

SECTOR ASSESSMENT (SUMMARY): AGRICULTURE AND NATURAL RESOURCES

1. A detailed sector assessment analyzing the proposed Jiangsu Yancheng Wetlands Protection Project with respect to laws, regulations, strategies, plans, and programs, and aligning the project design with the sector strategies and priorities, considered (i) sites, focusing on the master plans of the two nature reserves and the twelfth five-year plans of the two forest farms; (ii) the municipality, focusing on the Yancheng coastal development plan, twelfth five-year plan for economic and social development, and twelfth five-year plan for forestry; (iii) the province, focusing on the Jiangsu coastal development plan, the twelfth five-year plans for economic and social development, and the plan for building Jiangsu into an ecological province; (iv) the nation, focusing on national laws, regulations, strategies, plans, and programs on wetland and wildlife protection; and (v) international commitments, including the Ramsar Convention, the Convention on Biological Diversity, and other multilateral and bilateral environmental agreements.

1. Importance of Yancheng Coastal Wetlands

2. With an area of 843,500 hectares (ha) of coastal and seashore wetlands, accounting for 14.2% of the national total, Jiangsu Province ranks third in this regard in the People's Republic of China (PRC). A significant portion of these wetlands are in Yancheng municipality, where they cover 453,000 ha (30% of the municipality) and stretch for 580 kilometers (km) along the coast. The Yancheng coastal wetlands consist primarily of extensive intertidal mudflats, tidal creeks and river channels, salt marshes, reed beds, and marshy grasslands that provide desirable habitats for numerous species of flora and fauna of global and national importance.

3. The coastal wetlands in Yancheng include two national nature reserves: the Dafeng Milu National Nature Reserve (DMNRR) and the Yancheng Rare Birds National Nature Reserve (YRBNNR). The YRBNNR is very rich in biodiversity, containing 480 species of plants, 370 of birds, 281 of fish, 48 of mammals, and 45 of amphibians. Twelve of its animal species are included on the country's first-ranked list for priority protection, and 29 of its bird species are listed on the International Union of Conservation Nature's (IUCN) Red List of Threatened Species. The YRBNNR is one of the two wintering grounds in the PRC for the red-crowned crane (*Grus japonensis*), which is rated as endangered in the Red List of Threatened Species. About 60% of the world's estimated 2,500 red-crowned cranes migrate every winter to the YRBNNR. The DMNRR is home to 25% of the world's population of milu deer (*Elaphurus davidianus*), which is rated as "extinct in the wild" in the Red List of Threatened Species. The two national nature reserves are accredited to the List of Wetlands of International Importance under the Ramsar Convention and the World Network of Biosphere Reserves of the United Nations Educational, Scientific, and Cultural Organization (UNESCO), recognizing the uniqueness of these wetland ecosystems and the species biodiversity that they harbor. The Dafeng Forest Farm and the Sheyang Forest Farm, neighboring the DMNRR and the YRBNNR respectively, provide additional ecological protection to the two nature reserves and are part of the national coastal ecological protection forest network and provincial forest parks.

4. The Yancheng wetlands provide important ecosystem services to local communities. Local livelihoods are sustained through gathering and culture of marine and estuarine plants (e.g., reeds) and fish species. Wetland plants slow the flow of rivers, and the mudflats absorb wave energy from the Yellow Sea, thereby protecting against coastal erosion, tsunamis, and storm surges. Wetlands improve water quality by assimilating some of Yancheng municipality's rapidly worsening pollution flowing from households and industry. They regulate the local climate and help raise agricultural productivity. Finally, the two nature reserves, together with

the two forest farms designated as provincial forest parks, attract hundreds of ecotourists each year from around the world, generating employment and income for local communities.

