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Program Information Document (PID)

Appraisal Stage | Date Prepared/Updated: 19-Dec-2024 | Report No: PIDPA00173

Public Disclosure Authorized

BASIC INFORMATION

A. Basic Program Data

Project Beneficiary(ies)	Region	Operation ID	Operation Name
China	EAST ASIA AND PACIFIC	P505267	Low-Carbon Agriculture and Soil Health Improvement Program
Financing Instrument	**Estimated Appraisal Date**	**Estimated Approval Date**	**Practice Area (Lead)**
Program-for-Results Financing (PforR)	13-Jan-2025	25-Mar-2025	Agriculture and Food
Borrower(s)	**Implementing Agency**		
People's Republic of China	Hubei Provincial Department of Agriculture and Rural Affairs		

Proposed Program Development Objective(s)

The PforR Program Development Objective is to reduce agriculture greenhouse gas (GHG) emissions and enhance the productive capacity of degraded farmland in selected Counties in Hubei province.

COST & FINANCING (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)?	Yes
Is this project Private Capital Enabling (PCE)?	No

SUMMARY

Government program Cost	**812.40**
Total Operation Cost	**812.40**
Total Program Cost	810.89
Other Costs (Front-end fee,IBRD)	1.50
Total Financing	**812.40**
Financing Gap	**0.00**

FINANCING

Total World Bank Group Financing	**150.00**
World Bank Lending	150.00
Total Government Contribution	**662.40**

Decision

The review did authorize the team to appraise and negotiate

B. Introduction and Context

Program Strategic Context

1. **China is a significant contributor to rising global greenhouse gas (GHG)[1] emissions causing climate change and severely affected by their adverse impacts.** The country accounts for 27% of annual global carbon dioxide (CO_2) and a third of the world's GHG emissions.[2] China is also the world's largest emitter of methane (CH_4), which has 84–87 times the global warming potential of CO_2 over a 20-year timespan,[3] as well as of nitrous oxide (N_2O), another highly potent GHG.[4] Together, these GHGs contribute significantly to climate change, causing rising sea levels, storm surges, and coastal flooding and erosion. These climate change impacts threaten China's densely populated low-elevation coastal cities, which account for a fifth of China's population and a third of its gross domestic product (GDP). China's direct annual losses from natural disasters averaged US$76 billion over the 2016–2021 period.[5] These impacts will intensify in the future, estimated to result in GDP losses of from 0.5% to 2.3% by 2030.[6]

2. **China is committed to transitioning toward a green and low-carbon economy**, whereby growth is increasingly decoupled from resource overuse, carbon emissions, and environmental degradation. To balance green development and climate objectives, the Chinese government has requested World Bank support in strengthening institutional capacity for developing low-carbon agriculture and improving soil health.[7] Characteristics of healthy soil include (a) contributing to climate change mitigation by maintaining or increasing its carbon content – create carbon sinks; (b) hosting a diverse community of organisms that help control pests, recycle nutrients, and improve soil structure – high in biodiversity; (c) converting dead and decaying matter into nutrients for plants – high nutrient recycling capacity; and (d) improving its ability to hold water and nutrients – good soil structure.

3. **The China Low-Carbon Agriculture and Soil Health Improvement Program for Results (PforR Program) in Hubei Province is framed around dual objectives:** (a) to contribute to Global Public Goods (GPGs) by improving environmental performance indicators such as reducing GHG emissions and increasing carbon sequestration and (b) to enhance the climate resilience and production capacity of degraded farmland through soil health improvement. The PforR Program aims to reduce GHG emissions, sequester carbon in soils (carbon sinks), and improve soil health and productivity of degraded farmlands through a suite of innovative sustainable soil management (SSM), climate-smart agriculture (CSA), and agriculture biomass (circular bioeconomy) recycling technologies and practices that are profitable to farmers and farmer cooperatives and enterprises, and replicable at scale. This is the first World Bank–supported operation in China and globally to focus on low-carbon agricultural transformation through soil health improvement for healthy food systems.

