

## EXECUTIVE SUMMARY

# FOOD FOR THOUGHT

Investment Opportunities Across a Changing Food System

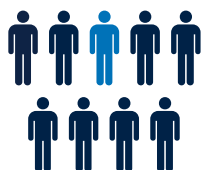
## INTRODUCTION

From farm to fork, our global food system is vast, complex, inefficient and increasingly unfit for purpose. We believe understanding and navigating the rapid evolution of our fragile global food system is important for asset owners for four primary reasons:

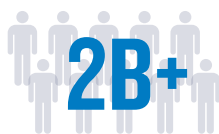
1. Vulnerabilities in the food supply chain are driving critical macroeconomic outcomes, both monetary and fiscal
2. Food and farmer security is critical in evaluating domestic political stability – across both emerging and developed markets – and cross-border geopolitical risks, such as those posed by the war in Ukraine.
3. The global food system is transforming and the current inflection point create unique investment opportunities in both public and private markets
4. Investing in the food system provides opportunities for investors to further ESG goals and have a measurable impact.

For investors, it is especially critical to identify the compelling supply and demand forces reshaping the entire food value chain.

### UNEQUAL DISTRIBUTION OF CALORIES



One of every nine people is undernourished (800M+ people)



Over two billion people worldwide are obese or overweight

### FOOD WASTE



2.5 billion tons of food lost or wasted each year throughout the food value chain

### CLIMATE AND AGRICULTURE



Climate change is causing a 12% decline in crop yields

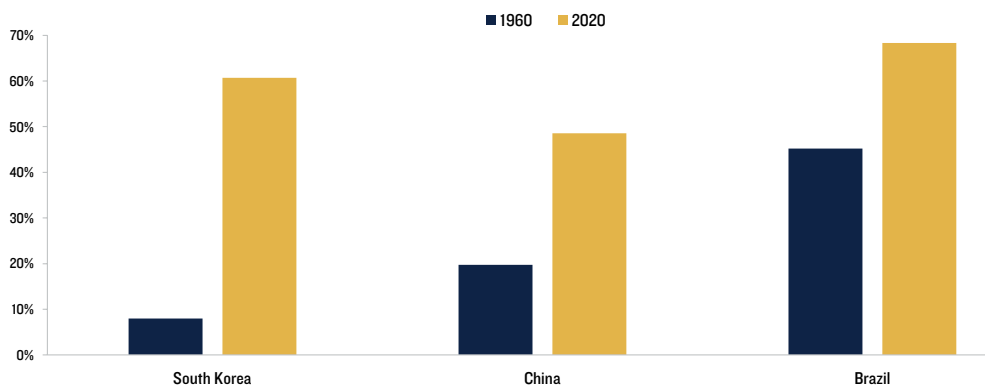
# RISING AFFLUENCE & SHIFTING PREFERENCES ARE RESHAPING FOOD DEMAND



Three drivers are critical to understanding global food demand and are an essential part of any investment decision across the food system:

- 1) **Rising affluence will be a key driver of food demand.** As countries grow in affluence, their food consumption patterns change dramatically. Alongside population growth, this income effect has strong implications on food demand as more countries approach middle-income status.
- 2) **Diets are converging globally.** Over the last few decades, emerging and frontier markets have seen a shift to a “western” diet. That is, a diet heavy on animal proteins, dairy products, wheat, oils and sugar. This trend will persist going forward.
- 3) **Global consumer preferences are evolving in different ways.** There is a global trend towards convenience and in-home dining. Consumers in emerging markets are driven by packaged and delivered food in general, while health and wellness concerns are paramount for consumers in developed markets.

SHARE OF TOTAL DAILY CALORIES FROM A “WESTERN DIET”



Source: United Nations, Food and Agriculture Organization. As of April 2023.

Note: In this chart, “western diet” refers to animal proteins, dairy products, wheat, vegetable oils and sugars.

GLOBAL DEMAND FOR  
PREPARED FOODS &  
MEALS IS SET TO GROW

↑ **70%**  
TO  
**\$250**  
BILLION BY 2029

Source: Fortune Business Insights

## INVESTMENT IMPLICATIONS ACROSS FOOD DEMAND

- |   |  |
|---|--|
| 1. Meat producers offer a contrarian investment opportunity         | <ul style="list-style-type: none"> <li>• More affluent populations and convergence of global diets create opportunity for meat producers</li> <li>• ESG investors should consider engaging with conventional meat manufacturers</li> </ul>                       |
| 2. Cold storage and transportation provide global opportunities     | <ul style="list-style-type: none"> <li>• Proximity to urban centers and transportation hubs are key</li> <li>• Cold logistics providers and real estate in the US, SE Asia and Latin America can be attractive</li> </ul>  |
| 3. Packaging offers cash flows no matter the underlying food fad    | <ul style="list-style-type: none"> <li>• Irrespective of the trend, food innovation is reliant on new packaging and machinery</li> <li>• Seek out leading packaging firms as well as equipment makers in the US and Europe</li> </ul>                            |
| 4. Health and wellness options drive grocery and food innovation    | <ul style="list-style-type: none"> <li>• Consumers are seeking healthier food options and may be willing to pay up for it</li> <li>• Look for companies that are closing the gap on price and taste rather than relying on changes to consumer tastes</li> </ul> |
| 5. Convenience and food safety drives emerging market opportunities | <ul style="list-style-type: none"> <li>• Concerns around food safety in EM has led to demand for recognized brands and packaged foods</li> <li>• Regional bakers and bottlers offer opportunities in India and Latin America</li> </ul>                          |

