



Report and Recommendation of the President to the Board of Directors

Project Number: 38660
July 2008

Proposed Loan and Global Environment Facility Grant
People's Republic of China: Ningxia Integrated
Ecosystem and Agricultural Development Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 30 June 2008)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.14552
\$1.00	=	CNY6.87180

ABBREVIATIONS

ADB	–	Asian Development Bank
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
FYP	–	five-year plan
GEF	–	Global Environment Facility
HPCMA	–	Helan piedmont conservation management area
IEE	–	initial environmental examination
IEM	–	integrated ecosystem management
IWRM	–	integrated water resource management
IWRMP	–	integrated water resource management plan
LIBOR	–	London interbank offered rate
NARB	–	Ningxia Agricultural Reclamation Bureau
NFD	–	Ningxia Finance Department
NHAR	–	Ningxia Hui Autonomous Region
NHARG	–	Ningxia Hui Autonomous Region government
NSFG	–	Ningxia State Farm Group
NWRD	–	Ningxia Water Resources Department
PIA	–	project implementing agency
PIU	–	project implementation unit
PPMO	–	provincial project management office
PPMS	–	project performance management system
PRC	–	People's Republic of China
TA	–	technical assistance

WEIGHTS AND MEASURES

ha	–	hectare
km	–	kilometer
km ²	–	square kilometer

NOTES

- (i) The fiscal year of the Government and its agencies ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

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CONTENTS

	Page
LOAN AND PROJECT SUMMARY	i
MAPS	
I. THE PROPOSAL	1
II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES	1
A. Performance Indicators and Analysis	1
B. Analysis of Key Problems and Opportunities	2
III. THE PROPOSED PROJECT	7
A. Impact and Outcome	7
B. Outputs	8
C. Special Features	13
D. Project Investment Plan	14
E. Financing Plan	14
F. Implementation Arrangements	15
IV. PROJECT BENEFITS, IMPACTS, ASSUMPTIONS, AND RISKS	19
A. Benefits and Impacts	19
B. Social and Environmental Dimensions	21
C. Risks	22
V. ASSURANCES AND CONDITIONS	23
A. Specific Assurances	23
B. Condition for Loan Effectiveness	26
C. Condition for Loan Disbursement	26
VI. RECOMMENDATION	27
APPENDIXES	
1. Design and Monitoring Framework	28
2. Sector Analysis	32
3. External Assistance	37
4. Detailed Cost Estimates	39
5. Project Organization Chart	41
6. Implementation Schedule	42
7. Procurement Plan	43
8. Terms of Reference for Consulting Services	50
9. Financial and Economic Analyses	55
10. Summary Poverty Reduction and Social Strategy	60
11. Summary Resettlement Plan	65

SUPPLEMENTARY APPENDIXES (available on request)

- A. Detailed Project Costs
- B. Detailed Terms of Reference for Consulting Services
- C. Problem-Solution Analysis
- D. Project Management, Implementation, and the Role of State-Owned Enterprises
- E. Detailed Financial and Economic Analyses
- F. Monitoring Indicators and Rural Household Income Impacts
- G. Market Analysis
- H. Assessment of Financial Management Capability of the Executing and Implementing Agencies

LOAN AND PROJECT SUMMARY

Borrower	People's Republic of China (PRC)
Classification	Targeting classification: Targeted intervention Sector: Agriculture and natural resources Subsector: Environment and biodiversity Themes: Sustainable economic growth, environmental sustainability, capacity development Subthemes: Developing rural areas, natural resources conservation, institutional development
Environment Assessment	Category A. The summary of the environmental impact assessment was circulated to the Board of Directors of the Asian Development Bank (ADB) and placed on the ADB website on 28 May 2007.
Project Description	<p>The Project covers 3,655 square kilometers of the oasis of the Yinchuan Plain extending into the Helan Mountains to the west of the Yellow River in Ningxia Hui Autonomous Region. It comprises three districts and two counties that surround the ancient city of Yinchuan, the capital. The Project will support the policies and plans of the Ningxia Hui Autonomous Region government (NHARG) to combat land degradation through an integrated ecosystem management (IEM) approach. Since 2003, the PRC has been selectively introducing IEM in acknowledgment of the multidimensional nature of land degradation. IEM approaches emphasize the links between natural ecosystem capacities and socioeconomic activities, and seek to holistically rehabilitate damaged ecosystem services and functions by tackling the root causes of damaging practices, including reduction of rural poverty. The Project will reform enabling policies and regulations, as well as build institutional, regulatory, and policy capacity to combat land degradation using an IEM approach. It will demonstrate measures to achieve improved water and land use planning and management, support sustainable rural livelihoods in poor communities through contracts with commercial enterprises, and link commercial and conservation values to rehabilitate the degraded wetlands and grasslands. A Global Environment Facility (GEF) grant will ensure that an IEM approach is used in project implementation and provide support measures to protect 15 globally threatened species. A market-based approach will be taken to promote sustainable resource use and protect and conserve wetlands, grasslands, transboundary flyways, and cultural sites. Tourism and recreation opportunities will be provided for 1.1 million local residents and visitors.</p>
Rationale	<p>The PRC has some of the worst land degradation problems in the world, especially in the vast western region where more than 350 million people live and poverty incidence is the highest. In recent decades, the pressures of intensified use, increased population, and rapid economic growth have led to losses of vital ecosystem services, and reduced productivity of grasslands, farmlands, wetlands, forests, and mountain areas.</p>

Programs to combat land degradation were initiated under the 9th (1996–2000) and 10th (2001–2005) five-year plans, and have resulted in some environmental improvements. However, the high cost of top-down and uncoordinated sector approaches are of concern. The root causes, such as rural poverty and alternative livelihood options to reduce activities that damage the environment, were inadequately addressed. The project area typifies problems found in many parts of the western region. Very fast economic growth in recent years, overuse of water and agrochemicals in agriculture, conversion of marginal desert-edge lands to irrigation for poor farming households, and rapid urban and industrial spread with high pollution have resulted in significant loss of vital ecosystem services and values. Reversing this trend requires strengthening the quality of the policy and regulatory framework, coordinating land and water planning and management, and expanding the role of markets in activities that are compatible with the rehabilitation of ecosystems and their sustainable future use.

Impact and Outcome

The impact of the Project will be improved environmental management to rehabilitate the ecosystems and increase rural incomes in the Yinchuan area. The main outcome is to introduce an IEM approach to provide sustainable livelihoods for the population of the project area.

Project Investment Plan

The investment cost of the Project is estimated at \$221.0 million equivalent, including taxes and duties of \$4.2 million.

Financing Plan

A loan of \$100,000,000 from the ordinary capital resources of ADB will be provided under ADB's London interbank offered rate (LIBOR)-based lending facility. The loan will have a 25-year term including a grace period of 5 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility, a commitment charge of 0.15% per annum, and such other terms and conditions set forth in the draft Loan Agreement. NHARG will ensure counterpart funding of \$116.5 million equivalent.

GEF grant cofinancing of \$4.545 million equivalent, to be administered by ADB, is proposed for the Project.

Source	Amount (\$ million)	%
A. Asian Development Bank	100.0	45.2
B. Global Environment Facility^a	4.5	2.1
C. Government		
1. Ningxia Hui Autonomous Region Government (Finance Department)	8.8	4.0
2. Ningxia Administration Bureau	12.3	5.5
3. Ningxia Agricultural Reclamation Bureau	33.1	15.0
4. Ningxia Water Resources Department	37.6	17.0
5. Yinchuan Municipality	24.7	11.2
Subtotal (C)	116.5	52.7
Total (A+B+C)	221.0	100.0

^a Subject to Global Environment Facility approval.
Source: Asian Development Bank estimates.

Allocation and Relending Terms	The PRC Government will relend the proceeds of the ADB loan to NHARG under the same terms and conditions as those of the original loan. NHARG will onlend part of the loan proceeds to the participating local government agencies under the same terms and conditions as the ADB loan. The subborrowers will assume the foreign exchange and interest rate variation risks for their part of the ADB loan.
Period of Utilization	Until 30 April 2015
Estimated Project Completion Date	31 October 2014
Implementation Arrangements	NHARG will be responsible for overall implementation of the Project and for coordinating activities of the project implementing agencies and their respective project implementation units. The Lead Group, formed by NHARG, will ensure coordination across sectors and provide important decision-making for key project plans, strategic decisions, and policy issues. The provincial project management office (PPMO), established by NHARG, will be provided with adequate full-time staff. It will be responsible for day-to-day project implementation, and coordinate and provide leadership in IEM approaches. IEM capacity within the PPMO will be developed.
Executing Agency	NHARG, through its Finance Department
Procurement	Goods, works, and related services for ADB-financed and GEF-financed contracts will be procured in accordance with ADB's <i>Procurement Guidelines</i> (2007, as amended from time to time). Depending on the value, contracts for equipment and materials will be awarded through a combination of international competitive bidding, limited international bidding, national competitive bidding, direct contracting, and community participation. Foreign contractors may bid on contracts using national competitive bidding procedures. A procurement plan covering goods, works, and services, including the contract value, procurement method, and prequalification of bidders was agreed with NHARG at loan appraisal.
Consulting Services	<p>The Project will finance 27 person-months of international and 100 person-months of national consulting services in three contract packages.</p> <p>Package A, comprising 4 international and 7 national person-months to strengthen the project management capabilities of the PPMO, will be financed from the GEF grant. Individual consultant selection will be applied. ADB will be responsible for recruitment and the PPMO for contract negotiations and contract management.</p> <p>Package B, comprising 12 international and 77 national person-months to provide technical specialists, will be financed from the GEF grant. A consulting firm will be recruited, based on quality- and cost-based selection, to provide the required services. ADB will be responsible for recruitment and the PPMO for contract negotiations and contract management.</p>

Package C, comprising 11 international and 16 national person-months to provide specialist technical services in water resource management, will be financed directly from the loan. Individual consultant selection will be applied. The PPMO will be responsible for selection, contract negotiations, and contract management. Consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time).

Project Benefits and Beneficiaries

Income benefits will be achieved for about 46,400 rural households, including previously resettled poor communities and Hui minority people. These will result from linkages to enterprises in conservation-oriented production of beef, dairy, grapes, and other agricultural activities such as Chinese dates, wolfberry, and other fruits; fodder; and significant production of vegetables, mushrooms, medicinal herbs, and cut flowers. Vocational and technical training will be provided for rural households. About 5,200 nonfarming jobs will be created in the livestock, perennial crops, and other agricultural industries.

Project activities will enhance the environment and improve the habitats of Shahu Lake, Yuehai Lake, and the Yinchuan City wetlands. Water resources and livelihood improvement will directly benefit about 10% of the land area and an estimated 32% of the rural population. About 124,195 hectares of the piedmont zone of the Helan Mountains, wetlands, and the Helan Nature Reserve will benefit from improved protection and conservation management. The benefits from investments to restore and conserve ecosystem functions, services, and values to help protect the habitat of threatened wild species have not been quantified but are believed to be substantial.

Risks and Assumptions

The Project adopts an ecosystem-based approach to address the root causes of land degradation and related issues, and the planning and implementation of project activities. Top-down and sector-specific approaches to land degradation have been expensive and only partially successful in the PRC.

Risks facing successful project management and implementation include (i) lack of familiarity with ADB policies and procedures; (ii) changes in PPMO personnel; (iii) bureaucratic and lengthy procurement decision-making; (iv) inadequate management capacity that compounds delays; and (v) procurement, fraud, and corruption. To mitigate these risks, the Project will provide technical and management advisory support and training, particularly during the first 2 years of project implementation. The multifaceted character of the Project limits its financial and economic risks. The risks to individual activities may be significant, but are all unlikely to occur, so the overall project risk is low.

Market risks include (i) excess production could lower local prices and reduce returns to households, which would be more likely if local production is not adequately connected to market distribution chains; and (ii) tourism demand could fail to grow as expected due to congestion or other negative impacts. These risks will be mitigated through planning and coordination of producers, market diversification, and integrated tourism sector planning. Some activities face technical risks, and these are addressed by ensuring that appropriate contractual relationships are in place; and providing for adequate reviews, technical assessments, and monitoring.

GEF Grant

In October 2002, the PRC Government entered a strategic partnership with GEF and other international partners to develop and scale up comprehensive resource management approaches that integrate the ecological, economic, and social dimensions of the land degradation problem through an IEM approach. GEF will provide a grant of \$4.545 million, which will be administered by ADB. The GEF-financed activities will ensure the IEM approach is followed to contribute to restoring the productive and protective functions of the area's ecosystem resources. The project area includes 68% of the vertebrate species and 42% of vascular plants in the Ningxia Hui Autonomous Region; the alluvial plain of the Yellow River system is its most important zone. Fifteen globally threatened species are in the project area, of which nine are permanent residents and the other six are migratory birds. An IEM approach will be followed for protecting resident and migratory species and their grassland and wetland habitats, as well as for building the institutional and regulatory capacity to rehabilitate, sustainably manage, and protect the ecosystems in the project area.



I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed loan to the People's Republic of China (PRC), and (ii) proposed administration of a grant from the Global Environment Facility (GEF) for the Ningxia Integrated Ecosystem and Agricultural Development Project.

II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

2. In August 2005, the Asian Development Bank (ADB) approved project preparatory technical assistance (TA) to help the Ningxia Hui Autonomous Region (NHAR) of the PRC to formulate the Project.¹ GEF also provided assistance to formulate the Project. This report is based on the findings of the TA, feasibility studies of the Ningxia Hui Autonomous Region government (NHARG), findings of ADB missions, and discussions with officials and stakeholders. The project design and monitoring framework is in Appendix 1.

A. Performance Indicators and Analysis

3. The PRC has some of the worst land degradation in the world, with more than 40% of its land area, or between 3 million and 4 million square kilometers (km²) adversely affected. The vast western region accounts for 71% of the country's land area and has a population of more than 350 million, including many of the most poor and vulnerable. A strong correlation exists between land degradation and poverty incidence. Although the western region has fewer biodiversity species than the rest of the country, the richness of the endemic species is higher, and a serious threat of species extinction coexists with severe to moderate land degradation in nearly half of its area. The pressures of intensified use and rapid economic growth in recent decades have adversely impacted the quality of most farmland, grassland, forests, wetlands, and mountain areas of the western region. To respond to the increasing threat, the PRC Government (the Government) significantly expanded its programs to combat land degradation under the 9th (1996–2000) and 10th (2001–2005) five-year plans (FYPs), including reforestation, closure and protection of natural forests, grassland improvement, soil and water conservation, biodiversity protection, and renewable rural energy. The Western Development Strategy, adopted in 1999, aims to (i) reduce economic disparities between the western and other regions, and (ii) ensure sustainable natural resource management.

4. Located in the center of the western region, Ningxia is the smallest of the PRC's provinces, with a land area of 66,400 km² and a population of only 5.8 million. It is one of the country's five ethnic minority regions, with approximately 2.1 million Hui, most of whom maintain Muslim traditions. Mostly a dry and desert-like region, it is bordered by the Yinchuan Plain in the north along the Yellow River, which runs for 397 kilometers (km) from the west to the northeast and provides extensive irrigation areas. Semi-arid loess plateau areas in the south and the large Tenger, Ulan Buh, and Mu Us deserts border the northern and eastern parts of Ningxia. Although it has the second smallest provincial gross domestic product, Ningxia's economy grew quickly with annual growth of 10.9% during the 10th FYP, exceeding the national average and supported by the continuing stimulus of the Western Development Strategy. Infrastructure and social indicators improved significantly, and poverty decreased. Urbanization, at 42%, is growing at 9% annually.

¹ ADB. 2005. *Technical Assistance to the People's Republic of China for Preparing the Ningxia Yinchuan Integrated Ecosystem Management Project* (cofinanced by the Global Environment Facility). Manila. The TA is under the Country Programming Framework for the PRC–GEF Partnership on Land Degradation in Dryland Ecosystems.

5. The oasis of the Yinchuan Plain has the best natural resource endowment in Ningxia. The Yellow River flows through it, and it has areas of good soil in the alluvial plain and irrigation canals dating back more than 2,000 years. It is protected from the prevailing winds and large deserts to the north by the Helan Mountains. Wetlands provide an international flyway for birds moving seasonally between north Asia and southern areas of the PRC and beyond. The project area lies in and around this oasis on the western side of the Yellow River, including the piedmont zone and the Helan Mountains, and covers about 3,655 km² including three districts (Jinfeng, Xingqing, and Xixia), two counties (Helan and Yongning), and Yinchuan City. Yinchuan, the capital, is undergoing a building boom, including a new district to support a large new government complex; it is densely settled with a population of 1.14 million.² Poverty incidence is quite low, but the area has pockets of resettled poor migrants (about 74,000) from the southern region of Ningxia. Over time, the quality of the water and land resources has been degraded because of expansion of agriculture onto marginal soils, overgrazing, and industrial and urban pollution, with significant loss of vital ecosystem functions, including loss of habitat for wild species and loss of productive capacity. However, the project area has favorable hydrological characteristics; and major features of the Yellow River pass through it; the area has considerable deep alluvial aquifers in the wetlands and the protected Helan Mountains. These conditions provide the area with resources key to enterprise development in livestock raising, meat and dairy production, higher-value horticulture, and tourism-related industries. A review of the sector analysis is in Appendix 2.

6. NHARG has taken preliminary measures to conserve water, close the Helan Mountains to grazing, promote conservation agriculture, and seek a more comprehensive approach to the root causes of environmental degradation. NHARG's 11th FYP (2006–2010) recognizes the challenge: "The implementation of the 10th FYP was good, but the weak economic status of the NHAR remains. We face problems such as unsustainable growth and lack of integrated development."³ However, economic considerations dominate planning and the target growth rate is more than 10% during the 11th FYP.

B. Analysis of Key Problems and Opportunities

7. The signs and symptoms of land and water degradation, including salinity, desertification, soil erosion, polluted waterways, and lack of vegetative cover on farming areas and grasslands, are widespread throughout the project area. As the population expanded and agricultural, urban, and industrial influences grew, ecosystem degradation and the lack of capacity to control it have become key problems. Contributing factors include the following:

- (i) **Unsuitable agricultural practices.** On good agricultural land, excessive tillage and removal of all crop residues exposes soil to high seasonal winds, loss of soil quality, and high risk of dust storms. Poor rural households have been resettled on marginal lands with lighter soils and low water-holding capacity. Crops grown on these areas require large inputs of water and fertilizers to achieve acceptable

² The project area is 60% urban and 40% rural, with average per capita income of \$919 equivalent in urban areas and \$393 equivalent in rural areas.

³ Ningxia Hui Autonomous Region Government. 2006. The Outline of the 11th Five-Year Plan for the Economic and Social Development of Ningxia Hui Autonomous Region. *Fourth Plenary Session of the 9th Ningxia People's Congress*. Beijing (12 February).

productivity, leading to polluted runoff and widespread salinity.⁴ Increasing demand for cashmere has led to replacing sheep with goats, and overstocking of animals on grasslands.

- (ii) **Uncoordinated water and land management.** Poor management of the lakes and wetlands along the Yellow River has resulted in eutrophied waterways, polluted habitat for aquatic and birdlife, and loss of tourism and recreation potential. Irrigation canals are mostly unlined leading to large losses and inefficient water delivery. Excessive extraction of cheap groundwater for agriculture, industry, and urban uses has led to a lowering of the groundwater table in some areas.
- (iii) **Poor management of natural resources.** Ecosystem elements have been treated in isolation from each other, based on institutional mandates. Land degradation control and ecosystem rehabilitation have emphasized top-down engineering solutions on a sector basis (e.g., programs in forestry, agriculture, and water resources), and have rarely involved the participation of local residents in identifying solutions. Habitat and biodiversity loss from inappropriate land use activities and past poor ecosystem management decisions have resulted.

8. Reversing ecosystem degradation in the project area requires that the root causes be addressed so that rehabilitation measures can be successful. Historically, the Government's programs to combat land degradation have not adequately addressed these basic causes, which include rural poverty, lack of alternative livelihoods that avoid damaging practices, inadequate land tenure arrangements, and lack of rural financial services. Although physical signs of improvement can be seen in some areas (e.g., regrowth of vegetation after closure of the Helan Mountains to grazing), the Government remains concerned about the top-down sector-by-sector approach, lack of coordination within the institutional system to tackle cross-sector issues, high cost, and need to develop sustainable livelihoods for inhabitants of affected areas.⁵ As identified through the work of the ongoing PRC-GEF Partnership on Land Degradation in Dryland Ecosystems,⁶ including in the NHAR, and the work of the TA team (footnote 1), the main barriers to be overcome to address the root causes of land and ecosystem degradation in the project area are (i) improving the quality of the policy and legal and/or regulatory framework to provide a consistent, well-understood, and well-coordinated set of policies, incentive-based measures, and regulations to ensure adequate land tenure and land

⁴ For example, in Ningxia, twice as much water is needed to produce a unit of rice compared to the national average. The intensity of agrochemical use is five times the national average, while crop yield is only half the national average. This has heavily contaminated water for agricultural irrigation. From 1986 to 2000, NHAR had the highest percentage growth in conversion of steppe and/or desert into irrigated cultivated land area of any province and/or region, despite being one of the driest areas in the country. This has led directly to further land degradation as many areas were either unsuitable for cultivation or were overcultivated, contributing to loss of soil health, drier soils, increased exposure to wind erosion, and long-term desertification.

⁵ Evidence of this is provided in two recent evaluation studies, (ADB. 2003. *Technical Assistance to the People's Republic of China for Poverty Reduction in Key Forestry Conservation Programs*. Manila; and ADB. 2003. *Technical Assistance to the People's Republic of China for Poverty Reduction in the Grassland Improvement Program*. Manila), which undertook field surveys covering the Government's major greenside environmental programs in multiple provinces in 2005. Both studies concluded that while some good environmental outcomes were achieved in line with their objectives (e.g., through tree planting and grassland rehabilitation), poverty was not significantly reduced, livelihood development was not achieved, and sustainability of the programs relied on large government subsidies. The studies identified key reforms to be addressed by future programs, including (i) reversing the top-down and centralized approach to planning and implementation, and (ii) increasing the participation of local people.

⁶ ADB. 2002. *People's Republic of China-Global Environment Facility Partnership on Land Degradation in Dryland Ecosystems, Framework Brief*. Manila.

use arrangements; (ii) addressing inconsistencies between sector approaches and area planning, and building institutional capacity to address resource management using an ecosystem approach, especially for upgrading land and water management; (iii) expanding the role of markets to better serve the income needs of the rural population in industries by making more efficient use of land and water; and (iv) linking commercial and conservation values in the future management of ecosystems.

9. The existing policy and legal framework in the NHAR is reasonably clear about the requirements, responsibilities, and working arrangements for all agencies; as well as the targets they are expected to meet and the policies they have to follow. However, with regard to handling more complex multisector issues, such as the control of land degradation, desertification, and biodiversity protection, no effective mechanism is currently in place to ensure cooperation and consultation among sectors, institutions, and agencies. Farmers and the public lack understanding of the role and functions of regulations. Overlapping functions between the agencies and overlapping responsibilities between specific laws, regulations, and policies require urgent reform and actions to meet the complex environmental challenges of the project area.⁷ Substantial efforts and cooperation at all levels are needed to remove the gaps and overlaps in existing environmental policies, laws, and regulations. Local regulations are not fully enforced, land tenure arrangements are often uncertain, and land use rights for rural communities require reform to promote a long-term perspective. Introducing special legislative provisions and supporting policy to enable rural citizens to participate in decision-making procedures for the use and management of the land they use is an important part of this process.

10. NHARG has made a start in addressing some of the problems of land degradation (e.g., through a grazing ban and urban water conservation measures), and now plans a comprehensive integrated ecosystem management (IEM) approach to combat the wider causes of past environmental damage, and to ensure that future resource use is sustainable. This is supported by the preparation of a land degradation strategy and action plan, authored by a multisector NHAR task force. The strategy acknowledges that the existing institutional arrangements are inadequate for a comprehensive approach.⁸ The Lead Group (para. 42) and sector specialists who contributed to this work will have a key role in the management and intellectual leadership of the Project and in ensuring that the IEM approach is institutionalized in the project area. Zoning of land to align land use with ecosystem capacity; analyses of future water demand to balance urban, rural, and environmental uses; provision of access and free sharing between stakeholders of data and information on ecosystem characteristics and trends; and multidisciplinary training to develop greater skills and awareness are all needed. Irrigation system rehabilitation, improved on-farm water delivery and management, reduced agricultural runoff into wetlands, and improved soil quality through the adoption of conservation agriculture are changes NHARG will pursue in the project area.

⁷ Ningxia OP12-Executing Office. November 2006. *Strategy and Action Plan on Combating Land Degradation*, p. 38, notes, for instance, that (i) the Soil Conservation Law mainly focuses on water erosion and soil loss, but it cannot solve the other root problems of land degradation in wider aspects concerning soil heath and the environment; and (ii) the Law on Desertification Prevention and Control mainly focuses on the actions of vegetation reconstruction to solve the problems of wind erosion, but does not address soil salinity, acid rain, soil pollution, soil fertility degradation, and deterioration of soil biological and physical characters, which must also be addressed for a comprehensive solution. Work is under way to address these issues.

⁸ Ningxia OP12-Executing Office (footnote 7). Similar work has been simultaneously prepared in six provinces and/or autonomous regions: Gansu, Inner Mongolia, Ningxia Hui, Qinghai, Shaanxi, and Xinjiang Uygur.

11. Improving rural incomes through agriculture-based livelihoods with greater choices is an important way to reduce poverty and provide an alternative to current unsustainable practices. Of the 450,000 rural residents in the project area, approximately 74,000 have been resettled from the very poor southern areas of Ningxia in six villages, known as poverty communities. Located on marginal lands between the alluvial soils of the Yellow River and the rocky piedmont zone of the Helan Mountains, these villages have a higher vulnerability to poverty than most other rural dwellers, with average per capita income of between the equivalent of \$0.41 and \$0.56 per day. Approximately 73% of the population is Hui minority. Their per capita land availability and grain production is also lower than average. In some rural areas, a transition has commenced away from low-yielding cereals and grazing using traditional practices to higher-value and more resource-efficient industries with lower water demand such as vineyards and wine making, dairy, halal meat products, medicinal herbs, other perennials, and greenhouse-based horticulture. The market analysis shows trends toward increasing consumption of these goods in general, and in niche markets for some of Ningxia's products in particular (e.g., halal market). Commercial enterprises are leading this transition, with processing, marketing, and export experience. The most prominent is the Ningxia State Farm Group (NSFG), which either employs or has commercial links with approximately 45% of the rural population.⁹ NSFG and several other state-owned enterprises have the capacity to expand their operations, and offer a range of market-oriented services and opportunities to the rural community, including the rural poor.

