

Staple crop diversification

Why and how to diversify from the big five crops (wheat, rice, maize, potato & soy)



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1. Executive summary

The lack of diversity in staple crop production and consumption drives several negative health, social and environmental impacts around the world and jeopardizes our capacity, especially in the face of the climate, nature and inequality crises, to provide healthy and sustainable diets to 9 billion people by 2050, within planetary boundaries. As tensions on raw materials start to emerge, the overall resilience challenge is evolving as a business risk for several food and agri-food companies.

New business models are needed to ensure that diversity in staple crops across the value chain stages emerges to safeguard their resilience and economic viability in the medium and long terms, while also potentially delivering better nutrition. A comprehensive and coordinated approach to diversifying staple crops that mixes consumption, transformation, trade and production levers has the best chance of succeeding.

The *Staple crop diversification* paper outlines the challenges and opportunities of diversifying production, procurement, manufacturing and consumption to go beyond the traditional big five crops and to help inform decision-making in companies and other key stakeholder groups.

Furthermore, recognizing that no individual company – regardless of its size – can address this challenge alone, the paper calls for pre-competitive collaboration via coalitions or associations to develop solutions.

For a start, companies will be able to come together with other key stakeholders in coalitions of action within the Food Systems Summit 2021 and the Nutrition for Growth Summit 2021 . But beyond the summits, businesses will need to demonstrate action and impact, using existing or new reporting frameworks that society as a whole is increasingly calling for – from governments and NGOs to the people who are the end-customers of these companies.

It is time to transform, for a world where people can live well, and within planetary boundaries, by 2050.

2. Introduction

Crop diversification is a critical lever in delivering healthy and sustainable diets to all, produced responsibly and within planetary boundaries. The United Nations (UN) Food System Summit is covering this subject as part of its Action Track 3 Cluster on Agrobiodiversity, which aims to boost nature-positive production. Yet it is equally relevant to all other Action Tracks that correspond to critical topics related to food systems: Action Track 1 aims to ensure access to safe and nutritious food for all; Action Track 2 to shift to sustainable consumption patterns; Action Track 4 to advance equitable livelihoods; and Action Track 5 to build resilience to vulnerabilities, shocks and stress.

In this paper, we uncover the appropriateness and feasibility of diversifying food value chains from the big five crops that dominate them today, meaning wheat, rice, maize (also known as corn), soy and potatoes (referring broadly to any roots/tubers). It will form the foundation of a dialogue with companies aimed at identifying solutions for such diversification at production, trade, procurement, product design and consumption levels, creating new markets and business opportunities that can align with and contribute to the UN Sustainable Development Goals (SDGs) and to achieving the Paris Climate Agreement.

Objectives

COVID-19 is the latest manifestation of a fractured relationship between humans and nature whereby humans have transgressed the planet's safety boundaries and must urgently re-establish them.¹ Far too often humans ignore the nutritional and health ecosystem services that biodiversity provides – and which include diversity in commodities.²

The development of more sustainable, biodiverse food production and consumption systems adapted to local conditions is critical to providing healthy and sustainable diets to 9 billion people by 2050, within the boundaries of what the planet can provide, as laid out in [WBCSD's Vision 2050](#). Business leadership is necessary for a deep, rapid and systemic transformation whereby collective action will strengthen food systems while protecting the natural resources they rely upon and people. Humans can achieve the biggest impact by first basing diversification on staples, given that these make up 70% meals in developing and emerging economies in Africa and Asia.

Our objectives are to outline the challenges and opportunities of diversifying production, procurement, manufacturing and consumption to go beyond the traditional big five crops and to help inform decision-making in companies and other key stakeholder groups.

Approach

We have developed this paper through a rigorous and iterative research and consultative process including the following key steps:

Literature review – A desk review of existing scientific research and analysis.

Company engagement – Semi-structured interviews, in-depth online seminar and individual exchanges with members of the World Business Council for Sustainable Development (WBCSD) and One Planet Business for Biodiversity (OP2B) spanning the supply chain, first to outline the challenges and opportunities to diversify production and consultation for healthy and sustainable diets, then to agree on opportunity areas for business and farmers.

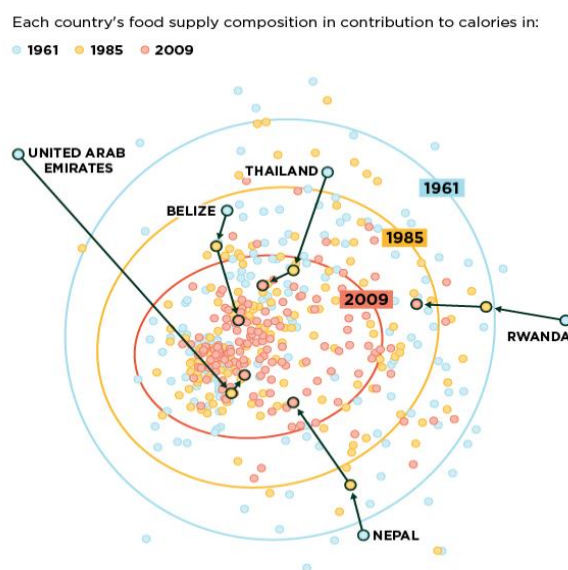
Key expert and stakeholder engagement – Consultation with key experts, scientists and stakeholders to advise on appropriate literature and data to develop the paper.

