the same period two visiting academics carried out research at the Institute.

By working together closely on international, third-party funded research projects, young researchers from partner countries integrate themselves into the international academic community. Former IAMO researchers, both from Germany and partner countries, are now working in international organisations such as the EU and World Bank, or they have acquired management positions in their respective national agricultural administrations. An even larger number of them are continuing their academic careers back in their home countries.



## Development of third-party funding

Project title (January 2022 – December 2022)	Funder	
I. Newly approved research projects with third-party funding		
The role of the ‘status quo bias’ in family farms and immobility – illustrated using empirical data from Southeast Europe	Status Quo_Bu Status Quo_JM	DFG
Enhancing resilience in a post-pandemic era:: challenges and opportunities for rural development IAMO Forum 2022	IAMO Forum 2022	DFG and Landwirtschaftliche Rentenbank
Water governance and peacebuilding in Afghanistan	AWAGO	Volkswagen Foundation
Strengthening Capacity in Price and Market Information Systems and Policy Monitoring in Response to COVID-19 and Other Shocks	FAO Workshop_Herzfeld_2022	FAO
Coronavirus fund of the Land of Saxony-Anhalt Measure 20: compensation payments to non-university research institutions	CSV-20-IAMO	Saxony-Anhalt
Coronavirus fund of the Land of Saxony-Anhalt Measure 21: digitalisation measures to non-university research institutions	CSV-21-IAMO	Saxony-Anhalt
IAMO Alumni Netzwerk Rural Development (AA)	Alumni Network AA	DAAD
IAMO Alumni Netzwerk Rural Development (BMZ)	Alumni Network BMZ	DAAD
Central Asia Water Conflict and Migration Network	CAWAMNET	DAAD
From consumer protection to innovative marketing of green genetic technology: policy recommendations for optimised communication of innovation.	Grüne Gentechnik	Landwirtschaftliche Rentenbank

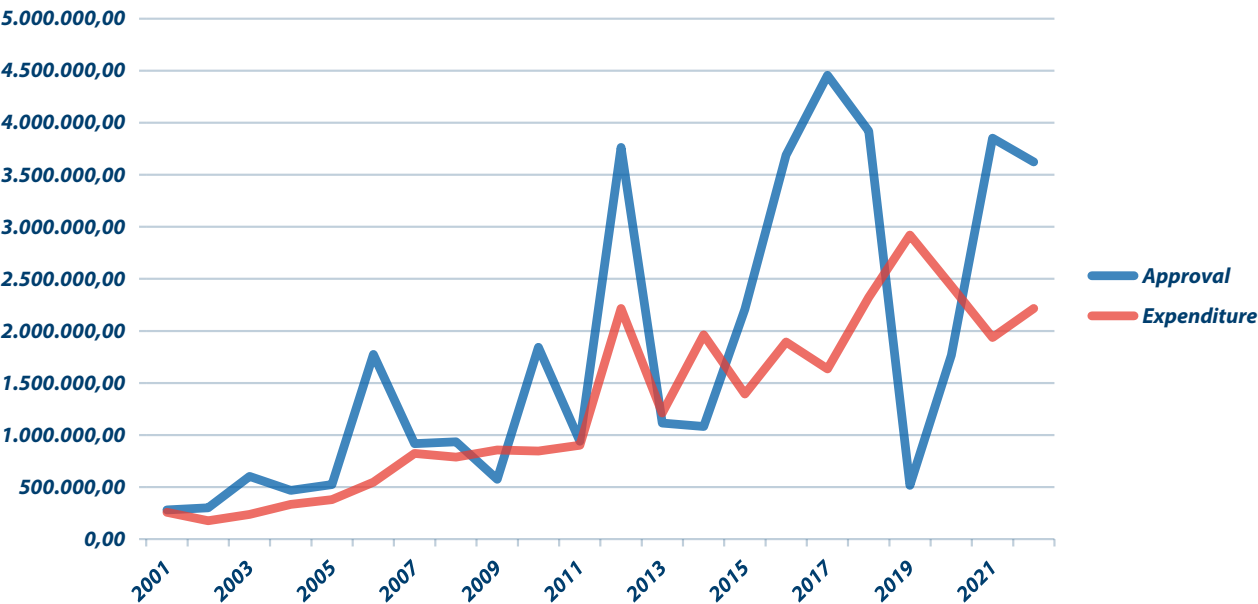
Project title (January 2022 – December 2022)	Funder
<b>II. Ongoing projects with third-party funding</b>	
Perceptions of inequality through social comparisons and transference on subjective wellbeing: a micro perspective on reference groups	<b>Wahrnehmungen_Bu and Wahrnehmungen_JM</b> DFG
Agricultural Land Markets – Efficiency and Regulations sub-project 6 Influence of strategic behaviour on the development of land markets and their regulation	<b>FORLand II_Balman FORLand II_Appel FORLand II_Graubner</b> DFG
Agricultural Land Markets – Efficiency and Regulations sub-project 7 Quantification of the concentration of land ownership and of conflicting goals in agriculture	<b>FORLand II_Müller</b> DFG
Agricultural Land Markets – Efficiency and Regulations sub-project 3 Investigation of market scepticism towards land markets	<b>FORLand II_Jauernig</b> DFG
SEAVID19 Ensuring economic sustainability in the seafood industry	<b>SEAVID19</b> Research Council Norway
Rural well-being in transition: multidimensional drivers and effects of (im)mobility	<b>RuWell</b> Leibniz Association
Transnational Families, Farms and Firms: Migrant Entrepreneurs in Kosovo and Serbia from the 1960s to today	<b>TraFFF</b> Leibniz Association
Institutions, change mechanisms and impacts in natural resource management of Central Asia	<b>INRESCA</b> Volkswagen Foundation
Strukturiertes Doktorandenprogramm zur nachhaltigen Agrarentwicklung in Zentralasien	<b>SUSADICA</b> Volkswagen Foundation

