MERIDIAN INSTITUTE

The Food and Land Use Coalition

Accelerating a Shift to Healthy and Sustainable Diets in China

Scoping Study
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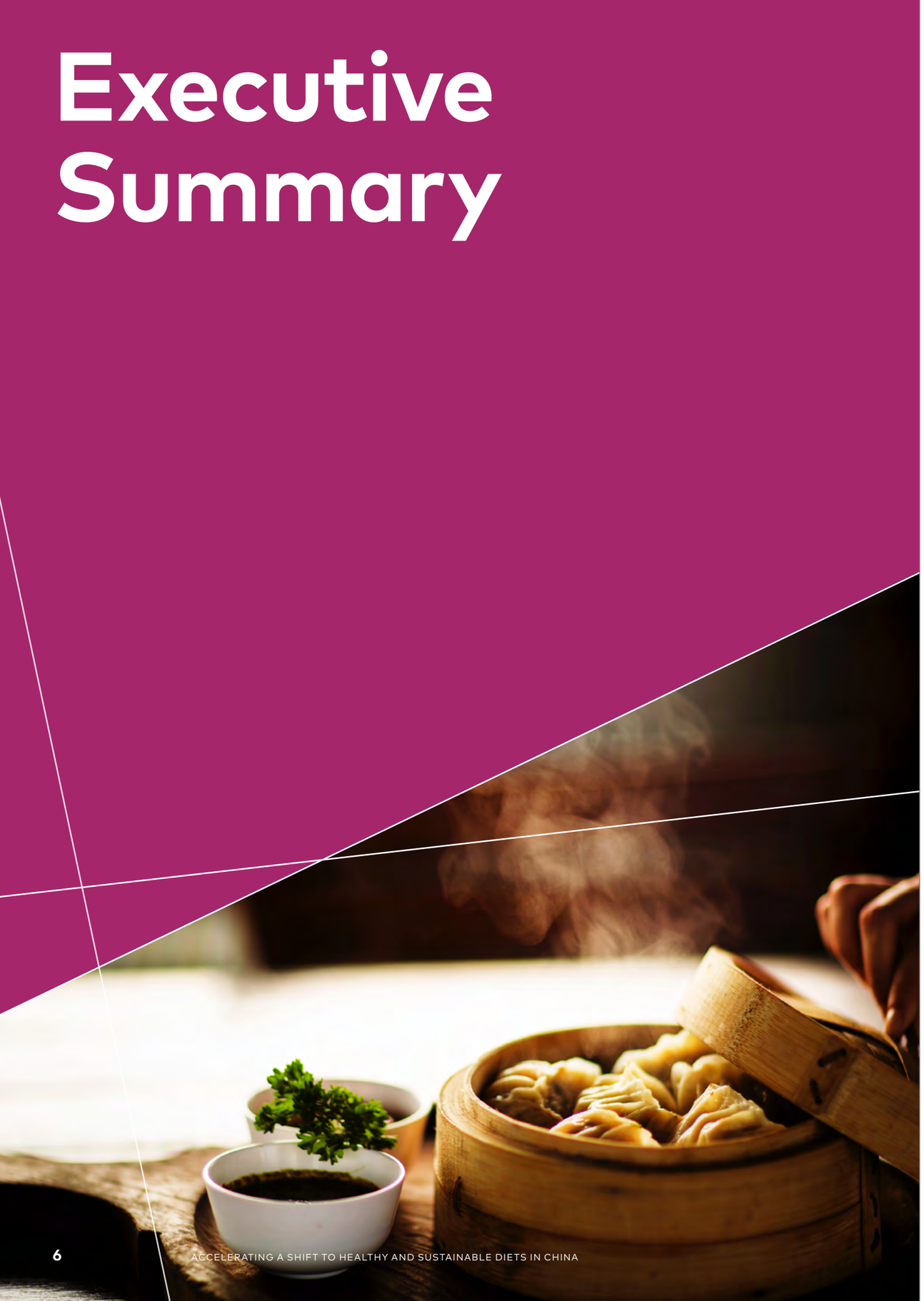
Executive Summary



Chinese diets have undergone a remarkable transformation over the past four decades. Chinese food culture is rich, offering a diverse variety of vegetables and plant-based proteins. Chinese diets have historically been predominantly grain-based, combined with plant-based protein such as soybeans and tofu, which originated in China thousands of years ago. Spurred by market liberalization, rising affluence, and a flourishing food services industry, food in China today caters to more diverse tastes and has become more accessible and convenient. These developments have driven many people to shift to diets often heavier in animal-based proteins, with consequences for health, the environment, and climate change.

China's rich and diverse food heritage and commitment to ecological civilization create a strong foundation for healthy and sustainable diets. There is significant potential to increase consumption of 'traditional' healthy and sustainable foods such as tofu, legumes, nuts, vegetables, and fruits. China is also well positioned to become a global leader in production and consumption of new and innovative food products, including new proteins. It benefits from local ingredients, e.g., mycelium and mushrooms, and traditional processes, e.g., fermentation, that have a longstanding history in Chinese culinary traditions and are well suited for development of such protein products.

How can China make the transition to healthy and sustainable diets?

Accelerating the transition to healthy and sustainable diets will require a combination of enabling policies, regulations, strategies based on robust scientific data and research, and bottom-up campaigns focused on education and awareness for businesses and consumers.

This scoping study describes the necessary policy shifts and specific actions that policymakers and government agencies, researchers and academics, businesses and investors, and civil society actors can take to engender a transition to healthy and sustainable diets in China. Government ministries and their affiliated research institutes will be key actors for providing enabling policies and evidence-based research and analysis. Businesses can contribute through investment in rural agriculture and innovation, including digital technology, rural infrastructure and development, and consumer education. Collective impact organizations, initiatives, and action hubs coordinated by civil society can play a key role in building cross-sectoral consensus, bridging gaps for public benefit research, nurturing pilots, conducting targeted strategic communication with consumers, industry, and government, and facilitating incubation of innovative products and services. This study makes the following recommendations to key stakeholders in China for bringing about this transition.

Summary of key recommendations

GOVERNMENT AND POLICYMAKERS

- Develop and implement a holistic **national food strategy** with supporting policies, plans, industry-wide standards, operating guidelines, and inter-ministerial coordination mechanisms.
- Repurpose **agricultural support policies** to facilitate the transformation of agri-food systems. These policies should align with the Big Food concept.[1]
- Provide **capacity building and access to finance**, alongside enabling policies, to support farmers, agriculture, and food industry enterprises in gaining the knowledge and skills to implement sustainable production practices.
- Develop **localized nutrition guidelines** based on culinary traditions, local natural resources, affordability, and local and regional dietary contexts and traditions; promote the guidelines through targeted campaigns.
- Incorporate sustainable and healthy diets, well-being, and agri-food systems into the **national educational curriculum** and related policies to develop an environment for healthy and sustainable food; develop a **platform for sharing educational resources and raising awareness** of sustainable and healthy diets among the public.
- Support **development pilots** which integrate sustainable and healthy diets into local policies and implement the Sustainable Development Goals, including the promotion of green and low-carbon lifestyles.
- Provide financial and other **incentives to the private sector**, especially small- and medium-sized enterprises, to adopt sustainable practices with diverse financing approaches, action agendas with time-bound targets, implementation plans, and best practices for dietary transition.
- Provide financial and technological support to **build the capacity of civil society and social enterprises** to help them retain talent, improve the effectiveness and efficiency of their management, track their impact, and develop their strategies.
- Provide fresh, healthy, nutritious, and sustainable **food choices in government-run facilities** including public cafeterias, school and university canteens, and dining hall areas.

[1] Introduced by President Xi in 2022, the Big Food concept calls for: 1. Enhancing food security by ensuring a reliable supply of grain and foods such as vegetables, fruits, aquatic products, and meat; and 2. Developing biotechnology and bio-industry and using China's abundant biological resources to produce food for domestic consumption.

RESEARCHERS AND ACADEMIA

- Develop accessible **food consumption databases** containing credible, large-scale datasets related to individual or household consumption of food.
- Develop an **emissions calculator and metrics for environmental impacts** of agriculture and food systems, all the way from production to consumption.
- Collaborate with industry to **understand consumer dietary trends** and conduct research to underpin **business strategies for dietary transition.**
- Conduct **research and analysis on new protein** (the term used in China) to provide scientific and evidence-based information on its health, nutritional, and environmental impacts, and to tap into the potential of new technologies to use fermentation to develop new proteins, e.g., biomass fermentation and precision fermentation.
- Explore the potential, e.g., through leveraging behavioral science, to increase local supply and demand for **alternatives to traditional meat, egg, and dairy products** (such as coarse cereals and beans) **and new protein sources** (such as local fungi, mycelium species, and algae).
- Improve **academic cooperation and communication** across disciplines and regions to build understanding and consensus around new proteins.

BUSINESS AND INVESTORS

- **Invest in** agricultural innovation and technology, rural revitalization, infrastructure, logistics, and transportation, carbon neutrality, sustainable and healthy food systems, land restoration projects via regenerative and low-carbon agricultural practices, and smallholder farmers to help them transition to sustainable agriculture.
- Provide **support for suppliers** in transitioning to low-carbon agricultural practices.
- Invest in **digital direct-to-consumer retail platforms** to improve access to markets for Chinese producers and streamline the supply chain.
- **Cater to the growing demand** in urban areas for locally sourced, organic, and fresh produce.
- **Raise consumer awareness** of healthy and sustainable diets and lifestyles.
- Improve **provision of nutritional information and eco-labelling** to raise consumers' awareness of the nutritional composition and environmental impact of their food.
- For Chinese finance institutions: incentivize agricultural and food companies to improve their practices by **offering sustainability-linked financial instruments** such as loans and credit facilities, bonds, insurance products, and supply chain finance.

CIVIL SOCIETY AND SOCIAL INNOVATORS

- Create **platforms to promote collaboration** and incubate initiatives.
- Develop **educational materials and tools** in collaboration with government, nutritionists, businesses, and social innovators to inform consumers' food choices.
- Design **social media campaigns** around specific target audiences; encourage social media influencers to leverage their platforms to educate others on healthy and sustainable diets.

These recommendations were all developed with the aim of aligning with the Chinese government's agendas, which will be essential for bringing about dietary transition. If implemented together, these recommendations have significant potential to bring about positive change for food and nutrition security, rural revitalization, climate, and nature. This scoping study shows what actions policymakers and government ministries, researchers and academics, businesses and investors, and civil society can take to bring about healthy and sustainable diets in China.

Introduction

The 2021 State of Food Security and Nutrition in the World report recommends that all countries shift to healthy and sustainable diets to reduce health and climate change costs by 2030.[2]

Globally, the adoption of healthy and sustainable diets could reduce health costs linked to diet-related non-communicable diseases and associated mortality by up to 97%, and social costs arising from diet-related greenhouse gas (GHG) emissions by 41–47% by 2030.[3] There is a significant opportunity to transform agri-food systems to reduce these costs, both on a global scale and within China.

The Chinese government is positioning green, high-quality agricultural development front and center in its plans. As the world's second largest economy and home to 18% of the global population, China can play an important role in transitioning to healthy and sustainable diets while reaping associated economic, social, and environmental benefits. Now is an opportune time to make significant strides towards dietary transition in China, given the policy environment, environmental impacts of agri-food systems, concerns over food security, and the state of public health. This report explores the opportunity for such transitions in China to deliver positive outcomes for food and nutrition security, rural revitalization, climate, and nature. The report is primarily targeted at philanthropic foundations and researchers. It also provides recommendations for all key stakeholders, including Chinese policymakers, businesses and investors, and civil society.

WHAT DO WE MEAN BY A HEALTHY AND SUSTAINABLE DIET?

There is no globally accepted definition of a healthy and sustainable diet, despite efforts to develop one. A number of studies have been conducted on what constitutes a healthy and sustainable diet, with most concluding that it involves a diet rich in plant-based foods and with

moderate amounts of animal-based protein.[4] The composition of a healthy diet generally depends on individual characteristics including age, gender, lifestyle, and degree of physical activity. The Chinese Dietary Guidelines (CDG) suggest that a balanced diet consists of grains, legumes, vegetables, fruit, animal-based protein, dairy products, soybeans, and nuts, along with fat and salt.[5] According to the Food and Agriculture Organization of the United Nations (FAO), sustainable diets have a lower environmental impact, enhance food and nutrition security, and contribute to a healthy lifestyle for present and future generations.[6]

WHY IS A TRANSITION TO HEALTHY AND SUSTAINABLE DIETS IMPORTANT FOR CHINA?

In recent decades, China has made enormous strides in addressing undernutrition and ensuring food security, and has become a dominant player in global agricultural production and trade. However, these efforts have come at a cost, contributing to public health issues linked to overnutrition and the increased consumption of meat, refined staple foods and processed foods, and dietary imbalances resulting in micronutrient deficiencies. More than half of Chinese adults are now either overweight or obese, and rates of non-communicable diseases (NCDs) such as diabetes, heart disease, and cancer are rising. Unsustainable agricultural practices have led to degradation of nature and the ecosystem services it provides, such as healthy soil, clean water, and pollination, which threatens agricultural productivity and the livelihoods of farmers. China has also been impacted by price volatility and significant delays along commodity supply chains caused by the COVID-19 pandemic, global conflict, and climate change. These challenges are compounded by limited availability of arable land in the country; China is home to 18 percent of the world's population and less than 9 percent of the world's farmland.[7,8]

Meanwhile, China has made important commitments to carbon neutrality and ecological civilization. Achieving these aims will require reducing China's GHG emissions, addressing China's ecological footprint (the amount of natural resources the country consumes versus how much it restores), and protecting vital natural ecosystems that underpin the economy.

There is a significant opportunity for a dietary transition in China that improves citizens' access to a diverse range of affordable, safe, nutritious, and sustainably produced food. Such a transition can deliver on China's goals related to food and nutrition security, rural revitalization, climate, and nature.

Report overview

This report explores the opportunity for transitions to healthy and sustainable diets in China to deliver positive outcomes for food and nutrition security, rural revitalization, climate, and nature.

CHAPTER 1

Provides an overview of Chinese dietary trends and their implications for food and nutrition security, rural revitalization, climate, and nature. It presents China's development path in recent decades, the resulting shift towards more "Westernized" diets, and the adverse impact on public health. The chapter explores the implications of national and global trends for food and nutrition security and proceeds to explore dietary transition in the context of the country's rural revitalization efforts. It concludes by investigating the implications of current dietary trends for climate change and the natural environment.

CHAPTER 2

Explores opportunities for the Chinese government to accelerate a shift towards healthier and more sustainable diets. It outlines the key roles of different central government ministries, the policies and plans already in place, and opportunities to strengthen and build on these foundations. The chapter also explores the potential role of provincial and local government in enabling dietary transition.

CHAPTER 3

Outlines potential priorities for academia and researchers in China to support evidence-based policymaking that accelerates a transition to healthy and sustainable diets. It identifies gaps in research on dietary consumption practices and explores a range of actions researchers and academics can take to facilitate dietary shift.

CHAPTER 4

Identifies business opportunities for China's private sector through innovation and investment in sustainable and healthy food. It explores how businesses can support dietary transition through investment in rural agriculture and innovation, including through digital technology, rural infrastructure, and development. It explores opportunities for businesses to market and promote sustainable and healthy food products. It also looks at opportunities for Chinese financial institutions to incentivize agricultural and food companies to improve their practices by offering favorable financial instruments.

CHAPTER 5

Highlights opportunities to enhance the role of civil society actors and social innovators in advancing behavior change and supporting a transition to healthy and sustainable diets. The chapter explores their role in creating platforms to promote collaboration and incubate initiatives, and in supporting campaigns that promote healthy and sustainable consumption and the associated need to enable and strengthen the capacity and visibility of social efforts.

CHAPTER 6

Summarizes the key elements of dietary transition in China explored in this scoping study, as well as the key recommendations for bringing about this transition.

1. Chinese Diets: Key Trends and Challenges

This chapter describes the main trends of Chinese diets in recent decades and their interplay with food and nutrition security, rural revitalization, climate, and nature. These historic dynamics are helpful in contextualizing the actions that government and policymakers, researchers and academia, business and investors, and civil society can take to bring about dietary transition.