4. **There are synergies and differences between this PforR Program and the Sustainable Soil Pollution Management Project (P181487) to be implemented in Guangdong Province.** This PforR Program is focusing on scaling up low-carbon agriculture approaches to reduce GHG emissions from intensive crop production systems through the adoption of CSA and SSM practices and from agricultural waste by recycling biomass into bioenergy and commercial

[1] Refers to carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).
[2] World Bank, China: Country Climate and Development Report (CCDR), 2022.
[3] *Methane Tracker 2020 - Analysis - International Energy Agency.*
[4] Nitrous oxide is 300 times **more potent** than CO_2 and takes 114 years to break down.
[5] World Bank, China: CCDR, 2022.
[6] Ibid.
[7] The Food and Agriculture Organization (FAO) of the United Nations defines healthy soils as those with ability to function as a living system that supports plant and animal productivity, maintains water and air quality, and promotes plant and animal health.

organic fertilizer (circular bioeconomy) and sequester carbon in soils (carbon sinks) to improve soil health and productivity of degraded farmlands, as well as enhance ecosystem services. The Guangdong Sustainable Soil Pollution Management Project is multi-sectoral and aims to prevent and control heavy metal pollution. Specifically, it is using a flux-based soil pollution management approach to reduce net cadmium flux (influx minus outflux) in arable land. This involves heavy metal source reduction, including management of legacy contamination from mining and industrial sites, irrigation water and sediments, and landfills; and active pollution sources such as industries with significant heavy metal influx via atmospheric deposition to surrounding arable land.

Sectoral and Institutional Context

5. **China will remain one of the largest agricultural commodity producers in the world in the foreseeable future.** According to the FAO, the country produced 50% percent of the global vegetables, 28% of the rice, 22% of the maize/corn, 37% of the fish, 38% of the pork, 13% of the chicken, and 9% of the global beef in 2021. In the same year, China's agricultural gross domestic product (GDP) amounted to US$1.37 trillion, equivalent to 7.3% of the national GDP (US$17.7 trillion).

6. **China's agriculture has undergone significant transformation over the past four decades that has improved productivity, farmers' income, and food and nutrition security.** However, its high-input and high-output agricultural production models have been proven to be environmentally unsustainable. China's agricultural sector now accounts for 13% of the global GHG emissions from agriculture. Agriculture is the fourth largest source of GHG emissions in China after the energy, manufacturing and construction, and industry sectors. Although agriculture, together with land use, land-use change, and forestry (LULUCF), accounts for only 6% of China's GHG emissions, equivalent to 792 $MtCO_2$-e per year,[8] the sector remains key to the country's GHG emissions reduction efforts. Global climate models estimate that, without serious national climate mitigation and adaptation efforts, China's agricultural GHG emissions will rise to 1,350 $MtCO_2$-e per year by 2050.[9] Therefore, reducing GHG emissions from the agricultural sector remains one of China's top priorities in its efforts to decarbonize the economy.

7. **China's unsustainable agricultural practices are the main drivers of severe farmland degradation.**[10] Land degradation is a change in soil health that reduces the ecosystem's ability to provide goods and services. The major contributors to farmland degradation are improper and/or overuse of chemical fertilizers and agrochemicals, which increase soil acidity and reduce organic matter content. In 2022, the total amount of chemical fertilizer used in China was about 50.8 million tons, with average application intensity of 298.7 kg/ha, compared with the internationally recommended amount of 225 kg/ha. Other factors contributing to farmland degradation are monocropping, excessive tillage, and removal of vegetation cover resulting in loss of soil nutrients and organic carbon, which in turn increases CO_2 emissions; poorly designed drainage and irrigation systems; inadequate agricultural waste treatment and disposal systems; and improper disposal of untreated municipal and industry waste. As a result, 69% of China's total arable land is

[8] World Bank, China: CCDR, 2022.
[9] China's Third National Communication to the UNFCC of December 2018.
[10] Land degradation is defined by FAO (2000) as the loss of production capacity of land in terms of loss of soil fertility, soil biodiversity, and degradation of natural resources.

now of low to medium quality.[11] Thus, restoring farmland productive capacity will not only enhance food and nutrition security but also boost farm income, build climate resilience of agri-food systems, and increase soil carbon sequestration.[12]