12. The cultural, aesthetic, and wildlife habitat values of the ecosystems in the project area, which offer significant benefits if well protected, have eroded over time. In the past, wetlands were filled in to support agriculture and urban growth; on the remaining water bodies, commercial exploitation took priority over conservation, threatening wildlife, and weakening vital ecosystem functions. These and other tourist venues have not attracted significant numbers of visitors nor has tourism expanded strongly compared with neighboring provinces due to the lower quality of the tourism experience offered. Linking commercial enterprises owned by NSFG and Yinchuan Municipality with conservation objectives offers a good opportunity to inject finance to protect assets of significant value, and to diversify the livelihoods of rural people.

13. **Government Policies and Plans.** The Government's development program is set out in the PRC's 11th FYP (2006–2010). It aims to develop a harmonious society through a science-based and people-centered development approach and continued economic reforms. The plan includes emphasis on resource conservation, environmental protection, cleaner production systems, and increased reliance on ecosystem rehabilitation processes. The western region will receive continued attention to address poverty and regional economic imbalances.

14. **ADB Country Partnership Strategy.** ADB's country partnership strategy (2008–2010) emphasizes continued support to poorer provinces and integrated rural development, and the PRC's contribution to protecting regional and global public goods.¹⁰ The Project supports ADB's strategic concerns to improve the environment and promote balanced and inclusive growth, as set out in the strategy. Project activities are aimed at promoting sustainable rural development with an emphasis on managing ecosystems and addressing rural poverty through livelihood programs.

⁹ NSFG, a part of the Ningxia Agricultural Reclamation Bureau, occupies 78,957 hectares on 9 sites, or about 22% of the project area.

¹⁰ ADB. 2008. *People's Republic of China: Country Partnership Strategy 2008–2010*. Manila.

15. **External Assistance.** To address concerns about the performance of its own programs, and to gain from international experience, the Government entered a strategic partnership with GEF and other international partners to develop and increase comprehensive resource management approaches that integrate the ecological, economic, regulatory, and social dimensions of the land degradation problem. Land degradation severely endangers the PRC's rich biodiversity, especially through human activities, many of which are illegal or poorly managed under the law and destroy natural habitats, especially through land conversion, industrialization, poor management of water resources, and deforestation. ADB's first project under the PRC–GEF Partnership on Land Degradation in Dryland Ecosystems, the Capacity Building to Combat Land Degradation Project,¹¹ is ongoing in six provinces and/or autonomous regions: Gansu, Inner Mongolia, Ningxia Hui, Qinghai, Shaanxi, and Xinjiang Uygur. In Ningxia, a multiagency task force prepared a provincial strategy and action plan for land degradation control using an IEM approach. In addition, a smaller legal, institutional, and policy review team assessed requirements of the legal and policy environment; its findings are incorporated in the strategy.¹² Appendix 2 provides details of the IEM approach, and its use internationally and in the Project.

16. In addition, the World Bank financed nine projects in education, health, infrastructure, and rural development; International Fund for Agricultural Development supported environment and rural development projects; Japan Bank for International Cooperation supported three projects for communications, forestry, and education; United Nations Children's Fund supported projects for a range of social welfare improvements; United Nations Development Programme supported projects for agriculture and water resources; and World Food Programme supported four projects (Appendix 3).

17. **Lessons.** ADB's agriculture, environment, and natural resource development projects in general, and especially in the PRC, indicate the need for stakeholder involvement and community participation in planning and implementation, as well as close coordination among implementing agencies and the private sector. Combating land degradation in the PRC has mostly been through top-down application of sector-by-sector engineering solutions. In the NHAR, the IEM strategy task force assessed this approach to be expensive and lack sustainability. Combating land degradation is effective if delivered as part of a comprehensive poverty reduction framework, particularly in areas where the causality between degradation of fragile ecosystems and poverty incidence is evident. A recent ADB evaluation shows that successful poverty reduction interventions link the poor to economic growth centers, commercial value-adding enterprises, and associated off-farm employment opportunities.¹³ To address the poverty-environment nexus, ADB recently suggested that interventions to improve the productivity of land and other natural resources through irrigation, better management of water, and other environment-related interventions would impact significantly on the poor. Poor farmers typically work on low productive marginal land caused by insufficient moisture or other soil deficiencies and aggravated by changing climate patterns.¹⁴ This closely describes the situation faced by the poverty communities that will be helped by the Project.

¹¹ ADB. 2004. *Technical Assistance to the People's Republic of China for the Capacity Building to Combat Land Degradation Project*. Manila (TA 4357/4358[G]-PRC for \$13.8 million, approved on 29 June, of which GEF provided \$7.7 million as a grant).

¹² Ningxia OP12-Executing Office (footnote 7). The report was prepared by a multidisciplinary team of Chinese academics, sector experts, and NHAR officials.

¹³ ADB. 2006. *Special Evaluation Study on Pathways Out of Rural Poverty and the Effectiveness of Poverty Targeting*. Manila.

¹⁴ ADB. Working Group on Rural Poverty. 2007. *Rural Poverty Reduction and Inclusive Growth Report*. Manila.

18. Based on lessons from dryland experience in industrial societies (e.g., Australia, Canada, and United States), Africa (e.g., Ethiopia, Mali, Niger, Nigeria, and Sudan), PRC, and South America (e.g., El Salvador, Guatemala, Honduras, and Nicaragua); and the experience of dryland research institutions such as the International Center for Agricultural Research in the Dry Areas and the International Crops Research Institute for the Semi-Arid Tropics, GEF and other development partners including the World Bank and leading bilateral agencies have been supporting the PRC to change its approach to combating land degradation. In these countries, from the 1930s onward, bottom-up approaches bringing local farmers and/or graziers, scientists, business, and government agencies together to solve local problems have proved to be successful. Adequate incentives, controls, and financial resources to ensure that environmental functions and services were rehabilitated and maintained are essential. Large areas that were severely degraded have been rehabilitated and are being used for sustainable agriculture and other purposes, yielding higher output and wealth for larger populations than in the past. Community organizations, including farmer and water-user associations, and a clear legal and regulatory framework are featured. Market-based solutions that link rural populations with processors and markets are essential for viable livelihoods.

19. A major international review of lessons on the functioning of dryland ecosystems and the livelihood systems of residents concludes that an integrative, participatory approach that addresses land degradation, poverty, safeguarding biodiversity, and protecting cultural heritage offers a far higher probability of finding sustainable development solutions for the 2.5 billion global dryland residents.¹⁵ The Project will adopt a holistic IEM approach with balanced emphasis on ecosystem conservation and sustainable rural livelihoods. This requires institutional capacity for implementation, especially when new concepts and technologies are introduced. Lessons from similar ADB projects are (i) the provincial government should provide the project management office with adequate financial and staff resources to ensure strong ownership; (ii) a strong lead group is necessary to provide leadership and guidance; (iii) commercial projects should be supported only if an entity exists to financially and managerially back the proposal, and is committed to promoting rural development; (iv) commercial operations should adopt a flexible approach and be sensitive to changes in market demand and prices; and (v) consultants are required to support institutional capacity building of the stakeholders involved, including project management. The Project will exchange information with other projects under the umbrella of the PRC–GEF Partnership on Land Degradation in Dryland Ecosystems.

III. THE PROPOSED PROJECT

A. Impact and Outcome

20. The impact of the Project will be improved environmental management to rehabilitate ecosystems and increase rural incomes in the project area. An increased number of smallholders and poor rural communities will be linked to enterprises in conservation-oriented industries to provide alternatives to current agricultural practices that are damaging to ecosystems. Farmland degradation (e.g., soil quality) and wetland water quality will be improved, and conservation agriculture will be practiced on 35,000 hectares (ha). The wildlife conservation area will be approximately 115,360 ha; and wetland conservation will be practiced on 8,825 ha. Visitors to tourism sites will expand to 1.1 million.

¹⁵ Reynolds, J. et al. 2007. *Global Desertification: Building a Science for Dryland Development*. *Science* 316: 847–851.

21. The Project's outcome is to introduce an IEM approach to provide sustainable livelihoods for the population of the project area. In line with successful experience in the PRC and internationally, a comprehensive approach to address the multidimensional root causes is needed to effectively address ecosystem degradation. The main targets and indicators are (i) demonstration of the IEM approach through policy, regulatory, and institutional reforms; (ii) livelihood improvement for up to 140,000 smallholder farmers, including six poor communities, and increased incomes for 20 enterprises through a transition to higher value and more resource-efficient industries; (iii) reduction of agrochemical and water use per unit of cultivated area; (iv) increase in water allocations for nine major lakes and wetland systems, and less runoff from agriculture; and (v) protection of 15 globally threatened wild species.

22. The Project has four outputs: (i) IEM capacity building and project management, (ii) land and water resource management, (iii) rural livelihood improvement, and (iv) ecosystem conservation.

B. Outputs

1. IEM Capacity Building and Project Management

23. Under this output, an integrated approach to ecosystem management will be developed. Overall project management and IEM capacity building are needed to institutionalize IEM and bring guidance from the Lead Group (para. 42) representing the stakeholder agencies.

24. **IEM Capacity Building.** Three aspects will be covered:

- (i) **Policy, legal, and regulatory frameworks.**¹⁶ To enable implementation of an IEM approach, the Project will establish (a) IEM principles, including coordination and public participation; (b) water resource zoning; (c) spatial planning for land and water use regulations according to ecosystem capability; (d) creation and management of the Helan piedmont conservation management area (HPCMA); (e) control of pesticide and fertilizer usage to reduce nonpoint source pollution; (f) a water pricing mechanism to support water trading in Ningxia; (g) management of wetlands; (h) revenue-sharing arrangements for enterprises operating cultural or tourism sites; (i) contractual farming arrangements for smallholder farmers; and (j) legal recognition of rural farmer and water-user associations, including contract services. With the assistance of specialist consultants, NHARG staff will prepare the necessary policy papers, draft laws, and regulations for NHARG approval. These provisions will either be incorporated in the proposed regulations currently being drafted by NHARG for wetland management and the new implementation provisions for the Water Law (2002), or incorporated in an IEM policy to be issued by NHARG for the project area. The IEM policy will be followed, in the later stages of the Project, by comprehensive IEM regulations that incorporate the main principles of the IEM policy and lessons from project implementation.

¹⁶ The Project's work will complement and build from the Ningxia-wide policy and regulatory framework reforms that commenced under the TA for Capacity Building to Combat Land Degradation Project (footnote 11). Improved land tenure and water rights arrangements for rural households are among the benefits from the proposed reforms.

- (ii) **Training and capacity building.** Increased coordination and integration will be developed through cross-sector planning sessions, and design and implementation of an IEM demonstration area. Training and study tours will be provided to build institutional capacity, develop skills, and provide vocational training in the rural community. Based on a training needs assessment, specialist consultants and qualified training institutions will deliver the training.¹⁷ Training consultants will develop short-term domestic training courses and materials. Awareness building study tours will expose senior and midlevel managers to IEM concepts and applications. Overall, 35 people will be included in study tours over 4 years. A total of 76 stakeholder representatives will visit various programs and approaches throughout the PRC, including other IEM projects.¹⁸
- (iii) **Information systems and monitoring.** The Project will support development of the operating capacity of the NHARG IEM information center. All agencies represented in the provincial project management office (PPMO) and Lead Group will have access to ecosystem-relevant data through a signed data-sharing agreement. The public will have free access to the data through a web-based portal; 13 agencies signed an agreement to freely exchange data in April 2007. The ongoing monitoring and evaluation methods being developed under the Capacity Building to Combat Land Degradation Project will be used. Agreements to ensure use and analysis of data from service providers including the Ningxia Remote Sensing Center, Land Degradation Data Center, and Ningxia University, will be signed.

25. **Project Management.** The PPMO has been established under the Foreign Debt Management Office within the Ningxia Finance Department (NFD), and will be fully staffed once the Project is approved. The PPMO provides the office for the Lead Group and will be responsible for overall project implementation including overall planning, coordination of work plans, financial management, technical support, stakeholder agency coordination, and reporting. It will be responsible for implementing some project activities including (i) IEM institutional strengthening, including preparation of the HPCMA management plan; and (ii) IEM demonstration and, through the concerned stakeholder agencies, coordinating arrangements to demonstrate new technologies for land management using conservation agriculture. The Project will provide salaries and operating costs for the PPMO, including sector staff and a group of 10 technical experts. Training will be provided in procurement, financial management, disbursement, work planning, and reporting.

¹⁷ Training providers will be leading universities and technical, research, and/or extension institutes in the PRC, NHAR, and the Asia and Pacific region. A list of training courses has been agreed, including natural resource management, conservation, economic valuation of resources and ecosystems, market-based resource management, ecological development and business, poverty and linkages to land degradation, water use efficiency, land use and spatial planning, ecosystem zoning, management objectives, management regulations, conservation agriculture, tourism planning, information and data management systems, natural resource policy, law and regulations, contract farming, market chains and value addition, and community and participatory natural resource management.

¹⁸ Possible destinations include wetland management and conservation-based tourism (Hong Kong); ecological management of land and natural resources (Qinghai); fodder, silage, and livestock production systems (Inner Mongolia and Heilongjiang); conservation agriculture in dryland agriculture (Beijing district); and the World Bank-financed Gansu and Xinjiang Pastoral Development Project, and Loess Plateau Watershed Rehabilitation Project.

2. Land and Water Resource Management

26. Under this output, the Project will establish area planning and build institutional capacity to address resource management on an ecosystem basis. Interventions include (i) integrated water resource planning and spatial planning; (ii) conservation agriculture demonstrations, farmer field schools, and fertilizer management demonstrations; and (iii) improvement of water resource efficiency for 15,000 farmers.

27. **Integrated Water Resource Management Plan (IWRMP) and Spatial Planning.** NHARG (through the Ningxia Water Resource Department [NWRD] and assisted by consultants) will prepare an IWRMP within the first 2 years of the Project. This will assist in balancing demand and availability of water (surface and groundwater) and the potential reuse of water, in accordance with a long-term water conservation strategy. The IWRMP will establish the policy and guide water investment. It will be updated as new data becomes available. A spatial planning framework will be developed and implemented under the leadership of the PPMO, which will work with stakeholders to define management objectives, management zones, environmentally sensitive areas, conservation areas, land use options, and programs needed to achieve these. The process will involve local participation, field assessments, and coordination between sectors.

28. **Conservation Agriculture Demonstrations and Fertilizer Management Demonstrations.** Demonstrations of conservation agriculture for smallholders will be undertaken at three sites including crop residue mulching, minimum tillage, crop rotations, and improved pest and plant nutrient management.¹⁹ Work will build on existing Ningxia Agricultural Reclamation Bureau (NARB) demonstrations to increase the adoption of conservation agriculture outside the NSFG areas. The Project will train trainers and then work through existing farmer associations and rural cooperatives. The farmer associations will have linkages to machinery cooperatives and NSFG, to enable smallholders to access the necessary farm equipment. An action research program will apply site-specific nitrogen management and the economic use of fertilizer within the catchment of Shahu Lake. A nitrogen balance model will be developed to define nitrogen crop demand, identify fertilizer placement technologies, and introduce nitrogen stripping practices through reed-bed management. Soil and water testing will be included within an intensive monitoring program that involves land users and farmer field schools.

29. **Water Resource Efficiency.** The Project will support design and construction of part of Xixia Canal, including 15.1 km of inverted siphon past the protected area for Xixia tombs, 16 km of the main canal, control and monitoring stations, 21.3 km of new secondary canals, 118 km of secondary canals to be lined, and lining of 632 km of laterals and on-farm distribution. Xixia Canal will be extended (31.1 km) to replace the current low-efficiency Xigan Canal, and will serve a 15,546 ha irrigation area. The increased efficiency will enable water to be transferred to the Yinchuan wetlands, plus support livelihood development, including for poor communities. The current irrigation area will be rehabilitated to ensure efficient water distribution through canal lining, laser leveling, and conversion to gravity-fed irrigation. To strengthen irrigation management, the Project will use water scheduling, monitoring, and shorter return periods to reverse overwatering and salinization risks. Water user groups in the area will be supported.

¹⁹ The three sites are (i) Zhengshaqu village in Yongning County (for spring corn trials), (ii) Tongchang village in Helan County (trials for intercropping of winter wheat and silage), and (iii) Xiaodianzi village of Pingluo County (trials for spring wheat and corn). This last site is related to the nitrogen management trials at Shahu Lake.

3. Rural Livelihood Improvement

30. The Project will develop and implement sustainable livelihood programs in the project area.²⁰ Expanding the role of markets to improve rural incomes in industries that make more efficient use of land and water is a vital part of the strategy to reduce ecosystem degradation. Through NARB, Yinchuan Municipality, and Ningxia Administration Bureau, the Project will support demonstrations of the Government's policy of industry supporting rural smallholders and city to support rural as foreshadowed in the new socialist countryside policies of the 11th FYP. The Project will support enterprises that link with smallholder producers and adopt more benign land use systems in higher value markets.

31. Under NARB, beef, dairy, and higher value horticultural production will be expanded involving up to 8,325 households: (i) The existing beef herd will be expanded and a halal-certified beef slaughterhouse built. The genetic quality of the central breeding herd will be upgraded, and through artificial insemination services, the quality of smallholder animals will be improved, along with a beef finishing feedlot, and smallholder beef breeding and rearing units. (ii) The existing dairy herd on Pingjipu State Farm will be split into five herds and the state farm will provide cooperative milking platforms with breeding and technical support services to provide milk to an existing milk processing plant. All livestock operations will involve the conversion to perennial fodder production systems requiring less water and soil disturbance. (iii) Up to 670 ha of existing flood-irrigated land will be converted to small contract viticulture to supply a processing facility, and market through the existing local and national distribution network. The viticulture will use cover crops and water-saving irrigation technologies to increase the sustainability of land use. These enterprises will adopt biogas, biofertilizer, and water-recycling technology.

32. In Yinchuan Municipality, the Project will address sustainable land management and poverty reduction through production systems for up to 9,800 households, including perennial crops. Water and agrochemical use will be reduced compared to current practices. Vocational and technical training will be provided for up to 3,000 individuals, including through NHARG's ongoing programs. Based on past research into alternative cropping and irrigation systems on fragile soils on the margin of the piedmont zone, land currently cropped by poor households will be converted into sustainable systems where crops and soil types are more appropriately matched.²¹

33. Under Ningxia Administrative Bureau's existing state-owned enterprise, the Project will support development of a pilot district involving perennial crops such as Chinese dates (jujube) and alfalfa along with a beef feedlot, contract fodder, and livestock production systems for resettled smallholders in poverty villages. Up to 4,680 households will be involved with intensive household production systems for livestock, fodder, passive solar housing, and greenhouse production. The enterprise will develop its plant propagation business and infrastructure, and provide processing and market distribution services to smallholders. Vocational training will be provided to give local people new skills to enable them to better compete for off-farm employment.²²

²⁰ The sustainable livelihoods approach of the Department for International Development was used in the design of the Project.

²¹ These activities are also called Yinxi alternative livelihoods.

²² These activities are also called high technology and ecological agriculture.

4. Ecosystem Conservation

34. This output is designed to address the threats of further conversion and degradation of habitat, and promote biodiversity conservation. It covers (i) Shahu and Yuehai lakes, (ii) Helan Mountains Nature Reserve and its extension into the piedmont zone, (iii) Yinchuan wetlands, and (iv) Yinxi wetlands. At these sites, commercial tourism will be balanced with ecosystem conservation, habitats for wild species, and preservation of cultural heritage sites and values.

35. The incorporation of conservation values will enable future sustainable use and build public awareness of wetland functions, conservation, and habitats. On NSFG-managed wetlands at Shahu Lake, activities will cover revegetation, galleries, viewing platforms to see wild birds, aquaculture, and tourist accommodation with wastewater treatment and a scientific education center. At Yuehai Lake, activities will include aquatic plants for commercial use, a processing plant for aquatic vegetarian food, ecological rehabilitation, water supply and/or heating, and greening of wetland landscapes.

36. On three sites managed by Yinchuan Municipality, conservation values will be incorporated into commercial tourism to rehabilitate and protect ecosystem services and functions, protect wildlife, and enhance the quality of tourism experiences: (i) An extended conservation management zone that unifies the current Helan Mountains Nature Reserve with 53,150 ha of the piedmont zone will be set up as the HPCMA and managed for a biodiversity habitat. Fencing and patrolling west of the new Xixia Canal will prevent illegal grazing, antiquity collection, and poachers. An IEM ecological restoration demonstration center and support for biodiversity conservation will emphasize the management of local endangered species and tourism impacts. An integrated ecotourism management plan will be prepared. (ii) At the Yinchuan wetlands, management planning and monitoring will be accompanied with rehabilitation of vegetation and management of wetland parks for recreation and sustainable use of wetland resources. The current public awareness programs will be upgraded and investments made in water quality management, including water treatment. The Project will support the existing Mingcui training center to build capacity of staff of wetland management agencies. (iii) At the Yinxi wetlands, a program to conserve residual habitats and improve the quality of the wetlands will be introduced including restoration of 8,000 ha of natural grassland and protection of linked wetlands on each side of Xigan Canal with waterfowl habitat.

5. GEF-Financed Project Activities

37. GEF joint cofinancing will support a multifocal approach to conserving biodiversity and combating land degradation.²³ The GEF-financed activities will ensure that the IEM approach is followed to contribute to restoring the productive and protective functions of ecosystem resources. An IEM approach will be followed for the protection of resident and migratory species and their grassland and wetland habitats; as well as for building the institutional and regulatory capacity to rehabilitate, sustainably manage, and protect the ecosystems. GEF will finance complementary activities in each of the four outputs to ensure that incremental global environmental benefits above the baseline investment are achieved. For output 1, GEF will

²³ GEF operations programs 1, 2, 3, and 4 cover biodiversity conservation in arid and semi-arid regions, freshwater ecosystems, forest ecosystems, and mountain ecosystems; whereas operations program 15 covers sustainable land management. Combined, these programs will support an IEM approach under the Project. Following changes in GEF's financial arrangements, OP12 for IEM no longer provides project financing. The GEF project proposal was considered at the intercessional council meeting in July 2007. However, following the deletion of the subcomponents relating to Xixia Tombs, Helankou Rock Drawings, and Jiangjun House, which involved a revision of GEF's financing for the Project, the proposal was resubmitted to the GEF Council in March 2008. NHARG is aware that alternative grant cofinancing will not likely be available if the GEF grant is not approved.

support institutional reform and capacity strengthening, reflecting the demonstration value to the NHAR and the PRC. GEF will support equipment costs and training for project management and consulting services related to the introduction of improved natural resource management, conservation agriculture, wildlife conservation, study tours, and international and national postgraduate studies. For output 2, GEF will finance the IWRMP and spatial planning processes, conservation agriculture demonstration sites, farmer training program, and fertilizer management demonstrations reflecting the impact this is expected to have on aquatic biodiversity, wetland habitat functions, and migratory wildlife. For output 3, GEF will support training of local communities in appropriate land use technologies, vocational training, integrated planning systems, and development of conservation and public education programs. For output 4, GEF will support the establishment of the HPCMA and the capacity of staff to manage endangered species; biodiversity habitat protection and restoration planting programs for the Yinxi wetlands; and biodiversity conservation management programs including protection, bird observation hides and boundary demarcation, and wetland training programs.

C. Special Features

38. The Project is under the PRC–GEF Partnership on Land Degradation in Dryland Ecosystems (footnote 6). It is governed by a country programming framework approved by the GEF Council at its Beijing meeting in October 2002. The framework covers a programmatic approach over 10 years (2003–2012) and seeks to combat land degradation, reduce poverty, and conserve biodiversity through capacity-building investments and development of viable model IEM demonstration investment projects.²⁴ As a comprehensive demonstration investment under the PRC–GEF partnership, the Project is linked to a network in the PRC, involving 11 government agencies; six provinces and/or regions; policy, legal, regulatory, and institutional reforms; participatory processes; and development partner cooperation. It is part of a planned long-term programmatic approach, and will provide and gain feedback and information from other parts of the PRC. The IEM approach is well grounded in international experience of successful dryland rehabilitation and in some bilateral assistance projects in the PRC. It is highly relevant to the new socialist countryside policies for rural regeneration under the 11th FYP. The ongoing Capacity Building to Combat Land Degradation Project has sensitized the Government to IEM. The proceedings of an international workshop on IEM endorsed this approach for the PRC,²⁵ and the case for integrative approaches for the world's drylands is strongly supported by a recent scientific review of worldwide evidence from the 1930s onward (footnote 15).

39. The project area includes 68% of the vertebrate species and 42% of vascular plants in the NHAR, with the alluvial plain of the Yellow River system being its most important zone. Fifteen globally threatened species exist, of which nine are permanent residents and six are migratory birds. GEF will support the protection of these globally threatened species and their habitats, and build institutional capacity to rehabilitate and sustainably manage the ecosystems in the project area.

²⁴ The initial focus (2003–2005) was on six provinces and/or autonomous regions in the western region that are national priority areas and of global significance for land degradation control and biodiversity preservation: Gansu, Inner Mongolia, Ningxia Hui, Qinghai, Shaanxi, and Xinjiang Uygur with a population of about 120 million. Eleven central government agencies are involved: Legislative Office of the State Council, Ministry of Agriculture, Ministry of Finance, Ministry of Land and Resources, Ministry of Science and Technology, Ministry of Water Resources, National Development and Reform Commission, Poverty Alleviation Office of the State Council, State Environmental Protection Agency, State Forestry Administration, and Working Committee for Legislation of the National People's Congress. During 2006–2012, the entire western region will be eligible.