3. Background

Food systems rely heavily on five key commodities (wheat, rice, maize, potatoes and soy), with global calorie production concentrated on a limited set of commodity crops grown using intensive methods in a small number of breadbasket regions.³ According to the Food and Agriculture Organization (FAO) of the United Nations, intensive crop production of maize, rice and wheat has almost doubled over the past 50 years.⁴ Today, these three commodities are the single most produced and consumed food products in the human diet, accounting for an estimated 42.5% of the world’s calorie supply. It is much higher in developing countries; for example, in many parts of Asia rice alone can provide up to 80% of caloric intake.⁵ These cereals make up half the calorie supply in Southern Africa, with significant loss of dietary diversity. Figure 1 illustrates how, especially in the developing world, crop commodity composition (diversity) sharply decreased from 1961 to 2009.⁶

Figure 1: Principal component analysis of crop food supply composition in contribution to calories in national food supplies for 1961 (blue), 1985 (yellow) and 2009 (red)

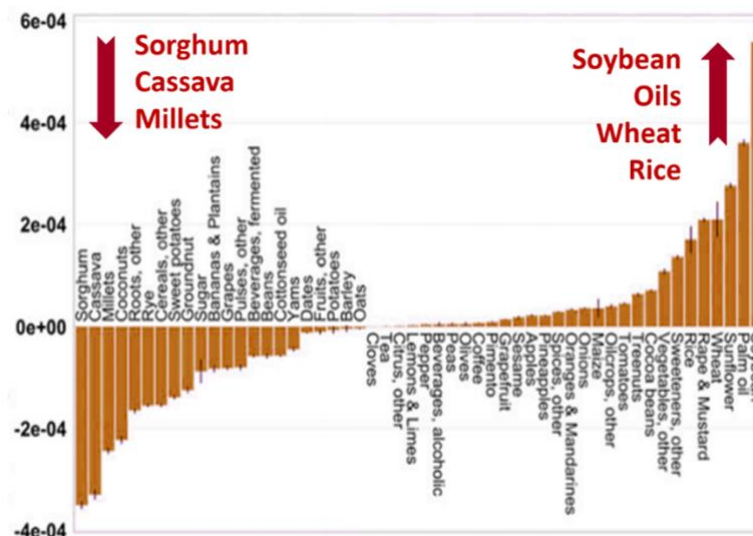
The concentration of points between 1961 and 2009 shows that the diversity of composition decreased by 69% with the world’s calories supply concentrating on a few crops.⁷



Source: Khoury et al. 2014. Proc. Natl. Acad. Sci. USA.

As shown in Figure 2, the largest increases are in soy, oils, wheat and rice; and the largest decreases are in sorghum, cassava and millets.⁸

Figure 2: Change in relative contribution of crops to diets (by calorie intake), 1961 to 2009⁹



What has driven and maintains the dominance of the big five

Multiple factors have driven – and tend to maintain – the trend in reduced crop food supply diversity:

- Rice, maize and wheat have **long histories** with humanity (the Mayans referred to themselves as “children of the maize”). The cultivation of those crops was a huge step in human evolution because of their energetic (caloric) value and because of their storage value. They were locally adapted to different soil and climate conditions and selected among many others.
- The **Green Revolution** played a significant role in intensifying and modernizing agricultural production methods, especially in Asia, which also resulted in narrowing the variety of crops consumed. There was a major emphasis and government support for large-scale output of higher yielding varieties of rice and wheat, along with increased use of fertilizers and pesticides. The focus was on the need to have enough food to stop mass starvation.
- Since the Green Revolution, organizations have focused a significant share of **international agricultural research and development aid** on wheat, maize, rice and potato. About 45% of the world’s private industry research and development into crop seed and biotechnology is dedicated to just one crop – maize.¹⁰ CGIAR is the largest single agricultural research for development organization in the world. Although representing less than 2% of agricultural research globally,¹¹ its investments reflect typical interests and investments globally as the largest agricultural government and development investors fund it. Of the funds contributing to commodities, 54% goes to rice, wheat and maize; this increases to 80% when including potatoes.¹²

- The distribution of food production is not even around the globe. **Regional specialization** in the production of certain food and feed types is one of the main drivers behind inter-regional trade and the decrease in staple diversity.¹³ Figure 3 illustrates that the US, China, India, Brazil and Russia produce half of the world’s food supply (crops, livestock and seafood).

Figure 3: Regional distribution of crops, livestock, and seafood

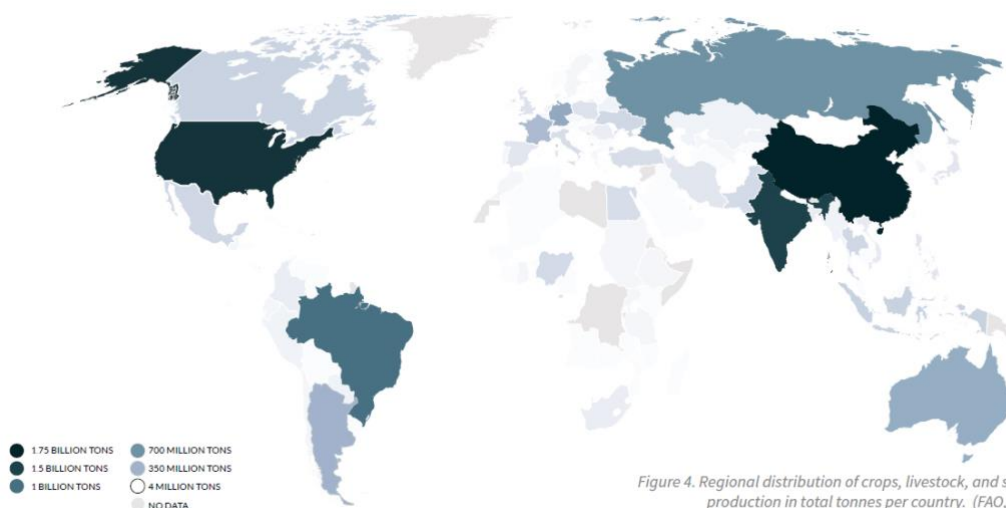
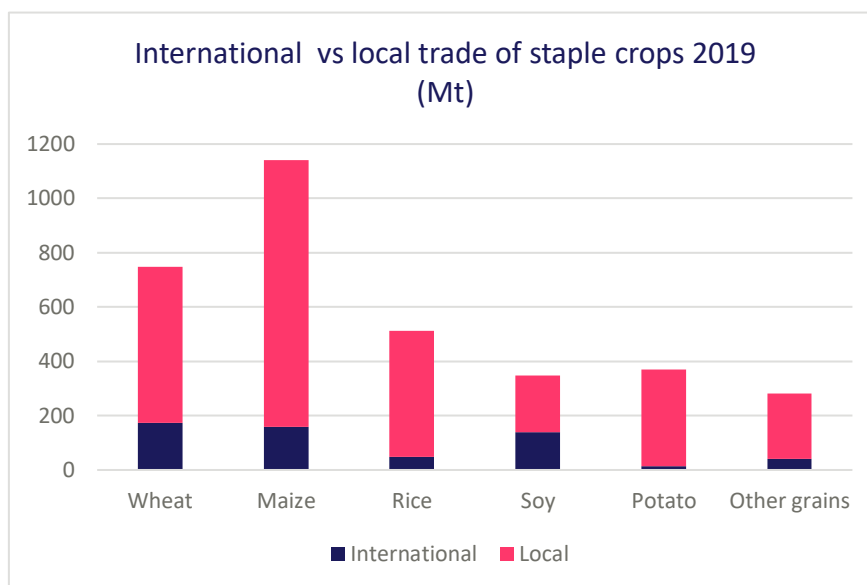


