Jiangxi Biologic Energy Forest Demonstration Base

Construction Project Funded by European Investment Bank

Environmental and Social Impact Assessment Report

Evaluation Unit: Jiangxi Academy of Agricultural Science

Jiangxi Agricultural University

Collaboration: Jiangxi Forestry Department

City and County Forestry Bureaus

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1.2 Purposes of the preparation of the report

(1) To analyze and evalue the natural environment and the status quo of socio-economic conditions qualitatively, determine the future impact of the proposed project on the scope and extent,and to investigate and audit the implementation of the project in an environmental protection point;

(2) To determine the potential environmental impact of the implementation of the project,reflect relative information to the excutive sector; as well as make mitigation measures to reduce /decrease the negative impact

1.3 Brief introduction of the environmental impact assessment

1.3.1 Significance of the project

"Jiangxi Biologic Energy Forest Demonstration Base Construction Project" is an international cooperation project that Jiangxi govermont got from European Bank International Fund.It’s also one specific initiative for Jiangxi Province to further expand international cooperation in forestry and to be opening-up.Jiangxi is still one of China's poor provinces.Therefore,it is so necessary for it to actively absorb and introduce domestic and foreign capital resources, technologies and management experience to develope forestry in Jiangxi Province.Construction of bio-diesel raw material forest base is not only an important measure to deal with energy and environmental issues during the economic development, but also accords with the demands of the dual task of ecological and industrial construction in the forestry.Undoutedly it is of great strategic significance to achieve a sustainable energy supply and forestry development.

1.3.2 Structure of the report

The report is to assess environmental impact possibly caused by implementation of "Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank".This report was prepared according to form of World Bank agricultural development projects.The section of environmental impact assessment is arranged as follows. The first chapter introduces the background of the project; the second chapter describes the policies, regulations and management framework; Chapter III is a description of the proposed project;the fourth chapter is the natural environment and socio-economic environment description in the project area; the fifth chapter is devoted to public participation; Chapter VI is selective analysis of the project; Chapter VII is to determine the potential environmental impact as a result of the implementation of the project , as well as to put forward mitigation measures to reduce the impact; Chapter VIII is the environmental management and monitoring plan of the proposed project, including the implementation outline , mitigation measures and monitoring plans as well as training programs before and during the implementation period and operating phase of the project. Chapter IX is the conclusions and recommendations. Besides,it also includes the attached maps, annexes and appendixes.

1.4 Bases of the evaluation

The evaluation is based on relative laws and regulations of People's Republic of China as well as the technical documentation requirements of World Bank. The following are the documents used in the preparation of the report.

1.4.1 Relevant state laws and regulations

(1) "People's Republic of China Environmental Protection Law" 1989

(2) "People's Republic of China Forest Law " 1998

(3) "People's Republic of China Wild Animal Protection Law" 1988

(4) "People's Republic of China Water Law" 1988

(5) "People's Republic of China Water Pollution Prevention Law" 1996

(6) "People's Republic of China Soil and Water Conservation Law" 1991

(7) "People's Republic of China Environmental Impact Assessment Law" 2002

(8) "People's Republic of China Nature Reserve Regulations", the State Council Decree No. 167, 1994

(9) "People's Republic of China Regulations on the Protection of Wild Plants", the State Council Decree No. 204, 1996

(10) "To Turther Strengthen National Nature Reserve Administration",the State Council Decree No. 111, 1998

(11) State Environmental Protection Agency "Environmental Management Regulations on Projects Construction" 1998

(12) State Environmental Protection Agency and other four ministries GEMS [1993] No. 324," To Strengthen the Management of Environmental Impact Assessment of Construction Project Funded by International Financial Institutions"

(13) State Environmental Protection Agency,"Management of Construction Projects Environmental Protection Classification List" 2002

(14) State Forestry Bureau, "The Forest Pest Prevention Regulations" 1989

(15) State Forestry Administration, "Interim Measures for the Administration of Afforestation Quality" 2001

(16)State Forestry Administration, "Provisions of Redacting Forestry Projects Feasibility Study Reports" (for trial implementation) 2006.8

(17) State Forestry Administration,"Forest Tree Seed Project construction standards (for trial implementation)" 2003.11

(18) " Rules of afforestation technology " GB/T15776-95

(19) " Rules of breeding technology " (GB/6001-85)

(20) "Norms of Approving Improved Varieties of Trees " (GB/T140-93)

1.4.2 Requirements of World Bank

(1) O.D4.01 "World Bank Environmental Impact Assessment Guide"

(2) O.D4.01 " World Bank Business Guide "

1.4.3 Specifications of the evaluation

(1)"Environmental Impact Assessment Technical Guidelines" (HJ/T2.1-2.3-93)

(2)"Environmental Impact Assessment Technical Guidelines - non-polluted ecological impact" (HJ/T19-1997)

(3)"Comprehensive Treatment Norms of Soil and Water Conservation" (GB/T16453.1-16453.6-1996)

(4)"Technical Specifications of Water and Soil Conservation Program of Project Development and Construction" SL204-98

(5)"World Bank business guideline", 4.01(Environmental Assessment), 4.04 (Natural Habitats), 4.09 (Plant Diseases and Insect Pests Management), 4.11 (Cultural Heritage), 4.36 (Forestry), "World Bank Public Information Policy"

1.4.4 Relevant documents about the construction project

(1) "Interim Measures for Subsidies Management in Bio-energy and Bio-chemical Raw Materials Base" (Ministry of Finance [2007] No. 435);

(2) "Forestry Development" 11th Five-Year Plan "and the Medium and Long-term Planning";

(3) "Forestry Building program of Bio-diesel Rraw Material Forest Base for the" 11th Five-Year Plan "", State Forestry Administration, 2006;

(4) "Jiangxi Forestry Development" 11th Five-Year Plan"and the medium and long-term planning", Jiangxi Forestry Department, May 2006;

(5) Biologic fuel research information from Jiangxi Provincial Academy of Forestry, Hunan Provincial Academy of Forestry;

(6) Relevant rules, provisions, technical standards and policy regulations of Jiangxi forestry projects construction;

(7) Relevant technical and economic indexs provided by Jiangxi forestry sector;

(8) Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank, Inventory and Planning Institute, State Forestry Administration, June 2008.

1.4.5 Principles of the environmental impact assessment

The project EIA report is to meet the requirements of European Investment Bank, national and provincial environmental protection departments about the environmental impact assessment of projects construction.The design of environmental assessment report and environmental management plans following principles of sustainable development objectives and scientific evaluation.

Overall, the project is a natural resources (forests) project. It does not involve any great construction activities and will not cut or damage the natural forest, woodland shrub / grass which are original and of high biodiversity.According to World Bank Business guidelines (OP4.01), it's classified as Category B. Therefore, the environmental assessment is carried out relatively in a simple way; the research focus lies in issues of significant impact on the environment as a result of the project.

1.5 Relationship with the project's feasibility study

According to the "Environmental Protection Regulations on Projects Construction", Article 9 and Article 17, the implementation department of the project needs to provide EIA report to the environmental protection departments which have the right to examine and approve the project construction.And the EIA report should pass the examination and approval in the project feasibility study stage . In preliminary design, the report should have a special section on environmental protection, including domestic relevant environmental standards, environmental impact mitigation measures and the corresponding design. In addition, it should also include the project's possible environmental impact, mitigation or preventive measures to reduce / prevent the impact, as well as the potential causes of environmental pollution.

As World Bank's request, the project’s EIA and the project should be prepared at the same time. During the preparation of the report, we work closely with the project office of Jiangxi Forestry Department, biologic energy forest evaluation group, social evaluation group as well as members of other groups, to examine the feasibility study report, to negotiate and consult fully with local communities, farmers and forest operator.EIA group has carried out extensive exchanges with each expert group in the group seminars and process of field work in order to ensure that we are fully aware of the project. The EIA report is fully completed during the preparatory phase of the project, so it can be seen as part of the project feasibility study. In the project feasibility study there is a chapter covering all environmental issues discussed in the environmental impact assessment report, and the capital for environmental management plan is also included in the projects investment budget.

1.6 Environmental impact assessment expert team

The EIA Group on the projects is made up of four senior environmental impact assessment experts, as well as more than ten assistant persons. The majority of members are professional researchers from the Jiangxi Academy of Agricultural Sciences, as well as staff in Jiangxi Agricultural University, Jiangxi Forestry Department, forestry bureaus in the project-corresponding county, each forestry station. The detailed division of labor of the experts can be seen on Annex 1.

Owning environmental impact assessment certificate Class B awarded by State Environmental Protection Agency, Jiangxi Academy of Agricultural Sciences has carried out more than 1,000 projects' environmental assessment.

1.7 Scope and period of the evaluation

1.7.1 Evaluation scope

The scope of the project Environmental assessment covers 19 administrative counties (districts) in the projects implementation areas. The proposed project does not involve nature reserves, places of interest and important places of heritage.

1.7.2 Evaluation period

The project Evaluation includes different environmental assessment stages.

(1) Design stage;

(2) Implementation stage(five years): 2008-2013, incomplete grown-up forests breeding for 2 years;

(3) Operation stage (24 years): This project plans to operate from the year 2008 to 2032.

1.8 Factors of the evaluation

The proposed project is to create biologic energy forests. The main source of evaluation factor is based on field survey, second-hand data collection, communication with other expert groups to understand the

environmental sensitivity of the project area, and experience from some other forestry development projects similarly in South China. And the EIA expert group identifies the evaluation factor by use of an interactive environmental impact matrix (Table 1.8-1).

Table 1.8 Environmental Impact factors preliminary identification matrix

Projects Composition / activities	Environmental parameters															
	Physical environment					Ecological Environment					Social environment					
	Hydrological	Water Quality	Soil Erosion	Solid waste	Terrain / terrain	Flora and fauna	Biodiversity	Soil fertility status	Rare / endangered species	The ecological balance of pests	Land Use	Village-level traffic	Socio-economic	Minority	Public health	Employment
biologic energy Forest Construction																
Soil preparation		-1	-2			-1	-1									
Nursery expansion				-1		-1							1			1
Increase the use of chemical fertilizers		-2						+2			1		1			1
Increase the use of pesticides		-2				-1			-1	-2			1		-1	1
Tending / thinning / weeding			-1	-1			-2	-1								1
Tree species selection						1	2			1					-1	
Choice of forest land	1	1	2			1	1	1		1	1					

Note 1 = Minor impact 2 = Moderate impact 3 = Significant impact

" - " = Negative impact " + " = positive impact "*" = If there is "+"= If directly related to ethnic minorities

1.9 Classification of the evaluation

Principles of specific factor evaluation classification and environmental classification stipulated by the State Environmental Protection Agency are referred to in "Environmental Impact Assessment Technical Guidelines" (HJ/T2.1 ~ 2.3-93, HJ/T2.4 ~ 1995, HJ/T19 ~ 1997). The evaluation focuses on the impacts to ecological environment, water environment and social environment aroused by the project during implementation period and operation period.To be further, the EIA report is basis of the potential environmental impacts, and treats the water quality, land use, soil erosion, degradation of forests and biodiversity as the main evaluation factors.

Assessment of the water quality focuses on the land use's impacts on the surface water and groundwater in the process of reforestation and using pesticides in the project implementation stage.

1.10 Standards of the evaluation

According to environmental function zoning the environmental protection sectors have done in the project-corresponding county, the evaluation criteria includes quality standards and emission standards. Execute quality standards in the areas where environmental pollution happens easily. If there are emission standards, then implement the corresponding emission standards in the field. If some of the emissions

standards do not exist, then use emission standards associated with each specific pollutant.

According to geographical distribution and environmental characteristics in the p reach roject area, apply the following standards.

1.10.1 Environmental quality standard

(1) Surface water environmental quality meets "Surface Water Environmental Quality Standards" (GB3838-2002) Ⅲ water quality standards；local reaches carry out Ⅱ criteria.

(2) The soil quality standards refer to "Soil Environmental Quality Standards" (GB 15618-1995)

1.10.2 Pollutants emission standard

(1) Sewage disposal implements "Sewage Comprehensive Discharge Standard" (GB9878-1996) Ⅰ Criteria.

(2) "Standard of Safe Use of Pesticides " (GB4285-89).

(3) The suggestions on pesticide classification proposed by the World Health Organization according to the dangers and guidelines for the classification.2004-01 (WHO/PCS/01.4).

1.11 Focuses of the evaluation

(1) Engineering analysis is basis of the evaluation. It is also an important mean of ensuring that the proposed project is advanced and the environmental protection facilities run effectively.

(2) What has more impacts on the natural environment is the project construction period. So the environmental assessment impact during the project construction period is one of the key points.

(3)Project operating period has a great impact on the ecological environment, so it's also emphasis of the evaluation.

(4) Public participation is one focus in the evaluation of European Bank's projects, which is also one of the focuses of this EIA.

The Focus of the EIA lies in the potential impact of the project on the environment, especially including the impact of forest clearing, soil trimness on soil erosion, the impact of breeding young trees on the ecological environment; the impact of application of fertilizers and pesticides on the ecological environment. Besides, the EIA should pay attention to the impact of this project on wildlife habitats as well as biodiversity for the sustainable development in the project area.