²⁵ Jiang, Z. 2006. *Integrated Ecosystem Management: Proceedings of an International Workshop*. Beijing: Forestry Publishing House (published in Chinese and English).

D. Project Investment Plan

40. The project investment cost is estimated at \$221.0 million equivalent, including taxes and duties of \$4.2 million (Table 1).²⁶ A summary of cost estimates by expenditure category and by financier is given in Appendix 4, while detailed project costs are given in Supplementary Appendix A.

Table 1: Project Investment Plan
(\$ million)

Item	Amount ^a
A. Base Costs^b	
1. IEM Capacity Building and Project Management	9.3
2. Land and Water Resource Management	40.5
3. Rural Livelihood Improvement	100.8
4. Ecosystem Conservation and Tourism	27.6
Subtotal (A)	178.0
B. Contingencies^c	32.5
C. Financing Charges during Implementation^d	10.5
Total (A+B+C)	221.0

IEM = integrated ecosystem management.

^a In 2007 prices.

^b Includes taxes and duties of \$4.2 million.

^c Physical contingencies computed at 10% for civil works, and from 2% to 6% for equipment, vehicles, materials, and training. Price contingencies computed at 6.8% for 2008, 0.7% for 2009, 1.4% for 2010, 0.45% for 2011, and 0.5% thereafter for foreign costs; and 5.5% for 2008 and 5.0% thereafter for local currency costs.

^d Includes commitment charges of 0.15% and interest during construction computed at the 5-year forward London interbank offered rate, with a spread of 0.2%.

Source: Asian Development Bank estimates.

E. Financing Plan

41. The Government has requested a loan of \$100,000,000 from ADB's ordinary capital resources to help finance the Project. The loan will have a term of 25 years, including a grace period of 5 years, an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per annum, and such other terms and conditions as set forth in the draft Loan and Project Agreements. The Government has provided ADB with (i) the reasons for its decision to borrow under ADB's LIBOR-based lending facility on the basis of these terms and conditions, and (ii) an undertaking that these choices were its own independent decision and not made in reliance on any advice or communication from ADB. In addition to the ADB loan, which will finance 45.2% of total costs, a grant of \$4.545 million from GEF will finance 2.1% of project costs. The Borrower of the loan will be the PRC. The ADB loan proceeds will be made available to NHARG, which will onlend part of the loan proceeds to NARB and Yinchuan municipal government (subborrowers). The onlending will be on the same financial terms and conditions as those of the ADB loan, with NHARG and the subborrowers bearing the exchange rate and interest rate variation risks, and performing the obligations applicable in the Project Agreement, which will be made an integral part of the onlending agreements. The financing plan in Table 2 provides details of the project implementing agencies (PIAs), including the subborrowers, which will be responsible for providing the counterpart funds for the Project.

²⁶ The final amounts of the ADB loan and GEF grant were agreed following appraisal in 2007.

Table 2: Financing Plan
(\$ million)

Source	Total	%
A. Asian Development Bank	100.0	45.2
B. Global Environment Facility^a	4.5	2.1
C. Government		
1. Ningxia Hui Autonomous Region Finance Department	8.8	4.0
2. Ningxia Administration Bureau	12.3	5.5
3. Ningxia Agricultural Reclamation Bureau	33.1	15.0
4. Ningxia Water Resources Department	37.6	17.0
5. Yinchuan Municipality	24.7	11.2
Subtotal (C)	116.5	52.7
Total (A+B+C)	221.0	100.0

^a Subject to Global Environment Facility approval.
Source: Asian Development Bank estimates.

F. Implementation Arrangements

1. Project Management

42. NHARG, acting through NFD, will be the Executing Agency responsible for overall implementation of the Project. NFD has already formed the Lead Group, which will ensure coordination across sectors and provide an important decision-making role for key project plans, strategic decisions, and policy issues. NFD has also established the PPMO and assigned core office staff members. The project organization chart is in Appendix 5. NFD will ensure that the PPMO is provided with an adequate number of full-time staff members and be the coordinating point for project implementation. Development of IEM capacity will be undertaken through the PPMO, which was formed to provide coordination and leadership in IEM approaches, and will involve all stakeholder agencies. ADB will provide training on project administration and familiarization with ADB's policies and procedures.

43. The PIAs, including Ningxia Administrative Bureau, NARB, NWRD, and Yinchuan Municipality, will be the coordinating bodies for implementation as each will use a range of state-owned enterprises, and state-sponsored and public sector bureaus as project implementation units (PIUs) to implement the subprojects. Twelve PIUs, as well as the PPMO, will implement the 23 subprojects. The implementation capacity of the PIUs was assessed.

2. Implementation Period

44. The Project will be implemented over 6 years from November 2008 to October 2014. The project implementation schedule is in Appendix 6.

3. Procurement

45. Goods, related services, and civil works financed partly or wholly by ADB and GEF will be procured in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time) and the procurement plan described in Appendix 7, which will be reviewed and updated on an annual basis. Contract packages for goods and related services exceeding \$1,000,000 will be awarded on the basis of international competitive bidding or limited international bidding, while those costing between \$100,000 and \$1 million will be awarded through national competitive bidding. Contracts below \$100,000 will be procured through shopping. For contracts

below \$10,000, direct contracting can be used. Civil works contracts costing more than \$10 million will be procured using international competitive bidding, while those valued at the equivalent of \$10 million or less can be procured using national competitive bidding procedures acceptable to ADB. Small-scale works and contracts in rural areas may be awarded using community participation procedures. The selection of suppliers and/or contractors and award of contracts will be subject to ADB approval.²⁷ The relevant sections of ADB's *Anticorruption Policy* (1998, as amended to date) will be included in all procurement documents and contracts. A procurement plan setting out an indicative list of all procurement packages and the procurement methods is provided in Appendix 7.

46. Three PPMO staff will be assigned procurement management activities, including monitoring of the procurement plan and coordinating procurement activities under the Project. Measures to strengthen the capacity of PPMO staff in undertaking procurement activities will be implemented, including the engagement of project management consultants, financed by the GEF grant, to provide training on procurement and other aspects of project implementation. PPMO staff will be nominated to attend ADB-sponsored courses and seminars on procurement and project implementation. NFD will appoint a procurement agent to help with procurement and to ensure compliance with ADB policies and procedures, on terms and conditions satisfactory to ADB.

4. Consulting Services

47. The Project will finance three consulting packages. Package A, financed by the GEF grant, will comprise 4 international and 7 national person-months of individual consultants to strengthen the project management capabilities of the PPMO. ADB will be responsible for the selection with concurrence of NHARG and the PPMO for contract negotiations and contract management. Package B, financed under the GEF grant, will comprise a team of 12 international and 77 national person-months to provide technical specialists. In selecting the firm, the quality- and cost-based selection method, with a quality-cost weighing of 80:20, will be used and short-listed firms will be required to submit simplified technical proposals. The PPMO will be responsible for the selection, contract negotiations, and contract management. Package C, financed under the loan, will comprise 11 international and 16 national person-months of individual consulting services in the field of water resource management to be financed directly from the loan. Individual consultant selection will be applied. The PPMO will be responsible for the selection, contract negotiations, and contract management. A summary of all consulting packages is included in Appendix 8. All recruitment will follow ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time).

5. Advance Procurement and Retroactive Financing

48. NHARG requested and ADB approved a provision for advance contracting for consulting services. NHARG also requested retroactive financing for civil works, equipment, and services; setting out the details in a written request to ADB. ADB advised NHARG that retroactive financing could only apply to up to 20% of the ADB loan in respect of expenditures incurred not earlier than 12 months before the signing of the Loan Agreement. Further, all contracts proposed for retroactive financing will be undertaken in accordance with ADB's *Procurement Guidelines*. Advance action will be undertaken in accordance with ADB's *Guidelines on the Use of Consultants* and *Procurement Guidelines*. The Government and NHARG were advised that

²⁷ ADB will require the PPMO to use ADB-approved standard bidding documents to ensure high quality and consistency, and to facilitate ADB review. This is reflected in the project administration memorandum.

approval of the advance action and retroactive financing does not commit ADB to finance the Project.

6. Anticorruption Policy

49. ADB's *Anticorruption Policy* (1998, as amended to date) was explained to and discussed with NHARG, NFD, and the PIAs. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the Project. To support these efforts, relevant provisions of ADB's *Anticorruption Policy* are included in the loan regulations and the bidding documents for the Project. In particular, all contracts financed by ADB and GEF in connection with the Project shall include provisions specifying the right of ADB to audit and examine the records and accounts of the Executing Agency; PIAs; and all contractors, suppliers, consultants, and other service providers as they relate to the Project. The project design and implementation arrangements provide for mitigating corruption risks. Risks associated with project management, including procurement and disbursement, will be mitigated by (i) engaging an international consultant and a national consultant to advise and assist in procuring goods and services, and engaging other consultants; (ii) introducing a dual signing system requiring the civil works contractor awarded the contract to sign an anticorruption contract with the employer; and (iii) requiring periodic inspection by the PPMO of the contractor's activities related to fund withdrawals and settlements.

7. Disbursement Arrangements

50. The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2007, as amended from time to time). Since many of the payments will be made for large contracts, direct payment, reimbursement, and commitment procedures will be used to withdraw funds from the loan account. To expedite the flow of funds and simplify document processing, the statement of expenditure procedure may be used to reimburse eligible expenditures for any individual payment not exceeding \$100,000. The payments exceeding the statement of expenditure ceiling will be reimbursed based on a full documentation process. Before disbursement for any activity, the Government will have certified to ADB that the onlending agreement, which will include the terms and conditions required under the Loan Agreement, has been duly executed and delivered on behalf of NHARG and the subborrowers, and is fully effective and binding upon the parties in accordance with its terms. GEF grant funds will be channeled through ADB. To expedite the disbursement of the loan and GEF grant proceeds, the Government will set up two imprest accounts, one for the loan proceeds and one for the GEF grant, in a commercial bank acceptable to ADB. Disbursements from the imprest accounts will be supported by an appropriate withdrawal application and related documentation. The initial amounts to be deposited in each imprest account will not exceed the estimated expenditures for the next 6 months or 10%, respectively, of the loan amount and GEF grant, whichever is lower.

51. The PPMO requires additional capacity and experience to deal efficiently with the operation and withdrawal procedures necessary for the operation of the imprest accounts. Accordingly, assistance and training will be provided so that PPMO staff can expedite loan and GEF grant disbursements. An assessment of the financial management capability of NFD and the PIAs and the specific arrangements for managing the project funds are provided in Supplementary Appendix H.

8. Accounting, Auditing, and Reporting

52. All agencies involved in project implementation will maintain records and accounts that identify goods and services from loan proceeds and the GEF grant, financing resources received, expenditures incurred, and use of local funds. These records and accounts will be established and maintained in accordance with sound accounting principles and internationally accepted accounting standards, and with the PRC's Accounting Law. The PPMO will review and consolidate these accounts and have them audited annually in accordance with sound accounting practices by the sovereign audit agency of NHARG or other auditors acceptable to ADB. The audits will be carried out in accordance with the regulations for auditing approved by the State Council and ADB. The audit report will include a statement verifying whether or not the funds disbursed by ADB were used for the purposes for which they were provided, as well as a separate auditor's opinion on the use of the imprest account and statement of expenditures procedures. The PPMO will submit copies of the audited accounts and auditor's report to ADB within 6 months after the end of each financial year. The PPMO will prepare consolidated semiannual reports indicating progress made, problems encountered during the period, steps taken or proposed to remedy the problems, proposed program of activities, and progress expected for the next 6 months. Both the loan and GEF grant will be covered in these reports. Within 6 months of physical completion of the Project, the PPMO will submit a completion report to ADB describing achievements in relation to the Project's expected impact, outcome, and outputs.

9. Project Performance Monitoring and Evaluation

53. To monitor the progress of the Project in achieving the expected outcome and outputs, the PPMO will establish and maintain a project performance management system (PPMS) designed to permit adequate flexibility to adopt remedial action regarding project design, schedules, activities, and development impacts. The PPMS will adopt the following agreed indicators (i) project progress, (ii) enabled framework improvements (harmonization of policies and regulations, and clear institutional mandates), (iii) results of capacity development, (iv) IEM capacity-building performance, (v) progress toward demonstration and field targets, (vi) environment improvements, and (vii) related social impacts of the Project. At project inception, the PPMO, in consultation with each subborrower and with the assistance of the consultants, will develop comprehensive PPMS procedures to establish baseline values and systematically generate data on inputs and outputs of the project activities; and the socioeconomic, agricultural, and environmental indicators to measure project impacts.

54. The PPMO will refine the PPMS framework, confirm achievable targets, firm up monitoring and recording arrangements, and establish systems and procedures no later than 6 months after commencing project implementation. The PIAs will report baseline and progress data at the requisite time intervals to the PPMO, including annual reporting on the environmental management plan (EMP). The PPMO will be responsible for analyzing and consolidating the reported data through its management information system, and reporting the outcome to ADB through semiannual progress reports.

10. Project Review

55. In addition to regular monitoring reports, project performance will be reviewed twice per year for the first 3 years and once a year thereafter, jointly by ADB and NHARG. The review will (i) assess implementation performance and achievement of progress toward project outcomes and outputs, and financial progress, (ii) identify issues and constraints affecting implementation, and (iii) work out a time-bound action plan for their resolution. ADB and the Government will undertake a midterm review to assess implementation status and take appropriate measures including modification of scope and implementation arrangements, and reallocation of loan and grant proceeds, as appropriate, to achieve the Project's expected impact.

IV. PROJECT BENEFITS, IMPACTS, ASSUMPTIONS, AND RISKS

A. Benefits and Impacts

56. The Project's strategy for achieving benefits and impacts has four aspects: (i) building on the success of commercial and state-owned enterprises (mostly within the NSFG group) and their links to local, national, and international markets and supply chains; (ii) investment and institutional links between these enterprises and poor and marginalized smallholders who do not have market opportunities and whose basic needs result in degradation of the environment; (iii) support for programs that provide skills for the rural labor force thus enabling surplus labor to move into nonfarm work; and (iv) development of plans and institutions to support the transition from a predominantly rural society to an urban and industrial society, and the changing demands on land and ecological services. The transition from traditional low-yielding and polluting agricultural practices used to produce grains to cleaner and more resource-efficient industries such as greenhouse-based horticulture, vineyards and winemaking, other perennial crops; livestock products; and medicinal herbs for higher-value and export markets has already begun, as has tourism. The Project will support this transition. Conservation agriculture has commenced and will be significantly expanded under the Project. NHARG is keen to use the Project to demonstrate that the environment can be rehabilitated in ways that will bring income benefits to rural people and ensure the effective conservation of ecosystem services, functions, and values for future generations. The Project's water resources and livelihood improvement components will directly benefit some 10% of the land and up to an estimated 46,400 households or 32% of the rural population in the project area. Improved protection and conservation management and conservation agriculture will be practiced on 35,000 ha of wetlands, in the Helan Nature Reserve, and on 124,195 ha of the piedmont.

57. The Project will have a positive impact on rural livelihoods through added income to individual rural households from increased annual production of milk (23,800 tons); beef (6,760 tons); wine (5,000 tons); Chinese dates (14,000 tons); wolfberry (2,250 tons); grapes and other fruits (more than 30,000 tons); fodder (48,000 tons); and production of vegetables, mushrooms, medicinal herbs, and cut flowers. Rural households and the previously resettled poor communities will gain production and supply contracts, with greater certainty of land tenure and irrigation services through contracts with enterprises in the case of beef, dairy, perennial crops, and ecological agriculture.

58. Project activities will enhance the environment and improve the habitats of Shahu Lake, Yuehai Lake, and Yinchuan City wetlands; and lead to increased visitor numbers and revenues. Biodiversity conservation benefits will accrue through restored habitat and protection for wild plants and animals, including 15 globally threatened species of birds, mammals, and the Chinese softshell turtle.

1. Financial Analysis

59. Separate financial analysis was carried out for 11 activities. For the remaining 12 activities, costs were estimated but direct benefits were not quantified. Financial indicators were estimated for 10 activities, with financial internal rates of return above the weighted average cost of capital calculated for 9 of them. This indicated their financial viability.²⁸ The financial internal rate of return for the Yinchuan City wetlands was only 0.7%, but this is regarded as a valuable public good by Yinchuan Municipality, which will provide financial subsidies to ensure sustainability. No financial internal rate of return was estimated for the overall Project.

60. Rural livelihood improvement will significantly impact the incomes of most participating households. A range of activities is included to increase household incomes by between CNY2,537 and CNY37,200 per year.²⁹ About 10,000 of households expected to participate in the Project are currently classified as poor and additional income from project-related activities is expected to raise these households out of poverty. Estimated household incremental incomes are above the poverty line (CNY1,000 per capita per year in Yinchuan Municipality); these exclude beef production, which is a secondary activity in household farming and so does not represent the full household income. Details on the financial analyses are in Appendix 9.

2. Economic Analysis

61. Economic analysis was carried out for 10 activities and the Project. Six are concerned with agricultural production, with benefits primarily in the form of increased crop or livestock outputs, and five are wetlands or cultural sites for which measurable benefits are increases in visitor numbers and tourism-related revenues. Benefit estimates are based on data capturing the current situation and on conservative assessments of future scenarios with the Project in place. With- and without-project scenarios are identified. In the project scenarios, particularly for agriculture, ongoing damaging practices that lead to ecosystem degradation mean that current production will likely only be maintained with increasing inputs and costs in the future. Declining returns are likely in the absence of the Project, but these are not included in the without-project assumptions. This suggests that for agriculture, project benefits are likely to be underestimated. In addition to the quantified benefits included in the project financial and economic analyses, environmental, ecosystem, cultural, and heritage benefits will be generated.

62. The economic internal rate of return for the whole Project, including all 23 activities, is estimated at 14.4% and the net present value at CNY198.6 million. The economic internal rates of return for the 10 activities for agriculture and wetlands vary widely, although most are in the range of 13%–17%. The highest economic internal rates of return are for horticultural viticulture (44.2%) and Yuehai Lake (39.1%) subprojects. Yinxi alternative livelihood is 11.3%, but has the greatest poverty reduction impact so is justifiable on that basis. The Yinchuan City wetlands investment is justified on the basis of environmental protection benefits, including its role in supporting a unique and permanent collection of indigenous plants in the botanical garden. Details on the economic analyses are in Appendix 9.

²⁸ The weighted average cost of capital is 4.0%.

²⁹ These estimates assume no opportunity cost for household labor applied in project-related activities.

3. Sustainability

63. The Project's overall sustainability will be assisted by investments to either generate large revenue streams to support ongoing operations or count on the support of NHARG agencies that are strongly committed to project success should revenue shortfalls occur. Ongoing fiscal implications for NHARG will be limited. Thirty-five percent of project investments will be made by experienced commercial enterprises that are fully responsible for the financial operation of the investment. NWRD will fund 18% of investments in the water resource area using water fees to cover ongoing operation and maintenance costs. Yinxi alternative livelihoods accounts for 26% of project investments and will incur low ongoing costs since new crops established under the Project will be operated by individual households.

B. Social and Environmental Dimensions

1. Social Benefits and Poverty

64. The Project targets rural poor communities and large numbers of rural smallholders in an ethnic minority region. Of the 74,000 previously resettled people from the very poor southern area of Ningxia, approximately 73% are Hui Muslims. They reside in four of six resettlement townships: Liangtian, Minning, Naliangtaizi, and Xinjiang. From the livelihood survey completed during the TA (footnote 1), the communities are poor and have low economic development due to low education, especially among women; access to poor quality land with high irrigation costs; and heavy reliance on off-farm income. Project design has specifically included contract farming, processing, and alternative livelihoods through links with enterprises, vocational and technical training, and increased irrigation efficiency measures to benefit these communities. A gender plan described in Appendix 10 will be developed during implementation. No negative impacts are anticipated for Hui people.

65. Overall, up to an estimated 46,400 households will benefit, with the majority of these Hui from previously resettled poor communities, including up to 5,200 individuals who will benefit from employment. The Project will train approximately 2,200 individuals in technical subjects, 5,500 farmers in field schools and a demonstration program on conservation agriculture, and some 3,000 rural poor in vocational training through which additional livelihood options will develop. Adverse consequences are minor and come from land acquisition for the Project. These will be mitigated by compensation payments and provision of replacement houses, if necessary, as per a resettlement plan that will be updated in the final design. Demonstration of new conservation agriculture approaches to land use management will improve water-use efficiency; while integrated pest and nutrient management will aid beneficiaries' integration into higher-value market chains and enable households to attain higher incomes, reduce vulnerability, and increase their participation in rural decision making. Project-related human capital investments for rural households provided as skills and vocational training will support the orderly movement of labor into off-farm employment.

2. Land Acquisition and Involuntary Resettlement

66. For the construction of Xixia Canal, compensation will be paid for (i) permanent acquisition of 18 ha of orchards and irrigated farmland, and 246.8 ha of woodland, grassland, and wasteland; (ii) temporary acquisition of 9.3 ha, including 0.5 ha of orchards. For the irrigation rehabilitation, 29 ha will be temporarily acquired during construction. The owners will be compensated and these lands will be restored and returned to owners once construction is complete. A short resettlement plan was prepared, endorsed by the PPMO, and posted on ADB's website, covering all the temporary or permanent impacts; it has been disclosed to those

affected. About 770 households (approximately 3,260 people) will be impacted to a very limited extent. The impacts will be confirmed once final project design is completed. The resettlement plan will be updated and disclosed to those affected and submitted to ADB for approval prior to award of civil works contracts. Compensation payments and cost-based entitlements will be a precondition for the commencement of civil works. The estimated cost of resettlement is CNY23.9 million, including contingencies. The Project includes provision for external resettlement monitoring and reporting. In addition, the PPMO will report to ADB on land acquisition and resettlement issues each quarter and at project completion. The summary resettlement plan is included in Appendix 11.

3. Environmental Impact

67. The project investments have a range of positive impacts on the environment through changes in land, water, wetlands, and conservation management practices. The Project is categorized as environment category A, following the realignment of the Xixia Canal extension to bypass Xixia tombs within the priority protection area of the tombs. Environmental impacts are addressed by 10 initial environmental examinations (IEEs), one environmental impact assessment (EIA), and a consolidated summary EIA (posted on ADB's website on 28 May 2007), including a consolidated EMP. The aesthetics of Xixia tombs will be protected through the use of an inverted siphon. Key environmental issues relate to wastewater from agricultural processing and livestock enterprises, which will be addressed through water treatment and processing, particularly animal waste treatment using biodigesters and biofertilizer treatments. Project environmental assessments provide strategies to avoid, manage, and mitigate adverse impacts, and recommend monitoring to be undertaken during implementation. The PPMO will report on the findings of the monitoring programs semiannually. Final detailed designs will be subject to final IEE and EIA scrutiny, and will be reported to ADB for its concurrence and approval.

C. Risks

68. The Project will adopt an integrated approach to address land degradation and related issues, and to plan and implement project activities. In the past, sector-specific approaches to land degradation have generally been unsuccessful. For the project impact and outcomes, risks include (i) the IEM approach may be ineffective as Yinchuan City and NHARG's economic growth ambitions overwhelm a reasonable balance between growth and environmental rehabilitation and protection, leading to further ecosystem deterioration; and (ii) climate change reduces available water resources, especially from the Yellow River. These risks can be mitigated in part by planning, monitoring, and enforcing appropriate policies and regulations. Measures that reduce water use per unit of agricultural production are especially valuable and are supported by the Project. Raising stakeholder awareness and incorporating conservation values into land-use planning, farming practices, and wetland management are essential. Leaders acting as high-profile champions who advocate appropriate policy settings are also important. Other risks facing project management and implementation include (i) lack of familiarity with ADB policies and procedures, (ii) changes in PPMO personnel, (iii) bureaucratic and lengthy procurement decision making, (iv) inadequate management capacity compounding delays, and (v) procurement fraud and corruption. To mitigate these risks, the Project will provide technical and management advisory support and training, particularly during the first 2 years of implementation.

69. The multifaceted character of the Project limits its financial and economic risks. The risks to individual subprojects may be significant, but all are unlikely to occur; the overall project risk is low. Market risks include (i) excess production could lower local prices and reduce returns to households; this would be more likely if local production is not adequately connected to market distribution chains; and (ii) tourism demand could fail to grow as expected due to congestion or other negative impacts. These risks will be mitigated through planning and coordination of producers, in particular, through market diversification, and with coordinated tourism sector planning. Technical activity risks are addressed by (i) ensuring appropriate contractual relationships are in place; and (ii) providing for adequate review, technical assessment, and monitoring.

V. ASSURANCES AND CONDITIONS

A. Specific Assurances

70. In addition to the standard assurances, the Government, NHARG, and NFD have given the following assurances, which are incorporated in the legal documents.

1. IEM Policy in the Project Area

71. NHARG will issue, within 5 years of commencement of the Project, the IEM policy, satisfactory to ADB, which will incorporate for the project area (i) the recommendations of the Strategy and Action Plan on Combating Land Degradation in Ningxia (final report); (ii) principles of the IEM approach for the NHAR, including the items in para. 24 (i) (a), (c), (h), (i), and (j); and (iii) guidance to government agencies on the use of IEM practices in their area of responsibility

72. The PPMO will, prior to completion of the Project, submit to NHARG its recommendations and findings for implementation of the IEM policy.

73. NHARG will formulate and gradually apply principles of conservation agriculture within the policy for the whole project area based on an IEM approach to address land degradation control.

2. Environmental Management

74. NHARG will, within 3 years of the commencement of the Project, or such other period as will be agreed between NHARG and ADB, prepare and submit legislation recommendations to the Standing Committee of the People's Congress of the NHAR, which will include draft regulations relating to wetlands management, and draft regulations on water resource zoning, satisfactory to ADB.

75. NHARG will, within 3 years of the commencement of the Project, or such other period as will be agreed between NHARG and ADB, prepare and submit legislation recommendations to the Standing Committee of the People's Congress of the NHAR, which will include draft regulations relating to implementation of the National Water Law (2002), and regulations on the control of pesticide and fertilizer usage to reduce nonpoint source pollution, satisfactory to ADB.