Figure 4. Regional distribution of crops, livestock, and seafood production in total tonnes per country. (FAO, 2015b)

Source: FAOSTAT¹⁴

- All countries (including in the Western world) consider staple crops as the first pillar of food sufficiency. A key driver of the status quo is thus that these **main staple crops are predominantly a national issue in maintaining food security**.¹⁵ As shown in Figure 4, trade indeed only represents a minor part of the consumption of staples for food, feed, fiber and fuel (wheat: 24%; maize: 14%; rice: 9%; soy: 40%; potato: 6%). Similarly, only 15% of other coarse grains (including barley, oats, rye, sorghum and millets) are traded.

Figure 4: International vs local trade of staple crops globally in 2019 (Mt)



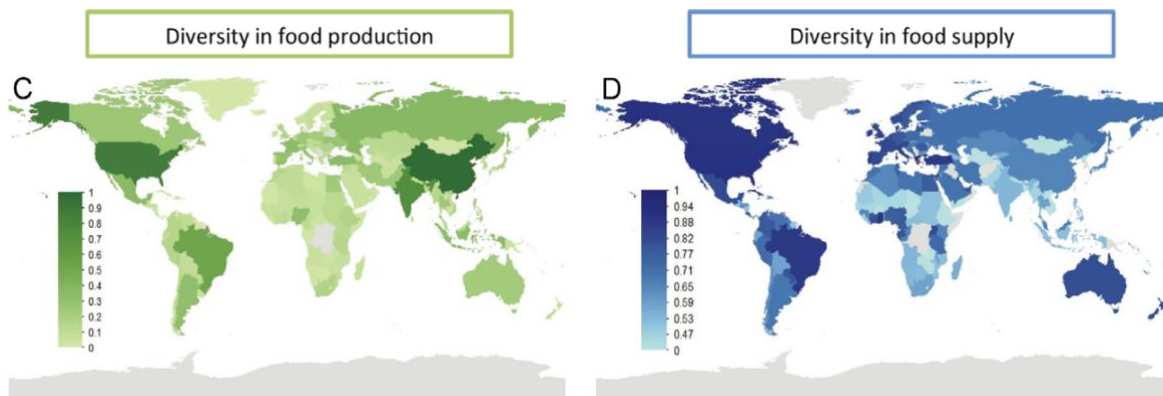
Note: Other grains include barley, oats, rye, sorghum and millet.¹⁶

Specifically, most Asian countries are concerned with being rice self-sufficient and highly support or subsidize it. India has included rice and wheat in its main schemes: minimum support price, public distribution scheme, school feeding mid-day meal programs and Anganwadi (mother and child) feeding programs. Similarly, the European Union, USA and China still subsidize wheat production to maintain their self-sufficiency and avoid imports. But the outcome is that wheat (often under extensive dry farming) ends up being one of the least efficient crops per land unit.¹⁷

- Despite the predominance of local trade in staple crops, another important driver of the status quo is **globalization**, through two major mechanisms:
 - **Food value chain concentration and integration** have contributed to changes in the power and strategies of all actors. The 10 biggest seed producers controlled over 75% of the market in 2011, while the ABCD traders (Archer Midlands, Bunge, Cargill, Louis Dreyfus) accounted for between 60% and 75% of global trade flows in cereals and soy.¹⁸ This rationalization has strengthened agribusiness companies, which generally focus on the largest crops, hybrids and scale that are most profitable. This leaves less commercial support for other commodities and hence disincentivizes diversification.
 - **Food uniformization and standardization**, with more uniform food trends – food “westernization”, along with international restaurant brands being present all over the world, drive more uniform demand for the main staples, with disincentives for crop diversity or variety.¹⁹
- Diets and food habits remain strongly embedded in **national and regional culture**. Many Asians view a meal as incomplete if not served with rice. The same applies in many sub-Saharan Africa countries: *The shadow of the sun*²⁰ talks about a rural village in Senegal:

“One eats once a day and always the same thing. [...] In the village, there are poor and rich people, but it is the quantity of rice, and not the variety of dishes that marks the difference.” Worldwide, people perceive rice and wheat as modern aspirational foods and traditional grains like millets and sorghum as old-fashioned food or food for the poor. Specifically, Africa imports large quantities of rice and wheat while consumers perceive their traditional grains as inferior and are not popular foods in demand. Research on trophic levels (a synthetic metric of diets that describes the composition of food consumed and enables comparisons of diets) shows that countries tend to evolve in quite similar directions.²¹ Research on functional diversity (describing the diversity in nutritional composition of food items) shows clear regional trends,²² whereby middle- and high-income countries compensate for their low production diversity through imports of diverse foods (see Figure 5).

