SUMMARY INITIAL ENVIRONMENTAL EXAMINATION (OVERALL)

FUJIAN SOIL CONSERVATION AND RURAL DEVELOPMENT II PROJECT

IN THE

PEOPLE’S REPUBLIC OF CHINA

August 2003
CURRENCY EQUIVALENTS

Currency Unit — Yuan (Y)

Y1.00 = $0.1211
$1.00 = Y8.26

ABBREVIATIONS

ADB — Asian Development Bank
BOD₅ — biochemical oxygen demand
COD — chemical oxygen demand
EAF — environmental assessment framework
EPB — environmental protection bureau
ha — hectare
IEE — initial environmental examination
km — kilometer
m³ — cubic meter
mg/L — milligram per liter
PMO — project management office
PRC — People’s Republic of China

NOTE

In this report, "$" refers to US dollars.
I. INTRODUCTION

1. The Fujian Soil Conservation and Rural Development II Project is categorized as environmental category B. As the Project follows a sector-like approach, procedures for environmental assessment for sector loans have been adopted. This summary initial environmental examination (IEE) brings together the findings of the overall IEE of the Project, and presents analysis of the generic environmental benefits, adverse impacts, and recommended mitigation and monitoring measures for each component. In addition, specific sample IEEs have been prepared for two most environmentally sensitive subprojects, one for the integrated livestock development subproject (Dahe Pig Breeding Farm, Attachment 1), and one for the development of small hydropower scheme (Sancengji Small Hydropower Scheme, Attachment 2). The overall IEE preparation and the selection of the two subprojects for sample IEE preparation are in accordance with Environment Policy of the Asian Development Bank (ADB), and ADB’s Guidelines on Environmental Assessment of Project Loan and Environmental Assessment of Sector Loan (2003).

II. DESCRIPTION OF THE PROJECT

2. The Project is designed to promote growth in the rural economy of the Project area in a manner that is sustainable and will benefit poor families in rural communities. The project area consists of 50 counties, 198 townships, and 497 villages, mainly located in inland and mountainous areas and 4 coastal municipalities townships of the Province. The proposed Project have three main components:

   (A) Soil Conservation and Integrated Agriculture, including
       (i) conservation farming and orchard rehabilitation,
       (ii) forestation,
       (iii) aquaculture,
       (iv) agro-processing, and
       (v) integrated livestock farming.

   (B) Rural Infrastructure, including
       (i) agriculture marketing,
       (ii) rehabilitation and development of rural infrastructure,
       (iii) rehabilitation and development of small hydropower schemes, and
       (iv) rehabilitation and development of rural water supply.

   (C) Support Services and Project Management

3. The total cost of the Project is estimated at $286 million, of which $80.54 million is in foreign costs and will be financed by ADB.
III. DESCRIPTION OF THE ENVIRONMENT

A. Physical and Ecological Resources

4. The present population densities for the project area exceed 20 persons per cultivated hectare and the activities of this large population continue to exert significant pressure on the environment, in addition to any adverse impacts imposed by natural climatic variability. The climate is warm-wet temperate in the north whilst the south grades into the humid sub-tropical. The annual rainfall varies from a minimum of 1,100 millimeters (mm) in the south to a maximum of 2,000 mm in the northwest region. Annual average temperature ranges from 18°C in the north to 21°C in the south. Frost-free days increase from 260 days in the north at higher elevations, to 365 days at sea level towards the south. Along the coast, during the brief height of a typhoon, of which there is 3-4 each year, wind speeds can exceed 100 kilometers (km) per hour and rainfall intensity exceeding 50 mm per hour.

5. The entire landscape is one of intensive and planned land use with very little surplus land available. The average arable land per capita is only 0.04 hectare (ha), compared with 0.085 ha per capita for the People’s Republic of China (PRC) as a whole. Some 46% of the project area is classified as forestland. Three main categories of land are recognized: paddy land in the valleys and irrigable hillsides; dryland located on the lower slopes, directly above the paddy land; and hillside comprising land of slope greater than 20°.