1.12 Procedure of the evaluation

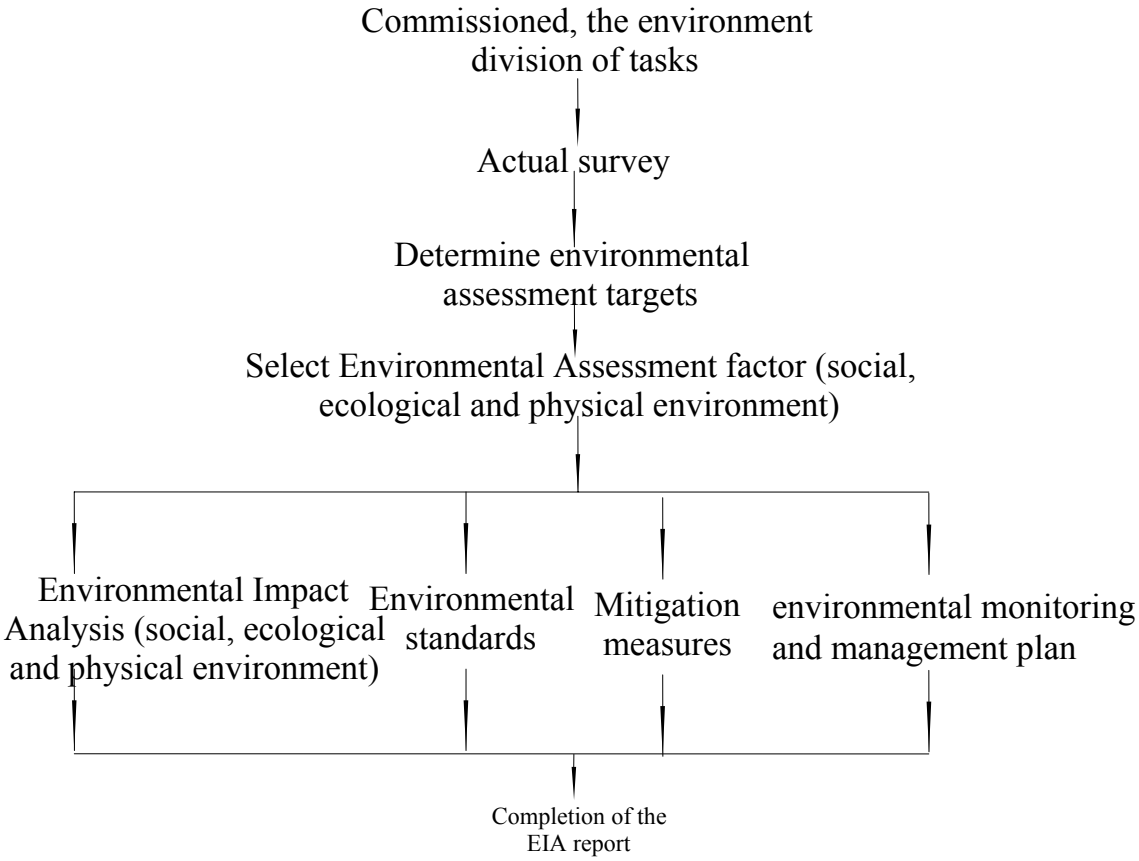

Fig. 1-1 Procedure of the evaluation

2 Policies, Regulations and Management Framework

2.1 Organization and management framework of the project

2.1.1 Organization framework

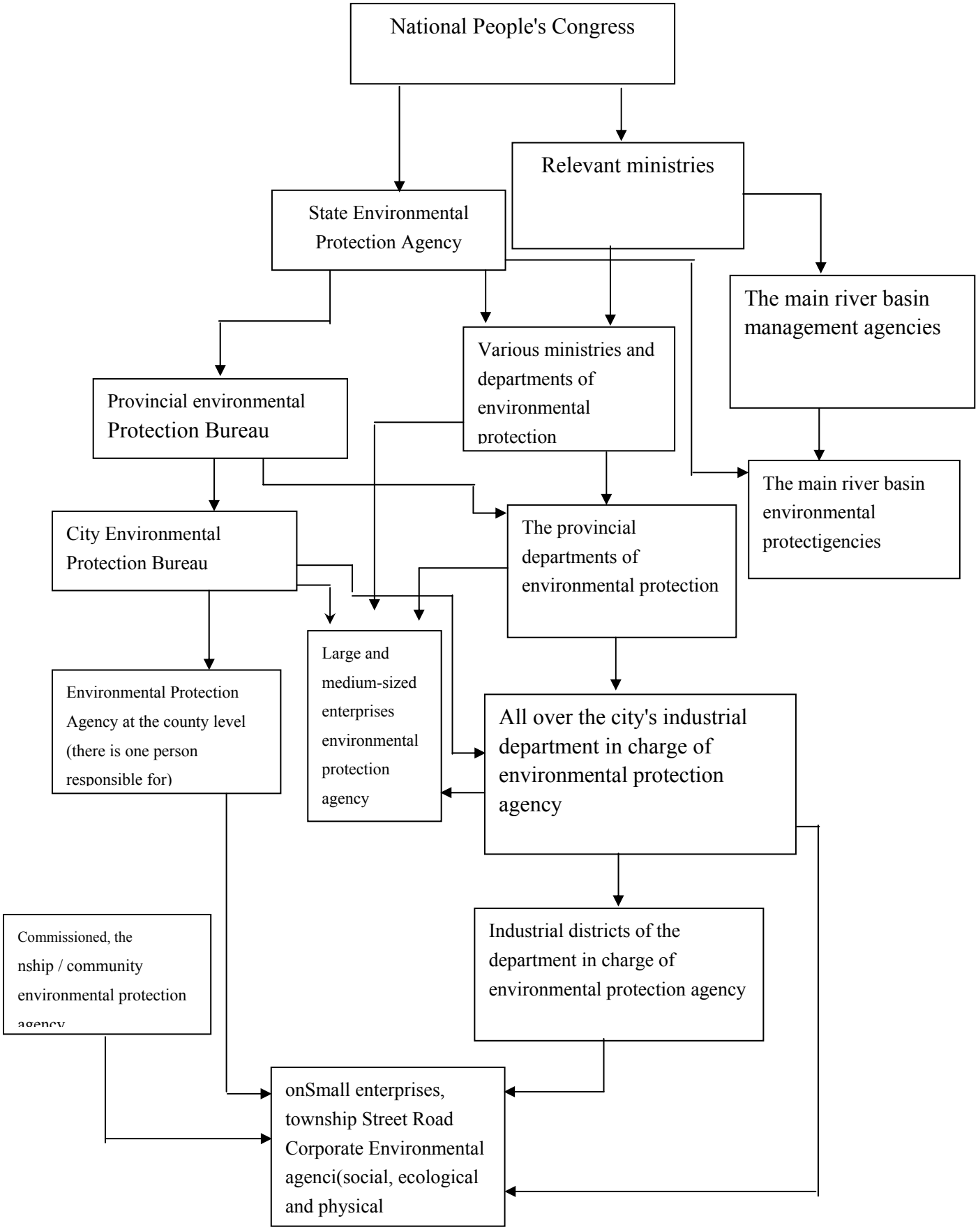

Fig. 2-1 Framework of China’s Environmental Protection Organization

National People's Congress, State Environmental Protection Department, Relevant ministries, Provinces (autonomous regions) level of environmental protection, Various ministries and departments of environmental protection, The main river basin management, Municipal Environmental Protection Bureau, The provincial departments of environmental protection departments and bureaus, Environmental Protection Agency at the county level, Large and medium-sized enterprises environmental protection agency, All over the city's industrial department in charge of environmental protection agency, Township / community environmental protection agency, Industrial districts of the department in charge of environmental protection agency, Small enterprises, township Street Road Corporate Environmental agencies

2.1.2 Management framework

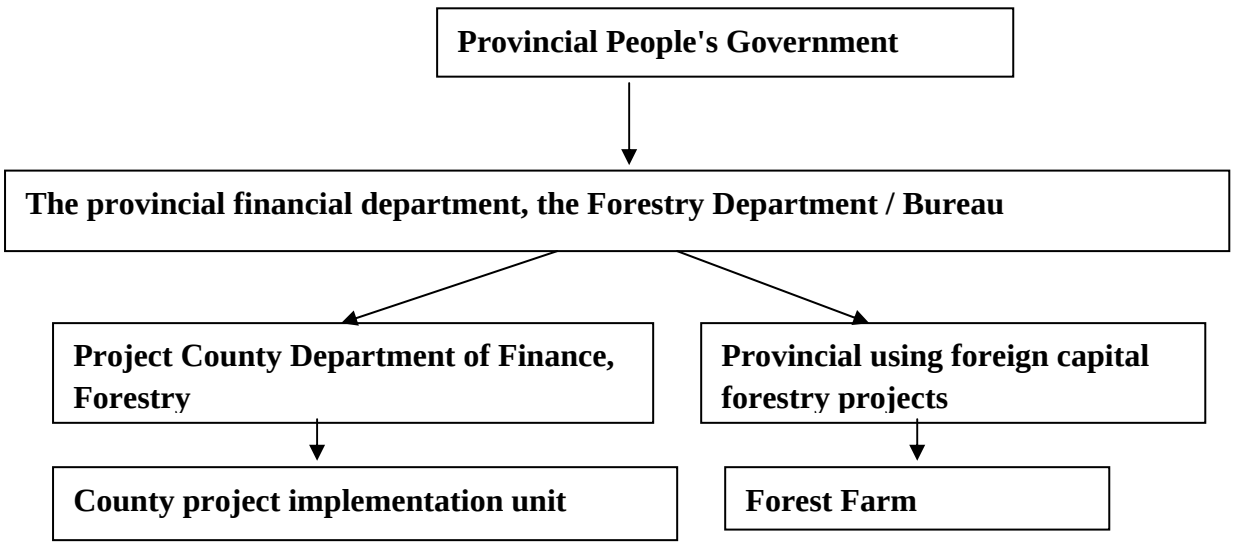

Fig. 2-2 Framework of the Project Management

2.2 State biologic energy forest policies and strategies

Biologic energy is one kind of clean renewable energy sources, which has been internationally recognized as one of the next most promising alternative energy sources. China's energy consumption currently ranks second in the world and still grows rapidly; the energy security becomes severe. So the government must attach great importance to the development of new energy sources; particular attention should be paid to speed up the development of forestry biologic energy.

China attaches great importance to the development of renewable energy. The government has enacted "Renewable Energy Law"; the "11th Five-Year" Plan announces to “boldly develop renewable energy … to build a number of straw and wood power plants, to expand production of forming solid biologic fuel, fuel ethanol, bio-diesel"; "Medium-Long Term Development Planning of Energy and Renewable Energy” determines that by 2020 the ratio of renewable energy in the energy structure must reach up to about 16%.`

For three times continuously in State five-year plan, State Science and Technology Commission have listed research and application of biologic energy technology as key research projects.

In recent years, State Science and Technology Commission organized to work out "National Energy Forest Construction

Plan","Construction Program of Forestry Bio-diesel Raw Material Forest Base in the "11th Five-Year Plan"","Implemental Program of Demonstration Projects to Cultivate Energy Forest in the"11th Five-Year Plan"", and together with relevant ministries constituted taxation policies to support the implementation of biologic energy and bio-chemical projects including flexibility subsidies of a loss, grants of raw materials base ,demonstration grants, preferential tax incentives, el at.

2.3 Requirements of World Bank about forestry project

The EIA report must meet the following policies in accordance with the requirements of World Bank on forestry projects:

(1) "Operations Manual" 4.01, Environmental Assessment

(2) "Operations Manual" 4.04, Natural Habitats

(3) "Operations Manual" 4.09, Plant Diseases and Insect Pests Management

(4) "Operations Manual" 4.10, Land Ownership

(5) "Operations Manual" 4.11, Cultural Heritage

(6) "Operations Manual" 4.36, Forestry

(7) World Bank operational procedure, No.17.50, Information Publicity.

3 Description of the Project

3.1 The aim of the project

By construction of biologic energy forest demonstration bases, the aim is to make full use of forest productivity and forest biologic energy which have particular characteristics and advantages, trying to improve the ratio of forest biologic energy in entire national energy sources and making contribution to state energy development goals. Meanwhile, the implementation of the biologic forest projects can further improve the forest cover proportion, meliorate the ecological environment, reduce greenhouse gas emissions and actively explore forests effect on climate change.

3.2 Objectives of the project

The specific objectives: to be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 1.1.7 Project construction objectives: P2.

Products objectives: to be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 5.1.4.2 Products quality objectives: P34.

3.3 Content of the project construction

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 1.1.8 Content and scale of the project construction: P2.

3.4 Regional layout of the project construction

3.4.1 Principles of the project layout

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 5.2.2 Principles of the project layout: P35~36.

3.4.2 Scheme of the project layout

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 5.2.3 Scheme of the project layout: P36~37.

3.5 Technology design

3.5.1 Selection of tree species for the reforestation

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 5.2.1 Selection of tree species for the reforestation: P35.

3.5.2 Technology measures of the reforestation

(1) Woodland selection of reforestation

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 6.1.1 Woodland selection of the reforestation: P41.

(2) Woodland clearing and soil trimness

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 6.1.2 Woodland clearing and soil trimness: P41~P42.

(3) Fertilization

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 6.1.3 Fertilization: P42.

(4) Nursery stock specifications

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 6.1.4 Nursery stock specifications: P43.

(5) Planting

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 6.1.5 Planting: P43.

(6) Pruning

DO pruning to the trees which are mature every year in order to increase the number of health branches in the second year; that is to increase the yield. Remove some old, overlapped or thin branches and sticks of diseases or pests so as to increase leaking light, to reduce pests and diseases, and promote fruit bearing in the winter.

(7) Harvest

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 6.3 Harvest: P46.

(8) Breeding

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 6.2.1 Breeding of tea plant: P44~ P45.

3.6 The project investment

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 1.1.10 Qualifications of the project loan, Investment scale and sources of the capital: P3.

3.7 Indexes of the project’s success

The Indexes of the project’s success are as following:

(1) Economic benefits

To be seen in “Feasibility Study Report of Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank”, 1.1.11 Economic benefits of the project: P3~P4.

(2) To benefit farmers

The implementation of construction of the Biologic energy forest base project can provide 20,000 job opportunities each year; therefore, it may effectively increase the incomes of farmers and speed up the pace of getting rid of poverty and becoming better off.

(3) Technical training

The project will offer training to all levels of forestry worker in Jiangxi Province to improve their technical capabilities of business. The training to farmers will improve their business skills and knowledge level.

(4)Quality of the environment

Currently, China is the second large country in the total of carbon dioxide emissions, only a bit lower than the United States, facing pressure to reduce greenhouse gas emissions. The development of bio-diesel can effectively reduce pollution, protecting the ecological environment.Tests showed that the bio-diesel is non-toxic and biodegradable; 20% of bio-diesel mixed can reduce 70% of the sulfur dioxide emissions and lower 90% of the air toxicity.

At the same time, emissions and absorption of carbon dioxide produced by bio-diesel can cycle in the natural environment; the use of bio-diesel energy can achieve zero carbon dioxide emissions. In addition, naked-cortex trees are drought-resistant, barren-resistant, easy-to-plant and easy-to-grow and other characteristics; it is suitable for cultivation at barren hills and wasteland.The construction of the biologic energy forests project could effectively increase forest cover areas, improve the ecological environment, and build a multi-functional forest ecosystem which can enhance the absorption of carbon dioxide and the carbon collection.

(5) Biodiversity Conservation

Construction of bio-diesel raw material forest base can fully exploit the potential production ability of the barren hills and wasteland which are not suitable for farming before, speed up afforestation so as to expand forest areas and develop forest resources.Transformation of the existing low-quality forest

can improve the quality of forest resources and give full play to forest soil and water conservation, conservation of water sources, windbreak and sand-fixing, regulate climate and other similar measures to improve the ecological environment. At the same time, it can promote the development of biodiversity.

4 Overview of natural and social environment in Jiangxi Province

4.1 Ecological environment

4.1.1 Geographic region of Jiangxi Province

Jiangxi Province is located in the south bank of middle reaches of the Yangtze River; the geographical coordinates are: longitude 113°34′~118°28′, latitude 24°29~'30°04'.The east of Jiangxi is Zhejiang and Fujian; the south links Guangdong; the west lies Hunan and the north is Hubei and Anhui. The north of Jiangxi Province links the Yangtze River, with three towns of Wuhan in the up direction, and Nanjing, Shanghai in the down direction. The south-east nears to several open and developed coastal cities. The province's total land area is 16,690,000 hectares, 36% of which are mountains, 42% are hills and 22% are hillocks, plain and water.

4.1.2 Plant resources and major types of vegetation in Jiangxi Province

There are more than 4,000 species of plants in Jiangxi province, including about 470 kinds of ferns and over 100 kinds of moss-type plants. There are 500 fungal species in the large-scale lower plants. More than 300 fugal species are based on the specimens, of which over 100 kinds are edible. Representatives plants in various stages of the evolution of the plant system are found in Jiangxi Province. Meanwhile, there are many old plants of original characters in Jiangxi including Ginkgo which is always called the "living fossil", etc. These abundant plant resources fully show that China's sub-tropical region including Jiangxi is one of the plants origin centers in modern times.

Due to the unique conditions of energy and water, many endemic plants are distributed in Jiangxi. Totally 64 of the national 198 kinds of endemic genera are woody plants; 19 are found in Jiangxi Province, 11 of which are single tree species. A total of 119 branches of woody plants are distributed in Jiangxi, 56 (accounted for 47.1 percent) of which are branches of the tropics extended to the north in Jiangxi.

In Jiangxi Province the representative main resources plants with development prospects, which have been directly used or possible to be directly used can be divided into 12 categories.

(1)Timber plants. There are more than 10 kinds of bamboo, pine, fir and so on, the number of which are very large. There are also precious Altingia, tourism-plants, etc, and even valuable species like Pseaudotaxus, Huadong Huang Fir, but the number is small.

(2) Firewood plants. There are more than 10 kinds of woody plants like Azalea, Wood that grows in barren hills. Besides, there are Linearis, Fern, Mango and a variety of other herbs. Plants that have a large number include Eucalyptus, Acacia and black Locust, and so on.

(3) Woody food plant. Plants that have a large number are Sclerophylla, Eyrei, Castanopsis structure, Castanopsis Antlers, Castanopsis Luo Fu, Millet, Cogon Millet, white oak, Quercus oak, Quercus, stone and oak Lithocarpus, and so on. And the common plant species include jujube, persimmon, ficus pumila, wild papaya, bean curd wood, and so on. Double-season Millet which is so rare and precious lives in Yongxiu County.

(4) Edible fruits and vitamin-rich plants. The edible fruits and vitamin-rich plants which have a large number of Distribution are hawthorn, mountain persimmon, waxberry, raspberries, strawberries, rough Rubus, Mihou Peach, black-rice tree, rice- flower, wild grape, and so on. Fruit trees that can be used for grafting include wild pear tree, Malus, and so on. Mihou Peach now has been transformed in order to improve the yield fruit. Wild fruit trees whose vitamin content is higher than Mihou Peach include Elaeagnus and so on.

(5) Wild vegetables and fodder plants. most of these are herbaceous plants,also some aquatic plants,kind rich.the usually kinds are Soybean field, to leave Portland, corns grass, Lespedeza, Pueraria lobata, sweet clover, Trifolium, Desmodium, mountain trail, Malange, mouse song grass, Artemisia pears, Peng year, Cephalanoplos vegetables, fern, Osmunda, wild Amaranthus, shepherd's

purse, as doing dishes, Houttuynia, Mission glutinous rice, quinoa, hoof-and tree structure, car, webbed duck grass, purslane. Aquatic plants in common including Azolla, Potamogeton, water hyacinth, the big dipper, water bamboo leaves, duckweed, turbot, is Amaranthus, cress.Woody plants are yu and Tilia. Its leaves are edible.

(6) Aromatic plants. The species of great exploitation and development value including maudiae, Michelia chapensis, purple smile, Magnolia officinalis, Tourism-wood, M., Lan Jian, Whelan, Chunlan, cold blue, blue flowers, and so on. there are a large number of distribution Litsea, Spicebush , Angustifolia pepper, Jiang Shan, and so on, there are fewer large camphor leaves, soil cinnamon, Cinnamomum Gui laurel, Lindera, such as Dan Litsea. There laver, Chinese cabbage, Liquidambar, pine, and a number of Mi Houtao genus Rosa has taught more. In addition, Bell-flower and Tuberose are relatively fewer;the number of Rhododendron dauricum is especially very small, but the aroma is pure, strong and of great value; there are orange grasses all over the barren hills, which are of great value in use.

(7) Medicinal Plants. the province has more than 1,500 kinds of Medicinal Plants, There are more than 300 commonly used species.there are rich ofGardenia, Alisma, Shi Wei, taro, South Hawthorn, Aurantii, Citrus, Uncaria, Viticis, Poria earth, mint, Nepeta and so on. Large distribution or valuable specials including Guanzhong, Chrysanthemum, Pinellia, Araceae, Campanulaceae, imperatorin, ginkgo, the Chinese, gentian, Senecio, honeysuckle, soil Fuling, Sophora, Melaleuca tower, Magnolia, Lygodium, Li Feng and the Netherlands, five Cortex Periplocae spent palm tree wood, Polygala, Kim Jin-Hong, Desmodium, Wintergreen, dangshen soil, Pseudostellaria, Dodder, odoratum, Lily, Cotoneaster Cotoneaster, Radix, the Senate dragon, commercial land, coral grass, Galla, and so on. Zhu Yi Yao has water, sodium a flower, the first cloud, Law bamboo leaves, wild pepper, yelan spot, Dysosma, Herba, lobelia, Wang Jiangnan, fiber Hedyotis grass, lentils

Hill, the bar board, Bee Hill vegetables and so on. Another anti-cancer drugs and a variety of contraceptives.

(8) Tanned plant. Wider distribution specials including Mu-carlesii, Quercus, mosquito trees, wild persimmon, lotus-jun, Yangmei, Liquidambar, Rhus and so on. There are a lot of acacia trees,which is high-quality raw materials.

(9) Fiber Plant Wider distribution specials including Bamboo, Mountain, the fescue, reed, Pennisetum, Cattle grass, eight River King, rush, and Alpine Rush Alniphyllum, Mountain flowers, linden and so on. folk paper-making raw materials including Maodongqing, holly iron, longifolia frozen green, small red Ma, and a number of Mi Houtao Malvaceae plant.

