

# Financing the climate transition in China's agri-food systems: toward net zero, resilience and justice



**MGF** MACRO AND GREEN FINANCE LAB  
宏观与绿色金融实验室

Climate Bonds INITIATIVE



# Foreword



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The climate transition of our agri-food system is of paramount importance for the sustainable development of China. As a developing country with a population of over 1.4 billion people, China attaches great importance to food security and sustainable agricultural development. However, the practices of many firms and small farmers in the agri-food sector in China have yet to fully align with the decarbonisation and climate-resilient goals. Meanwhile, due to the large number of smallholders in China's agri-food sector and their relatively high climate-related exposure and vulnerability, it is critical to ensure this climate transition is just and inclusive.

Finance can play a pivotal role in promoting a just and inclusive climate transition. With China's ongoing efforts to develop transition finance in accordance with the G20 Transition Finance Framework, and the inclusion of agriculture as one of the focal sectors, agri-food corporates and financial institutions will be provided with clearer standards and guidance to operate climate mitigation and adaptation projects. We also expect financial and fiscal incentive policies to catalyse more private capital into agri-food climate transition activities, by reducing related costs and risks.

We believe that just transition considerations should be incorporated into other pillars of the transition finance eco-system, including standards, information disclosure, financial instruments, and incentive policies. Efforts should also be made to explore an integrated approach towards using transition finance, supply chain finance and blended finance instruments in the agri-food industry.



**Sean Kidney**

*CEO, Climate Bonds Initiative*

In a world grappling with the severe impacts of climate change, the role of finance in steering the transition towards a more sustainable future cannot be overstated. The urgent need for transition is especially evident in the agri-food sector. Revolutionising agri-food systems not only addresses the challenges of climate change, but also acts as a safeguard for food security and nutrition for present and future generations. Thus, there is great urgency to get finance flowing into the agri-food sector and speed up the transition to more sustainable practices.

China has already shown dedication and commitment to sustainable development, taking proactive measures to speed up the transition. This includes the development of the NDRC's low-carbon transition catalogue, and the development of a transition taxonomy by the People's Bank of China. Furthermore, local governments have established regional transition standards, demonstrating proactive and innovative steps towards a greener future. With these outstanding achievements in the climate finance market, China holds the experience, and immense potential to redirect capital flows towards sustainable agriculture, whilst building more resilient food systems.

This report identifies investment opportunities and hotspots in the agri-food system that can accelerate China's transition and support the achievement of its climate goals. It offers guidance on how transition finance can catalyse entity transitions and unlock greater private capital to foster the sustainable evolution of China's agri-food system.

By directing capital towards climate transition activities and leveraging the power of transition bonds in the agriculture sector, we can mobilise the resources needed to catalyse transformative change, build net-zero and resilient food systems, and enable a just transition.



**Ms. Beate Trankmann**

*Resident Representative, UNDP China*

As the global community tackles the escalating impacts of climate change, the call for a whole-of-society transition becomes increasingly urgent. The agri-food system, not only a cornerstone of lives and livelihoods but also responsible for nearly one-third of global greenhouse gas emissions, stands at the forefront of this challenge. This report, a collaborative effort with Climate Bonds and the Macro and Green Finance Lab at Peking University, delves deep into the financing mechanisms essential for catalysing the transition of China's agri-food system towards net-zero emissions, resilience, and inclusivity. Bridging the sector's financing gap is not only a financial challenge but also a profound opportunity to correct pathways, and a shift to a sustainable socio-economic model where people and nature coexist in harmony.

This report also underscores the critical need for a just and inclusive transition. Our research illustrates how targeted financial instruments and policy incentives are crucial to enhance the adoption of sustainable practices, particularly among more vulnerable players such as smallholders. These are often the stakeholders most vulnerable to climate impacts yet vital for the food security of billions of people.

The low-carbon and just transition of the agri-food system can contribute to several sustainable development goals (SDGs). To this point, the report provides valuable ideas for policymakers, industry leaders, financial market practitioners, development agencies, and stakeholders in the ecosystem for collective action which aims at leveraging financial innovation reshaping the agri-food sector and unlocking significant potential in advance of the 2030 Agenda for Sustainable Development.

We extend our gratitude to all the partners and experts who contributed to this report, offering both domestic and global perspectives. As we move forward, UNDP is committed to translating these insights into actionable strategies that support sustainable development and equitable growth, ensuring that no one is left behind in our journey towards a sustainable future.

# Executive Summary

## **The urgency of China's agri-food system to transition towards net zero and climate resilience is unquestionable.**

Agri-food systems are responsible for about 21%-37% of global total GHG emissions but also face considerable climate risks which make them a critical factor in both climate change mitigation and adaptation efforts. Furthermore, aligning the climate transition of the agri-food system with the Sustainable Development Goals (SDGs) is crucial to ensure justice and inclusivity especially given the role of the sector as a major employer in rural areas. China, as a major producer and consumer of agricultural products and food and a country feeding 1.4 billion people, ought to prioritise a just and inclusive agri-food system climate transition.

## **Significant funding gaps exist to facilitate this transition. Only 4.3% of global climate finance (approximately USD28.5bn in 2020) is allocated to agri-food systems, which is only one-seventh of that required to transition the sector.**

While climate finance for the agri-food sector mostly comes from fiscal funds and development finance institutions, mobilising significant private capital is imperative to bridge the financing gap.

## **However, the agri-food sector faces multiple financing constraints, and China's current policy schemes on green and inclusive finance are incompatible with the climate transition needs of the agri-food system, calling for further policy coordination and financial innovation.**

Considering the numerous small- and micro-sized entities (farmers, SMEs, etc.) within the agri-food system, financial instruments supporting its climate transition must also address the needs of SMEs and small market players to avoid exacerbating social inequalities and ensure a broader sharing of the benefits of climate transition.

## **Transition finance has a critical role to play in mobilising private capital to support a just and inclusive climate transition of China's agri-food system.**

Despite the efforts by China's financial regulator to establish China's transition finance system and to prioritise agriculture in the transition agenda, innovation in transition finance instruments for agri-food systems remain nascent. Currently, these transition finance instruments are primarily in the loan and bond market, while instruments like private equity venture capital IS private equity, insurance, carbon credit finance, blended finance, and supply chain finance also show potential. Notably, large agri-food companies need to take a leadership role to mobilise and support their suppliers and more SMEs in this transition (Chapter 2.3).

**Several factors hinder the financing of the climate transition of China's agri-food system,** which is impeded by insufficient climate-related information disclosure, the lack of credible transition plans, omission of scope 3 emission reduction by agri-food entities, and inadequate policy incentives. Better coordination across existing financial, fiscal, and industrial policies can further realise the potential of finance supporting China's agri-food climate transition and aligning it with the SDGs.

## **This report makes the following policy recommendations to tackle the identified obstacles:**

1. Regulators should enhance climate-related information disclosure in the agri-food sector by establishing agri-food GHG emission accounting standards, information disclosure requirements, and monitoring system;
2. Regulators should guide and support agri-food entities in developing credible transition plans with clear regulatory requirements and technical assistance;
3. Governments should establish an enabling policy environment and strengthen policy incentives by a) establishing transition finance incentive policies focusing on the transition of agri-food supply chains, b) creating synergies between transition finance and inclusive finance policies, c) tilting existing agriculture supportive policies towards agri-food climate transition activities; and d) enhancing the government's role as agri-food bond issuer.

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## **Acronyms and Abbreviations**

- CCER** Chinese certified emission reduction
- DFI** Development finance institution
- GHG** Greenhouse gas
- MDB** Multilateral development bank
- PE** Private equity
- SDG** Sustainable development goal
- SLB** Sustainability-linked bond
- SLL** Sustainability-linked loan
- SME** Small- and medium-sized enterprise
- UoP** Use of proceeds
- VC** Venture capital
- VCM** Voluntary carbon market

# 1. The imperative climate transition of China's agri-food systems

Developing an agri-food system that can withstand the ramifications of climate change is crucial to ensuring food security. As a key producer and consumer of agricultural products with a substantial population, China must urgently transition its agri-food system to net zero and be climate resilient to limit the impacts of global warming.



The agri-food system plays a vital role in both mitigating and adapting to climate change. It contributes about one-third of global greenhouse gas (GHG) emissions.<sup>1</sup> At the same time, the agri-food system faces considerable exposure and vulnerability to the impacts of climate change, necessitating urgent improvements in its adaptation and resilience to climate-driven events. Moreover, considering the close connection between the agri-food system and multiple UN Sustainable Development Goals (SDGs), along with its impact on the world's most vulnerable populations, ensuring a just transition for the sector is crucial.

## 1.1 The role of the agri-food system in climate change mitigation

The terms 'food system' and 'agri-food system' are often used interchangeably. According to the Food and Agriculture Organisation's (FAO) definition, the food system encompasses all participants and their related activities in producing, storing, processing, distributing, consuming, and disposing of food products from crop cultivation, livestock, and fisheries.<sup>2</sup> According to the IPCC, 21%–37% of global greenhouse gas (GHG) emissions are attributable to agri-food systems; arising from agriculture and land use, storage, transport, packaging, processing, retail, and consumption.<sup>3</sup> Notably, methane emissions from rice cultivation, enteric fermentation in animals, manure management, and nitrous oxide emissions from using nitrogen fertilisers in agriculture are a particularly significant source of GHG emissions globally.<sup>4</sup>

In 2019, China's GHG emissions from the agri-food system exceeded 1.9 Gt CO<sub>2</sub>e, making it the largest food-related emitter in the world.<sup>5,6</sup> China is responsible for one-tenth of global food emissions while feeding 18% of the world's population. However, China's per capita emissions from food are expected to rise with increased demand in the future. Given growing global demand for food and materials, including bioenergy, GHG emissions from agri-food systems are projected to rise 30% to 40% by 2050 if unchecked.<sup>7</sup> All things considered, this increase would contribute to worsening of climate change globally, including growth in the number of climate change-induced disasters, deaths, and diminished social stability as food systems and wider societies struggle to cope with unpredictable and extreme weather events.

