People’s Republic of China: Study on Building an Ecological Security System for the National Core Grain Growing Area of Henan Province
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The technical assistance (TA) aimed to support the Government of the People’s Republic of China (PRC) to stabilize grain production in Henan Province to maintain national food security and to promote the sustainable use of the country’s land and forest resources. While food security has improved in the PRC because of agricultural intensification, this has come at the cost of reduced environmental quality including a significant decline in the state of agriculture ecosystems. Ecological security depends on a maintained dynamic equilibrium between societies’ demands and the environment. The current level of environmental degradation driven by changes in land use, land cover, and mono-cropping; intensification of irrigation and the use of chemical fertilizers and pesticide; alteration of the hydrological cycle in terms of water quality and quantity; and increasing level of nonpoint source agricultural pollution have put the ecological health at risk. The worsening environmental conditions have made it difficult to sustain grain production and keep crop productivity at the high levels required to meet the PRC’s food requirements.

As the ecology and productivity of cropping areas are strongly linked, improving the quality of the cropping ecosystem is as important as maintaining crop productivity. Approaches to cropping that can bring both ecological (improve crop yields and soil fertility, reduce soil erosion, conserve soil moisture, recycle nutrients, protect crops from wind and storms, sequester carbon from the atmosphere, and increase biodiversity) and economic benefits are needed. However, with the focus on intensification of agricultural practices, the use of alternative production systems such as agroforestry has been completely lost or are severely degraded as with most of the knowledge and skills needed to set up, maintain, and manage these systems. To reverse this situation, farmers need to be made more aware of the importance of such systems, their benefits, and the technical skills needed to manage them. Government institutions and policies need to be strengthened to enable more support for enhanced ecosystem management, as it involves many agencies with competing and conflicting demands and priorities. To address these needs, the Henan Provincial Forestry Department (HPFD) sought to develop a framework that can promote sustainable development and balance the competing demands for agriculture production and ecosystem rehabilitation and preservation.

**Expected Impact, Outcome, and Outputs**

The impact of the TA was increased contribution by Henan’s grain production systems to national food security. The outcome was an improvement in the ecosystem of the core grain cropping region of Henan. The outputs were (i) best practices in technical management of agroforestry recommended; (ii) strategy for agroforestry development drafted; and (iii) government and community capacity to implement agroforestry activities enhanced.

**Delivery of Inputs and Conduct of Activities**

The TA was carried out by a consulting firm composed of one international and six national consultants. The international consultant’s input was adjusted from 3.00 to 3.04 person-months. The national consultants’ inputs were adjusted from 18.0 to 19.5 person-months, with the additional inputs added to the finance specialist and institutional and policy specialist; responding to the technical complexity of the TA. The performance of the consulting firm was rated as satisfactory. The consultants utilized the terms of reference and design and monitoring framework to prepare the detailed approach and methodology of the TA and assign tasks within the consultant team. The work was organized into three phases. The first phase was devoted to assessing the main physical, climate change, policy, and institutional constraints affecting ecological security, with a focus on the issues affecting the role of farmland protection forests and on farm agroforestry in enhancing ecological security and improving crop productivity under physical, ecological, and socioeconomic conditions prevailing in the Henan plain. During the second phase, the ecological security strategy was drafted, which provided a roadmap as a means for advancing ecological security. During the third phase, the ecological security forestry related action plan was drafted, based on six goals that would enable the HPFD to provide additional knowledge, tools, and assistance to enhance the role of forestry in ecological security and crop productivity in the Henan plain. The executing agency’s performance was satisfactory. The executing agency provided counterpart staff; coordinated field surveys and meetings; coordinated the circulation of the TA progress reports; and collated feedback and/or comments from various agencies and departments. The executing agency actively provided guidance on the content and direction of the TA, as well as in the quality of and the expectations for the TA outputs.
The Asian Development Bank (ADB) provided guidance and fielded timely missions for the inception, interim, training, and final review of the TA. ADB's overall performance was satisfactory.