<b>Project title (January 2022 – December 2022)</b>	<b>Funder</b>	
An Innovative Pilot Program on the Re-Integration of Scientists to Central Asia: Research and Capacity Building on Food Chains under Climate Change	<b>VW IPReS</b>	Volkswagen Foundation
Modelling individual decisions to support the European policies related to agriculture	<b>MIND STEP</b>	EU Horizon 2020
Rural NEET Youth Network: Modeling the risks underlying rural NEETs social exclusion	<b>RNYN</b>	EU COST Action
What can digital communications do for generational renewal in farming?	<b>Young Farmers</b>	EU MSCA
EU Assistance for Uzbekistan Agri-Food Development Strategy 2020-2030	<b>EU Assist Uzb</b>	EU Europe Aide
LULCC – Land use and land cover change: Impacts of the sorghum and millet upscaling project in Mali	<b>LULCC</b>	Biodiversity International
Analysis of Export Markets for Special Agricultural Markets	<b>FAO Export Markets</b>	FAO
German–Ukrainian Agricultural Policy Dialogue	<b>APD Ukraine</b>	BMEL
Sino–German Agricultural Centre	<b>DCZ</b>	BMEL
Agricultural Policy Dialogue Germany - Western Balkans	<b>APD Westbalkan</b>	BMEL
Joint project: Digital Transformation of China's Agriculture (DITAC); sub-project: Resources, Trade and Food Security	<b>DITAC</b>	BMBF
Preparations for the establishment and development of a German–Ukrainian Centre of Excellence. Working title: 'German–Ukrainian Centre of Excellence for Smart Agriculture and Food Economics (GUCE-SAFE)	<b>GUCE-SAFE</b>	<b>BMBF</b>

Project title (January 2022 – December 2022)	Funder
ERA-Net: joint project: ERA-FDC Policies – Agricultural potential in Russia with respect to climate protection, climate adaptation and rural development; sub-project: Mapping land-use changes and modelling yields and carbon changes	<b>ERA-FDC-Policies</b> BMBF ERA-Net
Promoting Resilience and Food Security through Risk-Contingent Credit in Africa	<b>Risk-Contingent for Resilience</b> BMZ
Towards Resilient and Sustainable Integrated Agro-Ecosystems through Appropriate Climate-Smart Farming Practices	<b>TRUSTFARM</b> BLE ERA-Net
Multiplatform delivery of co-development tools for national control and prevention of Banana Xanthomona Wilt (BXW) in Rwanda: Scaling innovation for enhanced banana production and food security	<b>GIZ Banana Wilt II</b> GIZ
Land Reform in Ukraine: New Prospects and Challenges for Sustainable Development of the Agricultural Sector and Rural Areas	<b>Landreform UA</b> DAAD
<b>III. Completed projects with third-party funding</b>	
Agrifood systems in the bioeconomy IAMO Forum 2021	<b>IAMO Forum 2021</b> DFG und Landwirtschaftliche Rentenbank
Doctoral Studies in Geoinformation Services	<b>DSinGIS</b> EU Erasmus+
Monitoring of policy implementation and impact assessment for Republic of Moldova – subcomponent Impact Assessment	<b>MDA-Impact</b> FAO
Bioeconomy as social change. The role and functions of bioclusters in the transition to a bioeconomy	<b>TRAFOBIT</b> BMBF
Joint project on climate adaptation: Increasing climate resilience via agricultural insurance – Innovation transfer for sustainable rural development in Central Asia. Sub-project 1: Joint coordination, data collection on insurance projects and experiments	<b>KlimALEZ</b> BMBF

Project title (January 2022 – December 2022)		Funder
Entwicklung eines Risikomanagement-Konzepts für Kleinbauern und -bäuerinnen in Armenien und Aserbaidschan	RIMARA	Deutsche Sparkassenstiftung
Förderung der Gleichstellung von Wissenschaftlerinnen am Leibniz-Institut für Agrarentwicklung in Transformationsökonomien (IAMO) – Schaffung der Position einer Gleichstellungs Koordinator*in	FEM Power	Investitionsbank Sachsen-Anhalt

Development of third-party funding 2001–2022



**Note:** 2006: 1.775m euros of newly approved funding, 610,000 of which for project partners. 2012: 3.763m euros of newly approved funding, of which 2.008m for project partners. 2012: 2.211m euros disbursed, of which 1.104m to project partners.

## Selected third-party funded projects

Below is an outline of important third-party funded projects that are good examples of IAMO's extensive activities in its target countries. These projects often include comprehensive transfer activities in addition to their high-quality scientific work. They are carried out in such a way that the findings generated in dialogue with business, politics and the public make an effective contribution to solving urgent problems and issues of the future.