Notably, the agri-food system also has significant potential for mitigating climate change. Research indicates that by enhancing food systems and adopting low-emission and carbon sequestration practices, emissions from the agri-food sector could be reduced from the current level to -2.0 CO<sub>2</sub>e per year without relying on carbon offsets, while meeting the growing demand for food.<sup>8,9</sup> With the increased focus on emission reduction policies, GHG emissions from China's agri-food system could be reduced by 70% by 2060, potentially dropping to 651 million tonnes of CO<sub>2</sub>e.<sup>10</sup> Climate transition in the agri-food system can effectively support lowering GHG emissions and support the transition towards a more sustainable food system. This can be achieved through the adoption of sustainable agricultural practices, such as improved soil management, sustainable livestock systems, agroforestry, renewable energy utilisation, enhanced land carbon sequestration, dietary changes, and technological innovation.

## 1.2 The need for climate change adaptation in the agri-food system

The agri-food system is also particularly vulnerable to the impacts of climate change. Frequent and intense weather events like floods and droughts, shifts in temperature and rainfall patterns, and increased occurrences of plant diseases and pests, can drastically disrupt crop yields and threaten food supply stability. Similarly, extreme weather events and temperature fluctuations can lead to outbreaks of livestock diseases and reduced production. Studies have found that climate change causes around one-third of the variability in global crop yields.<sup>11</sup> Without adequate adaptation measures, climate change could reduce global food production by 5-30% by 2050 compared to current levels.<sup>12</sup> Extreme weather events can also damage the infrastructure of the agri-food supply chain, such as warehouses and transportation networks, leading to disruption in food supply and market price volatility. Between 2008 and 2018, China experienced agricultural losses totalling CNY976bn (USD145bn) due to extreme weather.<sup>13</sup>

This uncertainty in the market and agricultural productivity can pose a threat to food security both in China and worldwide. Notably, vulnerable groups, including low-income communities already struggling with food scarcity and small and micro-farmers, are disproportionately affected by decreases in food production and price instability caused by climate change, frequently leading to unplanned migration to urban centres in search of work.

Therefore, developing an agri-food system that can withstand current and future climate change impacts is crucial, strengthening resilience and minimising losses to ensure food security. The Global Commission on Adaptation has identified food systems as a priority area for urgent action on climate change adaptation, emphasising the necessity of supporting small-scale and micro-farmers in maintaining and improving their livelihoods while safeguarding food security.<sup>14</sup>

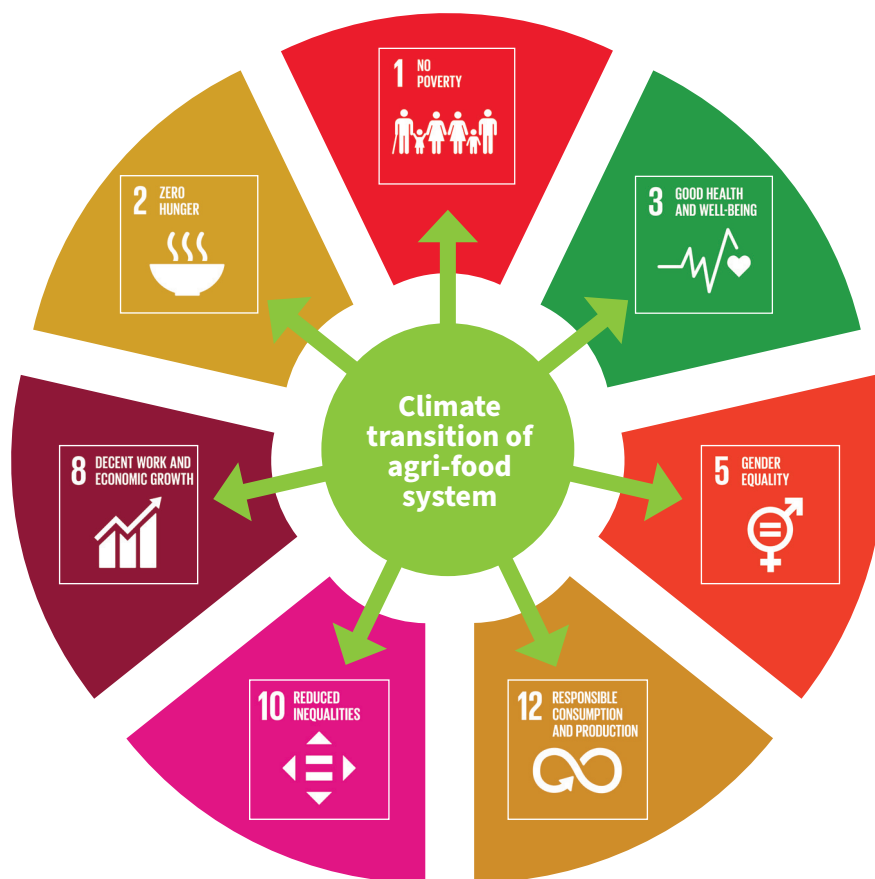
### 1.3 A just and inclusive transition

The agri-food system touches multiple vulnerable populations, including farmers, small and micro-entities, and women. Due to limited adaptation capacity, these groups face heightened exposure to the impacts of climate risks, such as floods and droughts that can harm crops and reduce yields, with limited capacity to adapt, hence making them more susceptible to adverse impacts. It is paramount to ensure that the climate transition of the agri-food system is inclusive and equitable for these groups to avoid exacerbating social inequalities.

While there is no internationally agreed-upon definition or scope for a just transition, both in agriculture and more broadly, several studies and initiatives have sought to clarify the concept and establish criteria. These efforts include the *Guidelines for a Just Transition Towards Environmentally Sustainable Economies and Societies for All*, the *Principles for Just Food System Transitions* and the *Just Transition Principles and Criteria for Food Systems and Beyond*.<sup>15,16,17</sup> These guidelines underscore the relevance of the agri-food system to various SDGs. The climate transition of the agri-food system must prioritise mitigation and adaptation actions but also safeguard vulnerable groups, prevent the exacerbation of inequalities, strive to reduce existing disparities, ensure food security, eradicate hunger, enhance public health, generate fair employment opportunities, and promote gender equality (as shown in Figure 1-1).

While Chinese policy documents do not currently include a clear definition of the term just transition, China did support the establishment of the UNFCCC Work Programme on Just Transition Pathways, agreed at COP27.<sup>18</sup> There are also some existing initiatives in China that share common ground with the principle of just transition, such as 'inclusive finance', 'rural revitalisation', and 'common prosperity', which support smallholders in the agri-food sector. However, agriculture and food security is another critical component of just transition in the agri-food sector, which China has identified as a key priority in its National Climate Change Adaptation Strategy 2035. This commits to establish pilot projects to evaluate technologies for agriculture adaptation and climate-smart agriculture, as well as climate-friendly low-carbon agricultural product certification.

Figure 1-1: Climate transition of the agri-food system is linked to multiple UN SDGs



Source: Macro and Green Finance Lab, National School of Development, Peking University and Climate Bonds

### 1.4 Governance and policy framework for the climate transition of agri-food systems

Historically, global efforts to combat climate change have predominantly targeted sectors such as energy, transportation, and construction, often overlooking the significance of the agri-food system. However, this situation has begun to shift in recent years. Initiatives such as the 2021 *Glasgow Leaders' Declaration on Forests and Land Use*, which pledged to halt and reverse forest loss and land degradation, and the 2023 *UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action* at COP28, which garnered support from 70% of the world's food-producing countries, point to a growing recognition of the pivotal role of the agri-food system in addressing climate change. These developments underscore a positive shift towards prioritising and acknowledging the importance of the agri-food system in the global climate agenda.

Agri-food system GHG emissions are predominantly non-CO<sub>2</sub> gases, mainly methane.<sup>19</sup> Methane is a short-lived but very powerful pollutant and climate-forcing gas. Therefore, cutting methane emissions has dual benefits in mitigating climate change and improving

air quality. Methane abatement is now starting to emerge as a political priority for action. For example, the *U.S.-China Joint Glasgow Declaration on Enhancing Climate Action in the 2020s* highlights the urgency of reducing methane emissions and specifies incentives and programmes to decrease agricultural methane emissions.