76. NHARG will ensure that, by no later than 31 December 2008, the HPCMA (west of the Xixia Canal) will be classified and gazetted as a provincial nature reserve and not be used for future activities that will damage the original ecological environment, including agricultural, forestry, production, or industrial use.

77. On the basis of monitoring methods to be agreed between NWRD and ADB, and in accordance with the IWRMP, NHARG will ensure that the provision of Xixia Canal will not result in any increased water extraction from the Yellow River for the irrigation system including Meili, Yaojin, Xigan, and Xixia canals.

78. NHARG, through NWRD, within 18 months of the commencement of the Project, will prepare and issue the IWRMP, including a water pricing mechanism to support water trading in the NHAR, satisfactory to ADB. NHARG will ensure that the necessary regulations with respect to implementation of the IWRMP will be incorporated in the draft regulations relating to the implementation of the National Water Law (2002) as referred to in para. 75.

3. Implementation

79. NHARG will establish the Lead Group, which will ensure overall coordination between sectors and agencies. The Lead Group will be chaired by the governor of Ningxia (or his and/or her representative). Membership will comprise those in charge of each of the concerned departments of the NHAR including finance, forestry, agricultural and animal husbandry, and water resources; and representatives of Development and Reform Commission, Environment Protection Bureau, Yinchuan Municipality, NARB, and Ningxia Administrative Bureau. The main responsibilities of the Lead Group include (i) approve important policies and principles relating to IEM; (ii) review project plans and ensure that all activities are in accordance with IEM; (iii) refer technical plans and sector plans to sector experts for review; (iv) approve final project work plans, enable coordination, and improve interagency communications; and (v) provide leadership and guidance to the IEM spatial planning programs. The Lead Group will meet each quarter during implementation and such other times as may be necessary. It will be supported by a lead support group which, for the duration of the Project, will be the PPMO.

80. NFD has established the PPMO, which will have a dual role of managing the Project and providing necessary support to the Lead Group. The PPMO will be adequately staffed once the Project is approved with full-time personnel to properly carry out the tasks assigned to it under the Project. The PPMO will be equipped with skill sets and resources: (i) project administration including planning, financial management, and project management; (ii) sector focal points for each of the PIAs; and (iii) a group of technical experts who can review plans, proposals, and investments to ensure technical correctness and coordination with the relevant departments and agencies. International and national consultants will conduct their research and consultancy work under the direction of the PPMO. Following completion of the Project, the PPMO will continue its role of supporting the Lead Group.

81. NHARG will ensure that part of the loan proceeds are onlent to the subborrowers and that such onlending in all cases is on the same terms and conditions as the ADB loan.

82. NHARG will take all necessary measures to ensure that all the PIAs and PIUs carry out their respective activities under the Project and the timely provision of all counterpart funding for successful implementation of the Project.

83. NHARG will procure the necessary approvals from the Ningxia Cultural and Relic Management Bureau for the alignment of Xixia Canal and report the approval to the State Relics Management Administration.

84. NHARG will implement the Project in concurrence with the gender action plan agreed between NHARG and ADB, and the participation plan to be drawn up within 6 months of commencement of the Project.

4. Capacity Building

85. NFD will ensure that all PIAs, PIUs, and other relevant stakeholders implement, in accordance with the implementation plan agreed upon by NHAR and ADB, the capacity building and institutional strengthening recommendations made by the consultants, as set out as output 1 of the Project.

86. NFD will select the most suitable and available trainers and training institutions based upon selection criteria to be agreed by NHAR and ADB.

87. NFD will ensure that all staff selected for training are suitable for such training and are selected using a transparent and objective methodology. NFD will take such steps as may be reasonable to ensure that all staff who receive training under the Project remain available during the project implementation period.

5. Environment

88. NFD will cause each relevant PIA to construct, maintain, and operate the project facilities in strict conformity to (i) all applicable national and local government environmental laws, regulations, and procedures; (ii) ADB's *Environment Policy* (2002); and (iii) the environmental mitigation and monitoring measures detailed in the approved EIA, summary EIA, and relevant summary IEEs and EMP for the Project.

89. NFD will ensure that all IEEs and EIA are reviewed and updated, after final detailed designs are completed and approved by ADB and prior to any works being undertaken, and all mitigation measures will be incorporated in the bidding documents and civil works contracts.

90. NHARG will ensure that each PIA (i) engage sufficient personnel and resources to monitor implementation of the EMP; and (ii) provide monitoring reports to the PPMO, which will coordinate the preparation of a semiannual environmental report on implementation of the EMP in a format acceptable to ADB for the duration of the Project.

91. NHARG will ensure that all planting of perennial trees, plants, and shrubs in the project area will be made on the basis of sound ecological considerations, taking into account the efficiency of water usage and an IEM approach to natural resource management.

6. Land Acquisition and Resettlement

92. NHARG will ensure that (i) all land acquisition and rights-of-way required by the Project are made available in a timely manner; (ii) the resettlement plan will be implemented promptly and efficiently in accordance with its terms; (iii) the resettlement plan will be prepared and implemented in accordance with all applicable national and local government laws and regulations and ADB's *Involuntary Resettlement Policy* (1995); (iv) the resettlement plan will be updated and submitted to ADB for approval, prior to award of civil works contracts and following any changes arising from finalization of detailed design; (v) it will consult with and disclose the resettlement plan to all affected persons and the public, and on ADB's website; (vi) it will make the necessary and timely provision from counterpart funding for compensation, eligibility, rehabilitation measures, resettlement costs, grievance redress, and monitoring and evaluation; (vii) compensation and allowances are paid and assets are replaced before the displacement of affected people; and (viii) it will engage an independent agency acceptable to ADB, who will monitor and evaluate implementation of the resettlement plan and forward reports to ADB annually.

7. Health and Safety and Labor Laws

93. NHARG will ensure that all PIAs comply with all applicable employment and health and safety laws of the PRC. In addition, NHARG will ensure that all civil works contractors engaged under the Project will be obliged to (i) provide timely payment of wages and safe working conditions for all male and female workers; (ii) provide equal employment opportunities for men and women, and pay equal wages to male and female employees for equivalent work; (iii) not employ child labor; and (iv) disseminate information on the risks of contracting and transmitting socially and sexually transmitted diseases, including HIV to their workers and employees.

8. Monitoring and Evaluation

94. In consultation with ADB, NHARG will establish and implement project performance monitoring, which will include a set of indicators for evaluating project performance in relation to impact, outcome, outputs, and conditions. The set of indicators will cover each subcomponent of the Project and provide baselines where relevant. NHARG will develop a data portal and ensure that all data sets relating to the Project, including all project documents and reports, are posted on the data portal for public access.

B. Condition for Loan Effectiveness

95. Effectiveness of the Loan Agreement will be subject to confirmation of GEF financing through written endorsement by the chief executive officer of the GEF Secretariat.

C. Condition for Loan Disbursement

96. Disbursement of the loan proceeds for each subcomponent of the Project will be conditional on the Government's certification, in form and substance satisfactory to ADB, that the applicable municipal government or NHARG department has executed and delivered the relevant onlending agreement, which will include terms and conditions as required in the Loan Agreement, and which has become effective and binding on the parties in accordance with its terms.

VI. RECOMMENDATION

97. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve

- (i) the loan of \$100,000,000 to the People's Republic of China for the Ningxia Integrated Ecosystem and Agricultural Development Project from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Project Agreements presented to the Board; and
- (ii) the administration by ADB of a grant not exceeding the equivalent of \$4,545,000 to the Government of the People's Republic of China for the Ningxia Integrated Ecosystem and Agricultural Development Project to be provided by the Global Environment Facility.

Haruhiko Kuroda
President

Date

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact Improved environmental management to rehabilitate ecosystems and increase rural incomes in the project area	<ul style="list-style-type: none"> Increased number of poor smallholders linked to commercial enterprises compared to base year of 2007 Farmland degradation (soil quality) and wetland water quality improved, and conservation agriculture on 35,000 ha Wildlife conservation area increased to 115,360 ha from 52,210 ha in 2007; wetland conservation for 8,825 ha Visitors to tourism sites increased to 1.1 million from 0.97 million in 2007 	<ul style="list-style-type: none"> IEM information and land and/or water quality analysis Government's annual income and poverty statistics 11th FYP reported achievements and future FYP directions and priorities 	Assumptions <ul style="list-style-type: none"> IEM approach influences future urban and/or rural planning. Conservation values are incorporated into land and water use and farming practices. Risks <ul style="list-style-type: none"> Conservation objectives are given low priority leading to limited ecosystem recovery. Yellow River water allocation is permanently reduced due to climate change.
Outcome IEM approach provides sustainable livelihoods for the population of the project area	By 2014 (end of Project): <ul style="list-style-type: none"> IEM approach demonstrated and adopted Up to 140,000 rural people, 6 poor communities, and 20 enterprises have increased incomes from transition to higher-value rural industries Agrochemical usage reduced by 25% and water use reduced by 10% per unit of cultivated area Nine major lakes and wetland systems have achieved balanced water allocation and reduced agricultural runoff Fifteen globally threatened wild species protected with improved habitat 	<ul style="list-style-type: none"> IEM information center and/or land degradation and water data reports 12th FYP documents show IEM approach accepted Government's annual income and poverty surveys Project monitoring Remote sensing trend analysis Research papers Project reports 	Assumptions <ul style="list-style-type: none"> NHAR adopts IEM approach and strategy and/or action plan to combat land degradation (developed under ongoing Capacity Building to Combat Land Degradation Project). Signed data-sharing agreements between all stakeholder agencies are effective. Water savings are allocated to wetlands.
Outputs 1. IEM Capacity Building and Project Management: All public and private stakeholders have the capacity, regulations, and information to jointly implement IEM.	<ul style="list-style-type: none"> Harmonized policy and regulatory framework in place by 2009 Participating institutions have capacity to understand and implement IEM by 2014 All stakeholders aware of IEM approach and comply with regulations by 2014 Timely and informative reporting reflects accurate and timely implementation in line with agreed assurances Domestic reporting and information systems, including project performance monitoring system, operationalized IEM institutional capacity built and demonstration conducted 	<ul style="list-style-type: none"> Policies and regulations for project area approved; Ningxia's laws and/or regulations for combating land degradation harmonized Number of violations, court, and records Project reports and monitoring Fully-staffed PPMO equipped Timely coordinated work plans IEM information system is operating IEM approaches are adopted 	Assumptions <ul style="list-style-type: none"> Revised policies and regulations are accepted and enforced. Political commitment established. Stakeholders and trainees actively participate in capacity building activities. Agencies are cooperative in adopting IEM practices. Risks <ul style="list-style-type: none"> Competitive interests undermine IEM objectives. Trained personnel do not remain in their posts during the Project.

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
2. Land and Water Resource Management: Land users, public and private farmers, and NWRD implement sustainable land and water management.	<ul style="list-style-type: none"> • Water resource planning achieved and all data freely shared by stakeholders by 2010 • Water use efficiency for 15,000 farmers improved by new Xixia Canal, irrigation system, rehabilitation, and on-farm conservation by 2011 • Water quality of irrigation discharge and wetlands improved by introduction of conservation agriculture and sustainable fertilizer balance by 2014 	<ul style="list-style-type: none"> • Project IWRMP • NWRD and/or EPB monitoring • Project spatial plan • IEM information center database • Project reports and monitoring 	Assumptions <ul style="list-style-type: none"> • Agencies are supportive to comprehensive management practices. • Parts of Xixia Canal not under the Project are constructed on time. • Farmers accept irrigation rehabilitation and water use efficiency. Risks <ul style="list-style-type: none"> • Water use efficiency program is not implemented. • Water savings are diverted and not available for wetlands.
3. Rural Livelihood Improvement Rural households and smallholders are provided with alternative agriculture-based incomes through links with three enterprise groups.	<ul style="list-style-type: none"> • NARB: <ul style="list-style-type: none"> (i) Incomes of up to 8,325 households increased through engagement in beef, dairy, and grapes by 2012, including NSFG production, processing, and marketing by 2014 • Yinchuan Municipality: <ul style="list-style-type: none"> (i) Incomes of up to 12,800 households improved through sustainable land use, perennial crops, and vocational training (2012) (ii) Sustainable farming practices lead to decreased use of water and chemicals with technical training (2014) • Ningxia Administration Bureau: <ul style="list-style-type: none"> (i) Smallholders integrated into processing, distribution, and marketing systems (ii) Up to 4,680 households provided with alternative agricultural incomes through cattle raising (600) and fodder production (800), greenhouses (510), intercropping (400), and related jobs (2,170) (iii) Soil quality improved and water usage decreased on up to 6,600 ha through adoption of conservation agriculture 	<ul style="list-style-type: none"> • Project reports and monitoring • NSFG and other enterprise data sets • EPB water quality data • Biodiversity monitoring • Training records • Management plans • Procurement records • IEM information center database 	Assumptions <ul style="list-style-type: none"> • Budget is adequate to implement IEM plans; land plots are allocated with a preference for poor households. • Smallholder contracting is effective in protecting the rights of the poor. Risks <ul style="list-style-type: none"> • Increased livestock adversely impacts water quality. • Commercial return is prioritized at the cost of ecological systems.
4. Conservation and Tourism: Commercial enterprises and conservation objectives are linked.	<ul style="list-style-type: none"> • NARB wetlands (Shahu and Yuehai lakes): Number of tourists, protected species increased through integrated lake and wetland conservation on up to 4,670 ha; also aquaculture (2012–2013) 	<ul style="list-style-type: none"> • Project monitoring reports • Visitor numbers and/or records • Training records • Procurement records • Company records. 	Assumptions <ul style="list-style-type: none"> • The HPCMA receives provincial ratification and future land conversion is stopped. • Staff and financial resources are adequate for effective wetland management programs.

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
	<ul style="list-style-type: none"> • Yinchuan Municipality: <ul style="list-style-type: none"> (i) 53,150 ha of sensitive area incorporated into the HPCMA where production activities are prohibited (2012) (ii) Number of waterfowl increased by revegetating 880 ha of Yinxi wetlands (2014) (iii) Number of visitors increased and species protected through sustainable development of up to 3,275 ha of Yinchuan wetlands (2011) 	<ul style="list-style-type: none"> • Water resource data and monitoring • Wetland monitoring and public environmental awareness program • EPB records 	Risks <ul style="list-style-type: none"> • Service standards and management capacity are adequate to maintain higher value attractions. • Endangered species are mismanaged.
Activities with Milestones			Inputs (\$ million)
Output 1: IEM Capacity Building and Project Management 1.1 Institutional arrangements for IEM application (2008) <ul style="list-style-type: none"> 1.1.1 Policy, legal, and regulatory framework <ul style="list-style-type: none"> Conduct legal and institutional studies and seminars (2009–2012) 1.1.2 Training and capacity building <ul style="list-style-type: none"> Implement training through existing suppliers (2010–2012) Implement training (in-service: 2009–2014, study tours: 2009–2012, postgraduate: 2009–2012) Conduct monitoring, data analysis, and evaluation (2009–2014) 1.1.3 Information systems and monitoring <ul style="list-style-type: none"> Conduct project management (procurement: 2009–2012, reporting: 2009–2014) 1.2 Project management, including agency coordination <ul style="list-style-type: none"> 1.2.1 Mobilize consulting services (2008) 1.2.2 Conduct workshops, including two international IEM workshops (2008 and 2014) 			ADB Financing: 100.00 GEF Financing: 4.54 Government Financing 116.46 Total 221.00 Civil works 119.32 Equipment 12.40 Vehicles 1.30 Materials 10.50 Training 5.23 Surveys and studies 1.87 Resettlement, land compensation 2.33 Design and supervision 6.93 Consulting services 1.42 Staff costs 2.65 Recurrent costs 14.04 Contingencies 32.51 Financing during construction 10.50
Output 2: Land and Water Resource Management 2.1 IWRMP and spatial plan <ul style="list-style-type: none"> 2.1.1 Conduct studies on IWRM (water balance and water quality) (2009–2010) 2.1.2 Establish surface-groundwater model (2010–2011) 2.1.3 Implement training on IWRM tools and management (2009–2010) 2.1.4 Conduct monitoring and compile data (2009–2014) 2.1.5 Conduct spatial planning (2009–2010) 2.2 Conservation agriculture, farmer field schools, and fertilizer management demonstrations <ul style="list-style-type: none"> 2.2.1 Demonstrate conservation agriculture site-specific nitrogen management practices (2010–2014) 2.2.2 Implement training at farmer field schools (2010–2014) 2.3 Water resource efficiency improvement <ul style="list-style-type: none"> 2.3.1 Resettlement and land compensation (2009) 2.3.2 Construct Xixia Canal (2009–2011) 2.3.3 Implement training for on-farm water use efficiency (2009–2011) 2.3.4 Rehabilitate irrigation scheme (2010–2012) 			
Output 3: Rural Livelihood Improvement 3.1 Under NARB: Increased livelihoods from beef production <ul style="list-style-type: none"> 3.1.1 Construct breeding center, purchase 1,500 improved breeding cows for the central herd (2010–2011) 3.1.2 Construct slaughterhouse (2010–2012) 3.1.3 Construct fattening unit (2011–2012) 3.1.4 Implement conservation agriculture on NSFG farms (2010–2013) 3.1.5 Implement training to smallholders on beef production and conservation agriculture (2010–2014) 			

Activities with Milestones	Inputs (\$ million)
<p>3.2 Under NARB: Increased dairy livelihoods</p> <p>3.2.1 Construct household infrastructure (2010–2011)</p> <p>3.2.2 Construct communal milking infrastructure, fodder production (2010–2012)</p> <p>3.2.3 Implement veterinary programs (2010–2014)</p> <p>3.2.4 Implement training on dairy production to smallholders (2009–2011)</p> <p>3.3 Under NARB: Increased livelihoods from higher-value horticultural production</p> <p>3.3.1 Implement training of staff (2009–2010)</p> <p>3.3.2 Establish vineyards (2010–2013)</p> <p>3.3.3 Construct test center and laboratory (2010)</p> <p>3.4 Under Yinchuan Municipality: Yinxi livelihood improvement program</p> <p>3.4.1 Train staff and farmers (2009–2014)</p> <p>3.4.2 Establish crop farm, nursery, and shelter planting for conservation agriculture (2010–2014)</p> <p>3.5 Under Ningxia Administrative Bureau: Improved livelihoods from ecological agriculture</p> <p>3.5.1 West block: Training on ecological agriculture (2009–2014)</p> <p>3.5.2 West block: Implement ecological agriculture programs (2010–2013)</p> <p>3.5.3 West block: Implement beef production (2010–2012)</p> <p>3.5.4 West block: Establish biofertilizer production (2011)</p> <p>3.5.5 East block: Develop greenhouse, plant propagation unit, and logistic center (2010–2012)</p> <p>3.5.6 East block: Strengthen existing vocational training school (2010–2012)</p> <p>Output 4: Conservation and Tourism</p> <p>4.1 Under NSFG: Shahu Lake</p> <p>4.1.1 Construct three lakes and rehabilitate canal (2010–2014)</p> <p>4.1.2 Implement conservation programs (2010–2013)</p> <p>4.1.3 Construct tourism program-related facilities (2010–2013)</p> <p>4.1.4 Implement sustainable use of wetlands (2010–2013)</p> <p>4.1.5 Conduct monitoring of environmental indicators (2009–2014)</p> <p>4.2 Under NSFG: Yuehai Lake</p> <p>4.2.1 Implement water resource management, construct biotreatment facility (2010–2011)</p> <p>4.2.2 Implement conservation programs (2010–2014)</p> <p>4.2.3 Construct tourism program-related facilities (2010–2012)</p> <p>4.2.4 Implement sustainable use of wetlands (2010–2014)</p> <p>4.2.5 Implement wildlife habitat management (2009–2014)</p> <p>4.3 Under Yinchuan Municipality: Helan Nature Reserve</p> <p>4.3.1 Implement endangered species management planning (2010–2012)</p> <p>4.3.2 Establish and protect the HPCMA (2011)</p> <p>4.4 Under Yinchuan Municipality: Yinxi wetland conservation program</p> <p>4.4.1 Construct earthworks and flood control gully, and revegetate (2010–2013)</p> <p>4.5 Under Yinchuan Municipality: Yinchuan wetland conservation program</p> <p>4.5.1 Construct canals, control structures, biological water treatment (2010–2014)</p> <p>4.5.2 Implement wetland conservation measures (2011–2014)</p> <p>4.5.3 Conduct capacity development, construct relevant facilities (2011–2013)</p> <p>4.5.4 Construct tourism development facilities (2011–2012)</p> <p>4.5.5 Establish water quality monitoring; introduce sustainable use of wetland resources (2011–2013)</p> <p>4.5.6 Implement wetland training program (2010–2014)</p>	

ADB = Asian Development Bank, EPB = Environmental Protection Bureau, FYP = five-year plan, GEF = Global Environment Facility, ha = hectare, HPCMA = Helan piedmont conservation management area, IEM = integrated ecosystem management, IWRM = integrated water resource management, IWRMP = integrated water resource management plan, NARB = Ningxia Agricultural Reclamation Bureau, NHAR = Ningxia Hui Autonomous Region, NSFG = Ningxia State Farm Group, NWRD = Ningxia Water Resources Department, PPMO = provincial project management office.

SECTOR ANALYSIS

A. Overview

1. The Project covers a total land area of 3,655 square kilometers (km²), distributed across the six counties and/or districts under Yinchuan Municipality. Rangeland is the largest land cover, particularly in the most fragile Helan Mountain foothills. The project area of proposed interventions is bounded to the west by the Helan Mountains, to the east by the Yellow River, to the north by a line above the Shahu Lake wetland region, and in the south by the southern boundary of Yongning County. The project area is in an arid part of the People's Republic of China (PRC) with adverse climatic conditions: low precipitation; high potential evaporation; groundwater with high pH and, in places, high salinity and alkalinity; cold winters; and mild summers. However, the area has favorable hydrological characteristics: major features of the Yellow River pass through it; the area has considerable wetlands; deep alluvial aquifers; and the protected Helan Mountains. These conditions provide the area with resources key to development in the rural sector.

2. Drylands cover about 41% of the world's land surface and are home to over 38% of the world's population. Severe land degradation is present on 10%–20% of these drylands and poverty exceeds that of any other ecosystem classification worldwide. The PRC has some of the worst land degradation in the world, with more than 40% of its land area adversely affected; a strong correlation exists between land degradation and the incidence of poverty. The PRC Government's past top-down and uncoordinated sector-by-sector approach has proven expensive and only partially successful. Because the root causes have not been adequately addressed, the approach was not sustainable. A recent worldwide review of lessons identified for drylands strongly endorses an integrative approach of the type being taken by the Project, based on key lessons that include the following:¹ (i) Desertification² has emerged from a combination of social and biophysical causal factors. Poor resource management is compounded by weak institutions, poorly implemented technologies, or exploitative economic systems. (ii) Expansion of cropping into rangelands during wet periods often results in crises and environmental collapse when dry conditions return, e.g., the 1930s dust bowl (United States) and desertification of the PRC's Ordos Plateau (adjacent to the project area). (iii) Development projects in drylands that have been justified as reducing poverty have been driven by higher political or economic objectives (e.g., relocation of people). Out-migration is often needed to sustain poverty reduction in drylands. Poverty trap thresholds require outside interventions and livelihood diversification to reduce dependency on highly variable natural resources. (iv) Top-down policies often contradict local practices and undermine sustainable development. An increased role for local communities and land users is needed for win-win (environment–development) outcomes requiring rights to participate and capacity building initiatives. Combining local environmental knowledge with scientific knowledge can contribute to sustainable management. (v) The critical dynamics of dryland human–environmental systems are determined by slow variables (e.g., soil fertility, household capital wealth) with long turnover times, not by fast variables (e.g., crop yields, household disposable cash), which are poor indicators of land degradation or the need for intervention. However, most interventions focus on the less strategically important fast variables, leading to confusion and poor designs based on a lack of understanding of system dynamics.

¹ Reynolds, J. et al. 2007. *Global Desertification: Building a Science for Dryland Development*. *Science* 316: 847–851. {City}.

² As described in the United Nations Convention to Combat Desertification: "land degradation in arid, semi-arid, and dry subhumid areas resulting from various factors, including climatic variations and human activities."

3. Ecosystem degradation, of which land degradation is a major component, is mostly caused by interacting socioeconomic factors (e.g., overexploitation of natural resources, poverty, and population pressure). Ecosystem management attempts to address these by influencing the ways in which people use natural resources and benefit from viable ecosystems. Integrated ecosystem management (IEM) is a holistic approach to addressing the linkages between ecosystem functions and services, and social, economic, and production systems. It recognizes that people and the natural resources they depend upon directly or indirectly, such as land, water, and forests, are inextricably linked. Rather than treat each resource in isolation, IEM offers the option of treating all elements of ecosystems together to produce multiple benefits. IEM is incorporated in a number of international conventions concerning the environment and development; and international experience demonstrates the value of this approach.

4. Based on lessons from dryland experience in industrial societies (e.g., Australia, Canada, and United States), Africa (e.g., Ethiopia, Mali, Niger, Nigeria, and Sudan), PRC, and South America (e.g., El Salvador, Guatemala, Honduras, and Nicaragua); and the experience of dryland research institutions such as the International Center for Agricultural Research in the Dry Areas and the International Crops Research Institute for the Semi-Arid Tropics; the Global Environment Facility (GEF) and other development partners have been supporting the PRC to change its approach to combating land degradation. In these countries, from the 1930s onward, bottom-up approaches bringing local farmers and graziers, scientists, business, and government agencies together to solve local problems have proved successful. Adequate incentives, controls, and financial resources to ensure that environmental functions and services are rehabilitated and maintained are essential. Large areas that were severely degraded have been rehabilitated and used for sustainable agriculture and other purposes, and yield higher output and wealth for larger human populations than previously. Community organizations, including farmer and water-user associations, and a clear legal and regulatory framework, are featured. Market-based solutions that link rural populations with processors and markets are essential for viable livelihoods. An international workshop on IEM, held in Beijing on 1–2 November 2004, introduced the concepts and principles to promote an understanding of overcoming the main barriers to combating land degradation.³

B. IEM in the PRC

5. The PRC Government is adopting the IEM approach under the 11th Five-Year Plan (FYP), as IEM is seen as having a better chance of lasting success than the top-down, sector-by-sector approach, which has been the PRC's conventional approach. The PRC–GEF Partnership on Land Degradation in Dryland Ecosystems is helping introduce the IEM approach.