(10) Ornamental plants.there are a variety of species. Azalea is Specialty , it has more than 20 varieties. The color is yellow, white, pink, red, the branches unique,it can be used for large-scale bonsai. A variety of orchid, grass tail section, lily plants,big beautiful flowers. The large number growth including Golden Chrysanthemum, Chrysanthemum, anemone, yellow, yellow Polygala, the Hypericum, flowers are eye-catching. Magnolia, M., Huang Mu-lan open a single large flower, it can be as pure forest;

There are a large number of Kwai plants; Nageia, yew, Parkinson's Fujian Province, cycads, Cephalotaxus, East China Huang Shan, Juniperus, hemlock, ginkgo, skin-nan, thick incense and incense trees, Syzygium, Phoebe, Jinggangmycin carlesii, fruit Horseshoe Netherlands, China Heteropanax maple, box be popular as body-building and strange tree leaves . A value bamboo including Wong, purpurea, the owner, Chimonobambusa sandwich bamboo, Phyllostachys bamboo, bamboo face, makino, Jinggangmycin Chimonobambusa. Which can be used for bonsai and very common plant are Ji wood, bone white, Gardaniajas minoides Ellis. Lagerstroemia indica, it goes, Rosa, Rosa multiflora, wood grouper are Very bright and Pleasing.

(11) Oil Plant. Camellia has more than 20 species,such as small fruit tea, safflower oil tea, fruit tea rough. Oil industry such as three-tung, the Millennium-tung, Sapium has been widely cultivated plant, wild plant includingStyrax, Rhus, wild sumac, Alniphyllum, milk-white, mountain Sapium, Another is Amorpha introduction from the United States. Seeds have oil-bearing were Nageia, Torreya. 13 Symplocos have oil-bearing plants, large distribution plant are Huashan alum, a rat vector. Hazel, pecan, walnut and so on are less distribution, but high oil capacity.

(12) Cleaning up environment and monitoring environmental pollution plant. Camphor tree, oleander, Ailanthus altissima, Ligustrum lucidum, the configuration tree, fir, Eucommia, honey locust, Paulownia, gardenia, fig, mosquito trees, hawthorn, Xanthium, Celastrus, spiraea, azaleas, Ai Artemisia, the water chestnut MichaelCan reduce the toxic components of the air content ; Water hyacinth, cattail, and can reduce water pollution;which can monitor air pollution are Tang calamus, webbed duck grass, morning glory, as well as various types of bryophytes.

In Jiangxi Province, there are 110 kinds of endangered species which are unique in China.Such as water pine, silver pine, Japanese cedar, Huadong Yellow cedar, woody lotus ,Yulan and other over sixty kinds. They are sub-tropical species unique to China.16 species in Jiangxi Province are unique to China. They are Jiangxi Rhododendron, Jinggang Mountains Azalea, red azalea, back soft Rhododendron, Jiangxi hill willows, Jiangxi maple, U.S. gross smile, Lamei pattern, the entire margin of tea safflower oil,Jinggang Mountains Ternstroemia, Jinggang Mountains Chinese gooseberry, Jinggang Mountains grapes, Jinggang Mountains plum, Xunwu rattan bamboo, river bamboo, thick-skinned bamboo .

These species nearly account for 73.3% of precious plant resources in Jiangxi. In addition, there are some ancient trees in Jiangxi provincial

region,for example the Lushan "Baoshu" planted in Jin Dynasty (265-420 AD), East Temple" Six Dynasties Pine ",and dozens of reservations of the ancient ginkgoes which are over thousand years old.According to incomplete statistics, there are nearly 40 kinds of ancient trees retained in Jiangxi Province, including 13 families, 29 genuses;and the distribution points are as many as 95. In particular, ancient camphor tree is a representative specie in Jiangxi; there are more than 30 places where ancient camphor trees are over 500 years old.Almostly there are 300 year-old ancient camphor trees in every village.

Jiangxi Province was named “Yu Zhang” in the old times, because of camphor trees all over the province. At present, camphor trees are often chosen to green cities in Nanchang and other cities.

Vegetation types: the representative type of vegetation are sub-tropical evergreen broad-leaved forest, coniferous forest, mixed coniferous and broad-leaved forest, mixed evergreen and deciduous broad-leaved forest and deciduous broad-leaved forest, as well as a few of bamboo forest and peak coppice. Poyang Lake area is the mainly distributed region. Besides, there are some other distributed regions such as barren hills and scrub grass, sand-soil vegetation, meadow vegetation, and so on. Barren hills and scrub grass are the products of repeated vandalism to the evergreen broad-leaved forest. After the reverse succession, they become sparse, short, and of low biologic yield, few plant species.

The preponderant plants include azalea, yellow Gardenia, golden Gardenia, Cogon Millet, black-rice trees, red clovers, holly, long frozen green leaves, blueberry short-tailed, dichotoma Ridge, arista, ancient wild grass, and so on.Many of them live in the Poyang Lake area, as well as the hills and mountain areas around alluvial plain generated by Ganjiang River.

4.1.3 Wildlife overview in Jiangxi Province

Water area in Jiangxi is very large; the mountains are sheer and long. The vegetation coverage rate is very high; the ecological environment is quite

favorable. Especially because the government has been strengthening the environmental protection measures in recent years, the abundant animal resources are effectively being protected.

Investigation showed that there are 600 species of vertebrates existing in the province including more than 170 species of fish, accounting for 21.4 percent of the country's water resources(in freshwater); more than 40 species are amphibians, accounting for 20.4 percent of the country's total; more than 70 species are reptiles, accounting for 23.5 percent of the country's total; more than 270 species are birds , accounting for 23.2 percent of the country's total; more than 50 kinds are mammals, accounting for 13.3 percent of the country's total. Fish and birds are abundant and of great economic value. So they become the key protection targets in the development and utilization of resources.

4.2 Physical environment

4.2.1 Topographic conditions

The outline of Jiangxi territory is slightly seemingly a rectangular. East and West boundary is obviously longer than the North-South, and the width of North is several times the South's,seemingly like a head-upright seal. The distance between North and South of the province is about 620 km, The distance between east-west is about 490 km. Total land area is 166,947 square kilometers, accounting for 1.74 percent of the country's total land area, ranking first in the provinces and cities of East China.

Three sides of Jiangxi Province in the east, west and south are mountains but the north is relatively flat and the central is hilly. The province is like a great basin wholly tilting to the Poyang Lake and open towards the north.

Landforms Types of Jiangxi are relatively complete. The distribution is more or less a irregular ring, and the normal type of the landscape are mainly hills and mountains, of which are 60,101 square kilometers of mountain (including medium-mountains and low- mountains), accounted for 36% of the provincial total area; the hills area are 70,117 square kilometers (including

high-hill and low-hill), accounting for 42%; hillocks and the plains are 20,022 square kilometers, accounting for 12% ;area of the water is 16,667 square kilometers, accounting for 10%. In addition to the normal types of the landform, there are karst, red rosy cloud, glaciers and other special landform types.

Geomorphologic landforms of Jiangxi can more or less be divided into 9 zones and 9 sub-zones:

(1) Low mountain and hill areas in North-West of Jiangxi. The area is about 35,000 square kilometers. Many peaks are at an altitude of 1,000 meters or so, some up to 1,500 meters. The zone can be divided into2 sub-zones; that are Mu-Fu Mountain, JiuLing Mountain erosion areas, mainly developing electricity ,water and forestry; Yifeng, Gao-an sub-zone for the development of rice and cash crops. Lushan Mountain is based on Mu-Fu Mountain, extending to the east.

(2) Plain areas around Poyang Lake. The area of the plain is about 15,000 square kilometers. The region has a vast lake and river siltation alluvial plains, while outer edge is the low ;this region is rich in fish and rice.

(3) Hilly areas in the north-east of Jiangxi. The hilly area is about 25,200 square kilometers. HuaiYu Mountain area lies in this zone; the central is high and the north and south are low, full of hills and basins. This zone can be divided into 3 sub-zones: Hao Mountain, Jiao Pond erosion hilly areas, Wuyuan, HuaiYu Mountain erosion low-hilly areas and Yiyang, Yushan eroded red rock hills and denuded basins.It is suitable to develop forestry economy in the region.Wuyuan tea is renowned in and out of China; Valley Basin and the two sides are suitable for farming industry.

(4) Middle reaches of the river valley and the hilly region of the Ganjiang River and the Fu River. The area is about 21,900 square kilometers. There are river terraces, hilly and basin staggered in the region ;the terrain is wavy ups and downs, having a moderate slope; there are also scattered lower hill.

Because of the large amount of land available for planting, the agricultural production has a huge potential for the development in the area

(5) Medium-low mountains in the West of Jiangxi. The area is about 10,400 square kilometers. Wan-yang Mountain, Jing-gang Mountain and Wu-gong Mountain stretch in the region, highly or sheer with river stream deeply or fast. In addition, forests and water resources are very rich.

(6) Low mountain and hill areas in south-middle of Jiangxi. The area is about 59,400 square kilometers. In the East of the area lies Wu-yi Cordillera; the South links Jiu-liang Mountain, Da-yu Mountain and other cordilleras; the middle is mainly made up of low-hills, hilly areas and basins filled with red terrane and granite, all of whom form a red rosy clouds physiognomy. This zone can be approximately divided into four sub-zones. They are North Wu-yi Mountain erosion medium-hill area,Nan-feng and Lichuan hilly erosion area, South Jiangxi erosion medium-low hill and hilly area,Xingguo and Xingfeng erosion hills and basins. There are abundant forests mineral and water resources in the region, which are conducive to farming development. If the goverment can control the soil erosion effectively, all of the industries have considerable potential.

4.2.2 Climate

Jiangxi Province is in the vicinity of the Tropic of Cancer, turning warm earlier in the spring, but the weather is changeable. And the rainfall is on the high side until the early summer; in the period from the Mid-Autumn Festival to the summer the weather is often sunny, hot and dry. Especially in the recent few years the cold winter weather is obvious. Climates in the North and South areas are different from each other in Jiangxi due to its long and narrow terrain distance, but wholly the spring and autumn are short while the summer and winter are long. The climate of the province is warm, including ample sunshine and abundant rainfall, a long frost-free period, which is the sub-tropical moist climate and conducive to the growth of crops.

In Jiangxi Province, the average annual temperature is around 18℃. In Northeast, Northwest of Jiangxi and areas along the Yangtze River, the average annual temperature is slightly lower, from about 16℃ to 27℃. In the areas of Bing Lake, middle and lower reaches of the Ganjiang River, Fu River, Yuan water area and mountain areas in Southwest of Jiangxi the average annual temperature is between about 17℃ to 18℃; Average annual temperature in Fuzhou, southern region of Ji-an City and middle reaches of the Xing River is between about 19 ℃ to 20℃.Basins in South of Jiangxi the average annual temperature is the highest, from about 19℃ to 20℃.The difference of the province's annual extreme maximum temperatures in the North and the South of Jiangxi is slightly, even the north is higher than the south, but almost all close to or exceeding 40℃;in some individual counties the daily maximum temperature has reached 44.9℃.Extreme minimum temperatures of the North and the South are relatively different. In most parts of Jiujiang the extreme minimum temperature is from -12℃ to -14℃; there were also individual counties, of which daily minimum temperature reached -18.9℃; the extreme minimum temperature in South of Jiangxi is about -5 ℃. In other parts of the province it generally varies from -7℃ to -12℃.

The average total amount of annual sunshine radiation of Jiangxi is from 97 kcal to 114.5 kcal per square cm, Duchang County the most, Tonggu County the least. The average annual sunshine duration is from 1473.3 hours to 2077.5 hours, Duchang County the most, Chongyi County the least.

Jiangxi is pluvian. The average annual precipitation is from 1341 mm to 1940 mm。Generally the South is more than the North, East more than West, mountainous areas more than basins.In Wuyi Mountain, Huai-Yu Mountain and Jiu-ling Mountain, the area average annual precipitation is up to from 1,800 mm to 2000 mm; areas from breaches along the Yangtze River to the north of the Poyang Lake,and the Jitai Basin, the average annual precipitation is about from 1350 mm to 1400 mm; in other parts it varies from 1500 mm to 1700 mm.The rainy season in a year is quite different; in autumn and winter the weather is often fine and dry.The phenomenon is very infrequent that the rainy weather in autumn and winter filled main of the region.The weather in the spring is shortly warm and shortly cold. And it is rainy very much; generally after April the province enters a rainy period.

May and June are the biggest precipitation months throughout the year; the average monthly rainfall reaches from 200 mm to more than 350 mm, the most to 700 mm. During this period there are mainly heavy rains or rainstorms; in the rain date the intensity of precipitation is from 50 mm to 100 mm, the largest up to 300 mm to 500 mm. The rain moves to the north in July, and the the rainy season ends; the temperature rise rapidly and the province gets into a sunny and hot period. The typhoons from the southeast oceans can bring rains into Jiangxi Province, which can relieve the drought damage to crops and decrease the temperature.

Except the Lushan Mountain, the province's annual average wind speed is from 1 meter per second to 3.8 meters per second, for the smallest the Dexing City, for the largest the Xingzi County. Number of windy day is average 28.5 days to 0.5 days, at least Yihuang County, for the most Xingzi County. The province's major natural disasters include cold damage, floods, drought and frost damage as well as the relatively short duration of the high temperature hazard. Excellent conditions like light, energy, water and gas are rather suitable

for woody plants to survive and multiply, and also helpful to the development of biologic energy forest.

4.2.3 Soil

The forest soils are mainly red soil, yellow red mountain soil, yellow mountain soil and the mountain yellow-brown soil. The soil thickness is mostly the 40 to 100 cm while the humus thickness mostly varies from 8 to 20 cm, acidic soil. The soil layers are thick and fertile, suitable for the development of biologic energy forest project.

4.2.4 Hydrological data

(1) The surface water

Jiangxi Province is located in the south bank of the middle and lower reaches of the Yangtze River; it is also an important part of the southern hills in China. The province's total land area is 167,000 square kilometers. It contains more than 3700 big and small rivers and streams (River valley area is more than 10 square kilometers), 451 of which are more than 100 square kilometers. The main rivers include Ganjiang, Fu, Xingjiang, Rao, Xiushui, all of whom runs into Poyang Lake and lastly enters into the Yangtze River in Hukou County, forming a complete water system of Poyang Lake. The area of rainwater collecting before the Hukou station is over 162,225 square kilometers. Among them 156,977 square kilometers are in Jiangxi territory, accounted for 94% of the total provincial area. Besides the Poyang Lake water system, there are also Chang River, Sha River, etc, north directly running into the Yangtze River, Lu Water, Li Water and Du Water, etc, west directly running into the Dongting Lake water system and Xunwu Water, Dingnan Water, etc, south directly running into the Dongjiang water system.

(2) The ground water

For many years the average amount of groundwater resources in Jiangxi Province is 38.2 billion m^3 (the result of integrated planning of water resources investigation and assessment), accounting for 24% of the total water resources

of the province. The province's water resources distribution is quite uneven. According to the water distribution, the general situation is as follows: Ganjiang river system accounts for 49.8 percent of the total,Fu-Xing-Rao-Xiu water system accounts for 36.2 percent of the total; around the Poyang Lake Plain area the groundwater resources accounts for 8.8 percent of the total. The province's water distribution is: mountainous areas are more than plain areas; upstream reaches are more than downstream reaches; the main stream is greater than tributary stream.

4.2.5 Air quality

In 2006, the overall environmental quality of Jiangxi is good. According to the routine monitoring of ambient air in 11 cities across the province, 81.8 percent of the urban environment meets the air quality GB3095-1996 "Ambient Air Quality Standard" Class Ⅱ, 18.2 percent meets GB3095-1996 "Ambient Air Quality Standard" Class Ⅲ. Compared with the monitoring in 2005, the province's air quality does not change very much; air quality of Jiujiang is still for Class Ⅲ, but a slight overall improvement in air quality. Ganzhou City situation becomes worse, belonging to Class Ⅲ,while Xinyu City’s situation improve to meet to Class Ⅱ.

The projects are located in rural areas ,where there are basically non-industrial sources of pollution. The environmental quality is excellent;it can meet "Ambient Air Quality Standards" better than the secondary standard.

4.2.6 Surface water quality

The eight major rivers of the province to participate in the monitoring and evaluation in 2006 mainly belong to ClassⅠ~Ⅲ water quality, accounting for 85.3 percent of the total cross-section ; the most cross-sections meet Class Ⅱ

water quality, accounting for 67.0 percent of the total ; sections worse than Class Ⅲ water quality account for 14.7%.

In 2006 there are Xiushui River, Jiujiang Reach of the Yangtze River and Xinjiang River in Jiangxi province, whose water quality are good and always better than Class Ⅲ water quality. The other five rivers ranking from high to low are Fu, Lu, Rao , Ganjiang and Yuan. Worst of all ,the Yuan River's section eligible rate is only 78.6 percent.

4.3 Social development overview

4.3.1 Population

There are 11,454,800 persons living in urban cities of Jiangxi province, accounting for 27.67 percent of the total population; 29,943,200 ones, about 72.33 percent of the total population live in rural countries. The proportion of the urban population in the total increases by 7.27 percentages compared with the fourth national census in 1990.

4.3.2 Nations

There are a total of 38 nations across the province, among which the Han nationality has the largest number, 41,285,200 people, accounting for 99.73 percent; the minority population is 112,800 people, accounting for 0.27 percent.

Compared with the fourth national census in 1990, the Han population increased by 3,675,300, an increase of 9.77 percent; the minority population increased by 12,400, an increase of 12.39 percent. The minority nationalities that have a large number of population include Hui, She, Zhuang, Man, Miao, Yao, Mongolian, Dong, Korean, Tujia, Buyi, and so on, of which the largest population are Hui and She nationality; there are minority nationalities such as Bai, Yi, Li, Gaoshan, Tibetan, the Aquarium, Dai, Mao difficult race, Naxi, Nationality, Turkish, Hani, Qiang, Mulam, Uygur, Lisu, Daur, Gelao, Yugur, Jing, single-lung Family, Lahu, Jingpo, Blang, Russia and the ethnic nationality and so on.

In the minority nationalities only She people live together. They mainly live in the Taiyuan, Qianshan, She nationality countries and Guixi Zhang Ping She nationality countries , etc, as well as more than 30 other She minority nationality villages in Yongfeng, Gi-an, Xingguo, Wuning, De-an, Zixi, Yihuang, Le-an, and other cities and counties. Other minorities live scattered in different places.