China has prioritized domestic food security over the past few decades, with a focus on food production, poverty alleviation, and rural revitalization. During this period, Chinese diets have undergone significant changes. The Reform and Opening-Up Period of the 1970s saw rapid changes to the Chinese economy and society, lifting 850 million people out of poverty and creating a rapidly growing middle class.[9] Government policies were highly successful in reducing undernourishment rates in the Chinese population, from 22.9% in 1990 to below 2.5% in 2020.[10] Food safety and quality have also improved. The Chinese population has access to a wide range of domestically produced and imported foods.

While these efforts have succeeded in significantly reducing poverty and undernutrition, they have contributed to public health issues linked to overnutrition, along with other trends affecting diets, e.g., increased consumption of meat, refined staple foods and processed foods, and unbalanced diets resulting in micronutrient deficiency. There have also been significant environmental impacts, including degraded ecosystem services, which have led to reduced crop yields and serious implications for climate change. Food loss and waste is another connected issue. Lastly, the COVID-19 pandemic and global conflict have delivered a series of shocks to commodity supply chains, causing price volatility and supply disruptions, threatening to undermine China's food and nutrition security achievements.[11]

China is addressing these impacts as it enters a new stage of development, guided by its 14th Five-Year Plan (2021-2025). This five-year plan (FYP) prioritizes high quality and sustainable growth, with an emphasis on healthy lifestyles, rural revitalization, green development, and carbon neutrality.

Figure 1 depicts the evolution of China's economic development from the Reform and Opening-Up Period (starting in 1978) to the present and how its development priorities have shifted over these periods.

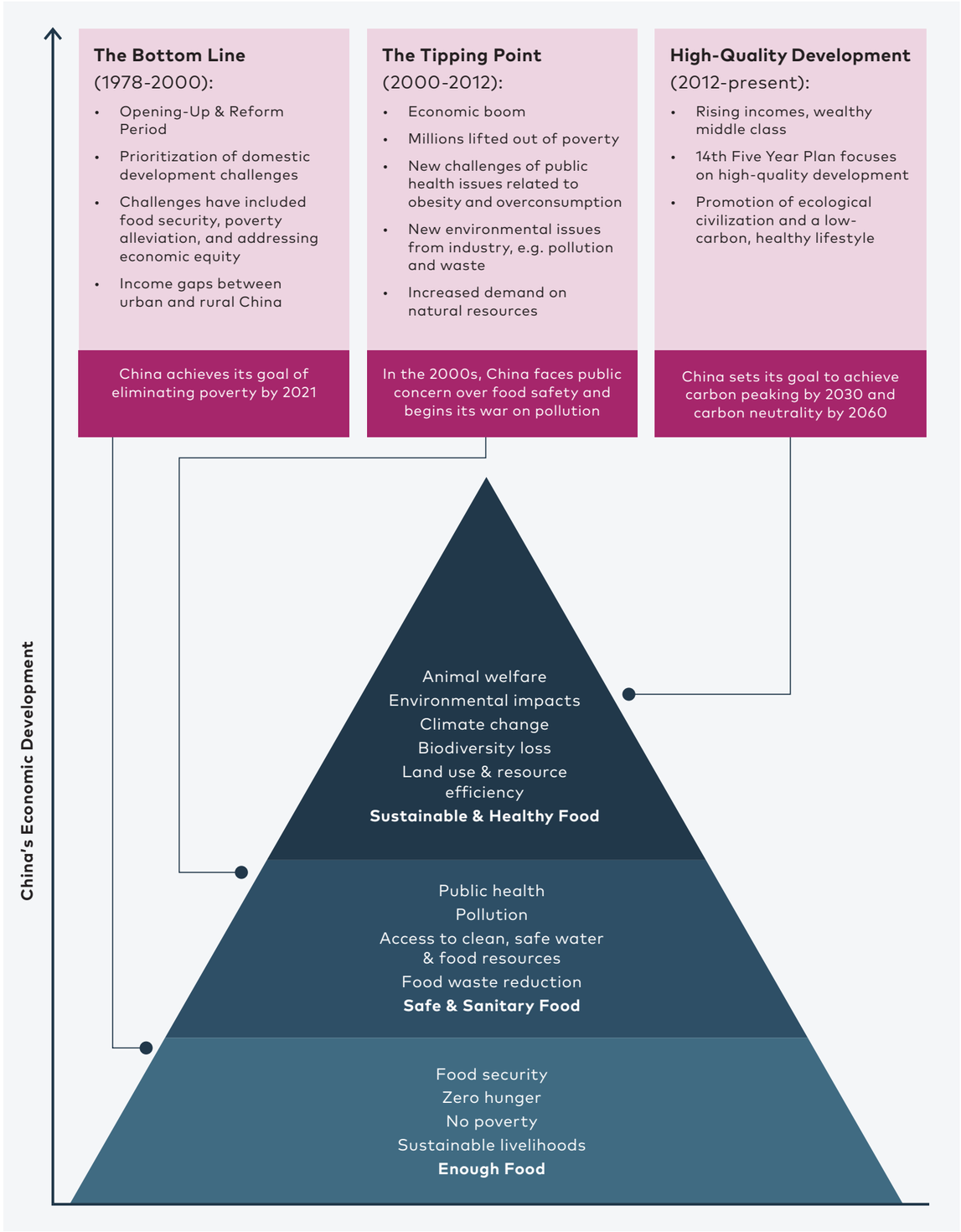


Figure 1. Evolution of China's development priorities against the backdrop of its economic development

Food and nutrition security

Providing its people with "enough food to eat" has long been a priority of the Chinese government, with domestic food security a vital component of the government's approach to achieving this goal. China's successive agricultural policies have focused on increasing the productivity and yields of staple crops such as rice, maize (corn), and wheat. While the country remains largely self-sufficient in producing its staple crops (>95%), it relies on imports to meet rising demand for poultry, red meat, dairy products, and animal feedstock.

Rising incomes and the increased availability of diverse foods – particularly following China's accession to the World Trade Organization in 2001 – have influenced Chinese people's food choices and eating habits.[12,13] According to the Chinese Nutrition Society, grains remain the main dietary source of energy for Chinese people. Meanwhile, Chinese diets have shifted to more "Western" consumption patterns, characterized by increased intake of red meat, refined grains, and processed foods high in unhealthy fats, salt, and sugar. In the 1960s, the average Chinese person consumed fewer than 5 kg of meat annually. By the 1980s, this amount had risen to around 20 kg per capita, and reached 50 kg per capita in 2021 – twice the amount recommended by the Chinese Dietary Guidelines (CDG).[14] Today, China consumes 28% of the world's meat, including half of the world's pork.[15] Per capita meat consumption is projected to increase a further 10% by 2031, compared to 2021 levels.[16] Consumption in categories such as fruit, vegetables, fish, and dairy has also increased, but remains below levels recommended in the CDG.

The increase in consumption of animal-based protein and total fat in recent years has significant negative implications for public health.[17] Consuming high amounts of red and processed meats, for example, is linked to an increased risk of cancer, type 2 diabetes, and cardiovascular disease.[18,19,20,21] More than half of the country's adults are now classified as overweight, with around 12% classified as obese.[22] Obesity is strongly associated with stroke and ischemic heart disease, which are now the leading causes of death in China.[23] Around 11% of the Chinese population suffers from diabetes, for which weight is a significant factor.[24] As a result of increases in these non-communicable diseases (NCDs), China faces growing public health costs, estimated at just over $23 trillion USD over the period 2012-30.[25,26]

Meanwhile, gaps persist between urban and rural populations and between low- and high-income groups regarding the quality and nutritional value of their food intake. As illustrated in **Figure 2**, all population groups, except those in the urban high-income group, over-consume refined staples, tubers, and oils, while urbanites (both high- and low-income groups) over-consume red meat and poultry. While both urban and rural groups show an inadequate intake of vegetables, fish, and dairy products, rural populations (regardless of income) show significantly lower intake of these products.

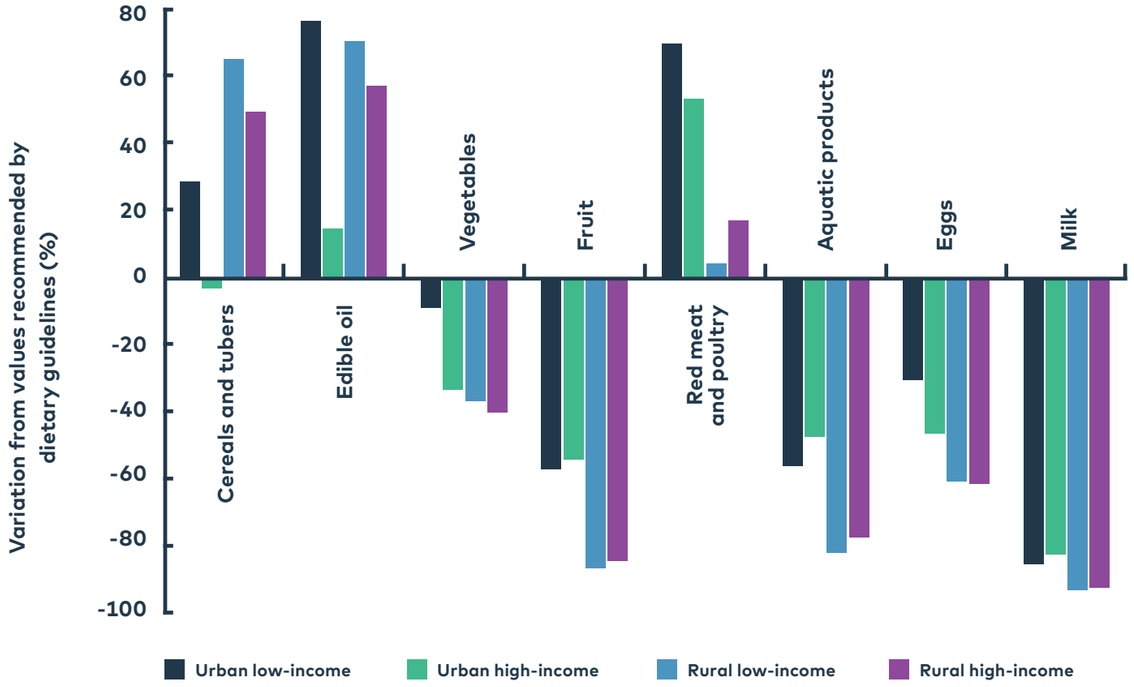


Figure 2. Differences in food intake by population categories in 2020, compared with the recommended volume of intake given by the 2016 Chinese Dietary Guidance (CDG).[27]

The recent increases in the already high costs of healthy diets threaten to widen these gaps, making such diets out of reach for much of the population. Between 2019 and 2020 alone, the cost of foods associated with healthy diets rose by seven percent globally.[28] The COVID-19 pandemic, global conflicts, and climate change have also had a direct impact on China's food and nutrition security. The COVID-19 pandemic has brought about a greater focus on food safety and quality in China, particularly for meat and dairy products, given the zoonotic origin of the virus. The pandemic and the citywide lockdowns imposed by the Chinese government to control the virus have also had economic impacts, including serious disruption to the country's agri-food supply chains.[29] Ongoing COVID-19 lockdowns have prevented several food processing factories from producing at full capacity and have hindered the transport of goods.

The Ukraine-Russia conflict has further impacted agricultural supply chains globally. China's high levels of self-sufficiency in staple crops, such as corn and wheat, shielded its population from some of the earlier impacts of the conflict. The country may nonetheless experience longer-term impacts due to higher prices of imports of other agricultural commodities and food products, leading to an increased cost of food for consumers.[30]

Lastly, China's heavy use of antibiotics, including for livestock, has led the country to become an antimicrobial-resistant hotspot. China now has the world's second highest number of multidrug-resistant tuberculosis cases. To mitigate public health concerns, China is reducing its consumption of antibiotics and developing new approaches to infection control.[31]

Rural revitalization

China has seen unparalleled economic growth following its economic reforms of the late 1970s, supported by reform-driven economic growth and a well-funded poverty reduction program.[32] The result has been a remarkable decline in (rural) poverty, alongside significant increases in per capita income. China has also experienced rapid rural transformation since this period, paired with a massive migration from rural to urban areas. Its agricultural sector, long dominated by numerous smallholders, has become an increasingly modern, commercial industry within the country.

Since 1978, China has increased its agricultural productivity and food production. This increase has facilitated China's industrialization and influenced how farmers engage in agriculture. Rural farmers began to diversify their activities and rent out their land, while a few continued to engage in full-time farming, which facilitated the mechanization of farming practices and increased the scale of production. China's agricultural landscape on the whole is progressively moving towards modern, commercial agriculture.[33]

Despite these shifts, China remains a largely traditional agricultural country with an agricultural industry mainly comprised of small-scale farms. Smallholder farmers are the largest, most important, and most vulnerable group of agricultural producers, and increasing their resilience is key to sustainable food systems transformation.[34]

Having declared the elimination of absolute poverty in 2021, the Chinese government is now prioritizing rural revitalization and common prosperity. The government sees agriculture, rural areas, and rural residents as key to resolving China's uneven development and is making strides to enhance agricultural modernization, green and sustainable crop production, and access to healthy and nutritious food sources, as well as reducing the use of chemical fertilizers.[35]

The Chinese government has enacted policies to prioritize farmers and the agriculture industry, e.g., by encouraging small-scale farmers to adopt modern farming and agricultural practices and improving their property rights. The government is also implementing measures to boost the amount of arable farmland and enhance agricultural productivity. These efforts all have positive implications for reducing the environmental impact of agricultural production across smallholder farms in China, as well as for improving the nutritional quality of domestically produced foods.

The increased focus and measures already in place for rural revitalization – particularly those which pertain to agricultural development and innovation – hold much promise for improvements in sustainable agricultural production. There is a great opportunity to build upon these policies and plans to continue improving the sustainability of agricultural production and access to nutritious foods for rural residents.

Climate and nature

China's food systems and consumption patterns over the past decades have exacerbated the country's greenhouse gas (GHG) emissions, and undermined natural ecosystems.

Globally, more than one-third of anthropogenic GHG emissions can be attributed to food systems, with livestock production responsible for about half (14.5%) of this figure.[36,37] In China, agriculture is responsible for a large share of two of the most potent GHGs: methane from livestock and from rice production (together 40% of total methane emissions) and nitrous oxide from excessive nitrogen fertilizer usage (47% of total nitrous oxide emissions).[38,39] Food-related emissions of carbon dioxide, methane, and nitrous oxide in China increased by 24% from 1996 to 2010 and continue to rise.[40] Chinese modelers and researchers have identified that reducing consumption of livestock and poultry meat to levels consistent with dietary and nutrition guidelines (i.e., the CDG) could reduce GHG emissions from agriculture by 7-12% by 2030 and 13-19% by 2060.[41]

Excessive use of chemical fertilizers – particularly nitrogen fertilizers – and pesticides have led to water pollution, eutrophication, and loss of diversity of plant and insect species in China.[42] China is also a major manufacturer of fertilizers, a highly GHG-intensive process. The country's nitrogen, phosphate, and potash fertilizer manufacturers release double the amount of GHGs per unit of fertilizer than in the United States or the European Union.[43] Additional nitrogen is emitted after the fertilizers are applied. The Chinese government is addressing the impacts of chemical fertilizers by taking measures to increase efficiency, reduce usage, and increase the use of organic compost.[44]

Rising demand in China for commodities such as beef, pork, soy, and palm oil has also had negative implications for land-use change and degradation of land and water resources in countries from which China imports its food products. China imports 60% of the world's internationally traded soy (for animal feedstock), 17% of globally traded beef, and 12% of globally traded palm oil.[45] China's grain, cotton, oil, sugar, meat, and milk imports are equivalent to production on more than 67 million hectares of cultivated land (40% of China's total sown area of domestic crops) and require more than 120 billion m^3 of water per annum (31% of the country's agricultural water use).[46] Animal-based protein sources such as beef, lamb, and pork require significantly more land, water, and feedstock than equivalent amounts of energy from plant-based protein, eggs, milk, and poultry.[47] Shifting to diets which rely more on plant-based protein would help address these issues.

Chinese government goals

Transitioning to healthy and sustainable diets therefore offer a profound opportunity to help the Chinese government meet and align with its stated national goals for food and nutrition security, rural revitalization, climate, and nature (**Table 1**).