6. The first project of the Asian Development Bank (ADB) under the partnership, the Capacity Building to Combat Land Degradation Project, is ongoing in six provinces and/or autonomous regions: Gansu, Inner Mongolia, Ningxia Hui, Qinghai, Shaanxi, and Xinjiang Uygur. Its initial focus is for each province and/or region to (i) prepare its own strategic plan for land degradation control using an IEM approach; (ii) review relevant policy and legislative and/or regulatory conditions; (iii) strengthen national and provincial coordination, and improve

³ Seven barriers to a comprehensive approach to land degradation in the PRC are (i) weak policy and legislative framework, (ii) uncoordinated sector approaches, (iii) poor application of lessons from previous experience, (iv) undeveloped participatory approaches, (v) poorly developed locality-specific land use planning, (vi) perverse incentives, and (vii) inadequate financial arrangements and incentives.

provincial and county operating arrangements; (iv) support the capacity for future IEM investment projects;⁴ (v) examine ways to improve and coordinate existing monitoring and evaluation systems; and (vi) support project implementation. A multiagency task force has been involved in preparing a Ningxia IEM strategy and action plan for land degradation control. The first draft report was completed in November 2006. In addition, a smaller legal and policy review team has undertaken a detailed assessment of the legal and policy environment required for IEM within Ningxia, and incorporated the findings within the strategy.⁵

7. Through the initial capacity building, awareness on IEM has been achieved among a relatively limited number of government officials, planners, and technical experts. However, effective operationalization of the IEM strategy, particularly through implementation of the Project, requires a critical mass of people with not only a good understanding of IEM but also the capacity to plan and implement IEM-based field interventions. The concepts and principles of IEM are new to Ningxia. While they are gaining acceptance, time will be required to include them in development policies, programs, and investment projects, although the principles are incorporated within Ningxia's 11th FYP.

8. Previous aid-assisted projects in the drylands of the PRC have used an IEM-style approach, e.g., local community participation, bottom-up design, scientific resource, social assessments, and detailed monitoring. These include bilateral project assistance from Australia and Canada in Inner Mongolia and Qinghai; the World Bank's Loess Plateau rehabilitation interventions; and most recently, the Gansu and Xinjiang Pastoral Development Project. Yet, despite good local results, mainstreaming has not occurred as they were seen as "too slow and too expensive," and poorly understood at senior levels. The changed rural priorities under the 11th FYP provide a far better chance of success. Under the Project, the links between rural communities and commercial enterprises to overcome poverty offer a more sustainable alternative than a fully public sector-led intervention.

C. IEM Approach under the Project

9. The Project is the main instrument through which IEM will be institutionalized in Ningxia. Figure A2 shows key links between project area-wide policy, regulatory, and ecosystem analysis through site-specific conservation and livelihood development. The project management structure and role of state-owned enterprises in helping poor households exit poverty is given in Appendix 5. Consultant services will assist implementation (Appendix 8). The following measures will underpin introduction of an IEM approach:

- (i) **Project management and planning.** A common understanding of the ecosystems of the project area is needed if an IEM approach is to be successfully taken. A multisector approach is essential as no agency has all the disciplinary experts required to solve the multidimensional problems of land degradation. This requires coordination and cooperation between all sector

⁴ This includes (i) documenting IEM/land degradation control-related projects and programs, (ii) identifying lessons from past successes and failures by assessing the impact of past investments, (iii) training a cadre of provincial planners with the skills required to design land degradation control investment projects, and (iv) conducting feasibility studies of priority IEM/land degradation control project investments eligible for possible financing under the partnership.

⁵ Ningxia OP12-Executing Office. November 2006. *Strategy and Action Plan on Combating Land Degradation*. The report was prepared by a multidisciplinary team of Chinese academics, sector experts, and Ningxia Hui Autonomous Region (NHAR) officials who worked together for 12 months. The final report will be submitted to the NHAR government for approval, so that it will become an executable policy document.

agencies, especially those responsible for agriculture, livestock, forestry, land and water resources, environment, science and technology, finance, planning, and legislation; and project implementing agencies and the public. Training and capacity development for stakeholder agencies and participants will be provided, and regulatory reforms will support improved ecosystem management.

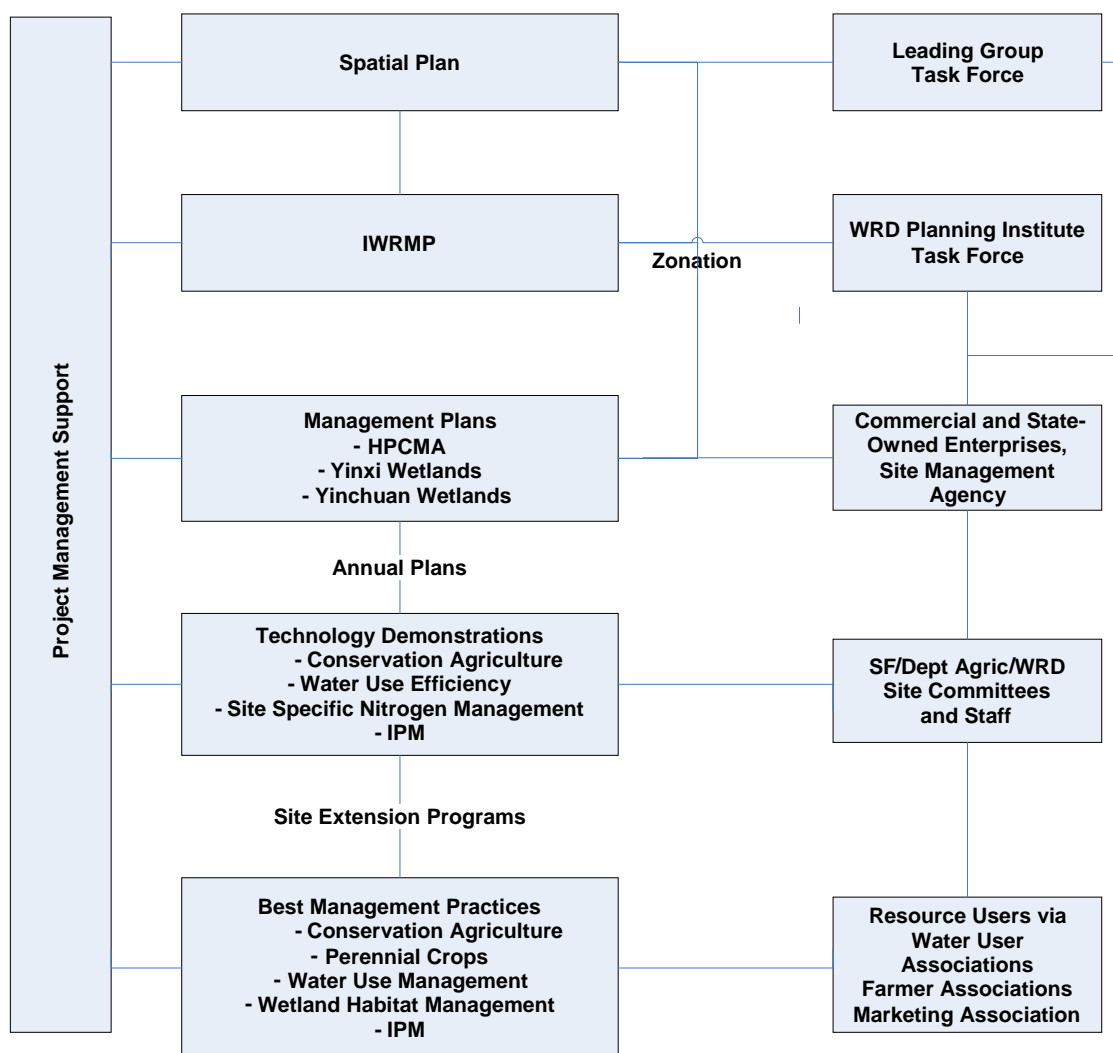
- (ii) **Spatial planning, integrated water resource management plan, zoning, and IEM information center.** The slow variables (para. 2) will be assessed so that future development takes place within the sustainable capacity of the ecosystems. This will provide all stakeholder agencies and leaders with an understanding of the capacity of the physical aspects of the ecosystems, and future demands. A signed agreement is already in place between 13 agencies to share information with an open access website, and an IEM information center is being equipped that will have analysis and mapping capacity.
- (iii) **Site-specific planning and sustainable development.** This will include grasslands, wetlands, and irrigated areas. It will involve commercial enterprises to help small farmers exit poverty through links to market opportunities in sustainable production systems, and rehabilitate areas for conservation of natural habitats that provide vital ecosystem functions and services. Participation of community organizations (e.g., 114 farmer associations and 163 water-user groups are in the project area) is a feature that will replace the top-down approach. Sector and market issues are addressed in paras. 10–11.
- (iv) **Technology demonstrations of best practices.** The focus will be on conservation agriculture, water use efficiency, fertilizer management, wetland and grassland management, and integrated pest management, e.g., substantial ecological and environmental benefits can be gained from adopting conservation agriculture practices. This is a holistic approach to agricultural production based on enhancing natural soil biological regeneration processes involving (a) improved soil organic matter management for the efficient use of rainfall, soil moisture, and plant nutrients; and (b) maintenance of soil physical properties by keeping mechanical tillage to the absolute minimum required for direct planting and/or seeding.

D. Market and Sector Issues

10. The current conditions in key sector markets likely to be developed or influenced under the Project are summarized in this appendix. All production interventions under the Project are based on sound assessments of financial and economic aspects of the proposed commodities, and commercial decisions by the investing enterprises. Market conditions and forecasts of future market opportunities (i.e., supply, demand, and anticipated price trends) are detailed for the following markets: livestock raising and the production of processed beef and dairy foodstuffs, including halal products for established export markets; vineyards and wine; Chinese medicinal herbs; horticulture; and the supply and condition of existing tourism facilities and products. Expectations regarding future tourist numbers likely to visit the city of Yinchuan and surrounding areas are considered along with assessments of the impact of planned upgrades to existing cultural–historical sites and nature preserves on future visitor arrival figures. Reviewing the planned increases in output for these commodities and increases in visitor numbers forecasted to result from the proposed project activities, trends toward increasing consumption of these goods in general, and in niche markets for some of Ningxia’s products in particular (e.g., halal markets), suggest a highly favorable market environment can be expected to support the planned development activities.

11. The sustainability of the natural resource base is analyzed in two detailed supporting documents: (i) Environmental Assessment Report (May 2007), and (ii) the final GEF submission (August 2007). The precarious state of the natural resource base means that project-financed innovations are required that will support (i) rehabilitation of vital functions; (ii) development of promising growth or niche markets under technologies offering sustainable resource use; and (iii) improved future economic and commercial viability, so that rural producers can improve both the level and the sustainability of their incomes.

Figure A2: Overview of Project Implementation Linkages



Agric = agriculture, Dept = department, HPCMA = Helan mountains piedmont conservation management area, IPM = integrated pest management, IWRMP = integrated water resources management plan, SF = state farm, WRD = Water Resources Department.
Source: Asian Development Bank.

EXTERNAL ASSISTANCE

Funding Agency	Project Title	Year	Amount (\$ million)
Asian Development Bank	1. Ningxia Highway Development Project	2004	250.00
	2. Capacity Building to Combat Land Degradation TA (to support implementation of GEF project)	2004–2008	1.00
Global Environment Facility	OP12 Capacity Building to Combat Land Degradation	2003–2013	7.70
International Fund for Agricultural Development	Ningxia Arid Area Poverty Reduction and Environment Improvement Project	2003	15.00
Japan Bank for International Cooperation	1. Program Control Telephone Network Improvement Project	1997	20.63
	2. Ningxia Vegetation Coverage Project	2002	64.00
	3. Ningxia Talents Development Project	2004	22.10
United Nations Children's Fund	1. Children Immunity Plan	1983–1988	0.20
	2. Primary School Teacher Qualification Training	1985–1989	0.15
	3. Younger Science and Technical Center	1985–1989	0.15
	4. Children's Immunity Plan	1988	0.05
	5. Development for Women and Children's Health	1988–1989	0.20
	6. Health Care	1988–1989	0.20
	7. Training of Middle School Population Education Teacher Qualification	1988–1989	
	8. Enhancement of Immunity	1990–1994	0.12
	9. Education of Health	1990–1994	0.08
	10. Training of Kindergarten Qualifications	1990–1994	0.11
	11. Long Distance Education of Teacher Qualifications	1990–1994	0.03
	12. Enhance Primary Education in Poverty Districts	1990–1994	0.02
	13. Monitoring of Children's Nutrition	1990–1994	0.02
	14. Training of Primary School Teachers	1990–1994	0.08
	15. Enhance Youngster Science and Technical Education in Poverty District	1990–1994	0.02
	16. Improvement of Children's Inchoate Education Development	1990–1994	0.00
	17. Development of Women and Children's Health	1990–1994	0.15
	18. Minority Science Popularization Education	1990–1994	0.01
	19. Women's Involvement in the Development of Society	1990–1996	1.10

Funding Agency	Project Title	Year	Amount (\$ million)
	20. Women's Involvement in Bringing about Economic Income, Maize Peel Unit	1991	0.01
	21. Family and Community Education	1993	0.01
	22. Children's Health Facility	1993	0.04
	23. Girls Education and Society	1994	0.03
	24. Dissemination of Girls' Enrollment	1995	0.03
	25. Children's Plan and Development in Poverty Region	2001–2005	1.00
United Nations Development Programme	1. Develop Agriculture Science and Technology in Dry and Half Dry Land	1991–1994	0.30
	2. Education of Medium Agriculture School	1991–1994	0.39
	3. Utilize and Develop Yellow River Water Resource	2000–2005	1.70
World Bank	1. Qinba Mountain Poverty Reduction Project	1997	18.00
	2. Poverty Reduction IV Project (No. 4 Basic Education for Impoverished Area, Component Project of Qinba Mountain Project)	1997	1.61
	3. Basic Health Service VIII Project (Qinba Health Project)	1998	2.44
	4. Guangxia Grape and Winery Project	1998	4.98
	5. Tri-Provincial Highway Project	1999	50.00
	6. World Bank-Ningxia GDLN Center Project	2002	0.77
	7. Yinchuan City Development Strategic Research Project	2002	1.00
	8. Ningxia University Distance Internet Education Project	2002–2003	0.77
	9. Western Basic Education Project	2003	14.85
World Food Programme	1. XIII 2605 Project	1983–1986	22.83
	2. Zhongwei Nanshan Taizi Irrigation Project	1983–1986	7.30
	3. 667 ha Fish Pool Construction	1987–1990	3.70
	4. Food Assistance 407	1994–2001	13.91

GDLN = Global Development Learning Network, GEF = Global Environment Facility.
Source: Asian Development Bank.

DETAILED COST ESTIMATES
Table A4.1: Detailed Cost Estimates by Expenditure Category
(\$'000)

Item	Local Currency	Foreign Exchange	Total Cost	% Foreign Exchange	% Total Base Costs
A. Investment Costs					
1. Civil Works					
a. Structures	40,083.3	6,834.8	46,918.1	15	26
b. Field Infrastructure	26,512.1	2,846.4	29,358.5	10	16
c. Ecological Engineering	43,041.2	0	43,041.2	0	24
Subtotal (A1)	109,636.6	9,681.2	119,317.8	8	67
2. Equipment					
a. Equipment–Machinery	2,509.8	1,072.2	3,582.0	30	2
b. Other Equipment	6,741.4	787.0	7,528.4	10	4
c. Office Equipment	1,167.0	125.4	1,292.4	10	1
Subtotal (A2)	10,418.2	1,984.6	12,402.8	16	7
3. Vehicles					
a. Cars and Trucks	677.3	218.8	896.0	24	1
b. Tractors	34.8	11.3	46.1	24	0
c. Boats	270.9	87.5	358.4	24	0
Subtotal (A3)	983.0	317.5	1,300.5	24	1
4. Materials					
a. Project Materials and Supplies	4,041.0	0	4,041.0	0	2
b. Planting Materials and Supplies	2,262.5	0	2,262.5	0	1
c. Livestock Purchase	2,492.9	0	2,492.9	0	1
d. Office Materials and Supplies	1,700.3	0	1,700.3	0	1
Subtotal (A4)	10,496.7	0	10,496.7	0	6
5. Training					
a. IEM Training (PMO)	1,186.9	0	1,186.9	0	1
b. IEM Training (sectors) ^a	1,994.6	0	1,994.6	0	1
c. Vocational Training	116.4	0	116.4	0	
d. Farmer Training and Extension	1,573.1	0	1,573.1	0	1
e. Demonstrations	362.2	0	362.2	0	
Subtotal (A5)	5,233.2	0	5,233.2	0	3
6. Surveys and Studies					
a. Planning	95.0	0	95.0	0	0
b. Monitoring and Evaluation	815.5	0	815.5	0	0
c. Field Technical Surveys and Trials	963.4	0	963.4	0	1
Subtotal (A6)	1,873.9	0	1,873.9	0	1
7. Resettlement					
a. Land Acquisition	1,410.3	0	1,410.3	0	1
b. Compensation	922.6	0	922.6	0	1
Subtotal (A7)	2,332.9	0	2,332.9	0	1
8. Design and Supervision	6,931.5	0	6,931.5	0	4
9. Technical Assistance					
a. International Consultants	0	661.5	661.5	100	0
b. National Consultants	756.8	0	756.8	0	0
Subtotal (A9)	756.8	661.5	1,418.3	47	1
10. Staff Costs	2,653.3	0	2,653.3	0	1
Subtotal (A)	151,316.0	12,644.8	163,960.8	8	92
B. Recurrent Costs					
1. Operation and Maintenance					
a. Civil Works	8,961.5	0	8,961.5	0	5
b. Equipment	3,490.2	0	3,490.2	0	2
c. Office Equipment	559.2	0	559.2	0	0
d. Vehicles	1,036.5	0	1,036.5	0	1
Subtotal (B)	14,047.5	0	14,047.5	0	8
Total Baseline Costs	165,363.5	12,644.8	178,008.3	7	100
Physical Contingencies	6,093.6	625.0	6,718.6	9	4
Price Contingencies	25,546.2	244.8	25,791.0	1	14
Total Project Costs	197,003.3	13,514.5	210,517.9	6	118
Interest during Implementation	0	10,225.8	10,225.8	100	6
Commitment Charges	0	270.1	270.1	100	0
Total Costs to be Financed	197,003.3	24,010.4	221,013.8	11	124

IEM = integrated ecosystem management, PMO = project management office.

^a IEM training for staff of implementing and other agencies.

Source: Asian Development Bank estimates.

Table A4.2: Detailed Cost Estimates by Financier

(\$'000)

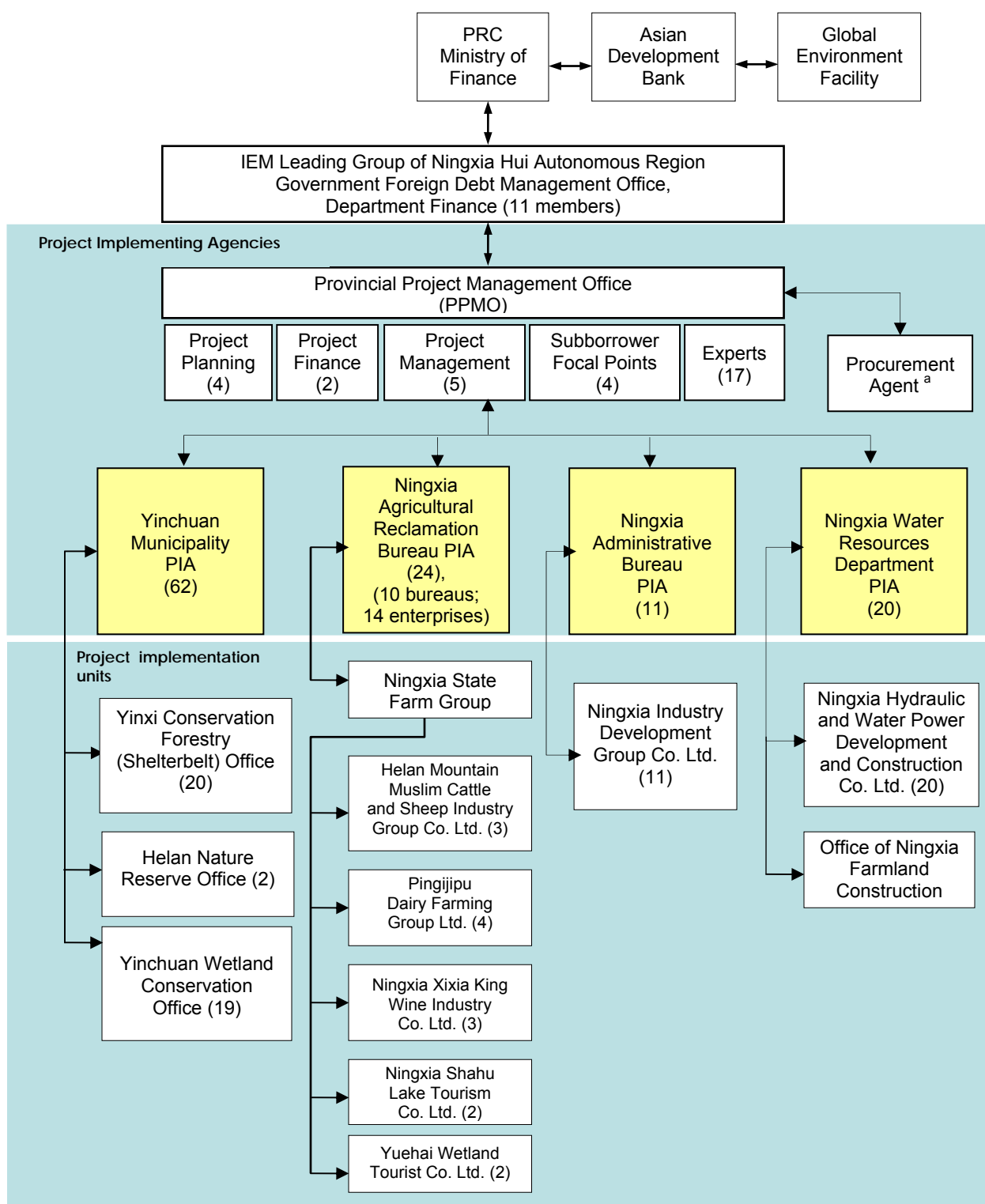
Item	Asian Development Bank		Global Environment Facility		Yinchuan Municipality		Ningxia Administration Bureau		Ningxia Agricultural Reclamation Bureau		Ningxia Water Resources Department		The Government		Total		Foreign Exchange	Local Currency (Excluding Taxes)	Duties and Taxes
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%			
A. Investment Costs																			
1. Civil Works																			
a. Structures	12,174.9	22.3	126.7	0.2	961.0	1.8	7,060.4	12.9	11,411.6	20.9	22,900.5	41.9	0	0	54,635.1	24.7	7,373.5	47,261.6	0
b. Field Infrastructure	9,463.7	26.9	281.5	0.8	15,332.0	43.5	1,726.7	4.9	2,947.4	8.4	5,155.8	14.6	321.6	0.9	35,228.7	15.9	3,028.7	32,200.0	0
c. Ecological Engineering	35,021.6	75.5	257.1	0.6	2,618.4	5.6	5.9	0	8,281.2	17.9	181.8	0.4	0	0	46,366.0	21.0	0.0	46,366.0	0
Subtotal (A1)	56,660.2	41.6	665.3	0.5	18,911.4	13.9	8,793.0	6.5	22,640.2	16.6	28,238.1	20.7	321.6	0.2	136,229.8	61.6	10,402.2	125,827.6	0
2. Equipment																			
a. Equipment–Machinery	3,330.3	81.2	116.1	2.8	0	0	0	0	0	0	0	0	653.3	15.9	4,099.7	1.9	1,142.0	2,304.4	653.3
b. Other Equipment	4,559.7	52.0	217.0	2.5	0	0	301.8	3.4	2,475.9	28.2	0	0	1,214.7	13.9	8,769.1	4.0	837.4	6,623.8	1,307.9
c. Office Equipment	1,093.4	76.8	117.8	8.3	0	0	0	0	0	0	0	0	212.6	14.9	1,423.8	0.6	129.5	1,081.7	212.6
Subtotal (A2)	8,983.4	62.9	450.9	3.2	0	0	301.8	2.1	2,475.9	17.3	0	0	2,080.6	14.6	14,292.6	6.5	2,108.9	10,009.9	2,173.8
3. Vehicles																			
a. Cars and Trucks	827.2	81.7	24.7	2.4	0	0	0	0	0	0	0	0	160.4	15.8	1,012.3	0.5	230.4	621.5	160.4
b. Tractors	43.5	84.1	0.0	0.0	0	0	0	0	0	0	0	0	8.2	15.9	51.7	0	12.0	31.5	8.2
c. Boats	346.0	84.2	0.0	0.0	0	0	0	0	0	0	0	0	65.0	15.8	411.0	0.2	91.8	254.2	65.0
Subtotal (A3)	1,216.7	82.5	24.7	1.7	0	0	0	0	0	0	0	0	233.6	15.8	1,475.0	0.7	334.2	907.2	233.6
4. Materials																			
a. Project Materials and Supplies	4,006.2	79.0	341.4	6.7	0	0	0	0	0	0	0	0	722.6	14.3	5,070.2	2.3	0.0	4,335.2	735.0
b. Planting Materials and Supplies	8,243.7	97.5	0	0	0	0	0	0	0	0	0	0	208.1	2.5	8,451.8	3.8	3,600.0	4,442.9	408.9
c. Livestock Purchase	2,671.1	89.0	0	0	0	0	0	0	0	0	0	0	330.1	11.0	3,001.2	1.4	2,000.0	671.1	330.1
d. Office Materials and Supplies	1,586.9	80.0	100.3	5.1	0	0	0	0	0	0	0	0	297.3	15.0	1,984.5	0.9	300.0	1,386.8	297.7
Subtotal (A4)	16,507.9	89.2	441.7	2.4	0	0	0	0	0	0	0	0	1,558.1	8.4	18,507.7	8.4	5,900.0	10,836.0	1,771.7
5. Training																			
a. IEM Training (PMO)	79.0	6.0	601.9	45.7	0	0	0	0	0	0	0	0	637.2	48.3	1,318.1	0.6	0	1,318.1	0
b. IEM Training (sectors) ^a	2,193.2	98.5	34.4	1.5	0	0	0	0	0	0	0	0	0	0	2,227.6	1.0	0	2,227.6	0
c. Vocational Training	0	0	137.5	100.0	0	0	0	0	0	0	0	0	0	0	137.5	0.1	0	137.5	0
d. Farmer Training and Extension	1,548.1	93.1	114.2	6.9	0	0	0	0	0	0	0	0	0	0	1,662.3	0.8	0	1,662.3	0
e. Demonstrations	437.9	100.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	437.9	0.2	0	437.9	0
Subtotal (A5)	4,258.2	73.6	888.0	15.4	0	0	0	0	0	0	0	0	637.2	11.0	5,783.4	2.6	0	5,783.4	0
6. Surveys and Studies																			
a. Planning	84.9	80.7	9.3	8.8	0	0	0	0	0	0	0	0	11.0	10.5	105.2	0	0	105.2	0
b. Monitoring and Evaluation	553.3	58.7	389.2	41.3	0	0	0	0	0	0	0	0	0	0	942.5	0.4	0	942.5	0
c. Field Technical Surveys and Trials	809.3	72.8	301.9	27.2	0	0	0	0	0	0	0	0	0	0	1,111.2	0.5	0	1,111.2	0
Subtotal (A6)	1,447.5	67.0	700.4	32.4	0	0	0	0	0	0	0	0	11.0	0.5	2,158.9	1.0	0	2,158.9	0
7. Resettlement																			
a. Land Acquisition	0	0	0	0	0	0	0	0	0	0	1,594.0	100.0	0	0	1,594.0	0.7	0	1,594.0	0
b. Compensation	0	0	0	0	0	0	0	0	0	0	1,009.4	98.7	12.9	1.3	1,022.3	0.5	0	1,022.3	0
Subtotal (A7)	0	0	0	0	0	0	0	0	0	0	2,603.4	99.5	12.9	0.5	2,616.3	1.2	0	2,616.3	0
8. Design and Supervision	0	0	0	0	2,987.0	37.8	857.7	10.9	2,198.5	27.8	1,859.0	23.5	0.0	0.0	7,902.2	3.6	0	7,902.2	0
9. Technical Assistance																			
a. International Consultants	274.1	41.0	395.1	59.0	0	0	0	0	0	0	0	0	0	0	669.2	0.3	669.2	0	0
b. National Consultants	134.3	16.7	670.7	83.3	0	0	0	0	0	0	0	0	0	0	805.0	0.4	0.0	805.0	0
Subtotal (A9)	408.4	27.7	1,065.8	72.3	0	0	0	0	0	0	0	0	0	0	1,474.2	0.7	669.2	805.0	0
10. Staff Costs	21.9	0.7	308.0	9.9	0	0	0	0	51.1	1.6	77.3	2.5	2,645.3	85.2	3,103.6	1.4	0.0	3,103.6	0
Subtotal (A)	88,056.7	46.0	3,844.4	2.0	21,898.4	11.4	9,952.5	5.2	27,365.7	14.3	32,777.8	17.1	7,489.3	3.9	191,384.8	86.6	19,080.3	168,125.4	4,179.1
B. Recurrent Costs																			
1. Operation and Maintenance																			
a. Civil Works	0	0	0	0	1,797.8	16.6	1,358.7	12.5	3,331.4	30.7	4,351.9	40.1	0	0	10,839.8	4.9	0	10,839.8	0
b. Equipment	0	0	0	0	697.1	16.4	860.3	20.3	2,182.0	51.5	478.9	11.3	20.8	0.5	4,239.1	1.9	0	4,239.1	0
c. Office Equipment	0	0	0	0	63.8	9.6	0	0	0	0	0	0	599.2	90.4	663.0	0.3	0	663.0	0
d. Vehicles	0	0	0	0	213.8	17.3	112.1	9.1	172.0	14.0	9.7	0.8	724.7	58.8	1,232.3	0.6	0	1,232.3	0
Subtotal (B)	0	0	0	0	2,772.5	16.3	2,331.1	13.7	5,685.4	33.5	4,840.5	28.5	1,344.7	7.9	16,974.2	7.7	0	16,974.2	0
Total Project Cost	89,504.2	42.5	4,544.8	2.2	24,670.9	11.7	12,283.6	5.8	33,051.1	15.7	37,618.3	17.9	8,845.0	4.2	210,517.9	95.3	19,080.3	187,258.5	4,179.1
Interest during Implementation	10,225.8	100.0	0	0	0	0	0	0	0	0	0	0	0	0	10,225.8	4.6	0	10,225.8	0
Commitment Charges	270.0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	270.0	0.1	0	270.0	0
Total Disbursement	100,000.0	45.2	4,544.8	2.1	24,670.9	11.2	12,283.6	5.6	33,051.1	15.0	37,618.3	17.0	8,845.0	4.0	221,013.7	100.0	19,080.3	197,754.3	4,179.1