8. **China generates the largest quantity of agricultural waste, including crop straw residues and livestock manure.** Developing innovative technologies that can reduce GHG emissions from agricultural waste has emerged as one of the top priorities of the Chinese government. Globally, the country ranks first in generating crop straw residues. In 2020, China's production of crop straw residues reached 737.5 million tons,[13] accounting for 17.3% of global production. Maize, wheat, rice, and rapeseed are China's major crop straw residues. Traditionally, these residues were often burned, causing air pollution and emitting CO_2 into the atmosphere, or abandoned in or around the fields. In 2019, the open burning of crop residues in China's Mainland accounted for 17% of the global total.[14] To mitigate climate change risks, China aims to recycle crop straw into bioenergy products to reduce CO_2 emissions and return residues into the soil to increase carbon sequestration. China is also the world's largest producer of livestock manure. From 2007 to 2017, China produced 3.8 billion tons of manure, which is 18.2% of the global output.[15] To reduce CH_4 emissions, the PRC government aims to treat and recycle 80% of livestock and poultry manure annually by 2025. Recycling treated livestock and poultry manure into commercial organic fertilizer would further increase soil organic carbon and improve soil health and the production capacity of degraded farmland in China.

9. **Hubei is among the top 10 largest agricultural producers in China.** In 2023, the province's gross agricultural production value was nearly US$60 billion. The province's farmland occupies 5.2 million hectares (78.6 million mu), accounting for 28.2% of the province's total land area, while its total per capita arable land is 0.09 ha (1.3 mu), which is lower than the national average of 0.10 ha (1.5 mu). Despite its small farm sizes, Hubei produces 8.4% of China's rice, 6.0% of its vegetables, and 10.3% of its rapeseed. Hubei is the fourth largest producer of tea after Yunnan, Guizhou, and Sichuan provinces, and is a significant producer of fruits.

10. **Hubei generates enormous quantities of GHG emissions from its crop production systems.** The province uses more than 2.5 million tons of chemical fertilizer annually, ranking third in China, with an average application rate of 400 kg/ha, which is 101.3 kg/ha more than the already high national average. Hubei also uses about 52,000 tons of pesticide annually, contributing to air, water, and soil pollution, and adversely impacting food safety and human health. The province also generates 48 million tons of crop straw residues annually, 27% of which are burned in fields, causing air and water pollution, GHG emissions and a reduction in soil carbon stocks. Hubei uses significant quantities of coal in tea processing, releasing a range of pollutants, including sulfur dioxide, N_2O, CO_2, volatile organic compounds, ash, and a range of heavy metals. These pollutants enter the atmosphere, causing damage to the environment and to human health. Hubei also generates about 120 million tons of livestock and poultry manure annually, contributing significantly to CH_4 and N_2O emissions. Although about 85% of the manure from large farms is treated, not all is recycled into other productive uses or bioeconomy. This presents an opportunity to use treated livestock manure as a resource to produce commercial organic

[11] Ministry of Ecology and Environment. China Ecology and Environment Status Almanac. Available at *https://www.mee.gov.cn/hjzl/sthjzk/zghjzkgb/202305/P020230529570623593284.pdf*.
[12] Carbon sequestration is defined as the capture and long-term storage of carbon in plants, soils, geologic formations, and the ocean that would otherwise be emitted to, or remain in, the atmosphere.
[13] Estimation of crop residue production and its contribution to carbon neutrality in China. Available at https://www.sciencedirect.com/science/article/abs/pii/S0921344924000442.
[14] FAO (Food and Agriculture Organization of the United Nations). 2021. Crop Residue Burning: Is It a Boon or a Bane? Communications in Soil Science and Plant Analysis 53(4), 1927. doi: 10.1080/00103624.2022.2071927.
[15] Guo, R. N., Yin, J. C., Liu, J. H., et al. 2024. Research progress on the harmless and resourceful utilization of livestock and poultry manure. Specialty Products Research 1-6.

fertilizer for use in tea, fruit, and vegetable production systems. This would not only reduce CH_4 and N_2O emissions from the livestock sector but also increase soil carbon sequestration.

11. **Hubei's farmland is severely degraded through decades of intensive farming practices, which has reduced its productive capacity.** In Hubei, the proportion of farmland that is suitable for crop production is only 2.3%, moderately suitable is 67.7%, barely suitable is 11.5%, and unsuitable is 18.5%.[16] Unsustainable farming practices have depleted soil organic carbon (SOC). The average SOC in Hubei Province is 14.2 g/kg which is lower than the national average of 17.3 g/kg. Long-term excessive and improper application of chemical fertilizer has resulted in increased soil acidification on about 2.0 million ha (30 million mu) of farmland, lowered soil quality and crop yield, and increased agricultural production costs. The overuse of chemical fertilizer and pesticide also contributes to soil contamination with heavy metals. The fertilizers used contain trace amounts of heavy metals, such as arsenic, cadmium, chromium, mercury, and lead, which can accumulate in soils and be absorbed by crops over time.

