

Technology and Innovation for Small Holders in China

Feeding the world's rapidly growing urban population

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Executive Summary of the background paper prepared for the working session co-organized by GIZ and SAI.

The background paper introduces sustainability issues in China's agri-food sector, and presents case studies of how supply chain actors are promoting innovation for sustainability among their small holder suppliers, including through public-private partnerships.

Please find the full report at www.saiplatform.org. This study was commissioned by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) under its "Promoting sustainable sourcing in the fruit industry" project. The findings and opinions shared in this report are author's, who was solely responsible for generating this research and content to advise GIZ and SAI (Sustainable Agriculture Initiative Platform).

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Transformations in China's agri-food sector

China's agri-food sector has developed rapidly in recent decades. The value of agricultural production accounts for about 25% of the total value of the sector. Input supply, food and drink manufacture and wholesale and retail trade are growing rapidly. With rapid urbanisation and rising incomes, consumers' diets have changed, driving growth of cash crops (e.g. fruit and vegetables) and livestock production. Although agricultural production is still dominated by small holder farmers, agribusinesses and modern supply chains have emerged. Changes in farming practices, adoption of new technologies and improved farming infrastructure have played important roles in continued agricultural growth. Government policies, backed by strong fiscal support, have also promoted growth in productivity and changes in supply chains.

Sustainability challenges

With a large population but limited land and water resources, increasing productivity and yields, increasing the efficiency of resource use, and reducing environmental impacts of food production are high priority concerns in China. Widespread environmental challenges include the need to maintain productive arable land area, improve soil fertility, increase water and nutrient use efficiency, and prevent pollution of soil and water resources. More intensive production practices, longer supply chains, increased food trade, transport and processing have also increased the food safety risks, and food safety is now a priority concern of both government and citizens alike. Large-scale migration to the cities has changed the structure of the rural labour force, with women and elderly people playing ever greater roles in agricultural production. Both technological and institutional innovation are relevant to addressing China's sustainability challenges.

Government policies

Many of these sustainability challenges are addressed in a recently issued National Plan for Sustainable Development of Agriculture (2015-2030). Major reforms of food safety regulations have also been underway. Government policies strongly support continued technological innovation in the agriculture sector, while also promoting institutional reforms. Two important policies are the promotion of markets for arable land use rights, and the promotion of agricultural cooperatives. Markets for arable land use enable more efficient producers to engage in production. Rights to use about 30% of China's arable land have been transferred, about 10% of which has been to agribusinesses. There are now more than 1 million farmer cooperatives, providing a range of technical and marketing services to their members. More recently, government policies have promoted public-private partnerships to leverage private investment in the agriculture sector.

Innovation for sustainability in China's agriculture sector

This report presents ten case studies of how agri-businesses are addressing sustainability issues in their supply chains, and ten case studies of public-private partnerships to address sustainability challenges. The examples cover a range of products and services, and involve international and domestic agri-businesses, small and medium enterprises and farmer cooperatives, all of which work source from farmers. The sustainability dimensions addressed in the case studies include inclusive growth (expanding market access for smallholders, and increasing productivity and profitability); addressing ecological challenges relating to land, water, nutrients and resource flows; and improving product quality and safety. Examples of public-private partnerships address sustainability through knowledge exchange and technology innovation; testing and demonstration of existing technologies; and the deployment of technologies and know-how with public goods benefits possessed by the private sector. Together, the cases exemplify international and domestic input producers whose core products have sustainability benefits; agri-food companies whose business model depends on enhancing sustainable practices within their own supply chains; and companies promoting public goods benefits in partnership with public sector and in pre-competitive partnerships with other private firms. The case studies highlight the following key points:

- Innovation for sustainability often depends on partnerships, whether between public and private sectors, with input, advisory service or technology providers, or between suppliers and buyers in the supply chain.
- Innovations have stronger potential for uptake when there are synergies between environmental benefits and productivity, quality and profitability. Improvements in economic outcomes may be essential for incentivizing adoption of practices with benefits for the environment and food safety.
- In China's rapidly changing economic context, appropriate and effective strategies for promoting sustainability will change over time and vary from place to place. This suggests that there will be no single approach that meets diverse and changing needs.
- Recent government PPP policies primarily frame partnerships as a mechanism to leverage private investment for public goods provision, but addressing sustainability challenges is also knowledge-intensive. Development of pre-competitive partnerships involving the public sector and private firms, who may compete in other respects, may require strategic planning and patient support.