Figure 5: Global map of functional diversity describing the diversity in nutritional composition of food items produced (C) and supplied (D)²³



- Over the last decades, food systems have received significant **economic incentives** for the expansion of a few staple crops. The entrenchment of power that results is a lock-in effect that makes it very difficult to push through corrective policies that address more diversified production and consumption patterns beyond the traditional big five crops that dominate the food and agriculture system.²⁴
- While the **global banking system** has made climate more of a priority, it is generally expanding investments into agribusiness companies regardless of their farming practices and related impacts on land use, soil and biodiversity. As an illustration, overall global banks have increased their lending to commodities linked to deforestation by about 40%, funneling USD \$154 billion dollars in credit since December 2015.²⁵
- The focus on a few major staples for self-sufficiency, culture and different forms of investment incentives has led to a **food system divide**. Government support, private industry investment, product development and development aid geared towards the big five staple crops have strengthened the value chains and markets of these crops. These crops consequently attract more investment and so the cycle continues. This makes it difficult for other crops with less-developed value chains to attract investments and compete.

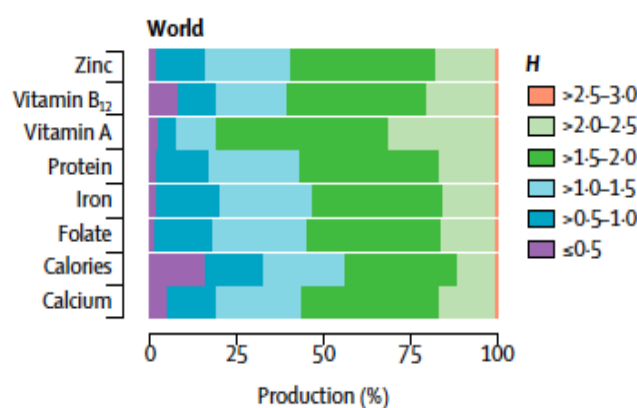
4. Risks and impacts associated with today’s staple crop system and options for improvement

Nutrition- and health-related risks and impacts

While wheat, maize and rice yields have increased steeply, other cereal species outperform them – and wheat and rice in particular – in terms of nutritional yield.²⁶ As the share of people’s diets has evolved in favor of these three crops, the overall nutritional content of the cereals consumed has decreased over time. There is indeed a strong association between dietary diversity, particularly micronutrient density of the diet, and nutritional status.²⁷ The lack of diversity is thus a vital issue, particularly in the developing world where diets consist mainly of starchy, refined staples that are low in micronutrients and people have limited access to nutrient-rich sources of food such as animal proteins, fruits and vegetables. In Africa, 25-30% of the population’s nutrient intake falls under the minimum dietary requirements,²⁸ with the number of undernourished people today at 250 million and growing.²⁹

Land-use change from natural to managed habitats and higher costs of crop diversification are heavily undermining the production and consumption of indigenous vegetables that contain high levels of minerals, especially calcium, iron and phosphorus, vitamins A and C, and proteins.³⁰ On the other hand, more diverse agricultural landscapes produce most global micronutrients (53-81%) and protein (57%)³¹ (see Figure 6).

Figure 6: Production of nutrients by diversity category. *The higher the Shannon index H, the higher the diversity*³²