6. The tremendous human pressure on land resource for food production has led to modification of large areas of natural forest with concomitant loss of habitat and the diminution of biological diversity (biodiversity). Additional threats to once viable populations of local flora and fauna have come from hunting, fishing and collection activities. The FPG attached great importance to ensuring that remnant areas of high biodiversity are protected and conserved. There is a complete ban over any forest removal and the exploitation of wasteland areas is discouraged. Only ecologically sustainable farming practices are permitted with no cropping activities permitted on slopes greater than 25°.

7. The most serious environmental degradation in Fujian Province is through soil degradation caused by natural weathering and unsustainable intensive farming practices including deforestation and communal grazing on marginally arable sloping uplands with significant impacts on agriculture and forestry productivity. Soils are impoverished with low organic matter and essential nutrients for crop growth and under traditional land use practices are subject to severe soil erosion.

8. There are three main rivers in the area—the Minjiang, Jinjiang and Jiulong—that drain northwest to southeast, and into the South China Sea. Likely sources of pollution of surface and ground waters are the rapid growth of large-scale industries along the coast, high rates of fertilizer usage and large number of pig farms. Other rivers in the Project areas are small streams and tributaries of the main river systems. There are numerous large and medium scale reservoirs in the mountains, which store water for hydropower generation in combination with irrigation schemes, and for supply to the large and rapidly growing urban centers. There are few groundwater resources, with deep aquifers in the limestone deposits of the southwest, and shallow aquifers in mountain valleys, on the lower flood plains and along the peninsulas of the coastal region. Likely sources of pollution of surface and groundwater are the rapid growth of large-scale industries along the coast, high rates of fertilizer use and the high density of pig population.
9. The numerous bays, tidal flats and rock-islands along the 3,324 km Fujian coastline and the generally unpolluted water provide a rich marine environment for over 1,000 species of demersal organisms including 23 commercially valuable species of fish, five crustacean species, and 15 species of mollusk and shellfish. They are a natural resource ideal for mariculture development. There has been a rapid but essentially unregulated growth of the marine fishing industry during the past three decades with a consequent decline in recent years of certain commercial fish stocks such as the yellow croaker due to over fishing. Consequently, many fishing communities have forsaken commercial fishing and now resort to mariculture. About a third of the shallow bays and tidal flats have been converted into areas for multi-species mariculture. Recognizing the need to conserve the coastal resources and to protect and sustain the remaining wild fish stocks, the provincial government has prepared the Tenth Five-Year Plan to regulate the use of the marine and coastal waters and establish sanctuaries for spawning fish and other wild stocks of crustaceans and shellfish. Five bays have been reserved as multiple use zones where fishing and fishing gear will be regulated to reduce pressure on the fish population, and closing breeding grounds during the spawning season. Ongoing experiments will focus on artificial breeding and farming of endangered fish species for release to replenish the wild stocks and for commercial mariculture.

10. Because of the rather high rate of vegetation cover and prevailing winds within the project area, air pollution has not become as serious a problem as in some other provinces in PRC. However, inversions do occur, and the major air pollution in the project area results from the burning of low quality coal that is used in small and large-scale industry as well as for domestic energy generation. High levels of particulates and sulphur constitute a serious nuisance and potential health hazard with an estimated 93% of cities affected by acid rain.

B. Human and Economic Development and Quality of Life Values

11. Fujian Province has 9 municipalities, 84 counties, 942 townships and 14,988 villages. The total population in 2001 was 34 million, with 27 million or 79% living in rural areas. By the end of 2001, the provincial gross domestic product (GDP) averaged ¥12,474 (about $1,510) per person, with the rural per capita income at ¥3,380 (about $409). However, economic growth is unevenly distributed, most of poor counties are concentrated in the remote mountainous areas, with limited farmland, poor access to basic infrastructure, harsh weather conditions and lack capital. The Project includes 15 of the 17 government-designated poverty counties and 81% of all poor townships and key poverty villages in the province. The total number of poor in the Project area is about 258,241, using the official poverty line of the province of ¥1,000 per person per annum.

12. Agriculture markets need improvement and development. Currently most agriculture markets in poorer villages are primarily small plots of vacant land where farm produce is traded daily without any protection. These sites are temporary, without water, electricity or storage facilities and may be required to move at short notice.

13. Currently, the Province’s power supply is derived from thermal and hydropower stations. The total existing capacity is estimated at 10,835 MW, while the requirement to meet current demand is estimated at 13,465 MW. The Fujian government plans to increase its power generating capacity to 14,730 MW by 2005, with 7,360 MW or 50% coming from hydropower.