National goals	How healthy and sustainable diets can support these national goals
Food and nutrition security	• Meeting the targets for a balanced, nutritious diet in the Chinese Nutrition Plan. • Addressing issues of undernutrition and overnutrition, which are central to the government's Healthy China 2030 campaign. • Improving self-sufficiency in key agricultural products such as rice, maize, and wheat, as well as new proteins (e.g., through expanded development of fermented protein products). • Meeting the government's long-term goal of ensuring all citizens have "enough food to eat".
Rural revitalization	• Achieving basic modernization of agriculture and rural areas by 2035 and fully realizing the goals for robust agriculture and prosperous farmers in rural areas by 2050. • Enhancing food security and nutrition, promoting modernized technology to enhance productivity, abating environmental pollution from the agricultural sector, and reducing food loss and waste. • Eradicating extreme poverty, improving the livelihoods of rural people, enhancing rural industrial development, implementing ecological conservation, and enhancing urban-rural integration.
Climate	• Peaking CO_2 emissions before 2030 and achieving carbon neutrality by 2060. • Achieving a significant impact on methane emissions control and reductions in the 2020s. • Reducing overall consumption of livestock and poultry meat to levels consistent with dietary and nutrition guidelines.
Nature	• *Ecological civilization*: Achieving ecological restoration, environmental protection, and green development. • Reducing overnutrition and improving the sustainability of food production to reduce negative impacts on natural ecosystems. • Reducing degradation of land and water resources to mitigate threats to the long-term viability and profitability of China's agricultural sector. • Reducing excessive use of chemical fertilizers and pesticides in agriculture to reduce water pollution, eutrophication, and loss of diversity of plant and insect species.

Table 1: Chinese national government goals bolster the case for healthy and sustainable diets

2. The Role of Government and Policymakers in Accelerating the Transition

This chapter outlines the policy landscape for dietary shift in China. It details the role the Chinese government and policymakers can play in enabling a shift towards healthier and more sustainable diets while enhancing food and nutrition security and rural revitalization, as well as reducing the impact of diets and the agri-food system on climate and nature.

Policy jurisdiction for sustainable agri-food systems in China involves a wide range of ministries and other actors (see the stakeholder mapping in **Annex A**). Governments play a key role in policy interventions to increase the availability and affordability of healthy, sustainably produced foods. They can also provide important signals and an enabling environment for other stakeholders – such as businesses – to help facilitate this transition. The Chinese government has recently taken steps to reduce the impacts of food production and consumption. Nonetheless, there are further opportunities to enhance the coordination and coherence of these policies to accelerate the dietary transition and achieve win-wins for planetary and human health.

Promote food and nutrition security

The Chinese government has introduced a series of policies in response to negative health and nutrition trends in recent years. China's National Nutrition Plan (2017-2030) and its Outline of Food and Nutrition Development (2014-2020) include detailed targets for dietary consumption within specific food categories (e.g., meat, dairy products, aquatic products, vegetables, fruits, etc.), and for nutrition (e.g., a recommended maximum daily protein intake from meat of 75g per capita). They also include key strategies and actions to achieve these targets, such as strengthening research, monitoring, and assessment of consumers' nutritional intake by improving data collection and analysis; and tailoring dietary guidelines to the habits of different target groups and regions.[48] Developing localized nutrition guidelines based upon culinary traditions, local natural resources, affordability, and other related factors is important, as Chinese diets vary widely.

In 2019, the Chinese government initiated the Healthy China 2030 campaign, which promotes balanced diets as a key element in tackling the over-consumption of energy-dense and nutrient-poor foods and its contribution to the rise in overweight and obesity rates. As part of Healthy China 2030, the Chinese Nutrition Society updated the Chinese Dietary Guidelines (CDG), originally released in 1989, which offer practical suggestions for food choices for nutritionally sound diets.[49] The latest edition, released in 2022, has been updated to accommodate Chinese dietary and behavioral changes and to align with the National Nutrition Plan (2017-2030). The 2022 CDG Food Guide Pagoda provides suggested intakes for each category of food (see Figure 3). Compared with previous versions of the pagoda, the 2022 edition emphasizes reducing the consumption of salt and starch, and increases minimum consumption levels of milk.

The 2022 CDG includes the following dietary principles: (1) diversify food intake and balance different food categories; (2) balance food intake with physical activity to maintain proper weight; (3) consume plenty of vegetables, dairy products, whole grains, and soybeans; (4) consume balanced amounts of fish, poultry, eggs and lean meat; (5) reduce consumption of salt and oil, and to limit intake of added sugar and alcohol; (6) eat on a regular basis and drink enough water; (7) know how to cook and choose food, as well as how to read labels; and (8) use public chopsticks when fetching food for others and to avoid food waste. Principles 7 and 8 are new to the 2022 version and highlight guidance on food selection, cooking and serving. The suggestion to use public chopsticks also reflects improved awareness of infectious disease prevention in the wake of the COVID-19 pandemic.

Despite the CDG's national recognition as the primary dietary guidelines in China, it poses communication challenges. The guidelines make consumption recommendations in grams, which can be difficult for the target audience to understand. The CDG's recommendations may also differ from other dietary guidance, which could confuse the public and undermine their message. Finally, the CDG are more accessible to those living in urban rather than rural China.

To address these challenges, the Chinese Nutrition Society could tailor the CDG to local dietary contexts and improve accessibility for rural populations.

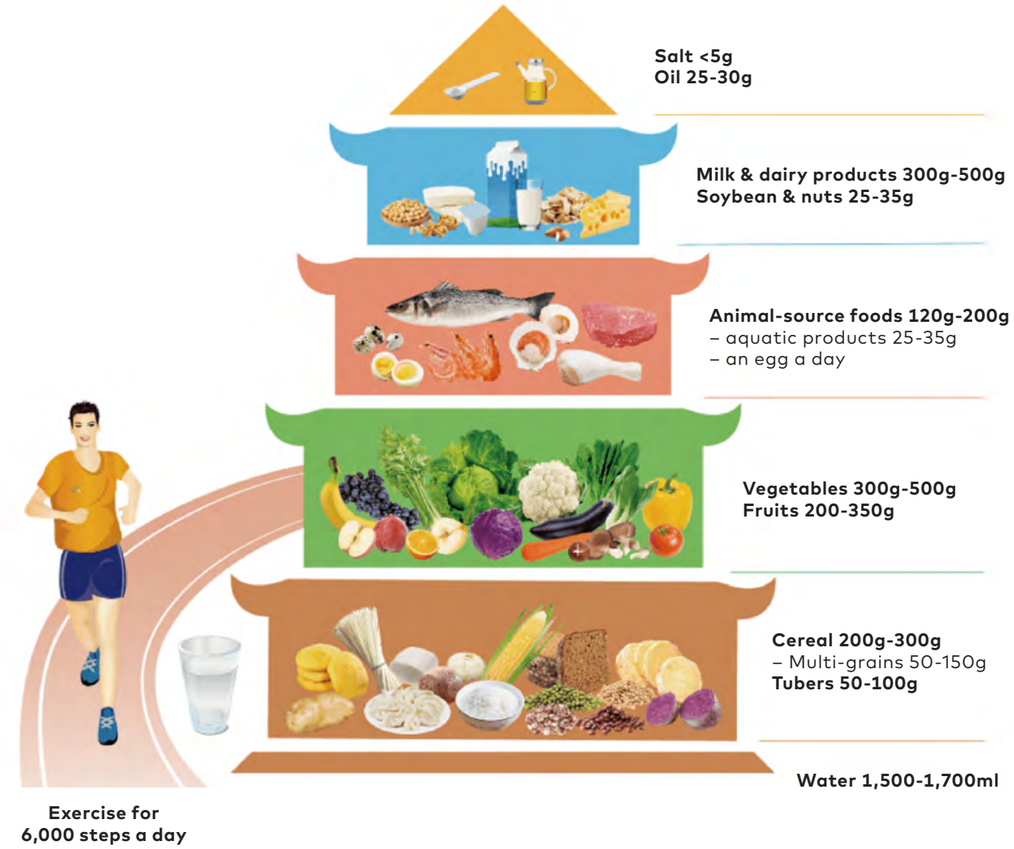


Figure 3. The Chinese Nutrition Society's Food Guide Pagoda of 2022, which depicts the recommended amount of nutrients per day for Chinese adults.[50]

Visualization tools, such as the Food Guide Pagoda, should be used to achieve more effective public communication. The Chinese Nutrition Society could consider adding a more user-friendly measurement unit for the target audience, alongside the measurements in grams. Additionally, institutions involved in promoting the CDG should improve coordination to convey a unified messaging to the public. Social networks and other online channels could spread the updated information to a wider audience.

The National Health Commission (NHC) could support this effort by developing and distributing information and training about the CDG to help citizens better understand and follow the guidelines.

The NHC should also take advantage of social media to reach younger generations to popularize the traditions and customs of traditional Chinese medicine and local cuisine, as well as to highlight the benefits of consuming healthy and fresh foods. The Ministry of Commerce and the State Administration for Market Regulations should improve food product labeling to incorporate sustainability and nutrition facts.

The Ministry of Education (MoE) also has a role to play in furthering the uptake of healthy diets. It should develop policy recommendations for incorporating sustainable and healthy diets, wellbeing, and food systems into the national educational curriculum. Finally, local city and provincial governments should

develop policies and activities that promote and incentivize wellbeing and healthy practices.

In addition to the measures mentioned above, the government can improve the nutritional quality and sustainability of its citizens' food intake by providing fresh, healthy, nutritious, and sustainable food choices in government-run facilities, such as public cafeterias, school and university canteens, and dining halls.

Given its past experiences of famine and food shortages, the Chinese government has long prioritized food security. Since its 18th National Congress in 2012, the Chinese Communist Party (CPC) has given greater importance to food security by ensuring complete security of staple foods (e.g., rice, wheat, and maize) via domestic grain production, guaranteed food production capacity, moderate imports, and technological support.[51] The government has developed a series of policies to safeguard food security, including the National Agriculture Sustainable Development Plan (2015-2030), the National Land Planning Outline (2016-2030), and the National Rural Revitalization Strategic Plan (2018-2022). These policies establish the principles and goals for promoting agricultural modernization, enhancing nutrition from food, and further developing the food industry.

In early 2022, President Xi Jinping introduced the Big Food concept at the "Two Sessions" (the National People's Congress and the Chinese Political Consultative Conference). This signals a transition towards enhancing food security by ensuring a reliable supply of grain and foods such as vegetables, fruits, aquatic products, and meat.[52] President Xi expressed the importance of developing biotechnology and the bio-industry, as well as making greater use of China's abundant biological resources to produce food (i.e., not only seeking energy and protein from animals, but also from locally available plants and micro-organisms). The 20th National Congress also emphasized the importance of diversifying the food system.[53] This green light for the expansion of additional protein and nutrition sources opens the door to improved food security, as well as healthy and sustainable diets.

The Ministry of Agriculture and Rural Affairs (MARA) released its Five-Year Agricultural Plan in January 2022. The plan recommends conducting further research into culturing and manufacturing technologies used for nutritious foods such as cultivated meat, synthetic eggs, dairy, fats, and functional recombinant protein.[54] This move also signals that China is likely to accelerate efforts to overcome regulatory hurdles faced by its new protein market and increase research and investment in this area.

Returning to and scaling up traditional, non-meat protein sources which have long been used in Chinese cuisine – such as tofu, edamame, and other bean products – offers another approach to enhancing Chinese food and nutrition security. These traditional sources of protein and other nutrients depend upon local resources and can be scaled to provide healthy, widely-accepted, nutrient-rich, and less environmentally-damaging alternatives to meat. Promoting their production and uptake can reduce GHG emissions and other environmental and land-use impacts of raising livestock, and, by extension, contribute to a more food-secure China.[55]

Promote rural revitalization

In 2017, China set out its Rural Revitalization Strategy, which focuses on raising farmers' incomes and narrowing the gap between urban and rural development. This led to the development of the 2018-2022 Strategic Plan for the Revitalization of Rural Areas, a comprehensive roadmap outlining approaches to realizing the short and long-term goals of establishing an institutional framework and policy system for rural revitalization. The plan includes making significant progress on rural revitalization, achieving the basic modernization of agriculture and rural areas by 2035, and fully realizing the goals of robust agriculture and prosperous farmers in rural areas by 2050.[56]

In April 2021, the 13th National People's Congress (NPC) Standing Committee approved the Rural Revitalization Promotion Law to enhance rural industrial development, ecological conservation, and urban-rural integration.[57] The law aims to intensify the development of rural areas and modernize the agriculture sector, while protecting the environment and supporting the livelihoods of rural people. Also in 2021, the Ministry of Agriculture and Rural Affairs (MARA) released the Rural Development Report, which highlights the significance of transforming food systems for rural prosperity and outlines the investments and policy changes needed within rural food value chains to make adequate and nutritious food available to all.[58] Other government documents lay out core measures for boosting the rural economy, including enhancing food and nutrition security and promoting modernized technology to boost productivity, as well as abating emissions from the agricultural sector and reducing food loss and waste.[59] MARA continues to update its green development priorities and targets. These include promoting green and sustainable crop production, reducing fresh water and chemical fertilizer use, fostering biodiversity conservation, and measuring GHG emissions from the livestock sector.

The Ministry of Ecology & Environment (MEE) took measures in 2017 to enforce strict environmental regulations to control waste and pollution from livestock farms, which is speeding up industry transformation and upgrading in rural contexts, and improving production efficiency. According to a contributor for this report, the new regulations will increase environmental costs for the meat production industry by 30%, providing the impetus to accelerate industrial integration and efficiency improvements.

The rural revitalization measures already in place have positive implications for dietary transformation because of their potential to enhance the sustainability of agricultural production and increase rural peoples' access to healthy and nutritious foods. Nonetheless, there are further opportunities for the government to strengthen these efforts and to close the gap between rural and urban China. For example, MARA should develop a systematic governance program to provide fresh, healthy, and unprocessed foods to communities, beginning with regional pilots. MARA should also build capacity for farmers, agriculture, and food industry enterprises to provide bolster their knowledge and skills in implementing sustainable production practices, supported by access to finance and enabling policies.

Meet climate neutrality goals

At the 75th session of the UN General Assembly in September 2020, President Xi Jinping declared that China would achieve carbon neutrality by 2060 after peaking its CO_2 emissions before 2030. Chinese ministries and enterprises are now focusing on meeting this commitment, with detailed timetables and roadmaps being developed at the local level for provinces and cities.

Achieving these goals depends upon a range of transformations in the agricultural and land-use sector, including reducing enteric methane, bringing meat consumption in-line with the CDG, increasing soil carbon sequestration, and halting and reversing forest loss and degradation. Chinese policymakers are increasingly recognizing this. While demand-side mitigation (mainly reduced energy consumption) is an important component of China's carbon neutrality strategies, there is increasing interest in mitigating GHG emissions – particularly methane – linked to agricultural production and food consumption. A growing body of scientific evidence and studies evaluating the role of sustainable dietary shifts and food waste reduction in abating methane emissions underpins this interest.

In November 2021, China joined 140 other countries at the 26th Conference of the Parties (COP26) to the UN Framework Convention on Climate Change to release the Glasgow Leaders' Declaration on Forests and Land Use. This commits them to working together to halt and reverse forest loss and land degradation by 2030.[60] At the same time, ten of the major global agriculture companies (including the Chinese conglomerate COFCO International, with a combined revenue of almost $500 billion USD and with major market shares in key commodities such as soy, cattle, and palm oil), made a joint commitment to accelerate sector-wide action to reach net zero emissions globally by 2050.[61]

China also joined the US to release the Glasgow Declaration on Enhancing Climate Action in the 2020s.[62] While the declaration mostly focuses on carbon dioxide, it also recognizes the significant role of decreasing methane emissions, signaling this as an area of cooperation between the two countries. As a result, China has committed to developing a comprehensive and ambitious National Action Plan to achieve significant methane emission control and reduction in the 2020s. Priority areas for China in reducing methane emissions are monitoring, calculating, reporting, and verifying the methane emissions from its energy, agriculture, and waste.