4.3.3 Transport

Jiangxi traffic is relatively developed, with a complete network. The Beijing-Kowloon Railway crosses Jiangxi from north to south; Zhejiang-Jiangxi railway runs from the East to West. The two railway lines together with Xiamen-Yingtan railway, Anhui-Jiangxi railway, the Southern Cross railway, Long Jiangxi province railway constitute the railway network of Jiangxi. The total length of the railway lines reaches 3070 km; the highway network extends all over the province like a Chinese character "Heaven". The total length of the highways is up to 2206 km, by which Jiangxi links other provinces, and the provincial capital city Nanchang links other section cities by highways.In late 2005, 100% of the towns and 86% of administrative villages have road traffic.Water transportation is also very convenient in Jiangxi Province. Including the Yangtze River (Jiangxi reach), Ganjiang River and Xingjiang River, there are 62-connected navigation rivers; and the province's total navigable distance is 5638 km. There are currently over 54 ports whose annual handling capacities are more than 10,000 tons such as Jiujiang Harbor and Nanchang Harbor. The Nanchang international container port and Jiujiang international water transport center can link the world's major shipping ports. There are five airports in Jiangxi ;they are Nanchang Changbei International Airport (4D-level), Golden Ganzhou Airport (4C level), Jingdezhen Luojia Airport (4C level), Jiujiang Lushan Airport (4C level) and Gi-an Jinggang Mountain Airport (3C level) with 47 lines.

Comprehensive transport facilities provide convenient and fast traffic conditions for the construction of biologic energy forest demonstration base.

4.3.4 Public Health

In recent years, Jiangxi medical and health conditions continue to improve; both urban and rural residents have their basic medical security.

4.4 Economic development conditions

The economic development is sustained and rapid. According to preliminary accounting, the province's 2007 GDP is 546.93 billion yuan, 13.0 percent increase over the previous year; for five consecutive years the growth ratio is more than 12%.In the 12% increase of GDP, the first industry added 91 billion yuan, with an increase of 5.0 percent; the second industry added 282.73 billion yuan, with an increase of 17.3 percent; the tertiary industry added 173.2 billion yuan, with an increase of 10.7 percent. Besides, the personal GDP is 12,562 yuan, 1764 yuan more than the previous year.

The revenue growth is accelerated. The one year fiscal revenue is more than 60 billion yuan, amounting to 66.46 billion yuan; the growth ratio is 28.2 percent, 6.4 percentage higher year-on-year, and it is the fifth year that the growth ratio reaches more than 20%.

The local financial revenue is 38.96 billion yuan, an increase of 27.5 percent, 6.7 percentage higher year-on-year. The financial structure has been optimized; the ratio of tax revenue in the total fiscal revenue has increased. Annual tax revenue is 55.66 yuan, an increase of 32.0 percent which is 3.8 percentage points higher than the total fiscal revenue growth ratio.The financial resources at the county level significantly enhance.. All the counties' (cities, districts) revenues reach more than 100 million yuan. In Guixi City, the financial revenues touch 2 billion yuan for the first time; the financial revenues of areas such as Nanchang County, Qingshan Lake Distinct, Fengcheng City, the West Lake District, Guang Feng County are over 1 billion yuan, and another 13 counties (cities, districts) exceed 500 million yuan.

The product prices increase fast. In the whole year the consumer price index rose 4.8 percent over the previous year; the CPI in the city rose 4.4 percent while in rural areas it rose 5.8 percent. The structural characteristics of the price changed apparently. Food prices rose 11.9 percent, which became a major factor. Retail prices rose 4.0 percent. Ex-factory price of industrial products rose 6.2 percent. Raw materials, fuel and power purchase prices rose 7.9 percent. Investment in fixed assets rose 5.4 percent. Prices of agricultural means of production rose 6.6 percent.

Solid work to promote the employment. At the end of the year the employees are 23.696 million people, 485 thousand more than the previous year.9,008,000 people are working in primary industry, a decrease of 66,000 people, the secondary industry 6,633,000, an increase of 238,000 people, the tertiary industry 8,055,000, an increase of 31.3 million. At the end of the year registered urban unemployment rate was 3.37 percent.

4.5 Land use situation

The total area of forest land in Jiangxi Province is 10.629 million hectares, accounting for 63.7 percent of the province's total land area.

In the forestry land, forest land area is 8.717 million hectares, accounting for 82.0 percent of the land for forestry. Woodland area of the province there are 139,000 hectares, the area of woodland shrubs 1.186 million hectares, tree-free area is 136,000 hectares.The total area is 1.589 million hectares, accounting for 15.0 percent of the land for forestry. Besides, there are big areas of woodland inefficient, which provide a wealth of forest resources for the implementation of this project.

5 The Public Participation

5.1 Investigation methods and content

5.1.1 Intention

Public Participation is that to allow persons and crowd influenced by item to express their views during the seedtime. The intention is that the erectors can consider the opinion of public fully when they make decision of the item so that the design of programming tends to become more perfect and reasonable. In addition, the environment decision-making which including public participation is good for improving the quality of environmental influence evaluation and ensuring the diaphaneity and reliability of evaluation and decision-making.

5.1.2 Investigation methods

According to the requirments of World Bank and People's Republic of China Environmental Impact Assessment law, in order to reflect the opinion of public roundly, we adopted many kinds of manner such as putting up revelation, publishing in the newspaper, holding villager meeting, collectivity visiting and colloquia, providing public participation questionnaires and individual consultation to investigate the public participation.

We hold colloquia 5 times which includes expert colloquia once. Meanwhile, we also visited some farmers' families and understood thoroughly about their using of infield or woodland, pesticide and fertilizer, the living conditions, public healthiness and their opinions of the item. During the investigation work, we also got help from the social assessment group who were going on social investigation aiming at social inpact of this item.

5.1.3 Investigation scope

5.1.3.1 Investigation about family and individual

This investigation includes 19 counties and forestry centres related to the project.We mostly interviewed three representative counties in XiuShui, SuiChuan and LiChuan where we visited the farmers and had an informal

discussion with them.Meanwhile, we also provided public participation questionnaires including 2000 pieces to all circles in the area related to the project.We had taken 1882 pieces of paper feedback;the investigation object mainly included organ cadres,technique personnels and farmers.

5.1.3.2 Investigation about non- government organization

We also interviewed some non- government organization and invited them to take part in the expert colloquia and recorded their suggestions timely in the public investigation.

5.2 Analysis of the public investigation result and public point of view

5.2.1 Analysis of the public investigation result

As for the object filling in public participation questionnaires, 99.43% informants consider that it is necessary to construct the project and only 0.57% informants consider it is unnecessary for worrying about the project may result in destroying the natural woodland and water and soil erosion. It indicates that a majority of public approve of the project construction. 98.78% informants consider that it is necessary to loan from European Investment Bank and only 1.22% informants consider that we should construct the project by domestic self-preparing fund instead of loaning from World Bank, It indicates that a majority of public approve of the project construction by loaning from World Bank. Toward to the content of this project; 99.6% informants consider it is reasonable and only 0.2% informants consider it is unreasonable worrying that planting area of oil-tea is too large while 0.2% informants are unknown about the content. It indicates that a majority of public agree with the content of this projectt. As for the intercalation in the project area, 98.64% informants consider it is reasonable; 0.64% informants consider it is unreasonable and 0.72% informants are unknown about the intercalation. It indicates that a majority of public identify with the intercalation in the project area. As for the disadvantage influence brought by this project; 54.5% informants consider it may influence the quality of soil; 43.4% informants consider that it is easy to

erode soil during the construction period; 22.3% informants consider it is easy to take place plant diseases and insect pests; 42.3% informants consider that it is possible to influence the biodiversity; 66.2% informants consider that water and solid waste producted in the constructing period will lead to short-term environmental impact; 8.2% informants consider that the item will result in short-term water and soil erosion; 12.6% informants consider that the project will result in destroying of natural woodland and 23.7% informants consider that the project will make no difference of environment, respectively. It indicates that public afraid the project will result in negative influence to environment in short time. When coming to the advantage influence brought by this project, 85.6% informants consider that it is good for improving entironment such as retaining soil, maintenance biodiversity, heightening vegetation coverage rate, cleansing air, adjusting climate, reducing water and soil erosion and keeping source and so on;23.7% informants consider it is good for advancing industry structure, boosting development of economy and increasing income of locality;40.0% informants consider it is good for boosting farmers' lives;39.2% informants consider it is good for increasing chances to obtain employment and 8.0% informants consider there is no advantage that the project will bring to our society, respectively. It indicates that a majority of public think this project will product positive influence.

5.2.2 Public opinions and suggestions

Firstly, according to the constructive opinion and suggestion put forward by some informants, we should take effective measure as follows

(1) We should make sure that all aspects of the project are reasonable composition to the best of our abilities.

(2) We should manage forest according to the law, strengthen protection and management and solve issues timely.

(3) As for forestation, we had better not adopt the mode of cultivation complete, so that more serious water and soil erosion and influence of biodiversity will be avoided effectively.

(4) We should reduce the using of deleterious pesticide and extend the using of fertilizer to protect environment.

Secondly, other informants also put forward some constructive opinions and suggestions as follows：

(1) We should lead crowd to develop planting and breeding industry, organize technology-training and help farmer develop economy;

(2) We should consider all aspects of the project in reason and adopt a mode which combines with mixed farming.

(3) Finally finer seedling trees should be offered; meanwhile we also should offer sustainment including fund and technology.

5.2.3 Conclusions of the experts' opinions and suggestions

We hold an experts consultation meeting in the investigation,and experts' opinions mainly showed as follows:

Firstly, exploitation and construction of the project should be brought into the development programming of forest industry in JiangXi. Besides, it will make an advanced effect for the development of forest industry in JiangXi to construct biology energy forest funded by European Investment Bank; however, we should strengthen the ability of management of protecting environment. They agreed with construction of the project on the condition that we should reduce the impace of entironment to the lowest level.

Secondly, because there are a lot of barrens and remnant forests, it is propitious to develop construction of biology energy forests and during the process we should pay attention to biodiversity protection.

Thirdly, in the process of project exploitation, we should avoid constructive breakage such as destroying forest, using pesticide and fertilizer,

losing and polluting water and soil and destroying biodiversity and so on. Meanwhile, in order to reduce the influence of environment to the lowest level, we should take effective and operable measures.

Fourthly, we should make sure the mode scientize the project construction instead of planting by refining hills or cultivating completly.

Finally, we should organise science research activity and ravel the issues about sustainable management of biology energy forest mainly.

5.2.4 Farmers' opinions and suggestions

The evaluation group interviewed some farmers and their families in the project areas. They referred and recorded their opinions and suggestions shown as follows:

They hope the policy will keep tranquilization all the time and consider farmers' behalf and ability of repaying loan; then, the project construction will be offered technical sustainment; last, they hope that local people will be engaged and offered some chances to obtain employment during the project actualized.

5.3 Information publicity and feedback

From Aug.15th to Sept.15th, 2008, evaluation group of the project, biology energy forest demonstration base project construction in JiangXi, showed the basic content at government bulletin column in the project locus, the form of which name announcement of environmental influence evaluation for biology energy forests demonstration base project construction in JiangXi. During the proclamatory period, we didn't receive any feedback from villagers, cadre or technical personnel. The content is shown in the attached 2.

5.4 Procedure conclusion of public participation

According to the investigation result, we can conclude that the public is highly concerned about the construction of this project and mass people agree with it. They think it is necessary to implement the project which is good for improving people habitation and economy conditions. They also express that

the negative impact brought by the project is endurable during the construction period. In addition, part of the public hope that the project will go along soon for increasing forest and vegetation areas and improving environment. Denizen living in the project areas hope that they can be offered assistant fund, technical-training and employment opportunities.

6 Analysis of the project program selection

6.1 Overview

The project program selection, namely, is to define the property of land using of the projec construction according to the state forest management laws and regulations,and then to compare the impact of project construction on zoology whether the project implement or not.Meanwhile analyse the environmental impact assessment of the project.The evaluation group recommends the program from a point of environmental protection in order to provide scientific suggestions for the construction of the project.

6.1.1 Relevant provisions of the project of the national forest management laws and regulations

The state forest management laws definitely regulates that woodland can only be used for tree planting, forestation and management forest industry. In Forest Law of People's Republic of China, the fifteenth articl regulates that usufruct of forest,wood and woodland can be attorned, evaluated for buying a share and as condition for joint venture and cooperation forestation legally; however, woodland cannot be changed to non-woodland.In Jiangxi Forest Regulations, the 28th articl regulates that all levels government ought to make tree planting and forestation programming, ascertain coverage rate, organize denizens working in different vocations to accomplish assignment prescribed by the tree planting and forestation programming, encourage units and individuals to make use of appropriate hills, barren hills, channels, beaches and hillocks for tree planting and forestation.In addition, forestation people can possess of the forest planted by them and inherit and transfer the forest according to the law. The 32nd article regulates that the woodland obligees ought to accomplish renewal forestation, which was demolished by cutting, firing , prevente and control the diseases and pests of the forest in the same year

or the next year and take effective measures to strengthen management and protection.

6.1.2 Contents of the selection analysis of the project

Soil used for the project is the land that the county government marks out as forest land;it regulates that the selected land only can be used for planting biology energy forest and naked-cortex tree. As to the content of the selection analysis of the project, we only comparatively analyse the impact of constructing the project or not, select the the design of forestation land and model.

6.2 Comparative analysis of environmental impact between with and without the project

Whether there is an project or not has considerable different results to entironment,seeing in Table 6-1.

Table 6-1 any comparative analysis table of the environmental impacts of the project

environmental influence	There are projects	There are no projects
Direct impact on the environment	1.an increase in the project area of forest resources and forest cover, improvement of soil and increase the land utilization rate. However, improper methods of artificial afforestation will also have an adverse ecological effects and risks, such as a single tree species, soil erosion and water pollution, disease and disasters. 2.barren hills and improve the grassland, forest defective	1.barren hills and grass, defective secondary Lin and protection measures have not often been grazing or fire occurred, which led to soil erosion and land degradation, and other serious ecological problems. Inefficient low-yield forest degradation are not improved, it will give rise to diseases and insect pests. 2. forest degradation is not

	secondary forest cover. 3. Lin biologic energy needs during the planting of forest land for the land, forest roads clean-up will be a certain amount of damage to vegetation, causing soil erosion.	effectively manage and protect, until the succession of barren land retrograde; real "rock-desertification" is the land of the phenomenon. 3. frequent man-made interference, it is difficult to achieve on the protected area of the effective protection of biological diversity.
Indirect impact on the environment	1. the biologic of forest products made from biologic diesel, biodiesel non-toxic, biodegradable can add 20% biodiesel can reduce sulfur dioxide emissions 70% lower 90% of the air toxic. At the same time, bio-diesel emissions of carbon dioxide and the formation of the natural world to absorb the carbon cycle, and its use of energy to achieve zero carbon dioxide emissions. Lin biologic energy through the bases, indirectly improve the local ecological environment and enhance forest ecosystems to absorb carbon dioxide and the function of the role of carbon sinks	1.no management and protection measures, frequent human disturbance, and even some mountain areas there are still slash and burn, resulting in continued degradation of forest land, causing soil erosion, animal or move away, can lead to serious new ecological disaster.
	To adopt a scientific and	Greening barren hills and

Comprehensive environmental impact comparison	rational management techniques and reforestation programs, implementation of the project will increase the forest cover and improve the quality of the forest, improving and optimizing the ecological environment and enhance forest ecosystems to absorb carbon dioxide and the function of the role of carbon sinks. However, artificial afforestation design and construction methods, such as improper, but also the ecological environment have a negative impact on the risk.	no grass, forest degradation is not effectively manage and protect, retrograde succession eventually lead to declining vegetation cover, increased soil erosion and ecological deterioration of the environment, indirectly caused by the poor mountain farmers.
Recommended program	Recommended	Not recommended

On the basis of overview about three World Bank funded implementary projects in GuangXi, from 1991 to 2004, namely, National Forestation Project, Forestry Development in Poor Areas Project and Jiangxi Forestation Project Funded by Japan, advanced and scientific forestation technical project was designed in order to minimize impact on environment during the processing period of construction and operation. In addition, artifical forest management environment protection regulations must be executed strictly. Enhance environmental monitoring and management and put an end to disorderly empolder project which may cause a negative impact on the environment.

6.3 Comparative analysis of implementation plan designs of the project

Project implement project designs mainly include in choosing forestation land, choosing tree seed and forestation model.

6.3.1 Selection analysis of reforestation areas in the project

Selection of project areas must insist on the following principles:

Adjusting measures to local conditions, planting the right trees at the right land, choosing land for forestation in accordance with the site conditions except for moderate convergence connecting forests which are convenient for operation in scale, making the best of forestation establishment that had been or are in the process of construction, protecting establishment and infrastructure, avoiding repeated investment and construction and making sure that local economic development and land using planning are in harmony.

Procedure of forestation land selection analysis:

Project villages and counties—→Forestation project areas—→Business forest areas or ecological forest areas—→Peliminary indoor selection of forestation land—→Investigating and verifying on the spot—→Forestation designing.

According to the biology and ecology characteristic of oil-tea, oil-tea has more strong adaptability and grows well at poor land; however, in order to improve the survival rate of trees and make sure the high and steady yield, the land should be choosed for forestation, where the soil is deepth, loosen and drainage good; the pH is 6～7; the land is upland exposed to the sun or the gentle slope land of mountain that is less than 800 meters above sea level.

According to the biology and ecology characteristic of bare-skin tree, forestation land should be choosed that has the following characteristic: neutral soil and limestone, shale mountains; soil layer thickness is above 30 cm;the light is enough; slope is relatively gentle with below 30 degree; downhill slope has a good site conditions; areas centralize comparatively;at low-shallow hills the traffic more convenient and is less than 800 m above sea level;it isn’t far from the village or at least has rural dirt roads (tractor road). It can form an

appropriate operation scale of barren hills and wasteland, slash, woodland and fade-farmland. Meanwhile, the forestation land should not conflict with other programming using land such as commonweal forest and nature reserves.