Against this backdrop, the Chinese government is refining its policy framework to address climate change in the agri-food system. This includes prioritising climate change responses in macro-strategic plans such as the National Plan for Sustainable Development of Agriculture (2015–2030) and the 14th Five-Year National Agriculture Green Development Plan. Additionally, specific implementation pathways and supportive policies have been developed.<sup>20,21</sup> The National Climate Change Adaptation Strategy 2035 identifies agriculture and food security as a primary focus area to enhance the climate change adaptability of economic and social systems, outlining strategies and action plans to improve the climate resilience of the agri-food system. Finally, China has undertaken efforts through its Action Plan on Methane Emissions Control, which prioritises work on rice cultivation practices, enhancing manure management, and reducing methane emissions from livestock ruminants.<sup>22</sup>

## 2. Financial instruments and their role in the agri-food systems climate transition

### 2.1 The financing gap for the agri-food system climate transition

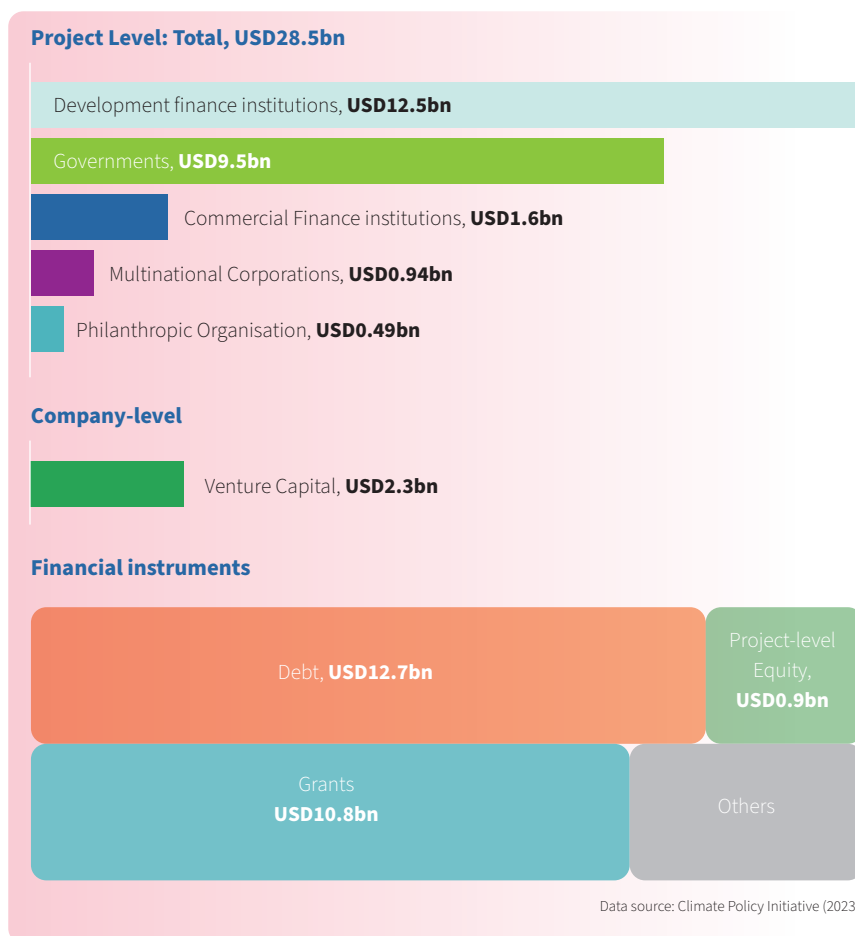


It is estimated that food systems will require USD350bn per year globally until 2030 to meet climate mitigation and adaptation targets, yet a substantial funding gap persists.<sup>23</sup>

Currently, the climate transition of the agri-food system currently relies heavily on public funds, primarily in the form of grants and debt instruments, and faces a considerable funding gap globally. Research by the Climate Policy Initiative (CPI) indicates that only 4.3% of global climate finance, approximately USD28.5bn, is allocated to the agri-food system, which is only one-seventh of the estimated financial needs for climate transition in this sector (based on conservative estimates by the Food and Land Use Coalition).<sup>24</sup> At present, climate finance for the agri-food system primarily stems from development finance institutions and governments, with limited involvement from commercial capital. This is the case both in China and globally. The main financing instruments include subsidies, grants, and debt financing at market-based interest rates, whereas equity financing instruments constitute a minor portion (as shown in Figure 2-1).

A core part of the agri-food system transition is climate adaptation, for which estimates of the financing required vary considerably. A UNEP study reveals that developing countries will require USD387bn annually for adaptation by 2030, with agriculture being one of the sectors with the highest funding requirements (around 20%). However, the available funding for climate adaptation in developing countries is lagging and currently amounts to only a tenth of the required amount, resulting in a substantial funding gap.<sup>25</sup> This is despite the fact that the enhancement of agricultural adaptation and resilience can yield considerable environmental, social, and economic benefits. According to the Global Commission on Adaptation, investing USD1.8tn in climate-smart agriculture and technologies could save approximately USD7.1tn in environmental, social, and economic value by avoiding climate change-related losses.<sup>26</sup>

Figure 2-1: Global climate finance supporting agri-food system (2019/2020)



### 2.2 Transition finance is crucial to bridge the financing gap

Private capital can bridge the financing gap in the agri-food system transition referenced above but the sector faces unique financing challenges and increased costs, which require targeted financial innovations. Such challenges include long investment cycles, high environmental and climate risks, deferred returns on investment, and high uncertainty. A survey of 131 modern agricultural entities in China revealed that the average cost of financing was 7.38% in 2023, which is 37 basis points (bps) above the national average recorded by the People's Bank of China.<sup>27</sup> These comparatively high financing costs can hamper motivation and efforts directed towards climate action.

Meanwhile, the transition needs of the agri-food system are incompatible with China's current policy schemes for green finance and inclusive finance. The current inclusive finance system does not include climate change considerations, with some policies and products still supporting agricultural activities that hinder efforts to mitigate climate change. Meanwhile, green financing tends to prioritise pure green activities, leaving most emission-reducing or climate-resilient agri-food activities uncovered. This underscores the necessity to incorporate climate considerations into the inclusive finance system and broaden the inclusivity of the green finance system.

Transition finance has the potential to bridge these gaps. The G20 Transition Finance Framework defines transition finance as financial services supporting the whole-economy transition, in the context of the SDGs, towards lower and net-zero emissions and climate resilience, in a way aligned with the goals of the Paris Agreement.<sup>28</sup> It employs five pillars to channel private capital into transitional economic activities, emphasising transition effects and justice at the same time (see Figure 2-2). Unlike green finance, which supports activities already deemed green, transition finance aims to fund entities and projects that are not yet fully green but have a clear transition plan demonstrating their commitment and ability to transition to net zero.

The Chinese government is working on a framework for transition finance, with agriculture as a key focus sector. The People's Bank of China (PBoC) is spearheading the development of national transition finance standards, including agriculture and other pivotal sectors like coal and electricity, building materials, and steel. Additionally, several local governments have introduced region-specific transition finance guidelines. For instance, the Chongqing Transition Finance Support Project Catalogue (2023 Edition) incorporates agricultural low-carbon production among its supported fields.<sup>29</sup> Leveraging these standards, the PBoC, in collaboration with a selection of local authorities, is implementing a range of specific policies to incentivise transition finance. These include structural monetary policy tools (targeted relending and rediscounting facilities for banks), interest rate subsidies and guarantees

for transition-related loans and bonds, reimbursement for transition-related certification costs, subsidies for transition-related insurance premiums, and tax cuts for transitioning entities.<sup>30</sup> These measures aim to mitigate the financing and certification costs associated with agri-food climate initiatives, enhance transition benefits, and encourage agri-food producers to embark on climate transition efforts, as well as increase the expected investment returns. Such supportive policies and schemes will provide a clear framework for agri-food entities to undertake a credible transition which in turn will facilitate the application of transition financing tools. With clear standards of agricultural transition project and agricultural transition entity, agricultural projects with significant emission reduction effects and agricultural entities with credible transition plans can get concessional funding and risk-sharing through transition loans, bonds, and insurance which are supported by the above-mentioned policy incentives.

### 2.3 Financial instruments to support climate transition of agri-food systems

With China's transition finance policy framework under development, market participants have already been exploring funding opportunities through instruments such as sustainability-linked bonds (SLBs) and sustainability-linked loans (SLLs). Private equity/venture capital (PE/VC), insurance, and carbon finance products can play an important role in supporting the climate transition of the agri-food system. Blended finance and supply chain finance solutions can also contribute to supporting an inclusive and

just transition of China's agri-food system if they are integrated with transition finance.

With numerous small- and micro-entities in the agri-food system, large- and medium-sized corporates provide a fulcrum for transition finance. Therefore, loans and bonds should be designed to incentivise large- and medium-sized corporates to transition their supply chains towards net zero and climate resilience.

Currently, financial instruments supporting the climate transition of China's agri-food system are in a very preliminary stage, lacking in diversity, scale, and maturity. Progress requires tackling these bottlenecks and implementing targeted transition finance practices at scale.

Two main structures in transition debt financing tools are:

**1. Use of Proceeds (UoP) instruments:** UoP debt mandates proceeds to be used for financing social or green activities, and it can support non-financial corporates and sovereigns in financing their shift towards sustainable production or procurement and a just transition.

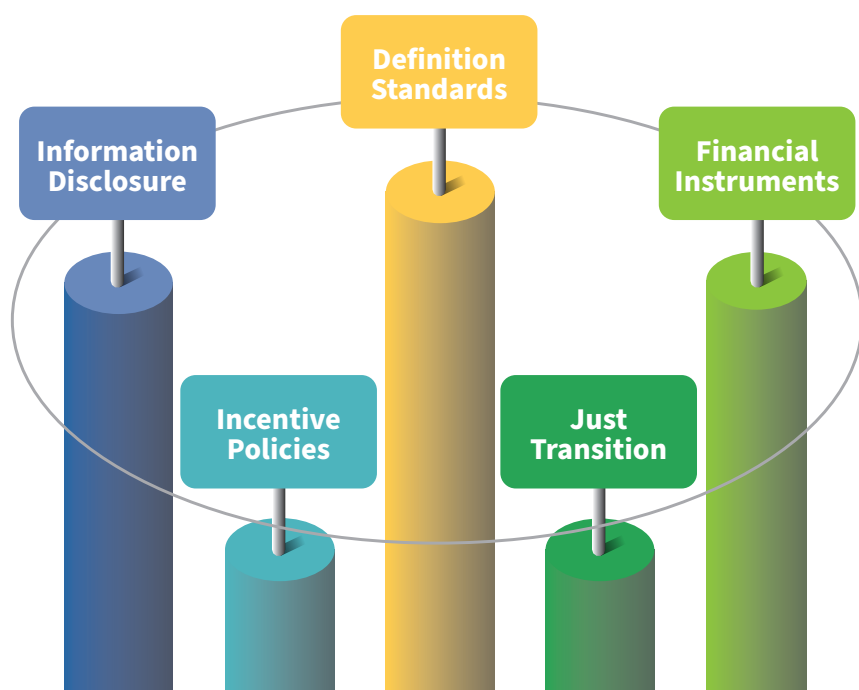
**2. Performance-linked instruments:** SLBs and SLLs where cost of capital is linked to key performance indicators (KPIs) achieving predefined sustainability performance targets (SPTs). These instruments can be used by a broad range of entities, in particular, those lacking the required assets to support UoP borrowing.