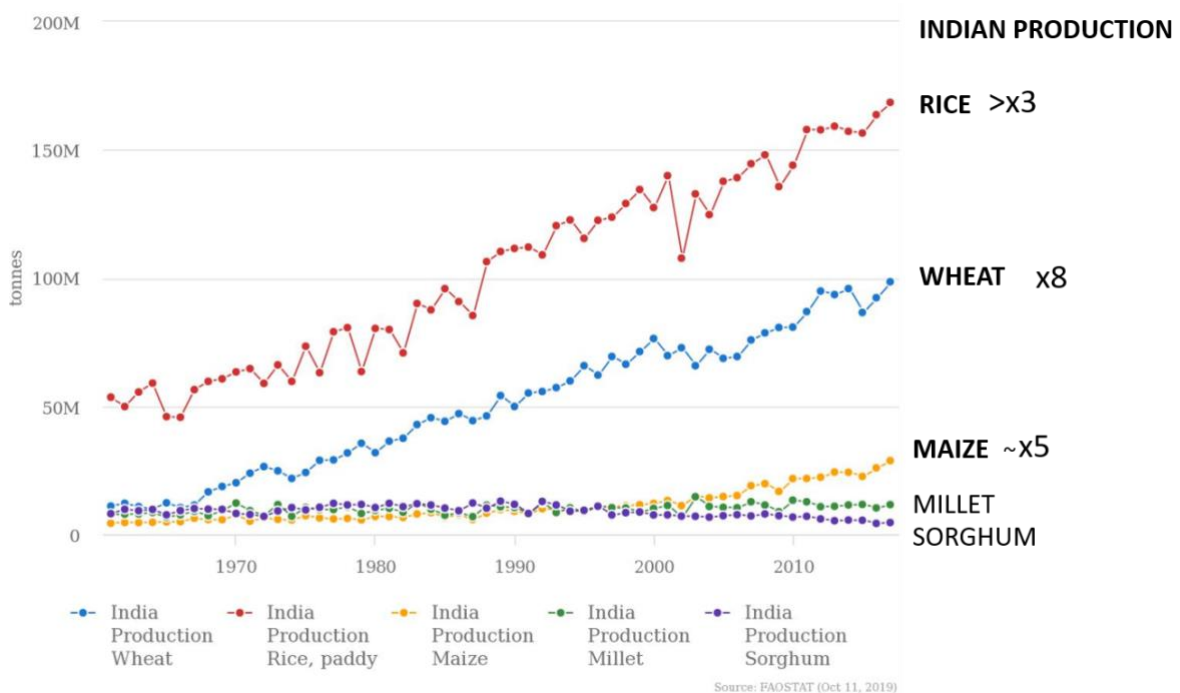


Diversity of food intake is also important in supporting the gut microbiome³³ and the related functions of the immune systems are key to preventing and overcoming non-communicable and infectious diseases. For instance, there is evidence that nutritionally well-balanced diets and the consumption of nutrient-rich indigenous vegetables improve the control of HIV infection and mitigate the health impact of AIDS.³⁴ The negative impacts of poor dietary choices on immune systems has legitimately raised global attention with the COVID-19 pandemic given the fact that

being overweight or obese, or having a non-communicable disease often related with poor diets, increases the risks associated with COVID-19, including severe and fatal forms.³⁵ This new development further supports the fact that providing adequate nutrition should be a central goal of production systems, value chains and marketplaces.³⁶

This applies specifically to millet and sorghum, which are dominant crops in semi-arid tropical regions in Asia and Africa but are neglected and little used crops globally.³⁷ Yet, they are high in micro- and macronutrient content – especially many of the most needed nutrients: iron, zinc, calcium and essential amino acids. Additionally, millets and sorghum have a low glycemic index that is key to managing and preventing diabetes – which is of growing concern with an estimate to increase by 25-51% from 2019 to 2045.³⁸ Despite these environmental and nutritional benefits, rice has supplanted millet in countries such as India, where it used to play a key role in household food security and dietary diversity. Figure 7 shows India’s dramatic rise in rice and wheat production and the emergence of maize compared to the traditional millet and sorghum staples, which have seen almost no change.

Figure 7: Staple production in India from 1960 to 2018³⁹

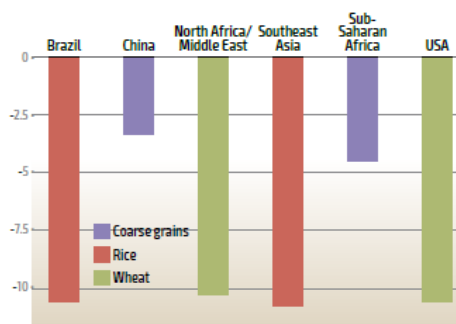


Environmental risks and impacts

Higher temperatures and lower precipitation experienced since 1980 due to climate change have lowered wheat yields by 5.5% and maize yields by 3.8%.⁴⁰ Climate change is expected to reduce global crop yields by 3–12% by mid-century and 11–25% by century's end, under a vigorous warming scenario. The short-term and long-term impacts of radical changes in temperature will be larger in magnitude and significant especially for soybeans, maize, and winter wheat⁴¹.

Without system adaptation, global crop yields in 2050 are projected to be 6.9% lower earlier yields, with cereal yields in particular 10% lower, as illustrated in Figure 8.⁴² In addition, today's high-yielding rice varieties are intolerant of major abiotic stresses that climate change is likely to aggravate, such as higher temperatures, drought and salinity.⁴³

Figure 8: Projected declines in cereal yields owing to climate change 2050, without adaptation (%)⁴⁴



*Relative to baseline values in 2050 without climate change, average result of three general circulation models

Agriculture and the diversification of crops towards less stressed varieties/species are at the crossroads of problem and solution. A large body of evidence shows that populations of many plant species are better adapted to their local environments and therefore are more resilient to local environmental pressures than foreign ones.⁴⁵

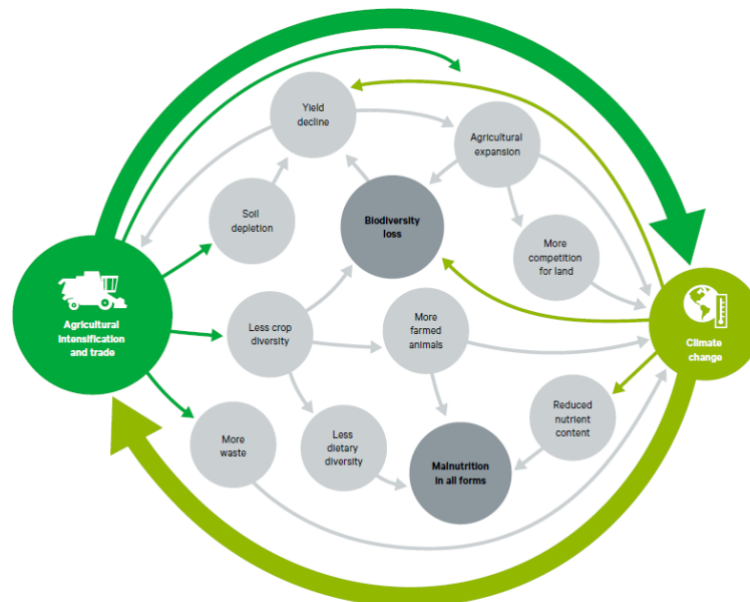
Grain sorghum, for instance, is highly resistant to drought and can withstand water logging better than other cereal crops.⁴⁶ In addition, sorghum varieties have been known to thrive better on marginal lands than other cereal crops.⁴⁷ Millet and sorghum are thus climate-smart crops: good for climate change adaptation and a resilience risk management strategy for farmers. This is important for marginalized farmers in the Sahel, for instance, and could also be a solution for farmers in water- and heat-stressed areas of the US. For instance, farmers grow grain sorghum – or milo – in Kansas, harvesting 433 million bushels from over 6.4 million acres in 2014.⁴⁸

Crop diversification has the potential to enhance biodiversity, pollination, pest control, nutrient cycling, soil fertility, and water regulation without compromising crop yields.⁴⁹ The positive impact on the environment and the protection of biodiversity, however, also largely depends on the sustainability of the agricultural practices involved. In addition, it will only be possible to maintain them sustainably over time if production practices contribute to maintaining the equitable livelihoods of farmers and farmer communities.