There is a total area of forest land 10,629,000 hectares in Jiangxi Province, which accounts for of 63.7% of the province's total land area. In the land used for forest industry, the forest land is 8,717,000 hectares accounting for 82.0%; distant land is 139,000 hectares; shrub land is 1,186,000 hectares; non-stumpage land is 136,000 hectares and woodland is 128,000 hectares. In addition, there is a large area of low-efficiency forest, which provides abundant forest resources for the project construction.

6.3.2 Selection analysis of reforestation tree species in the project

The project is construction of biologic energy forest; the tree species are prescribed oil-tea trees and bare-skin trees which has been discussed in Section 3.5.1.

6.3.3 Selection analysis of reforestation models in the project

Forestation model choice is the design for forestation technology and measure actually. It includes selecting tree species and woodland, clearing woodland, clearing manner, density, planting termly, upbringing and management and fertilization. As for tree species and woodland choice, we have analysed above; we will go on with the comparative analysis of other technology design and traditional forestation model.The environment influence of forestation project can be seen in Table 6-2.

Table 6-2 afforestation model environmental impact comparison tables

environmental influence	Operational measures	The afforestation project model	The traditional model of afforestation

Eco-Environmental Impact	Forest clean-up	Massive use of ribbon cutting grass or miscellaneous clearance. Health reservations with grass to reduce soil erosion and soil nutrient loss, and is conducive to biodiversity conservation.	Use clean-burning. The original vegetation destroyed the basic and easy to cause soil erosion and soil nutrient loss is not conducive to biodiversity conservation.
	Soil preparation methods	Foot of a mountain, the Peak to retain 10 to 20 meters of the lot with native vegetation. Camellia soil preparation methods adapted to local conditions and take the ribbon-shaped hole, such as soil preparation methods. Strip site preparation before planting by digging a certain point spacing in the rows. Swida land: land use of most of the points the way Ken, along the contour to play big hole, the hole as "goods"-shaped arrangement; gentle part of the machinery available to the whole strip be cultivated or farming.	Ken-wide, strip the land, ground-breaking area of 30-100%, all or part of the vegetation is damaged, the more serious soil erosion.

	Planting density	Zhu Xingju Camellia (m) 2 * 2 * 2 or 2.5 Swida Zhu Xingju (m), 2 or 3 * 2 * 2	Forest density nearly
	Permanent planting	A higher utilization rate of seedlings, planting tear when strict nutrition bags and maintain Ying Yangtu not loose, to preserve the survival rate, rapid seedling growth, early closing, soil and water conservation benefit.	A low utilization rate of seedlings, planting will not tear strict nutrition bags or loose Yingyang Tu, to preserve the survival rate is not high, slow the growth of seedlings, delay the forest canopy is not conducive to the soil and water conservation.
	Care and protection	Camellia strip tending to adopt methods, the use of space and culture for more than two kinds of training to protect young plants, Betula trees must be pruned in a timely manner, then planting to weeding loose soil, the use of massive shovel or ribbon grass, soil and water conservation and biological diversity in favor Protection.	The use of all-grass Tending shovel is not conducive to water and soil conservation and biodiversity conservation.

	Fertilizers	For soil nutrient content and the need for tree growth, Camellia forest soil before backfilling requirements of certain facilities at the base fertilizer, top dressing facilities at bringing up, Betula tree planting requirements before the topsoil back to the temple, Shi and some basic fertilizer, Shi layered into the topsoil and returned to the ground and fully Mix well stamp it, the loose soil above 25 cm high. Fertilization would be more reasonable and conducive to the growth of crops.	The lack of specific fertilization, the use of fertilizer formula is generally not the case (especially farmers planting), fertilization methods unreasonable delay the forest canopy is not conducive to the growth of tree species.
overall merit		According to the site conditions to choose tree species planted in strict accordance with relevant provisions of the afforestation model indicators of forest clearing, soil preparation, planting, tending (weeding, loose soil, top dressing), as well as environmental protection measures, such as detailed design and construction in strict accordance with	Density is too large, inhibiting the growth of understory plants, decreased biodiversity, biologic decreased, resulting in "no grass under the trees" phenomenon is not conducive to the soil and water conservation and biodiversity protection, ecological there is a big risk, The

		the design. Planting more reasonable density, fast growing trees, other forest plants to leave some room for growth, a reduction of biodiversity. At the same time, reduced soil erosion, the project on the ecological environment to reduce the negative impact to a minimum.	ecological environment of the negative effects of larger.
Recommended		Recommended	Not recommended

6.4 Comprehensive evaluation

The biologic energy forest demonstration base project construction in Jiangxi Province was selected after scientific and prudent consideration.

At present, entironments in most of project counties are ecumenic; the society and economy are in backward state; denizen grazing is dispersed mainly, and it is difficult for maintenance entironments to renew themselves.So there is a trend that the entironment will deteriorate sequentially. After the construction of the project, by rationally using forest land and adopting scientific cultivation methods, it is helpful to modulate growth structure in county, promote rural economic development and improve the living conditions. Meanwhile, by introducing advanced ideas of life and scientific culture knowledge, the denizen living in project areas will rationally make use of energy and scientific planting with self-knowledge, which is good to improve the quality of life and entironment.

The overall evaluation is that the advantages of the project construction are more than the disadvantages as for its impact on ecological and social environment, and the project is feasible.

7 Environmental impact analysis and mitigation measures

7.1 Ecological environment impact analysis ot the project construction

Biologic energy forest project will help speed up the Jiangxi Forestry bases construction, and it is also conducive to enhance the forest cover , protect the biodiversity and improve the ecological environment. However, if the measures of the process of constructing the project are inappropriate, it will have a negative impact on the environment. The large areas planting of oil tea trees is prone to lead to diseases and insect pests and soil degradation; inappropriate land-triming may cause new soil erosion; use of fertilizer and pesticide may cause unreasonable environmental pollution; during the operating phase of the biologic energy forest, it is still hard to avoid the fires and damage to biodiversity. The potential negative impact on the environment can be effectively controlled by rational distribution of the afforestation, practical environmental protection measures and scientific operating measures.

After a comprehensive analysis of the project' negative impact on the environment, we should make preventive measures in order to minimize the project's negative impact and so the project development can be sustainable.

7.2 Environmental impact and mitigation measures

Project for the construction of a new afforestation project, its direct negative impact on the environment, mainly on two fronts, one of inputs impact on the environment, and the other is the implementation of the project on the environment The main inputs, including seeds, fertilizers, pesticides and projects arising from the activities of the material; the possible environmental impact of projects, including reforestation activities to choose, to clear forest land, site preparation, tree configuration, tending, fertilizing, spraying, harvesting, forest roads and Infrastructure construction. Environmental performance of some of the main aspects:

7.2.1 Environmental impact of woodland choosing and corresponding mitigation measures

7.2.1.1 Impact Analysis

(1) Afforestation inappropriate choice, such as the top choice of shrubs or a community-arid areas of woodland to the development of biologic energy forests, is not conducive to the maintenance of biodiversity and ecosystem integrity.

(2) Slopes of forest land more than 35° will lead to serious soil erosion.

(3) Unreasonable layout of the forest may affect the proliferation of wildlife habitat or damage the environment, influence wildlives.For example the project forest areas are too close away from the nature reserves or the ecological forest.

7.2.1.2 Mitigation measures

(1) Slopes of forest land more than 35° will not be used as lands for reforestation project.

(2) New planting on lands produced by cutting natural forest is strictedly prohibited.We should protect all valuable natural heritages, rare plants and animal habitats and forest landscapes.

(3) We should take measures to avoid nagative impact on wild animals when we afforestate in scopes including 1000m away from external nature reserves, 100m away from external ecological forests, 50m away from both sides of the trunk rivers and 20m away from both sides of the tributary rivers .

(4) To control the size of each afforestation plot reasonably,the area of each small plot should not exceed 35hm^2.

7.2.2 Environmental impact of woodland clearing and corresponding mitigation measures

7.2.2.1 Impact Analysis

When we are clearing forest land, vegetation and plant resources may have gotten permanent or temporary disturbance.We destroyed the original

vegetation, causing surface soil erossion and loss of the nutrients. In particular, when we burned forests to clear the land, almost all the original vegetation are destructed. The surface soil erossion and loss of the nutrients will be worse.

7.2.2.2 Mitigation measures

(1) Strictly prohibit burning the forest in order to clear the land.

(2) Clear the ruderals in a block or strip form which may hamper the afforestation,and then leave them decaying and breaking down naturally in the plants space.

(3) Prohibit vegetation cutting and clearing at steep slopes, Poding valley and river banks.

(4) Protect and retain valuable natural vegetations and broad-leaved species at the peak, ridge, and the foot of a mountain forest.

(5) The slope vegetations where there has been water and soil erosion or the slope is long should be retained and protected .

7.2.3 Environmental impact of soil triming, planting, and breeding and corresponding mitigation measures

7.2.3.1 Impact Analysis

Due to soil preparation, planting, tending and other activities, the vegetations are destructed ; the surface soil is disturbed, resulting in new soil erosion, and impact on the project areas and the surrounding environment.

7.2.3.2 Mitigation measures

(1) According to the slope, soil and cultivating forest objectives, choose the appropriate soil preparation methods, such as ribbon shape, scale shape, ditch Bamboo and so on.

(2) Sloping fields over 25° are prohibited to take the whole forest land cultivation; only sloping fields below 15°are allowed to take the whole forest land cultivation,and when we take the whole forest land cultivation, we must set up vegetations or engineering measures for soil and water conservation.

(3) The whole forest land cultivation shall not be concentrated merging; strip-land triming should be cultivated to bring along the contour of the works; hole-land triming should be cultivated along the contour lines to hole.

(4) After soil preparation we should timely cover the soil surface with deadwoods to avoid soil being bare. Make sure that there is an isolation zone about 100-meter between each two pieces of woodland as a biological channel.

(5) Loose soil and weed partly when breeding young trees, and retain the surface vegetation, grass in order to improve forest land water conservation and to maintain the soil fertility.

(6) In sloping lands of serious soil erosion, regardless of the size of the slopes we should take soil preparation methods like anti-slope terrace, horizontal terrace, fish-scale pit terrace, at the same time take the necessary biological or engineering measures to prevent water and soil erosion.

7.2.4 Environmental impact of plant species selecting and corresponding mitigation measures

7.2.4.1 Impact Analysis

The adverse environmental impact mainly includes the diseases and insect pests and large-scale poor growth caused by low-quality seeds or seedlings.

7.2.4.2 Mitigation measures

(1)Mainly choose the fine native trees for the afforestation.

(2) when designing the project, we should pay more attention to site selection and scientific combination of tree species, tree sources, gene style and tree age. Select choiceness countryside tree and adopt fine and strong tree species for forestation so as to improve the ability of fighting back diseases and pests and thus to reduce the risk of diseases and pests.

(3) When designing the forest land layout,we should make full use of wildlife corridors, retain the native trees, use the river protection corridor in order to protect, renew and reserve the natural plant communities.

(4) Forbid planting a single and pure species of trees; oil-tea trees should be collocated 5-7 breeds; bare-skin trees should be collocated more than two breeds. Every single tree species forestation area should be controlled less than 10 hectares. In addition, we can properly inter-plant some nanism crop which have economic value and can be used as organic fertilizer to form multiple-species artificial plant communities and make sure that the soil fertility is in a virtuous circle.

7.2.5 Environmental impact of forest road construction and corresponding mitigation measures

7.2.5.1 Impact analysis

The potential impact of forest road construction on environment mainly includes include the following: some vegetation breakage, loosing the road surface soil and forming a certain slope when digging and filling roadbed. If corresponding defending measures aren't adopted, it may lead to water and soil erosion in the construction period.

7.2.5.2 Mitigation measures

(1) Make full use of the existing roads, combine with the backroads and and construct the roads following the fireproofing lines as possible as we can in order to reduce soil surface breakage and lighten water and soil erosion.

(2) Design scientifice road line directions, select fine road building materials and build roads through holes of getting soil and discarded rideaus in order to reduce vegetation breakage.

(3) During the construction period, we should adopt effective measures such as digging deeply so as to reduce the dug area and the quantity of discarded soil. Make sure that the excavation and construction process at the same time avoiding too long digging lines.

(4) Take effective engineering measures ,such as slopes, barrel-drains and soil blocking walls, and biological measures, such as planting rosebush,arbor

and climbing vegetations in the range of slopes and road bounds, increase vegetations at the slopes to avoid or decrease the soil erosion.

(5) After the construction, we should level off the holes of getting soil and discard rideaus timely, green them with plants, renew the forest and grass vegetation as soon as possible in order not to remain bareness lands.

7.2.6 Environmental impact of use of pesticides and fertilizers and corresponding mitigation measures

7.2.6.1 Impact analysis

(1) The nursery and forest diseases and pests controlling, will increase the use of pesticides.The application of pesticides will kill pests;at the same time it will also kill a lot of helpful animals who are natural enemies of the pests, resulting in the reduction of forest biodiversity and the the species imbalance. Another the application of pesticides may has a direct harm to wildlife.

(2) The improper use of pesticides will affect the nearby water quality and cause soil polluted.

(3) Unreasonable application of fertilization, for example, sprinkling fertilizer directly on the surface, will lead to the loss of fertilizer and water pollution.

(4) Long-term application of chemical fertilizers on the forest lands, would lead to a change in the physical and chemical properties, soil compaction, soil deterioration and declining soil fertility.

(5) Pesticide containers, if cleaned and handled improperly, will affect the water and soil.

7.2.6.2 Mitigation measures

(1) Avoid using the chemical pesticides and choose strong sprout seeds, disease-resistant tree species as possible as we can.

(2) When using chemical pesticides, we prefer to choose Class Ⅱand Ⅲ prescriptive pesticides by the World Health Organization,which only effect a

particular pest and are of low toxicity towards the non-target organisms. Besides, the first category pesticides belonging to Class Ⅱand Ⅲ designated by the WHO can't be used.

(3) Workers or farmer who may use pesticides must accept training on chemical pesticides safety management, reposition and using before using pesticides, so that they can avoid a direct influence or water and food pollution.Containers of pesticides and fertilizers have to be collected and processed collectively.

(4) Scientific and rational use of the fertilizer formula.The use of organic manure, green manure and forest inter-planting nitrogen-fixing plants are promoted.Inorganic fertilizer should be applied strictly in accordance with the requirements of forestation design; surface fertilization is strictly prohibited.

(5) Protect forest litter inside the plant and forbid collecting litter and gray turf in the forest. Return the forest soil in the cutting areas so as to maintain soil fertility.

(6) It is strictly prohibited to wash and clean the pesticide containers in the water source areas.Agricultural irrigation water can be used for cleaning the pesticide containers.

7.2.7 Environmental impact analysis of materials and timber transportation and corresponding mitigation measures

7.2.7.1 Impact analysis

(1) Transport vehicles may generate noise and dust when going through residential areas.

(2) If the seedling trees and materials aren't protected correctly during the transportation,it will influence the road environment.

(3) Broadening some roads can have impact on the land;

(4) If abandoned residues are not handled properly, they would have negative impact on water bodies

(5)The impact on the environment of a large number of timber transporting vehicles

7.2.7.2 Mitigation measures

(1) Spray water to reduce the impact of dust at sensitive places during working time.

(2) Fobid the transportation through sensitive places in rest time;

(3) Transport can not be overloaded; protect nursery stock and materials to avoid dropping;

(4) When widening the road, use as few lands as possible and buil soil retaining walls;

(5) Reasonable arrangements of transportation avoiding traffic congestion.

7.3 Risk analysis and preventive measures

7.3.1 Analysis of risk factors

The project's main natural risks include fires, pests and diseases, typhoons and so on.

7.3.2 Risk preventive measures

(1) Establish forest fire prevention agencies;strengthen the forest fire prevention construction. In accordance with relevant laws and regulations we must construct the forest fire prevention system including the individual responsibilities in order to effectively prevent forest fire and protect the forests.

(2) Strengthen pest forecasting system, earnestly implementing the "Prevention first, Comprehensive prevention and treatment."

(3) Avoid a single-source, family or clone forestation.

(4) Strengthen breeding and cultivation so as to promote the use of strong sprout seeds.

(5) Enhance ecological environment monitoring,setting fixed observation positions in the biologic energy forest areas.The project implementation unit must strengthen cooperation with relevant research institutes to carry out

ecological monitoring and regularly report monitoring data to the department in charge of environmental protection

8 Environmental management and monitoring plan

We have formulated the mitigation plan and the monitoring plan definitely in the environmental assessment report, adopt the compulsory measures to supervise and ensure the implementation of the plan. The environmental management and the monitoring plan make the responsibilities of the project in the aspects about implementating plan and carrying out the mitigation plan and the monitoring activities of every unit in the designing、implementation and operation stage.

The loan agreement is going to ensure the funds of building-up and implementating environmental management and the monitoring plan need are parts of the overall (but not the additional parts) of the entire project budget which the international financial institution participated.

Environmental management plan which working out in the project have include all the mitigation measures and environmental monitoring requires.You should build an executing agency as one part of the whole project office structure being responsible for carrying out mitigation measures and the monitoring activities once the project feasibility study acquisition containing environmental impact assessment passes.

In the construction scheduled time, the project may cause bad effects on environment. In chapter seven ,we have distinguished and analysed all project which can affect an environment, and put forward counter-measures.This chapter and section has worked out environmental management and monitoring plan for the implementation about the mitigation measures in chapter seven,and determine the appropriate implementation of the unit's duties.

Although having contained a lot of environment problems in the project, as long as that the main environment of the following problems are monitored and controled,then the impact of project over local environment can get effective controlling.

8.1 Implementation unit and its dutys

As is shown in Figure 8-1, in China, the project environmental management is usually under the supervision of country environmental protection administration and local environmental protection bureau by related ministries and their departments of environmental protection.