### **TraFFF – Transnational Families, Farms and Firms: Migrant Entrepreneurs in Kosovo and Serbia from the 1960s to today**

The three-year TraFFF project began on 1 April 2022, having secured funding in the Leibniz Competition, and is financed by the Leibniz Association as part of the Leibniz Collaborative Excellence. The basis of the project is the fact that few places in Europe are so affected by migration as the former Yugoslavia. Focusing on Serbia and Kosovo, TraFFF is researching the social impact of migration, in particular the impact of people returning on the societies of origin. The key question of the project is: Which strategies do migrants develop to use resources gained during migration? The project is focusing on entrepreneurial activities, correlating the agency of emigrants to social status, national policy, family, sex, value judgements, and political orientation. The research team is investigating the question of why migrants invest (financially, socially and emotionally) in

their home countries despite corruption and economic stagnation. A comparison over time traces the changes in their behaviour since the 1960s. By comparing areas with different migration and posting patterns, differences between urban and rural areas become apparent. The project is based on a mixed methods approach which uses a broad spectrum of sources, e.g. ethnographic interviews, household surveys, secondary data, archival documents and newspaper articles.

The project, consisting of eight partners, is being coordinated by the Leibniz Institute for East and Southeast European Studies (IOS), Regensburg. Other partners include the regional office of the FAO for Europe and Central Asia, and the German Agency for International Cooperation (GIZ).

### **RuWell – Rural well-being in transition: multidimensional drivers and effects on (im)mobility**

The Leibniz junior research group RuWell also began on 1 April 2022, having acquired its funding from the Leibniz Association's Leibniz Competition. This group of junior researchers will be funded for five years.

Their research topic are the serious structural problems of rural areas in Europe. These are caught in a vicious circle of emigration and aging. As population density falls, the wellbeing of those who stay behind often decreases too, which gives further impetus to emigration. The junior research group, coordinated by an IAMO member of staff, is investigating the





relationships of this vicious circle, focusing on people's attachment to a place, an aspect that has received little attention before. A multidimensional welfare index is being developed and adjusted to selected rural regions in Eastern Germany and Southeast Europe for a comparative analysis. The theoretical side of the project is anchored in welfare economics and based on a mixed method approach, to capture and triangulate the complex and multidimensional factors of wellbeing. The aim is to produce a qualitative analysis of attachment to a place as a dimension of quality of life, and a quantitative investigation of the connection between wellbeing and (im)mobility. By using regression models and structural equation models, the connection between wellbeing, attachment to a place and (im)mobility will then be analyzed.

Besides IAMO, which is coordinating the project, there are six partners from German universities, and from one Albanian, one Canadian and one Dutch university.

#### **Landreform UA – Land Reform in Ukraine: New Prospects and Challenges for Sustainable Development of the Agricultural Sector and Rural Areas**

This project, funded by the German Academic Exchange Service (DAAD) from Ministry of Foreign Affairs (AA) money, began on 1 January 2022 and will last one year. The liberalization of the land market is seen as an important building block for the efficient, stable and sustainable development of agriculture and rural areas in Ukraine. Land market reform is the subject of intense political and social debate, however, which is focusing more on the

uncertainties linked to reform and the possible negative consequences, rather than the advantages. Critical points are legal security in land relations, price developments on the land and lease market, the competitiveness of smaller farms, the concentration of agricultural land in the hands of few agricultural producers and the intensification of social conflicts in the countryside.

The aim of the project is to promote discussion of the process, current problems, requirements and prospects of land reform in Ukraine, and develop the level of knowledge about its economic, social and political effects to allow objective debate of an important, complex topic. As well as its academic component, therefore, the project is also a contribution to the social dialogue between decision-makers, those affected and researchers.

#### **APD Ukraine – German-Ukrainian Agricultural Policy Dialogue enters its sixth phase**

The German-Ukrainian Agricultural Policy Dialogue project (APD



Ukraine) has been financed by the German Ministry of Food and Agriculture (BMEL) since 2006. In 2022 the APD Ukraine was extended and is now in its sixth phase, which will run for three years until 31 December 2024. The project provides advice to agricultural policymakers in Ukraine, aiming at a socially balanced and sustainable development of the agricultural sector and rural areas. In dialogue between German and Ukrainian institutions and experts, the experiences recorded and jointly devised recommendations will be used to further shape

the Ukrainian reform agenda and develop the expertise of the Ukrainian institutions involved.

The objective of the sixth phase of the project is to give, in a participatory approach and in the dialogue format typical of the APD Ukraine, Ukrainian actors an understanding of German and European experiences in shaping agricultural policy and land policy, compare these with the current level of development in Ukraine, derive recommendations for action, and help convert these into practical policies.