#### 2.3.1 Green, transition, and sustainability-linked loans

SLLs have started to proliferate in the Chinese market starting with the traditional high-carbon industries such as energy, steel, and cement. However, several large companies in the agri-food industry have also begun exploring SLLs (see Case 2-1) and tried to set scientifically credible KPIs and SPTs aligned with the Paris Agreement's climate goals and non-climate SDGs.<sup>31,32</sup>

Although case 2-1 demonstrates how large- and medium-sized companies can use SLLs to decarbonise their scope 1 and scope 2 emissions, they can be used by these companies in scope 3 emission reduction within their value chains which contribute a substantial portion of their GHG emissions, sometimes exceeding 90%.<sup>33</sup> To enable a complete and effective transition across agri-food systems, large- and medium-sized agri-food companies should incorporate sustainable supply chain management practices into the KPIs and SPTs of their SLLs, assisting smaller entities within their supply chains to reduce emissions and enhance climate resilience.

Figure 2-2: Five pillars of the G20 Transition Finance Framework



Source: G20 Sustainable Finance Working Group (2022)

### 2.3.2 Green, transition, and sustainability-linked bonds

In 2023, Climate Bonds reported USD160bn green, social, and sustainability (GSS) bonds with UoP earmarked for sustainable financing frameworks that include agriculture or fishery projects, out of USD871.9bn in total.

Large and medium-sized agri-food entities can mobilise the local, regional, or global bond market to secure private capital investment. In 2023 China was the largest source of green bonds, with a volume of USD131bn (CNY940bn) originating from the country.<sup>34</sup> Most originated from sovereign and government-backed entities and 41 green, social and sustainability bonds earmarked UoP to support initiatives within land use, including land remediation, reforestation, sustainable agriculture and food security. Chinese agri-food entities have yet to deploy SLBs. Figure 2-1 shows a breakdown of the use of proceeds on land use in China.

In addition to these existing channels of GSS bonds, the transition bond market is at an early stage of development, with only a few leading agri-food entities beginning to explore the issuance of SLBs or transition bonds at the global level. By 2023, only USD6.2bn in cumulative volumes from issuers operating in the agri-food sector were identified in SLBs, of which Climate Bonds classified USD3.6bn as fully aligned with the Climate Bonds Standard.<sup>35</sup>

SLBs and sustainability bonds can be leveraged to support a just transition within the agri-food system. Sustainability bonds are designed to encompass UoP to support a mixture of social and environmental project categories, while SLBs could select SPTs linked to decarbonisation and social KPIs highlighted in the transition plan of the issuer. Greenfood, a Swedish food company, for instance, successfully issued an SLB worth SEK1.05bn (USD0.097bn) in 2021. The bond's KPIs were linked to reducing scope 1 and 2 emissions, setting Science Based Targets initiative (SBTi) goals, and decreasing food waste.<sup>36</sup>

In the context of China, although the National Association of Financial Market Institutional Investors (NAFMII) and the Shanghai Stock Exchange have released guidelines related to SLBs and low-carbon transition bonds, market practices remain exploratory and primarily focused on high-carbon sectors such as energy, steel, and chemicals. To date, no Chinese agri-food entities have issued transition bonds or SLBs. However, the upcoming introduction of China's agricultural transition finance standard by PBoC, and associated incentive policies, are expected to incentivise transition finance market development among agri-food entities and financial institutions.

Governments can help to attract crowding-in through sovereign GSS+ bonds. Over the past few years, an increasing number of national or regional governments have raised funds for sustainable development and climate transition in agriculture sector by issuing targeted sovereign and government bonds to grow the market. (Case 2-2)

### Case 2-1: Muyuan Foods Co., Ltd.<sup>51</sup>

In March 2021, Standard Chartered published its Sustainable Trade Finance Proposition which built the Loan Market Association (LMA)'s SLL Principles into its trade-financing framework. This initiative encourages clients to improve disclosure, reporting, and definition of use, while meeting their ESG goals. The financial products involve supply chain finance, invoice finance, receivables services, bonds, guarantees, and letters of credit, which are all aimed at supporting more sustainable global supply chain activities.



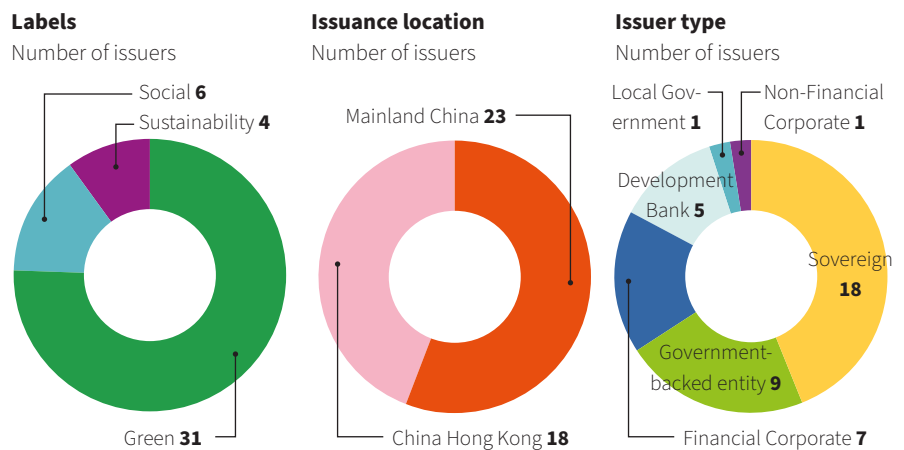
Muyuan Foods Co., Ltd. (Muyuan) is one of China's largest agri-food enterprises headquartered in Nanyang City, Henan Province. In 2023, the company outlined a

phased green and low-carbon action plan while setting its GHG emission reduction targets.<sup>52</sup>

Leveraging the Group's sustainable trade finance framework, in May 2023, Standard Chartered Bank (China) Limited (Standard Chartered, China) provided Henan Muyuan Grain Trading Co., Ltd. (Muyuan Grain Trading), a subsidiary of Muyuan, with its first sustainability-linked invoice financing loan. This loan aims to support Muyuan Grain Trading's procurement of raw materials and other operational needs. The SLL specifies installed photovoltaics capacity and carbon dioxide emissions per kilogram of pork production as key KPIs. The loan's interest rate is linked to Muyuan's performance in these areas, incentivising the company's low-carbon transition through financial mechanisms.

Figure 2-1: Chinese GSS+ deals with Land Use UoP have cumulative volume of USD6.7bn

UoP in total (USD bn): 6.695 Number of Issuance: 41



Source: Climate Bonds database

### Case 2-2: Cultivating change: Germany's green bond strategy for climate resilient agriculture

In 2023, Germany priced aligned sovereign green bonds amounting to EUR17.3bn (USD18.8bn) which included the largest allocation to agriculture among the sovereign GSS+ debt issuers. Germany is the second largest issuer of sovereign GSS+ debt and between 2020 and 2023, it had priced cumulative volume of EUR55.8bn (USD62.5bn).



Up to 40% of Germany's 2023 UoP (EUR6.9bn/USD7.5bn) is earmarked for Land Use expenditures, supporting the development of forests, and organic and environmentally friendly farming practices. Its framework describes the

eligible expenditures as low-carbon farming and grants that could be used for research and carbon storage. According to ISS ESG's SDG assessment, Germany's proceeds towards Agriculture, Forestry, Natural Landscapes and Biodiversity contribute to SDGs 13 and 15.<sup>53</sup>

Germany's financing of agriculture is a model for other governments to follow, as sovereign nations can provide long-term financing to target the preservation of their land and the development of sustainable agriculture infrastructures. Moreover, sovereign green bonds can support grassroots-directed financing to facilitate more engagement across stakeholders in agriculture supply chains.