Green and low-carbon technologies offer further opportunities to reduce the impact of the agri-food system in China. According to a projection from the Agriculture Food System (AFS) model developed by China Agriculture University, the application of selected green and low-carbon technologies in crop and livestock production could reduce GHG emissions by up to 10% by 2030 and up to 20% by 2060, compared to the baseline (**Figure 4**).[63]

These steps demonstrate China's commitment to reducing GHG emissions and other climate-related impacts from the agricultural sector to achieve climate neutrality goals. The government can further its climate efforts by addressing demand-side impacts of food consumption. Supporting development pilots which integrate sustainable and healthy diets into local policies and linking these with the Sustainable Development Goals, including promoting green and low-carbon lifestyles, is one such measure.

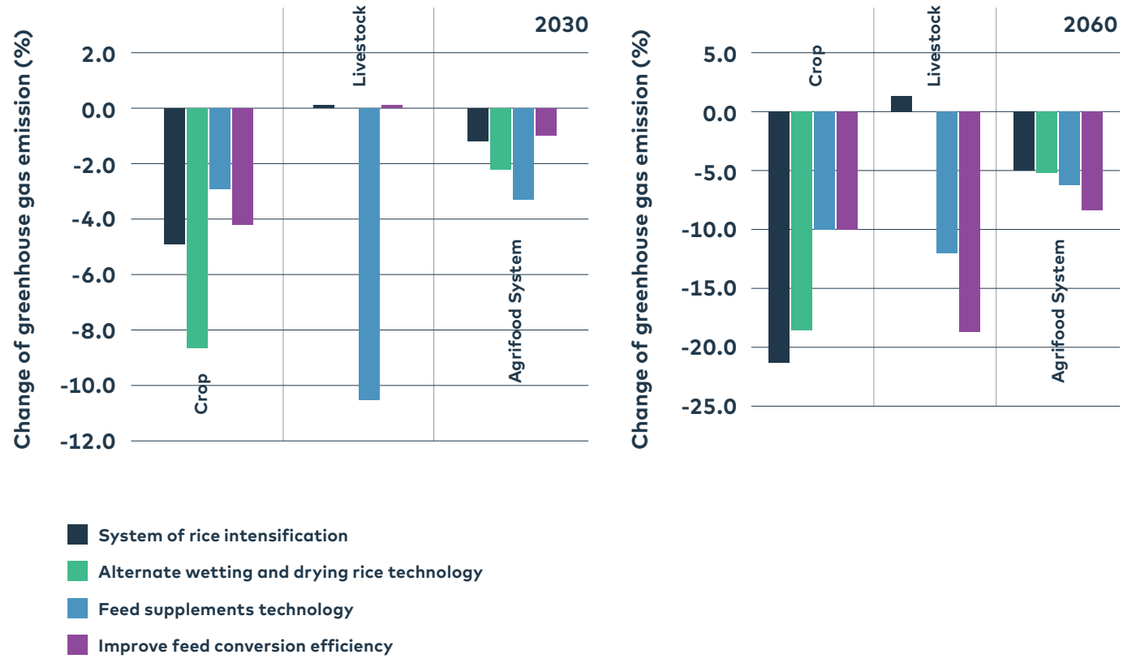


Figure 4. The potential GHG emission reductions of selected green and low-carbon technologies from crop and livestock production and the agri-food system in China in 2030 and 2060. (Results are from the CAU-AFS model.)

Protect the natural environment

Beyond emissions-reduction efforts, the Chinese government has taken a series of measures to mitigate the environmental impacts of the agri-food system. Key approaches have included implementing "ecological civilization" and "eco-compensation" measures (both defined below). The government has also reduced support for the chemical fertilizer industry, subsidized the preservation of resources in the agricultural system, and developed measures for using agricultural waste and returning farmland to forests or grasslands.[64]

Ecological civilization has become an important signal for China's transition from its previous development mode based on fast economic growth to a comprehensive approach that places more emphasis on ecological restoration, environmental protection, and green development.[65] The term "ecological civilization" encompasses a long list of concepts and campaigns, including green development, circular economy, low-carbon economy, ecological restoration and construction, green urbanization, climate change mitigation and adaptation, and pollution mitigation.[66] Ecological civilization came into force at the 17th CPC National Congress in 2007, and was later put forward as a strategic umbrella concept at the 18th CPC National Congress in 2012.

In May 2015, the Chinese government issued the Opinions on Accelerating the Construction of Ecological Civilization, followed by the Overall Plan for Ecological Civilization System Reform in September 2015[67]. Shortly thereafter, the objective to strengthen the construction of ecological civilization was written into the national FYP for the first time, with policies prioritizing eight areas for promoting ecological civilization: (1) spatial planning and development; (2) technological innovation and structural adjustment; (3) sustainable use of land, water, and other natural resources; (4) ecological and environmental protection; (5) regulatory systems for ecological civilization; (6) monitoring and supervision; (7) public participation; and (8) organization and implementation.

The central government has since issued a series of policies to assess progress towards ecological civilization, such as the 2016 Methods to Evaluate the Objectives of Ecological Civilization Construction, the Outline of the 13th FYP to Protect the Ecology, and the Pilot Program on Improving the National Natural Resources Management System. The 19th CPC National Congress and the latest (14th) FYP include the vision and mission of developing ecological civilization to realize the long-term goals of improving the ecological environment and building a beautiful China.

The Chinese government has made **ecological compensation**, or **"eco-compensation,"** one of the key mechanisms for achieving ecological civilization. Eco-compensation is a broad term to describe programs in China to improve its rural land and water management practices by means of fiscal transfers that incentivize actions by landholders and local governments. Eco-compensation can refer to a wide range of incentive-based approaches, including results-based payments for farmers, compensation for individuals affected by development measures, grants to local governments to reforest steep slopes, and financial incentives to implement soil conservation practices and revegetate land at risk of desertification.[68]

The pursuit of eco-compensation mechanisms by the Chinese government started in 1999, when the central government initiated the Conversion of Cropland to Forest and Grassland Program, also known as the "Grain for Green" project. Following its inauguration, a series of policies centering eco-compensation have arisen.[69] In 2018, the 19th CPC National Congress elevated eco-compensation development to an unprecedented level as an indispensable component of constructing ecological civilization.

Against this backdrop, there are other policies and strategies that the government can develop at local, provincial, and national levels to support the shift to healthy and sustainable diets. Key recommendations for government and policymakers include creating and implementing a national food strategy, along with supporting policies, to enact dietary transformation. A key factor for the national food strategy will be the development of a balanced and practical policy framework that results in win-wins and accounts for dietary differences across the vast Chinese population. This effort would also require stronger coordination between government departments and ministries to promote synergies and minimize trade-offs. Equally, the strategy would require integration of sustainability into China's national nutrition strategies and developing plans to support the growth of the plant-based and new protein industries. Finally, the strategy would require the establishment of a clear and widely accepted definition of healthy and sustainable diets in China, as well as industry-wide standards and operating guidelines underpinning financial policies and regulations. In preparation for the United Nations Food Systems Summit (UN FSS), held in September 2021, China developed an Action Hub to facilitate collaboration among stakeholders

working in the food space. Those efforts could serve as a potential starting point for developing this national food strategy.

Another key opportunity is optimizing China's agricultural support policies to deliver positive outcomes for food and nutrition security, rural revitalization, climate, and nature. These policies have helped bolster the country's food security, reduced undernutrition and poverty, and increased farmers' incomes. However, they have not sufficiently considered or invested in nutrition, public health, climate, or nature. Optimizing these policies will be key to successfully implementing the Big Food concept. Better targeting subsidies, increasing public support to producers of nutritious foods, using payment transfer policies and food subsidy vouchers for low-income families (particularly in rural areas), promoting agricultural science and technology, and increasing investment in research and development focused on reducing pre-harvest food loss and increasing agricultural yields will increase both the supply and population's access to and intake of healthy and nutritious food.[70]

At the global level, subsidy regimes can have a big impact on prices. Over USD 880 billion a year is provided in public support to agri-food systems around the world, including subsidizing the use of fertilizers and trade support that protects and incentivizes domestic production of staple foods, such as rice and maize, often to the detriment of domestic production of fruit and vegetables.[71] These measures can keep the costs of fruit and vegetables high and reduce consumers' access to diverse diets.[72] China participates in the Trade and Environmental Sustainability Discussions (TESSD) convened by the World Trade Organisation (WTO), which aim to advance measures for trade and environmental sustainability. TESSD can be a useful entry point to explore opportunities for repurposing agricultural subsidies.[73]

In addition to these recommendations, the government can support other sectors to realize a transition to healthy and sustainable diets. The government can provide financial and other incentives to the private sector, especially small and medium-sized enterprises, to adopt sustainable practices. The government can also provide financial and technological support to build the capacity of civil society, including social enterprises, to help them retain talent, improve the effectiveness and efficiency of their management, track their impact, and develop strategies.

Conduct local pilots to inform national policies and strategies

Chinese policymakers often use local-level pilots as a precursor to scaling nationwide approaches. Pilots have strong potential to provide experience-based learning to inform longer-term policies and strategies to promote the transition to sustainable and healthy diets across China. Researchers can lead these pilots in collaboration with food companies, government agencies, and NGOs to support a common vision for healthy and sustainable diets and develop detailed roadmaps to support planning and implementation. These pilots can demonstrate the potential of multi-stakeholder approaches and cross-sector alliance building.

Identifying several cities for pilots would promote friendly competition across cities in pursuit of food systems transformation (see the case study box on the next page for one example). As the cultural, culinary, and socio-economic context varies across regions, a more localized experience will also be valuable in developing adaptable approaches. For example, in agriculturally productive provinces, there could be an emphasis on the stable and efficient supply of fresh, healthy, and environmentally-friendly food. This would involve building supply chains, e-commerce platforms, and cold chains with high energy efficiency, as well as introducing green farming techniques to reduce the use of fertilizer, pesticides, and/or irrigation water.

For cities with many civil society organizations, research institutes and government can collaborate with NGOs to promote social campaigns and projects such as nutritious school lunches, healthy eating initiatives, and clean plates initiatives to reduce food waste. For cities oriented to new food industry development, government support could help create an enabling environment – for instance, in promoting the growth of the new protein industry.

Given the multiplicity of government departments and government bodies involved in a transition to sustainable and healthy diets, better coordination across these bodies is essential to enhance synergies and minimize trade-offs in this process. China can leverage its existing inter-departmental processes to coordinate approaches to deliver healthy and sustainable diets.

CASE STUDY

Nanjing City, Jiangsu Province

Nanjing City, in the central province of Jiangsu, is a six-time capital of China and enjoys a long and rich history and culture. The city has established goals to accelerate green and low-carbon development to contribute to China's carbon neutrality commitment and build an ecological civilization. Three of China's key ports are located in Jiangsu Province (Nantong, Lianyungang, and Zhangjiagang), and Nanjing and the Jiangsu Province play an important role in the processing and distribution of food products across China. In 2021, Nanjing launched an action plan to become an "international consumption center" city in accordance with the guidelines of the Ministry of Commerce. The plan includes the sustainable and high-quality development of sectors including food, health, education, tourism, etc.

At the same time, Nanjing has been recognized by the National Administration of Forestry and Grasslands as one of the National "Forest" cities in China, given that it has almost 30% forest cover and prioritizes the Sustainable Development Goals and environmental protection.

Nanjing City has been partnering with the United Nations Educational, Scientific and Cultural Organization (UNESCO) to host the annual Nanjing Peace Forum. In 2021, the Peace Forum was held under the theme of "Living in Harmony with Nature for Peace." At the opening ceremony, the Nanjing Forest Manifesto was jointly launched by the university, high school students, and local organizations as a call for action from different sectors to address the urgent issues of global forest and biodiversity conservation, establish green agri-commodity supply chains, and make production and consumption behaviors more sustainable and forest-friendly.

While Nanjing is at the initial stage of its green transformation, its progress demonstrates the importance of collective voices and actions by local stakeholders to raise awareness of the connection between food consumption and environmental protection. This initiative can support the transition to more sustainable and healthy diets that are aligned with government policies. Other provinces are developing similar local approaches to promote low-carbon and green lifestyles across industry and society.

Summing up

This chapter has provided a range of opportunities for government and policymakers at the local and national levels to bring about healthy and sustainable dietary shift. These efforts include enhancing policy coherence and coordination through the development of a national nutrition strategy, enhancing national education on healthy and sustainable diets and the CDG, and developing localized nutrition guidelines. The government can also incentivize the private sector to adopt practices which promote sustainable and healthy diets, and build the capacity of civil society to support sustainable and healthy diets through its activities. The key recommendations for government and policymakers are summarized below.

KEY RECOMMENDATIONS FOR GOVERNMENT AND POLICYMAKERS:

- Develop **localized nutrition guidelines** based on culinary traditions, local natural resources, affordability, and local and regional dietary contexts and traditions; promote the guidelines through targeted campaigns.
- Incorporate sustainable and healthy diets, wellbeing, and agri-food systems into the **national educational curriculum** and related policies to develop an environment for healthy and sustainable food; develop a **platform for sharing educational resources and raising awareness** of sustainable and healthy diets among the public.
- Provide fresh, healthy, nutritious, and sustainable **food choices in government-run facilities** including public cafeterias, school and university canteens, and dining hall areas.
- Repurpose **agricultural support policies** to facilitate the transformation of agri-food systems. These policies should align with the Big Food concept.
- Develop and implement a holistic **national food strategy** with supporting policies, plans, industry-wide standards, operating guidelines, and inter-ministerial coordination mechanisms.
- Provide **capacity building and access to finance**, alongside enabling policies, to support farmers, agriculture, and food industry enterprises in gaining the knowledge and skills to implement sustainable production practices.
- Support **local pilots** which integrate sustainable and healthy diets into local policies and implement the Sustainable Development Goals, including the promotion of green and low-carbon lifestyles.
- Provide financial and other **incentives to the private sector**, especially small- and medium-sized enterprises, to adopt sustainable practices.
- Provide financial and technological support to **build the capacity of civil society and social enterprises** to help them retain talent, improve the effectiveness and efficiency of their management, track their impact, and develop their strategies.

3. The Role of Research in Accelerating the Transition

This chapter outlines opportunities for researchers and academics in China to support evidence-based policymaking to accelerate a transition to healthy and sustainable diets. It identifies gaps in research on dietary consumption practices and explores a range of actions researchers and academics can take to facilitate dietary shift.

The Chinese government values scientific and academic research and draws on recommendations from the research institutes attached to ministries and leading universities in writing its long-term development plans, including its Five-Year Plans. China's world-leading universities and think tanks can develop cutting-edge research and analytical insights to help fill key knowledge and data gaps (see the case studies below on GFI Consultancy and the FOLU China Platform). The following opportunities are available to researchers and academics in helping promote dietary transition.

Develop accessible food consumption databases

The existence of comprehensive and accurate databases is a foundation for all research and evidence-based policy making. A key gap that needs to be filled for a shift to sustainable, healthy diets in China is the development of credible, large-scale datasets on individual and/or household food consumption that can be accessed for research. To date, a few micro-level datasets hold this information, including the China Health and Nutrition Survey (CHNS, by University of North Carolina at Chapel Hill and the Chinese Center for Disease Control and Prevention),[74] the National Household Survey (the NHS, by the National Bureau of Statistics), and the China Family Panel Studies (CFPS, by Peking University).[75] However, these datasets are either outdated (e.g., the CHNS, for which the latest publicly available dataset on food intake is dated 2011), not publicly accessible (NHS), or not detailed enough in quantifying food consumption (CFPS).

Historically, tracking consumption data in China has been difficult, given the country's large size and data limitations, and because transactions are largely made in cash. Over the last decade, however, the rise of mobile payment and e-commerce have improved record-keeping for food transactions. These records, stored in online systems, can enable academic institutions to monitor food consumption patterns and evaluate consumers' willingness-to-pay based on their socio-economic and demographic details. While online platforms can be hesitant to share their data for research, their buy-in could be in their own interest (and in the interest of associated food industries and restaurants). For example, industry-academic collaboration could test whether certain marketing strategies, such as product recommendations based on certain algorithms, can spur dietary shifts or better food planning to reduce food waste. This collaboration could encourage further academic research to help businesses to implement strategies that motivate the desired dietary shifts. Protecting consumers' private data, however, would be essential in this process, and this approach should only be taken if consumers' privacy is guaranteed.