Socioeconomic risks and impacts

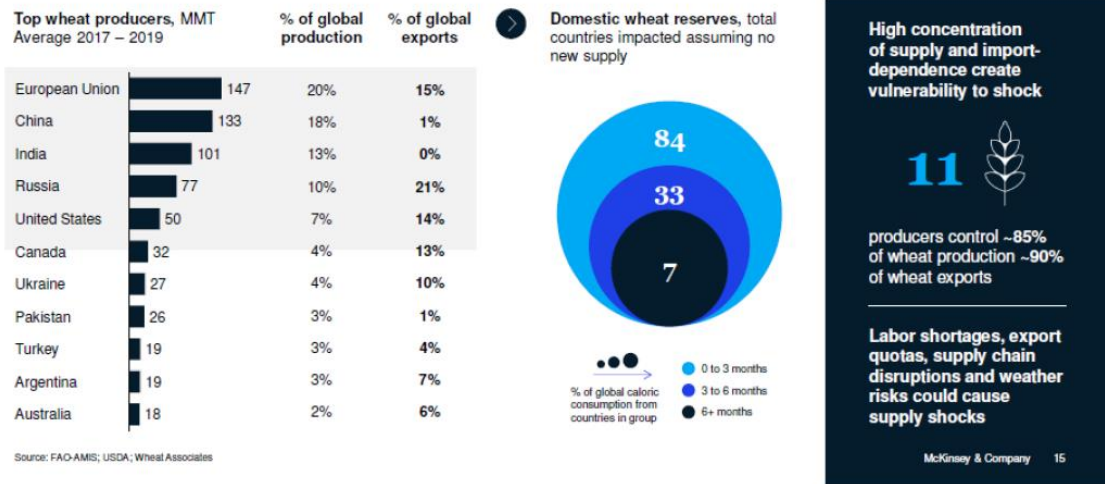
The negative impacts of today’s food system on people’s health, the environment and farmer resilience to climate change, at a regional and global level, are estimated at USD \$12 trillion per year, in comparison to USD \$10 trillion of economic value.⁵⁰ The concentration of the global crop production system on a few key commodities (wheat, rice, maize, soy and potato) has driven down their price to a level that largely ignores the costs to society, encourages unhealthy diets lacking nutrients, and undermines the capacity of communities and natural ecosystems to produce sufficient and nutritious food over time. Called the Cheaper Food paradigm (see Figure 9), a 2021 Chatham House report⁵¹ analyzes how it creates a risk of increased food and nutrition insecurity in the longer term.

Figure 9: The Cheaper Food paradigm⁵²



In addition, the COVID-19 outbreak has shown that higher crop intensity concentrated in a few countries (such as East and Southeast Asia, which account for 60% of world rice production) brings risks of shortfalls in production or supply, which has had disastrous impacts on food security around the world (see Figure 10). This has made clearer than ever the need to build more resilient systems to mitigate shocks.⁵³

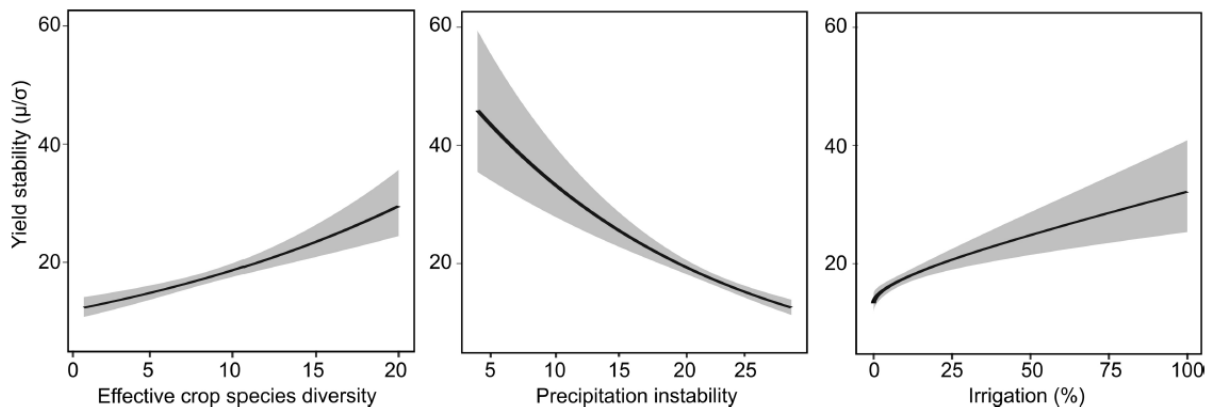
Figure 10: How 5 producing countries/regions control 70% of wheat production and 50% of exports



Data from McKenzie & Company. Source: World bank, FAOSTAT54

One pivotal way to increase resilience is to increase crop diversity: a greater effective diversity of crops at the national level is associated with increased temporal stability of total national harvest,⁵⁵ and crop diversity has stabilizing effects that are similar in magnitude to the observed stabilizing effects of irrigation, as shown in Figure 11. Among others, this is related to the fact that crop rotation helps de-risk farmer operations from pests and deter climatic events: hence diversification is not only beneficial regionally or globally but also at farm level. A recent study in the US shows that more diversified farms have been more resilient throughout the COVID-19 pandemic.⁵⁶

Figure 11: Main determinants of national caloric yield stability
Magnitude of the change in national yield stability as dependent on effective crop species diversity, precipitation instability, and irrigation⁵⁷



5. The business case for staple crop diversification

Food system integration is represented by retailer chains purchasing most of their food from the 10 largest food companies, which in turn procure from 4 large trade and processing distributors.⁵⁸ The latter source their crops from only 1% of the 157 million farms – cultivating 65% of all arable land.

