

# RURAL

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## Agri-food prices, food security and the role of trade

### LAND USE

Reconciling competing demands  
with food security corridors

### CAMEL MILK

Women's cooperative shows  
resilience during drought

### WATER

Using experiential indicators  
in water security measures

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Dear Reader,

Following the Russian Army's invasion of Ukraine in late February 2022, food prices soared up world-wide in next to no time. Not only did the Food Price Index of the UN Food and Agriculture Organization reach an all-time high, fertiliser and energy prices leapt up across the world, too – with the well-documented consequences for food production and supply in many countries, above all in those of the Global South. That the wheat price has returned to its pre-war level – despite the war's going on and the Ukrainian grain exports having collapsed – shows that the world markets seem to be more resilient than expected. However, developments over the last few months have also clearly demonstrated just how globalised the commodity flows in the agrifood sector have become. And they have once again raised the question whether this globalisation is really good – and if so, for whom – or, above all in food production, we had better return to a regionalisation after all.

No doubt international trade can get food from surplus to deficit regions and thus help alleviate food shortages. It can contribute to a varied and nutritious diet and help stabilise prices, it can promote access to markets for farmers in the Global South and enhance value creation in rural areas, and it can facilitate the transfer of technology and knowledge, thus helping farmers to adopt sustainable and climate-resilient practices, for example. The flipside of the coin is that, within a very short space of time, price surges and price volatility can spread from international to domestic markets; trade disruptions can lead to supply chain bottlenecks, which, with high import dependency and low domestic food sufficiency, can rapidly jeopardise the food security of entire regions.

In this edition, our authors take a look at the complex relations which – alongside the obvious shocks and crises – are behind price formation on the international agrifood markets. They analyse what triggered the major food price spikes in past years, how the food crises then and today differ from each other, and which countries were particularly affected then, and which are today. Here, special attention is given to the role of speculation and the growing corporate concentration in the food chain, be it the seeds, farm-

ing machinery, agrochemicals or commodity trade sector. For those who can acquire large market shares can not only crucially influence price development, but can also steer other important factors such as global research and development agendas.

Historically, there has been a pronounced correlation between international food and fertiliser prices, and the current food price crisis, too, has a fertiliser component. The availability of plant nutrients is crucial for enhanced agricultural productivity and hence for global food security and the economic development of rural areas. So far, mineral fertiliser has played a dominant role here, and many countries are opting for subsidies in order to create access to mineral fertiliser for smallholders. While such subsidies might be appropriate in the short term to help farmers cope with the current crisis, our authors recommend working out fertilisation strategies which focus on long-term alternatives, make farmers and the economies independent of price developments on the international fertiliser markets and above all enhance the yields and labour productivity of smallholders.

Wishing you inspiring reading, on behalf of the editorial team,



Patricia Sauer Silvia Richter

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# CONTENTS

## NEWS

- 04 Bonn Climate Change Conference between progress and disappointment/  
Global food prices are declining / High yield losses because of fungal  
disease / Reducing methane emissions from small-scale farming

## FOCUS

- 06 Agrifood prices and international trade flows
- 10 Food price inflation, its causes and speculation risks
- 13 AMIS – enhancing food market transparency and policy coordination
- 14 Agricultural prices and food security – a complex relationship
- 16 Strengthening the market linkages of smallholders in the face of global  
supply shocks
- 18 Long-term fertilisation strategies for blended agricultural sustainability  
are needed
- 22 Corporate power is growing in the industrial food chain
- 24 Global fertiliser price volatility – approaches to reduce vulnerability among  
countries in the Global South
- 27 The African Continental Free Trade Area – can the milestone live up to  
its promise?
- 30 Tapping intra-regional agricultural trade potentials in West Africa

## OPINION

- 32 Markets for farmers and consumers, not for speculators and corporations
- 34 High-hazard business

## INTERNATIONAL PLATFORM

- 36 Food security corridors – a promising solution to conservation and  
resource-grabbing conflicts
- 39 Women's cooperative in the camel milk business shows resilience  
during drought

## SCIENTIFIC WORLD

- 42 Measuring human experiences with water to inform policy and practice

## Bonn Climate Change Conference between progress and disappointment

More than 4,800 participants from all over the world met at the Bonn Climate Conference in Germany from the 5<sup>th</sup> to 15<sup>th</sup> June 2023 to lay the groundwork for the political decisions required at the UN Climate Change Conference (COP28) in Dubai, United Arab Emirates, at the end of the year.

Anthropogenic global warming has increased at an “unprecedented speed” since the last major climate system assessment two years ago, a recent analysis by a team of scientists warns. In Bonn, government delegates, observers and experts who took part in the global stocktake’s third and final technical dialogue discussed how to accelerate collective progress on mitigation, including response measures, adaptation, loss and damage, and means of implementation (climate finance, technology transfer and capacity building). Other discussions focused on climate finance,

notably the provision of adequate and predictable financial support to developing countries for climate action, including setting a new collective quantified goal on climate finance in 2024. On the global goal on adaptation, Parties agreed on structural elements for a Dubai decision. Discussions at the second Glasgow Dialogue on Loss and Damage at the Conference focused on maximising support from existing funding arrangements, including considerations on coherence, complementarity and coordination. The Transitional Committee will make recommendations for consideration and adoption at COP28 on how to operationalise the new loss and damage fund and funding arrangements. At the conclusion of the Bonn Climate Conference, the international relief organisation CARE publicised a new study on the insufficient climate finance plans of the industrial nations. The

analysis demonstrates that only ten of the 26 industrial nations reviewed refer to target figures for climate finance in their latest bi-annual reports: Canada, Denmark, France, Japan, the Netherlands, New Zealand, Norway, the United Kingdom, the USA and the European Commission. In all, these commitments amount to a mere approx. 13.3 billion euros of adaptation finance a year – falling way behind the agreed 46 billion euros.

The non-governmental organisation Germanwatch maintains that never before have climate negotiations discussed implementation measures for global climate protection efforts in such concrete terms. Nevertheless, after almost two weeks of intense negotiations, the results are sobering. “The climate negotiations have reached the implementation phase and are no longer discussing frameworks and rule books. Even so, the meeting

in Bonn has only achieved a formal minimum consensus. Progress has been made which could formally enable success at the next world climate conference, COP28. But the essential preliminary talks made hardly any progress. Major breakthroughs are not reckoned with in the intermediate negotiations, but they also ought to be prepared in terms of substance,” comments Christoph Bals, Policy Director at Germanwatch. “Some countries, including the COP Presidency of the United Arab Emirates, want to prevent the necessary phasing out of coal, oil and gas becoming a focal aspect of talks. This would jeopardise the massive profits which, in particular, the oil and gas exporting countries have made in the last two years. As yet, they are above all being supported by the newly emerging economies, which seek to avoid stringent climate protection provisions for themselves.” *(ile)*

## Global food prices are declining

The benchmark index of international food commodity prices declined in May amid significant drops in quotations for most cereals, vegetable oils and dairy products, the Food and Agriculture Organization of the United Nations (FAO) reported in early June 2023. The FAO Food Price Index, which tracks monthly changes in the international prices of commonly-traded food commodities, averaged 124.3 points in May, down 2.6 per cent from April and 22.1 per cent below the all-time high reached in March 2022.

The FAO Cereal Price Index declined 4.8 per cent from the previous month, led by a 9.8 per cent drop in world maize quotations given a favourable production outlook along a sluggish im-

port demand. World wheat prices also declined, by 3.5 per cent, reflecting ample supplies and the new extension of the Black Sea Grain Initiative. By contrast, international prices of rice increased further in May, sustained by Asian purchases and tighter supplies in some exporting countries, such as Viet Nam and Pakistan.

The FAO Vegetable Oil Price Index dropped by 8.7 per cent in May, averaging 48.2 per cent below its year-earlier level. International palm oil prices fell markedly from April, as protracted weak global import purchases coincided with rising outputs in major producing countries. World soy oil prices fell for the sixth consecutive month amid a bumper soybean crop in Brazil and higher-than-expected stocks in the



International prices of many commonly traded food commodities continued to fall in May.

Photo: Lorenzo Olympus/ shutterstock.com

USA. Rapeseed and sunflower oil prices continued to decline on ample global supplies.

The FAO Sugar Price Index posted its fourth consecutive month-

ly increase, up by 5.5 per cent from April and reaching a level nearly 31 per cent higher than a year earlier. The jump reflected tighter global availabilities, rising concerns over the impact of the

El Niño phenomenon on next season's crops and shipping delays amid strong competition from soybean and maize in Brazil. The positive outlook for 2023 sugarcane crops in Brazil prevented

larger monthly price increases, as did lower international crude oil prices. The FAO Dairy Price Index declined by 3.2 per cent from April, led by a steep drop in international cheese prices due mainly

to ample export availabilities amid seasonally high milk production in the northern hemisphere. However, international quotations for milk powders rebounded as did those for butter. The FAO Meat

Price Index rose by 1.0 per cent, driven primarily by a steady high Asian import demand for poultry meat and persistent supply tightness for bovine meat in the USA. (ile)

## High yield losses because of fungal disease

Fungal infections of crops are threatening global food security, experts warn. Yield losses because of fungal infections are huge, and the situation is likely to get worse. World-wide, growers lose 10–23 per cent of their crops to fungal infection each year, despite widespread use of antifungals. An additional 10–20 per cent is lost post-harvest. In a commentary in *Nature* published in May 2023, academics predict that those figures are projected to worsen as global warming means that fungal infections are steadily moving polewards, implying that more countries are likely to see a higher prevalence of fungal infections damaging harvests. Growers have already reported wheat stem rust infections – which normally occur in the tropics – in Ireland and En-

gland. The experts also warn that tolerance to higher temperatures in fungi could increase the likelihood of opportunistic soil-dwelling pathogens to hop hosts, and infect animals or humans. Across the world, food security is expected to encounter unprecedented challenges as rising populations mean more demand. Across the five most important calorie crops of rice, wheat, maize (corn), soya beans and potatoes, fungal infections cause losses which equate to enough food to provide some 600 million to 4,000 million people with 2,000 calories every day for one year.

The commentary highlights a “perfect storm” which is causing fungal infections to spread rapidly. Among the factors is the fact

that fungi are incredibly resilient, remaining viable in soil for up to 40 years, with airborne spores that can travel between continents. Added to this, they are extremely adaptable, with “phenomenal” genetic diversity between and among species. Modern farming practices entail vast areas of genetically uniform crops, which provide the ideal feeding and breeding grounds for such a prolific and fast-evolving group of organisms. They are also well equipped to evolve beyond traditional means to control their spread. The increasingly widespread use of antifungal treatments that target a single fungal cellular process means fungi can evolve resistance to these fungicides, rendering them ineffective. This forces farmers to use ever-higher concentrations

of fungicides in a bid to control infection, which can accelerate the pace of resistance developing. However, there is some cause for hope. In 2020, a team from the University of Exeter/UK discovered a new chemistry which could pave the way for a new type of antifungal strategy targeting several different mechanisms, thus making it much harder for fungi to develop resistance. Farming practices may also hold the key to change, after a study in Denmark showed promise by planting seed mixtures which carry a range of genes which are resistant to fungal infection. Technology may also prove crucial, with AI, citizen science and remote sensing tools such as drones allowing for early detection and control of outbreaks. (Kiel University/ile)

## Reducing methane emissions from small-scale farming

Small-scale farmers cause far fewer emissions than large-scale and industrial farming, but they can still help mitigate climate change. A new initiative to help developing countries lower methane emissions from small-scale farming was launched recently by the International Fund for Agricultural Development (IFAD). The new programme will receive 3 million USD in support from the Global Methane Hub and 1 million USD from the US State Department. Around 42 per cent of global methane emissions come from the agriculture sector. They are primarily caused by flooded rice cultivation, the burning of crop residues and livestock – through enteric fermentation and manure management. “The short

atmospheric lifetime of methane means that acting now can rapidly reduce the rate of global warming,” said Juan Carlos Mendoza, Director of the Environment, Climate, Gender and Social Inclusion Division at IFAD.

Over 150 countries have signed the Global Methane Pledge, established in 2020, and agreed to take voluntary action to collectively reduce global methane emissions by at least 30 per cent by 2030. The IFAD initiative is to support the development of a guidebook to help countries integrate methane emission reductions into their nationally de-

termined contributions (NDCs), mainstream reductions in their national planning, budgeting, and public investments procedures, and advance a pipeline of bankable interventions that pioneer re-

ductions in the agricultural sector and food systems. The Fund will also assist 15 countries in designing projects and blended finance solutions on reducing methane emissions in agriculture and food systems. The initiative aims to help highlight the advantages of using a variety of solutions in reducing methane emissions. For example, introducing better feed also promotes animal health and husbandry. Using less water to grow rice, or cultivating improved rice varieties that reduce the time between planting and harvesting, can also increase rice production. (IFAD/ile)



Photo: Chatrawee Wiratgasem/shutterstock.com



# AGRIFOOD PRICES AND INTERNATIONAL TRADE FLOWS

The development of global food prices and their short-term volatility are viewed with concern, as price increases indicate shortages and can have a direct impact on countries' food security, which is a problem not only for low-income countries. Our authors demonstrate which factors have a short- and long-term impact on agrifood prices and what the role of trade is in this context.

By Kirsten Boysen-Urban, Simon Ehjeij and Dorothee Flaig

International trade facilitates the movement of food from surplus to deficit regions, helping to alleviate food shortages and stabilise prices. However, high trade dependence makes a country's food supply vulnerable to trade disruptions, as seen recently during the Covid-19 crisis and the Ukraine-Russia conflict. Global trade in agricultural commodities is an important aspect of agricultural production and consumption and is growing, with the value of trade flows increasing fourfold over the past 20 years.

The most traded commodity groups by value are fruits and vegetables (23 %), cereals (14 %), fish and meat (11 % each) and oilseeds (8%). At product level, the most traded product by value is the oil seed soy, followed by cereals wheat and maize. China is the world's largest importer of soy. The country's large popula-

tion, growing demand for meat products and expanding livestock industry have led to a significant increase in soy imports. The largest bilateral trade flows for any single commodity is soy from Brazil and the USA to China. Chinese meat imports from Latin America and Europe are also considerable. Agricultural trade is highly concentrated. While there is some variation between commodity groups, the large majority of global agricultural trade is accounted for by just 11 countries. Trade shares by commodity group and region are depicted in the upper Figure on page 9.

Looking at trade between major trading blocs (see lower Figure on page 9), half of total agricultural exports is from Europe, Russia and Central Asia, mainly in intra-regional trade. Over a 20 year period up to 2019, there was a

shift in trade flows between regions, i.e. a shift to the Global South, while North American exports declined in importance from 19 per cent of total exports to 13 per cent. In East Asia and the Pacific, this pattern was reversed, with exports rising from 13 per cent to 19 per cent in 2019, whereas Latin America's share of exports increased slightly (13 % vs. 15 %) and Middle East and Northern Africa (MENA), sub-Saharan Africa and South Asia more than doubled their share of global exports, contributing to 8 per cent of total exports. This trade pattern was reflected in imports, where East Asian countries also grew. Their share of global imports rose from 20 per cent to 25 per cent, dominated by Chinese demand for soybeans, grains, meat and dairy products. Overall, Chinese imports accounted for 15 per cent of global imports in 2019.



Photo: Pradeep Gaur/ shutterstock.com

The importance of imports for domestic supply is illustrated by the UN Food and Agriculture Organization's import dependency indicator (see lower Figure on page 9), which shows how much of the available domestic food supply of cereals was imported and how much came from the country's own production. The map shows strong differences between regions. Especially the countries in the MENA region and some Central African countries are heavily dependent on agricultural imports. The most dependent countries include the Democratic Republic of Congo (95 %), Libya (94 %), Lebanon (94 %) and Gabon (93 %), which import almost all their needs for cereals. The same applies to countries in Central America and the western part of South America, Japan and South Korea. Ukraine, Canada, Argentina and Australia, on the other hand, are net exporters

and net exports amount to 84–242 per cent of the available domestic supply.

### Development of world market prices

Prices have an important role in signalling shortages. Price changes are normal in agricultural markets, as supply follows the harvest calendar and yields vary between years. This price movement is regular and can be anticipated. Higher prices help producers cope with low yields, while consumers benefit when prices are low. International trade can typically buffer regional supply shocks. Unexpectedly high and excessive price movements are problematic. Excessive price rises increase market uncertainty and therefore also accelerate inflation and hurt producers as well as the poor, who are typically net consumers and spend a relatively large share of income on food. The consequences are issues of political conflicts and social unrest.

Agricultural and food prices follow a trend that is determined by a complex interplay of various drivers which determine supply and demand in the long run, as detailed below. New technologies and the Green Revolution led to increasing yields, and real agricultural prices (prices adjusted for inflation) have been declining since 1960 for major agricultural commodities – according to the Agricultural Outlook of the FAO and the Organisation for Economic Co-operation and Development, the trend is projected to continue the coming decade. From 1960 to 2000, world market prices for food products, measured by the FAO Food Price Index, followed the trend of commodity prices and decreased, reaching its lowest point in 2000. Since 2000, however, the price trend has reversed, and world food prices have been increasing.

Prices move around this long-term trend, and these movements can be sudden and strong. There have been three major price spikes in the last three decades. In 2007/08, poor yields were exacerbated by the financial crisis, which increased demand for biofuels in response to high oil prices and by speculation, as investors became increasingly involved in agricultural markets. In addition, markets were nervous and protectionist measures led to price increases in markets that were not initially affected, such as rice. After a brief decline, prices rose again in 2011 following a drought and crop losses in the Northern Hemisphere. Most recently, they rose in 2021 in the wake of the Covid-19 crisis, due to disrupted value chains leading to higher transport and fertiliser costs.

The Ukraine–Russia conflict further increased energy and fertiliser prices and disrupted key grain and oilseed exports. The effect on the poor is broached on pages 14–15.

Temporary price movements are caused by short-term demand and supply shocks, such as weather events, pests and animal diseases, economic and political events. Several factors influence the resulting size of the price spike. One important factor is the general market conditions and the political environment. For example, a well-functioning, integrated and transparent market can partly buffer price shocks, and a high concentration in production lowers the possibility to react and increases the likelihood of severe impacts of market interruptions. High oil prices affect the demand and supply side by raising the demand for biofuels and increasing the costs of fertiliser, energy and transport. In addition, excessive speculation in financial markets, policy reactions such as protectionist trade measures and changing stocks can amplify shocks. The causes and risks of price spikes are demonstrated on pages 10–12.

### Global demand and supply of agrifood commodities

Long-term trends in world food prices are determined by changes in a variety of drivers that can be grouped in supply and demand side drivers, which have changed significantly over time.

#### Demand side drivers:

The world's population has grown rapidly in recent decades and is expected to continue to do so, reaching an estimated 9.7 billion people by 2050. While some regions are still experiencing high population growth, others are already stagnating or even declining. Three major trends, together with differences in the age structure of populations in different countries, determine the evolution of food demand. In general, more people require more food, and in the rapidly growing populations of developing countries, the proportion of young/adult and productive people is still high or even increasing, leading to above-average demand. In contrast, in many developed countries, the increasing proportion of older people leads to an opposite trend, as older people tend to require fewer nutrients.

Industrialised countries, and in particular emerging economies, have experienced significant economic growth in recent decades, which is expected to continue and spread to other developing countries. This is leading to



With rising incomes, consumer preferences are shifting towards healthier and more varied food options, including fruit and vegetables.

Photo: FAO/ Riccardo De Luca

an improvement in living standards and prosperity. With the increase in disposable income, the demand for food has risen sharply as more people seek access to a more diverse and energy-rich diet, leading to changes in dietary habits with higher consumption of fruits and vegetables, processed and convenience food and meat as well as animal products and the associated increase in demand for animal feed.

Although overall prosperity may increase, income inequality remains a challenge. Some populations and regions may benefit less from economic growth and have limited access to adequate and healthy diets. Other factors contributing to changes in dietary habits and increased demand for food with a wider choice of foods are increasing urbanisation, which is often associated with improved living standards thanks to better access to jobs and services, and globalisation and associated cultural exchanges, which encourage the adaptation of local diets to the so-called Western diet.

Demand changes for food are unlikely to be evenly spread across all agrifood products. Rising incomes and changing lifestyles are driving a shift towards more varied and processed foods, but cereals remain crucial for essential nutrients and calories, especially where they are staple foods. In addition, the growing middle classes in emerging markets may lead to increased consumption of cereals as part of a

balanced diet. Cereals are widely used in animal feed production and therefore reflect the increasing demand for animal products. With rising incomes, consumer preferences are shifting towards healthier and more varied food options, including a greater emphasis on fruit and vegetables. As environmental concerns continue to grow, consumers are likely to seek out sustainable food options, further driving demand for fruit and vegetables. Growing demand for plant-based protein is driving the use of oilseeds such as soybeans as a primary source of plant-based protein to meet the greater market for vegetarian and vegan diets.

The increasing use of biomass for non-food use in the framework of the bio-economy, especially as an energy commodity, and for feed, raises demand for agricultural products, binds resources and limits the supply available for human diets.

#### Supply side drivers:

Increases in agricultural production in the past have been driven by an expansion of factor inputs combined with the intensification of agricultural production, such as the use of modern technologies, including improved seed varieties, fertilisers, pesticides and irrigation systems, which have intensified agricultural production, leading to higher yields per hectare and an increase in total food production. More recently, the use of technology and data analysis has led

to the development of precision agriculture. Using sensors, satellite navigation, drones and advanced analytical tools, farmers can optimise production, improve resource efficiency and make precise decisions about fertilisation, irrigation and pest control. These specialisations and advances in agriculture have significantly increased agricultural productivity in the past and will play a key role in making agricultural production more efficient, productive and resilient in the future.