Identify opportunities for integrated policies

Integrated policies and strategies can help policymakers meet multiple policy goals. Research and analysis can identify opportunities to promote synergies between different policy priorities, minimize trade-offs, and promote scientific, evidence-based decision making. Opportunities include:

- Identifying where to incorporate consideration of the environmental impacts of food consumption into China's nutritional and dietary guidelines.
- Developing recommendations for incorporating sustainability into nutritional improvement programs, such as school lunch programs.
- Identifying how to incorporate food consumption into environmental planning and policies related to "green" lifestyles.
- Identifying where to integrate environmental sustainability into China's policies and strategies (carbon neutrality strategies and promoting rural revitalization are promising entry points).
- Identifying pathways to incorporate dietary transition into national and provincial carbon neutrality strategies.
- Identifying ways to strengthen rural revitalization through incentives focused on healthy and sustainable diets.
- Developing more systematic and unified metrics for emissions and climate impacts from agriculture and food products.

Conduct analysis of consumer behavior

Behavioral science in the context of dietary transition analyzes which interventions have the greatest impact in motivating consumers to change their dietary habits. Analysis points to the importance of income, education, and other socio-economic characteristics in influencing dietary choices, but we are still a long way from having a comprehensive understanding of consumer dietary preferences (regarding taste, cost, social norms, etc.), as well as the appropriate channels, platforms, and strategies (related to both food policies and food industry marketing) to effectively influence and promote sustainable dietary change. Another challenge is the difficulty of evaluating the impacts of policies, given that many factors affect people's diets. Recent improvements in data science techniques, including behavioral science experiments, could help to tackle this.

Most studies on consumer behavior to date have focused on Western countries. Studies on consumer preferences and behavior in China, as well as at the regional level, would likely yield very different insights. Most research on consumer behavior in China has focused on the younger generation and urban groups; the characteristics of elderly and rural groups are less clear. Ensuring sustainable and healthy diets for these groups, however, has implications not only for the food system in China, but also for preparing for the shift to an aging society and realizing rural revitalization goals.

Understanding the dietary and culinary preferences of elderly people is also important because, in many cases, they cook for their children and grandchildren.

While China's nutritional guidelines and the EAT Lancet's Planetary health diet provide general principles, there is still an information gap between the guidelines and targets they contain and practical strategies to encourage people to change consumption patterns.[76] The World Resources Institute (WRI) has a forthcoming report on "Opportunities to achieve healthy and sustainable diets in China through behavior change," which outlines possible strategies. Research and public opinion surveys can explore how Chinese consumers can implement specific dietary practices based on the food products available where they live. For instance, young white-collar workers in metropolitan areas who often eat outside the home would face different options than mothers who do most of their own cooking and live in small towns. Thus, the challenges and solutions for improving the nutritional benefits and environmental impacts differ widely among consumers, depending on geography, age, occupation, dietary preferences, etc. Behavioral science research could support targeted campaigns for improving the nutritional content of food products, such as instructions for selecting the most appropriate food products available in the Chinese market, adapted to the preferences of Chinese consumers.

Undertake life cycle analyses of different food products

Life cycle analysis (LCA) studies can identify food production practices with minimal negative environmental impacts and help different stakeholders assess the performance of food value chains. For example, detailed examination of the supply chains of food industry enterprises can help identify key nodes for improving production efficiency and reducing food loss. For example, evaluation of China's "Potato as a Staple Food" national strategy could potentially show reductions in GHG emissions, land appropriation, and water usage.[77] LCA studies could support decision making by incorporating scenarios to demonstrate the environmental outcomes of different choices or strategies by individuals, institutions, or policies.

Conduct research and analysis on animal-based, plant-based, and other new proteins

Current Chinese dietary trends suggest that the consumption of red meat will nearly double by 2030. The implications of this increase on China's food/nutrition security and climate/environment goals are potentially significant. Further research and analysis are needed on how China can meet its protein needs through sustainably-produced animal-based proteins, plant-based proteins, and other new proteins. Scenario analyses can assess the extent to which environmental impacts can be reduced by shifting to different types of proteins.

Behavioral science can provide insights into how to increase consumption of healthy and sustainable options. Tofu, edamame, and soybeans are rich in nutrients, and are already widely accepted and integrated into Chinese culinary culture. These foods are relatively affordable and healthy with varying degrees of processing. Convincing consumers to transition to these traditional, plant-based, and protein-rich sources of protein instead of meat will be crucial. It will take culinary effort and careful messaging that they are not 'going back in time' to an era when they could not afford meat, but rather pioneering innovative 'new proteins.'

Technologies like cultivated meat and fermentation are also garnering attention in China (see the Private Sector section). Research and analysis could explore the potential to develop new sources of protein from these technologies, e.g., biomass fermentation and precision fermentation, as well as provide policy makers with a panoramic view of this emerging industry and its potential for both domestic and global markets. New methods of protein production could have significant impacts on food and nutritional security, and environmental protection, while also contributing to rural development and livelihoods (by enabling new sectors for agricultural production, and connecting rural farmers with new and growing markets). New protein sources such as insect proteins could also provide a substitute for animal feed, thereby cutting the need for soy imports. The nutritional, food safety, environmental, and other implications of these products require further study, however.

Because the current generation of meat alternatives is fairly new, research comparing the health impacts of meat and meat alternatives is limited. While there have been numerous LCA studies on the environmental impacts of traditional food products such as meat and vegetables, there are not yet many studies on emerging food products such as new proteins.[78] A few studies quantify the environmental impacts of certain new protein products, such as Beyond Meat in the U.S. or meat substitution in Germany, but there is a need for more localized assessments based on the products in the Chinese market.[79,80] Some local companies are beginning to assess the environmental impacts of some of their products, such as Starfield's collaboration with Carbon Stop.[81]

Further analysis is also required to assess how a shift to new proteins would affect intake of micro-nutrients (as meat is an important source of iron, vitamin B12, and several other minerals and vitamins). Food engineering could also explore technologies to produce tastier food products from these plant-based, fermented, and cultivated proteins to accommodate the preferences of the younger generation.

CASE STUDY

FOLU China Platform

The **Food and Land Use Coalition (FOLU) China Platform** supports multi-disciplinary approaches that strengthen ecological protection, alongside improved health, sustainability, and rural prosperity. The national platform seeks to strengthen the evidence base for a transition to sustainable food and land-use systems, building on the recommendations of FOLU's **Growing Better Report**, including the recommendation for a transition to healthy and sustainable diets. FOLU China draws on a wide domestic and international network of experts at the nexus of climate, environment, nutrition, and agricultural policy. The organization also draws upon its wider network of businesses, investors, and farmers so China can benefit from cutting-edge research and analysis, as well as share experience and knowledge from China with other countries.

Core partners of the FOLU China platform include WRI China; China Agricultural University; Tsinghua University; and the Food, Agriculture, Biodiversity, Land-Use, and Energy (FABLE) Consortium members (which include the Center for Agricultural Resources Research of the Chinese Academy of Sciences, Nanjing Agricultural University, and Peking University). FABLE members carry out a crucial component of the FOLU work in China, which is to support the development of the data and modelling infrastructure needed to produce long-term FABLE pathways towards sustainable food and land-use systems.

CASE STUDY

GFI Consultancy (GFIC)

GFI Consultancy (GFIC) is a China-based impact consultancy firm providing industry insights and R&D resources to support the new protein sector. GFIC collaborates with academic institutions, scientists, corporations, start-ups, and investors to accelerate plant-based, fermentation-enabled, and cultivated protein innovation, as well as to explore underutilized natural resources for new proteins in China.

GFIC endeavors to foster a dynamic global new protein research network. In 2021, for example, GFIC launched the first research grant program to tackle the Chinese new protein industry's biggest technological bottlenecks. In 2022, to motivate young scientists and technologists to pursue new proteins in their careers and upskill the next generation of Chinese researchers, GFIC initiated the first Chinese-language Massive Open Online Course (MOOC) focused on the science and business of new proteins. GFIC also organizes quarterly webinars to share local and global innovation in the new protein industry with the research community, and hosts camps and workshops to provide students with first-hand experience and industry insights from new protein experts.

GFIC is developing a growing body of work on new protein innovation in China, and has recently published "2021 China Alternative Protein Innovation Insights: Plant-based Meat" and "Driving the Future of Alternative Proteins: China Fermentation Industry Report (2022)".

Summing up

The Chinese government relies heavily on its universities and think tanks in developing its policies and plans, meaning researchers and academics play an important role in food systems transformation in China. They can develop comprehensive databases on the environmental impacts of the agri-food system in China, as well as on individual food products across the value-chain. By conducting research into consumer behavior, researchers can also better understand consumers' dietary preferences and leverage this information to inform the development of lower-impact food products. Finally, research and analysis can identify opportunities to promote synergies between different policy priorities, minimize trade-offs, and promote scientific, evidence-based decision-making. Below is a summary of the key recommendations for researchers and academia to enable a shift towards healthy and sustainable diets in China.

KEY RECOMMENDATIONS FOR RESEARCHERS AND ACADEMIA:

- Develop accessible **food consumption databases** containing credible, large-scale datasets related to individual or household consumption of food.
- Develop an **emissions calculator and metrics for environmental impacts** for agriculture and food systems, all the way from production to consumption.
- Collaborate with industry to **understand consumer dietary trends** and conduct research to underpin **business strategies for dietary transition.**
- Conduct **research and analysis on new proteins** to provide scientific and evidence-based information on health, nutritional, and environmental impacts, and to tap into the potential of new technologies to use fermentation to develop new proteins, e.g., biomass fermentation and precision fermentation.
- Explore the potential, e.g., through leveraging behavioral science, to increase local supply and demand for **alternatives to traditional meat, egg, and dairy products** (such as coarse cereals and beans) **and new protein sources** (such as local fungi, mycelium species, algae).
- Improve **academic cooperation and communication** across disciplines and regions to build understanding and consensus around new proteins.

4. The Role of the Private Sector in Accelerating the Transition

This chapter explores the role of Chinese businesses across the agri-food value chain in supporting the transition to healthy and sustainable diets.

It explores how businesses can support the transition through investment in rural agriculture and innovation, including digital technology, rural infrastructure and development. It highlights opportunities for businesses to market and promote sustainable and healthy food products, including consumer education. It also highlights opportunities for collaboration between regional and national governments and businesses, as well as between businesses (including financial institutions) and industry associations.

Businesses can play an important role in transitioning China's agriculture sector towards greater sustainability, efficiency, and prosperity. Private sector investment can help revitalize rural areas, restore land through regenerative and low-carbon agricultural practices, enable agricultural innovation and technology to improve production efficiency and yields, connect China's smallholder farmers to markets, and improve infrastructure, logistics, and transportation.

Businesses can support their suppliers in transitioning towards low-carbon agricultural practices. The Sustainable Agriculture Initiative (SAI) Platform, for example, supports its members – including Unilever, Danone, Barry-Callebaut, Coca-Cola, and other globally leading food and beverage companies – to fulfill their sustainable agriculture production and sourcing policies. Using the Farm Sustainability Assessment (FSA) standard as a benchmarking tool, these multinationals require their suppliers to meet FSA standards. In China, there is growing demand and interest from members and non-members to use FSA to achieve their sustainable and low-carbon agendas. One of the

members, Nestlé, is implementing FSA in its coffee, maize, and dairy projects in China using an integrated approach with regenerative agriculture and low-carbon methods as part of its roadmap to achieving its net zero target.

Businesses can also invest in digital direct-to-consumer retail platforms to improve access to markets for Chinese producers and streamline their supply chains, thus allowing the producers to capture more of the product's final value. Pinduoduo is one such online platform, with millions of consumers directly purchasing agricultural products from the site. In many areas, these platforms are drawing members of the younger generation who have e-commerce or farming skills back to their rural hometowns by offering employment opportunities in local businesses.[82] Other ways in which businesses can help in the transition are described below.

Develop healthy and sustainable food products

China's rich food and medicine tradition and age-old philosophies provide a strong foundation for a transition to healthy and sustainable diets. For example, tofu, edamame, mushrooms, fungi, and mycelium (rich in Yunnan) have been used in Chinese cuisine for centuries. Often made from whole food sources of protein like beans and other legumes, tofu generally has a smaller environmental footprint than its ultra-processed counterparts, with beans ranking as one of the best protein sources in terms of land use, water consumption, and greenhouse gas emissions.[83] These whole food options are easier to source from farms that practice organic and regenerative methods, potentially lowering their environmental impact compared to conventionally produced crops.[84] They are also likely to enjoy greater acceptance by Chinese consumers than new proteins because of their longstanding place in Chinese cuisine.

Producing and manufacturing such products offer a unique opportunity for Chinese businesses to cater to growing domestic and international demand for healthy and sustainable foods.

Market and promote healthy and sustainable food products

As Chinese lifestyles are increasingly focused on convenience and low prices, consumption of highly processed snacks and food products has grown at the expense of diets based on healthy, fresh ingredients. China's food industry can play a role in raising consumer awareness of healthy and sustainable diets and lifestyles, while capitalizing on the business opportunity offered by the growing demand in urban areas for locally-sourced, organic, and fresh produce. Exposure to healthier and more sustainable dietary options is likely to spur broader dietary shifts, and businesses have an opportunity to help promote these options.

Participation in government-sponsored promotional platforms such as the China Green Food Exposition, China International Organic Food Exposition, and China International Agricultural Trade Fair for green food businesses can enable Chinese businesses to enhance visibility of their sustainable, healthy food products among domestic and international consumers. Food companies can also partner with public institutions to promote and provide fresh, healthy, nutritional, and sustainable food choices in public cafeterias, school and university canteens, and dining hall areas. Catering businesses, such as hotels and airlines, should also offer similar options to their customers.

Better nutritional information and eco-labelling is another key opportunity available to Chinese businesses to improve consumers awareness. Nutrition labelling has been mandatory for packaged food in China since 2013, but it is hard to estimate the nutritional content of meals in restaurants or canteens due to the complexity of mixed ingredients and lack of a standardized approach. As part of the Healthy China 2030 campaign, the Steering Committee of National Nutrition and Health has been encouraging nutrition labelling in restaurants and canteens via local pilot programs.[85] Guidelines for Nutrition Labeling of Restaurant Food have also been published to provide instructions on what could and should be included in nutrition labels.[86] Some restaurant chains, such as Hai Di Lao, one of the largest hot pot restaurant chains in China, are working on including nutrition labels on their products (see the case study box to the right). Establishing a regulatory system for industrial standards, however, is still a long way off. Voluntary environmental and nutritional labelling in restaurants and in the food industry is an opportunity for Chinese businesses to demonstrate sector leadership in the meantime. Collaboration with industry associations and social innovators will be necessary to engage peers and competitors and to reach and educate consumers.

Businesses can also leverage e-commerce platforms for consumer marketing. Urban centers such as Beijing, Shanghai, and Shenzhen have witnessed a boom in online platforms and local companies that offer 'farm-to-table' and organic produce to urban households through these platforms. Alibaba's HeMa E-commerce supermarket provides a variety of fresh produce with a traceability system that traces the product back to the farm through barcodes and QR codes for consumers. The expansion of these platforms to other regions offers significant opportunities to Chinese businesses active in the sector.