12. **Hubei Province is highly vulnerable to climate change and is experiencing significant climate risks and hazards.** In recent years, the province has experienced record heatwaves and sudden increases in frequency and severity of droughts and floods. For example, the severe floods of summer 2020 affected 6.03 million ha of cropland, resulting in crop failure from 1.14 million ha in the middle and lower reaches of the Yangtze River basin,[17] of which Hubei Province was the second most affected province.[18]

13. **Recognizing the growing agricultural emissions and land degradation challenges, China adopted the National Agricultural Sustainable Development Plan (ASDP, 2015–2030).** The ASDP includes measures to reduce the use of chemical fertilizers, pesticides, and agricultural plastics, and to recycle agricultural waste (crop straw residues and livestock and poultry manure) into biomass energy (e.g., biochar, briquettes, and biogas) and commercial organic fertilizer. These measures aim to help China reduce GHG emissions and increase soil carbon sequestration to improve soil health and productivity, while enhancing climate resilience.

C. PforR Program Scope

14. **The PforR Program aims to enhance the effectiveness and impacts of the government budget resources that support implementation of the Hubei Agricultural Sustainable Development Plan (ASDP, 2015–2030).** The PforR Program supports a subset of activities from four RAs of the Hubei Province ASDP. However, the activities from five RAs of the Hubei ASDP are repackaged into three interlinked RAs of the PforR Program (see Table 1). The PforR Program will be implemented for five years in five counties in Hubei Province: Chibi, Hefeng, Xian'an, Yunxi, and Zhushan. These counties were selected using the following criteria: (i) sound technical, environmentally sustainable, and economically viable proposal; (ii) willingness to pilot innovative and scalable approaches to reduce agricultural GHG emissions and improve soil health; (iii) adequate fiscal space to borrow IBRD funds – based on provincial debt sustainability assessment report; and (iv) willingness to repay their portion of the IBRD loan. The PforR Program will focus on four value chains: paddy rice, tea, fruits, and vegetables. These value chains were selected because together they generate more than two-thirds of all agriculture-related emissions in Hubei. Therefore, the PforR Program interventions will have the greatest

[16] According to MDPI (Multidisciplinary Digital Publishing Institute), 2023.

[17] Iowa State University, Agricultural Policy Review 2020: *https://agpolicyreview.card.iastate.edu/fall-2020/impact-flooding-chinas-agricultural-production-and-food-security-2020.*

[18] The seven most seriously affected provinces were Chongqing, Hubei, Hunan, Anhui, Jiangxi, Jiangsu, and Zhejiang, which are in the middle and lower reaches of the Yangtze River.

impact in term of reducing GHG emissions and enhancing productivity through soil health improvement. The description of three RAs of the PforR Program and typology of indicative activities is provided below.

15. **RA1: Enhancing institutional capacity for sustainable management of farmland ecosystem**. RA1 supports closing the existing institutional capacity gaps in sustainable soil management (SSM) and creating an enabling environment for family farms, farmer cooperatives, and private enterprises to participate in the PforR Program. Three main activities will be implemented under RA1. First is the development of SSM and risk-based soil pollution prevention and control plans. Each Program county will be responsible for developing this plan using participatory approaches to guide implementation of soil health improvement activities under RA2. Second is the development of MRV methodologies for calculating soil carbon sequestration, a Soil Health Index for classifying soil quality, and establishing (or upgrading) the IT platform (big data) for M&E. These management and governance systems will be developed at the provincial level and used by the Program counties but can be rolled out to other counties within the province as needed. Third is the strengthening of the existing incentive mechanisms to encourage the adoption of SSM and CSA technologies and practices as well as innovative biomass recycling technologies (e.g., result-based matching grants, payment for environmental services (PES) or eco-compensation, and exploring opportunities for accessing voluntary carbon markets). This activity will also be implemented by the provincial government to guide the results-based fiscal transfers to targeted beneficiaries in the Program counties.