14. The majority of poor counties and townships are found in interior mountainous terrain and some coastal fishing villages. They often suffer from natural disasters such as floods and typhoons and their farmlands on hill slopes are seriously eroded. The agricultural production
system is still at a self-sufficiency stage. Crop cultivation is the main economic activity, with the majority of farmers planting paddy and potatoes. Most of them rear a few animals such as pigs and chickens, with more than 80% of the produce consumed on the farm. Income growth is very slow. Farmers experience great difficulties in securing credit or loans, since most commercial banks do not extend them to poor households.

15. Most poor areas are located in remote mountainous territories, where available roads are of a very low standard. Many villages are either served by poor rural roads or by footpaths. Lack of access, communication, clean water and information pose serious impediments for production improvements, and perpetuate the high incidence of rural poverty. The lack of proper school buildings, teachers and funds in poor areas lead to a relatively high dropout rate from middle schools and illiteracy rate among the poor stands at 16%. Limited medical facilities cause prolonged periods of illness, loss of labor days and lower household incomes. Poverty is multi-dimensional and the lack of such basic social infrastructure depresses farm income and plunges poor areas into deeper poverty. The Provincial Government has launched an anti-poverty campaign to assist pockets of hardcore poor.

IV. SCREENING OF POTENTIAL IMPACTS AND MITIGATION MEASURES

16. Environmental benefits associated with the Project are significant. The subcomponent of Conservation Farming and Orchard Rehabilitation would introduce ecologically sustainable farming practices and reduce soil erosion on a total of 15,000 ha in the uplands. The Forestation subcomponent will develop 8,000 ha of forestry on upper slopes and hilltops to control soil erosion. The Rehabilitation and Development of Small Hydropower Schemes would provide clean energy to rural population and encourage them to use electricity for cooking instead of cutting down trees for fuel. The Rural Water Supply would provide potable drinking water to the population in remote rural areas. The Integrated Livestock Farming would reduce in-door pollution through replacing fossil fuel with biogas based on use of animal wastes, and minimize chemical fertilizer use by replacing it with organic manure for replenishment of soil fertility. Equally important, training sessions emphasizing technologies and management methods for a win-win situation of economic efficiency and environmental effectiveness of each component would enhance awareness of sustainable environmental development among enterprise managers and participating villagers.

17. To ensure its compliance with environmental requirements and conditions of loan approval, each subproject under all components will prepare an environmental assessment report with an environmental management plan (EMP). This will include environmental mitigation measures during construction and operational period, environmental monitoring, environmental reporting and the integrating of environmental improvement plans with quality management and occupational health and safety procedures, appointment of a designated environmental officer, and budget provisions to finance the implementation of the EMP.

A. Soil Conservation and Integrated Rural Development

1. Conservation Farming and Orchard Rehabilitation

18. The Project will support rehabilitation and development of up to 15,000 ha of existing orchards and farms in the uplands using conservation-oriented farming practices. The activities include (i) rehabilitation and improvement of terraces, access tracks, and construction of water tanks and simple stores; (ii) orchards and farms rehabilitation with high quality planting materials (scion); (iii) top-grafting; (iv) replacing some old trees with new and high yielding varieties; (v)
applying recommended levels of organic manure and/or compost; (vi) planting grasses and cover crops on terraces and hill slopes; and (vii) field maintenance. Choice of orchards and farms to be rehabilitated will be based on technical and financial viability with priority given to poor areas.

19. Environmental benefits associated with these interventions include stabilize hill slopes, reduce run-off, reduce siltation of rivers and coastal areas, and protect downstream ecology. No natural forest will be adversely affected by the subcomponent. Project beneficiaries will be required to attend training sessions on the proper contour terracing, use of soil-enriching planting techniques and plant leguminous tree crops to enhance soil organic matter with chemical fertilizer used only as a supplement to organic manure, and the control of pests and diseases.

2. **Forestation**

20. The Project will support 8,000 ha of forestry development on upper slopes and hilltops to control soil erosion through (i) creating a forested and protected catchment area (7,000 ha) on upper slopes (more than 25 degrees) and hilltops by villagers developing their orchards and farms with species that provide good soil retention, and fodder crops and fuel-wood; and (ii) windbreaks (1,000 ha) to protect orchards and farms. The species would include multipurpose species that have soil binding characteristics and commercial value.