**Evaluation of Outputs and Achievement of Outcome**

The TA produced the expected outputs which were approved by ADB and HPFD, including the inception, interim, and final reports. Three key outputs were produced: (i) recommendations for agroforestry best practices in technical management which included more than three agroforestry models formulated from the review of historical and current practices, nationally and internationally to understand the issues, constraints, and challenges facing sustainable agriculture and propose technical agroforestry models which can counteract the environmental degradation and enhance ecological services; (ii) strategy for agroforestry development: the forestry-related ecological security strategy including gender-sensitive policy support and inter-sectoral coordination requirements with issues paper on mainstreaming forestry-related investments for ecological security investment plan and an action plan for implementing forestry-related ecological security based on six goals that need to be integrated to facilitate a wider adoption and maintenance of forestry-related investments for ecological security; and (iii) enhanced government and community capacity from gender-sensitive training materials and training program with over 100 stakeholders trained, of which at least 30% were women. The outcome of the TA was achieved with more than three agroforestry models offered to farmers, which included training in model management and its potential financial benefits, as well as increased the farmers' awareness about their environmental value and their role in preserving and improving the agriculture ecology. The ecological security strategy and action plan were presented to and endorsed by the Henan Provincial Government. The government representatives commended the TA for its awareness raising efforts and producing the final outputs which were practical, strategic, and targeted with clear implementation plan. Two key achievements of the TA were to (i) raise awareness about the importance of ecological security and (ii) highlight the need for inter-sectoral cooperation and initiate inter-sectoral dialogue to address the competing and conflicting demands and policies that hinders achieving ecological security. The government demonstrated strong ownership of the TA: the executing agency made efforts in ensuring that the relevance of the TA outputs and deliverables contributed to achieving the desired outcome and that these were shared and openly discussed within and across sectors.

**Overall Assessment and Rating**

The TA is rated as highly successful. All required outputs and outcome, as well as related tasks and targets, were achieved. The executing agency was satisfied with the results of the TA as the outputs from the TA were well received from the government. The TA was fully aligned with the PRC’s aim to stabilize grain production in Henan to maintain national food security and to promote the sustainable use of the country’s land and forest resources; one of the key development priorities in the PRC’s Thirteenth Five-Year Plan for 2016–2020. The TA also supported the government’s policy for ecological civilization which aimed to construct an ecological security system that can safeguard the grain production bases. The TA was in line with ADB’s priorities in its country partnership strategy for the PRC for 2016–2020, and the ADB operational plan for agriculture and natural resources promoting sustainable food security both of which support greater agricultural productivity and enhance the quality, quantity, and management of natural resources.

**Major Lessons**

Intensification, production incentives, and technological improvements have all contributed to increased agriculture outputs. However, these have also exacerbated environmental pollution and degradation and is detrimental to food and ecological security. Ecological security requires food production to be maintained and stabilized for long term food security and livelihoods, sustainable economic development opportunities improved, and the negative factors such as pollution and environmental degradation eliminated from production systems.

**Recommendations and Follow-Up Actions**

The results from this TA align with national priorities for ecological civilization aiming to balance growth and economic development with environmental protection and efficient use of resources. The two knowledge products associated with this TA, one for policy makers and one for farmers will be shared (i) through HPFD to farmers in Henan Province; (ii) through the Regional Knowledge Sharing Initiative, based in Beijing for the policy makers, and (iii) by the Rural Development and Food Security (Agriculture) thematic group of ADB to developing member countries. Additionally, the results are relevant to the PRC’s Fourteenth Five-Year Plan, which sets the development priorities and guides the new normal in innovative, coordinated, green, and open economic development; the knowledge product will be shared with policy makers and agencies leading plan development.

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*a* Agroforestry models included: forestry–agriculture; windbreak–shelterbelt model; forestry–vegetable; forestry–medicinal plants; forestry–pasture–livestock; fruit trees; village woodlot; afforestation on sandy soils.


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