However, future food supply is expected to struggle to keep pace with food demand as our natural resources such as land, water and energy are limited, and it is likely that extreme weather events will become more frequent and severe due to climate change, leading to droughts and floods. Land suitable for agricultural production is a scarce factor with limited scope for expansion owing to a growing demand for human settlements or timber. There is also an increasing loss of arable land caused by soil erosion and desertification as a result of climate change. At the same time, freshwater availability is affected by climate change, water pollution and overuse of water resources, which is expected to increase through population growth and increased water consumption in various sectors.

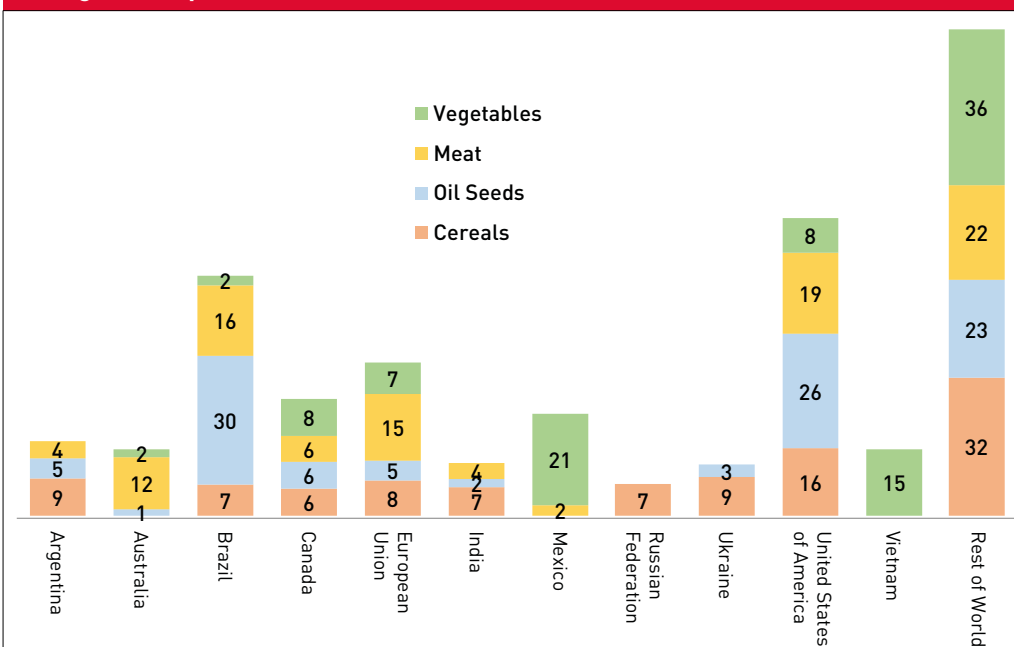
Energy is a key input in agricultural production. Recent events such as the Ukraine-Russia conflict have shown that increasing energy prices affect the cost of agricultural production. The transition to renewable energy and more efficient energy use could help reduce pressure on limited energy resources. Energy costs, crude oil shortages or limited supplies of other commodities such as phosphorus and potassium could lead to higher fertiliser prices and supply constraints, which in turn could result in lower agricultural yields due to reduced nutrient availability (also see article on pages 18–21). Promoting circular agriculture, the efficient use of fertilisers and alternative methods of nutrient delivery to crops could encourage a more sustainable use of fertilisers. Climate change is expected to lead to more extreme weather conditions, such as droughts, heat waves and floods, which could affect crop yields and change growing conditions. Agriculture will likely have to adapt to these challenges, for example by using more resilient crop varieties.

#### Potential future pathways and the role of agrifood trade

Future pathways to reduce food demand include promoting sustainable diets, taxing and



### Largest exporting countries for individual commodity groups in 2019 (% of global exports)



Source: Authors' compilation based on UN Comtrade data.

### Major agricultural trade flows between different world regions (2017–2019 averages) & cereal imports dependency ratio (in %)



The arrows indicate the largest agricultural trade flows between different world regions (North America, Latin America and the Caribbean, Middle-East and North Africa, sub-Saharan Africa, Europe and Central Asia, Southern Asia, and Eastern Asia and Pacific) and their respective counterparts. The width of the arrow indicates the trade flows' relative size compared to global trade.

The cereals imports dependency ratio, calculated as a 3-year average (2017–2019), tells the percentage of the available domestic food supply of cereals that has been imported. The maximum value of 100 indicates that a country relies fully on imports, while negative values indicate that the country is a net exporter of cereals.

Source: Authors' compilation based on UN Comtrade data and FAO data.

subsidising unhealthy or unsustainable foods, improving food labelling and more consumer education. Increasing food supply can be achieved by investing in agricultural research and development, supporting smallholder farmers, improving infrastructure and implementing land and water use policies that prioritise sustainable agriculture. In addition, waste reduction strategies are needed, such as target setting, donation schemes and consumer education. Improving sustainability also includes promoting organic farming, renewable ener-

gy and ecosystem protection. These pathways, together with international cooperation and innovation in sustainable agricultural practices, can help address food challenges and ensure food security.

Climate change, combined with the increased frequency of extreme weather events and the greater likelihood of pandemics and economic shocks, poses a major challenge to food security and the resilience of food systems. International trade plays a crucial role in ensuring

food security and strengthening the resilience of food systems. It facilitates the movement of food from surplus to deficit regions, helping to alleviate food shortages and stabilise prices. Trade diversifies food sources, reduces dependence on local production and provides access to a wide range of foods. It also creates access to seasonal and non-seasonal products, contributing to a varied and nutritious diet. International trade facilitates the transfer of technology and knowledge, helping farmers to adopt sustainable and climate-resilient practices. However, increasing globalisation and trade dependence also bring challenges such as trade disruption and environmental impacts. Trade disruptions can lead to supply chain bottlenecks and price volatility, while environmental impacts include greenhouse gas emissions and deforestation.

To maximise the benefits of international trade, it is important to promote diversified and resilient food systems, improve trade facilitation measures, strengthen local production capacity, support sustainable practices and improve global trade governance. Balancing international trade, local production and sustainability is key to building a resilient and secure food system that can withstand climate change, pandemics and economic shocks.

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## Food price inflation, its causes and speculation risks

Food prices are soaring across the world. The causes are a complex mix of global and national factors and are not only related to disruptions through the Covid-19 pandemic and the Ukraine war. Policy-makers and central banks need to counteract present food price inflation trends and fight the consequences to reverse the current trend of increasing global hunger, our authors maintain.

By Bernardina Algieri, Lukas Kornher and Joachim von Braun

The world economy is currently facing significant challenges: high inflation, food and energy insecurity, elevated debt levels, tightened financial conditions, volatility in capital flows and exchange rates, and the intensification of geopolitical tensions. The sharp and persistent rise in inflation, which started in 2021 and grew to distressing dimensions in 2022, is causing concern, above all for the world's poor, and is expected to increase food insecurity world-wide. The impact of inflation is not felt equally across economies. Low- and middle-income countries tend to be more vulnerable to high inflation than developed, richer countries, as lowest-income households in emerging and developing economies spend roughly 50 per cent of their income on food, while the highest-income households spend only 20 per cent. While higher food prices could benefit food sellers in developing economies, most of the poor are net buyers of food, so food-price spikes tend to have acute impacts on human health and living standards, increasing overall poverty and amplifying the risks of social unrest and political instability. In 2022, 828 million people were suffering from undernourishment, a 150 million increase from 2019, about 260 million were in acute hunger, and more than 3 billion people could not afford a healthy diet.

### Food price inflation causes – supply constraints and macro-economic factors

The FAO Food Price Index climbed by 50 per cent between the end of 2020 and March 2022. This was driven by price increases for wheat (100 %), for rice (25 %), and for maize (100 %) at some point in 2021 as compared to pre-Covid levels. During the same period, prices of oil, natural gas and chemical fertilisers started to rise. In early March 2022, during the first days of the Russian invasion in Ukraine, wheat and maize prices jumped by close to 50 per cent within just a few days. Rising international food and energy prices have increased inflationary pressure all around the world. While international grain prices returned to



pre-war levels in the second half of 2022, inflation world-wide remains strikingly high. Whereas in October 2021, only 20 out of 146 countries in the world registered inflation rates above 10 per cent, by October 2022, this number had more than tripled, with 68 out of 146 countries (most of which are developing economies) registering inflation rates above 10 per cent (also see upper Figure).

The reasons for the steep rise in food inflation in 2021 and 2022 are multifaceted and result from a confluence of different inflationary forces and multiple shocks, reflecting marked supply chain and logistical disruptions due to the pandemic first and the Russian-Ukrainian war later, the rising global demand following the partial world-wide economic recovery in 2021, elevated inflation expectations, the eroding value of national currencies against the US dollar and speculative trading in commodities. Since February 2022, the war in Ukraine has amplified pre-existing stresses in the global commodity markets, shoving prices up. The cost of oil and gas rose by a third as Western countries imposed sanctions on Russia, a major producer and exporter of both commodities and fertiliser (together with its sanctioned

ally Belarus). Food prices also reached historic heights, pushed up by input and transportation costs, as well as by Russia's blockades of grain exports from Ukraine, the fifth-largest exporter of wheat (Russia was until recently the first world exporter). Together they accounted (pre-war) for twelve per cent of all calories traded globally. In 2021–2022, then, a series of extreme climatic events reduced the production of some agricultural products. For example, Brazil experienced the worst drought in a century and, in July 2022, the worst frost in 20 years, both of which harmed several crops. Four-season drought has hit Ethiopia and Kenya. Lack of rain and extreme temperatures in India, along America's wheat belt and in the Beauce region of France also enlarged world-wide concerns. This was accompanied by uncertainties about trade policy restrictions.

On top of food price inflation, mainly linked to tight supply-demand conditions and eroding value of national currencies, inflationary pressures of 2021–2022 were driven by a combination of factors, including different policy stimuli (the generous pandemic-relief fiscal measures and expansive monetary policies) in each country. These factors impacted inflation

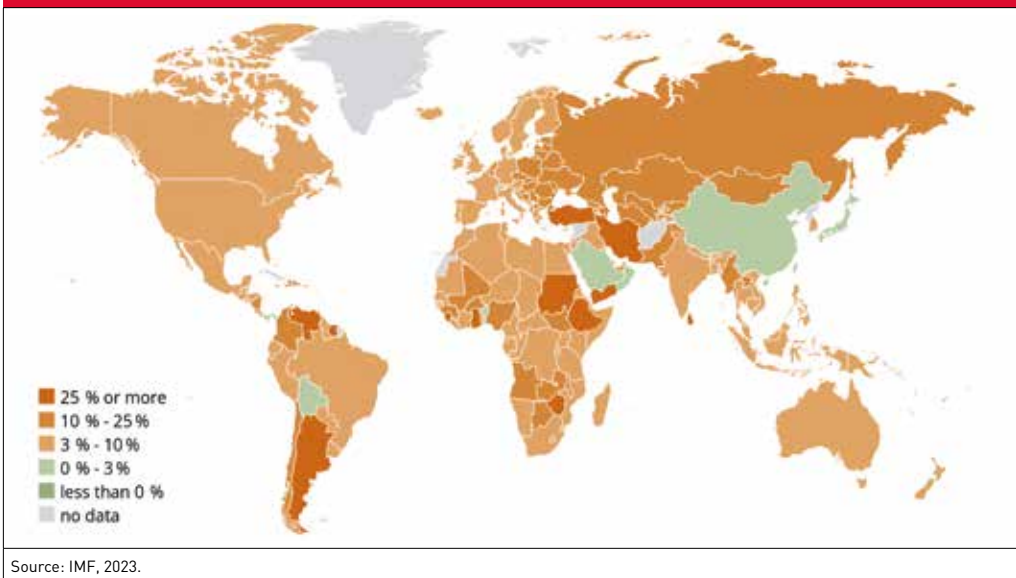
dynamics in varying proportions. For example, inflation in sub-Saharan Africa and other African countries was mainly pushed by elevated global food prices, especially wheat, maize, rice, and sorghum and energy prices accompanied by national depreciations. Egypt, for instance, imports 86 per cent of its whole wheat and 26 per cent of its maize from Russia and Ukraine, and the Egyptian pound went down by 18 per cent. Except for Ethiopia and Ghana, where the excess in domestic demand arising from expansionary fiscal policies has contributed to price pressure, in all African countries, the major drivers of inflation have been external factors (global commodity prices and supply chain disruptions, i.e. imported inflation). In Latin America, price pressures became stronger because of expansive monetary policies as a consequence of the pandemic response, wage indexation and, in some cases, strong aggregate demand. In Chile, pandemic-related financial support, together with pension withdrawals, heightened consumer spending significantly, fuelling inflation, whereas in Colombia, inflation surged mainly because of higher oil and commodity prices. In Asia, food price increases during the Covid-19 pandemic were slightly higher than in Africa, averaging about 50 per cent for some products compared to 2019, while most East Asian countries were generally less vulnerable to food price inflation in 2022, thanks to stable rice prices. Syria, Lebanon, Afghanistan and Yemen (partly Indonesia and the Philippines as well) also experienced extreme food price spikes.

### How is this crisis different from the food crisis 2008–2012?

The post-2020 price development and the 2022 price spike show some similarities to the 2008–2012 price spikes. However, there are also some differences between the 2008–2012 crisis and the current food and inflation crisis. In particular, the 2008–2012 crisis was mainly a food crisis, and inflation was not further triggered by monetary and fiscal policies. The impact of energy prices (oil and fertilisers) has been more pronounced in the recent spike, also because input markets have become more integrated. Instead, international macroeconomic factors, such as the role of the exchange rate and growing demand from emerging economies, are less pronounced than in 2008–2012.

The 2008–2012 food crisis emerged from poor harvests at the beginning of 2008 and supply shortages because of low grain stocks. International linkages in the global food system were

### Inflation rate world map in 2022

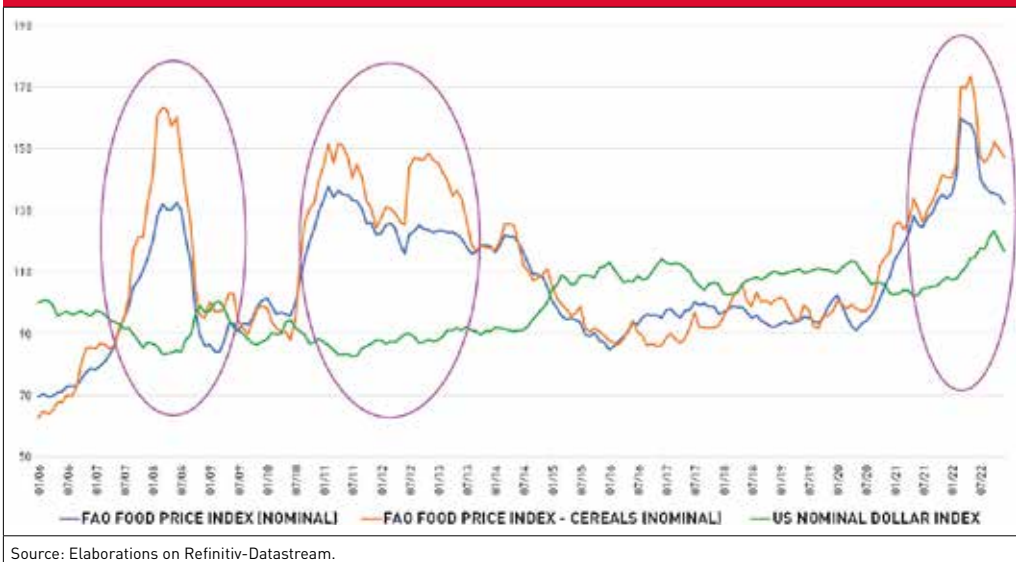


only developing during the 2000s, and were much lower than today. Therefore, the impact of international shocks on domestic food systems was unexpectedly strong. Post-2020 food systems are more strongly interlinked. This involves global food supply chains in input and output markets. Therefore, international food price pass-through to domestic food markets is faster and stronger. Moreover, economic slowdowns as a result of the Covid-19 pandemic hit low- and middle-income countries much more than the international financial crisis which started in mid-2007. Stimulus spending and expansive monetary policies have contributed to inflation on top of the international component. In consequence, the reduction in global food prices reduces inflationary pressure, but will not automatically lead to lower overall inflation.

### The role of speculation

Given seasonal production and climate-related fluctuations in yields, speculative storage of grains and oilseeds has been applied for thousands of years and contributes to offsetting supply shocks. Today, financial speculation – trading at commodity futures markets – plays an important role in stabilising agricultural commodity prices and reducing the risk for consumers and producers (see Box). The overall share of grain and oilseed produce that goes through formalised commodity markets has steadily increased over the last decades, and today, price developments at commodity exchanges strongly influence spot markets around the world. In a functioning market, financial speculation exclusively serves the demand for risk hedging of market players. Prices

### Dynamics of food prices and US dollar exchange rate, January 06 to December 22



### Commodity futures markets for staple foods – benefits and risks

Commodity futures markets have three important economic functions. First, they help producers, traders, and processors (commercial market actors or hedgers) hedge their price risks; i.e. they take price risks from less risk-averse hedgers. Second, they are important for price discovery in spot markets by enabling commodity traders to establish benchmarks for current prices. Finally, derivatives markets provide transaction efficiency by reducing transaction costs. As a result, investments become more productive and price volatility decreases. For these reasons, speculation is a necessary part of financial markets, and it is counterproductive to completely exclude food commodities from speculative transactions.

Financial speculation comprises buying, holding, selling and short-selling of commodities to profit from price fluctuations.

Speculative trading without an interest in the use of the commodity is referred to as non-commercial trading/ financial speculation. Excessive speculation can cause price shocks in commodity futures markets and jeopardise financial market stability once speculators' behaviour is driven by financial market strategies rather than market fundamentals. Following the stock market crash in 2002, agricultural commodities became a popular asset class in the portfolios of financial institutions and the general investment community because of their relatively low correlation with returns of other asset classes. During this period, trading in agricultural commodity futures and options contracts increased sharply. As a result, speculative activity also rose dramatically. Critics therefore hold speculation partly responsible for the commodity price boom in the 2000s.

are determined by fundamentals, i.e. the long-term, basic information about real production possibilities and the structures of the market. When speculative activity becomes rampant and financial speculators trade mainly among themselves, financial speculation gets excessive, and prices may deviate from supply or demand expectations in the market.

The assessment of the role of financial speculation in the 2021–2022 food price developments should not be viewed in isolation, because commodity trading is also related to the market development in other asset classes, such as equities, government bonds, and even real estate. A valid valuation can usually only be carried out in the aftermath of a crisis. However, the sudden price hike in March 2022 when wheat prices increased by 52 per cent at the Chicago Mercantile Exchange (CME) and by 39 per cent at the Euronext Exchange in Paris was a very exceptional case. At this time, representing a trend starting at the end of 2020, investments of financial speculators, like hedge funds, in agricultural commodities were very high. These speculators were betting on rising commodity futures prices, a behaviour that corresponded with price spikes in commodity futures markets in 2007–2008.

The Excessive Food Price Variability Early Warning System maintained by the International Food Policy Research Institute (IFPRI) also reported abnormal market dynamics between the third quarter of 2021 and the second quarter of 2022 which could have led to excessive financial speculation. Yet this does

not necessarily indicate that the increased financial market speculation contributed to the price hike in early 2022 because it also highlights an increased need of producers or sellers to hedge against the risk of falling prices. Since the second half of 2022, futures and spot prices of agricultural commodities have fallen to pre-war levels. At the same time, the investments of financial speculators in commodity markets have also significantly declined. This trend corresponds to significant reductions in market uncertainties in 2022. For instance, overland grain transports and the Black Sea Grain Initiative in June 2022 ensured that Ukraine grain exports have been available to the world market. While it will require further analysis to assess whether and to what extent excessive speculation contributed to the price increases in cereals in the first half of 2022, a re-rise in agricultural commodity prices cannot be ruled out given the prolonged uncertainties of Russian and Ukraine export levels.

### What measures have to be taken by politics to counter food price inflation and volatility?

The current situation requires immediate policy responses as well as long-term changes and a transformation of the global food system.

#### Immediate responses include:

- Improving the short-run functioning of the global food market through political coordination at the G20 and UN levels (i.e. keep food and fertiliser markets open to

avoid the direct or indirect impact of economic sanctions on the food security of third countries).

- Strengthening the Rome-based food agencies, the World Trade Organization (WTO) and AMIS (see page 13) to increase market transparency, trade functioning and policy coordination.
- Improving the coordination of fiscal and monetary policies to bring inflation down, while maintaining safety policies.
- Increasing debt relief, food aid and budget support to expand social protection, including scaling humanitarian efforts in and around hunger-prone zones impacted by climate crises and conflicts.

#### Long-term responses include:

- Strengthening sustainable productivity growth and sustainable land use, especially in low-income countries, with technologies and innovations to enhance crises resilience.
- Improving the efficiency of fertiliser usage by increasing fertiliser availability in Africa through local production and trade, increasing nutrient efficiency world-wide and the expansion of sustainable soil and land use. The latter is called for from a climate policy perspective in any case.
- Restructuring the global food system (without counteracting environmental and climate goals) by disincentivising the demand for bioenergy based on field crops and meat in high-income countries to expand food production and availability.
- Building and supporting strong macro-fiscal institutions, e.g. an import facilitation mechanism, to buffer commodity price volatility.
- Redesigning the ongoing follow-up to the UN Food Systems Summit 2021 to add global food crises response and global food systems reform issues to the UN agenda, in addition to national pathways of food systems transformations.