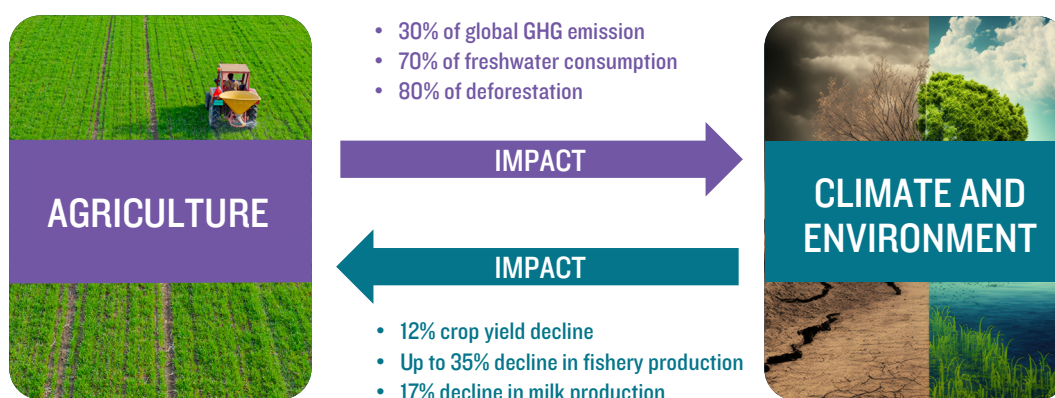
# FOOD SUPPLY: CLIMATE AND INNOVATION ARE TRANSFORMING PRODUCTION



The food supply chain is being transformed by two drivers that investors cannot ignore:

- 1) **The feedback loop between the environment and agriculture.** While the adverse effects of climate change on food production are well-reported, less attention is paid to the large imprint the food system leaves on the environment.
- 2) **Technology and innovation are critical.** To meet the challenges of the future, technology and innovation will need to play a leading role in making our food system more productive and sustainable. It is important for investors to recognize that real innovation is taking place in global incumbents as well as trendy tech startups.

## AGRICULTURE AND THE ENVIRONMENT IMPACT EACH OTHER



Source: PGIM Thematic Research, as of April 2023.

## INVESTMENT IMPLICATIONS ACROSS FOOD SUPPLY

1. <b>AgTech driving smarter, more sustainable food production on small farms</b>	<ul style="list-style-type: none"> <li>• Finding ways to enhance productivity of small-scale farms is critical to meeting future food demands</li> <li>• AgTech landscape is fragmented with many startups and can offer attractive VC investments</li> </ul>
2. <b>Farmland debt and equity offer a unique exposure and attractive investment</b>	<ul style="list-style-type: none"> <li>• A range of risk-reward propositions for debt and equity investors</li> <li>• California is especially attractive for investors because of its optimal climate and proximity to major exchanges, ports and highways</li> </ul>
3. <b>Crop science and feed additives solutions to boost productivity and sustainability</b>	<ul style="list-style-type: none"> <li>• Leaders in Asia have local expertise and established distribution networks</li> <li>• Leaders in Europe and North America offer real-world products and have diversified businesses and scale</li> </ul>
4. <b>Precision agriculture improves efficiency of larger farms</b>	<ul style="list-style-type: none"> <li>• Opportunities in both large global agriculture equipment makers as well as tech startups</li> <li>• Latin America provides growth opportunities as farmers in Brazil and Argentina modernize</li> </ul>
5. <b>Fertilizers will remain essential to maintain and enhance crop yields</b>	<ul style="list-style-type: none"> <li>• Annual need for some fertilizers provides steady source of demand that are not easily replaced</li> <li>• ESG-minded investors should strongly consider engagement with this sector as they will be vital to food production for some time</li> </ul>
6. <b>Cultivated meat: More sizzle than steak for investors</b>	<ul style="list-style-type: none"> <li>• The market for cultivated meat is highly fragmented with serious challenges and much uncertainty</li> <li>• Investors should instead focus on production of simple proteins (i.e., whey or egg albumen) for commercial use</li> </ul>



# PORTFOLIO-WIDE INVESTMENT IMPLICATIONS



**There are also important cross-portfolio implications from the transformations underway in the global food system, including:**

- 1) Disruptions in food distribution may reveal geopolitical and macroeconomic vulnerabilities.** Interruptions in food supply chains can threaten food security, drive price inflation and be highly disruptive. This can even lead to social and political instability – especially in frontier and emerging markets. Investors need to recognize interruptions to the food supply chain are likely to be more frequent going forward and may want to consider supplementing their assessment of country risk to account for these disruptions.
- 2) Today's food system provides a vital good with inherent ESG tensions and opportunities.** For investors with commitments to decarbonization and sustainability, there is a growing recognition that the broad food system needs to play a vital role in achieving both objectives. The report highlights the importance for ESG investors to engage with all sectors across the food system, seek out innovative incumbents, and work to narrow the ESG data gap at companies across the food value chain.
- 3) Farmland investing provides diversification and inflation protection.** Institutional investors may want to evaluate an allocation to farmland within their portfolio because it offers some potentially beneficial portfolio characteristics, in particular a low correlation major asset classes and a relatively reliable inflation hedge and store of wealth during uncertain times.

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