3. **Aquaculture**

21. The Project will support aquaculture through marine culture of fish, abalone, oysters and kelp, and freshwater culture in cage fisheries and fishponds. The activities include construction of house/store, cages, rafts (thick ropes and ball), fry ropes and fishponds. The main items of equipment are generators, water pumps and boats. RECs will provide links with the private sector.

22. All sites covered under this subcomponent will be at locations where there are no ecologically sensitive or wildlife areas, and where the water quality has been classified by the Fujian Environmental Protection Bureau (EPB) as suitable for aquaculture. The areas to be converted to mariculture are shallow sections of fairly large bodies of water so that the mariculture activities are not expected to significantly affect tidal and current movements or the wild fish population. Local fishing is not expected to be affected but where this is identified at a specific location the effect will be offset by the inclusion of the affected families in the target group for this component.

23. Some sites would be devoted to pond culture of freshwater fish (red tilapia and American catfish). The technology for this type of aquaculture is well developed in Fujian Province, with no history of any adverse environmental impact or public health risks. No antibiotics are used in the fish rearing, as the ponds are usually part of an integrated farming system. Feeding of fries would be managed to avoid surplus as residue and based on fry weight, water depth, pH, and temperature carefully monitored and water changed regularly and recycled to farm use in an integrated farming system minimizing the potential for adverse environmental impacts. Other sites will be coastal locations where each targeted village has been allocated use-rights to a portion of the bay in their vicinity for mariculture activities. Fish cage culture would involve the rearing of grouper, yellow croaker, snapper, porgy, and sea bass in deeper sections of the bays. Seaweed cultivation involves seeding and growing kelp in bunches anchored to poles in shallower waters. Oyster raising involves placing oyster fry into old oyster-shells tied to a nylon
line 10 meters (m) to 15 m long. Each line is submerged in seawater and the oysters fed with feed pellets, (an organic mixture) until they reach harvest size, in about eight months to a year.

24. Where possible cages to be combined with oysters and kelp (algae) to mitigate the impact of effluents on the environment and cages moved every three years and the vacated sites treated with lime to protect the environment. According to the provincial government’s coastal management plan, areas surrounding the target sites will not be targeted for industrial development, thus there is no location-related pollution risk. Although night soil and other domestic organic waste are commonly recycled for agricultural use, it would still be desirable to have a system in place to monitor the discharge of local sewage and ensure that aquaculture and mariculture sites will not be contaminated. As a precaution, the Project will include a covenant requiring the Fujian EPB to conduct annual monitoring of the water quality of all of the Project sites and at local level, in collaboration with the project management office (PMO), would periodically oversee enforcement of environmental requirements specified in the EMPs.

4. Agro-processing

25. The project will establish and expand the agro-processing capacity of facilities involved in canning and juicing of local fruit, canning vegetables and bamboos, dried tea leaves, and producing food freezing products. These plants will use primarily locally products.

26. Most of the solid wastes from agro-processing factories would be organic matter (fruit skins and pulp, waste tea leaves, and fish entrails) and could be used by farmers to produce compost, thus effectively recycling waste in an environmentally sound manner. The wastewater, although not health-threatening, would be treated in sedimentation ponds to reduce biological and chemical oxygen demand to levels that conform to PRC standards. While it is anticipated that any potential adverse environmental impacts will be of minor significance and extent, nevertheless the country EPBs will require preparation of an Environmental Impacts Form or Environmental Impact Assessment Report to support the issue of an environmental clearance certificate for all agro-processing plants. All new proposals to be considered will incorporate an environmental section, which will include a location plan, costs and measures for waste disposal and wastewater treatment, odor and emission controls.