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## AMIS – enhancing food market transparency and policy coordination

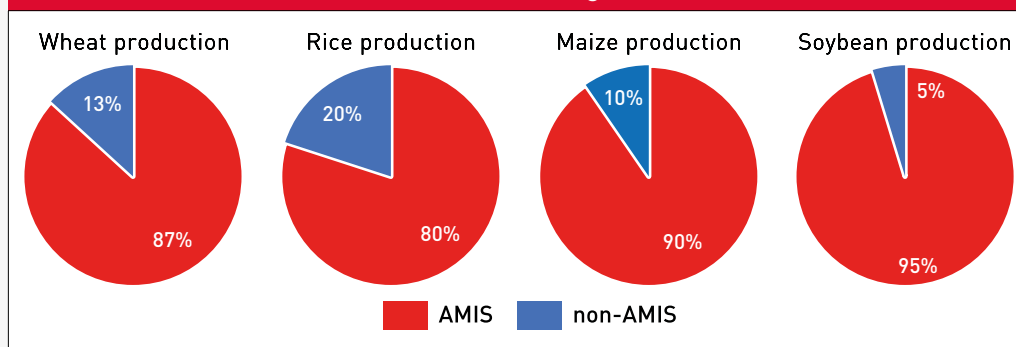
The Agricultural Market Information System (AMIS) was launched in 2011 by the Group of Twenty (G20) to prevent turmoil in international food markets. Looking back at more than ten years of operation, has the system delivered?

The Agricultural Market Information System (AMIS) came into being in response to the world food price crisis, the period in 2007–08 and 2010–11, which was characterised by surging and highly volatile global food prices. The crisis severely undermined the availability and affordability of food around the globe, resulting in political instability and social unrest in several countries. The drivers of the food price crisis were complex and continue to be the source of much debate. However, there is general consensus that better food market information and coordination could have mitigated some of the extreme market swings. This is especially the case as many of the policy decisions taken during this period, among them the abrupt implementation of export restrictions, are believed to have aggravated the situation and further stirred panic in markets.

To respond to these challenges, AMIS was mandated with two principle objectives: (1) enhance global food market transparency by providing relevant, timely and comparable food market data, especially on global production, stocks, trade, utilisation and prices of main food commodities (targeting wheat, maize, rice and soybeans), and (2) promoting policy dialogue among the principal trading countries of agricultural commodities, with a view to encouraging early discussion about critical market conditions and ways to address them. The initiative is composed of G20 members plus Spain (a permanent guest country of the G20) and seven invited countries that are major players in global food markets. Together, AMIS participants represent a large share of global production, consumption and trade volumes of the targeted crops, typically in the range of 80–90 per cent (see Figure), making discussions in AMIS both relevant and meaningful at global level. The initiative is hosted by the Food and Agriculture Organization of the United Nations (FAO) and supported by an inter-agency Secretariat currently comprising ten international organisations and entities.

AMIS is a collaborative effort between Secretariat member organisations and participating countries that have each committed to supporting its work through data and resources. In practical terms, this means that technical focal points from AMIS participants provide the Secretariat with regular updates of their

AMIS share in world markets (2020–2022 average)



countries' supply and demand situation of the four target commodities (balances), which are further discussed in meetings of the so-called Global Food Market Information Group. Based on the information collected, senior-level representatives of AMIS participants engage in regular policy dialogue events to review the current food market situation and outlook in the framework of the AMIS Rapid Response Forum. Balances submitted to the Secretariat are analysed and cleaned, making the information comparable by applying a unified methodology, filtering out possible politically motivated biases and filling in data gaps resulting from missing capacity in the reporting country. To support national focal points in their data submission obligations, the Secretariat has engaged in various capacity building activities and stays in regular contact with participating countries to ensure their successful engagement in AMIS.

Are all these efforts paying off, especially given that 2021–22 saw another major surge in food prices despite the existence of AMIS? Several market observers, but most importantly the performance of markets during Covid-19 and, most recently, the war between the Russian Federation and Ukraine seem to suggest that the answer is “yes”. While the turbulences during the food price crisis were aggravated, and possibly even caused, by hasty and ill-informed policy decisions such as export restrictions, the number and duration of trade measures implemented during the last two crises have been relatively limited. In fact, global food trade has demonstrated an astonishing degree of resilience, despite the enormous challenges posed by a global pandemic and a war between two major food producers. Also,

while the food price crisis was to a large extent “policy-induced”, the recent price spike can ultimately be explained by fundamental factors: strong demand following Covid-19, logistical bottlenecks in global supply chains, surging energy and fertiliser prices, and supply concerns due to the war in Ukraine. With the partial reopening of grain trade from Ukraine (e.g. Black Sea Grain Initiative and Solidarity Lanes) and a strong supply response expected by farmers this season, prices in international markets have already come down considerably. Finally, and irrespective of geopolitical tensions, the global response to these crises has been remarkably unified. Meetings of the Rapid Response Forum have been instrumental in agreeing on joint messages feeding directly into policy processes at both the G20 and, increasingly, the G7 level, fully endorsing the AMIS market assessments and the initiative's call to leave food trade open.

Experiences from recent years show that AMIS obviously cannot prevent global food prices from surging. However, it can provide the tools to help limit the extent of future crises and contribute to safeguarding the normal functioning of global food markets.

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## Agricultural prices and food security – a complex relationship

High agricultural prices affect developed and developing countries alike, but the problem is aggravated for the latter through the lack of or inadequate resilience measures. Our authors explain what can be done to mitigate the negative effects on food security in poor countries.

By Fatima Olanike Kareem and Olayinka Idowu Kareem



For producers, agricultural price hikes can be a catalyst or a barrier; the latter applies if input prices are concerned, such as for fertilisers or labour.

Photo: Jörg Böthling

Agricultural prices are pertinent tools in supply chains with an edging impact on food security. Rising agricultural prices – inputs and food alike – push more people into the poverty trap and food insecurity. This is evidenced by the Covid-19 pandemic and the Russia-Ukraine crisis, in which prices skyrocketed and became volatile particularly during the early period of the latter crisis, with a resultant effect on food security in many parts of the globe, especially in developing countries. Yet the implications of changes in agricultural prices on the populace are heterogeneous, affecting consumers, producers, income earners and regions differently, depending on their social capital and on aspects such as social insurance, preparedness and resilience. Thus, this article divulges into the pattern of global agricultural prices, their benefits and the challenges to food security.

### Price transmission of food and input prices

Higher global agricultural prices can transmit to domestic prices, where the consumers and producers act as price takers. Their behaviour,

the level of domestic markets' integration into the global economy, trade policies, exchange rates, trade costs and consumer/producers' price controls, among others, will determine the corresponding domestic prices. In addition, the responsiveness of domestic prices to international prices would be aggregated for net food importers, which many African countries are. This makes them more susceptible to international price shocks due to high import dependency and low domestic food sufficiency. Such price transmission is seen with the Russian-Ukraine and global financial crises, which have pushed more households into poverty and malnutrition, reduced income and escalated food insecurity for countries, especially for net importing ones. Besides, nationally, spatial price transmission is observed from one food market to another in the face of national conflicts and climate-induced drought or rain, which put constraints on food prices and agricultural production. Nonetheless, price transmission varies across commodities and markets – for instance, oilseeds and cereals have been shown to have more globalised markets than meat products. Prices have been volatile, as is evident in the upper Figure, which depicts os-

cillating nominal food and input prices with prominent spikes during crises such as those in 2007/08 and 2011 and the recent Covid-19 and Russian-Ukraine crises which have led to supply disruption and hikes in food prices.

### Consequences of high agricultural prices

Rising agricultural prices increase food production costs and reduce productivity, which puts pressure on food prices and food security. However, high agricultural price levels have their pros and cons for producers and consumers. For consumers, rising food prices usually result in a fall in the preferred food and the number of meals consumed, leading to wider food insecurity gaps for both urban and rural populations, particularly for the (urban) poor, who are majorly net food consumers. In addition, high agricultural prices, especially food prices, decrease net income and purchasing power, and they might lead to lower calorie intake or dietary diversity as consumers adjust their consumption patterns to rising prices. All these adjustments can be improvised by con-

sumers, particularly by the poor, thereby increasing their food security status. However, relative to high-income countries, consumers in low-income countries are hurt disproportionately as households in the former spend about 44 per cent of their income on food, while the latter spend 16 per cent on food. Nonetheless, some high agricultural prices might be beneficial for the poor since they increase the demand for unskilled labour, which characterises the skill-set of the majority of the poor, consequently leading to a rise in wages.

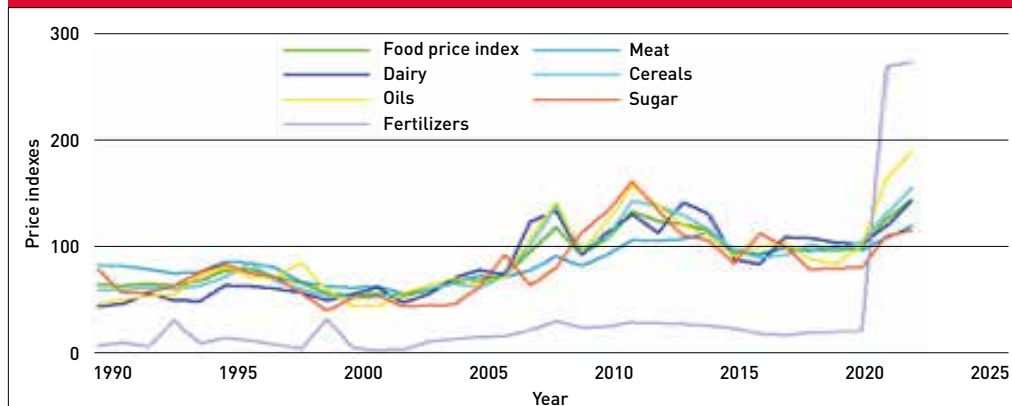
Furthermore, for producers, agricultural price hikes can be a catalyst or barrier depending on whether the increase is in the form of agricultural input prices (such as fertilisers or labour) or output prices (such as food). Input prices increase production costs and might dampen profit and producers' welfare. However, output price hikes such as for food can raise their profit margin, but spikes in commodity prices can harm them as well, because smallholder producers are also consumers of their products. This can have an effect on poverty and food security aggravated for smallholder farmers. In fact, the effect of such an output price increment can be dampened or negative if it is accompanied by an increase in agricultural input prices. This is expected as some input prices have recently outstripped output prices (see upper Figure). According to the World Bank, smallholder farmers constitute two billion of the world's population or about 500 million smallholder households world-wide. Most are highly dependent on agricultural commodities as income sources – which increases their susceptibility to commodity price hikes and volatility.

Hence any hike in agricultural prices, be it input or output, will impact smallholders most as they are both producers and consumers of their products, thus constituting a major problem for global food security. In terms of distribution, evidence suggests that severe food insecurity is on the rise globally and also in all continents, with Africa being the most affected. Furthermore, following the pandemic and the resultant supply distribution and rising food prices, the severity of food insecurity has risen since 2020, with low-income food-deficit countries being more affected (see lower Figure).

### Subsistence production, cash cropping and food security

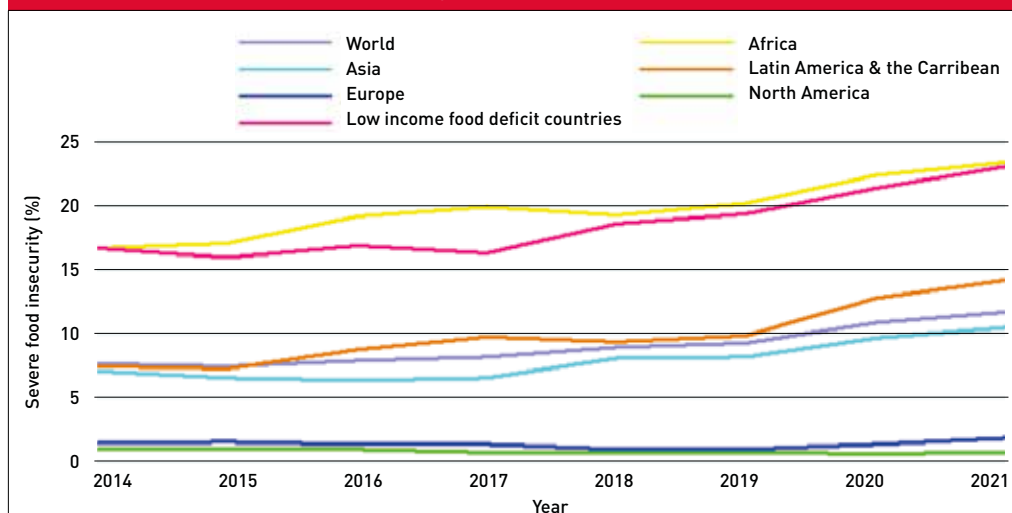
Among smallholders, subsistence production is a viable option for increasing livelihood and can buffer the negative effect of high food prices, thus reducing the vulnerability of house-

### Trends in global agricultural prices



Source: FAO and OECD-FAO Agricultural Outlook 2018–2027.

### Prevalence of severe food insecurity



Source: FAO.

holds to food insecurity. However, its role might be limited in ensuring dietary diversity given that it leaves little room to earn enough. As increased monetary income is important in reducing food insecurity, cash cropping might thus be more advantageous in improving food security relative to subsistence food production. Cash cropping has higher market value and monetary returns which can help smallholders finance their food expenditures (food accessibility), increase their household dietary diversity (food utilisation) and enable them to fight their way out of food insecurity.

However, increased income does not necessarily translate to food security, as there are other uses of household income besides food purchases. In addition, an increase in cash cropping can crowd out food crop production as land for the latter declines, affecting food availability, especially in African countries with limited technology to improve yields. Such a reduction in food production pushes up food prices, and the income earned from

cash crops may or may not be enough to offset such price increments, and may thus undermine food security.

Besides, the exact effect of income from such cash cropping on food security will depend on whether government policies support cash or food crops, farm and household size, gender, trade policies, etcetera. For instance, evidence suggests that access to resources by females increases household allocation to food purchases, which can thus ensure more household food security. In addition, access to (global) markets can be deterred by trade policies, particularly food safety measures, which can be very stringent and costly, and might exclude smallholders from the global supply chain.

### Implications for relief efforts and the role of agribusiness operators

The global shocks such as Covid-19, climate change, plagues and the Russia-Ukraine war

have led to an increased need for relief efforts. However, higher food prices are making support and palliative programmes, food aid, and subsidies and social protection expensive as the price increment strains the budget of governments, donor institutions and development partners in relieving the burden of the vulnerable. This drives the level of poverty and food insecurity upward.

Commodity price changes are sometimes influenced by the nefarious activities of some operators in the commodity value chains involving supply chain disruptions, hoarding, formation of cartels and/or oligopolistic scenarios and monopolies. Such activities often influence the availability and stability of food, creating artificial scarcity and higher prices. To mitigate these challenges, there is a need for an adequate and extensive regulatory framework that governs the activities of food supply chain operators and curbs exploitative behaviour in the food systems. Moreover, there is the risk of

higher future food prices and food insecurity if the Black Sea Grain Arrangement collapses and access to fertilisers is restricted. Overcoming the challenges entails a reduction in trade restrictions and removal of supply chains and/or market access challenges/ bottlenecks.

### Conclusion


High agricultural prices affect developed and developing countries alike, but the problem is aggravated for the latter through the lack of or inadequate resilience measures. Institutionalising price stabilisation support mechanisms such as agricultural output and price support are germane interventions that could stabilise incomes, incentivise farmers, particularly smallholders, to invest and increase agricultural production amidst high agricultural prices. In the short run, subsidising consumption, engaging in cash transfers and other food support to the vulnerable might be viable options. Long-run

interventions could include the implementation of minimum price models that enable farmers earn a premium over production costs, implementing crop insurance schemes and input subsidies to make farmers more resilient to price shocks. These measures are important to hedge farmers and consumers against income and price fluctuations and food insecurity. In addition, using a common national market platform to trade can help minimise direct price shocks to producers and leverage profits.

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 References: [www.rural21.com](http://www.rural21.com)

## Strengthening the market linkages of smallholders in the face of global supply shocks

The consequences of the Russian invasion of Ukraine have enabled many countries to open up new export markets for their agricultural goods. However, smallholder farms have been largely left out. Drawing on his experience in India, our author gives a brief overview of how this can be changed.

**By Niladri Sekhar Bagchi**

In the aftermath of the Covid-19 pandemic, the Russia-Ukraine war created a ripple of global supply shocks in agricultural and energy supply chains around the globe. While the disruptions in agricultural production in both Russia and Ukraine created shortages in the global supply of foodgrains, sanctions on Russian exports of energy and fertiliser pushed the prices of these critical inputs up to a record-breaking level. The food and nutrition security of the African and Middle Eastern countries deteriorated to a large extent as they depended heavily on food imports from these two warring nations. In contrast, South Asian countries such as Bangladesh, Sri Lanka, Pakistan and India faced the heat through higher prices of fertiliser and fuel. While India could somehow manage to bypass the sanctions on Russia and imported fuel from it at discounted rates, other developing nations in this region were unable to enjoy this advantage. The increased fertiliser and fuel prices pushed up the cost of agricultural production in many of these countries.

This affected the smallholders (those having less than two hectares of land) in the developing countries in many ways. They faced higher input and transaction costs. They also experienced high uncertainty in the export market as many countries, among them India and Indonesia, took recourse to export bans on their major agricultural crops, such as wheat and edible oil respectively. Smallholders in general are dominated and exploited by intermediaries at different strata of agricultural markets. The export opportunities created through the Russian invasion of Ukraine for many countries were most likely to be captured and exploited by the intermediaries and big traders. Among the major reasons why smallholders cannot gain much from the export opportunities is their strategic weakness in proper quality assessment infrastructure and an aggregative marketing platform such as a cooperative. It is frequently observed that the existing cooperatives in the developing countries are not inclusive in their

membership and governance, so that the interests of the smallholders are very often neglected.

Another important aspect where smallholders face huge challenges is their inability to use modern ICT tools such as smartphones and computers. Thus, the immense benefits of these modern ICT tools and their applications in agriculture remain out of reach for them. There are some remarkable instances of applications of ICT tools including different apps and web-enabled platforms in agriculture, ranging from crop choice and harvest quality assessment to marketing. However, these successful instances are mostly third party initiatives such as those run by NGOs or academia. Initiatives of this kind from smallholders are almost non-existent, the major reasons being their low education level, lack of regular training and a lack of links with the research institutions. Therefore, the pertinent question is how the market access



or market relations of the smallholders can be strengthened so that they can really benefit from export opportunities arising out of a changing global market scenario and can be insulated from the global supply shocks like those observed in the aftermath of the Russia-Ukraine armed conflict.

First, smallholders must be brought under the membership of an allrounder cooperative or a farmer producer organisation. The cooperative will act as a single window for accessing various benefits such as buying appropriate seeds, hiring machinery, getting loans and assessing the quality of their produce and introducing it on appropriate markets. This kind of cooperative is observed in Australia and other developed countries. The prevailing cooperatives need to be upgraded into such a single window-providing institution for the smallholders. It has been noted that smallholders in developing countries like India and Bangladesh are in many cases members of various collectives, such as water user associations, marketing associations and custom hiring centres, etc. Thus, they do not have single-window access to all the facilities, which could have considerably reduced their transaction costs and helped them connect to the profit-generating markets.

Second, the current structure of intermediaries needs to be regulated and upgraded to a multi-role agent system. In the existing system in India, it is observed that there are too many layers of intermediaries at different levels of markets – village, town, district and regional level, etc.

These multiple layers of intermediaries add to the price of the final produce multiple times just for making coordination possible at different levels. They also function in favour of the buying intermediaries at the higher level and, ultimately, in favour of the traders only. Unless these intermediaries have some incentives to function in favour of the smallholders, the latter will always remain at the receiving end. The example of farmer-allied intermediaries in Africa can be used to formulate policies in this regard. There could be compulsory registration of all the intermediaries in the agricultural sectors, and the government could introduce an incentive structure for them so that they could help the smallholders in various ways in their capacities. For example, intermediaries are incentivised through government schemes to fulfil the objectives of food security in Indonesia. The compulsory registration may wipe out the redundant intermediaries and thereby reduce unnecessary price rises of agricultural produce.

Third, regular training camps for smallholders in the application and use of modern ICT tools in agriculture and marketing could be popularised in the rural agricultural areas. Government-subsidised smartphones may be provided to the smallholders with dedicated apps for use in the agricultural sectors. The farmer producer organisations and cooperatives may receive easy credit for creating robust ICT infrastructure and linking them with agricultural universities and other reputed academia so that modern ICT research and applications can be percolated to ground

level without delay. In this way, smallholders would develop the confidence and capacity to be competitive in the world market.

Fourth, it is observed that the lack or total absence of quality assessment or certification facilities in most parts of rural India acts as a barrier for smallholders to connect with traders directly. There is a need for huge investments in quality assessment and certification of agricultural produce in the developing countries. This is the most crucial facility that can connect the produce of the smallholders with any big traders or exporters without the need for physical inspection by an intermediary trusted by the distant trader. Both private and government investments are necessary to make certification and quality assessment widely available and affordable for smallholders.

The above four ways have the potential to make market relations and access of the smallholders strong and robust. Along with this, direct benefit transfer to the smallholders as seen in India can create a suitable buffer for absorbing a supply shock such as the rise in fertiliser prices in the world market because of the Ukraine-Russia war.

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One of the reasons why smallholders cannot benefit from export opportunities is the absence of an aggregative marketing platform.