16. **RA2: Improving productive capacity of degraded farmland.** RA2 supports the adoption of technologies and practices that improve soil health. For example, reducing soil pollution, increasing and balancing soil nutrients, reducing GHG emissions, and increasing soil carbon sequestration. RA2 also has three main categories of activities. First is the implementation of the participatory risk-based soil pollution prevention and control plans developed under RA1. The focus will be on preventing and controlling farmland pollution. This will be done by cleaning irrigation waters using engineering methods such as ecological ponds (e.g., artificial wetlands) and sedimentation pits. Farmland that is lightly or medium polluted will be treated using chemical (e.g., lime, passivation agents) and agronomic practices (e.g., switching crops, planting low-cadmium-accumulation rice varieties). Crop production on highly polluted farmland will be prohibited under the PforR Program. This is to ensure food safety and reduce human and animal health risks. Second is the implementation of CSA technologies and practices (to achieve triple wins – increased productivity, enhanced climate change resilience, and reduced GHG emissions) in four selected value chains (i.e., rice, tea, fruits, and vegetables). This will include reducing chemical fertilizer and pesticide use, using formula fertilizer based on soil tests, improving irrigation efficiency, adopting fertigation, using green manure, and adopting IPM technologies and practices. Third is the implementation of activities aimed at increasing carbon sequestration on farmland (soil carbon sinks), including through returning crop straw residues into farmland soil, applying organic fertilizer and biochar, and adopting conservation agriculture and agroforestry technologies and practices.

17. **RA3: Recycling biomass to reduce GHG emissions from agricultural waste.** RA3 will pilot innovative and scalable circular bioeconomy technologies and practices to reduce GHG emissions from agricultural waste. There are three main proposed activities. First is the recycling of crop straw residues into bioenergy products – briquettes and pellets as sources of renewable energy, biochar for soil carbon sequestration, and substrates for mushroom production. The briquettes and pellets will be used to displace fossil fuels (e.g., coal, diesel) as sources of energy in agro-processing activities under RA2. The biochar will be applied on farmland to increase soil organic carbon. Second is the recycling of treated livestock and poultry manure and agro-processing by-products (e.g., rice husks, maize bran, oilseed hulls and shells) into commercial organic fertilizer (i.e., through an industrial process to balance crop-specific nutrients). Commercial organic fertilizer will be used for fruit and vegetable production under RA2. Third is the propagation of green plants (e.g., special bamboo and reeds) in strictly controlled areas (i.e., high-risk or heavily polluted farmland and tidal areas) for biomass energy generation. The energy generated will be used locally for agro-processing activities.

18. **A wide range of stakeholders will benefit from the PforR Program.** The primary beneficiaries will be family farm owners and farmer cooperative members, estimated to be 20,000, who will receive training and Technical Assistance (TA) in SSM and CSA technologies and practices, as well as targeted results-based incentive payments. About 50 low-carbon agricultural demonstration farms and five private enterprises will benefit from the existing one-time matching grants provided by the government to encourage the adoption of innovative CSA, SSM, and biomass recycling technologies. These activities will generate about 2,000 new or better green jobs in the Program counties. Civil servants will benefit from the capacity-building activities and TA from the Bank and Expert Panel teams. In all cases, the beneficiaries will be disaggregated by gender.

Table 1: Government program and PforR Program

Description	Government program (Hubei Province ASDP, 2015–2030)	Program supported by the PforR (PforR Program)*	Reasons for non-alignment
Objective	To accelerate the development of resource-saving, environment-friendly, and ecological conservation agriculture in Hubei Province.	To reduce agricultural GHG emissions and enhance the production capacity of degraded farmland in selected counties in Hubei Province.	The government program is targeting a larger spectrum of investments in crop and livestock production systems as well as forestry and grassland ecosystem management. The Bank Program aims to reduce GHG emissions from crop production systems and enhance the productive capacity of degraded farmland through soil health improvement.
Duration	CY2015–2030	FY2026–2031	
Geographic coverage/subsector coverage	Entire Hubei Province Entire agricultural production system: crop and livestock production	Five demonstration counties: Chibi, Hefeng, Xian'an, Yunxi, and Zhushan Four priority crop value chains: paddy rice, tea/camellia tea, fruits, and vegetables	The Government program supports sustainable development of the entire agro-food system in Hubei Province. The Bank Program supports low-emissions agriculture and productivity enhancement in intensive crop production systems.
Results Areas	RA1: Optimize the development layout and steadily improve agricultural production capacity. RA2: Protect cultivated land resources and promote sustainable use of farmland. RA3: Conserve and efficiently use water to ensure agricultural water safety. RA4: Control environmental pollution and improve	**RA1: Enhancing institutional capacity for sustainable management of farmland ecosystem.** Linked to government program RA1, which aims to transform agricultural production systems through strengthening governance and management systems to ensure that productivity growth matches the carrying capacity of natural resources (land and water).	The Bank Program does not support activities under government program RA5, which aim to enhance forestry ecological functions through reforestation and afforestation programs; protect and restore natural forestry landscapes and pastoral landscapes; improve the use of recycled water in basins to increase water volume in important wetlands, rivers, and lakes; promote the restoration of aquaculture ecosystems; and