中国小型自耕农的技术与创新

农业可持续发展项目平台会议
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德国国际合作组织与农业可
持续发展项目平台工作会议
背景文件执行摘要。

本背景文件介绍了中国农业
食品行业的可持续发展问
题，以及供应链参与者在推
动小型自耕农供应商可持续
发展创新（包括公私合伙）
上的案例研究。

请在以下网址查看完整报
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中国农业食品行业的转型

近几十年来，中国农业食品行业发展迅速。农业产值占农业食品行业价值的大约25%。输入性供应品、食品和饮料制造以及批零贸易发展迅速。随着城市化的快速发展和收入水平的不断提高，消费者的饮食结构也发生变化，推动商品作物（例如：水果和蔬菜）以及牧业生产的发展。尽管农业生产仍然以小型自耕农为主，但农工联合企业与现代供应链也已出现。耕种方式的变化、新技术的采用以及耕种基础设施的改善，都在农业的连续发展上发挥了重要作用。在强有力的金融支持下，政府政策也在推动生产力的提高，以及供应链的变化。

可持续发展挑战

中国拥有大量人口，而土地和水资源有限。在这种情况下，提高生产力和收益、提高资源利用效率以及减少粮食生产造成的环境影响，这些问题是中国的重中之重。中国面临着广泛的环境难题：维持生产性耕地面积、提高土壤肥力、提高水资源和营养物质利用效率，以及防止土壤和水资源污染。随着农业生产集约化程度的提高、供应链的延长以及食品贸易、运输和加工业的增强，食品生产的安全风险也在增加，食品安全问题现已成为政府和公民的关注重点之一。大规模人口向城市的迁移，改变了农村的劳动力结构，妇女和老人在农业生产中的作用不断增加。解决中国的可持续发展难题，不仅涉及技术创新，而且涉及制度创新。

政府政策

可持续发展问题在最近发布的《全国农业可持续发展规划（2015~2030）》中多有提及。重点食品安全法规改革正在进行。政府政策为农业的连续技术创新提供有力的支持，同时推动制度改革。其中两项重要政策分别是：推动耕地使用权市场发展政策和推动农业合作社发展政策。耕地使用权市场使得更高效的生产者能够从事农业生产。中国耕地的大约30%使用权已经转移，其中大约10%被转移到农工联合企业。目前有超过100万个农民合作社，合作社向社员提供一系列技术和市场销售服务。不久前，政府政策已在推动公私合伙，以撬动农业私人投资。

中国农业的可持续发展创新

本报告介绍了农工联合企业如何解决供应链可持续发展问题的十个案例研究，以及如何利用公私合伙解决可持续发展难题的十个案例研究。这些案例涵盖了一系列产品与服务，包括国际和国内的农工联合企业、中小型企业以及农民合作社，其中所有工作的源头都是农民。这些案例讨论的可持续发展方面包括：包容性增长（扩大小自耕农的市场准入，提高生产力和利润率）；解决土地、水资源、营养成分和资源流动带来的生态挑战；以及提高产品质量和安全性。其中的公私合伙案例通过以下方式解决可持续发展问题：知识共享和技术创新；现有技术的测试和示范；以及部署私营部门持有的公益性技术和诀窍。这些案例共同例举了以下企业类型：其核心产品带来可持续发展效益的国际和国内输入性生产企业；其商业模式有赖于加强自身供应链的可持续发展实践的农业食品企业；以及通过与公营部门建立伙伴关系或与其他私营企业建立竞争前期伙伴关系，推动公益事业的企业。这些案例的要点如下：

- 可持续发展创新往往有赖于伙伴关系，这种伙伴关系可以在公私部门之间，可以涉及输入性企业、顾问服务公司或技术提供商，还可以是在供应链上买卖双方之间。
- 当环境效益与生产力、质量与利润率之间出现合力时，创新势头将表现得更加强劲。为刺激企业采用有益于环境和食品安全的实践，最终经济结果的改进可能具有核心意义。
- 在中国快速变化的经济背景下，在促进可持续发展上，适当的、有效的策略将随着时间和地点的不同而有所变化。这意味着未来不会有哪一种做法能满足多样化且不断变化的需求。
- 近期政府制定的公私合伙政策主要把合伙企业框定为一种撬动私营投资，推动公益事业的机制，但是可持续发展难题的解决也是一项知识密集性事业。当竞争前期合伙企业的开发涉及公营部门和私营企业时（并且私营企业可能在这方面存在一定竞争），可能需要策略性规划和耐心的支持。