## Long-term fertilisation strategies for blended agricultural sustainability are needed

The world is currently experiencing a historic food crisis. High fertiliser prices are part of the problem. In addition to the necessary short-term aid measures, the crisis ought to be made use of to develop and implement longer-term fertiliser strategies for sustainable, in particular smallholder increases in production in the Global South.

By Michael Brüntrup

The majority of a total of more than 800 million food-insecure people live in smallholder households. As long as these people cannot move on to activities which are not dependent on agriculture, which is unlikely for most for the foreseeable future, an increase in their area and labour productivity remains the most important approach to more income and thus to food for the majority of those going hungry. At the same time, the intensification of smallholder farming represents a contribution to more food availability and more stability, to economic growth especially in rural regions and to a reduction in land pressure in natural reserves. The key argument is that it is income and not food production *per se* which assures their food security. Of course, for resilient livelihoods additional mechanisms also play a role, such as diversification, access to financial services and stable food markets.

Better availability of plant nutrients is crucial for enhanced agricultural productivity. So far, in modern agriculture, mineral fertiliser played a dominant role in that. Some estimates put around 40 per cent of global yield increases down solely to the increased use of mineral nitrogen, the most important plant nutrient. It is difficult to view the contribution of other macronutrients – phosphate and potassium – as well as micronutrients like boron, iron or zinc separately from that of nitrogen, with micronutrients being particularly important among higher-value and vulnerable vegetable and fruit varieties and for plant health and quality. And then there is lime, which is frequently added to raise the pH value and thereby nutrient availability of the soil. All in all, mineral fertilisers are said to account for up to 60 per cent of modern production progress, usually in conjunction with modern plant varieties neces-

sary for higher take-up, use in the plant and concomitant changing plant health situation.

### Strong correlation between fertiliser and food prices

Given the considerable importance of mineral fertilisers, it is no surprise that the correlation between international fertiliser and food prices has historically been very marked. The current food price crisis, too, has a fertiliser component. Since mid-2020, i.e. already before the Ukraine war, fertiliser prices had risen strongly, showed another sharp increase at the beginning of the war, and now, in mid-May 2023, they are back at the pre-war level, but are two or three times higher than they were before 2020. It is difficult to express in numerical terms just how large the contribution of fertiliser prices to the rise in food prices and the hunger problem really is, for this relationship depends on a large number of factors which interact. The cost-benefit ratio of using fertiliser varies depending on the respective location, crop and level of fertilisation. The less is used, the higher the yield loss tends to be according to the law of diminishing yield increase. Furthermore, other relevant prices change too, especially that of energy, which plays an important role for the food prices in various forms for production, processing, warehousing and transportation of fertiliser and agricultural products. The joint correlation of global energy, fertiliser and food prices is very close.

Severe price fluctuations are very problematic for the farmers. After all, they have to pay for fertiliser in advance, at a stage when they do not know what the agricultural prices will be after harvest.



Photo: Jörg Böhling

### Smallholders likely to react particularly sensitive to high and variable fertiliser prices

In poor developing countries and among smallholders, the fertiliser price crisis is further aggravated by a number of factors. Even if the price relations are an incentive to produce more, the farmers can hardly afford the higher fertiliser costs with their own reserves, and even if they do have access to credit, it is very expensive. Moreover, for various reasons, smallholders are particularly risk-averse, and insurances and price-hedging are virtually non-existent in developing countries. So on average, smallholders will take fewer risks and are most likely to apply less fertiliser if prices rise. Since their use of fertiliser is usually very low (the African average, for example, is below 20 kg/ha, compared with the global average of approx. 140 kg/ha), their drops in yield accompanying diminishing fertiliser use are particularly high. This explains why, in May 2022, the President of the African Development Bank warned that fertiliser shortages could lead to a 20 per cent decline in food production on the continent.

In order to attempt an assessment of the current fertiliser crisis despite the issue's complexity as described above, a study which appeared in the specialist journal *NatureFood* is cited in the following which tried to isolate the effects of fertiliser costs and trade restrictions in a model calculation: "We show that, combined, agricultural inputs costs and food export restrictions could increase food costs by 60–100 per cent in 2023 from 2021 levels, potentially leading to undernourishment of 61–107 million people in 2023 and annual additional deaths of 416,000 to 1.01 million people if the associated dietary patterns are maintained. Furthermore, reduced land use intensification arising from higher input costs would lead to agricultural land expansion and associated carbon and biodiversity loss."

### The debate over mineral fertiliser

Individual governments and the international community have resorted to a wide range of measures to mitigate the current food crisis. Alone the World Bank announced in April 2022 "that it is making up to \$30 billion available over a period of 15 months, including \$12 billion in new projects". For this purpose, in addition to support from already existing funding lines, the International Monetary Fund (IMF) has set up a new "food shock window under the emergency financing instruments".



Herbicides, seeds and fertiliser on a market stand in Gaoua, Burkina Faso.

Photo: Jörg Böhling

However, the current crisis has also exacerbated already heated up debates over a transformation of agricultural production and even "the" (global) food system. This applies in particular to the role of external fertiliser. To critics, very high rates of fertiliser application are a synonym for ecologically non-sustainable "industrial" agriculture – linked with the eutrophication of water bodies, breaching of planetary boundaries, greenhouse gas emissions and the degradation of soil quality. To advocates of this type of agriculture, external fertiliser use is not only a key means of achieving high yields, but also serves to limit the degradation of cropland through soil mining and the expansion of cultivated land, thus contributing to preserving biodiversity outside such land.

While both views have good arguments, the scientific bottom line is that sustainable agricultural production requires the nutrients drawn from the soil with the harvest to be added to it again, whether naturally, via soil weathering, sediments and the atmosphere or by human action, with organic and/or mineral fertiliser. This equation contains many variables which vary from location to location, such as soil quality and the mobilisation of nutrients, external inputs from the atmosphere or from the natural environment via livestock keeping, nitrogen enrichment with legumes from crop farming or agroforestry, the degree of nutrient circularity on the farms, but also

losses through insoluble fixation in the soil, leaching and outgassing. The degree of marketing among the farms is also of considerable significance. The more produce leaves a farm and enters the market, the more the circularity on a farm is disturbed, and the earlier external nutrients have to be added to make up for net losses. However, for smallholders, market production is an essential element to overcome poverty and attain higher income enabling an acceptable quality of living. For example, yield in sub-Saharan Africa is usually at less than 20 to 30 per cent of the yield under good agricultural practice, and even with this low level of area productivity, the nutrient balance is usually negative (soil mining). Therefore, with the exception of very fertile and deep-reaching soils, as area productivity and the degree of marketing rise, the additional and external supply of nutrients becomes essential. However, just how strong this supply has to be and where the nutrients come from can make a big difference both for the sustainability of supplies from agriculture, and hence for local resilience, and for the costs and thus the competitiveness of farmers.

### Setting the course for a sustainable fertiliser strategy

For long-term sustainable agriculture, fertilising oriented on net nutrient withdrawal with

a minimum of losses is desirable, hand in hand with enhanced yields and labour productivity of smallholders. Achieving this requires the following measures:

**Redistributing fertiliser intensity and developing a (clean) fertiliser industry.** For nutrient withdrawal which cannot be supplied via the practices described in the following, synthetic (this is what nitrogen fertilisers industrially gained from atmospheric nitrogen are often called) and mineral (other fertilisers produced by mining natural soil resources and mixtures of these with synthetic nitrogen) fertilisers will continue to be needed. Whereas the output quantities are far too high in many industrialised countries and certain areas of emerging economies, they are generally too low in poor countries and among smallholders. A global redistribution of fertilising intensity from the Global North to the Global South is therefore needed. For more about what origin of synthetic nitrogen fertiliser is desirable, see below.

In order to reduce the greenhouse gas emissions of nitrogen fertilisers in particular, efforts can be made to develop a synthesis of green hydrogen in the long term, although the necessary methods are still significantly more expensive, even when taking the current gas prices into account.

However, not only the application but also the production of mineral fertiliser ought to be promoted in the Global South. The crisis has shown that dependence on a handful of supplier countries is too high. Now some endeavours are underway to establish an independent fertiliser industry in Africa and use local natural resources, in particular gas and raw phosphate.

**Raising energy efficiency.** With clever crop sequencing, choosing the right time for application and properly working the organic and inorganic fertilisers into the soil, nutrient losses can be reduced. One major hope is the introduction or improvement of precision agriculture – by precisely placing the fertiliser below the soil surface, in accordance with the respective supply needs of the plants. On large, mechanised farms, this can be achieved with high-tech, using satellite and computer steering of the machines, on small farms with manual application of the fertiliser during or after sowing. Coating or chemically and biologically modifying the fertilisers with the aim of delaying the dissemination of nutrients and improving uptake is to contribute to reducing losses and gaining efficiency.

Components of a sustainable fertiliser strategy			
What should be done in the	short term	medium term	long term
Eliminating trade barriers	[Red bar spanning all terms]		
Subsidies	[Red bar spanning all terms]		
Access to credit	[Red bar spanning all terms]		
Fertiliser efficiency, soil activation	[Red bar spanning all terms]		
Legumes	[Red bar spanning all terms]		
Precision agriculture	[Red bar spanning all terms]		
Fertigation	[Red bar spanning all terms]		
Natural gas-based local N production		[Red bar spanning medium and long terms]	
Green hydrogen-based N production		[Red bar spanning medium and long terms]	
Nutrient feedback, circular economy	[Red bar spanning all terms]		

Source: Author's own compilation.

**Improving soil quality.** To optimise the use of the nutrients in the soil and those added, activating soil life and raising soil organic matter are crucial. Some tropical soils completely absorb fertilisers without such additional measures, while in most other soils, this improves nutrient supply and storage. This can be achieved by temporally and/or spatially phasing the cultivation of different cultures, by crop-livestock integration, by adding biological substance (residual matters), etc. Lately, there has also been much experimenting with microbial activation of the soil and plant-soil interaction. However, many methods requiring larger amounts of organic matter require conversions in the farming systems and entail investments which are frequently anything but trivial. For larger farms, mechanised methods are a precondition. For small farms, manual methods are required which, however, have to consider peaks in labour input as well as the workload, for even the smallest farms experience labour bottlenecks at certain times. For methods incorporating livestock manure, corresponding stocks of animals and the feed supply are a precondition.

**Growing legumes.** The cultivation of legume crops is one particularly frequently mentioned form of substituting mineral fertiliser and improving soil life. In connection with bacteria, these crops can bind atmospheric nitrogen, and depending on the mode of cultivation, they also contribute valuable subsistence and cash crops as well as feed. However, legumes are

not always easy to integrate into farms. They are often susceptible to disease and difficult to store, and in the form of trees and shrubs, they soon compete with other crops for water, light and nutrients, while their green mass has to be worked into the fields or transported within the farm and marketing them creates competition with imported products, in particular soy. Looking far ahead, it is conceivable that nitrogen fixation in non-legumes will become possible via genetic engineering, which would facilitate adaptation but present challenges in terms of biosafety and authorisation.

**Fertigation.** In horticulture, combining irrigation with applying soluble fertiliser is a tried and tested method to effectively disseminate nutrients, although it also entails considerable investments as well as water abstraction and pollution. It will therefore tend to remain a (larger) niche solution.

**Developing the circular economy.** In the long term, efforts also have to be made to improve not only the nutrient cycles within farms but also to enable the return of nutrients which leave the farms when farm produce is marketed. This is by no means trivial, either, for there are numerous health/ hygiene, logistic/ economic, legal and psychological obstacles. For most of the nutrients are contained in the human faeces. These are enriched with harmful substances, stink, cause revulsion, are watery and are bulky to transport fresh. Ways have to be found to separate and enrich the

substances and manufacture accepted products. This can be accomplished at local level in the form of organic fertiliser, which can also bring back nitrogen and organic matter to the soils. Partly, high hurdles have to be cleared regarding possible health hazards, and one partial solution could be restricting application to non-food crops. Nutrient concentration has to be raised for longer transportation routes, e.g. via the biological or chemical extraction of individual nutrients. During the last few years, this has already been achieved on a technologically large scale in the case of phosphate, with developments here being driven by fears of this possibly being the first substance to become scarce at global level. Such fears have since dissipated, which is one reason why the methods are not yet economical.

### Developing financing systems, eliminating subsidies

As argued, the respective fertilising strategies which are sustainable in the long term have to be tailored to locational features and cannot be put into practice from one day to the next. Bundles of measures customised to individual farming systems still require a considerable amount of research and local adaptation in cooperation with the farmers themselves. For many measures, markets have to be tapped and supply chains established, which calls for close cooperation with the private sector. For fertilisers and new inputs as well as labour, farmers have to make major investments in the short term, and they have to do so for mechanisation and farm conversions in the long term as well. For this purpose, they require capital (loans) and, in order to safeguard themselves from risks, whenever possible, insurances, as well as saving options. Here, support is needed for making rural finance systems work better.

From an economic angle, longer-term, lasting subsidies should not be resorted to whenever possible, since they usually set the wrong incentives and create considerable costs and risks for the state budget. This is currently becoming apparent for the subsidies for mineral fertilisers, which were introduced in many countries in sub-Saharan Africa following the example set by Malawi in the early 2000s (also see the article on pages 24–26). There, sometimes as much as 20 per cent of the entire state budget has been spent on them. Given the currently high price levels, governments cannot maintain the subsidies, and even in normal times, they absorb so much money that hardly anything is left for research and investments addressing the above-mentioned and other chal-



A farmer in Kakamega County, Kenya, using the remains of fermentation from a small biogas plant as compost to improve soil quality.

Photo: Jörg Böhling

lenges in the agricultural sector. Furthermore, many of the subsidised fertilisers tend to benefit more wealthy farms via the black market because, owing to urgent liquidity problems, the poorest often sell them quickly. However, while long-term subsidies are unsustainable, in the current high price phase, short-term subsidies are appropriate to cope with the crisis as a transitional instrument.

The current crisis offers the opportunity to develop fertiliser strategies which focus on the long-term alternatives, and which, while driving up the non-sustainable subsidies where necessary in the short term, wind them down in the long term. Now it is up to the countries of sub-Saharan Africa to employ the means as efficiently and effectively as possible. They do not have the rich industrial nations' option to maintain costly subsidy strategies. The EU ought to support such local strategies rather than transferring its own problems with sustainability to the developing countries in an unreflected manner. The European Union's refusal to support a local fertiliser industry with reference to climate change while simultaneously seeking to secure energy and natural resources world-wide can only be perceived as hypocrisy in the Global South. After all, the respective countries and actors there have greenhouse gas emission levels which have so far been way below the global average, and

the reasons for their emissions are probably the most justified ones globally. Saloni Shah notes in the journal *Foreign Policy* that "Even former United Nations climate envoy Mary Robinson has come around to the idea that African countries should take advantage of their natural gas reserves to meet their energy needs."

The effort to establish long-term fertiliser strategies may be cumbersome and challenging but is certainly worthwhile. In relation to the economy as a whole or to employment, the agricultural sectors are significantly more important for poor countries than the industry sectors are for rich countries.

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Today, a handful of corporations dominate world trade in agricultural commodities.

Photo: Jeff Whyte/ adobestock.com

## Corporate power is growing in the industrial food chain

In their report “Food Barons 2022”, the ETC Group exposes how few corporations have come to control the industrial food chain over the last century and proposes recommendations for fighting their growing power and negative impacts on communities, workers, public health and the environment. Some of the findings are presented in this article.

**By Kavya Chowdhry**

Over the last four decades, we have witnessed a pervasive and alarming trend: an ever-shrinking number of companies in the industrial agriculture and food chain are competing for market share. Those that remain, the Food Barons, have ballooned to control ever-larger swaths of global food and related sectors. In its most recent flagship state-of-concentration report, the ETC Group highlighted the current situation. Today, two companies control 40 per cent of the commercial seeds sector. Twenty-five years ago, we raised red flags when 10 companies controlled the same share! Just four companies hold 62 per cent of the agrochemicals sector, while six companies account for half of the global farm machinery market and four firms control more than 60 per cent of the global animal pharmaceutical market. The ten biggest global food and agriculture commodity traders piled up more than one-half trillion dollars in 2020 revenues.

In decades past, industrial agriculture was overwhelmingly dominated by corporations

based in North America and Europe, and focused primarily on meeting market demand in those regions. Today, corporate players in the Global South, especially China, Brazil and India, are reorienting the industrial food chain, while adopting the same extractive model as their Northern counterparts. The pace and scale of China’s hyper-industrialising agrifood system is without precedent. China’s Food Barons are catering to colossal domestic as well as global markets. The Syngenta Group (state-owned via Sinochem and Chemchina) is now the world’s largest agrochemical input firm (seeds, pesticides, fertilisers), and China’s newly consolidated COFCO is second only to Cargill as the world’s largest agriculture commodity trader.

### **The consequences of fewer companies pulling the strings**

When a handful of companies – no matter where they are in the world – are allowed to

dominate, amidst soft regulatory oversight, they can and will use their market power to squeeze out competitors, raise prices, hijack the R&D agenda and monopolise technologies. The fertiliser industry – dominated by a handful of giant firms: Yara, Nutrien and Mosaic, among others – demonstrates the consequences of unchecked power on global food price. In 2021, prices of some synthetic fertilisers rose to their highest level since the food-price crisis of 2008, hurting farmers and causing food prices to skyrocket. Energy prices and fertiliser prices are inextricably linked. High prices for coal contribute to a rise in the price of urea, for example. In China, where coal feeds nitrogen production for fertiliser manufacture – as opposed to natural gas, as in other regions – the government curbed fertiliser exports to tackle surging raw material costs and to address domestic food security concerns. Russia followed suit. The high cost of fertilisers forced many farmers in the Global South who rely on imports to cut back on application or reduce the sowing area. Some

farmers opted to grow crops requiring less fertiliser, while others explored alternatives to chemical fertilisers. In 2021, acute shortages of fertilisers caused long queues, protests and even deaths in some towns in India, for example, while the government announced record subsidies to counteract exorbitant input costs.

While companies cited supply chain concerns, Russia's war in Ukraine and higher raw material prices as reasons for downstream price increases, few flagged lack of competition as another factor. *The Financial Times*, however, noted in 2022: "Fertiliser expenses have increased far beyond the levels that agricultural simulation models would have predicted. Farmers say price gouging is part of the problem. Nutrien, for example, reported a 51 per cent increase in the cost of goods for nitrogen production (a key fertiliser input) in the third quarter of 2021, while gross manufacturing margins were up 680 per cent over the same period. The company declined to comment."

When the US's Department of Agriculture invited comments on corporate concentration in the fertiliser industry, 87 per cent of the commentators described price increases, 62 per cent referred to a link between increased prices and price-setting by manufacturers, and 72 per cent cited an "asymmetric fertiliser industry power dynamic" – in other words, many commentators felt they were being held hostage with no options. Corporate concentration's role in food price hikes is not unprecedented, of course. Researchers previously established causal links between fertiliser cartels and the 2008 food price crisis.

As food insecurity spiked through 2022, agro-industry giants reported record-breaking profits. In March 2023, Syngenta posted sales of 33.4 billion US dollars, a growth of 5.2 billion USD, and up 19 per cent from the prior year. The company disclaimed that higher prices were "necessary to offset elevated raw material and other costs." Corteva raised its 2023 yearly outlook as its quarterly sales exceeded expectations – due, at least in part, to higher prices. Bayer also reported that price increases in some cases "more than offset" a decrease in acreages and low license revenues.

The impact of concentration is not restricted to rising prices. Concentration also leads to straitjacketed, profit-driven research and development agendas (as can be seen in companies' sustained focus on genetic engineering and the agrochemical glyphosate and, now, on digital platforms). Companies can have a monopoly on technologies (evident today in

Corteva's patent grab on CRISPR, a genetic engineering technology widely used in agricultural product development). And they can maximise their own profits while continuing to quash competition and extract value from farmers and consumers – causing erosion of seed diversity, crop uniformity, increased farmer indebtedness, water and soil pollution and deforestation, and contributing immensely to carbon emissions.

As the world was faced with a pandemic, an energy crisis and war, commodity traders like Cargill posted record profits owing to what the business information company Bloomberg mentions commodity traders "crave", that is, market volatility. In 2021, Cargill posted the biggest profits in its 156-year history – up 64 per cent. The optics of record-breaking profits amid global chaos may be one reason that privately-owned Cargill discreetly announced in 2020 that it would stop making its financial results public.

To rein in the unchecked market power of bloated Food Barons, a number of national governments have proposed antitrust investigations and policies, although their modest efforts will likely prove to be too little too late given the deeply entrenched 'asymmetric power dynamic'. In 2021, US President Joe Biden's executive order highlighted concentration in meat packing industries in the USA, followed by a similar focus on the seed and fertiliser industries. It also announced funding for newer players to enter these markets. Anti-competition regulators must develop new mechanisms to understand and restrict the cross-industrial food chain powers and require much greater transparency, including among data giants, asset management firms, private equity and other corporate actors that are increasingly active – in ways not always obvious – in the industrial food and agriculture sector. The UN, especially its Conference on Trade and Development (UNCTAD), should revise the outdated international norms and model laws on competition to take into account the twisted ways in which anti-competitive practices are now pervasive not just by big food and agriculture companies but by the big technology corporations, private equity firms and asset management firms in industrial food and agriculture.

### **The alternative to a corporate-controlled industrial food system: the peasant food web**

It is urgent to recognise the vital importance of non-industrial food systems in this time of

food, health and environmental crises. The companies of the industrial food chain – and every one of its links – view food through the lens of financial profit. The alternative to the industrial food chain has existed long before corporations were created: it is the peasant food web which includes small-scale producers, usually family- or women-led, that comprise farmers, livestock-keepers, pastoralists, hunters, gatherers, fishers and urban and peri-urban producers who feed at least 70 per cent of the world. The web includes not only those who control their own production resources, but also agricultural workers who produce and supply food, and who have often been marginalised and dispossessed of their land.