### 2.3.3 Private equity and venture capital funds

Agri-food technology (agri-food tech) is a crucial contributor to achieving climate resilience in the sector, which requires substantial initial investment in R&D, entails long payback periods, and carries high technological and market risks. Agri-food tech entities are predominantly small and micro-entities with asset-light models, often lacking suitable collateral for debt financing tools such as loans and bonds. However, they are well-suited for equity investment and financing channels such as private equity (PE) and venture capital (VC) funds, which have a comparatively high

tolerance for risk, based on the potential for achieving relatively high returns. Such funds have longer investment horizons, and are therefore able to focus on the future growth potential of invested entities. According to AgFunder’s Global Agri-food Tech Investment Report, global agri-food tech investments totalled USD29.6bn in 2022, down 44% year-on-year which is largely in line with global VC markets despite a worldwide investment downturn caused by the pandemic, investments in climate-related segments continued to rise, emerging as the most focused area for investors in the agri-food tech sector.<sup>37</sup> In China, PE and VC funds invested about CNY14 bn in the

agri-food sector in 2023, of which ‘agri-tech and associated services’ were the second largest recipient (15%) after ‘food & beverage’ (39%).<sup>38</sup>

Critical areas of agri-food tech contributing to climate change mitigation include decarbonising inputs, transitioning to renewable energy sources, improving waste management, enhancing energy efficiency, and implementing intelligent agriculture practices. Moreover, technologies such as remote sensing, drones, the Internet of Things (IoT), and artificial intelligence can monitor GHG emissions within agricultural supply chains. Agri-food tech can also contribute to the development and management of agricultural carbon credit projects (Figure 2-3).<sup>39</sup>

Figure 2-3: Agricultural technologies for the climate transition

<div style="display: flex; flex-direction: column; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #008000; margin-bottom: 5px;"></div> High           </div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #66c266; margin-bottom: 5px;"></div> Medium           </div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #c2e0c2; margin-bottom: 5px;"></div> Low           </div>	Introduction	Technical efficiency			Feasibility		
		Carbon reduction benefits	Technology maturity	Social benefits	Feasibility in low- and middle-income countries	Skills requirements	Economic feasibility
<b>Decarbonisation of inputs</b>	Technologies for low- or zero-carbon agricultural and livestock inputs, including the production of organic/biobased fertilisers, controlled-release fertilisers, biochar, low-carbon pesticides, and feed additives						
<b>Renewable Energy</b>	Technologies for substituting fossil energy sources in energy-intensive areas such as irrigation, mechanisation, livestock ventilation and aeration, and aquaculture						
<b>Waste Management</b>	Technologies for reducing GHG emissions from farm and livestock waste management, including microbial decomposition, biodegradation, nitrification, and urease inhibitors						
<b>Energy Efficiency</b>	Technologies for optimising the use of fossil fuels upstream and downstream, including smart water controllers, energy-efficient pumps, small-scale farm cooling tanks, low-energy dryers, and automated sorting systems						
<b>Smart Agriculture</b>	Leveraging Agriculture 4.0 technologies (such as remote sensing, IoT, machine learning) to optimise resource use efficiency. This includes digital technologies for managing agriculture, livestock, and aquaculture, as well as reducing emissions through decreased use of fertilisers, feed, and agricultural chemicals						
<b>Carbon Accounting</b>	Utilising remote sensing, artificial intelligence, and IoT sensing technologies to monitor GHG emissions across the entire agricultural supply chain						
<b>Carbon Credits</b>	Developing and managing agricultural carbon credit projects using remote sensing, artificial intelligence, drones, etc.						

Source: Intellectcap (2023)<sup>34</sup>

The digitisation of China's agri-food sector remains relatively nascent compared to developed countries, with investment volume in agri-food technologies reaching just USD1.3bn in 2022.<sup>40</sup> Nonetheless, progress has been made. Technology companies specialising in agricultural drones, agricultural IoT, and digital management systems for intelligent farms, which contribute to climate change mitigation efforts in the agri-food sector, are emerging in China.<sup>41</sup> For example, XAG, a Chinese agri-tech company, introduced its first plant protection drones in 2015. By integrating intelligent agricultural equipments with an advanced smart agriculture management system, farms utilising XAG technologies can significantly enhance the efficiency of chemical fertilisers, pesticides, and water usage, as well as reducing fossil fuel and electricity consumption, consequently mitigating GHG emissions by 22% in total compared with a business as usual (BAU) scenario.<sup>38</sup> These ventures have garnered attention and support from private equity and venture capital firms.

### 2.3.4 Insurance for transition

The agri-food sector is susceptible to a multitude of environmental and climate risks. Insurance products can provide risk-sharing mechanisms for various stakeholders within the agri-food sector, serving as essential tools to support sustainable investment. Green insurance has broad potential in this sector, encompassing environmental liability insurance for agricultural non-point source pollution, weather index insurance, cropland fertility insurance, forestry carbon sink index (price) insurance, grassland insurance, and ecological ranger insurance.<sup>42</sup>

Beyond the physical climate risks,<sup>43</sup> entities in the agri-food sector also encounter climate transition risks. These risks stem from new government regulatory policies and higher standards for emission reduction and carbon sequestration, uncertainties regarding technological advancements in these areas, and growing consumer preferences for climate-friendly products. Furthermore, given the dynamic and intricate nature of the transition, there is a high degree of uncertainty, posing risks of transition-washing for both financial institutions and consumers.

Despite the fact that agricultural weather index insurance offers farmers and agribusinesses a means to mitigate the physical risks associated with climate, there are opportunities for innovation in insurance products to address climate transition risks of the agri-food system.<sup>44</sup> For instance, given the high uncertainty inherent in R&D for agri-food tech, targeted insurance products such as R&D liability insurance, R&D equipment insurance, patent insurance, and project investment loss insurance would support agri-food tech entities and agri-food firms in their climate-focused R&D endeavours, facilitating the necessary financing. Agri-food entities and farmers contend with uncertainties throughout their climate transition journey, including policy, technology, and market dynamics. Insurance products tailored to address these uncertainties can alleviate the anxieties of agri-food entities and farmers as they navigate their climate transition efforts. Combining transition insurance with transition loans through bank-insurance collaboration can further help agri-food entities secure financing while mitigating the risk of perceived transition washing.

Currently, transition insurance is still at a nascent stage with practitioners exploring key areas. The Green Insurance Classification Guidelines have incorporated innovative insurance products such as green Low-Carbon Technology Insurance, Low-Carbon Transition Insurance, Ecological Cultivation Insurance, Green Livestock Insurance, Green Fisheries Insurance, and Carbon Sink Insurance.<sup>45</sup>

### 2.3.5 Carbon finance

Carbon financial products are financial instruments or investment vehicles for emission reduction or carbon sink activities, based on carbon allowances or carbon credits. There are three categories of carbon financial products:<sup>46</sup>

- 1. Financing instruments**, such as carbon bonds, carbon asset collateral financing, and carbon asset repurchases;
- 2. Trading instruments**, such as carbon forwards, carbon futures, and carbon options;
- 3. Supporting instruments**, such as carbon indices, carbon insurance, and carbon funds.

Agricultural emission reduction and carbon sequestration cover a spectrum of practices, including soil carbon sequestration, optimising fertiliser usage, mitigating animal methane emissions, and utilising biomass energy; all offering avenues for generating carbon credits. Before the suspension of China's carbon crediting mechanism known as China Certified Emission Reduction (CCER) in 2017, its methodologies embraced agriculture-related projects such as repurposing waste crop residue, reducing emissions from ruminants, implementing conservation tillage practices to curtail emissions and enhance sinks, as well as managing animal manure for biogas production and utilisation. In March 2023, the Ministry of Ecology and Environment (MEE) launched a public call for methodology proposals for voluntary GHG emission reduction projects, encompassing agricultural interventions within its scope.

In January 2024, the MEE issued four new methodologies and restarted accreditation of new projects among which agriculture-related projects was not initially included. However, it is likely that additional CCER methodologies will be forthcoming, with potential for the agriculture sector to access this high-potential market. In order to realise this opportunity, further work is required to ensure the design of rigorous methodologies for project development and verification that address concerns such as data deficiencies and additionality.<sup>47</sup> The launch of the national carbon trading system and the reinstatement of the CCER market has opened up significant opportunities for agriculture within the carbon credit arena. As a result, agricultural stakeholders may have the chance to utilise carbon credits obtained from emission reduction and carbon sequestration initiatives to access various carbon financial products. These products can broaden financing avenues, lower financing expenses, mitigate transition risks, and amplify transition advantages.

### 2.3.6 Blended finance

Blended finance refers to the use of concessional catalytic capital to mobilise additional capital towards sustainability, climate, and/or social targets. Concessional (public or philanthropic) finance is provided at below-market rates or as a grant. Commercial finance is provided at market rates, requiring positive risk-adjusted returns. While mostly private investment, commercial finance can also be provided by public investors. Blended finance is a structuring approach that enables private investment in development opportunities, increasing availability of financing without increasing cost of capital.

Agri-food climate transition investment opportunities often have extended payback periods, diminished risk-adjusted financial returns, and heightened exposure to policy and technological uncertainties. Therefore, they may require risk-sharing or return-enhancing strategies to attract commercial finance. Concessional finance can improve the risk-return profile of agri-food climate transition investments through concessional investments, guarantees, insurance, grants, and technical assistance. This enhanced risk-return profile renders these investments more attractive to commercial finance (Table 2-2).

Blended finance can enhance the risk-return profile of agri-food climate transition projects and attract a broader range of investors. Blended finance structures could be applied to address both mitigation and adaptation needs across agricultural inputs, farm production efficiency, agro-processing, and agro-forestry.<sup>48 49</sup>

In China, even though the term ‘blended finance’ is relatively new, related practices do exist and provide a good foundation for China to utilise this innovative mechanism in climate finance. Associated examples include the projects on rural revitalisation and green agricultural development supported by concessional loans from China

Type	Tool	Role of developmental (public) finance
Equity investment	Mezzanine financing (e.g., first loss tranche)	Improves the risk-return profile for commercial finance by prioritising loss absorption or subordinating profit entitlement
	Quasi-equity (convertible bonds, convertible preferred shares)	
Debt investment	Interest-free loans	Enhances the risk-return profile for commercial finance by reducing financial returns or taking on more risk through subordination
	Impact bonds <sup>56</sup>	
	Subordinated loans	
Guarantees	Credit guarantees	Reduces investment risk for commercial finance through credit guarantees or subsidised insurance
	Subsidised yield/market/price insurance (e.g., weather index insurance, minimum volume insurance, hedging instruments)	
Assistance/Grant	Technical support/capacity building	Boosts the risk-return profile for commercial finance by providing free technical support/capacity building or grants based on climate transition performance
	Performance/results-based grants	

Source: Adapted from Convergence Blended Finance (2024)<sup>57</sup>

Development Bank and Agricultural Development Bank, further mobilising commercial-rate social capital. Additionally, China has been engaging with international development finance institutions to mobilise private capital for sustainable development, with some several cases in the agri-food sector. For example, in 2020, the World Bank provided a 25-year concessional loan to support Henan Green Agriculture Fund, aiming to mobilise private capital into green agriculture investments in Henan Province.<sup>50</sup> However, climate blended finance practices in China remain limited, and will not take off without policy support and better market awareness.