While this integrated supply chain has contributed to a loss of diversity in people’s diets,⁵⁹ it also provides a unique opportunity to transform the production system, to innovate for a better today. Crop diversification enabled through these large trading and processing companies could in turn leverage opportunities for smaller players, as supply, demand and resulting markets would open to new staples, at both international and local levels.

The benefits and opportunities are clear. Nevertheless, a transformation at scale will require large demand pull and (re)synchronization between supply and demand. The development of the market for organic products over the last decade has been a good illustration of the steps required to move from a niche to a relative mainstream market: farmer engagement, support to farmers, food safety standards, traceability, flux segregation, and consumer information are only a few of the essential topics to address.

Smart food: “Good for you, Good for the planet, Good for the farmer”⁶⁰

Efforts to diversify agriculture and diets have focused on developing value chains for and awareness of a wide range of local traditional but neglected and underused crops. Only one known global initiative – Smart Food initiative – has focused on diversifying staples, recognizing that this can have the biggest impact on the SDGs given the size of the market and especially their dominance in developing and emerging economies in Asia and Africa.

Highlighted by WBCSD’s project FReSH in 2018,⁶¹ the initiative recognizes that to bring in other major staples, there needs to be a focus on only one or two crops at a time, along with dedicated efforts to develop their value chains and make them local and global commodities. It also recognizes that this requires efforts at the consumer end to drive awareness and demand for the selected foods.

The initiative selected millets (broadly defined to include sorghum) as the first focus staples because they fill all the smart food criteria of being good for consumers, the planet and farmers. They are highly nutritious and satisfy some of the biggest health needs. They also have a low carbon footprint and can survive in high temperatures and with very little water. They are often the last crop standing in times of drought, are climate-smart and a good risk management strategy for farmers. They have greater potential to increase yields as they have received less investment and other major staples are closer to a yield plateau. And they have multiple uses, from food, feed and fodder, to brewing and biofuels.

The nutritional values of sorghum and millets are high and can meet some of the biggest nutrition needs. For example, finger millet has three times more calcium than milk. Many of the millets are high in iron and zinc (much higher than meat; although plant-based iron has lower bioavailability, the iron composition is so high it still provides close to the daily allowance of iron), have a low glycemic index (important due to the growing incidence of diabetes and a good alternative to cereals such as refined white rice), and are high in fiber and have good levels of protein and more.

Millets and sorghum have been staples in many African countries and parts of Asia. They also fit some of the biggest global health food trends – of being a super food, ancient grains, gluten-free, low glycemic index, high-fiber and good for weight loss. They grow in many countries and locations, from the tropics to drylands, and the Sahara to mountainous regions like the Himalayas.

Opportunities for food value chain businesses

The main opportunities identified are summarized in the table below:

Opportunities from staple crop diversification along the value chain	Production	Trade	Procurement	Product design	Retail	Consumption
Increased value chain resilience	++	++	++	+	+	
New, sustainable and healthy foods and recipes				++	++	+
Co-products to improve food processing/innovative formulation	+			++	+	
Company cooperation to develop processing		+	+	++		
Return on investment in the true value of food	++				++	++

Many persons consulted insisted on the need for a **business case for farmers**, considering farm sizes and geography, notably:

- Smaller farms are often more diversified, cultivating crops as both an income source and part of their diet; thus, they have more potential to diversify further if they have access to the means to de-risk their transition;
- Larger farms need a different approach, more related to international trade incentives and opportunities;
- Farmers will usually require support to adopt a new technical calendar at farm level, although several farmer organizations have noted that more diversified crops spread labor throughout the year;⁶²
- Considering the surfaces planted for alternative crops, it is also necessary to explore collective investments into harvesting material required for different crops; and
- Ultimately, in all the situations, there has to be a demand pull, and efforts to build consumers awareness and demand is an important part of the solution.

As for other food value chain businesses:

- One of the major opportunities is in **increased value chain resilience** provided by staple crop diversification: from the farm level, where crop rotations help fertilize soils (when introducing legumes) and de-risking farmer operations from pests and climatic events, to the sourcing and processing levels where diverse crops decrease economic volatility. “Adding small-grains species like oats, wheat, rye or barley to a crop rotation is an effective way to biologically control weeds, grow a bigger or more diverse cover crop that can offset feed or fertilizer costs and spread labor throughout the year. Once common on farms across the Maize Belt, the acres planted to these crops fell sharply over the decades – and with it, the infrastructure and markets farmers once relied on.”⁶³
- It is possible to **market** diversified staples in ways ranging from the development of niche products with a consumer-facing brand (such as mix of grains) to a more subtle way by modifying the core product formulation. The Smart Food initiative provides a good example of how Karnataka State in India has achieved this by mobilizing policy-makers, chefs, the media and food brands to nudge both farmers and consumers.⁶⁴
- Diversifying staples also create opportunities to generate **co-products to improve food processing** by improving product digestibility (such as malt into cereals or fermenting pulses), or providing useful phytonutrients, sustainable proteins and fats. Indeed, the increase in diversified food options has a positive impact on nutrition and health only if done through the correct processing practices (such as in conjunction with a higher consumption of diversified cereals that should also be less refined). Improved food processing can in turn decrease production costs through **innovative formulation**.
- Attempts to (re)diversify crops also show that farmers and business can mitigate the risks in entering a new market through **company cooperation in developing the processing** of both raw materials and individual ingredients at a scale where benefits compensate for the risks,

or in reorienting part of their business towards the services required to accompany diversification, both to farmers and other value chain actors.