Food Barons are not feeding the world, and it is not in their interest to do so. Rather, they are damaging the environment, public health and people who provide labour for their businesses. Even World Bank economists acknowledge that the industrial global food system's eight trillion USD value is largely cancelled out by its negative externalities – costs that are conservatively estimated, by them, at over six trillion USD (including the costs associated with malnutrition, food loss and waste, insufficient food safety, environmental degradation and greenhouse gas emissions).

In contrast, feeding people is the core concern of the peasant food web and food movements. La Vía Campesina, the biggest organisation of peasants, landless workers, indigenous people, pastoralists, fishers, migrant farmworkers, small and medium-size farmers, rural women and peasant youth from around the world, sets a very clear path to be able to feed the world and rebuild the planet: food sovereignty and agroecology. Proposals from the grassroots aim to put farmers, growers, fishers, hunters and consumers back at the heart of the food system and undo the power usurped by Food Barons. Establishing new movements and civil society-led technology assessment spaces is also emerging as a cross-movement demand to ensure that the introduction of new technologies in the food systems will advance peoples' rights over corporate interests.

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## Global fertiliser price volatility – approaches to reduce vulnerability among countries in the Global South

Using Malawi and its agricultural subsidy programme as a case study, our authors demonstrate how global fertiliser price rises can affect domestic fertiliser prices. They also propose strategies countries can consider to lessen their vulnerability and the burden price rises pose on farm household food security and the stability of national economies.\*

By **Christone Nyondo, Zephaniah B. Nyirenda, William J. Burke and Milu Muyanga**

At the beginning of the 2021/22 agricultural season, in August, the retail prices for NPK (nitrogen, phosphorous, potassium) and urea fertilisers in Malawi were 60–70 per cent higher than in the preceding two and half years. Expert analysis of these price increases revealed that the primary drivers were undoubtedly directly associated with changes in the world market fertiliser price. Just to give an example, our analysis showed that roughly 90 per cent of the movement in the retail fertiliser price of urea in the domestic market was directly linked to the changes in the world market price, transit costs, and exchange rate movements. Only 10 per cent of the domestic retail urea price was directly associated with internal factors, such as supplier margins and distribution costs. So since external factors are more important than internal factors in driving domestic fertiliser price volatility, they will continue having devastating effects on Malawian households and the economy as a whole, unless alternative strategies are implemented to mitigate these effects.

The vast majority of countries in the Global South are agro-based. However, they depend on the global market for their supplies of fertilisers and other important production inputs because they have not yet developed the local capacity to produce these inputs. In the Malawian context, the agriculture sector accounts for roughly 28–30 per cent of the overall national economy. Smallholders constitute around 85 per cent of the farming community. As would be expected, roughly 70 per cent of the fertiliser supplied to Malawi via imports is directly consumed by these small-scale farmers – through the agricultural input subsidy programme.

### Malawi's agricultural subsidy programme

The agricultural subsidy programme has historically been a central feature of Malawi's agricultural development programming. From time immemorial, the government has con-



Access to fertilisers for small-scale farmers has been supported by the Government of Malawi for decades.

Photo: Jörg Böhling

sistently incorporated different forms of this programme in its agricultural development plans to facilitate smallholder farmers' access to productive inputs, such as seed and inorganic fertilisers. Historically, the programme has primarily targeted resource-poor smallholder farming households with inputs for maize production to improve their household food security. In the 2005/06 agricultural season, the Government of Malawi introduced a second-generation, rationed and more targeted partial subsidy programme (the Agricultural Inputs Subsidy Program [AISP], and later the Farm Inputs Subsidy Program [FISP]) to provide seed and fertiliser for roughly 0.4 hectares of land per farmer. The programme provided access to 100 kilograms of fertiliser (50 kg NPK and 50 kg urea), 5 kg of hybrid maize seed or 7

kg of Open Pollinated Variety (OPV) of maize seed, and 3 kg of either groundnut, soya beans, pigeon peas, cowpeas or sugar beans seed at subsidised prices. NPK fertiliser is applied as a basal dressing fertiliser, after the germination of maize seed. Urea is applied approximately six weeks after the application of NPK to supply a higher rate of nitrogen (46 % N), when the maize starts maturing, to facilitate the process of turning N into maize grain. Tobacco, a key cash crop for Malawi, was also part of the programme during its maiden days. Tobacco was subsequently dropped to allow the programme to exclusively concentrate on household food and nutrition security objectives.

The FISP beneficiaries were identified through local government structures. The lo-



cal chiefs were given the authority to identify and recommend the beneficiaries to the central government through village forums. The local chiefs were backstopped by frontline agricultural extension officers in this process. The inputs were then administered to the identified beneficiaries through a paper-based voucher system. This system defined, allotted and controlled access to entitlement. Consistent with the main elements of the programme, the vouchers came in three types: fertiliser, maize seed and Flexi (for redeeming legume seed) coupons. For the fertiliser component of the programme, the subsidy rate roughly ranged between 60 and 90 per cent of the commercial price of a 50 kg bag of fertiliser. The household head was the only member of a particular household eligible for participation in the programme. However, evidence suggests that from time to time, some households had more than one beneficiary.

In many respects, the introduction of a more targeted FISP was a major policy shift for the government, especially when preceding programmes aiming at facilitating smallholder farmers' access to productive inputs are put into perspective. For example, between 1971 and 1994, during the one-party state, the government made available subsidised inputs for maize production to the population of smallholder farmers through farmer clubs. After the introduction of multiparty democracy in 1994, the government moved away from a universal subsidy programme and started the "inputs for work" programme, where farmers offered their labour in return for an in-kind payment with farm inputs. Later, however, the government introduced "free or labour-based inputs distribution" programmes, such as the "Starter Pack" and "Targeted Inputs Program" (TIP) where farmers were provided farm inputs free of charge or in exchange for labour. Through the Starter Pack programme, the government distributed over three million input packs for maize and grain legumes production for roughly 0.1 hectares of land per farmer. The Starter Pack was a universal programme because it distributed enough packs to cover the population of smallholder farmers. The TIP was a scaled-down "Starter Pack" targeted at the poorest smallholder farmers with the same type and quantity of inputs. However, the Starter Pack and the TIP cannot necessarily be regarded as subsidy programmes because they either provided inputs for free or in exchange for labour. They are presented here to highlight the significant policy shifts that took place prior to the introduction of the FISP in 2005.



Applying alternative soil management interventions such as compost ought to be supported to lessen dependence of farmers on the global market of mineral fertilisers.

Photo: Jörg Böhling

During the 2020/21 agricultural season, another policy shift took place after the election of a new national government which introduced the Affordable Inputs Programme (AIP) to replace the FISP. The AIP scaled down the scope of inputs in the programme but expanded farmer coverage. It currently exclusively focuses on providing inputs for maize production (i.e. inorganic fertilisers and improved seed), sorghum and rice, and goats to a limited extent. The AIP expanded farmer coverage to the population of smallholder farmers (3.7 million) in its maiden year before scaling down to 2.5 million farmers in the ensuing years. The FISP targeted between 0.9 and 1.6 million smallholder farmer households across the 2005 to 2020 period. The other difference between the AIP and the FISP is that access to inputs in the AIP is controlled using a biometric identification system built around national identity cards (IDs). The voucher-based identification system that dominated during the FISP period was replaced by the biometric identification system after noting that the former had effectively failed to eliminate the diversion and leakage of inputs to secondary markets. This background clearly demonstrates how, to a large extent, small-scale farmers in Malawi will continue relying on government subsidies to access inputs. It also shows how any factor that disrupts these supplies, be it e.g. surging fertiliser prices or scarcity of fertilisers, disrupts the ability of small-scale producers to access fertilisers and erodes their potential to contribute to the sector and their food security situation.

### Drivers of global fertiliser price surges

One of the principal drivers of the global fertiliser price surges in 2021, which also had a direct bearing on the domestic retail fertiliser prices in Malawi, was the global rise in food prices. These rises were attributed to several factors, including the rebounding of the global economy to the negative effects of the Covid-19 pandemic, poor grain harvests in South America due to weather and Covid-19-related shocks, and the weakening of the US dollar against major currencies that stimulated the demand for maize and soybeans. The effect of these price rises on fertiliser prices demonstrates the inherent linkages and reverse causality that exist between input and output prices. A global sharp rise in maize and soybean prices in 2021 incentivised producers, especially in the major producing regions of the world, to produce more of the two commodities, thereby inducing greater demand for fertilisers.

These shifts in fertiliser demand inevitably led to fertiliser price spikes since fertiliser prices could not adjust at the same pace as price rises because of relatively longer time lags that are typically required to accommodate production capacity adjustments. Obviously, the extent to which these global fertiliser price spikes affected countries in the Global South depended on their individual level of reliance on global fertiliser supplies. The other important driver was the unexpected rise in the prices of raw materials for manufacturing fertilisers, due to supply

shortfalls, and rising energy costs, especially for oil and gas prices. For example, crude Brent oil prices rose up to 59 per cent year-on-year in August 2021. Gas prices also rose to an all-time high due to an unusually cold winter in Europe. These energy price rises aggravated the production costs of nitrogen fertilisers, for fertiliser manufacturing countries, and the landing costs for net importing countries, such as Malawi.

### How can the countries of the Global South become more independent?

Obviously, the precarious fertiliser price situation that countries in the Global South were in since the beginning of the agricultural season in 2021 was deepened by the onset of the Russia-Ukraine war in February 2022. However, to a certain extent, the level of exposure to this compounded shock depended on the level of exposure of individual countries to world market fertiliser supplies (and possibly to the level of land-lockedness). As already alluded to, the vast majority of countries in the Global South were naturally pre-disposed to these shocks because they are net importers of fertilisers. Moreover, the fact remains that every year these countries have to import large quantities of fertilisers, mostly from the world market, to feed their fertiliser-intensive agro-based economies. Unfortunately, the primary drivers of fertiliser price surges in their domestic markets are outside their direct control. Hence, they have to bear the full consequences of these shocks in the absence of alternative interventions.

Having said that, these countries can implement several short-, medium- and long-term strategies to reduce their vulnerability to global price surges and improve nutrient use efficiency of the fertilisers that are accessible to them. In the short to medium term, they could consider encouraging farmers to progressively improve inorganic fertiliser use efficiency by promoting cost-effective complementary interventions that holistically address soil fertility, soil health, and soil and water conservation issues. This is particularly important for countries such as Malawi that are experiencing falling crop response rates to fertiliser due to poor soil biology (e.g. low soil carbon), poor soil chemistry (e.g. uncondusive soil pH), poor soil physics (e.g. sandy soils), and poor farm management practices. Estimates by soil scientists suggest that these poor soil properties have led to Malawian smallholder farmers to be only getting roughly 6 kg of maize grain per 1 kg of nitrogen, on average, relative to the regional benchmarks of 35–37 kg maize/kg N because they inhibit the ability of maize plants to con-

vert N (a key constraint in Malawian soils) into maize grain. Therefore, integrating alternative soil fertility management interventions that increase soil carbon in particular, reduce soil erosion and improve soil fertility in general, can significantly improve crop response rates to N. Examples of such interventions include the integration of organic fertilisers, livestock manure and/or compost into inorganic fertiliser production systems, the promotion of conservation agriculture practices, maize-legumes models and crop-livestock models, among others, to organically improve soil fertility. In the just ending 2022/23 agricultural season, we have already observed an increasing proportion of farmers integrating organic fertilisers, livestock manure and compost into their farming systems because of their inability to economically access adequate quantities of inorganic fertilisers owing to surging prices.

However, we believe the most cost-effective way is for farmers not to integrate these alternative fertilisation practices as substitutes for inorganic fertilisers but to use them to complement the inorganic fertiliser they are able to access. This is because most of these alternatives are habitually low in N concentration. Authorities should take advantage of farmers' willingness to reduce their dependence on inorganic fertilisers by swiftly moving in to promote this integration. Secondly, more investment should be put into agricultural research and extension services to strengthen extension support, and research into complementary fertilisation options as one way of improving the productivity of land, labour, and other agricultural inputs. Much research will be required to create and standardise such complementary fertilisation options to ensure that farmers are not given a raw deal by, for example, producers of organic fertilisers. Also, farmers will need considerable support from extension services to apply those alternatives correctly. Third, the government should consider designing a more streamlined and flexible subsidy programme that tailors its support to the different farmer and ecological needs. This approach has already been piloted in Zambia, where farmers were given the flexibility to access the inputs they need for their crop and/or livestock enterprises. The pilot proved to be more cost-effective and efficient in addressing farmers' needs.

In the long run, the government should consider incentivising the domestic production (and blending) of the area- and crop-specific fertilisers, especially for fertilisers that can be produced locally (e.g. NPK fertilisers) to address the critical nutritional needs of crops. Because of agro-ecological differences and spatial varia-

tions in the quality of soils for crop production, the government, through its National Fertilizer Policy of 2021, is promoting the production and blending of area- and crop-specific fertilisers to address the nutritional needs of various crops and agro-ecological zones. However, what remains is to fully incentivise the private sector to be able to actively play this role. Moreover, it would not be sensible for Malawi to produce certain types of fertilisers (e.g. urea) locally because it does not have a comparative advantage. Thus, for fertilisers where it will not be cost-effective for domestic production, Malawi should consider entering into a joint venture with more efficient countries or pushing for a regional project, where such an approach makes sense, to manufacture and distribute the fertiliser regionally. This would increase the economies of scale for fertiliser manufacturers participating in such ventures.

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*\* The article is based on a policy brief that MwAPATA Institute published in 2021 in response to the sudden and unexpected global surge in fertiliser prices.*

# The African Continental Free Trade Area – can the milestone live up to its promise?

The African Continental Free Trade Area is expected to significantly stimulate intra-African trade, increase income and food security, and to reduce the continent's external dependency. However, its success needs to be proven. In addition to comprehensive investments in infrastructure and trade facilitation, this above all requires improved policy coordination.

By Lukas Kornher, Mengistu Wassie and Joachim von Braun

The African Continental Free Trade Area (AfCFTA) agreement was signed during an Extraordinary Session of the African Union in March 2018 by representatives of 44 out of 55 member countries of the AU. With Nigeria, Africa's largest economy, signing the agreement in July 2019, 54 countries are now backing the declaration, leaving Eritrea the only African country outside of AfCFTA. Once in operation, the AfCFTA will offer a market worth 3 trillion US dollars (in terms of aggregate Gross Domestic Product, GDP) and could potentially cover all 55 countries, making it the largest free-trade area in the world in terms of the number of countries involved. The AfCFTA is a crucial component of the AU's 2063 agenda for the inclusive and sustainable development of Africa. The overarching agreement includes protocols on handling tariffs, non-tariff barriers, rules of origin, intellectual property rights, and dispute settlement.



Guards stand at alert to protect border entrance into the Republic of Guinea.

Photo: Edwin Remsberg/ Redux/ laif

## The current status of AfCFTA

Since January 2021, the AfCFTA agreement is formally effective, but de facto not implemented. Despite the agreement having entered into operation, trade under the AfCFTA has not started until recently. However, different initiatives have been prepared, such as the Guided Trade Initiative (GTI) by a group of eight countries, including Egypt, Ghana, Cameroon, Kenya, Mauritius, Rwanda, Tanzania and Tunisia in October 2022. Under the GTI, 96 products, including agricultural commodities like tea, coffee, processed meat products, corn starch, sugar, pasta, glucose syrup and dried fruits, have been earmarked to trade with AfCFTA rules. These products are not necessarily tax-free. The AfCFTA rules require members to liberalise 90 per cent of their goods until 2030 and another 7 per cent, comprising so-called sensitive products, by 2035. Countries are allowed to choose to tax the remaining 3 per cent of all goods. The launch of the Pan-African Payments and Settlements System (PAPSS) in January 2022 was also an important step to facilitate financial integra-

tion across African regions and enable smooth cross-currency transactions for trading businesses. However, the real test for the success of the AfCFTA is still pending.

The Covid-19 pandemic has largely disrupted Africa's development trajectory and the successful start of the AfCFTA. Lockdowns and other containment policies had severe economic impacts. Africa's GDP dropped by 1.6 per cent in 2020, investment and created jobs shrank by more than 50 per cent, and African exports fell by 5 per cent in February 2020, 16 per cent in March 2020 and 32 per cent in April 2020. This has consequences for the continent's micro, small and medium-sized enterprises and their ambitions to invest in regional trade. Coming at the time of Africa's recovery struggle, the outbreak of the Ukraine war caused gas prices to rise beyond 100 US dollars (USD), the highest since 2014. These problems are pushing Africa into debt distress and exacerbating the multidimensional poverty and inequality of the region by making food and fuel more expensive, thus constraining indirectly and overall the sus-

tainable development and transformation of Africa.

## What benefits to expect from AfCFTA trade liberalisation?

According to the rules of economic theory, the benefits of trade liberalisation are mainly built on the reallocation of production factors (e.g. labour, agricultural inputs) from inefficient to efficient producers. This leads to product specialisation and economies of scale in production. The exposure to regional or international competition for firms results in an adjustment towards optimal firm size and pushes inefficient firms out of the market. In turn, these adjustments create improved access to cheaper products and to more variety. In AfCFTA's case, this would mean that African consumers and exporting countries benefit at the expense of importing countries. In addition, as an indirect effect, regional integration can stimulate investment in improved technologies, cross-border value chains, R&D and related industries, which then triggers regional

production hubs and creates spill-overs along entire value chains. The integration into regional and global value chains opens access to knowledge, capital and improved and efficient inputs, which enable accelerated, across-the-board structural transformation. Industrialisation of value chains creates low- and high-skilled employment opportunities and contributes to income growth.

Intra-African trade has accounted for a maximum of 16 per cent of total trade in the past, without accounting for informal trade (see lower Figure). Studies by international organisations project that the AfCFTA could boost intra-African trade by between 30 and 80 per cent, leading to economic income gains of about 7 per cent. AfCFTA-related income gains are not distributed equally across sectors and countries, but according to a study by the World Bank, they have the potential to increase income of close to 100 million people and to pull 30 million people in Africa out of extreme poverty by 2035. Intra-African trade liberalisation and increased intra-African trade is expected to go along with sectoral reallocation of labour out of agriculture into the public sector, services and manufacturing. Overall, welfare gains from the agricultural sector are expected to be stronger than from manufacturing owing to moderate demand for intra-Africa trade in manufacturing products and higher existing trade barriers in the agricultural sector. The sectoral gains differ across countries and always benefit those employed in the exporting sector. Manufacturing and service exports from North Africa are expected to increase, resulting in a higher demand for skilled workers in these sectors. This could increase inequality. Overall employment of unskilled labour is projected to increase in the rest of Africa.

### The key role of the agricultural sector

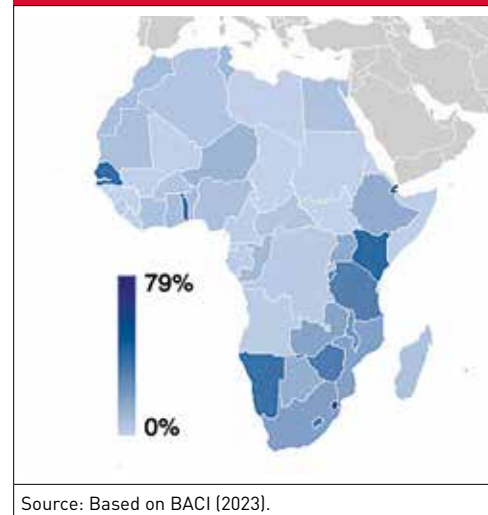
The agricultural sector accounts for only 15 per cent of continental GDP, but more than

60 per cent of continental employment, and therefore has a key role in Africa's economic development. However, intra-African agricultural trade is still as low as 20 per cent of total African trade, although higher than the share of intra-African total trade. The overall African food import bill – the value of food imports from outside of Africa – could increase to 110 billion USD by 2025 without the implementation of the AfCFTA. Currently, the product structure of African exports is not diversified, and is skewed towards unprocessed commodities. Extra-African agricultural exports are mainly unprocessed and largely consist of only few raw commodities (cocoa, coffee, cotton and tea), while extra-African agricultural imports are often processed and higher-value products. These patterns contribute to Africa's structural food deficit.

Given Africa's vast agricultural potential related to its favourable climatic conditions, low land prices and a large agricultural labour force, it has long been debated how Africa has only become a food importer since the 1980s. While self-sufficiency in all food commodities is not desirable due to environmental issues and resource availability, Africa's large structural deficit in staple food production is concerning. According to the UN Food and Agricultural Organization (FAO), the level of food import dependency is very different across African economies and different food products within the same country. On average, import dependency is highest among cereal products at more than 40 per cent and animal-based products, such as dairy and meat, at around 20 per cent. Generally, West, Central and North African countries are more import-dependent, particularly regarding cereals and dairy products. Africa's external import dependency exacerbates vulnerability to global shocks, such as that from the Ukraine war.