The sixth APD Ukraine phase will focus on:

- (1) Improving the use of opportunities in agricultural trade with the EU,**
- (2) A serious discussion on the development of rural areas and the corresponding institutional parameters including the strengthening of local administrations, and**
- (3) The use of the APD as a platform for the discussion of key specialist topics in agriculture.**

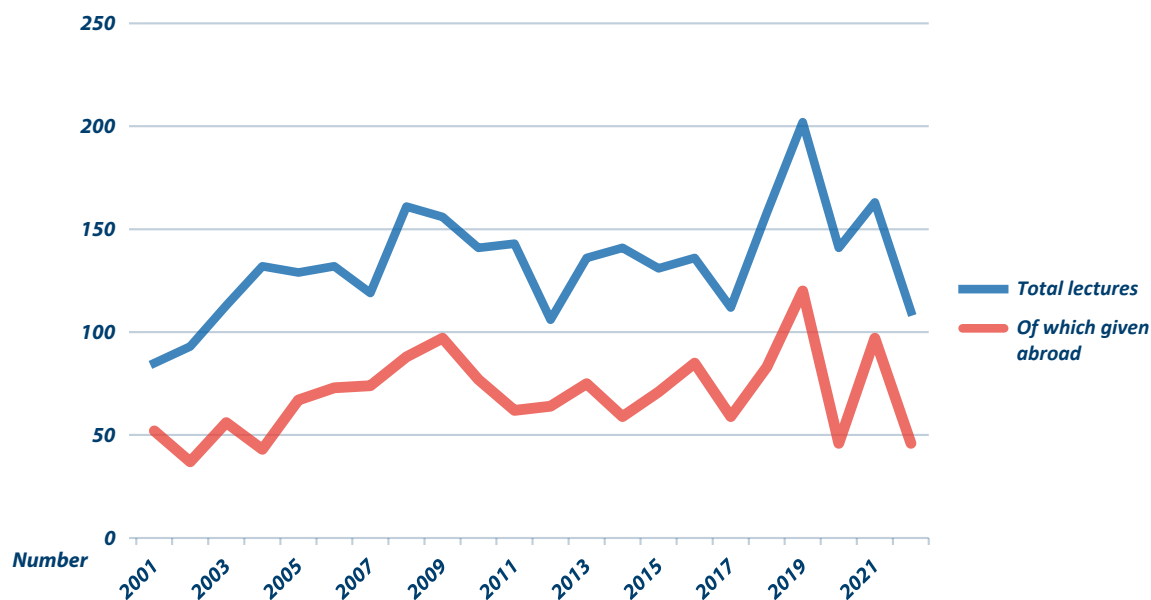
The APD Ukraine is run by the GFA Consulting Group as representative, IAK Consulting GmbH, the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) and AFC Consultants International as project leaders, as well as the National Association of Agricultural Extension Services in Ukraine (NVLBU/Dorada) as lead partner.

## IAMO lecture activity

Besides publishing their work, another important task of IAMO researchers is the presentation and discussion of research findings at national and international conferences, forums and workshops. A large proportion of lectures by IAMO staff are delivered at international events. In 2022 the costs of the **110 LECTURES DELIVERED** were either covered wholly by the organiser (18), by third-party funding (12) or other sources (7). There was mixed funding for 26 lectures, while 43 lectures were fully funded by IAMO's budget. One lecture was funded privately by the speaker.



### Development of IAMO lectures, 2001–2022



### Conferences and seminars

Conferences and seminars are key to IAMO's being able to fulfil its third core task, which is to act as a forum for the exchange of scientific ideas in all questions of agricultural development in transition countries. The events organised by the Institute represent an important platform for scientific exchange, both nationally and internationally. Besides greater academic collaboration, the meeting of academics with leaders from the food industry, administration and politics often provides an

important impetus for restructuring in the agricultural and food sectors in partner countries. At the same time, direct and intensive contact with actors from the regions allows IAMO to orient its research to the actual conditions in these localities. Here we should also highlight the fact that in the field of agricultural economics IAMO makes an important contribution to scientific capacity building in research and teaching in our partner countries, and plays a crucial role in developing long-term viable networks. Below is an outline of the most important conferences, symposia and workshops – **BESIDES THE IAMO FORUM** – held by the Institute in 2022.

## Global organisation established for young researchers in food security



Together with the Chinese Huazhong Agricultural University (HZAU), the International Policy Research Institute (IFPRI) and the International Maize and Wheat Improvement Center (CIMMYT), IAMO is one of the four founding institutes of the **GLOBAL FOOD SECURITY ASSOCIATION FOR YOUNG SCIENTISTS**. This association was founded on 2 December 2022 to connect young scientists across the globe researching food security. The areas of focus are climate change, agricultural systems, agricultural technology, food production, agricultural trade, agricultural markets and food consumption. The aim of the association is to create an international platform that enables young researchers to intensify their exchange of ideas. It is also designed to give them a voice to increase their visibility to leaders in politics, business and science.

The impetus for the establishment of this association are the profound changes in agriculture and the food economy as well as the threats to global food security. Because of climate change, the growing probability of pandemics, increased regional conflicts and wars, the global economy is facing ever greater challenges. Global food security and nutrition are getting worse. Governments, researchers and international institutions around the world are working together to develop

innovative strategies to combat new and potential dangers. As an innovative force the younger generation plays an important role here and will also provide the global decision makers of the future. Young academics are key to further boost global dialogue and multilateral cooperation.

As part of an international conference, a ceremony to mark the foundation of the association was organised in a hybrid format by Huazhong Agricultural University. In their speeches, Zhaohu Li, President of HZAU, Channing Arndt, Senior Director at IFPRI, Iván Ortiz Monasterio, Principal Scientist at CIMMYT, and IAMO Director  **Thomas Glauben** emphasised the significance and necessity of the network, because young scientists are the source of innovation and will play a key role in shaping global food systems. As an adjunct to the founding of the association, the first Global Food Security Forum for Young Scientists took place on 3 December 2022, at which more than 50 young researchers from around the world presented their research projects.