5. Integrated Livestock Farming

27. The Project will facilitate the expansion of medium-sized livestock farms including dairy, beef, pigs, goats, and chickens. Farms will be fully integrated with their own feed mills, breeding stock, slaughterhouses, and processing facilities. Developments will include (i) biogas digestion ponds, (ii) wastewater treatment facility, and (iii) solid waste treatment facility or appropriate disposal. A subproject-specific IEE was prepared for Dahe Breeding Pig Farm. Results of the sample IEE show that for the specific subproject, no any significant adverse environmental impacts are anticipated.\(^1\)

28. The biogas production technology would replace fossil fuel with clean energy and significantly reduce CO\(_2\), SO\(_2\) and dust output. Continuous monitoring, quality control, and other necessary measures taken during the lifetime of the biogas plant would be carried out to reduce wastewater and other wastes from the digester. Farmers would be trained in biogas operation, equipment cleaning and management. In addition, pasture management plans for sustainable

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\(^1\) As a supplementary document, the sample IEE for Dahe Pig Breeding Farm is available for inspection by the Board of ADB.
pasture utilization would be developed and implemented at dairy, beef cattle and goat farms. The Fujian EPB, through the county EPB, would be responsible for environmental monitoring and enforcement.

B. Rural Infrastructure

1. Agriculture Market

29. This Project will support the establishment and/or modernization of large to medium-size wholesale markets each with an average size ranging from 11,000 square meters (m²) to 15,000 m² and village markets each with an average size ranging from 3,500 m² to 7,000 m². These markets will serve as wholesale and retail outlets with wholesale yards, retail stands, short-term storage facilities, office space, parking areas, dormitories, and market information centers.

30. Markets will be located away from city and urban centers and residential areas to avoid any unacceptable odors transferring to adjacent communities and to minimize impacts of noise levels during market operations. Each market will be fully equipped with environmental safeguards, including (i) wastewater treatment facility, (ii) solid waste disposal system, (iii) proper drainage of storm water, (iv) separate wholesale and retail areas to maintain hygiene standards, (v) adequate public toilet facilities, (vi) a buffer zone/green area, and (vii) adequate facilities for loading and unloading of goods and parking.

2. Rehabilitation and Development of Rural Infrastructure

31. The Project will support rehabilitation, improvement and development of existing rural infrastructure facilities including roads, flood protection devices, and water supply schemes for small townships and villages in poor areas. It will include rehabilitation of (i) about 120 km of rural access roads; (ii) about 25 km of flood protection levees; and (iii) improvement in drainage and small water supply schemes to benefit the largest number of poor households.

32. The rehabilitation of roads and the construction of flood protection devices and small water supply facilities will involve few if any significant adverse environmental effects. However it will be necessary to assess each subproject on its merits and ensure appropriate mitigation measures are included in the design and implemented in construction period. Special attention will be paid to (i) soil erosion control, (ii) appropriate disposal of construction wastes, (iii) re-vegetation, and (iv) noise control.

3. Rehabilitation and Development of Hydropower Schemes

33. The Project will finance the rehabilitation or development of up to 21 small hydropower schemes, with generating capacities ranging from about 2.0 million to about 38 million kWh per year. The total power generated is estimated to be about 218 million kWh a year (representing a increase of 189 million kWh over existing output), capable of meeting the annual power requirements of 350,000 additional households.

34. Given that this is the most environmentally sensitive subcomponent of the Project, a subproject-specific IEE was prepared for Sancengji Small Hydropower Scheme. Results of the
4. Rehabilitation and Development of Rural Water Supply

35. The Project will support rehabilitation and development of about 25 township level water supply schemes of 5,000 to over 10,000 m³ per day capacities, including small water storage reservoirs/tanks, and pipes for distribution. These facilities will not involve any new land acquisition and will be built, maintained and operated by waterworks companies.

36. The water supply schemes would follow PRC’s Regulations on Anti-Pollution and Protection of Drinking Water Areas. Due attention would be given to soil conservation measures during construction period that include (i) prohibition of random disposal of soil, (ii) reduction in the time of earthwork, (iii) stoppage of construction during rainy season, and (iv) restoration of ground cover by planting trees and grasses after construction. Local EPBs and water resources management bureaus would carry routine monitoring to ensure that the surface water standards and drinking water standards are met.