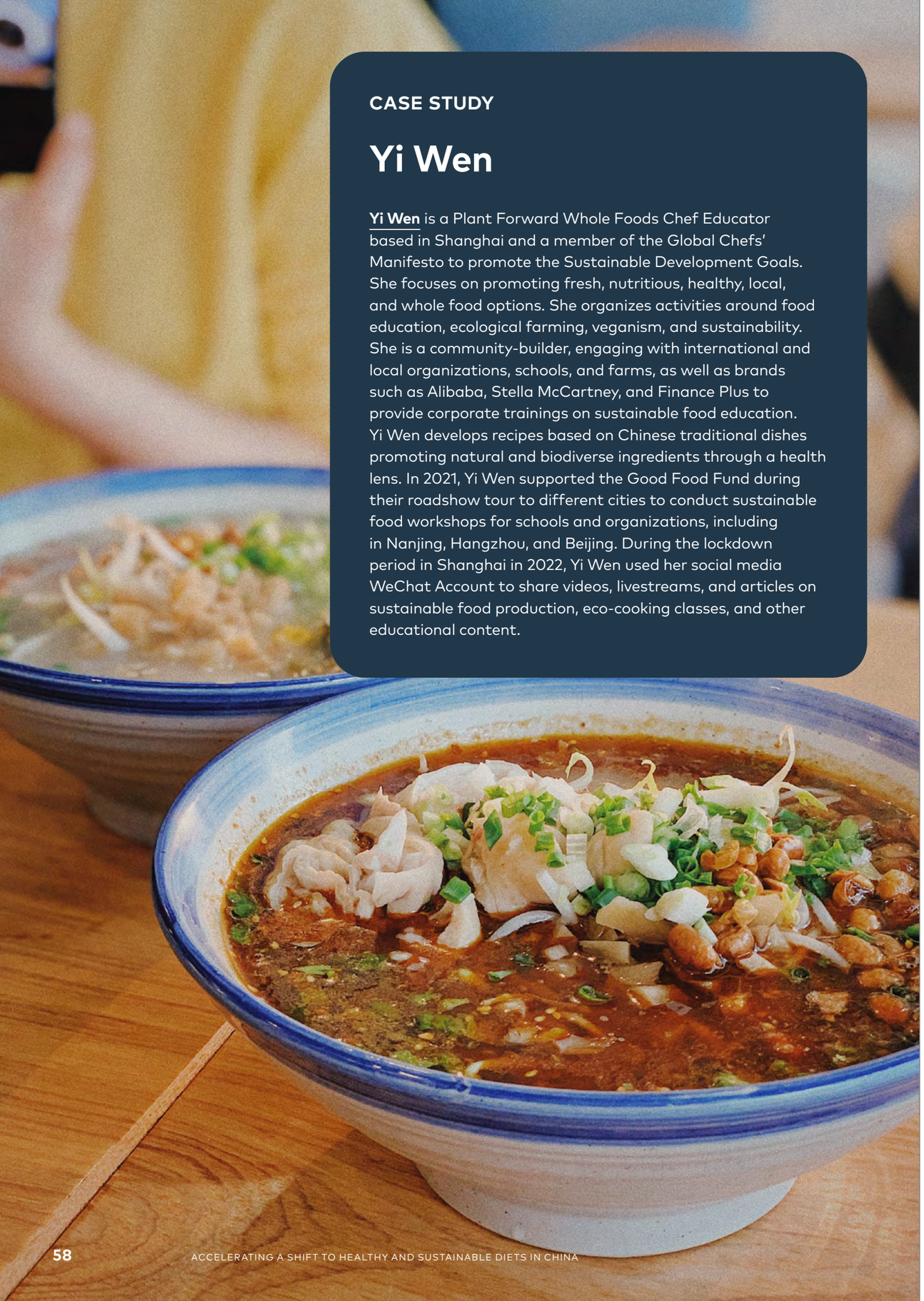
CASE STUDY

The China Chain Store & Franchise Association (CCFA)

The **China Chain Store & Franchise Association (CCFA)** has developed sustainable consumption guidelines to promote sustainable consumption among its member companies. Collaborating with the World Wide Fund for Nature (WWF), CCFA has organized several events in Shanghai and Beijing to raise awareness of sustainable consumption practices among consumers. In 2020, the CCFA developed a carbon footprint app for consumers to track emissions from their food consumption. These are early-stage efforts, with plenty of opportunity to enhance their content and scope.

E-platforms for food delivery like Meituan and Eleme are important channels for marketing healthier food options. These platforms are also well positioned to encourage the provision of healthier, sustainable food options and nutritional information by restaurants, as they often enjoy strong partnerships with these restaurants.

Lastly, social media channels and collaboration with celebrities can be instrumental in reaching and educating Chinese consumers, particularly in first tier cities, where there is growing demand and increasing disposable income from Gen-Z and young families for healthier food options (see the case study box on the next page). Plant-based food brands like Shanghai-based Z-rou and Beijing-based Zhen-rou collaborate with chefs to design plant-based dishes using their range of Chinese-style and Western-style plant-based meatballs, dumplings, and minced pork.



CASE STUDY

Yi Wen

Yi Wen is a Plant Forward Whole Foods Chef Educator based in Shanghai and a member of the Global Chefs' Manifesto to promote the Sustainable Development Goals. She focuses on promoting fresh, nutritious, healthy, local, and whole food options. She organizes activities around food education, ecological farming, veganism, and sustainability. She is a community-builder, engaging with international and local organizations, schools, and farms, as well as brands such as Alibaba, Stella McCartney, and Finance Plus to provide corporate trainings on sustainable food education. Yi Wen develops recipes based on Chinese traditional dishes promoting natural and biodiverse ingredients through a health lens. In 2021, Yi Wen supported the Good Food Fund during their roadshow tour to different cities to conduct sustainable food workshops for schools and organizations, including in Nanjing, Hangzhou, and Beijing. During the lockdown period in Shanghai in 2022, Yi Wen used her social media WeChat Account to share videos, livestreams, and articles on sustainable food production, eco-cooking classes, and other educational content.

Finance the transition to healthy and sustainable diets

Chinese financial institutions, such as banks, credit unions, and insurance companies, can play a critical role in financing and facilitating dietary transition. They can incentivize Chinese agricultural and food companies to improve their practices by offering favorable financial instruments such as loans and credit facilities, bonds, insurance products, and supply chain finance, providing risk-tolerant capital to help mitigate the risks of adopting green production methods.[87] Asset managers, private equity firms, impact investors, and other equity investors can also channel capital toward low carbon agriculture and new protein enterprises through equity investments, bolstering these business models.

China has begun to leverage financial innovations to accelerate transition in other sectors. By the end of 2020, the scale of green credits in China was nearly 12 trillion Chinese yuan, and the scale of green bonds was 813.2 billion yuan, ranking first and second in the world, respectively.[88] **Annex A** provides examples of green finance in China.

However, the proportion of green finance going to the agricultural sector is low, with investment in the sector perceived as high risk and low return. Partnerships between businesses and central or multi-lateral development banks, for example through the co-development of blended finance mechanisms, are needed to catalyze private sector investment in the agri-food system sector (see the case study below for an example).

CASE STUDY

The Henan Green Agriculture Fund (GAF) Project

The Henan Green Agriculture Fund (GAF) Project received a loan of USD 300 million in 2020 from the World Bank Group to foster green agriculture investments, standards development, and technological innovation in Henan Province. A dedicated investment facility demonstrates the viability of financing green agriculture investments by providing financing for equity investments and on-lending to eligible firms. The GAF sponsors green agriculture projects to increase the quality and safety of produce. Funding has gone towards green inputs and equipment production, as well as the reduction and elimination of the use of chemical fertilizers, pesticides, and plastics through good agricultural practices. The investments also include technologies and practices that reduce GHG emissions and nutrient run-off, improve energy and water resource use, and reduce food loss and waste.

Collaboration between businesses and the public sector is needed to develop detailed guidelines for green finance in the sustainable food sector, the lack of which is one of the biggest hurdles to scaling green finance and investment in the sector. The Central Bank has issued two industry standards for green finance – Guidelines for Environmental Information Disclosure of Financial Institutions and Financing Instruments of Environmental Rights and Interests. The next steps should be to turn these into operational guidelines and standards for investors interested in the agri-food sector which respond to the unique challenges linked to investing in the sector. Financial regulators should develop these with participation from food companies and industry associations representing agri-food producers to ensure they are fit for purpose.

Greening China's financial system and integrating sustainability and health considerations across all sectors, including agri-food, is a longer-term endeavor. Impact investing can offer a source of transition finance in the interim, but impact investing in the agri-food sector remains far from mainstream. The two leading networks of impact investors in China are the Social Enterprise and Impact Investment Forum and its affiliated China Impact Investing Network (CIIN), and the Alliance of Social Value Investment. However, a keyword search on their websites for words such as "food" or "sustainable/green food" yields very limited results.

Nonetheless, there are a few promising examples of impact investing in the sector, including the examples of Dao Foods and Ehong Impact Capital, highlighted in the box below.

CASE STUDIES

Dao Foods and Ehong Impact Capital

Dao Foods invests in plant-based and new protein companies within and outside China. Founded by experienced impact investors and social entrepreneurs in collaboration with New Crop Capital and the Good Food Institute, Dao Foods has invested in a series of sustainable food startups including Starfield, 70/30, WOW Kids, Fresh Foods, Mr. Raw, Geb Impact, Shanghai Protein, ShiShen Food Tech, Blue Canopy, and Cultured Decadence. According to Dao Foods, in 2020 the number of impact investments entering the plant-based protein field in China grew fivefold compared with the previous year.

Ehong Impact Capital is a prominent local impact investor. In green agriculture, Ehong Capital prioritizes increasing farmers' income, ensuring food safety, upgrading industry, and protecting the ecological sustainability in their investments. For example, Ehong Capital's investment in Anhui Qiangying Duck helped transform the company to a global player in the market with investments along its supply chain including breeding, incubation, feed processing, duck product processing, and sales. Two million acres of grain have been transformed to on-site foraging, which protected the environment and reduced grain waste. A cooperative business model has also helped local farmers get out of poverty and realize a profit.

Summing up

Businesses and financial institutions have a key role to play in enabling dietary transformation. Businesses can help their suppliers transition to producing sustainable, nutritious food, and can help farmers gain greater market access, for example by facilitating their access to online platforms to sell their products. Businesses will be key in promoting consumer awareness of nutritious and sustainable food. They can help enable the dietary shift by making sustainable, healthy diets available to their employees, supporting nutrition and eco-product labelling practices, and leveraging e-commerce platforms for consumer marketing. Financial institutions can incentivize agri-food system transformation by offering beneficial financial instruments. The key recommendations for businesses and investors to enable a shift towards healthy and sustainable diets in China are summarized below.

KEY RECOMMENDATIONS FOR BUSINESSES AND INVESTORS

- **Invest in** agricultural innovation and technology, rural revitalization, infrastructure, logistics, and transportation, carbon neutrality, sustainable and healthy food systems, land restoration projects via regenerative and low-carbon agricultural practices, and smallholder farmers to help them transition to sustainable agriculture.
- Provide **support for suppliers** in transitioning to low-carbon agricultural practices.
- Invest in **digital direct-to-consumer retail platforms** to improve access to markets for Chinese producers and streamline the supply chain.
- **Cater to the growing demand** in urban areas for locally sourced, organic, and fresh produce.
- **Raise consumer awareness** of healthy and sustainable diets and lifestyles.
- Improve **provision of nutritional information and eco-labelling** to raise consumers' awareness of the nutritional composition and environmental impact of their food.
- For Chinese finance institutions: incentivize agricultural and food companies to improve their practices by **offering sustainability-linked financial instruments** such as loans and credit facilities, bonds, insurance products, and supply chain finance.

5. The Role of Civil Society and Social Innovators in Accelerating the Transition

This chapter explores opportunities for Chinese civil society, including social innovators, to advance behavior change and support the transition to healthy and sustainable diets.

Civil society actors in this scoping study refer to social organizations (regardless of whether they are legally registered) and individual influencers. Social innovators refer to actors "developing and deploying effective solutions to challenging and often systemic social and environmental issues in support of social progress."[89] The chapter explores their role in creating platforms that promote collaboration and incubate initiatives, supporting campaigns that promote healthy and sustainable consumption, and highlighting the associated need to strengthen the capacity and visibility of civil society efforts.

Create platforms to promote collaboration and incubate initiatives

Chinese civil society actors have been working on sustainability and food system issues in recent years, largely focusing on raising public awareness, promoting behavioral change, and developing approaches to measure outcomes. However, there has been limited dialogue, coordination, or strategic collaboration among these actors. This is partially due to the nascency of such efforts and the limited capacity of civil society actors.

A lack of coordination can also hamper the crucial role of these actors in catalyzing collaboration among broader stakeholders such as the government, businesses, and research institutions. Thus, platforms that bring stakeholders together to collaborate, incubate, and implement new initiatives that support a shift to healthy and sustainable diets can help enhance civil society's impact (see, for example, the Good Food Fund case study below).

CASE STUDY

Good Food Fund

Since 2017, the **Good Food Fund (GFF)** has been convening civil society actors to discuss sustainable food system-related topics. Emphasizing the value of collectiveness, GFF has incubated and launched various initiatives. The Good Food Academy focuses on knowledge dissemination, and the Good Food Summit brings together policymakers, global leaders, researchers, business partners, and civil society actors to propose actions for food system transformation. The Good Food Fellowship identifies and supports young leaders in sustainable food systems. "Mama's Kitchen," GFF's laboratory kitchen project, aims to invigorate community bonding through food. The project won the top-ten Food System Vision Prize, an initiative launched by the Rockefeller Foundation in partnership with SecondMuse and OpenIDEO. The China Action Hub, launched at the 2021 UN Food Systems Summit, aims to build a shared national-level platform for civil society actors in the food space to collaborate and create a two-way communication channel between policymakers and civil society actors.

GFF has also partnered with local governments to increase public awareness and acceptance of the sustainable food system, based on their local priorities and opportunities. The Nanjing Peace City Forum in 2021, for example, provided an opportunity to focus on food and led to the release of the Nanjing Food Declaration.

Educate consumers and businesses on healthy and sustainable diets

Chinese civil society can play an important role in educating and improving public and business awareness of healthy and sustainable diets. In recent years, there has been an improvement in public awareness of the importance of healthy eating. However, research shows that more needs to be done to help consumers understand the nutritional value of their food consumption and make informed dietary decisions. For example, a national survey concluded that over half of consumers barely check nutritional labels on the packaged food items, as they do not understand the information.[90]

A key entry point for civil society is to stress the health benefits of a dietary shift, and the reduction of environmental impacts as a co-benefit. They can collaborate with government, nutritionists, businesses, and social innovators to develop educational materials and tools (e.g., tips for estimating portion sizes) that help consumers make healthier food choices. These can be disseminated through various channels, such as public-facing publications and posters, social media, and media campaigns. For example, the Chinese Nutrition Society published the Balanced Diet Pagoda as part of the CDG to illustrate the suggested composition of a healthy daily diet in an intuitive way (see Figure 3). Civil society support and educational efforts could help raise awareness of the health risks of consuming meat in quantities above the levels recommended in the CDG.

Social campaigns are effective tools to target and nudge consumers. Civil society organizations, with government support, can organize events and campaigns that promote healthy and sustainable food consumption patterns. Given the heterogeneity of the Chinese population, these campaigns need to be designed around specific target audiences. Insights into consumers' behavior and attitudes will be needed to build effective behavior-nudging strategies targeting heterogenous consumer groups (e.g., soy milk may be more acceptable for older generations, while cultivated meat snacks can target younger groups).

CASE STUDY

GoalBlue

GoalBlue is a Chinese non-profit startup that inspires low-carbon dietary and lifestyle trends among China's rapidly growing middle class, urban, and Millennial populations. GoalBlue focuses on private car ownership and meat consumption, aiming to reduce GHG emissions and protect the ocean by slowing China's projected growth of red meat consumption by 40 percent and encouraging citizens to swap cars for bicycles. GoalBlue leverages personal consumer behavior through social influences, such as media partnerships, viral communications, and large-scale events to make healthy and sustainable lifestyle choices attractive in China.

Social media campaigns (such as the one run by GoalBlue, see box above) may be more suitable for persuading Gen Z and white-collar workers to make healthier and more sustainable food choices. Current research shows that these consumer groups are open to the consumption of novel foods and are also heavy Internet users.[91] Social media (including influencers or celebrities who demonstrate a more sustainable diet or actions to reduce food waste) offer a unique opportunity to increase these segments' exposure to new ideas and products aligned with dietary transition and food waste reduction.

With food delivery becoming more common, civil society can work with leading restaurants, chefs, and food delivery platforms to design and present menus that consider nutrition and environmental impacts. Consumers need attractive options to motivate a switch away from habitual food choices to foods with higher nutritional value and fewer environmental impacts.

Campaigns can also target businesses on the supply side. One example of this is the Clean Plate campaign to tackle food waste. In 2021, a team of researchers led by Shengkui Cheng from the China Academy of Sciences (CAS) published a paper in *Nature Food* showing that 27 percent of food produced in China is wasted annually, with 45 percent associated with post-harvest handling and storage.[92] While the Clean Plate and associated social campaigns tackle the cultural shift required to reduce food waste, additional strategies are needed to reduce food supply-chain waste in conjunction with businesses.

By educating consumers and businesses, civil society actors can encourage creative use of food products which would otherwise be wasted. Reducing the stigma associated with consuming "ugly vegetables" is one example. Current consumer preferences for "beautiful" fruit and vegetables mean that irregularly shaped fruits and vegetables are often excluded from shelves in grocery stores and supermarkets in urban areas. Traditional wet markets, by contrast, sell such produce at a lower price. Food waste could be reduced if "ugly" fruits and vegetables were sold at a discount to these wet markets, where income can still be generated.