More information about the Global Food Security Association for Young Scientists can be found at:

 <https://thefoodsecurity.org>

## IAMO researchers at the 2022 Agricultural Policy Forum in Tirana, Albania



In 2005 the Regional Rural Development **STANDING WORKING GROUP (SWG)** was established

as an international, intergovernmental organisation of the government institutions responsible for agriculture and rural development in the six countries of the West Balkans: Albania, Serbia, Kosovo, North Macedonia, Montenegro and Bosnia-Herzegovina. The aim of the group is to further cooperation in agriculture, with an eye to EU accession.

On 19 and 20 October 2022 members of IAMO's Southeast Europe Research Group took part in the 22<sup>nd</sup> Agricultural Policy Forum in Tirana, Albania. The topic of the forum was '**AGRICULTURE AND RURAL DEVELOPMENT IN THE FRAMEWORK OF THE GREEN AGENDA FOR THE WESTERN BALKANS**'. The two-day conference, under the aegis of the Albanian Ministry for Agriculture and Rural Development and the Regional Rural Development Standing Working Group (SWG), brought together more than 140 representatives from twelve countries to discuss **MEETING GLOBAL CHALLENGES** in the states of the West Balkans. The focus was on policy measures to limit climate-related changes and, in parallel, enabling and promoting organic farming. There was particular discussion of sustainable wine production, including the search for appropriate markets, as well as sustainable forestry. With an eye to the future the forum also considered young people in rural areas and the development of functional knowledge and innovation systems in agriculture. Five members of

## Agricultural Policy Forum Tirana, Albania



IAMO's Southeast Europe Research Group participated in the conference. In the closing speech, political leaders were urged to take the necessary measures to address current problems such as food security and high energy costs, and to press on with the rollout of the Green Agenda in the West Balkans.



The Agricultural Policy Forum 2022 with Dragi Dimitrievski, Boban Ilic, Frida Krifca, Krzysztof Sulima and IAMO scientist Daniel Müller (l.t.r.)

## Two workshops on sustainable agricultural development in Central Asia



**SUSADICA**

In March and October 2022 there were two-day conferences as part of the **STRUCTURED DOCTORAL PROGRAMME ON SUSTAINABLE AGRICULTURAL DEVELOPMENT IN CENTRAL ASIA (SUSADICA)** – one at IAMO in Halle, the other at the National

Research University Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (NRU TIAME), Uzbekistan. SUSADICA was funded by the Volkswagen Foundation, Uzbekistan's Ministry of Agriculture and Ministry for Innovative Development. With more than forty participants in person and around the same online, the conferences discussed research progress as well as the prospects and plans for further work.

Embedded at NRU TIAME, the SUSADICA doctoral programme is run jointly by Justus Liebig University Giessen (JLU), IAMO, Martin Luther University Halle-Wittenberg (MLU), the Regional Environmental Center for Central Asia (CAREC) and a network of international partners. The aim of the SUSADICA programme is to carry out the highest quality research at international level on topics of regional and international relevance, strengthen postgraduate training in Central Asia in the discipline of agricultural development and help improve the academic environment at TIAME. Ten of the doctoral students supported by the programme spend half of the project year in Germany at three partner institutions (IAMO, JLU and MLU) and the other half at TIAME in Uzbekistan. The research topics of the students include

the restructuring of agricultural enterprises, agricultural innovation and technology, crop diversification, agricultural policy, and environmental change and water management in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

## IAMO and German Agribusiness Alliance (GAA) expert panel at Green Week 2022

The **14<sup>TH</sup> GLOBAL FORUM FOR FOOD AND AGRICULTURE (GFFA)** took place online from 24–28 January

2022 under the title 'Sustainable Land Development: Food Security Begins with the Soil'. As part of the GFFA an expert panel took place on 27 January 2022, organised by the German Agribusiness Alliance (GAA) in conjunction with IAMO. Experts from politics, business and science came together online to discuss the topic '**SECURING #SOILIDITY. CHALLENGES AND SOLUTIONS FOR SUSTAINABLE LAND USE**'. All over the world climate change, soil degradation and a shortage of water are threatening soil fertility and thus the basis for agriculture. Satisfying the increasing demand for agricultural products while preserving ecological integrity is presenting a major challenge.

The panel discussion was opened by Julia Harnal, chair of the German Agribusiness Alliance. She emphasised the importance of the debates taking place around the world on the long-term potential to coordinate economic and ecological efficiency. For this reason the expert panel, she said, would discuss existing possibilities as well as potential solutions being researched and explored in





practice from different perspectives. In her welcome speech Ophelia Nick, Parliamentary Undersecretary to the German Minister for Food and Agriculture, pointed to the many different helpful roles a healthy soil function can play, including acting as a carbon store. The growing demand for food and agricultural raw materials as a substitute for fossil materials requires sustainable farming practices that protect the soil, she said. The Ministry of Agriculture is therefore involved in a number of cooperation agreements and projects in Russia, China and the rest of the world addressing the global challenges posed by the relationship between agriculture, food and climate change.

Prof. Dr Julia Pongratz, Director of the Department of Geography at Ludwig Maximilian University in Munich, explained that specific measures can at least mitigate the inevitable CO<sub>2</sub> emissions from agriculture. These include reforestation, carbon storage in the soil, biomass plantations and the use of biochar. Even if these methods could make a crucial contribution to climate neutrality, a thorough scientific and political assessment is needed regarding undesirable side-effects, such as the impact on the ecosystem and competition with other potential uses of the land.