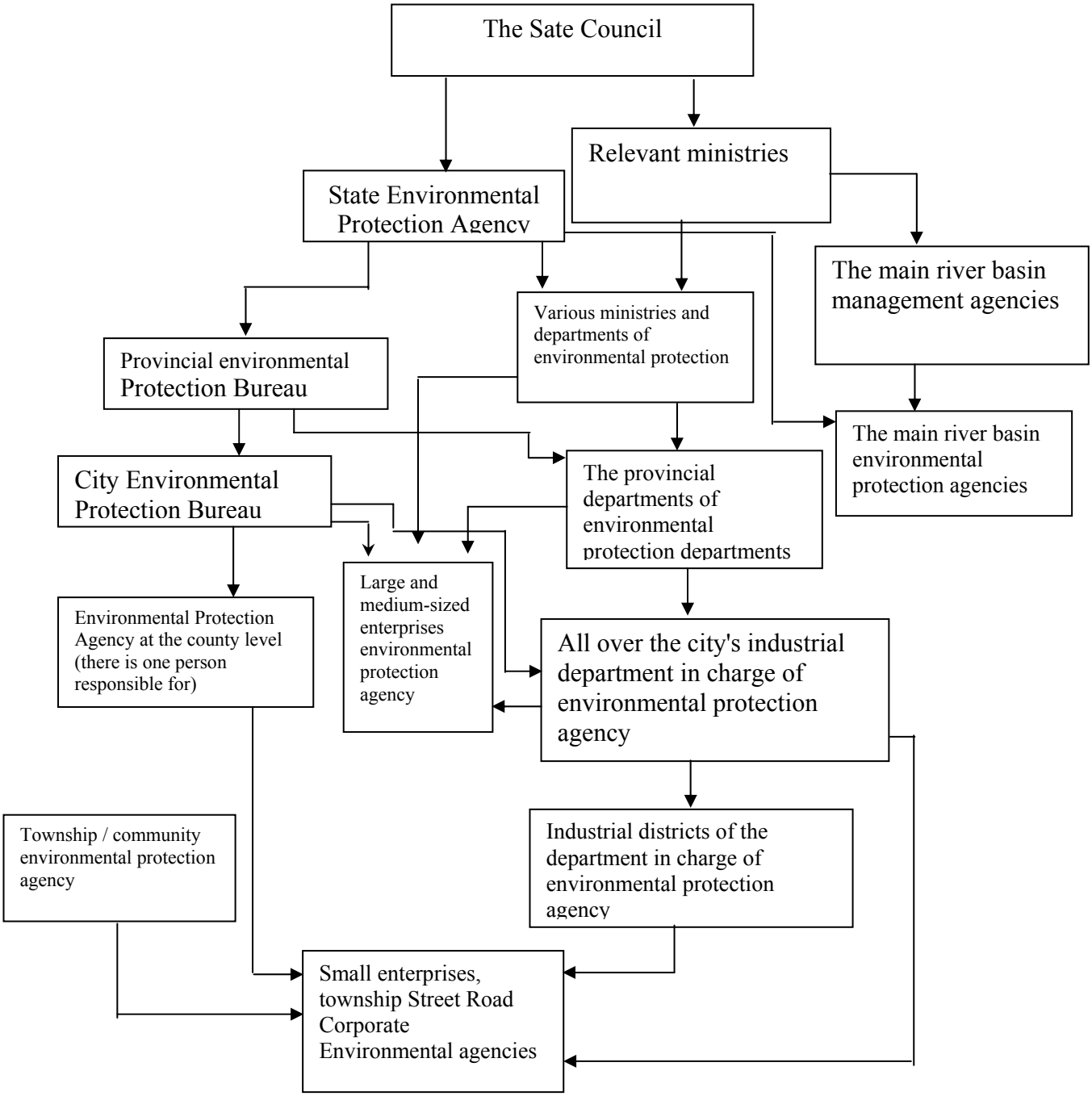

Fig. 8-1 Environmental administrative structure map

State Forestry Administration as one of the related ministries and departments is responsible for environmental protection and management in the affected region. Forestry Administration science and technology department and ecological environment department

are in charge of then directly. Its main duty has: (1) ensures that the project abides by pertinent country environmental protection laws and statutes,

and the standard; (2) superintends the environmental protection of country forestry branch job. Country environmental protection general administration supervises forestry branch . Forestry Administration of Jiangxi set Similar to the environmental protection departments and personnel, is responsible for the project supervision and monitoring under supervision by City Environmental Protection Agency and county Environmental Protection Agency (have one specially-assigned person to be responsible) . Provincial Project Office subordinates to Forestry Administration of Jiangxi directly manage and operate the project activities.

The province environment monitoring station directly subordinates to the technology unit in province level environmental protection bureau , does not have the administration management function.It being in charge of environmental impact monitoring about various developing activities beyond its judiciary jurisdiction range inner, and is responsible for weaving environmental quality annals. Whose main duty is included: (1) report the natural environment mass change to country environmental protection general administration; (2) environmental pollution controlled; (3) reports the accomplishment that environmental protection aspect gets; (4) To address key sources of pollution discharge application. City level and the county level environmental protection (directly subordinate to city county level environmental protection bureau) monitoring station are in charge of the mass change monitoring natural environments such as water and soil and are reported to the province level environment monitoring station.

But, the environmental protection bureau and the environment personnel of monitoring station not being in charge of daily environment aspect inspection and monitoring.Therefore, the corresponding project office should be forming necessary organization and providing necessary manpower to ensure a project effectively and smoothly realization in the field of the environment. The level project office sets up a environmental protection

section , which be in charge by a project office leader, set up 2 full-time personnel for environmental protection, the county level project office according to forestation area sets up 1 ~ 2 full-time personnel for environmental protection , afforestation technicians being in charge of entire forestation environmental protection aspect directly daily checking and monitoring. Physical factors monitoring such as the earth's surface water , and soil fertility of the project finished by city county level and county level environment monitoring station , ecological factor monitoring finished by The department who has the qualifications.

8.1.1 Environmental management implementation agency

Stage in project feasibility study,the environmental assessment report worked out by the project builder must be examined allowance by environmental protection bureau of Jiangxi. In this stage , Jiangxi environmental protection bureau also wants the suggestion and viewpoint of city level and the county level environmental protection bureau. In the project implementing and operation stage, the corresponding all of the various levels project office be in charge of implementing of environmental management and monitoring plan.

Environmental protection bureau of Jiangxi is in charge of superintending implementing about environmental management and monitoring plan and examines that whether the project every part mitigation measure achieve success carries out. Responding to the corresponding project office requires , the corresponding county environmental protection bureau being in charge of environmental management and monitoring plan supervision and examining and potential environmental impact produced by relevant laws of the state environmental protection.

Project area includes 19 counties. In order to ensure that project smoothly implementation with the smallest environmental costs, we work out the following environmental management and monitoring plan that implementated

by corresponding project projects. Environmental management and monitoring plan must be an integral part of the project as budget item in the project financing feasibility report and the implementation plan.

In order to ensure environmental management and monitoring plan implementated smoothly and ensure it compliance with the country relevant environmental system,every project office should appoint 1 ~ 2 full-time official who fully responsible for project activities implemented successfully of the part of mitigation and monitoring in the environmental assessment report during the project implementating every stage and operating period at least 5 years ago .The country level project office should appoint 1 ~ 2 full-time official according to the number of the arrangements afforestation are responsible for environmental protection and participate in the training project, whose duty is to ensure all environmental management and to monitor plan action being felt at ease on rank of project county/ forest farm. The environment relevance matters will be informed to province level project office and county environmental protection agency,and being in charge of the data collect at the same time and provides the technocal support . The environment official that (county-level city, level and province level) appointed from all of the various levels project office have to be responsible for prepareing relevant with the project environmental protection material and papers to prepare for country environmental protection general administration , world line and corresponding all of the various levels environmental protection bureau to examine.

During the operational stage, every county project office environmental officials will help the corresponding project to carry out the environmental monitoring plan, and other jobs contained by the environmental management and monitoring plan. However ,the final duty to ensure all action determined in the environmental management and monitoring plan to come true falls on the county project shoulder, they must ensure that the province project office could

getting demanded environment report/ data from county level project office smoothly. Environmental management and organizational framework during construction period and operation period are shown in Figure 8-2 and 8-3.

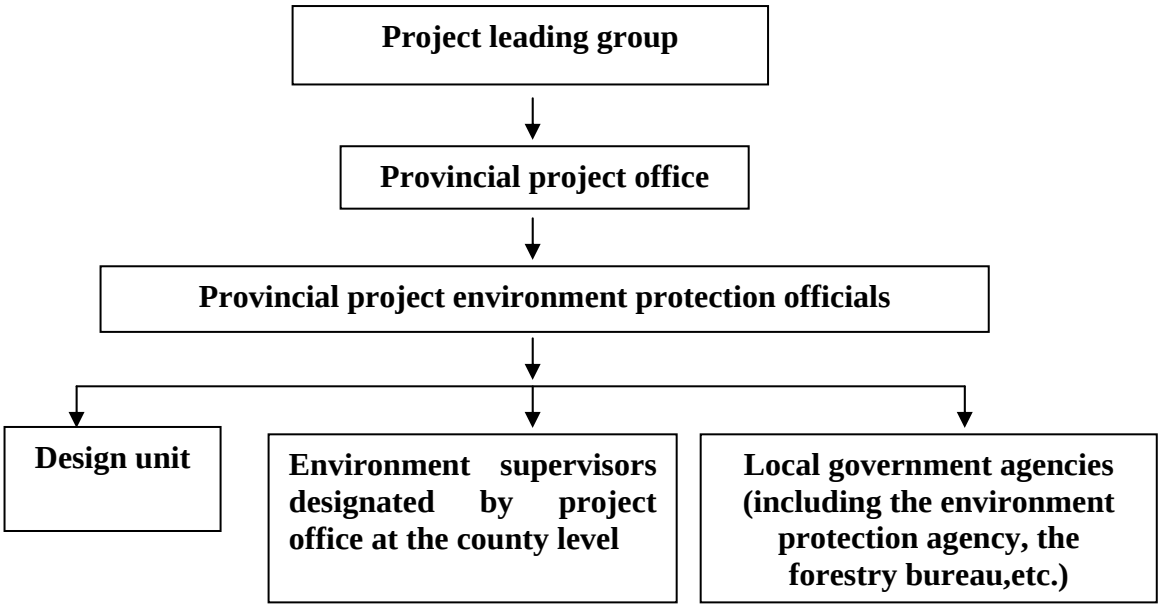

Fig. 8-2 Construction phase environmental management agencies

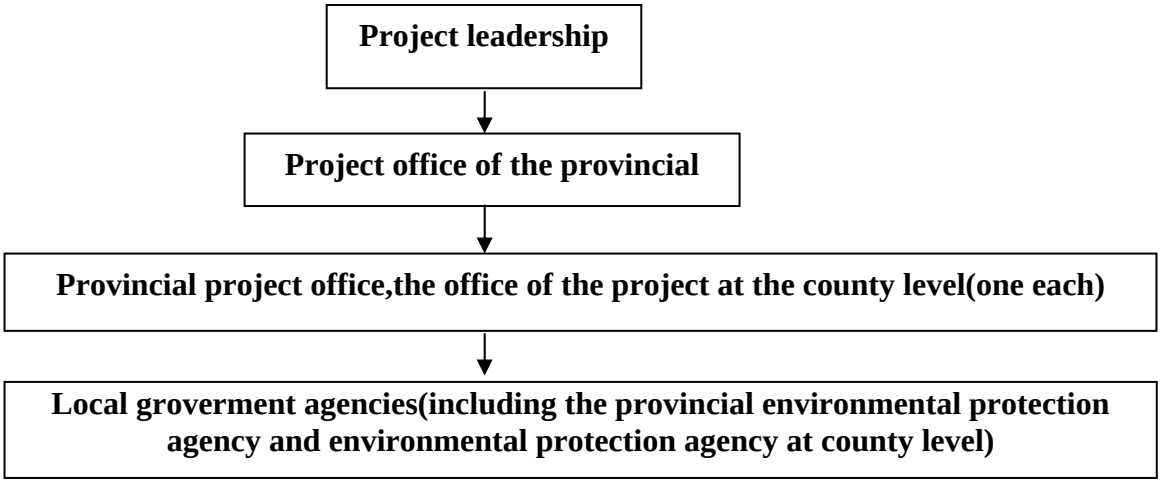

Fig.8-3 Environmental management agencies during operating period

8.1.2 The role of the project office and environment supervition

Following 8.1.1 section stated,all of the various levels project commite a role of executor about the project administration and monitoring plan .They are responsible for ensuring the mitigation plan and the monitoring plan puted into effect smoothly. Their main duty is included:

A. Examine and ensure the mitigation plan and the monitoring activities putting into effect and environment function putting forward a proposal to gain minimum environmental performance in the entire project when it certainly needed ;

B. When thinking that some special study is in order to gain the needs of environment function acceptable minimum environmental performance, recommend these project and make them passing and being into effect ;

C. To cooperation with the project design and implementation team in order to ensure the mitigation measure of the environmental management and monitoring plan has being reacted in the final project plan, ensures that the project monitors required condition at the same time;

D. provide the environment problem necessary aspect training for all of the various levels project office personnel and implementation personnel in order to strengthen the environmental management and monitoring plan ability about county and villages and towns personnel.

E. Superintend environmental management and monitor environmental protection measure implementation stipulating that in the plan;

F. Put forward guides in written form when you find that it is unable to reach environment function requires, adopt improvement measure;

G. Carry out a contingency plan while emergent environment event happened, report any happened environment accident/ disaster in time to province lever project office and local environmental protection bureau;

H. Carry out the environmental monitoring plan , including monitor organization and supervising supervision, ensure that taking sample in time according to the regulation monitoring plan;

I. Report environmental performance pertinently in the project construction and operation stage related to environmental administrative department/ bureau and World Bank

J. Handle environment aspect complaint , accept supervision by environmental protection branch;

K. Arrange the bank member of delegation and necessary environmental protection bureau or personnel of environment monitoring station to pays a visit;

L. Supervision on environmental matters during the implementation of construction stage , supervision construction and team building to follow the relevant provisions ;

M.Be responsible for implementating other item which environmental management and monitoring plan need.

8.1.3 Supervision organization

Guided by country environmental protection general administration, environment protection administrative department is province environmental protection bureau. They are bearing responsibilities about environmental management and supervising within respective province extent of competence. District and city level and the county level environmental protection bureau are the corresponding government administrative department environmental protection, they are bearing each's you government extent of competence inner project monitoring and supervising duty.

The province, cities and counties, environmental protection bureau and environment monitoring station should be working in close cooperation , make a clear division of labor to accomplish the project monitoring works. Under the leadership of province environmental protection bureau, the province centre environment monitoring station is in charge of environmental quality monitoring within respective province extent of competence. Under the leadership of city/ county level environmental protection bureau, the city/ county level environment monitoring station is in charge of environmental quality monitoring within respective province extent of competence. This project environmental protection will carry out under superintending of

province/ city environmental protection bureau and project area local environmental protection agency. Table 7-1 having summed up an environment superintending plan.

8.1.4 Environmental management plan

In order to ensure that the project environment mitigation measure implementated effectively,table 8-2 having worked out and having listed a environment management plan.

8-1 Environmental Monitoring Program

stage	organization	Monitoring Project	Monitoring object
The feasibility study stage	Jiangxi Environmental Protection Agency	1. EIA review 2. Audited environmental management and monitoring plan	1. To propose complete environmental assessment, determine the appropriate environment for the project, stress the focus; 2. To determine the important potential environmental problems the project may cause; 3. To propose concrete and practical mitigation measures.
Design & Construction stage	Jiangxi Environmental Protection Agency	1. Audited environmental management and environmental monitoring program of the preliminary design	1. Strictly implement the environmental management and monitoring plan; 2. To consider the implementation of the project / construction of all national laws and regulations;
	Jiangxi Environmental Protection Agency	2. Verify whether the investment in environmental protection is in place	3. To ensure sufficient investment in environmental protection in place;

stage	organization	Monitoring Project	Monitoring object
	Jiangxi Environmental Protection Agency, Local County Environmental Protection Agency	3. the choice of Verification of the regional project and resettlement way	4. Plans to verify the suitability of the regional development of biologic energy forests, whether or not to retain the original vegetation of the gully to ensure that the project will not seriously affect the biological diversity; 5. To ensure that projects stay away from the regional nature reserve area core and buffer zone to ensure that projects do not impede wildlife migration routes; near the nature reserve areas, the proposed planting areas and nature reserves in the pilot area between the cultivation of a certain width Eco-forest.
		4. to check for cultural sites on the ground floor	6. To protect cultural sites;
		5. inspect construction site of the sewage and garbage disposal	9. To ensure that the sewage and solid waste are dealed with based on the national and local laws and regulations. To ensure that the surface water and groundwater is kept from pollution;
		6. To check whether the construction of the project speed up soil erosion	10. To ensure that the soil erosion control measures followed the environmental management and monitoring plan. State and local laws to implement;.
	Jiangxi Environmental	7. Check with the planting of trees	11. To ensure the balance between the insects and their natural enemies, To improve their own balance of plant diseases and insect pests regulation

stage	organization	Monitoring Project	Monitoring object
	Protection Agency, Local County Environmental Protection Agency	8. Inspection of the energy of farmers, grazing issues	12. Solve the energy source of life and to avoid the emergence of social and ethnic conflicts;
		9. Inspection work area health and the health of workers	13. To prevent and reduce the incidence and prevalence of infectious diseases

stage	organization	Monitoring Project	Monitoring object
The ational phase	Jiangxi Environmental Protection Agency, Local County Environmental Protection Agency	1. During the operational phase inspections have been conducted on environmental management and implementation of the monitoring plan 2. Inspections to monitor the implementation of the plan 3. Check whether there is a need to take further environmental protection measures can not be expected to solve the environmental problems	1. To protect the environment, so that to minimize the environmental impact during the operation period; 2. If necessary, review and improve environmental management and monitoring plan in order to overcome the impact of unpredictable; 3. To ensure that the standards of sewage treatment; 4. To ensure the project's impact on natural resources, especially to minimize the impact on natural forests and water;

stage	organization	Monitoring Project	Monitoring object
	Jiangxi Environmental Protection Agency, Local County Environmental Protection Agency	1. Check whether the national emission standards are reached 2. Check whether the project of natural forest and water resources caused by unexpected pressure 3. Check whether the item of rare plants and animals and nature reserves will have an impact 4. Check whether the project is to accelerate soil erosion 5. In the project area to review the use of pesticides	5. To ensure that the pollution emissions to meet national standards; 6. To ensure that the project will not lead to degradation of natural increase; 7. To report any wrongdoing to related regulatory agencies; 8. To ensure that the project will not have a negative impact on water downstream and water users, report any wrongdoing to related regulatory agencie; 9. By strengthening environmental management and monitoring of the implementation of projects to prevent the nature reserve, rare plants and animals from any potential negative impact; 10. Oversight and control of plant diseases and insect pests in check aspects of the use of pesticides. Pest management plan to ensure that projects are fully implemented to ensure that I do not use insecticides, as well as to ensure that the use of the pesticide will not cause surface water and underground water pollution.