Encourage social media influencers to become societal educators

With the growth of social media platforms such as WeChat and Kuaishou, the concept of sustainable lifestyles and healthier food consumption has begun spreading through China. People can easily create an individual account on these social media platforms to share their daily lives and opinions. Some accounts have attracted thousands or even millions of followers, turning account owners into sustainable and healthy diet influencers (see the Li Ziqi and Qiu Cheng case study below).

CASE STUDY

Li Ziqi and Qiu Cheng

Li Ziqi is a video blogger known for independently growing and creating food. She lives in the Sichuan province's rural Pingwu County, and first uploaded videos of herself preparing food from farm to table in 2015. She quickly attracted significant internet traffic, and her YouTube channel (created in 2017) had nearly 12 million subscribers by June 2020. A key factor in her success was the support she received from a team of professional videographers and filmmakers. Ziqi has since begun branding and selling food products under her own name. A growing appreciation for farm-to-table food and an idyllic lifestyle has also contributed to the success of her videos and products.

Qiu Cheng, a current PhD student at New York University, is another example. Proactive in championing sustainable food systems since 2015, she started participating in farming activities with Forested, a farm located in Maryland, USA, which grows food and gardens on forested land to restore soil health and local ecosystems. She created several social media accounts on platforms such as WeChat, her own website, and Facebook, to promote the value of forested farming and sustainable food systems. Cheng uses social media to engage a wide audience via free to enroll online classes or live events.

Strengthening the capacity and visibility of civil society

As demonstrated, there are several ways civil society and social innovators can contribute to a dietary shift in China. Strengthening civil society and social innovator capacity and visibility for this purpose could be a winning strategy for the Chinese government. The government's recent emphasis on the need to build the capacity of local Chinese organizations and civil society is thus a promising development.

Currently, civil society organizations in China do not enjoy the same level of resources (e.g., funding, skillsets, etc.) or visibility as their Western counterparts. With limited access to foreign funding, Chinese civil society organizations need to be creative in identifying and forging new partnerships. The nascency of food systems sustainability as a concept in China makes it particularly challenging for civil society organizations working on this topic to access the resources they need. The cross-sectoral, industry-centered nature of the sustainable food system space makes it more difficult to navigate the space, identify opportunities for collaboration, and secure funding. The prolonged COVID-19 pandemic, still an acute challenge in China, continues to shift resources towards government, business, and other civil society sectors.

Civil society organizations also struggle to attract and retain talent since it is difficult for them to compete with the incentives offered by their government and corporate counterparts. Such barriers inhibit younger generations from entering the sector, despite their eagerness for societal improvement. Financial and technical support to build capacity in response to these challenges can strengthen civil society's role in transitioning China to more healthy and sustainable diets. Support is particularly needed to retain talent, secure funding, improve management effectiveness and efficiency, track impact, and develop long-term strategy. There are also opportunities through targeted leadership programs to support mission-driven individuals who demonstrate commitment, knowledge, and potentially innovative or effective solutions. These individuals need not be affiliated with established organizations.

Increasing the visibility of civil society organizations in China can also reinforce their role as intermediaries between different types of sustainable food system actors in China. Competitions, industrial recognition, and demo showcases are some measures the government can take to do so.

Finally, social enterprises are a sub-set of social innovators that can also contribute to a dietary shift in China. These social enterprises leverage market instruments to directly impact individual's lives and often use food as a medium to connect people, communities, and nature. These organizations usually have strong social missions, connections to communities, and involvement in commercial activities (see, for example, the Nurture Land case study below). Chinese social enterprises tend to be registered under the Ministry of Commerce or the Ministry of Civil Affairs. As social enterprises can help drive food systems change through market levers, government ministries can reduce roadblocks to their registration and market participation.

CASE STUDY

Nurture Land

Nurture Land (沃土工坊) was created in 2006 as a voluntary group that supports smallholder farmers practicing ecological farming in remote or mountainous areas. Since 2008, Nurture Land has transitioned into a social enterprise that provides sales channels for farmers to promote agro-ecological products. Nurture Land services provides a sales platform with strict quality control, a development center for multi-dimensional support, and sustainable living education access to hundreds of ecological farms and nonprofit organizations.

Revenues are reinvested to further support its social goals. For instance, Nurture Land established the Nurture Land Sustainable Development Center in 2015 to provide ecological farming knowledge and technical support to farmers, leveraging the interests of a new, younger generation of farmers who often have stronger social missions to help with the development of their respective hometowns, and adapt readily to new concepts and technologies. Nurture Land also partners with communities and schools to offer families and children opportunities to get close to nature through activities such as ecological farming, DIY handicrafts, gourmet food tasting, etc. Through these efforts, Nurture Land hopes to promote environmentally friendly, simple, and happy lifestyles.

Summing up

There is a significant opportunity to enhance the role of civil society actors to advance behavioral change and support a transition to healthy and sustainable diets in line with China's policy and political priorities. In particular, civil society can play a crucial role in fostering cross-sectoral collaboration at the nexus of policies, markets, citizens, and social life in the spirit of constructing a harmonious society as encouraged by the Chinese government. There is also potential to enhance this role for civil society and enable and strengthen their capacity and visibility. Below is a summary of the key recommendations for civil society and social innovators to promote a shift towards healthy and sustainable diets in China.

KEY RECOMMENDATIONS FOR CIVIL SOCIETY AND SOCIAL INNOVATORS

- Create **platforms to promote collaboration** and incubate initiatives.
- Develop **educational materials and tools** in collaboration with government, nutritionists, businesses, and social innovators to inform consumers' food choices.
- Design **social media campaigns** around specific target audiences; encourage social media influencers to leverage their platforms to educate others on healthy and sustainable diets.

6. Conclusion

Chinese government policies have been successful in achieving economic growth, expanding food access, and improving food security. However, Chinese diets continue to lack sufficient fruit, vegetables, eggs, and milk, while reliance on grain, meat, oils, and processed foods for caloric intake has contributed to over half of the Chinese population becoming overweight or obese, and an increased share of the population suffering from related health challenges.

Meanwhile, the production of food and feed crops – both domestic and imported – is contributing to environmental challenges, such as the production of greenhouse gas emissions and the degradation of ecosystems and their services.

Having made significant gains in alleviating poverty and undernourishment, China now has an opportunity to turn its focus to a transition to healthy and sustainable diets to deliver better outcomes for health and nutrition security, rural revitalization, climate, and nature. Chinese national and provincial government leadership will be essential in achieving this aim.

There are strong foundations to build upon — healthy and sustainable diets align with goals the government has already established under the Chinese Nutrition Plan, Healthy China 2030 campaign, "Ecological Civilization" concept, carbon peaking by 2030 and carbon neutrality by 2060, and rural revitalization ambitions. There are opportunities to enhance policy coherence, coordination, and implementation to achieve win-wins for human and planetary health, while minimizing trade-offs between different policy objectives. These include integrating sustainability into national nutrition strategies and developing plans to support the growth of plant-based and new protein industries as part of rural revitalization.

As China works to implement its 14th Five-Year Plan (2021-2025) and begins to craft its 15th Five-Year Plan (2026-2030), healthy and sustainable diets should be prioritized as an enabler for food and nutrition security, rural revitalization, climate, and nature.

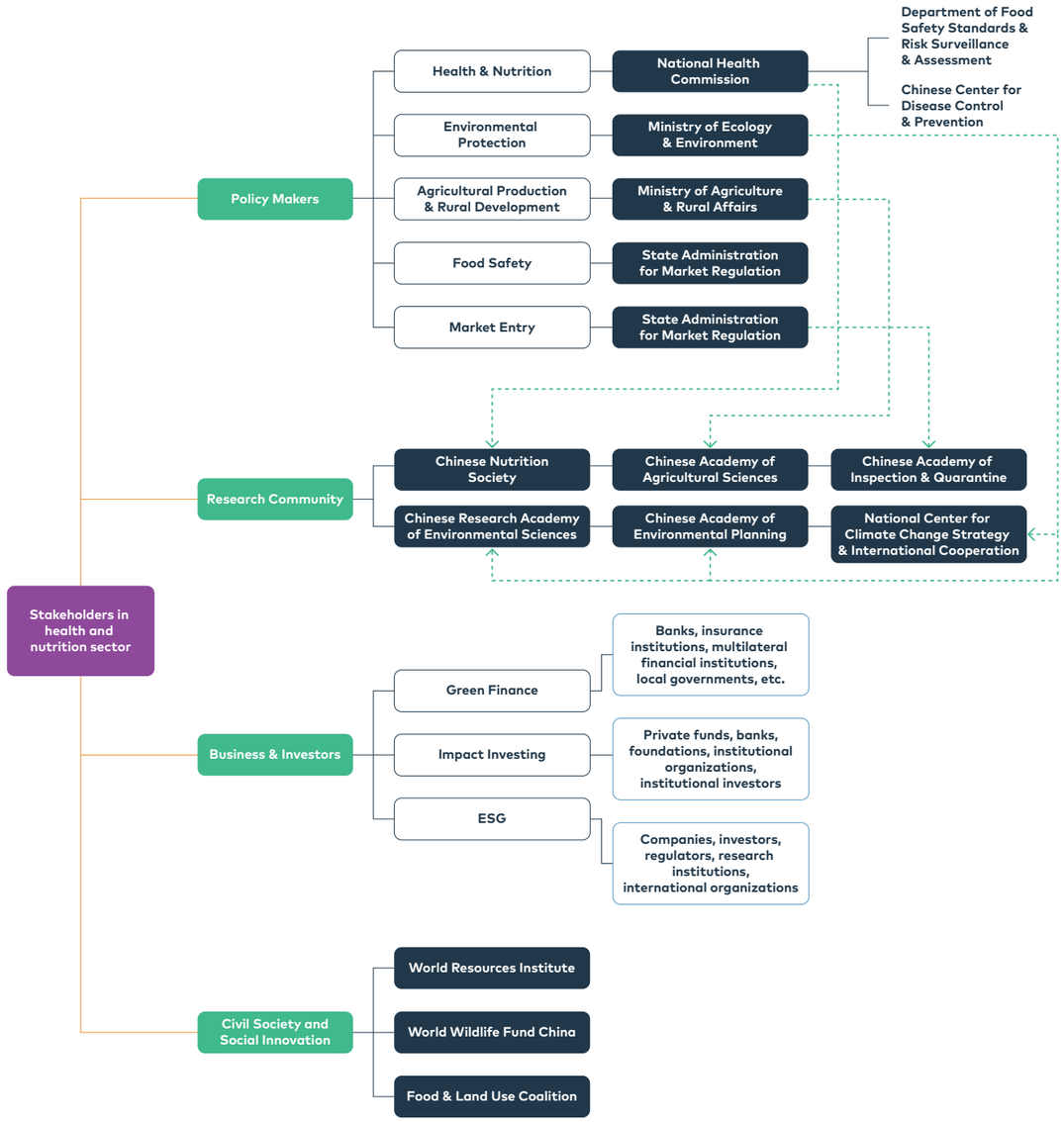
Through inter-ministerial collaboration, public-private partnerships, agricultural production support, and bolstering of civil society efforts, China can position itself as a leader in food systems transformation, with substantial health benefits for the Chinese population. A national food strategy can bring these elements together into a balanced and practical policy framework that accounts for dietary differences across the vast Chinese population.

Clear direction from government serves as an enabler for researchers, businesses, financial institutions, civil society, and social enterprises. Researchers and academia play a vital role by building evidence bases, developing monitoring tools, and initiating pilots — all of which can be further expanded by public funding and identification of research priorities. The current efforts of businesses and investors to explore market opportunities for healthy and sustainable food, including in the alternative protein space, can be accelerated with a more favorable policy and regulatory environment. Additionally, financial institutions investing in sustainable food and agricultural enterprises and sustainability-linked financial products can be supported by public financial institutions willing to provide risk-tolerant capital that alters the risk-reward calculation. Civil society actors focusing on healthy and sustainable diets can also be supported with financial, capacity-building, and communication support as well as greater inter-organizational collaboration. Finally, reduction of barriers to registration and market participation can encourage greater participation from social enterprises that drive food system change through market levers.

A clear and widely accepted definition of healthy and sustainable diets that is appropriate to China's national context will be vital to guide the actions of all relevant stakeholders. It will also be important for policies, plans, and strategies to take into account the significant differences between China's regions. With strong capacity to set direction and implement major reforms within central and provincial governments, world-leading universities and research institutions, a vibrant private sector, and growing interest in social innovation, China is well-placed to accelerate a transition to healthy and sustainable diets.

Annex A: Stakeholder Mapping

This annex gives detailed examples of the key actors in the food systems space in China. It begins by detailing the actors in the policy landscape, continues by explaining the businesses and investors in this space, and then goes on to detail the key environmental, social, and governance (ESG) actors, as well as actors in green finance and impact investing in China. The stakeholder mapping concludes with a summary of community supported agriculture (CSA) movements in China.



Policy Landscape

At the highest political level, statements that come from President Xi Jinping send the strongest policy signal, and ministries, research entities, and businesses are expected to respond. China's 2060 Net Zero Carbon Pledge is significant in this respect.

China's key national policy and planning document is its Five-Year Plan. Five-Year Plans are developed through a complex process which involves contributions of ideas from and negotiations among a wide range of ministries and experts. China's **15th Five-Year Plan**, issued by its State Council and covering the period 2025-30, presents the next major opportunity to send the strongest policy signal possible regarding a shift to healthy and sustainable diets at the highest level. Five-Year Plans provide high-level goals and objectives, and details of how to implement the plans are worked out by relevant ministries in their own plans. Each provincial government also develops its own implementation plans around this document.

NUTRITION AND HEALTH ISSUES

The **National Health Commission (NHC)** is responsible for monitoring the status of domestic health and nutrition, disseminating knowledge on healthy diets, and implementing key projects to improve the nutritional quality of people's diets (e.g., ensuring sufficient and adequate intake of nutrients such as vitamins and minerals, and advocating balanced diets to combat overweight and obesity). As a key department charged with implementing several national plans published by the General Office of the State Council, the NHC has been promoting nutritional quality improvement in school meals and restaurants, including by increasing provision of more nutritious meals and nutritient content labelling.

NHC's research institution, the **Chinese Center for Disease Control and Prevention (CDC)**, concentrates on public health studies concerning diet-related health risks. The Chinese CDC has conducted several iterations of nationally representative nutrition surveys every decade since 1980 to develop a detailed understanding of the dietary patterns and nutrient consumption of Chinese people. The Chinese CDC works closely with the **China Nutrition Society**, an NGO with a strong academic background in nutrition and food science, in compiling and updating the **Chinese Dietary Guidelines** to provide instructions for dietary education.

In 2019, the NHC organized the **Steering Committee of National Nutrition and Health**, bringing together 17 relevant departments (including Agriculture, Education, Rural Development, etc.) to supervise the implementation of the **National Nutritional Plan (2017-2030)**. This helped develop cross-department coordination and prioritize nutrition and health improvement in the policy system.

The Department of Food Safety Standards & Risk Surveillance and Assessment (under the NHC) is a regulatory body that organizes the drafting of food safety standards, in addition to conducting monitoring and evaluation of food safety risks. The department reviews new food ingredients and food additives. It also has direct power in regulating the new protein industry. The department is a key stakeholder of the new protein industry, especially the novel cultivated

meat industry, which will go from the lab to the market in the next few years. The department is also accelerating the regulatory process of new protein products based on its established novel bio ingredient review and assessment process.

CLIMATE CHANGE AND ENVIRONMENTAL SUSTAINABILITY ISSUES

The **Ministry of Ecology and Environment (MEE)** is the key department responsible for pollution regulation and climate action. The 13th Five-Year Plan includes promoting green consumption; however, MEE's efforts have predominantly focused on household energy consumption, buildings, and transportation energy saving. Food consumption is mentioned but not discussed in detail. The marginalized status of food consumption is unlikely to be changed by MEE's plans to peak carbon emissions by 2030. This is because the key indicator is CO_2 instead of all types of GHGs, which excludes the two major non-CO_2 GHGs involved in agricultural production: CH_4 and N_2O. As a result, policy design and implementation are still expected to be oriented to the energy sector. This underscores the importance of building the awareness and understanding of policymakers in the policy actions that can mitigate climate and environmental impacts from the agricultural and food sectors.