Prof. Dr Pavel Krasilnikov, Dean of the Department of Soil Geography at Lomonosov Moscow State University, is researching possible ways of preserving soil fertility and improving climate resilience in the grain growing areas of Southern Russia, which have been particularly badly hit by climate change. The relevant measures include less ploughing, a reduction in pesticide use, optimised irrigation systems and greater use of digital technology.

From the business side, the CEO of the agricultural engineering firm Horsch Maschinen GmbH, Cornelia Horsch, explained that her company is developing tillage and seed drill machinery that is adapted to different soils and climate conditions. As well the importance of good training and experience for farmers, the digitalisation of machinery and processes will increasingly play a key role. The ongoing expansion of digital networks in rural areas will be key to improving the exchange of information in agriculture. Torsten Spill, Chief Representative of the German Seed Alliance GmbH, highlighted the contribution made to sustainable land use by the development and production of seeds. Optimised mixes of catch crops can improve soils permanently by fixing nitrogen, building up humus and nutrients, as well as reducing erosion and weeds. Furthermore, new crop varieties are being developed that give adequate yields even with extreme soil conditions such as drought, flooding and salination. Partnerships between business and state institutions in the basic research into crop farming must be strengthened and international exchange improved.

Prof. Dr Bin Zhang, Chief Scientist at the Chinese Academy of Agricultural Sciences (CAAS), explained that self-sufficiency of the Chinese population is a key mission, which is endangered by a deterioration of soil quality. It is thus the goal of Chinese agricultural policy to expand sustainably farmland and yields, as well as raising income in agriculture, with the aim of being less dependent on food imports from abroad. The Chinese government has launched a number of action plans for environmentally friendly agriculture that conserves resources.



IAMO's self-published publications in 2022

## Publications

Academic staff at IAMO publish their research findings in academic journals, monographs, anthologies and discussion papers. Increasingly they are also being publicised in short Policy Briefs. A complete list of publications can be found on IAMO's website:

<https://www.iamo.de/en/publications/complete-publication-list>

Key to IAMO's research-based publication activity are refereed articles with an impact factor, which are listed on the Science Citation Index (SCI) and the Social Science Citation Index (SSCI). In 2022 there were 57 articles with an impact factor. Overall in 2022 there were 88 articles, compared to an average of 94 for the three years 2019–21. The total number of articles in refereed journals in 2022 was 67, compared to an average of 74 for 2019–21.

## IAMO Policy Briefs

<https://www.iamo.de/en/publications/iamo-policy-briefs>

Since 2011, IAMO's research findings with wider public relevance have been published in the occasional IAMO Policy Briefs, which are short and written with the non-specialist in mind. They are particularly aimed at politics, business and the media as well as members of the public with an interest in the area. The following IAMO Policy Briefs appeared in 2022 and can all be downloaded as pdfs free of charge from the IAMO website:

Glauben, T., Svanidze, M., Götz, L., Prehn, S., Jamali Jaghdani, T., Duric, I. & Kuhn, L. (2022). The war in Ukraine exposes supply tensions on global agricultural markets: Openness to global trade is needed to cope with the crisis. *IAMO Policy Brief No. 44*, Halle (Saale). (also available in German)

Kuhn, L., Jamali Jaghdani, T., Prehn, S., Sun, Z. & Glauben, T. (2022). Keep calm and trade on: China's decisive role in agricultural markets under turmoil. *IAMO Policy Brief No. 45*, Halle (Saale). (also available in German and Chinese)

### **IAMO Discussion Papers**

 <https://www.iamo.de/en/publications/iamo-discussion-papers>

The series of IAMO Discussion Papers continued in 2022 with the following, which can be downloaded as pdfs free of charge from the IAMO website:

Djanibekov, N. & Herzfeld, T. (2022). The impact of COVID-19 on agrifood systems and rural areas in Central Asia and Caucasus countries: Final report of a study commissioned by FAO, *IAMO Discussion Paper No. 198*, Halle (Saale).

Möllers, J., Herzfeld, T., Batereanu, L. & Arapi-Gjini, A. (2022). An analysis of farm support measures in the Republic of Moldova, *IAMO Discussion Paper No. 199*, Halle (Saale).

Amirova, I., Petrick, M. & Djanibekov, N. (2022). Community, state and market: Understanding historical water governance evolution in Central Asia, *IAMO Discussion Paper No. 200*, Halle (Saale).

### **Studies on the Agricultural and Food Sector in Transition Economies**

 <https://www.iamo.de/en/publications/iamo-studies>

In the series of publications *Studies on the Agricultural and Food Sector in Transition Economies*, IAMO publishes monographs and conference reports dealing with questions of agricultural economics in the countries of Central and Eastern Europe, as well as other transition countries. All publications from volume 22 onwards can be downloaded as pdf files for free from the internet. So far 32 conference reports or volumes and 67 monographs have appeared in the series. The publications in 2022 were:

Arapi-Gjini, A. (2022). Migration, remittances and well-being in Kosovo, *Studies on the Agricultural and Food Sector in Transition Economies*, Bd. 98, Halle (Saale).