### 2.3.7 Supply chain finance

Transition finance instruments, such as transition loans/bonds and SLLs/SLBs, predominantly serve large- and medium-sized entities, given the prerequisites. Such prerequisites typically encompass meeting basic credit conditions and demonstrating climate transition planning, capacity, and information disclosure which can be a challenge for most small- and micro-sized entities (such as farmers and SMEs) within the agri-food system. In this case, integrating supply chain finance mechanisms with transition finance allows large- and medium-sized entities to assist smaller entities along their value chains for climate transition efforts.

Supply chain finance mechanisms lean on the creditworthiness of key entities within the supply chain to offer credit enhancements and direct financing services to smaller entities. In China’s agri-food sector, these supply chain finance instruments primarily take the form of accounts receivable financing. Banks can offer preferential funding directly to small and micro-entities operating within the supply chains of large agri-food entities. These entities are either actively involved in climate transition initiatives or exhibit commendable transition performance (see Case 2-3).

#### Case 2-3: Rabobank’s sustainability-linked supply chain finance programme with Coca-Cola<sup>55</sup>

Coca-Cola has set goals to reduce its full value chain GHG emissions by 30% by 2030 from 2019 levels, and to achieve net-zero emissions across the value chain by 2040. Over 90% of Coca-Cola’s full value chain emissions originate from its supply chain. To reach its net-zero goal, Coca-Cola requires its suppliers to undertake three emission reduction actions: (1) set and get certified for SBTi targets by 2023; (2) switch to 100% renewable electricity by 2023; (3)



disclose carbon footprint data to Coca-Cola. KPIs are set based on suppliers’ ESG scores.

Building on this framework, Coca-Cola and Rabobank launched the first sustainability-linked supply chain finance programme in the global beverage industry in 2022. The programme is designed to support Coca-Cola’s suppliers in accelerating their climate actions. Within this programme, the financing rates offered to Coca-Cola suppliers for supply chain finance services reference sustainable KPIs, which include the three specified emission reduction actions and ESG scores. Suppliers can access more favourable financing rates if they meet predetermined sustainable KPI targets.

### 3. Releasing finance for China's agri-food systems climate transition

Large- and medium-sized companies in the agri-food sector are the pivotal players in transition finance for transitioning China's agri-food system. Despite the emergence of innovative practices in the market, the uptake of transition loans/SLLs for agri-food entities in China remains limited. Furthermore, other financial instruments, such as transition bonds, insurance, blended finance, and supply chain finance, have yet to be implemented in the agri-food sector. Several factors contribute to this, including a general lack of climate-related information disclosure by agri-food entities, the absence of credible transition plans (including sustainable supply chain management), and insufficient policy incentives.

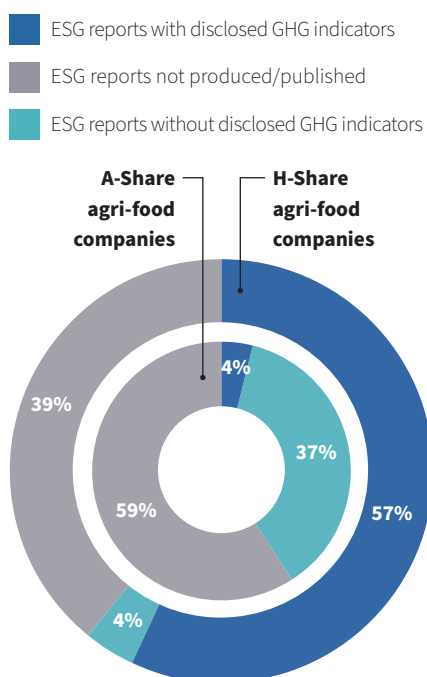


#### 3.1 Disclosure of agri-food emissions can enhance accountability and measurement of progress

Financial institutions require comprehensive information regarding GHG emissions, transition actions, and their efficacy to accurately assess agri-food entity performance in their transition or active transformation (i.e., with high potential for future sustainability). Therefore, disclosure of credible and detailed climate-related information by agri-food entities can enhance accountability and provide confidence to financial institutions for transition financing.

Based on data from 2023, disparities were uncovered in the ESG disclosures of agri-food companies listed on A-share/H-share markets in China.<sup>58,59,60</sup> Only 77 out of 187 A-share listed agri-food corporates (41%) produced ESG or social responsibility reports, with only seven disclosing GHG emission-related indicators and targets. In contrast, among the 104 H-share listed agri-food corporates, 63 (61%) produced ESG or social responsibility reports, with the majority (59) disclosing GHG emission-related indicators and targets (Figure 3-1). Comparatively, while agri-food listed companies show slightly better performance in publishing ESG reports than A-share listed companies overall, the proportion disclosing GHG data is lower than the A-share average (Figure 3-2). This suggests that agri-food companies are lagging other industries in climate information disclosure, with regulatory policies leading to less adequate disclosure by mainland China's agri-food companies compared to those in developed markets like Hong Kong.

Figure 3-1: ESG reporting and GHG indicator disclosure of agri-food entities in A/H share markets



Source: Compiled by the research team based on the Wind database

Addressing inadequate climate-related information disclosure by Chinese agri-food companies requires the following:

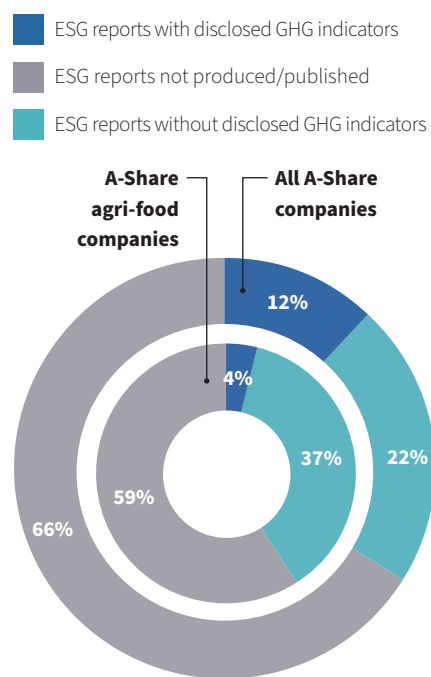
#### 1. Setting out an agreed agri-food GHG accounting methodology to establish a common benchmark.

Contrary to sectors such as electricity, industry, transportation, and construction, where GHG emissions are predominantly from industrial processes, the agri-food system's emissions arise from biological processes, which are dispersed and non-standardised. This complexity makes GHG accounting in agri-food systems particularly challenging, with methodologies and technical standards still under development. Reference models and guidelines already exist, such as the *IPCC Guidelines for National GHG Inventories*, the *GHG Protocol Agricultural Guidance*, and the *FAO-GLEAM*, as well as several domestic standards for agricultural sub-sectors. These methodologies need to be simplified or tailored to China's context to enhance their market application in China, addressing issues such as unapplicable accounting parameters and incomplete sets of indicators.<sup>61</sup>

#### 2. Defining corporate emission boundaries.

For agri-food companies, GHG accounting requires not only activity-based methodologies but also a clear delineation of emission boundaries, a challenge due to the multifaceted nature of agri-food business activities and complex supply

Figure 3-2: ESG reporting and GHG indicator disclosure by agri-food companies and others in the A-share market



Source: Compiled by the research team based on the Wind database; ESG Development Report of Chinese Listed Companies (2023)

chains. Key considerations include whether to include scope 3 emissions, emissions from indirect suppliers, and emissions due to land use changes.

#### 3. Data availability and accuracy.

Accurate GHG emission data is vital for setting climate transition goals. However, obtaining accurate data is challenging, especially for emission sources like methane from soil and gases from agricultural inputs. Consequently, collecting such data from dispersed upstream and downstream agri-food entities is complex. Enhancing local agri-food emission factor databases can benefit accurate emission accounting.

#### 4. Clear pathways for emission reduction.

Several guidelines and initiatives offer valuable references for emission reduction pathways in the agri-food sector, such as the *Forest, Land and Agriculture Science-Based Target Setting Guidance*, the *Accountability Framework Initiative*, and the *Agricultural Sector Roadmap to 1.5°C*, jointly proposed by bulk commodity companies. During COP28, FAO released a global roadmap and a three-year strategic plan for climate transformation in the agri-food system, which provides a vital reference for achieving the 1.5°C targets while ensuring food security globally. Despite the complexity of emissions in the agri-food system, the world is finding consensus on emission reduction pathways, which is essential for agri-food entities in formulating their mitigation strategies and transition plans.

## 5. Motivating agri-food companies to disclose.

While industrial authorities and financial regulators have not yet mandated climate-related information disclosure for agri-food companies, there are opportunities to foster positive incentives. On the one hand, industrial authorities and financial regulators can gradually establish mandatory climate-related information disclosure requirements and provide specific guidelines. On the other hand, financial institutions could introduce transition financial products and services offering preferential support to agri-food entities with robust climate transition performance and encourage transparency.