IEM = integrated ecosystem management, PMO = project management office.

^a IEM training for staff of implementing and other agencies.

Source: Asian Development Bank estimates.

PROJECT ORGANIZATION CHART

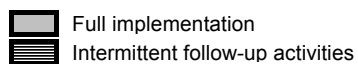
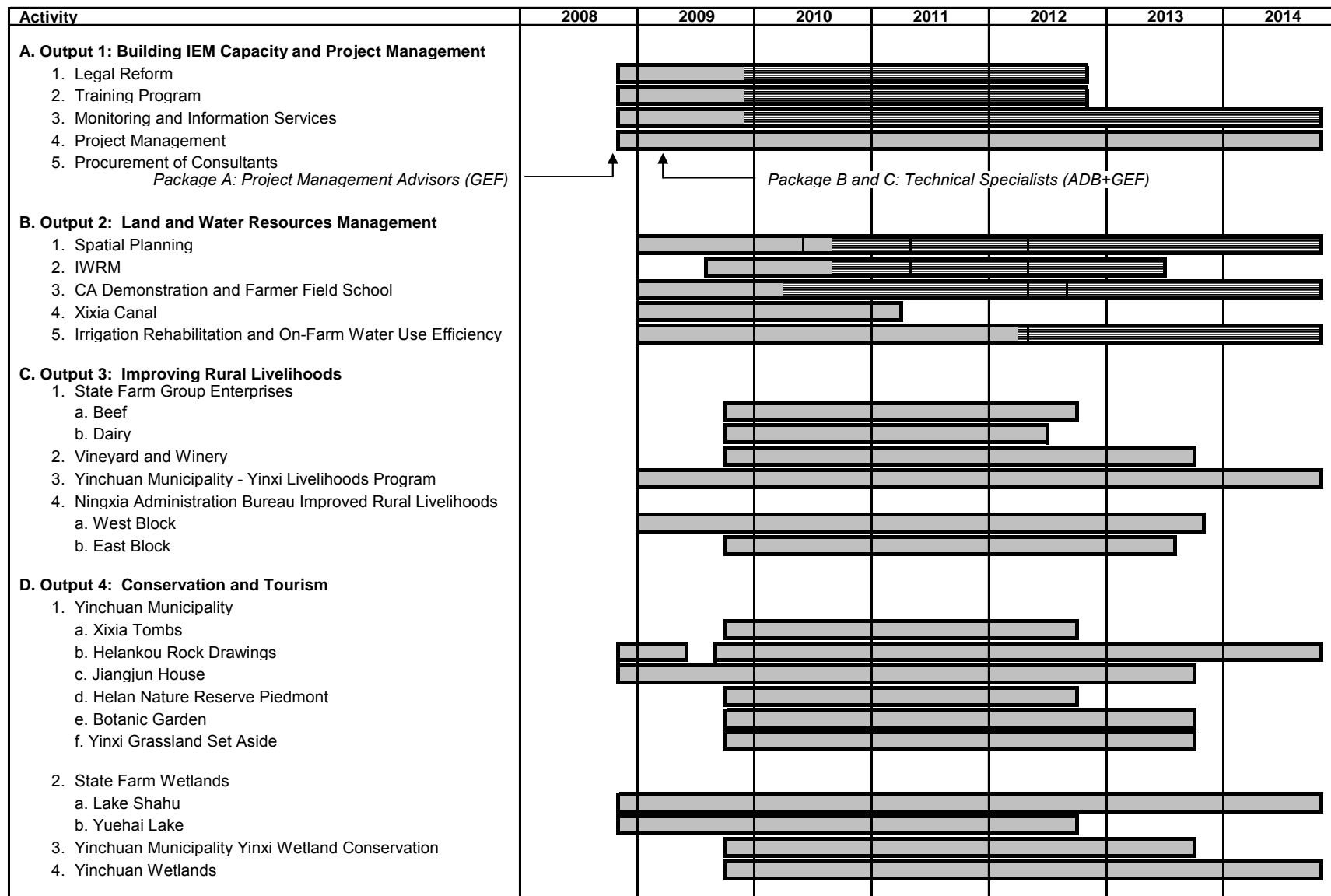


Co. = company, IEM = integrated ecosystem management, Ltd. = limited, PIA = project implementation agency, PPMO = provincial project management office, PRC= People's Republic of China.

^a A procurement agent will be contracted by the PPMO to process all procurement on behalf of the implementing agencies. Number in brackets is the number of staff involved in project management and implementation.

Source: Asian Development Bank.

IMPLEMENTATION SCHEDULE



ADB = Asian Development Bank, CA = conservation agriculture, GEF = Global Environment Facility, IEM = integrated ecosystem management, IWRM = integrated water resource management.

Source: Asian Development Bank.

PROCUREMENT PLAN

Project Name: People's Republic of China (PRC): Ningxia Integrated Ecosystem and Agricultural Development Project	Loan Number: 38660
Loan Amount: \$100 million	Executing Agency: Ningxia Finance Department (NFD) of the Ningxia Hui Autonomous Region Government (NHARG)
Date of First Procurement Plan: 24 April 2008	

A. Project Procurement Thresholds

1. Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds will apply to procurement of goods and works.

Procurement of Goods, Works, and Services	
Method	Threshold
International Competitive Bidding (ICB) for Works	> \$10,000,000
ICB for Goods	> \$1,000,000
Limited International Bidding (LIB)	<= \$1,000,000
National Competitive Bidding (NCB) for Works	<= \$10,000,000 > \$100,000
NCB for Goods	<= \$1,000,000 > \$100,000
Shopping (SHP) for Works	<= \$100,000
SHP for Goods	<= \$100,000
SHP for Goods - Direct Purchase from a Supplier	<= \$10,000 (see also comments below)
Direct Contracting (DC)	None, however, see comments below
Community Participation (CP)	<= \$30,000 (see also comments below)
Force Account	None, however, see comments below
Quality- and Cost-Based Selection (QCBS)	None, Threshold for Type of Proposal (FTP/STP/BTP) ^a
Individual Consultant Selection	None, see comments below

^a FTP (full technical proposal - >\$1,000,000), STP (simplified technical proposal - >\$600,000- <=\$1,000,000), BTP (biodata technical proposal - <= \$600,000).

B. ADB Prior or Post Review

2. Except as ADB may otherwise agree, the following prior or post review requirements apply to the various procurement and consultant recruitment methods used for the Project.

Procurement of Goods, Works, and Services		
Procurement Method	Prior or Post	Comments
International Competitive Bidding (ICB) for Works	Prior	Usage subject to ADB's <i>Procurement Guidelines</i> (2007, as amended from time to time) and Project Administration Instruction (PAI) 3.03.
ICB for Goods	Prior	Usage subject to ADB's <i>Procurement Guidelines</i> and Project Administration Instruction (PAI) 3.03.
Limited International Bidding (LIB)	Prior	Usage subject to ADB's <i>Procurement Guidelines</i> , para. 3.2, and PAI 3.03. H.1. 30.
National Competitive Bidding (NCB) for Works	Prior	Usage subject to the provisions of the NCB Annex, ADB's <i>Procurement Guidelines</i> , paras. 3.3–3.4; and PAI 3.04. Prior review applies to the first three NCB contracts conducted by the project implementing agency or procurement agent, irrespective of value.
NCB for Goods	Prior	

Procurement of Goods, Works, and Services		
Procurement Method	Prior or Post	Comments
Shopping (SHP) for Works	Post	Usage subject to ADB's <i>Procurement Guidelines</i> (2007, as amended from time to time), para. 3.5, and PAI 3.04 C. 4. and 5.
SHP for Goods	Post	Usage subject to ADB's <i>Procurement Guidelines</i> , para. 3.5, and PAI 3.04 C. 4. and 5.
SHP for Goods - Direct Purchase from a Supplier	Post	Usage subject to PAI 3.04 C. 6.
Direct Contracting	Post	Exceptional method only applied in accordance with ADB's <i>Procurement Guidelines</i> , para. 3.6, and PAI 3.05 A. 2–5.
Community Participation	Prior	Community participation will only involve contracting community labor for a variety of community-based initiatives (e.g., tree planting, and rehabilitation of rural roads and tertiary canals) ADB needs to be satisfied that the community, through an administrative committee or village unit, can demonstrate the capacity to mobilize and manage local labor contracted by the project implementing agency (PIA) or procurement agent in accordance with ADB's <i>Procurement Guidelines</i> , para. 3.17, PAI 3.05 H, and PAI 5.12; prior review applies to the first community participation contract for each community group.
Force Account	Prior	Exceptional method only applied in accordance with ADB's <i>Procurement Guidelines</i> , para. 3.8, and PAI 3.05 C. 7–9. Prior review applies to the first contract implemented by each PIA.
Recruitment of Consulting Firms		
Consulting Firm Selection by EA QCBS (80:20)	Prior	The Executing Agency selects and engages the consultant; and makes four submissions to ADB for approval: (i) draft shortlist and draft request for proposal, (ii) technical proposal evaluation report, (iii) overall (technical and financial) ranking report, and (iv) draft contract following <i>Guidelines on the Use of Consultants</i> (2007, as amended from time to time).
Recruitment of Individual Consultants		
Individual Consultant Selection by ADB (and engagement by the Executing Agency)	Prior	ADB selects individual consultant in concurrence with the Executing Agency, which engages the consultant and submits the draft contract to ADB for approval following ADB's <i>Guidelines on the Use of Consultants</i> and in accordance with PAI 2.03 Part B.
Individual Consultant Selection and Engagement by the Executing Agency	Prior	The Executing Agency selects and engages individual consultants and submits to ADB: (i) shortlist, curriculum vitae, and evaluation and/or ranking of individual consultants, (ii) draft contracts for selected individuals following ADB's <i>Guidelines on the Use of Consultants</i> and in accordance with PAI 2.03 Part B.

C. Works and Goods Contracts

Package	Contract Value (\$'000)	Number of Packages	Procurement Method	Forecasted Advertisement Date	Comments
A. Works Contracts					
1. Yinchuan Municipal Government					
a. Yinchuan Wetlands Conservation					
i. Mingcui Lake Wetlands Rehabilitation Works	1,380.21	1	NCB	First 18 months	
ii. Sanding Lake Wetlands Rehabilitation Works	578.14	1	NCB		
iii. Yueya Lake Wetlands Rehabilitation Works	177.36	1	NCB	First 18 months	
iv. Tonggui Wetlands Rehabilitation Works	144.76	1	NCB		
v. Baohu Lake Wetlands Rehabilitation Works	684.86	1	NCB	First 18 months	

Package	Contract Value (\$'000)	Number of Packages	Procurement Method	Forecasted Advertise-ment Date	Comments
vi. Haibao Lake Wetlands Rehabilitation Works	1,123.80	1	NCB	First 18 months	
vii. Yinchuan Wetland Information Office	69.86	1	SHP		
b. Yinchuan Yinxi Eco-Agricultural Development					
i. Yinxi Nursery Work Station	18.50	1	SHP		
ii. Wetlands Water Control and Vegetation Investments	1,543.34	Multiple	SHP/CP		
iii. Yinxi Grassland Fire Monitoring and Prevention Works	294.31	Multiple	SHP		
iv. Jujube (Chinese date)	3,712.48	Multiple	SHP/CP		
v. Wolfberry	3,871.00	Multiple	SHP/CP		
vi. Grapes	8,212.22	Multiple	SHP/CP		
vii. Fruit Mulberry	3,112.22	Multiple	SHP/CP		
viii. Mongolian Oblate Peach	3,122.22	Multiple	SHP/CP		
ix. Medicinal Herbs (honeysuckle)	1,753.70	Multiple	SHP/CP		
x. Fodder (alfalfa)	2,425.12	Multiple	SHP/CP		
xi. Nursery Development	2,048.31	Multiple	SHP/CP		
xii. Shelter Belts—gramineae spp	1,614.34	Multiple	SHP/CP		
xiii. Shelter Belts—zygophyllaceae spp.	2,073.36	Multiple	SHP/CP		
xiv. Establishment of Grassland Enclosure	1,371.93	Multiple	SHP/CP		
c. Helan Mountain Nature Reserve					
i. Nature Protection Works	41.81	1	SHP		
2. State Farm					
a. High-Value Horticulture					
i. Viniculture	5,639.20	Multiple	SHP/CP		
b. Yuehai Lake					
i. Water Resources Management	232.99	Multiple	SHP		
ii. Biodiversity Conservation Works	449.03	Multiple	SHP		
iii. Capacity Building and Structures	726.65	1	NCB	First 18 months	
iv. Tourism and Supporting Facilities	719.79	1	NCB	First 18 months	
v. Landscaping of Protected Areas	1,766.36	1	NCB	First 18 months	
vi. Aquatic Plants Processing Facilities	186.29	Multiple	SHP		
vii. Aquaculture Construction, Processing, and Services Facilities	945.41	Multiple	SHP		
viii. Aquatic Poultry Production Construction	1,553.04	1	NCB	First 18 months	
c. Shahu Lake					
i. Holiday Houses Construction	667.19	1	NCB	First 18 months	
ii. Scenic Structures (lotus pond)	322.04	1	NCB	First 18 months	
iii. Scenic Structures (lake islands)	591.57	1	NCB	First 18 months	

Package	Contract Value (\$'000)	Number of Packages	Procurement Method	Forecasted Advertise-ment Date	Comments
iv. Establishment of Water Plants	3,366.51	Multiple	CP		
v. Aquaculture Works	323.20	Multiple	CP		
vi. Wetland Education Center	1,177.24	1	NCB	First 18 months	
vii. New Water Channels	374.33	1	NCB	First 18 months	
viii. Wetlands and Bird Conservation Works	580.60	1	NCB	First 18 months	
d. Dairy Production					
i. Household Facilities	5,645.23	Multiple	NCB/SHP	First 18 months	
ii. Dairy Zone Common Facilities	765.59	1	NCB		
iii. Fodder Base and Shelter Belts	553.13	Multiple	CP		
e. Beef Production					
i. Cattle Breeding Unit and Fattening Feedlot	1,392.19	1	NCB	First 18 months	
f. Beef Production					
i. Conservation Agriculture Field Infrastructure	440.05	Multiple	SHP/CP	First 18 months	
ii. Beef Slaughterhouse and Processing Buildings	396.56	1	NCB	First 18 months	
iii. Household and Farm Digester	5,950.84	Multiple	NCB/SHP	First 18 months	
3. Sustainable Water Resources					
a. Xixia Canal Construction					
i. Xixia Tombs Inverted Siphon	8,527.94	Multiple	NCB	First 18 months	
ii. Canal Construction and Temporary Works	4,890.69	Multiple	NCB	First 18 months	
iii. Secondary Canal Rehabilitation	3,270.25	Multiple	NCB	First 18 months	
iv. On-Farm and Temporary Works	14,596.25	Multiple	NCB	First 18 months	
v. IWRM Planning Civil Works	924.32	1	NCB	First 18 months	
4. Administration Bureau High Technology Agriculture					
a. High Technology Agriculture					
i. Farmer Ecological Houses and Digesters	2,287.45	Multiple	CP/SHP		
ii. Mushroom Greenhouses	285.77	Multiple	CP		
iii. Storage, Processing, and Distribution Center	884.99	Multiple	NCB	First 18 months	
iv. Management and Technical Service Center	687.84	Multiple	NCB	First 18 months	
v. High-Tech Agricultural Site Infrastructure	1,432.08	Multiple	SHP/CP		
vi. Beef Cattle Breeding and Fattening Building and Structures	1,373.74	Multiple	SHP/CP		
vii. Enclosure, Wells, and Canals	295.55	Multiple	SHP/CP		
viii. Manure Processing Buildings	89.88	1	SHP		
ix. Plant Breeding and Seeding Center Buildings	434.15	1	NCB	First 18 months	

Package	Contract Value (\$'000)	Number of Packages	Procurement Method	Forecasted Advertise-ment Date	Comments
B. Goods Contracts					
1. Yinchuan Municipal Government					
a. Yinchuan Wetlands Conservation					
i. Office and Monitoring Equipment (Year 1-Part 1)	87.45	1	SHP		
ii. Office and Monitoring Equipment (Year 1-Part II)	89.00	1	SHP		
iii. Office and Monitoring Equipment (Year 2)	95.34	1	SHP		
iv. Vehicle	282.02	1	NCB	First 18 months	
b. Yinchun Yinxi Eco-Agricultural Development					
i. Yinxi Agricultural Machinery	588.23	1	NCB	First 18 months	One ICB Package for EB3, 4 and 5
ii. Yinxi Nursery Equipment	487.45	1	NCB	First 18 months	
iii. Yinxi Pump Irrigation	7,130.25	1	ICB	First 18 months	
iv. Yinxi Pipe Irrigation	4,109.58			First 18 months	
v. Yinxi Riser Irrigation	4,141.84				
vi. Yinxi Office Equipment and Vehicles	157.44	1	NCB	First 18 months	
vii. Grassland Fire Monitoring and Prevention Equipment	201.68	1	NCB	First 18 months	
c. Helan Mountain Nature Reserve					
i. Nature Reserve Protection Works	54.33	1	SHP		
2. State Farm					
a. High Value Horticulture					
i. Viniculture Field Equipment Vehicle and Office	84.61	1	SHP		
b. Yuehai Lake					
i. Materials of Aquatic Plants and Aquaculture	1,860.16	Multiple	SHP		
ii. Aquatic Plants Processing Facilities	249.55	Multiple	SHP		
iii. Aquaculture and Poultry Production Equipment	476.97	Multiple	SHP		
iv. Habitat and Wildlife Monitoring Equipment	308.54	Multiple	SHP		
v. Capacity Building Equipment	216.82	1	NCB	First 18 months	
vi. Tourism Facilities and Materials	444.24	1	NCB	First 18 months	
c. Shahu Lake					
i. Displays and Education	300.70	1	NCB	First 18 months	
ii. Monitoring Equipment and Vehicle	213.45	1	NCB	First 18 months	
iii. Aquaculture Equipment	204.14	1	NCB	First 18 months	
iv. Telescopes	73.03	1	SHP		
d. Dairy Production					
i. Milking Equipment	1,898.01	7	NCB	First 18 months	
ii. Veterinarian Supplies	1,522.24	5	LIB		

Package	Contract Value (\$'000)	Number of Packages	Procurement Method	Forecasted Advertise-ment Date	Comments
iii. Veterinary Equipment	189.73	5	NCB/SHP	First 18 months	
iv. Furniture and Fittings	21.99	1	SHP		
e. Beef Production					
i. Breeding Cattle	654.80	Multiple	SHP/DC		
ii. Breeding and Fattening, Slaughtering, and Processing Equipment	290.25	10	SHP		
iii. Conservation Agriculture Machinery	785.42	1	NCB	First 18 months	
iv. Household Support	1,285.64	Multiple	NCB/SHP	First 18 months	
v. Furniture and Fittings	43.34	1	SHP		
3. Sustainable Water Resources					
a. Xixia Canal Construction					
i. Canal Equipment	276.46	1	NCB		
4. Administration Bureau High Technology Agriculture					
a. High Technology Agriculture					
i. High-Tech Modern Greenhouse	4,357.96	1	ICB	First 18 months	
ii. Solar Energy Systems	287.84	1	NCB	First 18 months	
iii. Management and Technical Service Center Equipment	562.61	Multiple	NCB/SHP	First 18 months	
iv. Beef Cattle Breeding and Fattening Equipment and Vehicles	337.26	1	NCB	First 18 months	
v. Household Cattle	871.41	Multiple	NCB/SHP	First 18 months	
vi. Manure Processing Equipment	38.03	1	SHP		
vii. Plant Breeding and Seeding Equipment	254.98	1	NCB	First 18 months	
viii. Standard Vegetable Greenhouses for Households	494.70	Multiple	SHP		
ix. Storage, Processing, and Distribution Equipment, and Vehicles	374.64	1	NCB	First 18 months	
a. Ningxia Agricultural Integrated Development Office					
a. Building IEM Institutional Arrangements					
i. IEM Monitoring and Evaluation Equipment	30.01	1	SHP		
ii. Project Management Office Equipment	683.31	1	NCB	First 18 months	
iii. Project Management Vehicles	97.28	1	SHP		
b. Sustainable Land and Water Management					
i. Conservation Agriculture Machinery	140.62	1	NCB	First 18 months	
ii. Site Specific Nitrogen Management Materials and Equipment	39.07	1	SHP		

D. Consulting Services Contracts

Package	Contract Value (\$'000)	Number of Packages	Procurement Method	Forecasted Advertise-ment Date	Comments
C. Consulting Services Contracts					
1. GEF IEM Project Management Advisors	154.46	Individual Consultants		First 18 months	100% GEF funding ^a
2. GEF Technical Specialists and/or Consultants	900.26	Consulting Firm		First 18 months	100% GEF funding ^b
3. IWRM Planning Consultants	409.18	Individual Consultants		First 18 months	100% ADB funding ^c

ADB = Asian Development Bank, GEF = Global Environmental Facility, IEM = integrated ecosystem management, IWRM = integrated water resource management.