However, despite low average agricultural productivity across the continent, the agricultural sector in many African countries has a

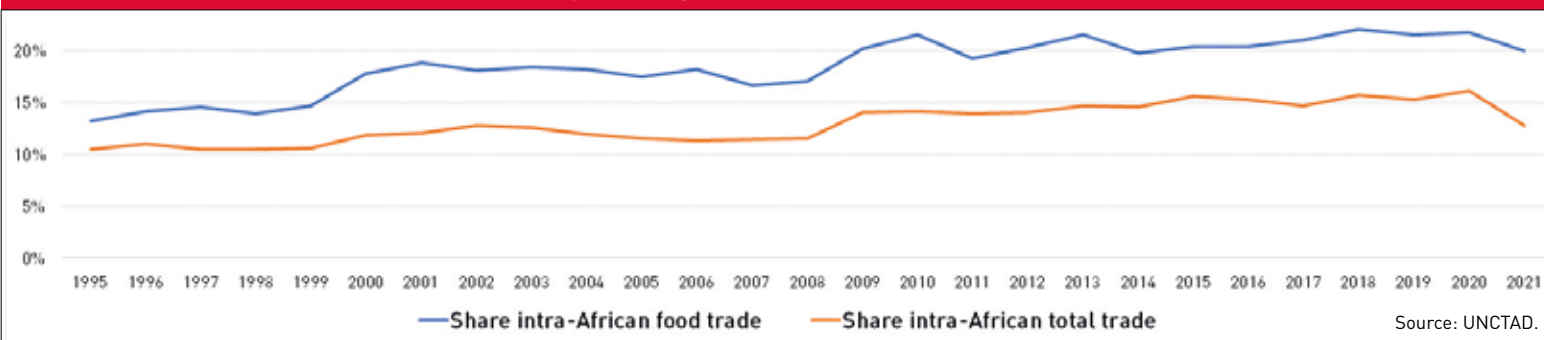
### Share of intra-African trade by country



large export potential. This derives not from a country's potential per se but from that of individual exporting firms, such that high average competitiveness is not a necessary condition for exports. In line with this consideration, it has been observed that African global competitiveness has increased in recent years and is particularly concentrated in oilseed and legume products. Besides, the intra-African trade of processed products shows a promising upward trend. Hence, trade integration could support greater production of high-value-added products and the emergence of regional agricultural value chains within Africa. The inclusion of the agricultural sector in agrifood chains represents an important opportunity to increase rural income, lower rural poverty and foster pro-poor growth. For instance, food processing plants need several inputs including semi-processed goods like flour.

The AfCFTA, as a continent-wide free trade area, expands tax-free market access for competitive African producers beyond the existing regional economic community (REC) level, which is important given the anticipated rapid growth rates of Africa's population and

### Intra-African food and total trade over time as percentage of overall African trade (1995–2021)



food needs. In times of global trade liberalisation and Africa's enhancing international trade integration, through Economic Partnership Agreements (EPAs), the African Growth and Opportunity Act (AGOA) and several bilateral trade agreements of African economies with India and China, there is the need to create a level playing field for producers on the continent. While intra-African import tariffs are generally already low, agricultural trade is often more restricted. In addition, non-tariff measures (NTMs) increase the transaction cost of trade, particularly agricultural trade. Despite significant improvements in reducing the costs related to NTMs in agricultural trade, they remain more prevalent than in the manufacturing products trade.

### The effects on food security

African food demand is projected to increase by 60 per cent by 2030. The Comprehensive Africa Agriculture Development Programme (CAADP) stipulates higher budget allocations for the agriculture sector and a target of 6 per cent productivity growth. The AfCFTA could potentially reverse this trend by promoting regional integration and trade in agricultural products. Studies predict an increase in intra-African agrifood trade by around 20–30 per cent until 2035. On top of that, extra-African agrifood exports could also increase by about 3.5 per cent. Among the different sectors, gains are expected to be particularly strong for sugar and dairy products.

However, Africa's food security remains of great concern. More than 20 per cent of Africans are food insecure, and about 40 per cent of their children are stunted. According to the *2022 Global Report on Food Crises*, over 140 million people in Africa are in acute food insecurity exacerbated by the Covid-19 pandemic and the Ukraine war. AfCFTA could have positive effects on the continent's food security situation in several ways. First, trade integration is projected to improve the accessibility of food by reducing prices and increasing incomes. This could lower the number of food insecure people in Africa by one million, which could be reinforced by long-term indirect effects. There is also ample evidence suggesting that regional integration in Africa can create economic growth, employment and purchasing power. Second, regional trade integration increases the availability of food. Preferential trade agreements lead to additional trade between the partners of the trade agreement but also reduce the partners' trade with other countries. In Africa, the experience

from past agreements shows consistent overall increases in trade and food availability. Among the RECs, the strongest impact between 1990 and 2012 was found for the Southern African Development Community (SADC) and the Common Market for Eastern and Southern Africa (COMESA), for which food trade doubled through regional integration. Food trade has not increased through the implementation of ECOWAS, however, the reduction of non-tariff barriers has created production incentives in ECOWAS, leading to higher food supply, thus underlining the importance of trade facilitation. Overall, a country's food export value is 3 to 5 per cent higher if exporting and importing countries are both in the same REC.

Third, intra-African trade and regional supply chains supported by regional coordination under AfCFTA have the potential to build and meet local demands. Integrated regional value chains, which enhance forward and backward linkages, can reduce Africa's external dependence and its vulnerability to international shocks, such as the Covid-19 pandemic or the Ukraine war. For instance, intra-African trade can quickly compensate for reduced international imports only if established regional supply chains exist. Our research has shown that production shocks among neighbouring countries are surprisingly uncorrelated in Africa, and therefore can make the grounds for regional trade as a buffer. Hence, regional trade is likely to have positive effects on several food security dimensions.

### Notes of caution and prerequisites for the successful implementation of AfCFTA

It has to be borne in mind that the level of existing differences in the level of development, the economic and political fragmentation, regional value chains and comparative advantages among African countries may cause unevenly distributed gains of intra-African trade liberalisation. This calls for economic policies that can compensate the population employed in importing sectors and also for increasing the population's acceptance of the AfCFTA. According to the *2022 Afrobarometer*, trade liberalisation is looked at critically by 40–45 per cent of the African population, while the large majority welcome Pan-Africanism. However, the expected gains of the AfCFTA are built on clay feet. Most expected gains originate from a reduction in non-tariff measures and not from trade liberalisation. This requires significant investments in national and regional infrastruc-

ture and trade facilitation. The harmonisation of quality standards and sanitary and phytosanitary standards is a necessary requirement to facilitate trade. In addition, UNCTAD's *Economic Development in Africa Report 2019* sees the proper set-up of the rules in the original protocol as the game changer for Africa's industrialisation. All this requires a strong regulatory framework. Currently, the AfCFTA regulations regarding extra-African trade remain vague.

The AfCFTA proposal talks about a free-trade area but not about a common external tariff. Furthermore, only 90 per cent of the total trade shall be liberalised. Without a common external tariff, tariff differentiation could lead to tax competition between governments and open the door for cross-border smuggling between neighbouring countries applying different tax rates. Therefore, regional trade policy without regional coordination of industrial policies could increase protectionism instead of promoting trade integration. An exclusion list, similar to the list of development goods in ECOWAS (see pages 30–31), allows countries to protect local producers of goods which could otherwise be imported from the region. In such a case, the market size argument for small countries disappears. As a consequence of external trade agreements, countries could eventually support and protect producers of the same goods as their trading partners, as the examples of cement and poultry from West Africa show. Therefore, regional industrial policy coordination is required to exploit the benefits of the AfCFTA.

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# Tapping intra-regional agricultural trade potentials in West Africa

Enhancing agricultural trade within the Economic Community of West African States (ECOWAS) is essential to increase resilience to shocks and build a more food-secure West Africa. Although the ECOWAS Commission has introduced policies aimed at promoting intra-regional trade, their implementation in member states remains challenging.

By Kristina Mensah, Jonas Wittern and Arne Schuffenhauer

In the context of multiple crises, including the Covid-19 pandemic, political conflicts and wars, climate change, and environmental degradation, agrifood trade has become even more important. By moving food from surplus to deficit regions, trade provides an essential tool to offset crop failures – thereby improving food access, affordability and availability. Part of the resilience of agrifood systems depends on how different farming systems and zones are used to buffer shocks – which appear to be rising in frequency. Beyond these sector-related benefits, trade and regional integration have historically often been accompanied by the establishment of more stable political and economic systems.

## Food price inflation and food security in West Africa

While global food prices have fallen somewhat from their peak in spring 2022, West African countries have not seen this trend mirrored within their domestic markets. In Ghana and Nigeria, for example, the year-on-year domestic food inflation rates stand at 48.7 and 24.6 per cent respectively. Even prior to these price surges, food expenditures already accounted for on average 50 per cent of total household spending in West Africa. This, along with the Covid-19 pandemic that has left many consumers poorer, is further exacerbating the challenges faced in advancing towards the achievement of Sustainable Development Goal 2.

After a period of progress in terms of food security, West Africa has experienced setbacks since 2015. In 2021, an alarming 247.4 million people, representing 60 per cent of West Africa's population, have been affected by food insecurity, forcing them to compromise the quality or quantity of their food intake. At the same time, population growth is one of the fastest in the world. One reason for the deterioration in food security is unexploited agricultural production potentials and woefully insufficient investment in the agrifood sector. This results in import dependencies on staple foods and agricultural inputs, making the



The role of agricultural trade for food security has been widely recognised in the ECOWAS region.

Photo: Fabian Pflume/ GIZ

region vulnerable to shortfalls in the world market and global market price fluctuations. Soaring fertiliser prices, driven by skyrocketing energy prices, have become unaffordable for many smallholders. With armed conflicts in the region and food prices projected to remain at historically elevated levels, food insecurity is destined to continue to increase.

## Potential gains from freer agricultural trade

The West African region offers a vast market that could foster economic growth and prosperity if regional trade barriers were removed and trade promoted and facilitated. Through freer intra-regional agricultural trade, producers could obtain higher prices for their produce, and boost their productivity and competitiveness – for example, by getting access to lower-cost production inputs. Among other

benefits, consumers could enjoy a greater variety of food at more affordable prices. In addition, the market size of individual ECOWAS member states is often insufficient to exploit economies of scale in agro-food processing – one important precondition for developing a competitive agro-processing industry. Conversely, the entire ECOWAS region covers a big market, thus facilitating processors' access to raw materials.

Despite the potential benefits of increased intra-regional agricultural trade, growing regional trade has been challenging because of structural issues such as inefficient institutions, poor infrastructure, inadequate financial markets, bureaucratic hurdles and politics. Ultimately, the implementation and enforcement of regional policies take place at the member state level and are driven by national and individual interests rather than regional commitments.

## At the crossroads to regional integration

The political ambition to strengthen trade relations among West African nations and to advance regional integration culminated in the establishment of ECOWAS in 1975. ECOWAS is Africa's oldest sub-regional bloc, comprises 15 countries, and is currently home to around 400 million people. With 66 per cent of all employment, the agri-food sector is the region's biggest employer. It represents a total monetary value of 260 billion US dollars (USD), that is 35 per cent of West Africa's Gross Domestic Product, and is projected to reach 460 billion USD in 2030.

Recorded intra-regional trade currently accounts for 12 per cent of total exports – compared to 59 per cent in Asia and 69 per cent in Europe – suggesting substantial room for improvement. However, case studies have shown that when unregistered trade volumes are included, intraregional trade is considerably higher than the official figures indicate. Why? Because trade costs in West Africa are overwhelmingly high. Existing agricultural trade policies between ECOWAS countries are not fully implemented, or if so, only in a non-transparent or incoherent manner. Non-tariff trade measures, dysfunctional customs transit procedures and poor logistical capacities result in long trade border controls and hold-ups, ultimately adding up to 30 per cent to the final consumer price. This is particularly relevant for perishable goods, such as fresh vegetables.

### Milestones on paper are not enough

The ECOWAS members agreed on adopting several regional policies aimed at fostering and facilitating food trade within the region. These are, among others, the ECOWAS Agricultural Policy (ECOWAP), the ECOWAS Trade Liberalisation Scheme (ETLS), the Common External Tariff (CET), and the Protocol on Free Movement of Persons and Border Security. While some progress has been made to overcome structural challenges in regional trade, such as road infrastructure projects like the Abidjan-Lagos corridor, implementation at the borders still poses several challenges: trade restrictions are imposed, the ETLS is insufficiently implemented, and non-tariff barriers and protocols such as phytosanitary standards remain unharmonised.

For effective implementation of existing policies, sustained cooperation between the ECOWAS Commission and the relevant na-

tional ministries in the member states is essential. In addition, comprehensive guidelines for harmonised national implementation of agricultural trade policies, for example through the issuance of implementing directives within the ECOWAS trade regimes, are required.

### The GIZ ECOWAS Agricultural Trade project

In order to support the ECOWAS Commission and its member states on their path to greater regional integration, economic development, improved social and economic conditions for women, as well as improved food security through agricultural trade, the project "ECOWAS Agricultural Trade" (EAT) was officially launched by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in March 2023. By employing a multilevel and multistakeholder approach in collaboration with the ECOWAS Commission and its members, the private sector, and civil society, the project focuses on three main pillars: policy advice, trade facilitation and trade promotion. It will promote evidence-based policy-making and work with local and regional organisations, supported by the Sahel and West Africa Club (SWAC) Secretariat of the Organisation for Economic Co-Operation and Development (OECD) and the International Trade Centre.

With a pragmatic bottom-up approach, EAT aims at facilitating trade flows by bringing policy-makers, border staff and the private sector together while specifically focusing on women in trade. This is to enable marginalised groups to reap greater tangible benefits from regional trade. Moreover, EAT will focus on the untapped potential of unregistered trade, building trade capacity for dealing with border inspections and controls and having better access to cross-border markets. Furthermore, the project will strengthen trading communities, e. g. by promoting and empowering small-scale traders' access to finance, improving business skills and solving technical problems such as compliance with norms and standards, traceability or packaging requirements. Working alongside other donor-funded programmes, EAT seeks to promote regional integration through agricultural trade, focusing on downstream approaches in the value chain towards market, consumer, and food security-driven solutions based on viable business models for small and medium enterprises (SMEs).

Drawing upon existing approaches and knowledge, EAT will work on enhancing and add-

ing value through a combination of capacity building, soft infrastructure, policy advice and dialogue. Together with regional and national partners, best practices and solutions to allow agricultural trade across borders to improve regional food security are to be showcased. Examples include training for food traders to comply with national standards when crossing borders, simplified custom control procedures for perishable goods and fast lanes for individual traders at borders. Finally, supporting and safeguarding female traders is key to women's economic empowerment. This can be achieved by creating safe spaces along trade corridors and informing women and assisting them in taking advantage of their rights.

### Tailwind from AfCFTA

The ratification of the African Continental Free Trade Area (AfCFTA) has injected fresh impetus into the ongoing efforts to facilitate trade, now with a comprehensive continental perspective. ECOWAS holds a pivotal role as a fundamental building block for the successful implementation of the AfCFTA. The CET has served as the foundation for the tariff negotiations of ECOWAS member states under the AfCFTA. Moreover, ECOWAS coordinates the AfCFTA negotiations and acts as a mediator in instances of disagreements among member states. However, the genuine value of trade agreements lies in their ability to yield tangible improvements and outcomes on the ground. Hence, the paramount objective is centred around the national implementation and harmonisation of these agreements across different countries.

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Photo: Author

## Markets for farmers and consumers, not for speculators and corporations

The impacts of the Ukraine crisis on food prices world-wide have highlighted just how globalised the commodity flows have also become in the agrifood sector. This is of no benefit to most farmers, our author maintains, and calls for a New Deal for agriculture.

By Jürgen Maier

Food prices surged world-wide after the Russian Army's invasion of Ukraine in late February 2022. Within a matter of weeks, the price of wheat rose from 260 euros a tonne to 430 euros, while the Food Price Index of the UN Food and Agriculture Organization (FAO) reached an all-time high. At first glance, this comes as no surprise – after all, Russia was the most important wheat exporter, and Ukraine the fifth most important. Furthermore, Russia is the world's biggest exporter of fertiliser. Globally, around 50 countries import more than 30 per cent of their wheat from Russia and Ukraine. A major world-wide famine seemed to be looming.

However, one year on, the war continues, Ukrainian exports have collapsed, and the price of wheat has nevertheless returned to its pre-war level. Losses among Ukrainian exports have been made up for by deliveries from other countries, including Russia. After the long-awaited agreement on the resumption of Ukrainian grain exports via the Black Sea ports had been signed, the first ship sent out came to a standstill in the Black Sea because the Lebanese importer had changed his mind and no longer wanted the shipment he had ordered several months previously. Initially, no one was willing to buy the consignment.

At the time, the European Union suspended its tariffs on food imports from Ukraine in order to get them onto the world market via alternative ports in the EU. At least this was the idea – but now, Poland, Hungary and other eastern European countries started closing their frontiers to cheap food imports from Ukraine. Instead of feeding a hungry world, the Ukrainian imports were flooding markets in the East of the EU, forcing local prices down.

The good news is that the world markets have proved to be more resilient than expected, and able to bear the impact of the war somehow. The bad news is that a global food system in which precisely this seems surprising is not really sustainable. For already before

the war broke out, world food supplies had been in a severe state of crisis. By the time the war started, two years of what had sometimes been erratic Covid-19 restrictions had already massively harmed the livelihoods of the poor, even in countries which had imposed no lockdowns or other such measures. Depending on sources, between 100 and 160 million people had slid into extreme poverty from 2020 on. Around 2.3 billion people have no access to adequate food, which is 320 million more than in 2019.

### Inflation is back again

It would appear that the true problem which world food supplies are now facing is by no means any acute physical dearth but rather the combined impacts of inflation, rising energy prices and disrupted supply chains. Following 15 years of relentless money printing, inflation, already written off, is back again, and is above all coming to bear on food. In March, Germany, for example, recorded a price increase of no less than 22 per cent compared to the previous year.

But why should a war in far-off Ukraine have any impact on food security elsewhere, for instance in Africa? Must this be the case? During the last major war in Europe, 1939–1945, there were no such impacts. Instead of today's "world market", until well into the 1970s, there was a considerable diversity of regional markets, regionally operating producers and regional price formation. Nowadays there can be no mention of all this. What we have today is a system dominated by multinational corporations, a corporate food system featuring globalised so-called value and supply chains, driven by the corporate profit logic. It does not result from any law of nature. This system would never have developed without massive political backing. Global supply chains can only work if markets are opened up with free trade agreements, if necessary against considerable public opposition.



Nevertheless, it is not countries but enterprises which operate on the world markets. Four corporations dominate trade in agricultural commodities: Archer Daniels Midland, Bunge, Cargill and Louis Dreyfus. Together, they are known as the “ABCD Group”. With their considerable market power, such corporations can influence the global agricultural markets in their favour and take advantage of their market clout in price negotiations with producers. However, the biggest profits can be made on the world agricultural markets by speculating, which requires a very good knowledge of the market situation. Extreme price fluctuations are ideal for speculating, whereas lastingly stable and low farm prices are not very profitable.

Since the deregulation of the financial markets, the global agricultural commodity markets have become more and more “financialised”. The laws of the financial markets are increasingly governing the prices of food and commodities. In the wake of the 2002 stock exchange crash, futures became a popular asset class in the portfolios of financial institutions and the investor community in general. On the world’s most important stock exchange for agricultural products in Chicago, USA, 73 times the amount of wheat that is actually available is traded. Via derivatives and other financial products, every grain of wheat switches owners 73 times before finally arriving at the processor. So whether an investor buys or sells agricultural commodities has not so much to do with actual demand on agricultural markets. Therefore, food markets cannot be viewed in isolation but only by considering the cross-links with the financial and energy markets as well as the input markets.

Neither farm producers nor consumers benefit from the globalisation and financialisation of the agricultural commodity markets. The profits are made by others. That agriculture and food usually spur public resistance against free trade agreements is not by coincidence. It was only with the founding of the World Trade Organization (WTO) in 1995 that the agricultural commodity markets also attracted the attention of the free traders. A South Korean farmer, Lee Kyung-hae, committed suicide in public during a demonstration against the WTO agricultural liberalisation negotiations at the organisation’s conference in Cancún in 2003 to send a signal against the ruinous opening of South Korea’s agriculture. The most devastating impacts of the African free trade agreements with Europe are the uncontrolled impacts of cheap, subsidised European meat, milk and other food. There are numerous reports, such as the one about former Ghanaian

tomato-growers who now pick tomatoes as migrants without any documents in Andalusia or Sicily, whereas tomato preserves from the EU now dominate the tomato market in West Africa.

Who really wants the new Mercosur-EU free trade agreement? Family farms in Europe and in the Mercosur region have nothing to gain from this agreement. The chief motive behind the EU’s currently so considerable interest in this agreement is geopolitical rivalry with China. Farmers are footing the bill for this. As a rule, opposition to free trade agreements in Europe stems from farmers fearing cheap imports from North and South America or Australia, and from consumers up in arms against genetically modified food or “chlorinated chicken” on the shelves in their supermarkets.



## We need more farmers, not fewer.

So what is the point of globalised food and agricultural commodity markets? For most farmers, they are not a good idea, and neither are they for most consumers. The industrial production forms going hand in hand with them are, to put it mildly, not a good idea for the environment and biodiversity, either. Again and again, globalising the food and agricultural commodity markets was used as bargaining chips in the interest of industry in the negotiations on free trade agreements and is now resulting in a concentration of these markets among a handful of multinational corporations. Ironically, the geopolitical confrontation currently dominating politics world-wide can indeed contribute to de-globalising the world markets again. For many countries, the food markets are by far the most sensitive “supply chains”, and here, one does not want to depend on hostile powers.

### Out of balance

However, throughout the whole world, top-down globalisation has resulted in farmers getting the feeling that they and their political interests do not count. Food prices rise and fall, but profits are made on the food markets by processors, retailers or speculators. Governments change market conditions on a whim, without farmers having much influence on the

matter. The farmers feel helpless amidst relentless international competition, ever more powerful retailers and governments seeking green regulation measures which, unfortunately, do not apply among their competitors in other countries.