2. Threats to the Yancheng Coastal Wetlands

5. Despite their local, national, and global significance, Yancheng coastal wetlands suffer rapid degradation, wildlife habitat loss and fragmentation, and loss of biodiversity. The main threats to the coastal wetland ecosystems and biodiversity are (i) land-use changes from reclamation for agriculture, aquaculture, industry, and urban expansion; (ii) habitat degradation, especially in the core and buffer zones; (iii) the rapid spread of invasive species, particularly *Spartina alterniflora*; (iv) draining; (v) pollution from terrestrial sources; (vi) poaching and poisoning; and (vii) overfishing and other unsustainable resource extraction. Since the 1980s, over half of the wildlife habitat has vanished. From 1975 to 2006, the area of fishponds and built-up land has expanded by 8.0 times and the area of farmland by 1.6 times. *Spartina alterniflora*, introduced from the United States to control coastal erosion and accelerate coastal sedimentation for reclamation, spread from zero to 13,705 ha since 1982. Consequently, the area of reeds contracted from 56,145 ha to 11,930 ha, seepweed from 72,134 ha to 9,499 ha, and mudflats from 133,683 ha to 77,373 ha. Fish catches declined from 165,605 tons in 1995 to 112,543 tons in 2005. Primarily human causes, compounded by natural causes, shrank the habitat suitable for the red-crowned cranes by 53.3%, from 2,354.4 square kilometres (km²) in 1987 to 1,100.1 km² in 2007, forcing the wintering population down from 1,175 in 2001 to an all-time low of 477 in 2010. The poor quality of drinking water and grazing and fodder grounds and a plague of parasites have undermined the health of milu deer in the DMNRR. These threats to the nature reserves are magnified by poor protection infrastructure, weak management capacity, and inadequate public education and community participation. Further, the two forest farms lack (i) diversity and strong resilience; (ii) adequate drainage; and (iii) adequate forest protection infrastructure, including for fire and pest prevention and control.

3. Government Responses

6. **National regulatory framework.** The PRC has a comprehensive regulatory framework for biodiversity protection and nature reserve management. The Constitution of the People's Republic of China of 1982; the Environmental Protection Law, 1989; the Law on Protection of Wild Fauna, 1989; and other laws and regulations provide for the protection of important species, their habitats, and valued ecosystems. The Guideline on Protection of Terrestrial Wild Fauna, proclaimed in 1992 by the former Ministry of Forestry, calls for adopting biological engineering and technical engineering toward maintaining and improving the habitats of wild fauna, wildlife rescue, biodiversity surveys and monitoring, and public education. The Regulation on Management of Nature Reserves, 1994 sets forth rules and procedures for establishing and managing nature reserves. It prohibits people entering the core zone but lacks provisions on ecosystem and habitat rehabilitation or patrol (e.g., by nature reserve management personnel) or emergency response (e.g., firefighting in a forest nature reserve). The Directive on Strengthening Wetland Protection and Management, 2004 calls for expanded (i) management infrastructure, including management and/or patrol stations, fences, border markers, wildlife rescue centers, patrol paths and vehicles, communication equipment, firetowers, firefighting routes, firetrucks, and the preparation and updating of management plans; (ii) public education infrastructure, including exhibition centers, specimen displays, audio and/or video equipment, signs, boards, and pamphlets; (iii) monitoring and scientific research infrastructure, including laboratories, field surveys, and sampling equipment and information systems; and (iv) administrative infrastructure, including office buildings and auxiliary facilities. The Guideline on Supervision and Inspection of Nature Reserves, 2006 requires the regular evaluation of national

nature reserves and defines the scope of evaluation to include (i) institutional set-up and staffing; (ii) patrol and protection facilities; (iii) area and suitability, boundaries, and land ownership of the functional zones; (iv) the formulation and implementation of management plans, as well as rules and procedures; (v) resource baseline surveys, protection, and utilization; (vi) scientific research, monitoring, recordkeeping, and specimen collection; (vii) the management of construction projects within nature reserves; (viii) tourism and other human activities; (ix) public education, training, exchange, and cooperation; and (x) financing.

7. **National plans and programs.** In 1996, the State Council approved the National Plan for Development of Nature Reserves, 1996–2010, which set the 2010 target of establishing 1,200 nature reserves covering 10.0% of national territory. By the end of 2010, there were 2,588 national, provincial, prefecture, and county nature reserves with a total area of 149.44 million ha, or 14.9% of national territory, including 319 national nature reserves with a total area of 92.68 million ha. By the end of 2010, more than 550 wetland nature reserves and 145 pilot national wetland parks had been established. Currently, there are 37 natural wetland sites with a total area of 3.81 million ha, or 10.5% of the 36.20 million ha of natural wetlands. The National Wetlands Protection Program of Action (NWPPA), 2004–2030 and the National Wetland Protection Program Implementation Plan (NWPPIP), 2005–2010 aim to remove such major threats to the country's wetlands as low awareness of the ecological value and social benefits, overfishing, draining, pollution, and upstream deforestation.