^a ADB will be responsible for selection (in concurrence with the Executing Agency), and the Executing Agency for engagement of the consultants.

^b Selection and engagement of the consultant, applying the quality- and cost-based selection (80:20), will be the responsibility of the PPMO.

^c Selection and engagement of the consultant will be the responsibility of the PPMO.

Source: Asian Development Bank estimates.

E. Training Groups and Packages

Groups	Item	Value (\$'000)
A.	1. Implementing Agency Capacity Training	1,746.20
B.	2. Building IEM Institutional and Demonstration Arrangements	3,462.62
C.	3. Land and Water Planning and Management	404.42
Total		5,613.24

IEM = integrated ecosystem management.

Source: Asian Development Bank estimates.

Notes:

(i) Where multiple procurement packages are envisaged within a "project" or "subproject" the above plan indicates more than one procurement method; the actual method applied will be determined by the value of a package or packages (see note ii) as defined by the procurement threshold table above.

(ii) To provide full details, this plan breaks the goods and works to be procured into packages. For the sake of economy and efficiency, the implementing agency (or procurement agent) may call for bids consisting of multiple packages as appropriate. Evaluation and comparison of bids will be done on the basis of a package or a combination of packages, or as a total of packages in order to arrive at the least-cost combination for the implementing agency.

TERMS OF REFERENCE FOR CONSULTING SERVICES

A. Scope of Services

1. Consulting services are required to support the project implementing agencies (PIAs) and the provincial project management office (PPMO) to build integrated ecosystem management (IEM) capacity. Through the expertise of the consulting team, the Ningxia Hui Autonomous Region government (NHARG) will gain access to IEM experience and technical skills not yet developed or available locally. Consultants will support the PPMO to build IEM capacity through the development of skills, trainers, resource materials, demonstration of technologies, and delivery of training. Supplementary Appendix B provides detailed terms of reference.

2. The consultants will provide international and national experience and best practices for developing IEM approaches in the project area. Technical support and training programs will specifically address major constraints to the introduction of IEM approaches including (i) knowledge and understanding for decision makers, (ii) institutional barriers, (iii) technical gaps, and (iv) systems for the rural poor and socially disadvantaged to access and share benefits equitably.

3. The initial period of the Project will address planning needs in the project area using spatial planning procedures to define land use capability, ecologically sensitive areas, and conservation zones. An integrated water resource management plan (IWRMP) will be prepared early in the Project. The introduction of management zones will be supported through the development of management planning, demonstration of new technologies, and development and extension of best management practices for land users. These systems will be supported through the capacity-building programs; introduction of institutional reforms; use of supply contracting and market chain linkages; and strengthening of farmer, grower, and water user associations to enable them to (i) access technical services, (ii) deliver farmer field schools, and (iii) link producers to supply and market chains. The consultants will work with counterparts at each level to produce the expected outputs.

4. The Global Environment Facility (GEF) proposes to finance 100 person-months of consulting services (16 person-months of international and 84 person-months national). The focus will be on introducing conservation management systems that incorporate values related to endangered species, local biodiversity (associated with both wetlands and terrestrial systems), and ecosystem services. The consultants will work closely with agency staff, enterprise managers and officials, and resource managers to develop guidelines for participatory spatial land use planning with supporting implementation procedures and guidelines, with the objective of mainstreaming conservation and ecosystem values within wider NHARG economic development planning. Consultants will support the development of policy, planning procedures, technical guidelines and manuals, and training of trainers so that IEM systems are implemented during the life of the Project and institutionalized within the NHARG development program. The Asian Development Bank (ADB) loan funds will support an additional 11 person-months of international and 16 person-months of national consultants.

5. Consultant inputs will support effective involvement and participation of all stakeholders, development of participatory and user-based monitoring and evaluation frameworks, and information services that support communication of lessons through media and education and awareness programs. Technical input will be provided across a range of geographic scales and institutions. These inputs will be coordinated and then integrated through linkages between the

project area spatial land use planning that will identify special management zones and sites. Within these zones and sites, the consultants will support the PIAs to develop management planning (including conservation protected areas, habitat protection zones) and supporting work plans. Where required, these plans will include the introduction and demonstration of new management systems and technologies, e.g., conservation agriculture, water use efficiency, nitrogen management, and habitat restoration.

B. Summary of Inputs

6. Tables A8.1, A8.2, and A8.3 summarize the consultant inputs.

Table A8.1: Package A: Support to Project Management (GEF-financed)
(person-months)

Position	Year 1	Year 2	Year 3	Year 4	Total
IEM management specialists					
International IEM project management specialist	2	2	—	—	4
National IEM project management specialist	4	3	—	—	7
Total	6	5	—	—	11

— = data not calculated, GEF = Global Environment Facility, IEM = integrated ecosystem management.

Source: Asian Development Bank estimates.

Table A8.2: Package B: Technical Support (GEF-financed)
(person-months)

Position	Year 1	Year 2	Total
A. International			
Biodiversity conservation specialist	3	3	6
Wetland management specialist	3	3	6
Subtotal (A)	6	6	12
B. National			
Biodiversity conservation specialist	4	4	8
Wetland management specialist	2	3	5
Wildlife and conservation ecology specialist	2	3	5
Land-use and planning specialist	3	3	6
Tourism specialist	—	3	3
Training specialist	2	3	5
Conservation agriculture—agronomy specialist	3	3	6
Conservation agriculture—water use efficiency specialist	3	3	6
Conservation agriculture-mechanization specialist	3		3
Legal specialist	3	4	7
Sociologist	2	2	4
Database and data analysis	4	4	8
Geographic information system specialist	4	2	6
Outreach and communication specialist	2	3	5
Subtotal (B)	37	40	77
Total	43	46	89

— = data not calculated, GEF = Global Environment Facility.

Source: Asian Development Bank estimates.

Table A8.3: Package C: Water Resource Specialists (ADB Loan-Financed)
(person-months)

Position	Year 1	Year 2	Year 3	Year 4	Total
IWRM and/or groundwater modeling specialist	2	3	3	3	11
Water resource management specialist	4	4	4	4	16
Total	6	7	7	7	27

ADB = Asian Development Bank, IWRM = integrated water resources management.

Source: Asian Development Bank estimates.

C. Consultant Services

1. Financed by the Global Environment Facility

7. International Consultants. GEF will finance the following:

- (i) **IEM project management specialist** (4 person-months): (a) support the PPMO to establish and operate effective project administration, management, and procurement systems; (b) provide guidance for recruitment and disbursement; (c) help the PPMO with procurement and contract management; and (d) familiarize the PPMO and counterpart staff with ADB guidelines.
- (ii) **Biodiversity conservation and IEM specialist and team leader** (6 person-months): develop (a) programs for improved conservation management in the extended Helan piedmont conservation management area (HPCMA) and the Project's wetland sites, (b) biodiversity planning for inclusion in the spatial planning procedures, (c) a comprehensive conservation management training program and train trainers, and (d) a biodiversity information data set.
- (iii) **Wetland management and conservation specialist** (6 person-months): develop a wetland management information system for each project site, advise and train wetland personnel and develop training materials, and develop monitoring research programs and habitat restoration plans.

8. National Consultants. GEF will finance the following:

- (i) **Project management advisor** (7 person-months): support the PPMO with project administration; project management; procurement and disbursement systems and their implementation; and help with procurement and contract management, and information and management information systems for project administration, reporting, and procurement.
- (ii) **Biodiversity and protected area specialist** (8 person-months): prepare a management plan for Helan Nature Reserve and HPCMA, develop and deliver training courses for field and management staff, construct a management information system and biodiversity conservation data set, and help implement a conservation monitoring system.
- (iii) **Wetland management specialist** (5 person-months): update wetland biodiversity entities; develop wetland information systems and education centers; develop training course and materials, and train trainers; and develop wetland management and restoration plans.
- (iv) **Wildlife and conservation ecology specialist** (5 person-months): help site managers update wildlife inventories and species lists; complete threat analyses; prepare, implement, and monitor endangered species management plans; develop wildlife training programs, course materials and field exercises; and train trainers.
- (v) **Land use and spatial planner** (6 person-months): implement an awareness and training program on spatial planning, assist in designing detailed planning guidelines, implement a pilot planning program and evaluate and adopt guidelines, prepare data sets and base maps, assist in developing zoning plans, and help integrate the IWRMP into the spatial plan.
- (vi) **Tourism specialist** (3 person-months): help with site management plans, develop tourism information systems, complete strategic tourism marketing plans, and prepare programs and course materials for training of trainers.

- (vii) **Training specialist** (5 person-months): complete an IEM training needs assessment; assess existing training provider and identify potential trainers; plan and coordinate the development of training courses, materials, and scheduling of training; organize postgraduate training programs and study tours; develop a training evaluation program, and implement and link training programs to farmer schools and outreach programs.
- (viii) **Conservation agriculture—ecological agriculture and agronomic and nutrient specialist** (6 person-months): design conservation agriculture demonstration programs; assist stakeholders including smallholders and staff of enterprises to introduce and monitor conservation agriculture; conduct awareness seminars and training for the PIAs, develop training materials, and train trainers; support the introduction of farmer schools; implement site-specific nitrogen management demonstration; and design and implement a monitoring and evaluation program for all conservation agriculture activities.
- (ix) **Conservation agriculture—water use efficiency specialist** (6 person-months): design and implement a training of trainers program for on-farm water use efficiency; design and implement conservation agriculture demonstration program for irrigation rehabilitation; support the development of water user associations and farmer schools including preparation of resource materials; and train farmer school facilitators.
- (x) **Conservation agriculture—mechanization specialist** (3 person-months): assess machinery needs and specifications for conservation agriculture demonstrations to the state farm and smallholders and the Ningxia Department of Agriculture, develop training programs and deliver training of trainers, and prepare policy recommendations on the extension of mechanization for conservation agriculture.
- (xi) **Legal specialist** (7 person-months): review the proposed legal reform agenda especially relating to conservation and wetlands, develop and draft regulations for implementing spatial planning and enforcing plan implementation, and conduct related legal studies for the Lead Group.
- (xii) **Sociologist** (4 person-months): review final designs, implement an awareness and mobilization program, help the PIAs to develop and implement gender action plans, and develop social and beneficiary monitoring programs and link social datasets to IEM databases.
- (xiii) **Database and information management specialist** (8 person-months): support the establishment of the IEM information center and information services; develop protocols and procedures, and provide training in these; develop data collection systems; design and implement a web-based IEM portal; and develop IEM knowledge products for staff of the PIAs, PPMO, NHARG, schools, and the general public.
- (xiv) **Geographic information system specialist** (6 person-months): develop spatial databases and spatial analysis, prepare project maps, develop training programs and course materials, introduce spatial modeling for planning scenarios, build capacity in remote sensing and satellite imagery, and integrate monitoring data with the spatial mapping and models.
- (xv) **Outreach and communication specialist** (5 person-months): develop communication and public awareness strategies for the Project, train staff in awareness-raising techniques and systems, develop materials and support the PPMO and the PIAs to hold awareness and education programs, and help the conservation education centers and IEM data center to develop resource materials.

2. Financed by the Asian Development Bank

9. The ADB loan will finance the following specialists and their activities:

- (i) **International water resource management specialist** (11 person-months): assist the Ningxia Water Resources Department to develop an IWRMP, including a complete data needs assessment; define the overall IWRMP program including special studies into salt and water balance; develop capacity to complete modeling of water resources to support the IWRMP; develop a training program and train trainers; and prepare a medium-term set of supply and demand projections, with recommended water resource management strategies.
- (ii) **National water resource management specialist** (16 person-months): supervise implementation of the IWRMP, help with management of discussion papers and their use in consultation, develop training materials and deliver training programs, and provide water resource management and water resource management zones for the spatial planning program.

D. Outputs

10. The consultants will provide the PPMO with the following main outputs: (i) project management and training: project administration manual updates, including procurement plans and operating guidelines; training of PPMO and PIA staff in project administration; training needs assessment; (ii) policy and legal reform research papers and draft of major regulations; (iii) monitoring framework and manuals including beneficiary monitoring and contract guidelines, and participation and beneficiary monitoring program; (iv) IEM information center operations manual and training, including design for web portal with data protocols; and communication and outreach strategy; (v) manual of spatial planning procedures and implementation guidelines, spatial plan maps prepared with management zone descriptions and best management practices for each zone, and guidelines for integration of biodiversity and cultural conservation into spatial plans; (vi) groundwater report, water balance study report, integrated water resources management (IWRM) planning guidelines, IWRM draft plan, and water trading options report; (vii) conservation agriculture demonstration guidelines and work plan for each site, training of trainers for conservation agriculture in farmer field schools, conservation agriculture resource materials for smallholders, conservation agriculture monitoring framework, conservation agriculture equipment specification and operator manuals, conservation agriculture policy recommendation for expanding machinery specifications, fertilizer demonstration site work plan and monitoring framework, capacity building for water user groups and integration with conservation agriculture, and conservation agriculture awareness and equipment specification report; (viii) smallholder social mobilization and contract award guidelines; (ix) management planning guidelines for wetlands including threat assessment, and wetland monitoring framework; (x) update of biodiversity status and endangered species lists; (xi) conservation landscape plan for the HPCMA; (xii) tourism site management guidelines for Shahu Lake, Helan Nature Reserve, and Yuehai Lake; (xiii) guidelines for conservation education and public awareness; and (xiv) other reports and guidelines as required.

FINANCIAL AND ECONOMIC ANALYSES

A. Analysis of the Project

1. Project Assessment

1. The Project has 23 main activities overall (Supplementary Appendix D). Of these, 13 do not generate direct, quantifiable, economic benefits, but are important public goods for environmental management and capacity building; only project costs are estimated. For the remaining 10, the benefits and costs are estimated, and financial and economic indicators assessed (Table A9.1). Together, these investments will ensure reforms provide livelihood improvements, poverty reduction, and sustainable economic development in the project area.

Table A9.1: Assessment of Project Activities

Activity	Main Project Activities
Cost estimates only	Building IEM institutional arrangements (including legal reform, information management, training and capacity building), project management, spatial planning, IWRM planning, Helanshan Nature Reserve, Yinxi wetlands and grassland set-aside, conservation agriculture, Yinchuan City wetlands
Benefits and costs	Water resources (sustainable land resources) ^a , Xixia Canal (irrigation system and on-farm water efficiency), ^b beef production, dairy production, vineyards, Shahu Lake, Yuehai Lake, Yinxi alternative livelihoods, high technology agriculture

IEM = integrated ecosystem management, IWRM = integrated water resources management.

^a Only benefits relating to conservation agriculture are estimated.

^b Benefit-cost evaluation combined with Xixia Canal.

Source: Asian Development Bank.

2. Benefit and cost estimates are based on feasibility study estimates originally prepared by the project implementing agencies (PIAs) for the various subprojects. The technical assistance team reviewed the estimates and modified or reformulated them as necessary to meet the Project's requirements and to ensure conformity with the relevant Asian Development Bank (ADB) *Guidelines for the Economic Analysis of Projects* (1997) and *Financial Management and Analysis of Projects* (2005). The Project has two types of subprojects: those concerned with agricultural production and for which quantifiable benefits are physical outputs (such as beef, wine, vegetables); and the wetlands and cultural relic sites for which the quantifiable outputs are visitor numbers and visitor receipts. In one case, Yuehai Lake, benefits are a combination of visitor receipts and sales of aquatic products from the lake.

3. For subprojects that involve agricultural production, the expected benefits are sufficient to provide incentives for households to participate in subproject activities and adopt new production and management methods that will be introduced by the subprojects. For this group of subprojects, per household annual incremental net benefits vary between CNY2,400 and CNY37,000. Net benefits reflect the resources, including labor, involved in the production activity.

4. Benefit estimates are based on the current situation and data in each case, and on conservative assessments of future developments with the Project. With- and without-project scenarios are identified for each subproject. However, agricultural subprojects have a background issue of land degradation, which was not directly considered in the analysis. Most scenarios assume that the future without the Project is more or less the same as the present.

This tends to overestimate the without-project production since given continued land degradation, present production is more likely to only be maintained with increasing inputs and costs, and declining returns for producers.

5. The Project will generate many nonquantified benefits, most fall into two broad groups: environmental and ecosystem benefits, and cultural and heritage benefits. Together, these are significant benefits that add justification for project implementation. Included in these groups are (i) benefits accruing from the protection and restoration of wetlands and wildlife habitats, and improvements in wildlife populations; (ii) improvements in biodiversity, especially on the piedmont of Helan Mountains; (iii) improvements in water quality from secondary treatment of sewage plant effluents, including the use of selected plants to remove water pollutants; (iv) reduction in water pollution from the overuse of nitrogen and other fertilizers on project area farms; (v) reduced land degradation; and (vi) intangible benefits accruing from the protection sites of cultural and historical importance.

6. Financial and economic indicators estimated for the activities and the overall Project are given in Table A9.2. These exhibit a considerable range of values of internal rates of return and net present value, both financial and economic. Only one, Yinchuan City wetlands, has financial indicators below the acceptance level determined by the weighted average cost of capital of 4.0%. This subproject has significant investments in wetland environmental and ecological infrastructure, but relatively limited visitor potential because of the size and location. It focuses on the wetland environment and habitats and does not offer the wide range of leisure activities associated with, for example, Shahu and Yuehai lakes.

7. One subproject, Yinxi alternative livelihoods, has an economic internal rate of return (EIRR) that is just below the 12% discount rate. The benefits are conservatively estimated, so the EIRR may be underestimated to some extent. This activity has the greatest potential direct impact on poverty reduction as it will involve about 9,800 households, a high proportion of which currently fall below the poverty line defined by Yinchuan Municipality and all of which can expect to have household incomes above the poverty line once the Project is established.

8. The EIRR for the whole Project is estimated at 14.4% and the net present value at CNY201.4 million. Because the Project is multifaceted with subprojects across several diverse sectors, this result is robust to variation in key variables within any of its component parts. Since adverse movements in prices or outputs in tandem are not likely, the effect of variations on the whole Project is limited. For example, if the selling prices for milk, beef, and wine, all important quantified benefits, were all 10% below the prices assumed in the analysis, the EIRR for the whole Project would still be 13.1%. Conversely, a reduction in total project costs of 6% increases the EIRR only to 14.6%.

2. Financial Analysis

9. The impact of the Project on household incomes is summarized in Table A9.3. These incomes do not include the value of households' own labor, which in most cases will be approximately equivalent to one full-time person. Household incomes with the Project are above the poverty line (CNY1,000 per capita per year in Yinchuan Municipality) in all these cases except for beef production, which is an additional activity to households' other farming activities, and therefore does not represent the full household income.

10. Financial indicators for the subproject's impacts on commercial enterprises are given in Table A9.2. Table A9.4 shows incremental cash flow data for the commercial enterprises expected to be affected by the 10 subprojects.¹ The data in the table relate to year 10 of the Project and show cash flows generated by the subprojects once investments are completed and full production is reached.²

Table A9.2: Project Financial and Economic Indicators

Item	Financial ^a		Economic	
	IRR (%)	NPV (CNY million)	IRR (%)	NPV (CNY million)
Ningxia Yinchuan IEM ^b	—	—	14.4	201.4
Water Resources	—	—	15.2	39.7
Beef Production	25.1	144.7	15.4	34.9
Dairy Production	7.2	24.0	13.8	9.7
Horticultural Production	19.2	149.8	44.5	183.2
Shahu Lake	8.8	28.2	14.8	7.6
Yuehai Lake	14.4	55.9	40.3	46.8
Yinxi Alternative Livelihoods	15.3	604.8	11.3	(18.8)
High Technology Agriculture	6.9	35.8	14.4	15.3

— = data not calculated, () = negative value, IEM = integrated ecosystem management, IRR = internal rate of return, NPV = net present value.

^a Weighted average cost of capital = 4.0%.

^b Financial indicator (IRR) has not been estimated for the total project or the water resources component.

Source: Asian Development Bank estimates.

Table A9.3: Household Income and Incremental Benefits

Subproject	HH Size	No. Beneficiary Households	Household Income (CNY)	Household Incremental Income (CNY)
Water Resources ^a	4.2	15,000	12,800	7,260
Beef Production ^b	3.4	6,000	2,537	2,537
Dairy Production	3.4	325	62,000	37,200
Horticultural Production	3.4	2,000	7,052	4,952
Yinxi Alternative Livelihoods	5.0	9,800	14,850	12,560
High Technology Agriculture ^c	5.0	1,400	6,000–21,000	2,445–18,000
Conservation Agriculture ^d	—	—	—	2,104

— = data not calculated, HH = household.

^a Water resources: income impact for 1.33 hectares with the average cropping pattern.

^b Beef production: includes only household cattle production.

^c The different activities under the high technology subproject have a wide range of effects on the incomes of households affected by the Project.

^d Typical benefits for conservation agriculture for 1 hectare.

Source(s): Asian Development Bank estimates.

11. The data refers to the respective financial positions after tax but before financing costs. The principal taxes paid by the enterprises are company income tax and business tax; and for the two processing enterprises (beef and wine), value-added tax on inputs and outputs.

¹ Ningxia Administration Bureau will implement the high technology agriculture subproject; a number of companies will be established to operate different parts of the Project. Table A9.4 shows a consolidated position for the whole subproject. The water resources subproject and Yinxi alternative livelihoods subproject are not included in this table as they will be operated directly by government agencies.

² Full details of project incremental cash flow data are in the final report of the project preparatory technical assistance: ADB. 2005. *Technical Assistance to the Peoples' Republic of China for Preparing the Ningxia Yinchuan Integrated Ecosystem Management*. Manila

Table A9.4: Enterprises: Project Incremental Cash Flows
(CNY'000)

Enterprise	Revenue	Operating Cost	Taxes	Net Revenue
Beef Production	14,083.7	10,556.2	1,482.8	2,034.7
Dairy Production	1,432.2	221.0	261.2	949.9
Horticultural Production	9,331.0	4,532.5	2,647.7	2,150.8
Shahu Lake	2,658.3	1,936.2	166.4	722.1
Yuehai Lake	8,841.1	7,298.1	466.4	1,076.6
High Technology Agriculture	4,544.1	2,966.6	—	1,677.5

— = data not calculated.

Source: Asian Development Bank estimates.

3. Assumptions Applied in the Economic and Financial Analyses

12. The economic and financial analyses are in 2007 constant prices. The exchange rate used throughout is CNY7.64 = \$1. The project life for the analysis is 25 years. For the economic analysis, the discount rate is 12%; and for the financial analysis, a weighted average cost of capital of 4.0% was estimated and used. In the financial analyses of the subprojects, value-added, business, income, and consumption taxes and surtax are applied at the rates applicable for the type of business activity concerned.

13. For most commodities, little or no price distortion is apparent in the market. Current market prices are used for all financial prices, for both traded and nontraded goods. For all goods for which a specific conversion has not been estimated, a conversion factor of 1.0 is used.³ Conversion factors for maize, wheat, and beef are estimated based on calculated import parity prices. Tax and other transfer payment calculations are included in the financial analysis but are deleted in the economic analysis. A shadow wage rate factor of 0.80 is applied to the price of unskilled labor in the economic analysis. Conversion factors used in the analysis are given in Table A9.5.

Table A9.5: Conversion Factors

Item	Value
Standard conversion factor	1.00
Fertilizers	1.20
Wheat	0.94
Feed concentrate (based on maize)	1.13
Irrigation water	5.00
Shadow wage rate factor	0.80

Source: Asian Development Bank estimates.

³ In the most recent report and recommendations of the President for projects in the PRC, practice has varied with regard to the conversion of financial to economic prices. The Hunan Flood Management Sector Project (June 2006) uses a standard conversion factor (SCF) of 1.09 and a shadow wage rate factor (SWRF) of 0.90; the Heilongjiang Road Network Development Project (June 2006) has a shadow exchange rate factor (SERF) of 1.01 (SCF = 0.99) and a SWRF of 0.67; the Wuhan Wastewater and Storm Water Management Project (June 2006) states that conversion factors are used to estimate economic prices but does not state what these factors are; the Guangxi Nanning Urban Environment Upgrading Project (June 2006) uses implied conversion factors between 0.96 and 1.0; and the Shandong Hai River Basin Pollution Control Project (May 2006) uses a SERF of 1.013 (SCF = 0.987). Several of these conversion factors appear unlikely to have had any significant impact on the respective analyses.

14. Import parity prices for fertilizers, maize, wheat, and beef are estimated based on average commodity prices for 2004–2006, as reported by the World Bank. These calculated prices are used to estimate conversion factors for these goods. For fertilizers, a composite conversion factor is estimated based on the ratio for urea, phosphate, and potash of 2:1:1. For beef, the calculated conversion factor is 1.01, which is approximated to 1.0.

15. The price of unskilled labor in the project area is about CNY25 per day. For the economic analysis, a shadow wage rate factor of 0.80 is applied.

16. The price of irrigation water is generally accepted to not reflect its true resource cost; extensive study would be required to establish what the appropriate resource cost might be. A recent World Bank project used an economic price for water of CNY0.3 per cubic meter (m³), which is assumed to be at least of the correct order of magnitude and is adopted here.⁴ This compares with a current financial price for irrigation water in the project area of CNY0.06 per m³.

4. Distribution and Poverty Impact

17. Although the main focus of the Project is on IEM, several subprojects will also have a significant impact on poverty reduction. Those that will have the greatest impact are the Yinxi alternative livelihoods and the high technology agriculture subprojects. These focus on the needs of the resettled population, which is the poorest group in the project area. Together, these subprojects will benefit at least 11,000 households (55,000 people), generating incremental benefits per capita that in almost all cases will be greater than the present poverty line income for Yinchuan Municipality of CNY1,000 per capita per year. The high technology agriculture subproject will generate significant demand for daily employment for people living in the area but not directly involved in subproject activities.

18. The beef production and vineyards subprojects will benefit a large number of households. Together, these subprojects will improve the livelihoods of about 7,500 households, although mostly Ningxia State Farm Group households, which are not currently below the official poverty line.