Akhmadiyeva, Z. (2022). Institutional change and agricultural land use in transition countries: Understanding institutional constraints of farmers' decision making. *Studies on the Agricultural and Food Sector in Transition Economies*, Bd. 99, Halle (Saale).

## Research communication

As well as discussing its research findings on agricultural and food economics within the academic community, IAMO also presents its findings to politics, business, NGOs and the wider public. In this regard the Institute regularly organizes and takes part in high-ranking international events.



Organised session 'Rural Livelihoods in Southeast Europe - out-migration, climate-change and the pandemic'. Iliriana Miftari, Aleksandra Martinovska, Thomas Herzfeld, and Dmitry Zvyagintsev (l.r.)

With the title 'Enhancing resilience in a post-pandemic era: challenges and opportunities for rural development', the **IAMO FORUM** took place from 22–24 June 2022. The conference brought together experts from academia, business and international institutions to discuss the impact of the Coronavirus pandemic and the war in Ukraine on rural development in Southeast European and Central Asian transition countries in particular. Over the course of 22 sessions the 154 participants from 24 countries mainly discussed strategies for helping

agricultural systems to react better to crises in future. The event was organised by IAMO's External Environment for Agriculture and Policy Analysis department and the German Research Foundation (DFG), and financed by the Rentenbank. Our cooperation partner was the International Food Policy Research Institute (IFPRI).

Detailed information on the Forum can be found here:

<https://www.iamo.de/forum/2022>

At the **14<sup>TH</sup> GLOBAL FORUM FOR FOOD AND AGRICULTURE (GFFA)** IAMO organised together with the German Agribusiness Alliance (GAA) a virtual panel discussion on the topic 'Securing #soilidity. Challenges and solutions for sustainable land use'. The panel, which consisted of representatives from politics, business and research, spoke about the most important challenges for the sustainable use of land resources, focusing on Russia and China as two global players in the international agricultural and food sector. At the heart of the discussion were the future responsibilities of the agricultural sector with particular reference to land use that conserves the soil, how politics might be able to boost sustainable cultivation, as well as the role of technological progress and incentives for the application of new technologies.

Following the Russian invasion of Ukraine, IAMO, together with Wageningen University & Research, the Kyiv School of Economics and the German-Ukrainian Agricultural Policy Dialogue (APD Ukraine), organised an **ONLINE SERIES OF DISCUSSIONS** in which renowned experts discussed the impact of the war on local and global agricultural food markets, providing expert knowledge to the wider public about this topic.

In parallel to the IAMO Forum, the 2022 **INTERNATIONAL IAMO ALUMNI SUMMER SCHOOL 2022** took place from 20–24 June 2022. The programme included lectures and discussions about the role of research and innovation for sustainable rural development.

After a two-year break because of the Coronavirus pandemic, the **LANGE NACHT DER WISSENSCHAFTEN** (Long Night of Science) again took place in Halle (Saale) on 1 July 2022. IAMO offered a varied programme of topics from agriculture and the food sector, focusing in light of recent events on questions relating to agriculture in Ukraine.

On 19 and 20 October 2022 members of IAMO's Southeast



As part of the Long Night of Science, visitors were offered to have traditional Ukrainian vinky (flower wreaths) braided.

Europe research group took part in the **22<sup>ND</sup> AGRICULTURAL POLICY FORUM** in Tirana, Albania, on the topic 'Agriculture and rural development in the framework of the Green Agenda for the Western Balkans'.

Along with the DLG and APD Ukraine, IAMO was co-organisier of the **INTERNATIONAL CONFERENCE UKRAINE at EUROTier 2022** on 16 November 2022 in Hanover.

As a cooperation partner IAMO supported the **8<sup>TH</sup> SINO–GERMAN AGRICULTURAL WEEK** from 21–25 November 2022 in Beijing, China, as well as the Global Food Security Forum for Young Scientists from 2–3 December 2022 in Wuhan, China.

From 17–18 November 2022 IAMO was assessed by experts from the Leibniz Association as part of the programme of **REGULAR ACADEMIC EVALUATION**.

An overview of all events can be found here:

<https://www.iamo.de/en/events/event-archive>

Information on IAMO's research activity is disseminated via the Institute's own publications, press releases, articles in the newsletter, on IAMO's website and on social networks as well as in expert interviews in the media. In 2022 IAMO or researchers at the Institute were mentioned by name in a number of radio, print media and online reports. The following topics attracted particular attention:

- **The war in Ukraine, especially in connection with the following topics:**
  - Global food security
  - Rising food prices
  - Rising production prices (feed, energy, fertilizer)
  - Sharp decline in Ukrainian production
  - Agricultural trade flows, agricultural export bans

- **The future of agriculture, especially in connection with the following topics:**

- Transformation of agriculture in Germany and around the world
- Conflicts of aims in agriculture
- Final report of the Future of Agriculture Commission
- Revival of Agriculture/Young Farmers
- Consumer behavior and change in agriculture to sustainable practices

- **Impact of climate on the global food market**
- **China's role in international agricultural trade**
- **10 must-knows / 10 must-dos of biodiversity**

A selection of articles in everyday and specialist media can be found on our website under **IAMO IN THE MEDIA**:



IAMO scientist Linde Götz is interviewed by ZDF about the impact of the war in Ukraine on international agricultural and food markets in Europe and in developing countries.