Something seems to have completely lost balance in today’s world. For even after so many decades of globalisation, it is still mainly family farms which produce in regions and for regions, feeding the world as they do so. But society has little to spare for them, both economically and politically. Their profession earns them hardly enough to live on; anyone wishing to earn money opts for other professions. The majority of those going hungry are farmers. In the rich countries, more and more farmers simply give up – or they find no one willing to take over their farms. In Europe, angry farmers are mobilising against a policy which they deem unfair and economically threatening.

But we need more farmers, not fewer. Farming has to become an attractive profession which one can be proud of, and which offers one a good income – on the market, and not as a recipient of government subsidies. Nowadays, farmers in Europe depend primarily on getting public money and the provisions this entails, but they should really be free entrepreneurs.

It’s time for a New Deal for Agriculture. Governments have to hand back farmers their regional markets, without ruinous world market competition. We must ensure that farmers once again become successful entrepreneurs who can live on what they earn on the market, rather than on subsidies and alms. Farming has to become a profession in which sons and daughters seek to carry on with their parents’ farms because they see it as an activity which is far more rewarding than eking out an income in offices in the cities.

However, in return, if one doesn’t seek to produce as cheaply as possible come hell or high water, and doesn’t have to grow or cut down on activities, one can indeed sympathise far more with a sustainability agenda which society and politics are expecting of farming. However it may be referred to, farming in harmony with nature is only conceivable without global competitive pressure. But if one is bent on retaining the latter, or even on raising the pressure, it should come as no surprise when farmers merely regard having more and more “green” conditions imposed on them as attacks on their livelihoods, which then results in the protest we are witnessing today.



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Photo: Author

## High-hazard business

The global pesticide market is constantly growing and just a handful of corporations share it out between them. Now manufacturers are making ever stronger inroads into countries of the Global South, where pesticides are less regulated and they can sell numerous substances that are already banned in the European Union. The EU must urgently enact an export ban to stop this, our author demands.

**By Carla Hoinkes**

The global market for agricultural crop protection products is highly concentrated. The four largest manufacturers (see box) now share an estimated 72 per cent of the global market, provisionally valued at 69 billion US dollars (USD) in 2022 by S&P Global, the leading market analyst. Twenty-five years ago, the top four's share was still below 30 per cent. Recently, business has been especially lucrative. The companies have successfully profited from price rises which more than compensate for higher raw material and energy costs. Just some of the factors behind this have been high demand due to supply chain bottlenecks and extreme weather conditions brought about by climate change.

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Every year, at least  
11,000 cases of pesticide  
poisoning end in fatalities.

For many years, sales in the crop protection market have shown a steady global growth rate of around four per cent per year. This is not evenly spread across all regions of the world, however. In Europe, for example, sales of crop protection products have stagnated for years and are even declining in some countries. The growth is primarily happening in South America and Asia. In the last 20 years, the quantity of pesticides applied in Brazil has increased by over 340 per cent, and in Bangladesh by almost 390 per cent. Other countries like China, Thailand and Argentina are also registering strong rates of growth. Pesticide use in Africa is the lowest by far, according to the Food and Agriculture Organization of the United Nations (FAO), with an average of less than 0.4 kilograms per hectare of cropland – compared

to the world-wide amount of around 2.6 kilograms per hectare. However, the industry has long had the African continent in its sights as another important growth market. According to the FAO pesticide figures, based albeit on incomplete data, the amounts used on the African continent have increased by more than 57 per cent since the turn of the millennium.

Not only have volumes of pesticides risen in the countries of the South, but many agrochemicals are in widespread use which have been banned within the EU since the authorities have designated them harmful to the environment or human health. These include substances suspected of causing cancer or potentially harming human reproduction or the nervous system, as well as substances which are highly toxic to pollinators or which build up in drinking water and groundwater. Yet the exact same problematic substances are still authorised for use in many low- and middle-income countries. This can be because of inadequate legislation, undue industry influence or severe understaffing of regulatory authorities.

### Catastrophic health consequences

The use of these highly toxic substances is particularly problematic in the Global South. Workers and smallholders are given little information about the health risks in many cases and apply pesticides without adequate personal protective equipment – either because it is impracticable because of the heat, unaffordable or simply not obtainable at all. Countless pesticide poisonings are the consequence. According to a recent study cited by the United Nations Environment Programme (UNEP), up to 385 million people unintentionally poison themselves with pesticides each year, the overwhelming majority of cases involving farmers and farm workers in Southern countries. Symptoms range from headaches, nausea or skin lesions to severe organ damage. According to conservative estimates, every year, at least 11,000 cases of poisoning end in fatali-

ties, and very high numbers are assumed to go unreported. Added to that, the World Health Organization (WHO) puts the annual number of suicide deaths by pesticide ingestion at over 160,000 – which is around a fifth of all suicides world-wide. At times these can be a tragic expression of an economic downward spiral which all too often takes hold of impoverished and usually uninsured small farmers. Many get into debt to buy expensive pesticides, fertilisers and seeds. Acute poisonings are not the only problem by far. Repeated and long-term exposure to pesticides is also linked to chronic diseases. Especially those classified as highly hazardous pesticides can have chronic effects on the “skin, eyes, nervous system, cardiovascular system, gastrointestinal tract, liver, kidneys, reproductive system, endocrine system, immune system and blood”, and some “may cause cancer, including childhood cancer”, the WHO notes. The UN organisation considers exposure to highly hazardous pesticides to be “a major public health concern”.

### Crisis is being instrumentalised

As our research has shown, Europe and the USA’s large pesticide corporations also play an important role in the global trade in highly hazardous pesticides – many of which are banned in the countries these corporations are based in. Despite the ban on their use in the EU, they are still produced in European factories and exported from there. We at the Swiss non-governmental organisation Public Eye worked with the British research organisation Unearthed to gather the first hard data on this trade in autumn 2020. Because the pesticide manufacturers maintain a wall of silence about their business, we invoked freedom of information laws to request the relevant “export notifications” from the European Chemicals Agency and EU Member States. According to these notifications from companies to the authorities, in the year 2018 alone, EU countries – most significantly Italy, Germany, the Netherlands and France as well as the UK – approved the export of 81,615 tonnes of pesticides that were banned from their own fields due to unacceptable health and environmental risks.

The manufacturers dismiss any responsibility and take the position that provided they are used as instructed, substances prohibited in our own countries are harmless in the South. In the context of current crises like the war in Ukraine and the energy and food price crises precipitated in its wake, the top four have managed to boost their pesticide sales and prof-

Today, the market leaders in the crop protection market are the Syngenta Group, headquartered in Switzerland, the German groups Bayer and BASF, and the US-based Corteva corporation. Syngenta Group, formed in 2020 from the merger of the Swiss firm Syngenta with agrochemical companies from Israel and China, dominates around 30 per cent of the global market on its own. The two US corporations Dow Chemicals and Dupont had already merged in 2019, combining their pesticide and seed businesses in Corteva. And in 2018, Bayer had taken over the US giant Monsanto and sold parts of its business to the chemical company BASF, which then also entered the seed business. These mega-marriages have allowed the dominant corporations to consolidate their lead over the growing competition and perfect the combination of agrochemical and seed business they have banked on since the mid-1990s. Back then, chemical and pharmaceutical companies were beginning to absorb numerous seed producers. In the meantime, the same mega-corporations have come to dominate both sectors.

its. Not only that, but the industry also made use of the crises to lobby for chemical-intensive agriculture and against organic production methods by talking up the spectre of a looming food shortage. Syngenta CEO Erik Fyrwald launched an unprecedented attack on organic farming in summer 2022. “Food is being taken away from people in Africa because we want organic produce and our governments support organic farming,” was the quote Fyrwald gave to the media at the time.

While these claims caused a major furore, they were quickly debunked as groundless. It was found that the ongoing food crisis is not, for the most part, a supply crisis as enough food has been available at all times. It has actually been fuelled by factors such as sharply rising food, energy and living costs and by diverse political conflicts and wars, with devastating consequences for people living in food insecurity and hunger, whose numbers have been back on the rise since 2015.

The sudden spikes in fertiliser and pesticide prices coupled with the climate crisis also pose immense problems for farmers in the South. Against this backdrop, promoting more independent agro-ecological forms of production which conserve soils and biodiversity in the long term makes much more sense than intensifying agriculture with chemical inputs. But the pesticide industry continues to call for exactly that. Syngenta & Co. are pushing back hard against the EU strategy for more sustainable agriculture (“Farm to Fork”) and the associated pesticide reduction targets.

### Is a turnaround on exports coming?

The pesticide lobby is also trying to prevent the EU from introducing an export ban on pesticides that are prohibited within its own borders. After Public Eye and Unearthed had drawn attention to these exports, the Euro-

pean Commission made a surprise announcement in October 2020 that it intended to stop the problematic practice. Prior to that, France had already become the first European country to impose such an export ban with effect from 2022, and Switzerland has had stricter export conditions in force since 2021. Germany and Belgium have also announced a halt to exports of pesticides banned in their own countries. These are important first steps. Nevertheless, as our latest research shows, the national bans in place to date have critical weak points. French authorities approved countless export applications for banned pesticides from January to September 2022 in spite of the ban. This was possible because of various loopholes in the French law, which only prohibits the export of “crop protection products” containing banned substances, but not the export of the active ingredients in their pure form. Another problem is that when single countries impose export bans, companies can simply circumvent them by relocating their production sites elsewhere.

Public Eye and more than 320 other NGOs and trade unions, including numerous organisations from the Global South, have therefore called upon the EU to swiftly implement an effective and comprehensive export ban. The EU had originally committed to presenting a legislative proposal for such a ban by 2023, but is taking a long time. The proposal is facing heavy opposition from the chemicals lobby. However, when the European Commission finally launched a public consultation in May, environment commissioner Virginijus Sinkvičius stressed that the EU “would not be consistent in its ambition for a toxic-free environment if hazardous chemicals that are not allowed for use in the EU can still be produced here and then exported”. These chemicals, he added, “can cause the same harm to health and the environment regardless of where they are being used”. It’s now high time for the EU to walk the talk.

## Food security corridors – a promising solution to conservation and resource-grabbing conflicts

Many vulnerable populations in sub-Saharan Africa are encircled by resource enclosures or land grabs while imperilled by food insecurity, livelihood vulnerability and climate shocks, which leads to conflicts. This article discusses food security corridors as a new way to manage land-use conflicts to engender equitable and sustainable land use.

By Eric Mensah Kumeh

Tropical forest ecosystems are rich in biodiversity and carbon, providing essential ecosystem services and supporting the livelihoods and cultural heritage of hundreds of millions of people world-wide. Yet these ecosystems are imperilled by multiple pressures such as deforestation and fragmentation, which are fuelled by human activities, including logging and agriculture. In some instances, conflicts emerge between forest conservation interventions and the rights and needs of vulnerable communities reliant on forests for their subsistence, income and well-being. One example of this conflict is the encroachment and farming in protected areas, or land grabs, which results in social conflicts, insecurity, land-use change and ecosystem degradation.

### Resources enclosures, conflicts and food insecurity

Many forest-fringe communities across sub-Saharan Africa are increasingly struggling

to acquire arable lands for food production due to multiple pressures. These pressures include the conversion of communal lands to protected forests and large-scale land acquisition by rich countries, multinationals and local elites. At the same time, climate change impacts are also shrinking the areas available to such communities for food production. Traditional authorities own most land in Africa, but some local communities face obstacles in using such lands to overcome food insecurity and build resilience to climate impacts. Protected forests serve multiple purposes such as eco-tourism, biodiversity protection and climate moderation, but they also create conflicts where they prioritise environmental protection over the rights and well-being of local communities. Large-scale land acquisition, which accelerated during the 2008 financial crisis, is creating conflicts in host communities in many African countries, where multinationals have largely failed to use accumulated lands to create green jobs, e.g. through biofuel, tree plantations, carbon offsets and related interventions. Final-

ly, the growing conversion of food crop farms into export-commodity plantations, including oil palm, cotton, cashew, coffee and cocoa, drives land accumulation from below, impeding marginalised local communities' ability to secure the production of food for their subsistence.

These trends create tensions and become a time bomb, especially when local communities are unable to make a living from the initiatives that take away their land unfairly. The loss of land, together with structural barriers such as low investment in crop productivity enhancement, extension services and value chain development, and high unemployment, push forest-fringe communities in many SSA countries to encroach into forest reserves to produce food crops, often as a last resort to survive. Crop expansion in protected areas in Africa increased from 74 km<sup>2</sup> per year between 2003 and 2007 to 4,265 km<sup>2</sup> per year (2015 and 2019), a 58-fold increase. A global comparative study by scientists from Norway, Ger-



Children playing after threshing maize on a farm adjacent to APSD's eucalyptus monoculture in Atebubu, Wiase, Ghana.

Photos: Eric Mensah Kumeh

## Two cases of resource-grabbing conflicts in Ghana

The Krokosua Hills Forest Reserve (KHFR) is one of 266 forest reserves in Ghana. Covering 48,100 hectares, the KHFR was enclosed in November 1935, with British colonial officials neglecting the concerns of Sefwi traditional leaders about farming and the well-being of their subjects. Today, struggles over farmlands in the area are rapidly depleting the KHFR, with 3.5 per cent lost from 2010 to 2019. A military-style task force assigned by the state only exacerbates the challenge, with KHFR-fringe communities using complex mechanisms to encroach, including farming with torchlights at night, deploying whistle-blowers and bribing forestry officials. The KHFR case is only a microcosm of the challenge, with similar cases leading to the emergence of reserves-on-paper, where a greater area of some forest reserves is, informally, farmland.



A farmer in an encroachment area within the Krokosua Hills Forest Reserve in Ghana's Western North Region.



A make-shift housing by a group of farmers squatting within a land grab enclosure by the company African Plantations for Sustainable Development in Atebubu/Wiase.

The company African Plantations for Sustainable Development (APSD) was founded by Aracruz Cellulose (AC) in 2010, following massive derivative losses and a bailout in Brazil from the 2008 financial crisis. Replicating AC's violent history of dispossessing indigenous communities in that country, the APSD has dispossessed several rural communities in Ghana's Bono East Region, failing to live up to its promise of job creation, biofuel generation and rural development. Despite a downturn in its operations, the company uses military officials to deny host communities access to farmlands, fuelwood and other resources, leading to multiple conflicts, displacement and food insecurity in communities dispossessed by the APSD.

many, Brazil and Indonesia in 2014 examined the relationship between forest clearance and rural livelihoods, using data from 7,172 households across 24 countries in Africa and Asia. They found that 27 per cent of the households had converted about 1.21 ha of forests to farms in the previous 12 months, with each household clearing 1.21 ha. In its *2016 State of the World's Forest Report*, the Food and Agriculture Organization of the United Nations (FAO) argues that small-scale farming accounts for 65 per cent of forest conversions in SSA. If the current trend continues, 2.1 per cent (314,214 km<sup>2</sup>) of protected forests will be converted to croplands by 2030, concluded a recent study published by Meng and colleagues in *Nature Sustainability*. This imperils

the achievement of global biodiversity conservation goals to secure at least 30 per cent of land by 2030.

Crop expansion into protected areas undermines biodiversity and climate goals, but food insecurity remains a nagging challenge in many African countries. The World Bank estimates that 59.5 per cent (2019) of people in sub-Saharan Africa experience moderate or severe food insecurity. This is more than twice the global average of 27.6 per cent. Incidentally, the growing expansion of farms into protected areas does not resolve food insecurity in the region. Conflicts between public authorities and forest communities lead to the demolishing of crops on so-called illegal farms in protected ar-

reas. It also accelerates low-input, low-output shifting cultivation practices because without secured tenure, "illegal farmers" have no incentive to invest sustainably. The biggest reinforcer of forest conversion is the neglect of forest communities' voices and needs in forest politics and policies, which usually results in solutions that do not fit local contexts. There is an urgent need to transform the way in which policy actors involve local communities whose existence and well-being are threatened by resource grabbing across SSA. Here, food security corridors could help. They offer a novel way to design and implement land use interventions that responds to the voices and needs of local communities who need it the most. The approach emerged from our analyses of

forest conversion and land-use conflicts in rural Ghana (also see Box on page 37).

### Food security corridors for rural land-use transformation

By definition, a food security corridor (FSC) is a geographical area created around land enclosures, e.g. protected forests or large-scale land acquisition, to implement food security projects for people who traditionally depend on forests or land for most of their subsistence but are now trapped in inequitable land relations. FSCs enable actors to institutionalise food security by broadening food availability and access to marginalised communities over time. FSCs are not prescriptive. Instead, they combine multiple place-based interventions such as i) physical food security corridors that use redistributed land for climate-resilient and regenerative farming, ii) viable local non-farm livelihood sources and rural enterprises, and iii) income transfer schemes that compensate food-poor, vulnerable communities for losing their access to land.

Despite their flexibility, FSCs have a better chance of success when built on the principle of equity, tending to avoid critical questions concerning who owns the land, contributes to land-use decision-making and benefits from resource rents (see Figure). Implementing FSCs in areas characterised by inequitable land-use relations requires skilful negotiation, resilience and an orientation towards fairness or equity. This is because any form of land or associated rent (re)distribution may be perceived as a threat to those already benefiting disproportionately from prevailing inequitable land relations. FSCs’ partiality towards evidence-based multi-stakeholder deliberations offers an avenue to navigate entrenched in-

terests and positions. Overall, FSCs seek to nurture resilient and recursive institutions that overcome the challenges associated with one-off consent mechanisms that are typically used to create protected areas and sanction large-scale land acquisitions. For example, instead of tools such as one-off environmental and social impact assessments (ESIAs) that enable states and companies to legitimise forest or resource enclosures in perpetuity, FSCs favour novel tools or instruments that set critical benchmarks or milestones, the unfulfillment of which opens up the possibility for marginalised communities to renegotiate the terms of their dispossession. Such recursive tools may include food security provident funds, community well-being guarantees and local employment quotas.

### Potential challenges and solutions

While promising, actors implementing FSCs must overcome a few challenges and risks, such as policy and governance challenges, the trade-off between goals, finance and market barriers, and sociocultural factors. The current plights, including food insecurity, in many forest-fringe communities are partly a product of governance problems and the complex challenge of finding a balance between nature conservation and social well-being. FSCs are not oblivious to these challenges. Alternatively, they embrace them, believing that inclusive processes which genuinely recognise power asymmetries among diverse actors open avenues for mutual respect, innovation and collective action. Multi-stakeholder deliberations needed to initiate an FSC may require significant investments in local research and capacity building. However, the high initial costs may be offset by the positive environmental and social impacts of halting further forest con-

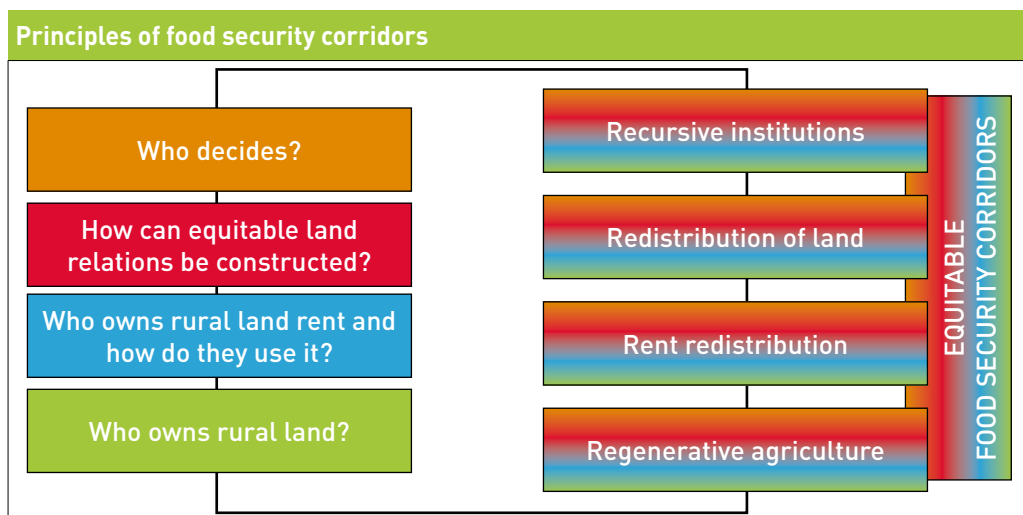
version, securing biodiversity and establishing carbon sinks while engendering sustainable livelihoods and well-being. Thus, investing in FSCs as a holistic and participatory approach is worthwhile.

### The way beyond

While food security corridors remain a theoretical design at this stage, they offer a promising solution to the complex and challenging issues of forest conservation and land acquisition conflicts in sub-Saharan Africa. By promoting a more integrated and holistic approach to land use and natural resource management, they can help to reconcile the competing demands and interests of different stakeholders and to enhance the resilience and sustainability of food systems and ecosystems. However, the successful implementation and scaling up of FSCs require concerted efforts and investments from different actors and a robust commitment to adaptive management and monitoring and evaluation.

FSCs can be supported by investors, development practitioners, researchers and policy-makers who are concerned with sustainable and inclusive development. Policy-makers can create an enabling environment for mobilising private sector engagement and innovation towards delivering FSCs. Investors can provide financial and technical support, while development practitioners can integrate the principles of FSCs into their projects, working closely with local communities and governments. And researchers can map areas most suited for FSCs and develop robust frameworks for monitoring the economic and socio-ecological contributions and impacts of FSCs. Overall, FSCs offer a promising pathway towards sustainable development and can help achieve multiple Sustainable Development Goals by building resilient and equitable food systems, protecting and restoring tropical forests. The time for action is now!