8. The NWPPA, 2004–2030 sets out to restore and maintain the ecological functions of wetland ecosystems by allocating and managing water resources more effectively; demonstrating the sustainable use of the wetland resources; and strengthening wetland monitoring, public awareness, training, scientific research, and management systems. As a near-term implementation program for the NWPPA, the NWPPIP, 2005–2010 proposed a series of programs with a total investment of CNY9 billion, including establishing 222 wetland nature reserves; restoring and rehabilitating 588,000 ha of wetlands with degraded area and ecosystem function, especially national wetland nature reserves, by rewatering drained wetlands, converting fishponds into wetlands, rehabilitating wildlife habitat, and controlling pollution; and demonstrating sustainable use while developing human resource capacity and infrastructure for monitoring, research, and public education. It specifically requires the comprehensive rehabilitation and restoration of degraded coastal wetland ecosystems using ecological engineering and technologies. In recognition that draining is the greatest threat to wetlands, 12 rewatering demonstrations across the country were proposed. Moreover, the NWPPIP required all reclaimed wetlands in nature reserves, including aquaculture ponds and farmland, to be restored. The capacity development package covered better management planning and improvements to infrastructure for patrolling, fire prevention, wildlife rescue, public education, and research and monitoring.

9. In 2010, the government released the PRC Biodiversity Protection Strategy and Action Plan, 2010–2030, which cites 9 priority areas and 39 priority actions, including regulatory strengthening; mainstreaming biodiversity protection into socioeconomic development planning; ecosystem and species monitoring; wetland protection, restoration, sustainable use, and monitoring; coastal ecosystem and species baseline surveys; public education; capacity development for nature reserves; nature reserve–community codevelopment; habitat protection and the breeding of rare and endangered species; and early warning and control of invasive species.

10. **Jiangsu provincial plans and programs.** Jiangsu's twelfth provincial five-year plan, 2011–2015 has established the targets of reducing energy intensity by 16%, industrial water

intensity by 25%, biological oxygen demand and sodium oxide emissions by 8%, and ammonia-nitrogen discharge and nitrogen oxides emissions by 10%, while expanding forest cover from 20.4% in 2010 to 22.0% by 2015. Resource conservation, environmental improvement, “clean waters,” and ecosystem health are among the strategic priorities for the twelfth five-year plan. The environment and sustainable development chapter of the twelfth five-year plan calls for greater efforts in reforestation, ecological protection and restoration, and eco-compensation. Ecological protection will protect key ecological function zones, including the two nature reserves and the two forest farms. Ecological restoration will restore the health of degraded land, freshwater, and coastal wetland ecosystems. Other priorities include species surveys and protection, controlling invasive species, establishing provincial genetic databanks, and rescuing and protecting rare and endangered flora and fauna. The twelfth five-year plan calls for establishing an eco-compensation program for key ecological function zones, improving the ecological forest compensation mechanism for provincial and national ecological forest farms, and implementing a regional system of pollution payments and compensation. The eco-compensation program will be piloted in national nature reserves. The Jiangsu Coastal Development Plan, 2009–2020 has a budget of CNY44.3 billion to 2012, including CNY350 million earmarked for YRBNNR wetland restoration and protection, establishing a management information system, ecological monitoring and laboratory facilities, and public education facilities, and CNY229 million for DMNNR ecosystem rehabilitation, infrastructure improvement, and building research capacity. The Jiangsu Ecological Province Plan proposed an investment of CNY200 billion from 2004 to 2010, including CNY20 billion for ecological protection and restoration and CNY20 billion for ecological agriculture and forestry. The priorities of these two plans have been incorporated into the twelfth five-year plan.