Description	Government program (Hubei Province ASDP, 2015–2030)	Program supported by the PforR (PforR Program)*	Reasons for non-alignment
	agricultural and rural environment. RA5: Restore agricultural ecology and improve ecological functions.	**RA2: Improving productive capacity of degraded farmland.** Linked to government program RA2, which seeks to adopt soil improvement technologies such as conservation tillage, returning straw to farmland, using commercial organic fertilizer, planting green manure, and restoring degraded farmland. Linked to RA3, which aims to promote high-efficiency water-saving irrigation technologies. Linked to RA4, which seeks to reduce chemical fertilizer use and improve its use efficiency, deepen soil testing and use of formula fertilizer, and improve fertilizer application methods; and use high-efficiency, low-toxicity, low-residue pesticides, biopesticides, and advanced pesticide application equipment and IPM technologies and practices. **RA3: Recycling biomass to reduce GHG emissions from agricultural waste.** Linked to government program RA1, which is promoting ecological circular agriculture models and recycling of agricultural biomass into new products: bioenergy and commercial organic fertilizer.	strictly control the intensity of fishing. These activities do not directly contribute to low-carbon agriculture and soil health improvement.
Overall financing		IBRD Loan: US$150.00 million Hubei government: US$662.40 million Total: US$812.40 million	

*RA1, RA2, and RA3 of the PforR Program have been developed following the repackaging of relevant activities presented under RA1, RA2, RA3, RA4, and RA5 of the government program.

19. **The total Program financing is estimated at US$812.40 million.** The Hubei government will finance US$662.40 million while the World Bank will provide an IBRD loan of US$150.00 million (see Section E).

Program Development Objective(s)

20. **The PforR Program Development Objective** is to reduce agriculture greenhouse gas (GHG) emissions and enhance the productive capacity of degraded farmland in selected Counties in Hubei province.

21. **The PDO level/outcome indicators are:** (i) net GHG emissions achieved (RA2 and RA3) ($MtCO_2$-e), (ii) increased carbon sequestration achieved (RA2 and RA3) (soil organic carbon g/kg), (iii) increased productivity of degraded farmland achieved (RA1 and RA2) (percentage), and (iv) increased safe utilization rate of polluted farmland achieved (RA1 and RA2) (percentage).

Lessons Learned and Reflected in the Program Design

22. **The design of this PforR Program is informed by China's and global experience on low-carbon agricultural transformation and sustainable land management.** This includes low-carbon agriculture approaches from the China Green Agricultural and Rural Revitalization Program for Results (Hubei and Hunan) (P178907); sustainable soil management approaches from the closed China: Guangdong Agricultural Pollution Control (P127775); and risk-based farmland pollution control from the closed China: Hunan Integrated Management of Land Pollution Project (P153115). Key lessons learned and reflected in this PforR Program design include: (a) intensive training, capacity building and technical assistance is needed to enhance the adoption of CSA and SSM technologies and practices; (b) robust third-party M&E system and VA agency are critical to tracking the results of PforR Program implementation and accountability of the government transfers; (c) globally, productive alliances between the enterprises and farmer cooperatives are known to have a "pull effect" that enables members to access inputs, technologies and markets; and (d) globally, matching grants for generation of public goods and services have been proven effective in promoting investment by enterprises and adoption of new technologies and practices by family farms and farmer cooperative members.

E. Environmental and Social Effects

23. **The Program would bring about broad and significant E&S benefits**. It will greatly improve the regional and agricultural eco-environment and improve soil health and enhance farmland carbon sequestration by adopting agricultural waste recycling technologies (circular bioeconomy) and CSA and SLM practices in Hubei Province.