8-2 Environmental Management Plan

environmental problem	Mitigation policies and control measures	executant	Agencies responsible for
A. Design / prior to the implementation stage			
1. Project	1. Optimize the design of the project and plans to make on the environment to minimize the potential negative impact. 2. Projects and programs should be designed to avoid impact on environmentally sensitive areas such as core areas, the study area, nature reserve buffer zone, wildlife habitat, as well as the natural and cultural heritage, reasonable arrangements for the construction schedule to reduce the land occupied by a long time. 3. To ensure that the region's water resources, requirements and the minimum flow of water downstream water users to minimize the impact of the requirements. 4. Province Project Office project to strengthen the region's biodiversity monitoring and protection work. 5. To ensure that the migration routes of wild animals and their food / water lines will not be separated. 6. Province Project Office and related departments should provide management plan for subgroup be close to nature reserves and / or wildlife habitat. 7. To ensure that the natural / biological diversity is not cutting shrubs to the development of biologic energy forest.	Provincial Project Office and design unit	Provincial Project Office

environmental problem	Mitigation policies and control measures	executant	Agencies responsible for
	8. Carefully chose species, to protect the safety of local tree species, avoid the effects of interference of alien species 9. To ensure that energy sources of local farmers 10. Does not allow large-scale planting of a single clone of biologic energy forestn, every county at least 10 clones		
2. Land Use	1. If there is need to build forest roads, the road must be designed to minimize the land occupied to prevent accelerating soil erosion, to avoid / minimize the damage caused to the vegetation. 2. The development of biologic energy forest should not requisite any natural forest. 3. Where is considered to be historical sites and cultural relics can not be used in place of biologic energy forest. 4. Slopes greater than 35 ° does not allow to create biologic energy forest.	design unit	Provincial Project Office
3. Pesticide use	1. Examine pesticide use in all the region of projects, avoid using any category I pesticides divided by the World Health Organization. Choice of high-performance alternative to pesticide chemicals. To promote the use of low-residue pesticides. Strengthen the management of pests and diseases have been developed by the implementation of the program. See Appendix "pest control plan"	Provincial forest pest control station	Provincial Project Office
B. Implementation phase			
1. Nature	1. Construction machinery should stay away from Nature Reserve and wild	constructional	Provincial

environmental problem	Mitigation policies and control measures	executant	Agencies responsible for
Reserve and wildlife habitat	animals habitats. If the site close to the buffer zone, appropriate use of protective measures (such as the muffler)should be adopted to reduce noise. 2. State law does not allow it to use as a natural change, including biologic energy forest. Forest biologic energy development should be the main Yi Lin in the current grassland or low-biodiversity areas 3. Appropriate to deal with construction garbage. Garbage disposal should be far from the nature reserve and wildlife habitat. 4. Constructors are not allowed to enter the core area, the study area or nature reserve buffer zone. Prohibited hunting and destruction of wild plants.	force	Project Office，County Project Office
2. Soil Erosion	1. When slope is greater than 16^{o}, prohibited use of the whole cultivated land reforestation way. Use of strip-shaped pieces of land or goods, and so on the way. 2. Afforestation on the slopesshould be in complete at least one month before the rainy season. 3. To avoid more than 25^{o} slopes during the rainy season and the season opened up on the slope, Waxue and / or digging ditches. With sandbags, hay cover package on the excavation of the region under the surface, reducing soil erosion. 4. After the end of construction, the vegetation of the construction site should be replanted as soon as possible, to prevent soil erosion. 5. The use of post-harvest residue to protect the surface vegetation. 6. Strictly in accordance with designs for thinning operations to prevent	constructional force	Provincial Project Office，County Project Office

environmental problem	Mitigation policies and control measures	executant	Agencies responsible for
	damage and destruction of trees to retain soil. 7. To take measures to maintain and improve soil structure, soil fertility and biological. 8. To promote the use of organic manure, green manure and regular inter-planting forest plants. 9. Afforestation design by applying organic fertilizer, can only be Xueshi or facilities, and spreading prohibited		
3. Natural and cultural sites	1. Make the contractor and construction staff be aware of the importance of the protection of cultural sites. 2. During the construction period, if we find that cultural sites should be an immediate halt to construction, construction / environmental supervisior should protect the scene and immediately inform the relevant departments to come to survey research.	County Cultural Bureau,County Project Office	Provincial Project Office
4. Minority	1. Respect for traditional way and life habits of ethnic minorities. 2. Through the distribution of leaflets, training, and other ways to enhance contractors' and workers' awareness of respect for minority habits and beliefs.	Construction Team, environmental supervisors	Provincial Project Office
7. Pests	1. To quarantine outside species. 2. To retain valley native vegetation. 3. To avoid large-scale use of chemical pesticides.	Design unit	Provincial Project Office

environmental problem	Mitigation policies and control measures	executant	Agencies responsible for
8. Society	1. Afforestation can not occupy land. 2. Solve the energy problem. 3. Relevant government departments to help and guide farmers to carry out the intensive animal husbandry. 4. Construction zone set up temporary health and epidemic prevention agencies, strengthening the epidemic monitoring, health management and health promotion.	County Project Office, the epidemic prevention departments	Provincial Project Office
C. Operation phase			
1. Flora and fauna and nature reserves	1. According to the relevant national and local laws and regulations as well as reporting requirements, strictly enforce the protection of biodiversity and nature reserves.	County Project Office	PPMO, and EPBs
2. Pests and diseases and the use of agricultural chemicals	1. Strictly enforce the management plan drawn up by plant diseases and insect pests, pesticides to improve efficiency in the use of pesticides on the natural environment so that the long-term adverse effects to the minimum. 2. A good selection of forest measures to strengthen the capacity of forest pest. 3. Selection of low-residue, low-toxicity pesticides.	County Project Office, the forest pest control station	Provincial Project Office

environmental problem	Mitigation policies and control measures	executant	Agencies responsible for
	4. regularly monitore serious pest populations 5. The promotion of integrated pest management, reduce the use of chemicals		
3. Soil erosion and soil fertility	1. On the floor of the protected forest vegetation, soil covering the use of the plant. 2. Manual weeding, stand assurances raising the quality and effect of environmental regulation. 3. Soil test the implementation of balanced fertilization technology. 4. As far as possible the use of organic fertilizer to promote bacterial manure. 5. To restore and protect plant 6. Logging residues remain in the forest. 7. New forest load has water and soil conservation measures.	County Project Office, constructional force	Provincial Project Office
4. Biodiversity	1. The protection of forest vegetation and litter to protect the existing vegetation between the lines to protect the edge of vegetation. 2. To promote the integrated control of plant diseases and insect pests and to strengthen the management of forest health and reduce the use of chemicals. 3. Control from the rolling hillside complex.	County Project Office, constructional force	Provincial Project Office
5. Scoiety	1. To help farmers find job, increase their income, solve the energy problems of diesel.	County Project Office	Provincial Project

environmental problem	Mitigation policies and control measures	executant	Agencies responsible for
			Office
6.Environmental Pollution	1. Less use of chemical fertilizers, pesticides, used to be an appropriate time. 2. Selection of organic manure and green manure 3. Use of trenches, pits and covered by soil fertilization and branches 4. Selection of low toxicity pesticides. 5. Recycling and processing farm chemical bottles and packaging of fertilizer	County Project Office	Provincial Project Office

8.2 Environmental monitoring plan

The bisic environmental monitoring objective of biologic energy garden model base construction projects which be loaned from european investment bank in JiangXi is:

Through the methods that Strengthening forest management and protection system to improve the quality and size of natural forest;

To improve the environmental quality in the project area , in special the project management of rocky desertification area;

Through afforestation to improve the living standards of local residents and to increase employment opportunities.

Types of environmental monitoring: according to the goals, environmental monitoring consider the following 3 types.

Implementation of the monitoring : To determine that whether the progress of the implementation of the project be consistent with the design(the number of the afforestation / forest eco-care plan implementated; the number of the project

activities; the number of people trained and so on). In this type of monitoring,we could assessment the completion of the degree of policies, protocols, procedures or other management's commitment.

Consistency of the monitoring:to compare project implementation to the commitment in the certain environmental standards and regulations, conditions and the project plan. In the results of this type of monitoring determine the innocent party on the way to penalties or fines, or reward good performance.

Monitoring of the effectiveness: to determine the relations of the environmental impact activities and the long-term goal of the project.If measure the monitoring according time-series, the results alse could determine environmental trends. To select this type of monitoring-related "targets" , to establish baseline,to observe the environment conditions regularly and compared to established state of the environment to determine whether environmental management measures validity in aspect of achieving project goals.

The purpose of environmental monitoring plan is to establish a comprehensive environmental monitoring program.

To ensure all the mitigation measures implemented the environmental impact assessment determined;

To assess the monitoring number, to determine whether the proposed environmental measures to fully play a role(incluld the stage of design 、 implementation and operation),if not have,then to make the necessary measures to improve;

Ensure the project coule use the nature resouce sustainable such as soil and water.

The potential environmental impact the most important and relevant with the reforestation part mainly have three aspects:the first,select earth ,in special,the potential change of the important natural ecosystems;the second, the

characteristics of the establishment and management of biologic energy garden,such as the selection of genetic material and species diversity in the project design and soil conservation measures aspect;the third, pest control.

8.2.1 Monitoring items of the project and the selection of the monitoring places

Monitoring plan including the determine single environmental problems monitoring in chapter 7,such as the impact which the project for the soil and water, potential impact for biodiversity which the development about biologic energy garden produced and the implementation state of pest management plan.

According to(1)research and observation about biologic energy garden tree in lastest 30 years.(2) several times census for the forest plants in JiangXi ;and(3) from other parts of the experience to determine monitoring plan as follows :

Through field investigation and laboratory analysis to monitor the impact from the main parameters of the environment(including biodiversity, soil erosion, soil fertility and water quality).when in the special state needs to be completed by the professionals, qualified individuals / institutions should enter into an agreement,with the guide by provincial project office and the environment supervisors, in strict accordance with the proposed method carry on these activities(biodiversity investigation and laboratory analysis). The monitoring activites carried on during operating period will gathered in the aspect about geological, geomorphological and climatic conditions(agro-ecological zone) are representative for four counties.these are RuiJin SuiChuan XiuShui and FuLiang.

Ruijin:lies in the south of jiangxi province,in the west foothills of the southern section of mountain wuyi, in the east source of GangJiang and upstream of GongShui. It is in the transition zone between huazhong climate zone and huanan climate zone,along to Sub-tropical moist monsoon climate.

Suichuan: lies in the east foothills of the southern section of mountain LuoXiao,at the edge of southwest of JiangXi province,in the southwest of JiAn city.All border the main terrain is mountains, low-lying west high east,the altitude of south of west is 2120.4 meters as the highest point of the county and the altitude of the noutheast border at the export of SuiChuan is 82 meters as the lowest point.

Xiushui:lies in upstream of XiuHe at the northwest of JiangXi province ,along to JiuJiang city,lies in bewteen mountain MuFu and mountain JiuLing, The landscape scene in the form, climatic conditions favorable, four seasons, full of rainfall, Rich in natural resources.

Fuliang:lies in northeast of jiangxi province,in the centrol of six moutains and two lakes(huangshan、jiuhuashang、lushan、wuyishan、longhushan、sanqingshang、boyanhu、 qiandaohu)

Table 8-3 Environment monitoring plan

The basis data collection:			
1. Surface water	select and establish sampling points at the end of first year. 1. Monitoring Project: pH, total phosphorus, total nitrogen, CODMn, BOD5 and suspended solids. 2. Monitoring frequency: one time, conduct after 2 weeks of the beginning of the rainy season. 3. Monitoring Length: 9 days. 4. Monitoring Location: In the 4 representative of the counties affected by the major rivers	Area / Provincial Environmental Monitoring Station	Provincial Project Office
The implementation phase:			
1. Surface water	1. To observe whether there is turbidity. If it is found to speed up the implementation of the project due to soil erosion, measuring suspended solids and inform the relevant departments and members of the cessation of construction projects or strengthen measures to control erosion.	County Environmental Monitoring Station	Provincial Project Office

2.Plant biodiversity	1. Monitoring Project: biologic energy forest understory vegetation, such as bush / herb layer diversity of the investigation, including type, quantity, coverage, distribution and growth, the basis for the establishment of the database. 2. Monitoring frequency: one time, at the end of the first year. 3. Monitoring Length: 9 days. 4. Monitoring Location: In the 4 representative of the counties select eight forest, ，each woodland establish two repeat and a control (That is a total of 24 plots)	Provincial, county Office for Project	Provincial Project Office
3. Animal biodiversity	detailed monitoring plans developed by GEF group 1. Monitoring Project: birds. 2. Monitoring frequency: one time a season. 3. Monitoring Length: 3 days. (Not consecutive) 4. Monitoring Location: Lin Ban is greater than the block	By the GEF project and a number of staff willing to learn, but also have the ability to learn how to monitor the birds, these people, including high school students, teachers, workers and peasants, and so on.	Provincial Project Office

4. Soil Fertility	1. Monitoring Project: Monitoring of organic matter, total nitrogen, phosphorus, potassium of the total and effective calcium, magnesium and pH to determine the change of soil fertility. 2. Monitoring frequency: one time, at the end of the first year. 3. Monitoring Length: 6 days. 4. Monitoring Location: In the kind of monitoring of soil erosion and surface soil composite samples collected (that is, in 4 representative of the county to choose a total of 8-lam, biologic energy, each 2 to repeat the establishment of forest land and control a total of 24 samples To)	Environmental supervisors Provincial and county environmental monitoring station	Provincial Project Office
Operating period			
1.Plant biodiversity	1. Monitoring Project: biologic energy forest understory vegetation, such as bush / herb layer diversity of the investigation, including type, quantity, coverage, distribution and growth to determine changes in biodiversity. 2. Monitoring frequency: the operation of the project period of 5 years ago, twice every two years (that is, the third year and at the end of the fifth year). 3. Monitoring Length: once every two years, 9 days each time. 4. Monitoring Location: 4 representative in the county to choose a total of 8-lam, biologic energy forest, each 2 to repeat the establishment of woodland and a control (that is, a total of 24 plots) 5. Kind of area: 0.01 hectares for each plot.	Provincial Project Office ， County Project Office	Provincial Project Office

2.Animal biodiversity	detailed monitoring plans developed by GEF group 1. Monitoring Project: birds. 2. Monitoring frequency: one time a season. 3. Monitoring Length: 3 days. (Not consecutive) 4. Monitoring Location: Lin Ban is greater than the block	By the GEF project and a number of staff willing to learn, but also have the ability to learn how to monitor the birds, these people, including high school students, teachers, workers and peasants, and so on.	Provincial Project Office
3. Soil Fertility	1. Monitoring Project: Monitoring of organic matter, total nitrogen, phosphorus, potassium of the total and effective calcium, magnesium and pH to determine the change of soil fertility. 2. Monitoring frequency: one time, at the end of the first year. 3. Monitoring Length: 6 days. 4. Monitoring Location: In the kind of monitoring of soil erosion and surface soil composite samples collected (that is, in 4 representative of the county to choose a total of 8-lam, biologic energy, each 2 to repeat the establishment of forest land and control a total of 24 samples To)	Environmental supervisors,County and Provincial Environmental Monitoring Station	Provincial Project Office ，County Project Office

4. Soil Erosion	1. Monitoring Project: Rainfall data (from the provincial / municipal meteorological station), soil erosion, sediment organic matter, total nitrogen, total phosphorus, total potassium, effective nitrogen, effective phosphorus, effective potassium and pH. 2. Monitoring frequency: rain followed by the collection of sediment and weighing. The loss of the collection tank of the loss of soil after planting 1-year analysis of the 3rd, followed by No. 2 to No. 5 in the annual analysis of the 1st. 3, Monitoring Location: In the kind of monitoring of soil erosion and surface soil composite samples collected (that is, in 4 representative of the county to choose a total of 8-lam, biologic energy, each 2 to repeat the establishment of forest land and control a total of 24 samples).	Area / Provincial Environmental Monitoring Station	Provincial Project Office，County Project Office
5. Surface water	1. Monitoring Project: pH, total phosphorus, total nitrogen, CODMn, BOD5 and suspended solids. 2. Monitoring frequency: one time, conduct after 2 weeks of the beginning of the rainy season. 3. Monitoring Length: 9 days. 4. Monitoring time: the end of the dry season, 2 weeks after the first major rain. 5. Monitoring Location: In the 4 representative of the counties affected by the major rivers	Area / Provincial Environmental Monitoring Station	Provincial Project Office，County Project Office
6. Plant diseases and insect pests	Monitoring of plant diseases and insect pests followed by"pest control program"	Provinces, municipalities and county-level forest pest control station	Provincial Project Office

8.2.2 Executive unit of environmental monitoring

The province project handles the implementation being responsible for monitoring a plan's. Under conductor handling in province project, every county project handles each's flexible concrete area under self's jurisdiction range inner environmental monitoring carrying out being responsible. The area under self's jurisdiction according to project area is divided, corresponding area , city or county environment monitoring station monitor to the earth's surface and ground water quality go along, Jiangxi Forestry Administration carries out to planted forest organism's habits sum relevance problem monitor, the forest pest control station monitors project area inner pesticide sigmatism and plant diseases and insect pests managing the implementation planning. The handle and respectively corresponding province project monitoring station should sign an agreement before the project is put into effect. The county environment superintends a personnel will be based on environmental management and monitor a plan , is in charge of the mission states of execution examining monitoring of corresponding monitoring station.