V. INSTITUTIONAL REQUIREMENT AND ENVIRONMENTAL MONITORING PROGRAM

37. The Fujian EPB and County EPBs have been involved with the planning stages of the Project, and will be intimately involved in review and approval of environmental assessment report of each subproject based on PRC’s regulations and guidelines and the requirements specified in the Environmental Assessment Framework (EAF). The Fujian EPB/county EPBs will monitor construction activities and environmental performance during operational period based on PRC and provincial regulations and guidelines. Fujian Oceanic and Fishery Bureau is establishing an Environmental Management Center at Fuzhou and two fishery environment management stations in the project area at Ningde and Fuzhou. These centers will be used to monitor the impact of the mariculture activities on the marine ecology in the project areas. They will also provide training courses in fishery management and monitoring for county and provincial officials and extension workers and training in fishery laws, environment protection and fishery culture for fisherfolk.

38. No small hydropower subprojects will be approved for project financing without an environmental clearance from Fujian EPB/county EPB and ADB. Each small hydropower scheme will be required to submit an environmental assessment report with an environmental management plan (EMP) with the proposal for financing and be subject to periodic environmental audits by the Fujian EPB/county EPB. The Fujian EPB/county EPBs will monitor water quality at all aquaculture sites and rural water supply projects on an annual basis. The monitoring of the impact of soil conservation measures will be coordinated by the PMO in collaboration with the Fujian Soil Conservation Office. The Agriculture Department will have a role in monitoring the incidence and effects of manure and pesticide runoff from project sites on water quality at strategic locations and the report on the uptake of environmentally sustainable farming practices by project farmers developed under the agriculture and livestock components.

39. The PMO would establish a system under which systematic soil and water conservation monitoring, and the monitoring of socio-economic impact on the potential beneficiaries would be carried out. The PMO would undertake the initiative and begin the establishment of computerized soil conservation, benefit monitoring and information system by appropriate skills.

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2 The sample IEE for Sancengji Small Hydropower Scheme is available for inspection by the Board of ADB.
and trained staff. Among others, the system would include an assessment and monitoring of key indicators for measuring the success of sustainable land management practices under the Project with regard to ecological and environmental improvements.

40. To assist the PMO to overseeing monitoring of environmental impact and requirements as stated in the EMPs, the Project would provide for 72 person-months of domestic consultants to be employed during the period of project implementation. This additional expertise will assist the PMO to undertake their own environmental monitoring and instituting appropriate mitigation measures instead of depending entirely on the EPBs to undertake this task as part of their overall responsibility for all development subprojects in the entire province. To implement environmental assessment requirements specified in the EAF, the consultants will also (i) review the environmental assessment reports (EARs); (ii) inspect and ensure compliance with the mitigation measures proposed in the EARs and EMPs for all components or subprojects funded by the Project; and (iii) provide necessary trainings.

VI. PUBLIC INVOLVEMENT

41. Relevant government agencies, environmental experts and media have been involved in the planning stage of the Project, and will be continuously involved in environmental assessment of each subproject during the Project implementation based on PRC’s procedures and guidelines and the requirements specified in the EAF. For the subprojects to be identified during Project implementation, public consultations will be conducted and documented by the end-borrowers, and inspected by PMOs at various levels. The consultants will assist the PMOs to review the results of public consultations.

42. For both Dahe Pig Breeding Farm and Sancengji Small Hydropower Scheme, the two subprojects selected for the sample IEE preparation, a survey on view of environmental concerns from residents/farmers living near the subproject site was conducted and documented. (for details see attached sample IEEs).

VII. FINDINGS AND RECOMMENDATIONS

43. The overall IEE findings show that the environmental impacts of the Project are expected to be positive especially for the subcomponents of orchard rehabilitation, and forestation and soil conservation. It also shows that no significant adverse environmental impacts are anticipated from any of the subcomponents. The subproject specific IEEs for Dahe Pig Breeding Farm and Sancengji Small Hydropower Scheme have indicated that overall environmental impacts would continue to be positive and the subcomponents of integrated livestock farming and development of small hydropower schemes will have a neutral, or limited impacts on the environment that are mitigated. A full-scale environmental impact assessment (EIA) is, therefore, not required.

VIII. CONCLUSIONS

44. The Project will have significant positive environmental impacts on the project area, including soil erosion reduction, forestation, and reduced air pollution and global warming form conventional fossil fuel energy sources by renewable energy development. The Project will have limited adverse environmental impacts. Appropriate mitigation measures, environmental management and monitoring plan, and budget for environmental management have been proposed.