The key research institutes under MEE are the **Chinese Research Academy of Environmental Sciences and the Chinese Academy of Environmental Planning**. The former focuses on physical scientific and engineering projects, while the latter is specialized in policy and management studies that feed into national strategies and planning. While environmental impacts have received attention from scholars from these institutes, they are currently not highly prioritized in research projects and so do not feed into policymaking.

Another institute under MEE involved in governance of climate change issues is the **National Center for Climate Change Strategy and International Cooperation (NCSC)**. As a think tank, NCSC focuses its research on policy and planning related to climate change through consultancy services to MEE. It also provides quantitative accounting for emission inventories and outcomes of mitigation projects (e.g., emission trading and the Clean Development Mechanism) to support the implementation of core national policies and planning, as well as international climate change negotiations and collaboration.

MARKET ENTRY

The State Administration for Market Regulation (SAMR) undertakes a broad range of market supervision responsibilities, including market entity registration, enforcement, and supervision of industrial products, food safety standards, testing, certification, and accreditation. Several food related departments work directly in the food space, including the Department of Food Safety Coordination, Department of Food Production Safety Supervision, and Department of Special Food Safety Supervision and Regulation. Earlier this year, SAMR published a list of health claims for nutritional supplements that are critical to the new protein industry, as companies are required to tell the public what effects their products could have on public health.

Chinese Academy of Inspection and Quarantine (CAIQ) is a research institution under SAMR responsible for developing research and technology to apply in inspection and quarantine. It provides technical support to the policymaking process for food safety inspections and food risk management. The National Health Commission recently commissioned CAIQ to conduct risk analysis on novel protein products, a process the new protein industry executives are watching closely.

AGRICULTURAL PRODUCTION AND RURAL REVITALIZATION

The **Ministry of Agriculture and Rural Affairs (MARA)** is responsible for agricultural production and primary food supply. Key targets of regulation include improving agricultural productivity and quality, ensuring stable, safe, and diverse food supply, managing food prices for affordability, the condition of rural areas, and the welfare of farmers.

MARA is also responsible for several areas related to food sustainability, including enhancing the efficiency of irrigation, curbing overuse of fertilizer and pesticides, and promoting appropriate disposal of agricultural waste, such as manure and straw. Climate change mitigation is rarely mentioned in its planning and policy documents. Traditionally, rural prosperity and agricultural productivity have been primary concerns of MARA.

To date, disruptive technology innovation in agricultural production, such as new proteins, has received little attention from MARA, despite lobbying from industry association executives. It remains unclear how much regulatory power MARA might have over the development of the new protein industry. Recently, MARA's Department of Animal Husbandry commenced research on the technological and market potential of cultivated meat as a supplementary source of animal protein production, primarily out of concerns for the potential negative impact on the existing animal farming industry. The key issues under investigation include climate impacts, technology development, and cost reduction potential, as well as the relationship between the cultivated meat and livestock industries.

The **Chinese Academy of Agricultural Sciences (CAAS)** is the key research institute reporting MARA. Its research focuses on technologies for agricultural production and food supply, such as innovative crop varieties resistant to pests and/or have higher productivity or nutrient density. Recently, CAAS launched a series of research projects concerning the GHG emissions and other environmental impacts of farming activities, aimed at supporting climate change mitigation and agricultural non-point source pollution control.

In 2018, CAAS merged with the Chinese Academy of Engineering to establish a new institute, the **Research Institute of Agricultural Development Strategy**, to concentrate on consultation and research on national rural development and revitalization, agricultural innovation and green development, and international collaboration on agriculture that contributes to top-level strategy design and formation. **The Food and Nutrition Development Institute**, another sub-institution of CAAS, plays a key role in conducting research projects on food safety as well as nutrition and dietary pattern improvement. It is also a major think tank in charge of consulting with the **Steering Committee of National Nutrition and Health** to provide suggestions for policy and planning.

FOOD SAFETY

The **State Administration for Market Regulation (SAMR)** is leading the management of food safety in China. Under its monitoring and coordination activities, the food safety issues in

each phase of the food supply chain are supervised by different government departments. The **Food Safety Commission of the State Council** supervises and coordinates all food safety issues. **MARA** is responsible for food safety of primary agricultural products, while the **SAMR** is responsible for the secondary agricultural products or processed foods, including those in the wholesale, retailing and catering industry. The **NHC** is responsible for developing national food safety standards and risk monitoring.

The responsibilities of each entity, as well as the other agents such as food producers and industries, are specified in the **Food Safety Law. Food Safety Planning** is also included in the Five-Year Planning system to promote governance on concrete issues such as food additives, pesticide residues, and food hygiene.

OTHER KEY MINISTRIES

The **Ministry of Science and Technology (MOST)** provides research support in developing innovative food products such as nutrient-fortified foods and supplements and food production techniques that can lower resource use and pollution emissions.

The **Ministry of Industry and Information Technology (MIIT)** works with food industries to ensure the supply of processed food, e.g., dairy products, supports the demand for healthy food consumption with high production efficiency.

The **Ministry of Education (MOE)** assists in improving the dietary quality of school meals by promoting nutritional lunch programs. However, MOE is not involved, at least not explicitly, in the implementation of national nutritional planning.

PROVINCIAL/LOCAL GOVERNMENT

The management of food systems largely replicates the institutional settings of the central government. Steering committees on nutrition and health have been established in multiple provinces to push forward the improvement of people's diets within the administrative area, though these do not explicitly include environmental sustainability or carbon neutrality goals. As for strategies for low carbon development and emission peaking in 2030 at the national level, planning and strategies are also iterated and implemented at the provincial level, usually with a focus on territorial, production-based CO_2 emissions. These policies, alongside an ongoing campaign to build green cities, often involve demand-side shifts towards sustainable, low-carbon, and green lifestyles. However, food is barely mentioned as a key lever, as the focus tends to be on residential energy savings and transportation.

Local governments have been instrumental in China's approach to development and its industrial policy to support key strategic industries nationwide. Specifically, China's local governments carefully strategize different approaches to industrialization, which has spurred the development of high-tech industry in the past few decades.

Business and investors

This section details the businesses and investors working to enhance sustainability and nutrition outcomes in China. It begins by laying out the main actors in green finance, impact investing, and ESG, and then goes on to detail green financial instruments and successful examples in China.

GREEN FINANCE

Players in the green finance space include banks, insurance institutions, multilateral financial institutions, local governments, financial technology companies, and international organizations. Successful green finance initiatives include the Anji White Tea loan, Harbin mortgage loan for green food, and the Henan Green Agriculture Fund (GAF) Project. One of the main challenges facing green finance is that there are limited guidelines, especially operating guidelines, for green finance in the sustainable food sector.

IMPACT INVESTING

The main actors in the impact investing space include private funds, banks, foundations, institutional organizations, and institutional investors. One of the main challenges facing impact investing is convincing predominantly profit-seeking investors to sacrifice short-term returns for sustainable long-term gains and impact. Another challenge is that impact investing is less competitive than mainstream investing.

IMPACT INVESTING EXAMPLES

Successful impact investing examples in China include Dao Foods, Ehong Impact Capital, Green Entrepreneurship Exchange, and Bits x Bites.

Green Entrepreneurship Exchange focuses on the incubation and investment of innovative projects or startups in the green field. It cooperated with Impact Hub Shanghai to launch a five-year green innovation incubation project, "Low-carbon co-creation camp", focusing on low-carbon and green products and funded by the HSBC Charitable Foundation. Industry companies raise demand and small companies respond to the demand. Through demand docking, verifying the market prospects of small business needs, funds can follow suit.[93]

Bits x Bites is an agriculture and food tech venture capital based in Shanghai. It invests in early-stage startups with transformative technologies to address critical challenges in the food system in China.[94] It has invested in several food technology startups, including Mojia Bio, Future Meat Technologies, Tropic Biosciences, EAVision, Next Gen, and Alchemy Foodtech. Mojia Bio manufactures essential nutrients with bio-manufacturing process, improving production efficiency while limiting pollution associated with conventional synthesis methods. Future Meat Technologies produces cost-efficient, non-GMO meat directly from animal cells without the need to raise or harvest animals. Next Gen makes chicken from plants, bringing together its proprietary plant-based fat and extrusion capabilities to emulate the smell, aroma, and sensation of eating meat.[95]

Investment Promotion Departments could be instrumental in establishing new protein pilots as a strategic emerging industry that can bring technology, talent, and long-term returns on investment. The division exists at all local government levels.

ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG)

ESG stakeholders include companies, investors, regulators, research institutions, and international organizations. Key actors in this space include the International Institute of Green Finance, Sanya Investment Promotion Bureau, Asset Management Association of China, the World Bank, and others. The penetration rate of ESG in China's food industry is very low, despite growing interest from governments, regulators, and international organizations. The use of digital technology is a promising opportunity for food companies to adopt and visualize ESG.

CERTIFICATIONS AND GUIDELINES

This section gives a few examples of guidelines issued to restaurants in China to help them become more sustainable, as well as examples of Chinese companies which have achieved B Corp Certification.

Restaurant sustainability guidelines: Meituan (美团) recently issued the "Guidelines for Sustainable Restaurants in 2020." These guidelines give 13 practical suggestions for improving the sustainability of restaurant operations, covering packaging, resource supply, store management, etc. and set a standard for sustainable restaurants in China's foodservice industry.[96]

B Corp Certification: B Corp certification is now being adopted internationally, including in China, where 32 Chinese companies have achieved the certification. In the food industry, there are three certified B Corps: Gung Ho! Pizza (叫板匹萨), a Beijing-based food chain company specializing in healthy food and committed to purchasing safe and green and healthy ingredients;[97] Danone China Beverages (达能中国饮料), which has integrated environmental and social responsibilities into corporate governance, combined with China's national conditions and the company's business model and put forward high-standard sustainable development goals;[98] and KexinFarms (可信农场), the business brand of Beijing Fuping Chuangyuan Agriculture Company (Fuping Agriculture). It is a social enterprise with comprehensive digital agricultural solutions and is the 30th joint-benefit enterprise in Mainland China.[99]

Civil society, social innovation, and multi-stakeholder organizations and platforms

This section gives examples of civil society organizations, multi-stakeholder organizations, and related platforms that are working towards a sustainable food system in China.

The **World Resources Institute (WRI)** shapes sustainable consumption in China, mainly through high-level policy engagement and knowledge production. WRI China's Food and Natural Resources Program focuses on the food system and relevant natural resources, including water, land, ocean, forests, etc. Working along the life cycle of the food industry, including production, supply, and consumption, WRI China is dedicated to a sustainable and resilient food and land transition, as well as the best use of natural resources to accelerate climate change mitigation and adaptation, protect biodiversity, and achieve the Sustainable Development Goals. WRI China works closely with other key international organizations, such as UN agencies, on sustainable food systems to produce knowledge products and organize international conferences and high-level panel discussions on the intersectionality of food, natural resources, and the environment.

To echo the China 30·60 Decarbonization Goals, **WildAid China** launched the Earth Aid (地球一援) program in August 2021 in partnership with the China Green Carbon Foundation, China Association for NGO Cooperation, and the Food and Agriculture Organization of the United Nations. Through a series of highly influential public campaigns, the Earth Aid program invites Chinese celebrities and key opinion leaders to advocate for sustainable food consumption and reduced use of non-recyclable plastic containers. It also educates the public on many government regulations and guidelines for healthy diets, sustainable food consumption, and recycling.[100] Set against the backdrop of carbon neutrality in China, the campaign is highly visible on Chinese social media as well as in popular offline locations. This has demonstrated WildAid China's successful Conservation Through Communication approach and its important role in advocacy for institutional implementation of environmentally responsible food consumption, as well as in forming critical partnerships with key stakeholders in the food and sustainability sector.

The Food and Land Use Coalition (FOLU) has set up a country platform in China to operationalize its framework document "Growing Better: Ten Critical Transitions to Transform Food and Land Use" in the country. FOLU China works in partnership with WRI, China Agricultural University, and Tsinghua University for ecological protection, rural revitalization, and food sustainability. The national platform seeks to strengthen the evidence base for action, and to support efforts in China to ensure responsible commodity sourcing. It also provides a bridge to the larger FOLU network, enabling China to share its rich development experience and knowledge with other countries. FOLU participated in the first Food System Dialogues in China in December 2020, which brought together multiple participants from the food supply chain who exchanged and shared their experiences with food

systems, proposed ways of building a more sustainable food system, and explored opportunities for different forms of collaboration. It has also co-conducted a series of webinars on "How to promote healthy and sustainable diets in China" and "Feeding China: Sustainability and Challenges in the Quest for Food Security." Connecting its global and China platform actions, FOLU has stimulated the cooperation of key stakeholders in the Chinese food system and helped the country overcome its environmental challenges related to food production, such as vulnerability to climate change, declining arable land area, growing levels of water scarcity and water pollution, widespread soil degradation, and pollution.

World Wildlife Fund (WWF) China is dedicated to promoting sustainable food consumption and supply chains, as well as advocating for the transformation of sustainable food consumption ideas and practices to increase efficiency and productivity, reduce food waste, and protect the environment. WWF China mainly focuses on three areas: food waste reduction, green supply chains, and sustainable food consumption/ healthy diets. WWF collaborates closely with Chinese industrial associations and regulators on setting up industry-specific sustainable specifications and standards. For example, WWF works with the China Meat Association (CMA) on introducing the Specification for Meat Industry Green Trade to help and encourage businesses in the meat industry to follow sustainable standards and practices. WWF China also makes policy inputs to China's Anti-Food Waste Law, based on its long-term experience advocating for sustainable food consumption and green supply chains in China. The Pride on our Plates project, jointly launched by WWF and Rare Germany in September 2020, has been helping micro-, small, and medium-sized enterprises (MSMEs) in China's hospitality sector prevent, reduce, and manage food waste. By engaging with key stakeholders along the green supply chain, WWF China issues important publications, offers service provision and education, and contributes sanctioned policy input through public participation processes to the state.

COMMUNITY SUPPORTED AGRICULTURE (CSA)

The **China Ecological Agriculture CSA Alliance** was initially launched in 2010 by Prof. Tiejun Wen, renowned agricultural expert in China and the former Dean of the School of Agronomics & Rural Development at Renmin University. It was officially registered as a social organization in 2017.

Little Donkey Farm was established in April 2008, comprising nearly 38 acres and situated in Beijing's Haidian District. Little Donkey Farm is a collaboration between Beijing's Haidian District's Agriculture and Forestry Ministry and Renmin University's School of Agricultural Economics and Rural Reconstruction Department. Part of Little Donkey's mission is to include agriculture in the tertiary industry of culture and heritage through mobilizing not just farmers, but also citizens, NGOs, and governments to join the sustainable agricultural movement. Little Donkey also seeks to use international experience to build civic agriculture and cooperative sustainable agriculture.

Little Donkey boasts a core research base, connecting rural and urban areas through affiliation with the Green Ground Eco-Tech Center (Beijing), founded in 2003. The Green Ground Eco-Tech Center has extensive experience in urban and rural ecological agriculture. These innovative and integrated explorations continue today through the Green Ground Eco-Center, founded in 2006.

Little Donkey Farm continues this ecological tradition through an ecological planting pattern and establishment of a CSA. This citizens' farm management model has been met with overwhelming support from Beijing residents, totaling approximately 700 members. Through Little Donkey Farm's CSA business model and ecological agriculture practices, it adheres to the concept of sustainable living.

Shared Harvest, a service-oriented social enterprise adopting the CSA model, was founded by Shi Yan and Cheng Cunwang in Mafang Village of Eastern Beijing in 2012. Shared Harvest includes 500 families, four groups of parents from local schools, and organic clubs and restaurants in Beijing. Another community building aspect is Shared Harvest's Earth School, where school children learn about ecological farming and the environment, how food is grown, and what it looks like. Intent on nurturing the community, Shi Yan also set up a clothes exchange on her farm, and in November 2022, the national network of about 500 groups will hold their annual conference in the area, including visits to her farm. Shi Yan maintains a popular blog about all these initiatives. Through programs like Diner Education and New Farmers Training Camp, it advocates sustainable, healthy, and simple food consumption and lifestyles, and strives to create an inclusive community centered on rural villages.

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