The absence of climate-related information disclosure by agri-food companies results in significant information asymmetries among financial institutions, regulators, the public, and agri-food companies. Financial institutions struggle to identify agri-food companies with transition ambitions and capabilities, hindering their ability to provide transition finance support. Meanwhile, the proliferation of 'green' food products with labels such as 'carbon neutral!', 'net zero', or 'climate-friendly' exacerbates the issue, as the lack of standardised climate information disclosure and inadequate regulation leads to widespread greenwashing and transition washing in the agri-food sector. Therefore, credible information disclosure is a necessity for ensuring the orderly development of sustainable investment and financing markets within the agri-food sector.

### Recommendation 1: Enhance climate-related information disclosure

The Ministry of Agriculture and Rural Affairs (MARA) should enhance the GHG accounting standards of the agri-food sector and establish relevant statistics and monitoring systems, and then collaborate with financial regulators to align the agri-food sector's climate transition pathways with transition finance standards. Given the exposure and vulnerability of the agri-food sector to climate change, transition finance standards should encompass both mitigation and adaptation.

Regulators should also improve the regulatory requirements for climate-related information disclosure of agri-food entities, especially the largest companies. Regions could mandate big agri-food companies to certify their disclosed climate information to enhance transparency and credibility. Local governments could offer subsidy incentives and disclosure frameworks and develop sub-national pilots for encouraging agri-food entities to undertake climate information certification and reporting.

## 3.2 Credible entity-level transition plans can support agri-food entities to seize opportunities and mitigate transition-washing risks

Whether at the project or entity level, transition finance requires credible transition plans from financing entities to ensure substantial carbon emission reduction benefits and mitigate the risk of transition washing. Globally, several organisations and governmental bodies have taken the lead in developing guidelines for transition plans to assist companies in crafting credible transition strategies. In 2020, Climate Bonds outlined five principles for credible transition and five characteristics of a credible corporate transition (Figure 3-3), along with the publication of *Transition Financing for Transitioning Companies* and [Agri-food Transition Principles Discussion Paper](#). The *Climate Bonds Standard V4.0* has expanded its certification scope to encompass sustainable linkages and entity-level transitions, aiding companies in developing credible low-carbon transition plans aligned with the goals of the Paris Agreement. Similarly, the UK's HM Treasury established the Transition Plan Taskforce (TPT) and released the final disclosure framework in October 2023. This framework includes five dimensions and 19 sub-elements and intends to provide sector-specific metrics and targets for 40 sub-industries.<sup>62</sup> The transition finance standards being developed by the PBoC are also

expected to mandate transition financing entities to establish credible transition plans. These plans must cover short-, medium-, and long-term transition goals, transition pathways, investment and financing plans, governance mechanisms, fair transition assessments and measures, and information disclosure.

Although a few companies have initiated the formulation of climate transition goals and plans (refer to Case 3-1), most Chinese agri-food companies have yet to establish credible climate transition plans, partly due to the lack of policy guidance after transition plans. This absence has become a major barrier to obtaining transition finance support from banks and investors. The main reasons are: (1) Agri-food entities lack sufficient motivation for the climate transition, as profitable business models for the transition are not yet clear to them, coupled with a lack of policy incentives; (2) There is no common understanding of the framework and requirements of a credible climate transition planning for the Chinese market; (3) There is a lack of clear guidelines and requirements in regulatory policies for developing transition plans; (4) Agri-food entities have insufficient knowledge of transition finance instruments and their requirements for financing entities, leading to a lack of motivation to develop transition plans; (5) There is a lack of awareness and capacity for sustainable supply chain management within agri-food entities (refer to Box 3-1).

Figure 3. Five Hallmarks of a Credibly Transitioning Company



### Case 3-1: Exploration of climate transition plans and actions by Chinese dairy companies – Mengniu Dairy

Mengniu Dairy ('Mengniu') is one of the major players in China's dairy industry.



As a midstream enterprise in the dairy value chain, the majority of Mengniu's carbon emissions across the entire value chain originate from the raw milk supply side. Approximately half of Mengniu's upstream raw milk supply is sourced from its own subsidiaries, either wholly owned or with equity participation, while the other half is procured from independent smaller farms. In 2022, Mengniu formulated its GREEN Sustainability Strategy and set a climate target of 'peaking carbon emission before 2030 and achieving carbon neutrality before 2050'.<sup>66</sup>

In establishing its climate targets, Mengniu carried out a carbon inventory to identify and assess the climate risks and opportunities facing the company, as well as their impact on the company's operations and finances. Based on the five hallmarks of credible transition proposed by the CBI, the research team conducted a benchmarking analysis of Mengniu's climate transition plans and actions (as shown in Table 3-1).

Mengniu's exploration in setting climate transition goals, plans, and practices serves as a valuable example for Chinese agri-food entities, yet there remains ample room for improvement. For instance, in terms of transition goals, Mengniu could utilise guidelines such as the SBTi FLAG to formulate ambitious climate goals and scientifically sound transition pathways.<sup>67</sup>

Furthermore, Mengniu should not limit its efforts to Scope 1 and 2 carbon reduction targets but should also extend and specify its scope 3 carbon reduction objectives. This could involve enhancing energy efficiency in scope 3 activities, increasing the share of renewable energy in these activities, conducting comprehensive emission inventory analyses for scope 3 activities, implementing systematic carbon measurement, and reporting mechanisms, and setting more stringent requirements for supply chain emission reductions. Additionally, Mengniu should intensify its efforts in managing and providing technical support for emission reductions at upstream small farms.

Table 3-1: Summary of Mengniu's climate transition efforts

<b>Climate Targets</b>	<p>Mengniu has set the goal of peaking carbon emissions before 2030 and achieving carbon neutrality before 2050, in support of the 1.5°C of the Paris Agreement. To realise this, the company has established phased targets to drive emission reduction efforts across all segments of the entire value chain, aiming to reduce its product carbon footprint year by year.</p>
<b>Detailed Plan</b>	<p>Mengniu has developed comprehensive, value-chain-wide transition strategies, plans, and pathways based on its sustainable development strategic objectives. These include establishing GHG management plans, carbon inventories for the entire industry chain, and identifying climate risks and opportunities. The company has also outlined 15 key initiatives across six dimensions: production, raw milk, packaging, transportation, products, and carbon offsetting. These initiatives define clear emission reduction pathways and facilitate systematic carbon reduction actions across the entire industry chain. For instance, Mengniu has committed to reducing carbon emissions by 1 million tonnes in upstream pastures, improving the health of 1 million mu of soil, and transitioning to 'green factories' by 2030.<sup>68,69</sup></p>
<b>Practical Action</b>	<p><b>By strengthening management of the entire industry chain,</b> Mengniu is advancing its net-zero transition and 'zero deforestation' efforts through enhancing efficiency, optimising energy use, and collaborating with supply chain partners. The company has devised and implemented green solutions and emission reduction measures across various stages, including feed production, dairy farming, manure management, packaging, and transportation. Additionally, Mengniu has put in place traceability and certification controls for soft commodities at risk of deforestation, including paper, palm oil, and soybeans.</p> <p><b>For scope 1 and scope 2 GHG emissions,</b> Mengniu is reducing its carbon footprint by optimising efficiency of energy use. In Qujing, Yunnan Province, the company has established the first zero-carbon factory in China's dairy industry, which has received both international and domestic certification.</p> <p><b>For scope 3 GHG emissions,</b> Mengniu collaborates with partners to promote carbon reduction practices throughout the value chain. Recognising that GHG emissions from the raw milk stage are a major source of the company's value chain emissions, Mengniu has implemented carbon management plans for upstream farms. These plans include adjusting feed composition and structure, managing and optimising herd structure, improving manure management, and enhancing farm energy efficiency. The company also provides carbon reduction support to farms.</p> <p>Mengniu has developed the <i>Mengniu Forest Protection Policy</i> and is progressively implementing zero deforestation traceability in its supply chain to further clarify deforestation risks and develop countermeasures.</p> <p>Mengniu's Modern Farming and COFCO International agreed in November 2023 to purchase 50,000 tonnes of 'zero-deforestation' Brazilian soybeans annually. This agreement marks the first Brazilian soybean order in China with an explicit 'zero-deforestation' clause.</p>
<b>Internal Oversight and External Reporting</b>	<p>Mengniu has put in place robust internal oversight and external reporting measures, establishing a corporate governance structure for dual-carbon issues. The company has organised a sustainability governance system that spans 24 top-level departments, from the decision-making level to the executive level, to clearly define each level's responsibilities for overseeing and managing dual-carbon issues.</p> <p>Since 2020, Mengniu has been publishing sustainability/ESG reports in accordance with the HKEX's <i>Environmental, Social, and Governance Reporting Guide</i> and the <i>Global Reporting Initiative (GRI) Standards</i>.</p>

Source: Mengniu's ESG reports and interviews.<sup>70</sup>

### Box 3-1. Deforestation risk along agri-food supply chains

On one hand, it is crucial for medium- and large-sized agri-food companies to lead and support their supply chain partners in collaborative efforts for climate transition in order to achieve a just transition in the agri-food system. On the other hand, as environmental and climate risks in agri-food supply chains become more apparent, investors face challenges in assessing the risk to their portfolios from companies that cannot trace their production sources. This, in turn, diminishes their willingness to invest in such agri-food companies. Therefore, the establishment of sustainable supply chain management systems should be integral to the credible transition plans of medium-sized and large agri-food companies, which is essential for securing transition finance support.