The Institute's website [www.iamo.de/en](https://www.iamo.de/en) and IAMO's **NEWSLETTER** – both in German and English – regularly publish information on research findings, collaborations and projects, events, publications, support for young academics and awards. The electronic newsletter appears four times a year and can be subscribed to for free: [www.iamo.de/en/newsletter](https://www.iamo.de/en/newsletter). Current Institute news can also be found on IAMO's social media profiles on Facebook <https://www.facebook.de/iamoLeibniz> and Twitter <https://twitter.com/iamoLeibniz>.

<https://www.iamo.de/en/press/iamo-in-the-media>





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## Sources and picture references

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**P. 143** IAMO scientist Linde Götz is interviewed by ZDF about the impact of the war in Ukraine on international agricultural and food markets in Europe and in developing countries., photo: A. Czenthe © IAMO

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**P. 145** Aerial view of the Institute's building, photo: F. Matte © IAMO

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## How to find us

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### By car

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#### Adress

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Theodor-Lieser-Str. 2  
06120 Halle (Saale)  
Germany

### By plane

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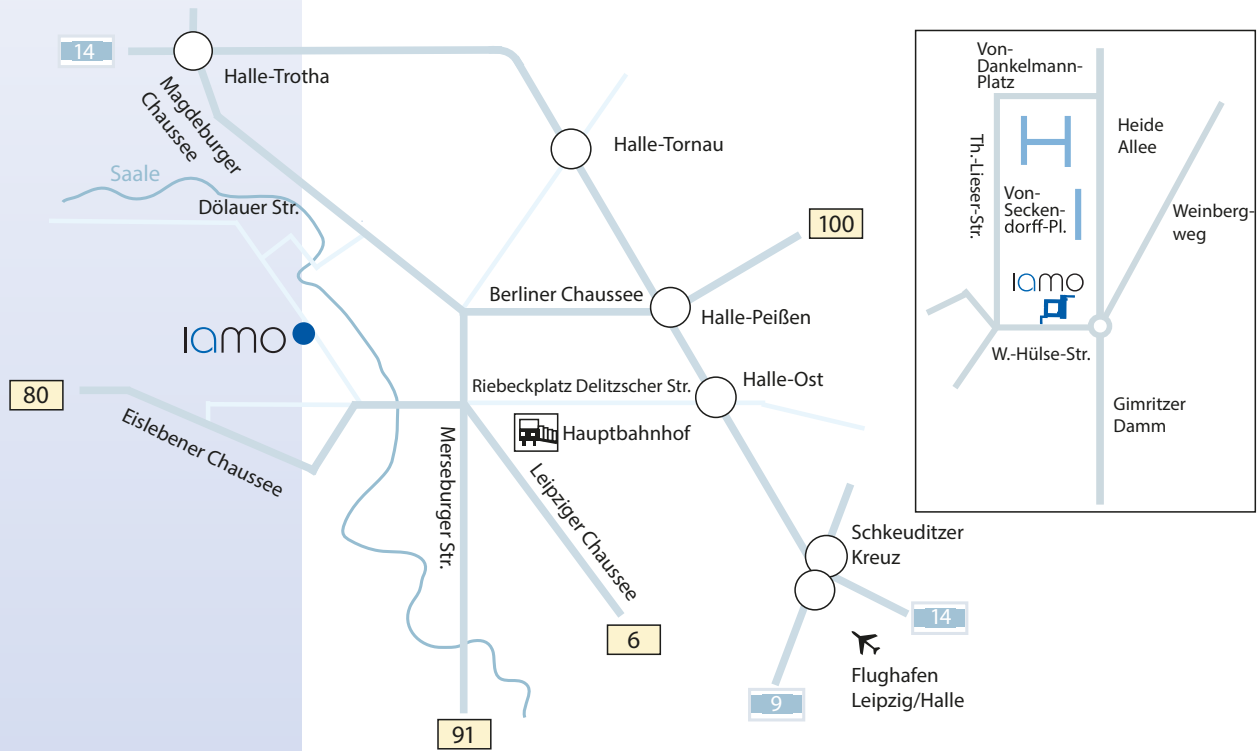
Leipzig-Halle Airport is 20 kilometres away from Halle. From there, the S-Bahn lines S3 and S5X run regularly to Halle's main railway station. You can find the rest of the route under 'by public transport'.

### By public transport

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Leave the station building through the side entrance and go to the „Hauptbahnhof“ stop. Here, take tram line 2 in the direction of Kröllwitz. Get off at the stop „Weinberg Campus“ (construction site timetable, journey time approx. 19 minutes). The Institute is located directly on the left side of the street in the direction the tram is travelling.

If you leave the station building through the main entrance, you can alternatively take tram line 9 in the direction of Göttinger Bogen to the stop „Rennbahnkreuz“. There you change to bus line 4 in the direction of Kröllwitz and get off at the stop „Weinberg Campus“ (construction site timetable, journey time approx. 24 minutes).



## Imprint

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In addition to this annual, IAMO's publications include the Discussion Paper series, the Studies on the Agricultural and Food Sector on Transition Economies, the Institute's annual reports and the Policy Briefs.

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**Cover photo** Grain exports. Wheat. Grain deal, shipment and transportation of farm and agrarian products and crops, aid to poor countries, famine, business.  
Agricultural income concept. © Ruslan Batiuk – stock.adobe.com

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