24. **A comprehensive ESSA has been prepared by the Bank team, analyzing the alignment between China's existing E&S policy frameworks and the World Bank's PforR Core Principles.** The main conclusion is that the systems align with the Bank's core principles: China and Hubei Province have established a robust regulatory framework, institutional structures, and adequate resources that provide a reasonable basis for managing the E&S risks and impacts associated with the PforR Program.

25. **The E&S screening process includes a set of exclusion criteria for activities with high environmental and social risks,** which has been incorporated into the ESSA report. After exclusion, the key E&S risks include (a) construction risks from agro-processing and agricultural waste recycling facilities; (b) operational risks, such as waste emissions polluting the environment and posing health and safety risks to workers and communities; (c) risks from technologies and practices applied under the PforR Program that might affect soil health or cause secondary pollution; (d) small-sized land acquisition for new workshops for recycling agricultural waste into biofuel products; (e) small-scale land transfer for expansion of eco-farms; and (f) the impact on Hefeng Tujia and Miao autonomous counties. Cumulative impacts on the natural environment in Hubei Province are expected to be both positive and negative because of the activities under this Program. Soft activities, such as research, pose minimal direct E&S risks, except for limited health and safety concerns for researchers.

26. **Overall, the E&S risk rating is rated Substantial, given the multi-dimensional risk and impacts on the environment and human population, and on land acquisition/transfer and ethnic minorities.** In addition, given the wide range of PforR Program activities, efficient coordination and active involvement of government departments will be necessary for successful E&S risk management. These E&S risks can be effectively managed by the existing E&S systems and by implementing the PAPs. The ESSA team's field visits and E&S due diligence in the five Program counties confirmed that there are no associated facilities.

27. **The gaps or risks to be addressed through the recommended E&S actions include** (a) inadequate regulations and rules in the private sector providing service on pest prevention and control; (b) a lack of limitation of application rate of straw/residues to farmland and lack of proper quality standards for using straw to produce biofuel products; (c) risks of land acquisition and land-use rights transfer; (d) risks of non-inclusive development of ethnic minority communities in Hefeng County; (e) risks of labor rights and working conditions in agro-processing; and (f) inadequate stakeholder participation and consultation; in particular, vulnerable groups' involvement. A set of E&S actions has been specifically developed and incorporated into the ESSA and the PAPs. The Environmental and Social Management Systems of China and Hubei Province are expected to improve as the E&S actions are implemented.

28. **A stakeholder consultation for the draft ESSA was conducted in Wuhan on October 24, 2024,** with participation of representatives from relevant government departments at the provincial and county levels as well as experts and PforR Program beneficiaries. The draft ESSA report was disclosed on the website of Hubei DARA on November 19, 2024.

29. **Grievance redress.** Communities and individuals that believe that they are adversely affected because of a Bank-supported PforR operation, as defined by the applicable policy and procedures, can submit complaints to the existing program grievance mechanism or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address pertinent concerns. Project-affected communities and individuals can submit their complaints to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, because of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints can be submitted at any time after concerns have been brought directly to the Bank's attention and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's GRS, visit https://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Accountability Mechanism, visit https://accountability.worldbank.org.

E. Financing

Program Financing (Template)

Source	Amount (US$, Millions)	% of Total
Counterpart Funding	**662.40**	**81.54%**
Local Govts. (Prov., District, City) of Borrowing Country	662.40	81.54%
International Bank for Reconstruction and Development (IBRD)	**150.00**	**18.46%**
Total Program Financing	**812.40**	

CONTACT POINT

World Bank

Ladisy Komba Chengula
Lead Agriculture Economist

Wendao Cao
Senior Agriculture Economist

Borrower/Client/Recipient

People's Republic of China
Xiang Peng
Director
zjc@mof.gov.cn

Implementing Agencies

Hubei Provincial Department of Agriculture and Rural Affairs
Dan Fan
Director
737809464@qq.com

FOR MORE INFORMATION CONTACT

The World Bank
1818 H Street, NW
Washington, D.C. 20433
Telephone: (202) 473-1000
Web: http://www.worldbank.org/projects

APPROVAL

Task Team Leader(s):	Ladisy Komba Chengula, Wendao Cao

Approved By

Practice Manager/Manager:	Paavo Eliste	19-Nov-2024
Country Director:	Alejandro Alcala Gerez	19-Dec-2024