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## Women's cooperative in the camel milk business shows resilience during drought

Camel milk is popular throughout much of Kenya and Somalia, and a women's community initiative in a north Kenyan town has established a cooperative to collect, process and distribute this much-sought product. While the venture faces considerable challenges, among them the severe and prolonged drought the region has been suffering from, Anolei Women's Camel Dairy Cooperative is determined to further develop its intricate network of activities. Our authors had a look at their operation.

By June Po, Aditya Parmar and Joseph Matofari

On the outskirts of Isiolo town, northern Kenya, our vehicle encounters a makeshift blockade of boulders and rocks, paralysing transport along the Nairobi-Moyale Highway. According to community and news reports, violence had broken out in retaliation to an attack of four Somali bomas or pastoral homesteads, killing three herders and raiding 160 to 200 camels. Violent conflicts have become more frequent as Kenya faces the worst climate-induced and protracted drought in 40 years. According to the International Federation of Red Cross and Red Crescent Societies, the drought in the Horn of Africa has left over 22 million people severely food insecure, with at least 5.5 million children facing acute malnutrition. Families in Kenya's semi-arid and arid regions have lost thousands of livestock in the crisis. Nomadic communities have crowded in a few remaining areas in search of food, water and pasture. In northern Kenya, Isiolo County is one of them.

Among pastoral communities in drought-prone regions, camels have enormous value. They provide milk and meat, drought-power, and are considered as long-term assets. A female camel can be sold for 100,000 to 180,000 Kenyan Shillings (675 to 1,200 €) and a male for 50,000 to 100,000 KSh (340 to 675 €) depending on the point of sale – with prices increasing from farm gate to local camel trading posts. For generations, camel milk (*Kiswahili: maziwa ya ngamia*) has been collected, sold and consumed. It is the preferred milk among communities in northern Kenya and Somalia, because of its availability and its medicinal and nutritional properties. Camel herding has been hailed a climate-resilient livelihood, and camel milk nicknamed “white gold” in the region. Camels have adapted to withstand 20 to 30 days without water, in comparison to two to three days among dairy cows. Even so, with little to no rainfall in the past five rain seasons, communities report that the camels' milk production has dwindled significantly.



Before milking, the herders bring the female camels to their calves, which suckle for a few minutes to stimulate the camel's milk let-down.

Photos: June Po

Approximately 60 per cent of camel milk from the surrounding counties of Isiolo is processed by Anolei Dairy Women's Camel Milk Cooperative. It is a community group based in Isiolo town, which began as a self-help group organised by a handful of Somali women camel milk traders. In 2010, the group registered as a cooperative society, with a membership of over 100 women. The cooperative's primary objective is to improve pastoral livelihoods and increase household income with the commercialisation of camel milk and camel milk products. While women control some of the major aspects of camel milk processing and trading, the animals are traditionally owned and herded by men. Since the emergence of Sharia-compliant banks in the region in 2012, female camel milk traders have had better access to credit and savings and better control of the monetary transactions across the camel

milk value chain. In 2021, Anolei Cooperative partnered with Egerton University, Kenya, the Natural Resources Institute at the University of Greenwich, UK, and the African Agriculture Knowledge Transfer Partnership (AAKTP) Programme to reduce post-harvest loss and advance the cooperative's product development and general management. The AAKTP supports the cooperative through various initiatives, including co-development of feed compositions, training herders, increasing exposure to technical know-how for developing value-added camel milk products, improving existing products and strengthening relations with dairy institutions and stakeholders. Additionally, the business analytical and managerial capacities are to be enhanced through membership expansion, value chain analysis, market research and consumer awareness campaigns.

## The camel milk value chain from udder to cup

Early in the morning, the herders prepare the milking containers. The majority of these containers are repurposed jerrycans that are washed when water is sufficient, sun-dried, and smoked using local species of woody plants (Somali name: *Bil-ill* or *sabans*, *Acacia nilotica*). Pastoral communities in Kenya have used smoke from certain herbs to disinfect milk-handling containers, preserve milk and give raw camel milk a characteristic desired flavour. Herders bring female camels to their calves, which suckle for a few minutes, stimulating the camels' milk let-down. Milk is collected and poured into 5–20-litre jerrycans. Transporters drive or ride through rough terrains to collection points and to aggregating centres. Milk arrives at Anolei Cooperative from within a 150 to 200 km radius by bus or motorbike.

At the cooperative's bulking and cooling facility, we had a glimpse of how milk was processed. From afternoon to night, a hired male technician tests and bulks hundreds of jerrycans of milk that are delivered. The cooperative members, the owners of the delivered milk, meet their transporter at a pre-arranged time to make sure the camel milk from their herd arrives and is accepted by the cooperative. The technician checks for spoilage by sight and scent. Spoilt milk can be rejected, but not without contestation by the transporter or owner, especially when camel milk is scarce and of great value. However, there is little wastage as rejected milk is taken away by the owner and usually sold at local markets as sour milk called *suusa*.

For fresh milk that passes, the technician pours the milk into four aluminium milk cans that rest on an industrial scale. He holds two layers of cheesecloth in place inside a plastic sieve. Physical particles from the charcoal used for smoking the jerrycans are filtered, and the technician records the amount of milk against the member's name in the register. The milk is emptied into a dump tank that is later pumped into a 3,000 litre cooling tank set at 4°C. The fresh milk is then chilled for a few hours, and in the morning, it is filled into 20-litre jerrycans to be ready for the six-hour journey to Nairobi's Eastleigh market, 270 kilometres away. The cooperative has been delivering camel milk to Nairobi since 2010.

At the street corner of Eastleigh district, multiple two-wheeled handcart carriers emerge from all corners of the intersection just before



A member of Anolei Cooperative showing an instrument for alcohol testing, called an alcohol gun.



The technician pouring the milk into the aluminium milk cans.



More value added through processing. Anolei Cooperative's camel yoghurt and meat.

the bus arrives. The transporters swiftly load the full jerrycans onto their carts and speed off to their respective retail points, mainly hotels, restaurants and milk distribution kiosks. Dotted around the street corners are milk stands. Women and men busily wash recycled plastic bottles, 750-ml to 2-litre, and sellers, mostly women, are ready to dispense camel milk into bottles for the mid-morning customers.

## A long way to go

Anolei Cooperative has become a key node in the camel milk value chain, enabling pastoralists, herders, milk traders and intermediaries to establish their livelihoods around markets in the capital. However, this endeavour has not been without challenges. For instance, the cooperative's facilities require an enormous amount of electricity to chill and store the daily camel milk deliveries, representing a significant operational cost for the cooperative, especially during the dry season when increased cooling is necessary. During the drought, the cooperative's income decreased given reduced milk production and trade. As a respected cooperative within the community, the group asked for payment deferrals to cope with the financial challenges.

To reduce dependence on the national grid, the cooperative is exploring options to search for suitable solar energy systems. An AAKTP associate based at the cooperative is assisting the members to seek support from various development organisations active in the county. Anolei Cooperative has also purchased a piece of land to construct a more permanent facility, eliminate rent and contribute to the cooperative's vision of supplying camel milk to new markets in major cities in Kenya and beyond.

According to the AAKTP associate, another challenge is the adoption of standard tests to meet the quality for value addition. The technicians must aggregate five to six hundred of milk containers a day. They draw on their experience and test through sight and scent within seconds before the milk is poured and weighed. Although there has been training on post-harvest quality control, adoption is slow. There are significant constraints of time and resources. Most milk jerrycans will pass the sight and scent tests, but Anolei Cooperative and its partners would like to enable more scientific tests to be used in the future. In turn, improved hygiene and milk safety will contribute to the development of camel milk products such as camel yoghurt.

Since early 2022, Anolei Cooperative has formed a local partnership with the Tawakal Farmers Marketing Cooperative Society in Isiolo to develop flavoured camel yoghurt and camel meat products. Tawakal Cooperative has the facilities and license from the Kenyan Bureau of Standards to develop related food products. This partnership enabled the two groups to cope during the drought seasons. Amina, the Chairlady of Tawakal, explains that the orders of their yoghurt had dwindled



from 100 to 200 litres a week to approximately 60 litres a week because of limited milk supply and demand. Beyond similar electricity cost, annual operational cost includes the renewal of the national standard certifications for each flavour of the yoghurt products (current flavours: plain, strawberry, mango, pineapple, chocolate from essence produced by Promaco East Africa) and several county health certificates. In 2022, Tawakal Cooperative received a donation of a milk “ATM”, an automatic milk dispenser. It lies unplugged in a corner of their facility, waiting for the day camel milk supply is sufficient again.

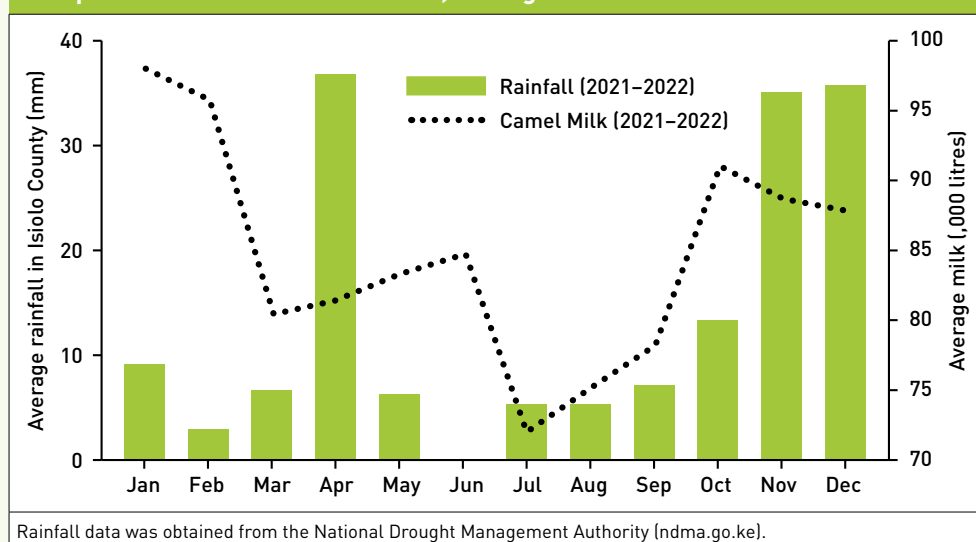
While aluminium milk cans had been donated to herders and traders from several development organisations, we saw that many of these were piled up in a corner and unused. It seems unlikely that these large and bulky aluminium cans will be used by motorcycle transporters. Although the current use of jerrycans is problematic, given high risks of contamination and difficulties to clean the inner hollow handle, herders continue to incorporate traditional ways of smoking the interior of each jerrycan before collecting milk. It provides the smoky aroma of camel milk that regular consumers come to know and love. Innovations are being developed, such as “mazzican”, which is made from food-safe and heat-stable plastics, with a large opening to reduce spillage. Its adoption has been tested by the International Livestock Research Institute. People gave low scores on usability and disliked its higher price. Meanwhile, small enterprises such as Savanna Circuit, a Kenyan specialist in solar cooling, are exploring smaller, more portable rectangular milk containers that can fit in a solar-powered cooler mounted on the back of a motorcycle. These milk containers are specially designed to carry small quantities, barcoded and geolocated to adapt to transporters going from dairy farm to farm or link herders within the vast terrain of the northern regions.

Efforts to improve the camel milk post-harvest hygienic practices along the value chain have faced multiple obstacles to innovation adoption. While Anolei Cooperative remains resilient to the increasingly severe weather events, we see a potential trade-off between safeguarding the availability and accessibility of a nutritious and local food source to existing consumers and the aim of expanding the camel milk industry to new markets and unfamiliar consumers through raising its food safety standards and, inevitably, its price. In April 2023, Amina shared good news: “It is raining, and things are good. Thank God, now the milk has increased.” For now, Anolei Cooperative

### The camel milk business

A lactating camel can produce 3–15 litres of milk a day. Camel milk production may vary depending on factors such as breed, health, diet and environmental conditions. Anolei members contribute one litre of milk as a share for every 20 litres of milk that is processed at the cooperative facilities. One share is equivalent to the going market price of camel milk, 120–140 Kenyan Shillings (KSh) per litre. As a reference, camel milk is more than three times the price of cow’s milk, approximately 40 KSh per litre according to prices in early 2023. As an average, Anolei Cooperative expects the production of 3,000 to 4,000 litres a day in the dry season and about 6,000 to 7,000 litres a day in the rainy season, which it has achieved. As the drought persisted in the start of 2023, Anolei Cooperative reported that the milk production has reduced to merely 2,000 litres a day. The Figure shows the average milk received at Anolei Women’s Cooperative and average rainfall for the years 2021 and 2022.

Milk production and annual rainfall, average 2021–2022



The Figure covers two particularly hard years for Isiolo County as it observed below long-term average rainfall and a drought was declared in several parts of the county. As the Figure shows, there is a strong correlation between camel milk production and average rainfall. Higher milk production was observed in the months of January/February and October/November 2022, which normally form the rainy season, and lower milk production was in the dry months of March, June and July. It will be interesting to look at the impact of additional factors, such as temperature, forage availability and management practices, on milk production in future studies.

and its community partners carry on, constantly looking for ways to strengthen the intricate network within the camel milk value chain.

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## Measuring human experiences with water to inform policy and practice

Widespread implementation of experiential food insecurity indicators in the prior two decades has substantially improved our ability to track and develop tailored solutions for addressing malnutrition globally. An analogous set of tools for measuring water insecurity is likely to be similarly transformative for the water, nutrition and agriculture sectors.

By Joshua D. Miller, Sera L. Young and John Brogan

Water is life. It is a critical nutrient and a necessary resource for growing crops, raising livestock, cleaning and preparing foods, and for implementing hygienic practices that limit exposure to disease-causing pathogens and chemicals. Despite its importance, our understanding of who lacks access to safe water and how such limitations impact health and development is insufficient. Until recently, most assessments have focused on identifying which water sources households primarily use for drinking. While this information is helpful for determining potential pathogenic exposure, it does not provide insight into whether available water sources are accessible, affordable, culturally and socially acceptable, or sufficient for all household uses, from drinking to cleaning and cooking. Consideration of the human experience has the potential to address this knowledge gap and provide a more holistic understanding of the global water crisis.

### Drawing on experience with predicting food insecurity

The utility of experiential indicators has a historical precedent. Throughout the 20<sup>th</sup> century, food insecurity was almost exclusively conceptualised in terms of food production and availability. The number of calories available per capita, calculated using food balance sheets, was a primary nutrition indicator. But such national-level measures masked inequities at sub-national levels. Further, these measures poorly predicted food insecurity risk in many settings, with malnutrition persisting in regions with high food availability.

Near the turn of the century, experiential food insecurity measures were developed to provide a more complete picture of the global food crisis. These experienced-based tools, which capture dimensions of food access, quality and use, have received widespread recognition and helped demonstrate that food insecurity is a prevalent issue. The tools have also been used to identify at-risk groups and inform the creation of more effective strategies for reduc-



The HWISE Scale is being piloted as part of a baseline survey of 8,400 households in 50 villages in Madagascar that will be connected to water service with the support of the organisation water: charity.

Photo: Felana Rajaonarivelo/ Helvetas Madagascar

ing the burden of malnutrition. In fact, progress toward Sustainable Development Goal 2 – zero hunger – is tracked using experiential food insecurity data.

The water sector is undergoing a similar change. Most international agencies, researchers and public health practitioners currently measure drinking water service availability by counting the number of users connected to a piped network or estimating the proportion of the population that relies on open-water sources like lakes and rivers, which have a high risk of contamination. Findings generated from this work have expanded our understanding of the global water landscape, but other key di-

mensions of water security that can be targeted to improve livelihoods, health and well-being have historically been overlooked.

In 2017, a team of over 40 researchers developed the Water Insecurity Experiences (WISE) Scales to concurrently capture all salient aspects of water insecurity, or the inability to reliably access safe water for all domestic uses. The household- and individual-level tools take fewer than three minutes to implement and provide a human voice to water insecurity. Participants are asked to report how frequently they experienced twelve water-related issues, ranging from worrying about not having enough water to going to sleep thirsty,

in either the prior four weeks or one year. Resultant scores can be examined in their continuous form or dichotomised to compare differences between those who are experiencing substantial water insecurity relative to those who are not.

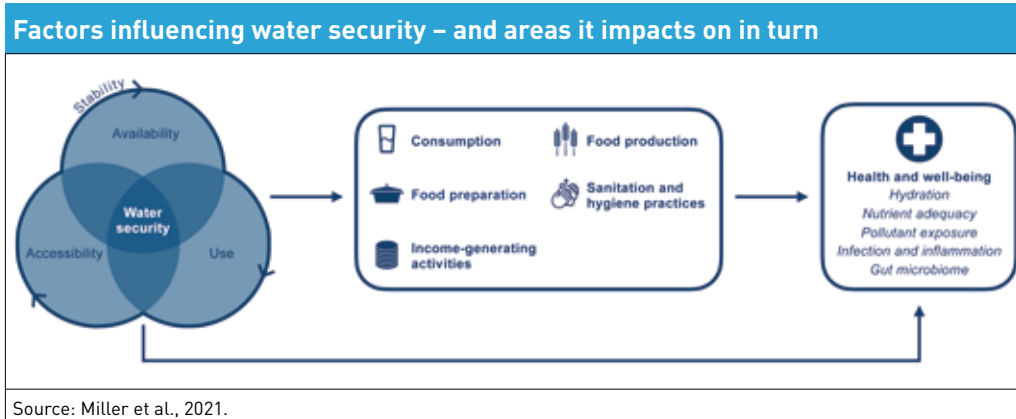
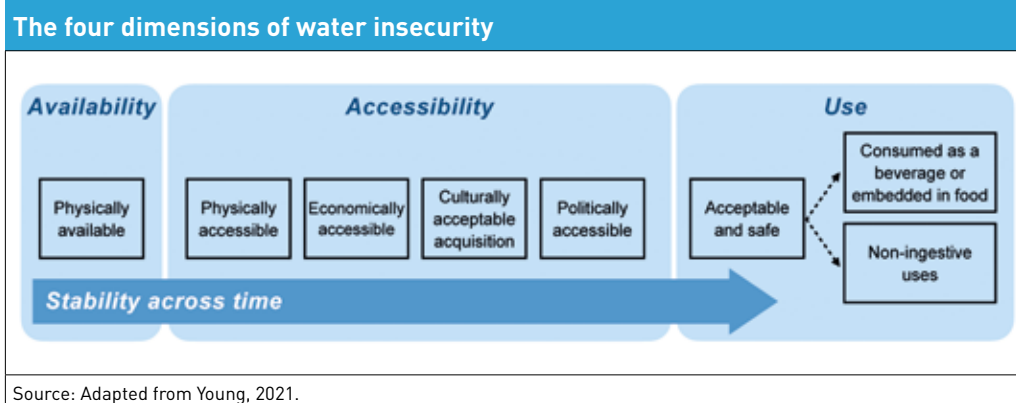
### The burden of water insecurity is not borne equally

The WISE Scales have been used by hundreds of academics, development organisations, governmental agencies and public health advocates. Additionally, the Individual WISE Scale has been included in the 2020 and 2022 rounds of the Gallup World Poll – which tracks important issues such as food access and employment world-wide, generating the first nationally representative estimates of water insecurity. The prevalence of water insecurity differed substantially across sampled countries, from 3.6 per cent in China to 63.9 per cent in Cameroon. Across assessed regions, prevalence of water insecurity was highest in sub-Saharan Africa (36.1 %) and lowest in Asia (9.1 %). Among the full sample, an estimated 14.2 per cent, or approximately 436 million of the 3.06 billion adults represented by this sample, were classified as water insecure. This prevalence was heavily influenced by China's low water insecurity prevalence and large population. Based on these data, individuals who struggled to get by on their incomes were predicted to have greater water insecurity experiences than their more financially secure peers. Additionally, water-insecure individuals were two to three times more likely to be food insecure, even after controlling for many known confounders, including gender, age and income.

Application of the tool in smaller projects has also demonstrated that water insecurity negatively impacts health and well-being. To date, studies have found that greater water insecurity is associated with greater food insecurity, lower dietary diversity, greater mental distress and higher risk of communicable disease, including higher HIV viral loads. This suggests that addressing water insecurity has the potential to meaningfully improve public health issues of international significance.

### Actionable insights for aid and development agencies

The WISE Scales can help identify vulnerable populations and more effectively target resources to those who need them most. They



can also be used to measure the impact of programmatic efforts, such as borehole construction, as well as natural shocks, including floods and droughts. The Swiss development organisation Helvetas is currently piloting the use of the Household Water Insecurity Experience (HWISE) Scale in Karnali Province in Nepal, where it has accompanied water infrastructure improvement projects for nearly 50 years, to understand people's experiences before and after water service interventions. In a 2021 survey, 18 per cent of respondents were water insecure, as measured using the HWISE Scale. That same year, with the support of the not-for-profit charity: water, Helvetas partnered with local actors to install household water connections in over 5,500 households. In the follow-up survey in 2022, less than three per cent of respondents were water insecure.

The initial results show a significant decrease in people's experiences of water insecurity after receiving household connections. In particular, there was a marked decrease in reports of feeling angry about the water service, feeling worried about not having enough water, and experiencing interruptions or a limited water supply. The HWISE Scale is also being piloted as part of a baseline survey of 8,400 households in 50 villages in Madagascar that will be connected to water service through charity: water's support.

### Adapting the scales for schools and health centres

Although implementation of the scales is widespread, they were not designed for use in settings beyond the household. Helvetas is therefore collaborating with the Swiss Water and Sanitation Consortium and Northwestern University, in the USA, to develop a new set of scales for use in evaluating experiences with water, sanitation, and hygiene services of those working in and receiving services from schools and health care facilities. By giving a human voice to water insecurity through the measurement of user experiences, we will be better equipped to advocate for change and advance toward a water-secure world for all.

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