In particular, the risk of deforestation in agri-food supply chains has become a topic of international concern. Deforestation is a significant source of scope 3 emissions for many agri-food companies and also leads to other adverse impacts, such as biodiversity loss. The *EU Deforestation Regulation*, which will come into effect on 30 December 2024, is set to have profound implications for the governance of global commodity supply chains. It imposes stricter demands on traceability and transparency in agri-food supply chains, making deforestation risk a key compliance issue for agri-food companies and investors, especially those engaged in international markets.

However, the incentives for agri-food companies to build traceability systems are hindered by

challenges such as the complexity of the agri-food system, information security, the cost of system construction and maintenance, and the difficulty of coordinating and mobilising supplier participation. This generally results in low transparency among suppliers, particularly when they are from different regions or countries because the absence of unified sustainability standards and certification systems increases the difficulty for agri-food companies to collaborate with them. This lack of standards, regulations, and incentive policies for sustainable supply chain management in the agri-food sector in China has led to insufficient policy guidance, lack of awareness, and a disincentive for agri-food companies to engage in sustainable supply chain management.

### Box 3-2. Sector-specific recommendations for the transition plans of big agri-food companies

Credible transition plans of agri-food companies are essential for finance to support the climate transition of the agri-food sector. Regulators, in cooperation with research institutions and professional service companies, should provide guidance on a transition plan framework for agri-food companies. Considering the importance of both mitigation and adaptation, and the essential role of supply chain management in the agri-food sector, specific recommendations for the transition plans of big agri-food companies are as follows:

1. Agri-food companies should heighten their awareness of climate adaptation, assess their needs for enhancing climate resilience, and incorporate necessary targets and related arrangements into their transition plans;
2. As the core entities in the supply chains, big agri-food companies should integrate value-

chain emissions reduction and enhancement of climate resilience into their overall transition goals and pathways, and actively implement sustainable supply chain management;

3. Agri-food companies should analyse the connection between their climate transition activities and non-climate SDGs, identifying material issues such as food security, supply chain deforestation risks, farmers' welfare, gender equality, and biodiversity, which should be integrated into their transition plans;

4. Agri-food companies should be advised to incorporate transition financing arrangements into their transition plans, with financing terms (such as interest rates) linked to sustainability performance regarding not only climate transition indicators but also non-climate SDG indicators with significant relevance.

#### Recommendation 2: Support the development of credible transition plans

Agri-food sector authorities such as the Ministry of Agriculture and Rural Affairs (MARA) and other relevant agencies should promote and support the development of credible transition plans by large and medium-sized agri-food companies by establishing clear regulatory requirements and providing technical assistance on methodologies regarding transition pathways and sustainable supply chain management. Considering the cross-border nature of agri-food supply chains, the MARA should also cooperate with its foreign counterparts to facilitate the harmonisation of agri-food sustainable supply chain standards across borders.

Financial regulators, such as PBoC, should establish clear requirements for entities to develop credible transition plans for getting concessional transition funding. Transition plans of big agri-food companies should be comprehensive, including short-, medium-, and long-term transition goals, transition pathways, investment and financing plans, governance, and just transition assessments and corresponding measures (sector-specific suggestions for the transition plans of big agri-food companies are in Box 3-2).

### 3.3 An enabling policy environment can create the right incentives for agri-food systems climate transition

The agri-food sector faces challenges due to its extended investment cycles, narrow profit margins, and high exposure to climate-related risks. Attracting capital becomes difficult without policies that incentivise higher returns or mitigate risks for agri-food transition activities. However, current policy incentives for agri-food transition activities need to be revised.

Firstly, both green finance and inclusive finance policies need to provide more support for the agri-food climate transition. One the one hand, as current definitions for green finance mandate that projects meet the criteria or taxonomy of being 100% pure green, this is leaving many agri-food climate transition activities ineligible for incentive policies such as refinancing tools, interest subsidies, grants, and guarantees. On the other hand, existing inclusive finance incentive policies target the agricultural sector as one of the key areas but are not aligned with SDGs yet. For instance, the PBoC's re-lending facilities for agriculture and SMEs, as well as the central government's special funds for inclusive financial development (which are used to provide interest subsidies on loans for agriculture and SMEs, fee reduction subsidies for agricultural services by government financing guarantee institutions, capital supplementation, and risk compensation) do not consider the environmental or climate impact of their target groups. This oversight excludes agri-food entities actively addressing climate change from targeted support and may even inadvertently support activities with adverse environmental/climate impact, undermining sustainability objectives.

Secondly, fiscal policies supporting agriculture (such as agricultural subsidies) must be aligned with climate objectives. A UN study revealed that approximately 86% of the global annual agricultural subsidies, totalling around USD540bn, still back activities that negatively impact the environment.<sup>63</sup> These subsidies often include support for fertilisers and pesticides, which can exacerbate GHG emissions and soil degradation. In China, agricultural subsidy policies have undergone recent reforms to prioritise environmentally friendly and ecologically sustainable practices over sheer production increases. However, current agricultural subsidies for green and ecological initiatives remain fragmented, insufficient in overall allocation, and lack integration with climate targets. Between 2004 and 2015, China witnessed a twelvefold increase in direct agricultural subsidies, a sevenfold rise in subsidies for agricultural insurance premiums, and a notable surge of nearly 15 times in price support subsidies. However, agroecological compensation subsidies experienced the slowest growth, increasing by only 9.8% over 11 years.<sup>64</sup> Additionally, China's agricultural subsidies should offer more support for agricultural emission reduction technologies or the enhancement of agricultural climate resilience.

Thirdly, publicly-funded de-risking tools to support agriculture (such as government-backed agricultural credit guarantees and national financing guarantee funds) need to incorporate climate transition factors. Given the unique risks associated with the agricultural sector, the government must introduce risk-sharing mechanisms for related entities. Agricultural producers are particularly exposed and vulnerable to climate change, and many small-

and micro-sized entities need more awareness, knowledge, and capacity to address climate-related challenges. Without appropriate risk-sharing and credit-enhancement mechanisms, they face heightened susceptibility to climate risks and may encounter difficulties securing financing for transition initiatives. China's National Agricultural Credit Guarantee System and the National Financing Guarantee Fund are pivotal policy financial instruments for risk-sharing in agricultural finance. However, they have yet to incorporate climate considerations. Consequently, agri-food climate transition activities need help to access adequate risk-sharing and credit enhancement, posing a hurdle in overcoming financing bottlenecks.

### **Recommendation 3: Create an enabling policy environment**

**3.a. Establish transition finance incentive policies focusing on the transition of agri-food supply chains.** Existing structural monetary policy tools include transition refinancing, interest rate subsidies, subsidies for transition insurance premiums, financing guarantees, and inclusion in the evaluation framework for financial institutions. If amended to support the agri-food transition, such tools could create incentives for large- and medium-sized agri-food companies to transition their value-chain. For example, discounted lending conditioned on sustainable supply chain management performance can encourage improvement in the transition of agri-food companies.

### **3.b. Create synergies between transition finance and inclusive finance policies.**

Leveraging existing inclusive finance policies in China by incorporating climate transition factors can maximise policy synergies. This involves

directing support towards agri-food transition entities and projects while gradually phasing out support for those not aligned with climate transition goals.

### **3.c. Tilt existing agriculture supportive policies towards agri-food climate transition activities.**

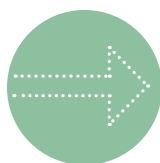
Directing agricultural subsidies and financing guarantee policies towards climate transition activities can help align government support with sustainability and climate goals.<sup>65</sup> This entails focusing subsidies on activities that facilitate climate change mitigation and adaptation while gradually reducing support for activities that do not align with climate transition objectives. For example, the central government can incorporate climate transition factors into its performance evaluation framework for provincial agricultural financing guarantee work, such as the number of supported transition projects, entities, and loan amounts, and then link related performance to rewards and subsidies for local governments.

### **3.d. Enhance the government's role as agri-food bond issuer.**

As a significant issuer of agricultural bonds, the government should further utilise its role by issuing transition sovereign bonds or local government bonds. These bonds should target agri-food transition activities with strong public attributes but potentially weaker commercial viability, such as scientific and technological research and development for agri-food climate transition or providing subsidies for agri-food climate transition activities. The issuance of government transition bonds can also serve as a policy signal, catalysing more private capital into supporting the climate transition of China's agri-food sector.

## **4. Conclusions**

Without adequate financing, China is unlikely to see a just and inclusive climate transition in the agri-food sector. While public financing plays an important role, both climate change mitigation and climate change adaptation in the agri-food sector require the mobilisation of private capital to close the existing transition financing gap.



This report has highlighted some of the barriers that exist for the mobilisation of private capital, including a lack of climate-related data transparency and credible transition plans for agri-food companies, as well as insufficient policy incentives. The report then proposes corresponding recommendations to overcome those barriers, including:

**Recommendation 1: Enhance climate-related information disclosure of China's agri-food systems.**

**Recommendation 2: Support the development of credible transition plans for medium and large agri-food entities.**

**Recommendation 3: Create an enabling policy environment,** by focusing on a) establishing transition finance incentive policies focusing on the transition of agri-food supply chains; b) creating synergies between transition finance and inclusive finance policies; c) tilting existing agriculture supportive policies towards agri-food climate transition activities; and d) enhancing the government's role as agri-food bond issuer.

In most cases, China will be able to rely on its existing policy frameworks for the agri-food sector and financial system, to further develop, enhance, and adapt them to better support the financing of the climate transition in the agri-food sector. As the largest agri-food-related emitter in the world, China's efforts in mitigating its agri-food GHG emissions will contribute to achieving its own climate objectives, and make a positive contribution at a global level. By transitioning its agri-food sector, making it more climate-friendly, resilient, and inclusive, China can also promote social equity and share the benefits of climate transition with more people.



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