11. **Yancheng municipal plans and programs.** The Yancheng twelfth five-year plan, 2011–2015 sets the target of meeting the national requirements for an ecological city by 2015 and replicates provincial pollution control targets achieved through structural adjustment, cleaner production, strengthened regulatory enforcement, constructing sewage treatment plants and sanitary landfills, and controlling pollution that lacks a single, clear source. On the ecological front, wetland restoration and protection is a top priority, with the emphasis on the two national nature reserves. The protection of key ecological function zones will be strengthened. The actions proposed in the master plans of the two national nature reserves will be implemented. Other important priorities are ecotourism and strengthening the coastal protection forest network, biodiversity monitoring, post-environmental impact assessment monitoring of wind farms, and controlling invasive species. The use of economic instruments for pollution control and ecological protection, including eco-compensation with a focus on the two national nature reserves, will be promoted. The environmental priorities of the Yancheng Coastal Development Plan, 2007–2020 are incorporated into the twelfth five-year plans.

12. **Local plans.** The YRBNNR master plan, 2008–2020 proposed priority actions on planning and infrastructure improvement, ecological restoration, research and monitoring, public education and outreach, and beneficial uses. The estimated investment in the plan of action is CNY26.78 million in the near term (2008–2010) and CNY58.55 million in the long term (2011–2020). The DMNNR master plan, 2000–2020 proposed improving drinking water supply and resting space for milu deer, grazing and fodder grounds, disease control, science education facilities, ecotourism development, protection facilities such as fencing, and building research and monitoring capacity. A review of the status of the three national nature reserves in Jiangsu in 2008 for the Ministry of Environmental Protection and the State Forestry Administration concluded that they have good management capacity, but expressed concerns about (i) the scope and functional zoning of the DMNNR; (ii) the incomplete granting of land titles; (iii) illegal development; and (iv) the lack of personnel and funds. The twelfth five-year plans of the two

forest farms set the goal of sustainably developing agriculture and forestry for economic diversification and a stable increase in forest worker and forest farm income achieved by expanding forest cover; improving forest infrastructure; expanding agroforestry, tourism, and associated industries; and improving drainage and fire and pest prevention and control infrastructure and services.