- Finally, in the medium term, crop diversification also helps increase the return on investment considering the **true value of food**, a concept that strives to advance how food and agriculture companies measure and value their impacts and their dependencies on natural, social and human capital, as well as understand how these impacts and dependencies pose critical risks and opportunities for business models, the planet and society. For instance, labels guiding consumer choices (such as Nutri-Score, Eco-Score in Europe) can reflect the value created by crop diversification. Ultimately there needs to be an evolution of the food environment at large to support improved health and sustainability, including ecosystem service markets (for instance carbon credits, water credits), providing benefits to both farmers and the industry.⁶⁵

6. Conclusion

The lack of diversity in staple crop production and consumption drives several negative health, social and environmental impacts around the world and jeopardizes our capacity, especially during the current climate crisis, to provide healthy and sustainable diets to 9 billion people by 2050, within planetary boundaries.

New business models are needed to ensure that diversity in staple crops across the value chain stages emerges to safeguard their resilience and economic viability in the medium and long terms, while also potentially delivering better nutrition. A comprehensive and coordinated approach to diversifying staple crops that mixes consumption, transformation, trade and production levers has the best chance of succeeding, as illustrated by the example of the Smart Food initiative. The initiative has contributed to a demand-pull millet movement across India that has witnessed a major expansion of new companies and products in the market.

The need for a coordinated approach focusing both on production and consumption is aligned with WBCSD's [CEO Guide to Food System Transformation](#), which outlines seven pathways to transform food systems in the next decade by turning around production and consumption.⁶⁶ It echoes WBCSD's Food and Agriculture Roadmap, which operationalizes the *CEO Guide* transformation pathways by helping companies prioritize and develop business-led solutions while advancing supportive policy, regulatory and financial frameworks.⁶⁷ This is also aligned with WBCSD's newly released [Vision 2050](#), which highlights the need for urgent business leadership and action to achieve a deep, rapid and systemic transformation of food systems.⁶⁸

As tensions on raw materials start to emerge, the overall resilience challenge is evolving as a business risk for several agriculture-centric companies. Acknowledging that none of the companies – regardless of their size – can fix it alone, there is growing corporate interest in working pre-competitively via coalitions or associations to develop solutions. One Planet Business for Biodiversity (OP2B) is one such coalition. Although signed off at the highest level of management, the operating challenge for the business sustainability agenda remains: How to partner best to cover the cost of changes generated by transforming from a truly optimized supply chain model? How to move from a cost-to-production ratio to societal value while still delivering the expected margins?

The [Food Systems Summit 2021](#) and the [Nutrition for Growth Summit 2021](#) provide unique opportunities for businesses and other stakeholders to come together in coalitions of action that aim to renew humanity's relationship with how it produces and consumes food. Specifically, food value chain companies have a role to play in improving staple crop diversity at production, trade, procurement, product design and consumption levels, creating new markets and business opportunities that can align with and contribute to the UN Sustainable Development Goals and to achieving the Paris Climate Agreement.

For a start, companies will be able to show leadership on this matter as part of the Food System Summit's Solution Cluster on agrobiodiversity and agroecology. But beyond the summit, they will need to demonstrate action and impact, using existing or new reporting frameworks that society as a whole is increasingly calling for – from governments and NGOs to the people who are the end-customers of these companies.

It is time to transform. Now.

Endnotes

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Disclaimer

This report has been developed in the name of WBCSD. Like other WBCSD publications, it is the result of a collaborative effort by members of the secretariat and senior executives from member companies. A wide range of members reviewed drafts, thereby ensuring that the document broadly represents the perspective of the WBCSD membership. Input and feedback from stakeholders listed above was incorporated in a balanced way. This does not mean, however, that every member company or stakeholder agrees with every word.

About WBCSD

The World Business Council for Sustainable Development (WBCSD) is a global, CEO-led organization of over 200 leading businesses working together to accelerate the transition to a sustainable world. We help make our member companies more successful and sustainable by focusing on the maximum positive impact for shareholders, the environment and societies. Our member companies come from all business sectors and all major economies, representing a combined revenue of more than USD \$8.5 trillion and 19 million employees. Our Global Network of almost 70 national business councils gives our members unparalleled reach across the globe. WBCSD is uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues. Together, we are the leading voice of business for sustainability: united by our vision of a world where more than nine billion people are all living well and within planetary boundaries, by 2050.

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About FReSH

Food Reform for Sustainability and Health (FReSH) is a WBCSD project aimed at providing healthy, enjoyable diets for all, produced responsibly within planetary boundaries through:

- A systemic approach covering health and nutrition, the environment and socioeconomics;
- A theory of change starting at the consumer level, whereby changing consumer habits and diets will pull the whole food value chain.

FReSH facilitates the pre-competitive collaboration of over 30 member companies on the development of business solutions relating to healthy and sustainable diets, which is one of the four direct pathways to food system transformation laid out in the [CEO Guide to Food System Transformation](#).

To that aim, FReSH coordinates action areas addressing three transformational goals:

- Positive Nutrition
- Positive Consumption
- True Value of Food

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One Planet Business for Biodiversity (OP2B) is a unique international cross-sectorial, action-oriented business coalition on biodiversity with a specific focus on agriculture, initiated within French President Macron's One Planet Lab framework, launched at the United Nations Climate Action Summit in New York on 23 September 2019. The coalition is determined to drive transformational systemic change and catalyze action to protect and restore cultivated and natural biodiversity within value chains, engage institutional and financial decision-makers, and develop and promote policy recommendations for the 2021 CBD COP15 framework.

Actions focus on three pillars: scaling up regenerative agricultural practices; boosting cultivated biodiversity and diets through product portfolios; and eliminating deforestation/enhancing the management, restoration and protection of high-value natural ecosystems.

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