19. Quantified benefits of the Project accrue principally to (i) households participating in the agricultural and livestock production activities through increased household incomes; (ii) households benefiting from increased full- or part-time employment with tourism, processing, and production activities, and through increased or more regular household income; (iii) the commercial PIAs and enterprises through increased revenues and profits; and (iv) Ningxia Hui Autonomous Region government through increased tax revenues from the Project's commercial activities (estimated at around CNY30 million per year). Nonquantified benefits in the form of strengthened institutional planning, management, and coordinating skills and capabilities accrue to the PIAs and enterprises. Supplementary Appendix E provides more details on the financial and economic analyses.

⁴ The World Bank-financed Xinjiang and Gansu Pasture Development Project.

SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

Country/Project Title: People's Republic of China/Ningxia Integrated Ecosystem and Agricultural Development Project

Lending/Financing Modality:	Loan	Department/ Division:	East Asia Department/ Agriculture, Environment, and Natural Resources Division
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I. POVERTY ANALYSIS AND STRATEGY

A. Linkages to the National Poverty Reduction Strategy and Country Partnership Strategy

1. Based on the country poverty assessment, the country partnership strategy, and the sector analysis, describe how the project would directly or indirectly contribute to poverty reduction and how it is linked to the poverty reduction strategy of the partner country.

The country partnership strategy (2008–2010)¹ of the Asian Development Bank (ADB) for the People's Republic of China (PRC) emphasizes continued support to reduce poverty, improve the quality of life for the millions of people with low incomes, and support for the PRC's contribution to protect regional and global public goods. The Project supports ADB's strategic concerns to improve the environment and promote equitable and inclusive growth, as set out in the strategy. Nationally, poor people mostly live in the central and western provinces that lag the eastern provinces in achieving the Millennium Development Goals. In these regions, poverty is mostly rural and strongly correlated to access to land and incidence of land degradation. The Project will address poverty reduction by introducing ecologically sound investments that support the livelihoods of the rural poor in obtaining better access to higher-value market chains and off-farm income, as well as through improving vocational skills, and reducing vulnerability through contract farming arrangements that include provision of technical, financial, and marketing skills.

The poverty partnership agreement, signed by the Government and ADB in September 2003, sets out strategies and interventions for poverty reduction. The PRC and ADB will cooperate on a broad range of activities related to policy and regulatory reform and capacity building in the environment sector, and support projects to reduce poverty as one of the underlying causes of environment problems. Projects will be designed so that the poor increase their incomes, while also capturing environmental benefits. To sharpen the poverty focus of environmental work, the PRC and ADB are addressing land degradation through an integrated ecosystem management (IEM) approach by supporting implementation of the long-term PRC–Global Environment Facility (GEF) Partnership on Land Degradation in Dryland Ecosystems. The partnership addresses policy, institutional, technical, and financing issues related to combating land degradation through a programmatic approach. It aims to arrest land degradation and restore dryland ecosystems to reduce poverty in the western region. The Project is one of the demonstration investment projects to be designed as part of the PRC–GEF partnership.

The project area has a population (including Yinchuan City) of 1.14 million with about 60% (690,000) urban and about 40% (450,000) rural. The project area of 3,655 square kilometers includes three districts (Jinfen, Xingqing, and Xixia) and two counties (Helan and Yongning). In 2004, the average annual urban income was CNY7,200 (\$931.13) compared with the rural per capita income of CNY3,080 (\$398.32). The project area includes 19 townships in Yinchuan and nine state farm enterprises of the wider Ningxia Agricultural Reclamation Bureau. The project area comprises an intensively irrigated and cropped alluvial plain with shallow wetlands, an extensive piedmont area of poor quality soils, and the Helan Mountains. Irrigation water is largely dependent on surface water from the Yellow River, which is increasingly facing new demands and declining availability. Ningxia Hui Autonomous Region (NHAR) had the highest rate of land conversion of all provinces in the last decade with expansion of irrigated agriculture on marginal soils, linked to increased agrichemical use, increased runoff and salinization, and loss of water quality and grasslands.

The Government's strategy considers rapid urbanization as an important means for reducing poverty. Rapid urbanization creates new challenges. For example, competing demand from urban and rural water users will necessitate reallocation of water, and increasingly scarce water resources need integrated planning systems for improved water conservation and use efficiency. The Project will provide the opportunity to achieve the objective of demonstrating and improving the institutional capacity to implement an IEM approach to sustainable use of natural resources, agriculture, and biodiversity conservation by means of (i) establishing an IEM institutional framework; (ii) demonstrating integrated land and water resource management; (iii) improving rural livelihoods, through promoting enterprise development, and sustainable commercial agricultural (e.g., vineyards and processing, dairy production, high-technology agriculture, and greenhouse production); and (iv) integrating conservation and tourism through cultural and nature tourism, wetland conservation, and management.

¹ ADB. 2008. *People's Republic of China: Country Partnership Strategy 2008–2010*. Manila.

B. Poverty Analysis**Targeting Classification:** Targeted Intervention - Households**1. Key Issues**

Poverty in the project area remains significant by world benchmarks. Using the poverty line of Yinchuan Municipality (CNY1,000 per capita per year)^a 48,000 people are classified as poor and a similar number deemed vulnerable to poverty with incomes less than CNY1,500 per capita per year. The majority of poor were resettled into the project area through a government poverty reduction program from the extremely impoverished southern mountainous area of Ningxia during 1983 to 1997. The Project's poverty classification is Targeted Intervention-Households.

A social and poverty assessment was carried out for each of the subprojects in compliance with ADB's *Guidelines on Incorporation of Social Dimensions in Bank Operations*. The assessments included rural livelihood assessment, which confirmed disparate growth rates between sectors resulting in large income inequities between rural and urban households and between groups of rural dwellers. Poverty analysis was undertaken using a field survey of 270 rural households and participatory rapid assessment within three typical communities identified through key informant discussions within the project area. They are (i) a resettlement community in the transition zone of piedmont and river plain, (ii) a community within the irrigated alluvial plain, and (iii) a state farm community. Institutional consultation was undertaken regarding ongoing programs and experiences in poverty reduction. The assessment concludes that rural poverty is mostly confined to previously resettled villages on marginal soil between the piedmont and the alluvial plain; however, even households in the irrigation scheme displayed indicators of increased vulnerability to poverty. State-farm rural households, while having higher incomes, are found to have weaknesses in social capital and housing. Poverty is linked closely to limited land per capita, declining productivity, low education, increased migration for work and households headed by women, increased dependence on straw and crop residues for heating (reducing soil nutrients), and lower salaries for off-farm work. A significant finding was the inability of Hui women, who are Muslim, to find off-farm employment due to their inability to migrate to work for religious reasons and the limited casual local work opportunities.

Rural incomes are 50% lower than urban incomes creating incentives for urbanization. The underlying causes of rural poverty are (i) lack of reliable irrigation; (ii) small landholdings; (iii) poor soil quality and traditional farming technologies; (iv) surplus labor within households and limited off-farm job opportunities; (v) the need for high inputs on marginal land (fertilizer, machinery, and irrigation); and (vi) lack of diversified crops, especially economic crops. The analysis concludes that poverty is linked strongly to insufficient land per capita and other resources, including water, limiting households in building sufficient capital to exit poverty. These underlying causes of rural poverty support the need for a strategy that includes facilitating rural labor to move into off-farm employment.

The Project's strategy is to address poverty by (i) addressing the root causes of land degradation, thereby reducing the vulnerability of households to poverty; (ii) increasing incomes by linking producers to higher-value crops and markets; and (iii) providing opportunities for developing skills for off-farm employment. The design of interventions on improving rural livelihoods and poverty reduction will result in productivity improvements and greater market certainty, leading to increased incomes, especially for poor smallholders in previously resettled communities. Conservation agriculture technologies, land use matched to soils and land-use capability, improved water use and nutrient efficiency, strengthened farmer associations, access to rural finance, contract farming agreements linked to processing and market chains, and capacity development will all contribute to improved sustainable livelihoods and improved resilience for poor rural households.

2. Design Features

A key design feature builds on the findings of a recent ADB evaluation of poverty exit achievements, which highlighted the success of linking the rural poor to commercial value-adding enterprises and the associated off-farm employment opportunities. The Project applies this by promoting perennial crops, grape and wine processing, ecological greenhouse systems, livestock and dairy production, provision of renewable rural energy programs, as well as the introduction of time-saving technologies to enable movement of surplus labor into off-farm employment. Vocational training will enable rural residents to compete for higher paying jobs and reduce poverty in the project area.

C. Poverty Impact Analysis for Policy-Based Lending

N.A.

II. SOCIAL ANALYSIS AND STRATEGY

A. Findings of Social Analysis

Key Issues

In the project area, of the 74,000 previously resettled people from the very poor southern area of Ningxia, approximately 73% are Hui Muslims. They reside in four of six resettlement townships: Liangtian, Minning, Naliangtaizi, and Xinjiang. From the livelihood survey done during the technical assistance, the communities are found to be poor and have low economic development due to (i) low education, especially among women; (ii) access to poor quality land with high irrigation costs; and (iii) heavy reliance on off-farm income. To address these issues, the project design has specifically included contract farming, processing, and alternative livelihoods through links with enterprises, vocational and technical training, and increased irrigation efficiency measures to benefit these communities.

Overall, up to an estimated 46,400 households will benefit, with the majority of these Hui from previously resettled poor communities, including up to 5,200 individuals who will benefit from employment. The Project will train approximately 2,200 individuals in technical subjects, 5,500 farmers in field schools and a demonstration program on conservation agriculture, and some 3,000 rural poor in vocational training through which additional livelihood options will develop. Adverse consequences are minor and come from land acquisition for the Project. These will be mitigated by compensation payments and provision of replacement houses, if necessary, as per a resettlement plan that will be updated in the final design. Demonstration of new conservation agriculture approaches to land-use management will improve water-use efficiency; while integrated pest and nutrient management will aid beneficiaries' integration into higher-value market chains and enable households to attain higher incomes, reduce vulnerability, and increase their participation in rural decision making. Project-related human capital investments for rural households provided as skills and vocational training will support the orderly movement of labor into off-farm employment.

B. Consultation and Participation

1. Provide a summary of the consultation and participation process during the project preparation.

The project design process was linked and extended the ongoing OP12 PRC-GEF Capacity Building to Combat Land Degradation Project and its development of a Ningxia Land Degradation Strategy and Action Plan using local experts working in a multistakeholder, and multisector planning procedure. For the design of the Project, consultation has taken place with stakeholders, beneficiaries, and directly affected people, and will continue during implementation. A participatory and consultative methodology was adopted to undertake the social analysis and rural livelihood survey during the project preparatory technical assistance. It involved (i) a formal questionnaire survey with 270 households; (ii) discussions with project stakeholders; (iii) a series of stakeholder workshops with the four subborrowers; and (iv) interviews with key informants in rural communities, key Government staff and nongovernment organizations, ethnic minorities, and women. Detailed discussions were maintained using both sector and cross-sector working groups that included the provincial project management office (PPMO) and its expert groups, project implementing agencies and associated state-owned enterprises, design institutes, academics, and safeguard agencies including environment and poverty reduction officials under the leadership of the PPMO. The working groups' findings were collectively discussed and reviewed through a series of stakeholder workshops.

2. What level of consultation and participation (C&P) is envisaged during the project implementation and monitoring?

☐ Information sharing ☐ Consultation ☒ Collaborative decision making ☐ Empowerment

During project implementation, the participation of stakeholders including beneficiaries will continue to be built through participatory planning and implementation processes. For example, inclusive processes will be established for participation in water resources planning, IEM spatial planning, conservation, and wetland management planning. The use of demonstrations linked to the involvement of farmer and water user associations in farmer field schools, training programs, contract farming systems, and outreach programs will adopt a highly participatory approach to rural livelihood improvement. The extent and scope of participation will require institutional capacity building early during project implementation to facilitate successful implementation of IEM approaches.

3. Was a C&P plan prepared? ☐ Yes ☒ No

If a C&P plan was prepared, describe key features and resources provided to implement the plan (including budget, consultant input, etc.). If no, explain why.

No C&P plan was prepared but it will be developed by the PPMO with assistance from the sociologist included in the consulting package (B) during the first year.

² ADB. 2004. *Financial Arrangement for A Proposed Global Environment Facility Grant and Asian Development Bank Technical Assistance Grant to the People's Republic of China for the Capacity Building to Combat Land Degradation Project*. Manila.

C. Gender and Development

1. Key Issues

Gender roles are determined by a combination of cultural factors, occupations, environmental conditions, education, and employment opportunities. In the project area, except for the Ningxia State Farm Group, income inequities create incentives for rural males to migrate to urban labor markets, thus resulting in feminization of agriculture (women now contribute up to 70% of the rural workforce). Female participation standards for training (including farmer field schools and formal training), vocational training, employment, and contract farming opportunities have been proposed along with recommendations for female representation in farmer associations and the provision of opportunities in a manner that enables female participation.

2. Key Actions

Measures included in the design to promote gender equality and women's empowerment—access to and use of relevant services, resources, assets, or opportunities and participation in decision-making process:

☒ Gender plan ☐ Other actions/measures ☐ No action/measure

Summarize key design features of the gender plan or other gender-related actions/measures, including performance targets, monitorable indicators, resource allocation, and implementation arrangements.

The Project will not have significant negative impacts on women, but the design aspects ensure gender is addressed to achieve equal participation of women in project activities, and equal opportunities for women to access social services, training, employment, and beneficiary agreements including contract farming arrangements.

A gender plan will be prepared during implementation and the terms of reference of the consultant to assist in this work are included in Appendix 8. Women's participation in income-earning activities and women's educational and off-farm opportunities are included in the design.

III. SOCIAL SAFEGUARD ISSUES AND OTHER SOCIAL RISKS

Issue	Significant/ Limited/ No Impact	Strategy to Address Issue	Plan or Other Measures Included in Design
Involuntary Resettlement	Limited	The land acquisition and resettlement impacts are considered not significant. ^b A total of 3,260 people in 770 households are affected to a very limited extent. The Xixia Canal extension and irrigation rehabilitation activities will require land acquisition with compensation agreements. Both require final designs requiring surveys to identify affected people during the first year of the Project and final ADB approvals. Total land acquisition will be 308 hectares (ha), of which 264.7 ha is required permanently for the Xixia Canal. Temporary land acquisition will total 43.3 ha.	<input type="checkbox"/> Full Plan <input checked="" type="checkbox"/> Short Plan <input type="checkbox"/> Resettlement Framework <input type="checkbox"/> No Action
Indigenous Peoples	No impact	Ningxia Hui Autonomous Region is a minority people's area—one of the five ethnic minority regions of the PRC. In 2004, 2.1 million Hui, mostly Muslims, resided in Ningxia, comprising 35.1% of the total population. In the project area, the Hui account for less than 20% of the population and their rights are well protected by national law. The Hui usually are integrated with Han communities. The Project will not have any negative impact on the Hui and will provide equal opportunities and benefits.	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input type="checkbox"/> Indigenous Peoples Framework <input checked="" type="checkbox"/> No Action

Issue	Significant/ Limited/ No Impact	Strategy to Address Issue	Plan or Other Measures Included in Design
Labor <input checked="" type="checkbox"/> Employment opportunities <input type="checkbox"/> Labor retrenchment <input type="checkbox"/> Core labor standards	No impact	Rural poor, especially smallholders, are unable to access capital for investment into improved livelihoods. The Project will provide mechanisms to address this through the provision of credit guarantees, the use of grants provided by Yinchuan Municipality and Ningxia State Farm Group, and contract farming agreements to access land and technical, financial, and marketing services.	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input checked="" type="checkbox"/> No Action
Affordability	No impact	Rural poor, especially smallholders, are unable to access capital for investment into improved livelihoods. The Project will provide mechanisms to address this through the provision of credit guarantees, the use of grants provided by Yinchuan Municipality and Ningxia State Farm Group, and contract farming agreements to access land and technical, financial, and marketing services.	<input type="checkbox"/> Action <input checked="" type="checkbox"/> No Action
Other Risks and/or Vulnerabilities <input type="checkbox"/> HIV <input type="checkbox"/> Human trafficking <input type="checkbox"/> Others(conflict, political instability, etc.), please specify	Limited	The Project will require adjustment of livelihood and land use to suit long-term and sustainable ecosystem management. The Government will need to ensure smooth implementation of the Project. Current plans include employment guarantees, subsidies provided for alternative livelihood, contract farming agreements, provision of interest free credit to rural poor, and natural hazard insurance.	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input checked="" type="checkbox"/> No Action
IV. MONITORING AND EVALUATION			
Are social indicators included in the design and monitoring framework to facilitate monitoring of social development activities and/or social impacts during project implementation? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
A project performance management system will be developed to include various indicators, among which include increases in farm incomes and reduction in poverty incidence, and gender and social development.			

HIV = human immunodeficiency virus.

^a Poverty benchmarks in the rest of the province are set between CNY625 and CNY865 per capita for low-income groups, and CNY580 per capita per annum for absolute poverty.

^b ADB. 1995. *Policy on Involuntary Resettlement*. Manila. The policy defines resettlement as "significant" where 200 or more people experience major impacts. Major impacts are defined as involving affected people being physically displaced from housing and/or losing 10% or more of their productive, income-generating assets.

SUMMARY RESETTLEMENT PLAN

1. The Project will support activities that require limited land acquisition, house demolition, and resettlement. In accordance with the Asian Development Bank (ADB) *Involuntary Resettlement Policy* (1995), a short resettlement plan was prepared by the project implementing agencies (PIAs) with assistance from the Foreign Debt Management Office of the Ningxia Hui Autonomous Region's Finance Department, and based on consultation with affected parties. As final engineering designs are to be completed during implementation, the resettlement plan will need to be updated based on the final design documentation, especially for the proposed Xixia Canal extension.

A. Project Impacts

2. Project construction will require the permanent acquisition of 264.7 hectares (ha) of land for the Xixia Canal. Of the permanent land being acquired, only 10 ha are irrigated and 8 ha are orchards. Temporary land acquisition during construction will be required for the Xixia Canal (9.3 ha) and irrigation rehabilitation (34 ha). No displacement of private housing is required.¹ Approximately 3,260 people in 770 households will be affected, but the impacts are relatively minor and will be fully mitigated through compensation provided by the Project and new opportunities through investments made by the Project.

B. Policy and Legal Framework

3. The resettlement plan incorporates the legal requirements of the People's Republic of China (PRC) and ADB policy. The main principles guiding these requirements are (i) minimize negative social impacts of project design; (ii) carry out resettlement and compensation to improve, or at least restore the preproject income and living standards of people affected; (iii) fully inform and consult those affected on compensation options and resettlement planning; (iv) provide asset compensation at replacement rates; and (v) compensate in full for lost assets, replacement of assets, and resettlement allowances prior to ground leveling or demolition.

4. The resettlement plan stipulates eligibility and entitlements for land, houses, and income losses, and rehabilitation subsidies in accordance with the 1998 Land Administration Law; State Council Document No. 28, *Deepening Reform on Land Acquisition Systems and Reinforcement* (2004); and ADB's *Involuntary Resettlement Policy*. The legal framework specifies compensation standards, and each subcomponent will determine compensation provisions based on stated criteria and how they apply to local land productivity and site features.

5. People affected through the permanent acquisition of land will be compensated through payment of (i) a land compensation fee, and (ii) a resettlement subsidy. According to the Ningxia Regulation for Land Acquisition (1997) and the Ningxia Land Administration Regulations (2000), affected people will also receive compensation for the loss of crops and trees. Yinchuan Municipality has also issued rules for resettlement implementation procedures.

6. According to the policy and socioeconomic conditions at the project sites, detailed compensation rates will be agreed upon with affected individuals or groups. For the short resettlement plan, compensation rates for land compensation, resettlement, relocation support,

¹ Previously affected parties at Xixia tombs and Helankou petroglyphs (rock carvings) are related to the 2002/2003 resettlement following the introduction of the Ningxia Hui Autonomous Region (NHAR) grazing ban; the NHAR government has agreed to settle these outstanding issues prior to loan negotiations.

and subsidy are based on the Ningxia Land Administration Regulations. Under these regulations each PIA has established compensation rates and estimated the cost based on local conditions and resettlement impacts.

7. For cultivated land, compensation rates are 6–10 times output based on the average of the previous 3-year output by different forms of land use. Noncultivated land is compensated at 1–2 times the average of the previous 3-year annual land output. Compensation rates for lost income from annual crops are the average of the previous 3-year annual output; 2–3 times the average annual value for perennial crops. Land used temporarily during construction will be compensated at a rate equivalent to production values foregone for the period of loss, which is expected to be less than 2 years. The contractor will restore any land required temporarily during project construction to its original condition.

8. For structures to be demolished, replacement value defines compensation to be paid to affected households where rates are derived from the prices within affected areas. Those losing structures will receive compensation for their plot and relocation costs. House compensation will not be reduced for depreciation, and people will be allowed to salvage materials from their houses. Miscellaneous resettlement support for transport and temporary housing for those being resettled is based on three times the average of the previous 3-year land output.

9. The provincial project management office (PPMO) and the relevant PIA will ensure that resettlement entitlements are provided to affected people prior to demolition or resettlement. Land compensation and resettlement subsidies will be paid to those affected or village leaders. Housing compensation and compensation for crops and other assets will be provided directly to those affected by the loss of assets.

C. Resettlement and Rehabilitation

10. The impact of the Project on people and their assets is considered to be minor. Rehabilitation options will be selected in consultation with each individual household. Where households are seriously affected and risk being worse off, despite the full set of compensation payments, they will receive the following entitlements: (i) guarantee of hire for project construction labor, (ii) offer of permanent employment by the project proponent, (iii) skills training, and (iv) priority for involvement in other project components with the township.

11. When the public sector is affected, the Ningxia Hui Autonomous Region government (NHARG) will help the PIAs arrange alternative land, housing, and shop arrangements. The process requires each PIA to obtain the approval of Yinchuan Municipality to proceed, and thereafter the PIA will apply to the Land Reserves Office for alternative premises. The PIA will be required to pay the Land Reserves Office in return for the reallocation of premises from within the public sector pool.

D. Resettlement Cost and Funding

12. Based on detailed cost estimates of the subcomponents, the total cost of land acquisition and resettlement is CNY23.9 million, inclusive of contingencies and taxes. These costs are included within the total project costs. Compensation for land acquisition, demolition of structures, and other costs will be paid directly to the affected entity or person through the project implementation unit of the respective PIA. According to the compensation policies and standards defined in the resettlement plan, the payment and usage of compensation funds will be undertaken under the supervision of the PPMO, with regular review by an independent

external monitoring agency. The funding for resettlement costs will be provided through the counterpart funds to be provided by each subborrower. Disbursements will be monitored quarterly to ensure that full compensation has been paid in a timely manner.

E. Information Disclosure and Public Participation

13. Preliminary consultation with the identified affected people has taken place. The summary of the Environmental Assessment Report (May 2007) describes in detail the consultation process, which included two rounds of public consultation on the Xixia Canal extension, plus other surveys and discussions. Detailed consultation will follow the detailed technical design.

14. The resettlement plan will be available to the public. Once it is approved, it will be sent to the PPMO and the PIAs. Those affected will then receive comprehensive information regarding the Project and any land compensation and resettlement, describing the entitlements of affected people and the procedures and timelines. Consultation and participation will be continued through subproject implementation, including signing compensation contracts and providing replacement land.

F. Institutional Responsibilities

15. The PPMO will be responsible for planning, finance and administration, and project management staff, as well as the focal point representatives and a group of technical experts. The PIAs will be responsible for borrowing and repaying the loan, the use of Global Environment Facility funds, and Government counterpart funding.

16. The main PIAs are (i) Ningxia Agricultural Reclamation Bureau, (ii) Ningxia Water Resources Department, (iii) Ningxia Administration Bureau, and (iv) Yinchuan Municipality.

17. The PPMO has responsibility for ensuring procedures of the Government of the PRC, NHARG, and ADB are followed. The PIAs will be responsible for implementing resettlement according to the resettlement plan and coordinating the planning, implementation, financing, and reporting of land acquisition and resettlement. The PIAs will take primary responsibility for the resettlement consultation, implementation, and timely delivery of entitlements by appointing a focal point to be in charge of all resettlement issues.

G. Grievance Procedures

18. Complaints and grievance procedures for land acquisition in the PRC are well established. Affected people will be made aware of grievance procedures through participatory meetings and through the resettlement information booklet provided to village leaders and those affected. Where no agreement is reached on compensation and/or resettlement costs, grievances can be lodged with the village committee. If no agreement is reached within 2 weeks, the complainant has 1 month to elevate the grievances to the county land management bureau or the PIA. If still unresolved within 2 weeks, the PPMO will try to achieve a solution. The final redress would be sought, if necessary, in the civil courts, in accordance with the Administrative Procedure Law of the PRC.

H. Monitoring and Evaluation

19. Following the requirements of ADB, compensation and resettlement issues will be monitored using both internal and external monitoring and evaluation. The monitoring is to establish that affected parties or villages receive compensation for resettlement and rehabilitation. After completion of land acquisition and resettlement, the PPMO will prepare a completion report and submit it to ADB.

20. Internal resettlement monitoring will be carried out by the respective PIAs. During the land acquisition stage, the PPMO will collect records of impacts, compensation payments, employment activities, training, and grievances. The PPMO will compile these individual project reports, as relevant, into an overall resettlement progress report for the subprojects and submit it to ADB as part of quarterly reporting on the Project until land acquisition and compensation activities are completed.

21. For external resettlement monitoring and evaluation, a local sociologist will be contracted for 1 person-month per annum for 4 years to assess and report socioeconomic progress based on independent monitoring and evaluation of land compensation activities. The monitoring and evaluation will be based on site visits and key informants. The independent monitor will assess whether (i) project implementation is in compliance with the policies and entitlements set out in the resettlement plan, (ii) the affected people have fully restored their livelihoods, and (iii) the affected people have directly benefited from the Project. The monitor should make recommendations to improve implementation. The resettlement monitoring and evaluation should be carried out once every year and an annual report prepared for submission to ADB and the PPMO.