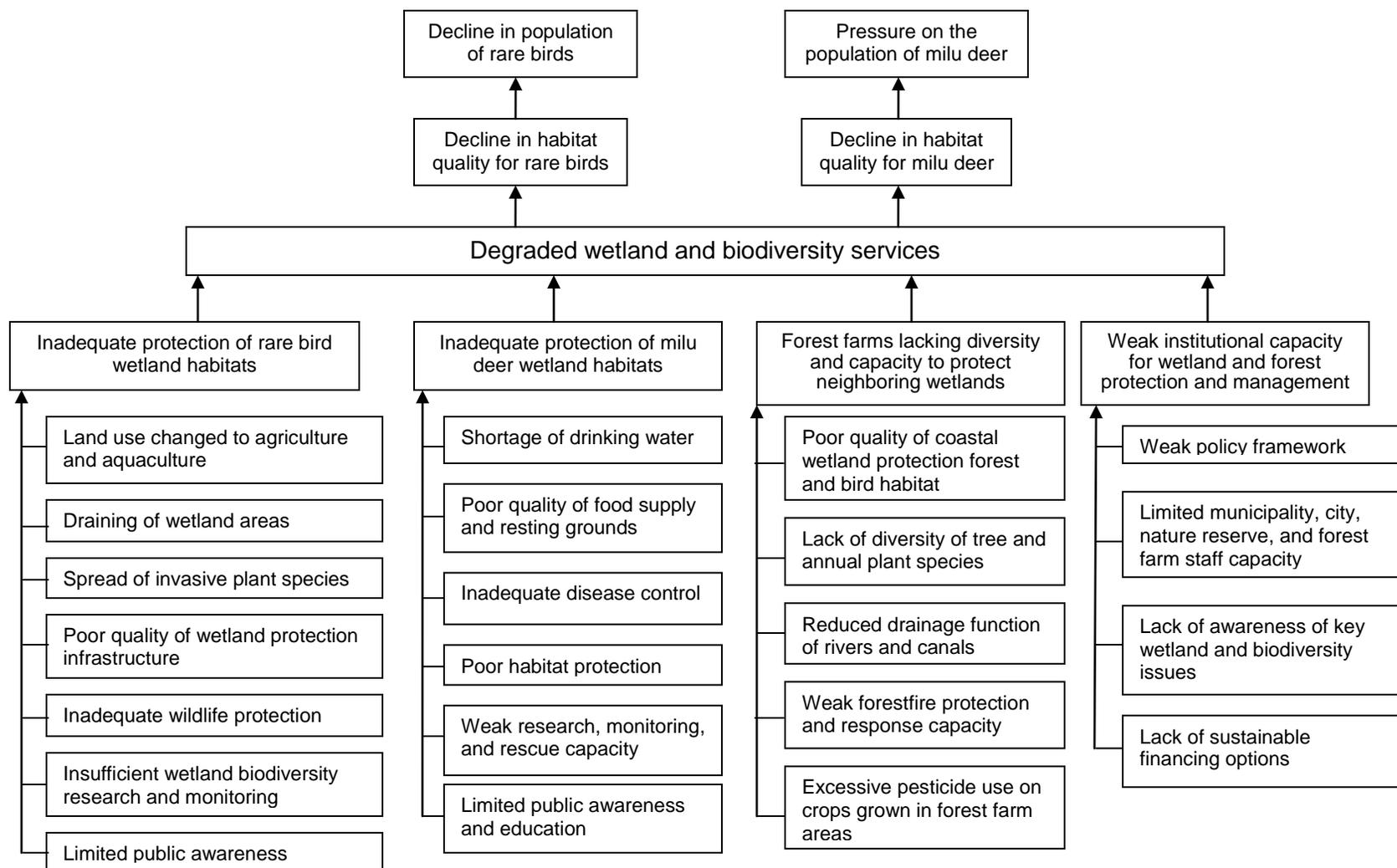
13. **International commitments.** In 1992, the PRC joined the Convention on Biological Diversity (CBD) and the Convention on Wetlands of International Importance (Ramsar Convention). The CBD requires each contracting party to, among other things, rehabilitate and restore degraded ecosystems and promote the recovery of threatened species by developing and implementing plans or other management strategies, as well as preventing the introduction of invasive species and controlling or eradicating them, among other actions. In 2009, the PRC submitted its fourth country report to the CBD secretariat. In June 1994, the government released its Biodiversity Protection Action Plan and in September 2010 its Biodiversity Strategy and Action Plan, 2010–2030. The Ramsar Convention calls for the protection, sustainable use, and monitoring of wetlands. In response, the PRC has 37 wetlands put on the List of Wetlands of International Importance under the Ramsar Convention. The DMNNR and the YRBNNR were so accredited on 11 January 2002.

14. The DMNNR and the YRBNNR are members of the China Biosphere Reserves Network, which was established by the Chinese National Committee for UNESCO's Man and the Biosphere Programme in 1993. The network has 141 members, of which 28, including the YRBNNR, are listed among 563 UNESCO World Network of Biosphere Reserves in 110 countries. The PRC is part of the Northeast Asia Crane Site Network, through which countries sign bilateral agreements to protect migratory birds including the red-crowned crane. The red-crowned crane is also covered by the East Asia–Australasia Flyway Agreement and the Asia Pacific Migratory Waterbird Conservation Strategy, which the PRC signed. Meanwhile, the PRC is party to a number of bilateral agreements on protecting migratory species. The PRC signed agreements with Japan in 1983 and Australia in 1988 to protect migratory birds and their habitats. In 1989, the PRC signed a memorandum of understanding with what was then the Soviet Union on nature conservation and an agreement with Mongolia on nature conservation. Finally, the PRC is a member of the International Crane Foundation, a Wisconsin-based nonprofit organization dedicated to studying and preserving of the 15 species of cranes.

4. Summary

15. The Jiangsu Yancheng Wetlands Protection Project will target wetland restoration, ecosystem and habitat improvement, species protection, invasive species control, infrastructure improvement, public education, community participation, and capacity development in research and monitoring. It will address the threats and pressures faced by the nature reserves and the two forest farms that form the Yancheng coastal wetland ecosystem; respond directly to national, provincial, municipal, and nature reserve priorities; and complement the attainment of the PRC's international commitments. Forest improvement interventions in the two forest farms will help strengthen the national coastal ecological protection forest network in the PRC. Together with wetland improvement, they contribute to carbon sequestration and building resilience under climate change.

PROBLEM TREE ANALYSIS



Source: Asian Development Bank.