8.2.3 System of monitoring report

Environmental monitoring is reported if system pursuing what 8-4 shows. The environment monitoring station must compile and compose monitoring a report , contain the data monitoring in the report after monitoring a mission every time being completed,these data say environmental protection measure states of execution valuation reporting , higher authority environmental protection administration submits as well as the environmental protection measure reaching improves an idea, and then draw to should handle to province project monitoring a report. The project handles a sum after environmental protection branch acquisition monitors a report, improvement reporting that the problem reporting carries out various measure right away. 5 years days before being put into effect expecting / the scheduled time building scheduled time as well as the project is in motion and does business's,the project sets up a

province ought to submit the year environmental quality report to World Bank. If the Jiangxi environmental protection bureau and country environmental protection general administration needing, also ought to get possessions report that these submit. Monitor written report procedure be pursued 8-4.

8.2.4 Monitoring prior to the implementation (collection of baseline data)

The plan building front monitoring use a project in achieving two purpose. The first purpose is to examine that the ring judges a report hitting the target slowing down if measure designing a document ultimately combining with a project and list in the construction contract. Second purpose is the situation appraising the current environment. Every part suggesting that monitors a plan if pursuing what 8-3 shows. Monitor a project being expressed 8-1 with relevance matters concerned.

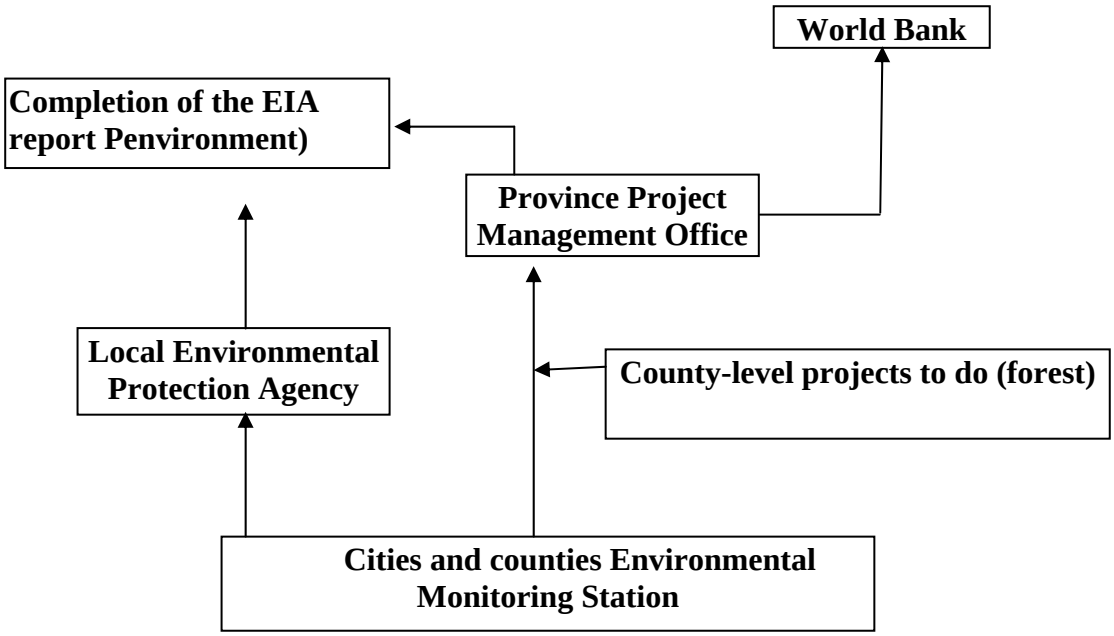

Fig.8-4 The chart of monitoring report

(1) The earth's surface water quality: The basis project puts plan into practice , the project will employ fertilizer and pesticide, this will may cause latent negative effects on water quality. That the earth's surface water monitors a plan before being put into effect is that the water quality monitoring builds the base line data for the future. According to the characteristic building the geographic location and project area river basin growing matter the sources of energy forest, plan choice 4 has typical river to carry out water quality monitoring , monitor a plan consulting a form, please 8-3.

(2) Natural reserve; nature preservation zone: Or project county approaching natural reserve; nature preservation zone in forestation field, that the project first step plan indicates natural reserve; nature preservation zone being in the cards may be infringed upon , the province project handles then to ought to ensure that so-called infringing upon can not happen. If some's natural reserve; nature preservation zone and manpower forest land approach ,so preliminary design ought to revise the call for with reaction environment according to law and law and regulation of our country right away.

8.2.5 Monitoring in implementation/construction period

Work out if the activity coming to appraise construction putting scheduled time/ construction scheduled time into practice monitoring a plan accord with established environmental standard. The environment superintends the regulation that the personnel is based on "planted forest protect the environment directive rules " , is responsible for carrying out environmental management and monitoring an activity.

The project construction activity will may possibly bring short-term slight effect to short-term slight effect a little bring along negative effect , for example vegetation , soil and biodiversity and common environment parameter health. If the environment superintends a personnel find that be necessary , this several environment parameters to back is monitored (if common health) is in progress. With the development of project but,cause specially appointed short-term effects on environment may possibly happen , suggest these project monitoring carrying out when necessary, whose purpose is to think that these are short-term when effect happens, degree knowing these effect, but adopt corresponding slowing down measure, these monitor a project being in progress when certainly needing , include the following content:

Common health: The environment superintends personnel if the field survey being responsible have any to disease occurrence be in popular , report the relevance branch immediately if having. Infect the nature disease if breaking out within the temporary shed for builders, the environment superintends the civilian worker that the personnel/ province project punishes besides the condition ought to inform of and entrust corresponding local prevention and cure to infect the nature disease control station monitoring a civilian worker infecting the nature disease, comes from the construction place especially. Monitor a plan consulting a form, please 8-4.

Table 8-4 public health monitoring program during buliding period

Monitoring Location	Object	Monitoring stage	Monitoring enforcer
Building sites at each biologic energy forest area	civilian worker	Epidemic diseases including hepatitis, dysentery, typhoid, hemorrhagic fever, leptospirosis, whooping cough, tuberculosis	Environmental monitoring / control of epidemic diseases

Refuse disposal: This problem priority monitors a job accomplishing to superintending a personnel from the environment. That the environment superintends personnel's job is a place and way ensuring that the construction unit accumulates according to that the scheme that the project designs ultimately chooses a rubbish and handling (including a stump, felling the rubbish and the house refuse and so on).

The earth's surface water and underground pollution: Machine gasoline , engine oil , fuel and antirust coating material being under construction are able to bring about to natural environment and climate contaminating , cause negative effects on natural environment. The environment superintends a personnel will be responsible for superintending the machinery equipment contracting person , the protection transporting equipment being under construction , instructs immediately contracting person being maintained if discovering any fuel/ gasoline leaking , ought to. Guard against any unexpected disclosing the thing enters a wave. Disclose if something unexpected happened among, the environment superintends a personnel will be responsible for stopping from disclosing further immediately , notice institution concerned checks up and to the go along contaminating. When being necessary, to groundwater and the earth's surface, water go along monitors.

Coast erosion and the earth's surface water deposit: The forestation is able to bring about the large area reclamation of land but nurturing accelerating a

coast erosion , being in forestation scheduled time and the first several years especially expects that. The coast erosion may happen in the field being under construction , the ride builds the place along the line, drawing , growing seedlings and weeding out. These corrode increasing by being able to bring about wave (brook , rivers and lakes, and wet land etc.) deposition , cause negative effects on aquatic animal and plant. Negative part handling/ an environment superintending a personnel being responsible for affirming these may happen affects the county project , the fence informing a mud to contract person working out slope face soil and water conservation measure , the for example shop hayrick , building draws/ or the deposit coming to guard against project area inner rivers and lakes shop fibre cushion, increases by further. Rational laxation measure is discussed in reporting 6th chapter and form 7.3 It both.

8.2.6 Monitoring in operating period

Project construction will possibly bring the negative influence to some environment parameter, for example natural vegetation, soil erosion, biodiversity and plant disease's occurrence. In the project operation time (the 2nd year ~ 6th year) the latent environmental effect will be mainly the soil erosion, the surface water/ground water pollution, the use agricultural chemicals and launches plant disease to prevent and control the related question which, the soil fertility influence and the biodiversity influences the activity produces. By each project county's environment supervisors in the project operation time monitor project the influence which will create to the different environment factor. The project operation time environmental monitoring plan's essential target is to understood that the project in the operation time the influence which creates to the environment. The gain information will be used for to further improve the environmental management and the monitoring programme, the corresponding project activity prevents/to reduce the project to create in the next stage to the environment the greatly negative influence.

8.2.7 Detailed monitoring plan of the main environmental parameters

With every county selections the forestation builds (together 8 pieces of the forestation burn) a coast erosion , plant diversity composes in reply a soil fertility to monitor appearance field , every appearance field 0.01 (20 hectare of ms X of different two seeds of trees having representativeness in 4 5 ms). Monitor the appearance field responding to in height , slope and using in history as far as possible similarity. In the same project county, monitor the appearance field should be similar on soil and landform condition. The building-up picking up a right person in every piece forestation 2 repeats and 1 contrasts (24 in total monitor the appearance field).

Coast erosion: Monitor a coast erosion in 24 monitoring the appearance field. The coast erosion monitors appearance field building-up should abide by a national standard.

Monitor contents

- The coast erosion monitors the appearance
- Field monitoring content mainly include: Rainfall data (come to every county climatological station);
- Soil erosion amounts; Analyse deposit organic quality , general nitrogen , general phosphorus , general potassium , effective nitrogen , effective phosphorus , effective potassium and pH.

The soil erosion being in progress after raining is inquired into, if deposit takes form , is collects and is weighs after being to ought to be in rain. Collect the soil running off running off in the slot, 1st year of the forestation queen analyses 3 time , the 2nd analyses 1 time afterwards to 5th year every year. Environmental protection superintends personnel (peasant or forestation personnel will train several people to have desire to advance) in selected forestation area , teaches them how, afterwards, to collect deposit in the slot , to record the water yield running off and weigh in raining every time from running off.

Biodiversity: The forest building life matter sources of energy also is in the cards bringing about negative effect to biodiversity. Biodiversity includes hereditary diversity , species diversity , ecosystem diversity and landscape generally diversity. This project is monitored and analytical vegetation and animal diversity. For knowing an impact of project over biodiversity,with ascertaining 8 forestations in this 4 counties, point , this 4 counties have representativeness in the general configuration of the earth's surface/ geology , landform , soil , the climate and the aspect cultivating seeds of trees mainly. The alternative forestation has reflected the main reproducing tree species of project (tea oil and skin-naked tree).

Monitor contents:

(1) plant biodiversity: Vegetation diversity monitors

the main parameters of Vegetation diversity monitoring including the density of vegetation, species composition, the number of individual types of coverage, understory of shrubs and herbaceous layer high. Each of point record these parameters to determine the forest eco-diversity impact between different species and different agro-ecological zones. The monitoring of vegetation diversity adopt a common international approach.The size same with soil fertility and soil erosion monitoring sampling area, in the eight biologic forest of four representative counties (cities), we set up the monitoring sample area, each forest establish three monitoring sampling area, the selected sample area have similarity(topography, soil, planting methods),the area of each monitoring sampling area is 100m2(20m×5m), two monitoring sampling area is in the afforestation region,one is out of the afforestation region as a contrast which the best establish in the buffer zone. The total is 24 fixed monitoring sampling area to monitor biological vegetation diversity.

(2) Animal biodiversity: we usually choose to monitor the birds, because of these:

Easy to observe (even though need the telescope); easy to identify the type; there are dozens of birds may be observed; each bird has unique ecological environment, therefore, some kind of birds may / not have the state of the environment reflect(there are some kind of vegetation have/not have, there are certain types of food have/ not have, the procedures of human interference); we have had the economic, efficient and statistical reliable methods and had been tested;we complete the monitoring plan by the group to GEF; the monitoring area be sites in more than a plot of Lin to carry out.

(3) Soil fertilities situation: The soil fertility monitors level (nitrogen , phosphorus , potassium) picking up a right person being used to monitor forestation forestation queen soil fertility exponent year development change , for example soil acidity and soil nutrition. The coast erosion and biodiversity monitor and point coinciding , the soil fertility monitors point including 3 treatment: 1 control point (nothing fertilizer uses) and 2 repetition (have fertilizer use). Come to reflect different reproducing tree species and forestation forestation pair of soil fertilities situation effect building 24 soil fertilities in total within 4 counties having representativeness monitoring point.

Monitor appearance field building-up

The field is identical appearance the soil fertility monitoring appearance field and the coast erosion monitoring. Contrast the field picking up a right person representing the forestation not having employed pesticide, condition judging that the development not having employed pesticide forestation field soil fertility changes condition, but the forestation field employing pesticide changes the development being applied to monitor a forestation and employing pesticide queen soil fertility. Design and building-up monitor sampling housing estate , having similarity (landform , soil , cultivating way taken a sample and so on), sets up 3 treatment: 1 be to contrast (nothing fertilizer uses) , 2 (use for repetition has fertilizer). 4 counties are together selected 8 forestations burn, every forestation 3 handles, be 24 to monitor sampling housing estate in total,

the year (is in motion and does business from 2nd year to 6th expecting) every sampling analysis for 2 years.

Monitor the exponent and methods

The soil fertility monitors the include the soil pH , general nitrogen of exponent mainly , the general phosphorus , general potassium , effective nitrogen , effective phosphorus , effective potassium , the forestation queen , the year monitoring these exponents change condition. Every June , 2 arrives at the sample book collecting soil between August from monitoring sampling housing estate. Ought to monitor sampling housing estate pedosphere from every collecting the compound sample book. And then analyse the epipedon compound sample book soil fertility exponent. The first putting phase into practice in project year ought to train an environment the method superintending personnel soil sampling right away , ensures flexible compatibility of sampling and standardizes. Every monitors project analysis method being unable to ought to clear and definite and standardize, such has comparable sex never with the result that forestation area gets.

(4) water quality: Monitoring the earth's surface water quality is to judge that employ causing bad effects on water quality or not if the project putting into effect bring along effect and base manure to water quality mainly. Thickness value ascertaining 4 strip river respectively monitoring main pollution in already selected 4 projects county, includes the pH , COD , BOD5 , general nitrogen , general phosphorus and suspension thing. River builds (standard base point) each 2 taking sample burning , 1 is the base line data in forestation area upper reaches,1 burn besides in forestation area lower reaches , ascertain the project activity giving river the reality that water quality brings about to affect. For cost down and avoid bringing negative effect, to negative effect the mass monitoring a plan as well, suggest 1 year to collect 1 time of water sample only, 2 cycles behind the main rain before rainy season (May April ~).

Situation suggesting that the main parameter monitoring includes forestation area inner the earth's surface water quality , biodiversity , plant pest control , coast erosion and soil fertility. Put unit , branch and project being responsible into practice monitoring an activity's describing that the idea expresses 8-2 basically.

All above is a plan to monitoring that main 4 environment parameters (biodiversity , coast erosion , soil fertility situation and the earth's surface water quality) suggest to carry out , these monitor according to that environmental management and monitoring the inner for 5 years (be that 2nd year arrives at 6th year) planning , expecting that in being in motion and doing business to adopt identical sampling to burn , sampling method and sampling time go along monitor. Because of the impact of forestation over these environment parameters, the effect especially to biodiversity and soil fertility situation is protracted nature's , suggest that the project builder is under the project sets up sum Jiangxi Forestry Administration's leadership of province, going a step further continuing the forest carrying these out monitoring an activity , being that Jiangxi grows matter sources of energy in the future develops and finds an impact of different seeds of trees over soil fertility , biodiversity to provide scientific basis for sth.

8.3 Environmental training/system-strengthening plans

8.3.1 Purposes of the environmental training

This environment training program purpose is that the feasible all of the various levels project punishes an official to be responsible for carrying out environmental management and monitoring a plan , goes a step further reinforcing their ability , ensures that they put scheduled time into practice in the project and is in motion and does business phase, carrying out in the laxation ascertaining that in environmental impact assessment system and monitoring a plan successfully. Accept the personnel who trains person to be able to include the forest farm and the company. For example board and

lodging and the fee training teaching material etc. is responsible by forest farm and respective unit of company then but, in participating in the cost happening during training a project,irrespective of enter this environmental management and monitor plan cost middle.

Be to ensure that the course success is completed assembling for training, intending to lay on the environmental protection carrying out the personnel who superintends a job and coming to join organism's habits , soil science and agriculture science training the course personnel to ought to have big educational background, and mimicked special field being natural science (for instance , forestry manages , water resource , environment best and so on).

8.3.2 Training courses

Under the project handles leadership of Guangxi, environment training program course will include several the following aspect:

(1) understanding and application by World Bank and the chinese government about environmental protection laws and statutes, standard and norm;

(2) environmental management standard which World Bank applied

(3)environmental protection technologies and environmental monitoring,including as following:

The measuring principle of hydrology and the earth's surface water quality;

Environmental monitoring basic knowledge;

Understanding of the plant degeneration degree ,diffrient plant form and ecosystem; To identify birds including image and sense identify ;

Biodiversity monitoring technology/ method, birds , amphibia/

Crawl knowledge/ identification;

Soil erosion prevention principle , the methods controlling soil erosion; Techniques of pest control , plant diseases and insect pests synthesize management plan (IPM) principle;

Soil and sediment sampled and the basic handling method determined in the environment management and monitoring plan (EMMP);

Advisory write of environmental monitoring report.

The province environmental protection bureau and official of Jiangxi Forestry Administration will be that all above these courses provide training within Jiangxi range , forestry Academy of Sciences , Jiangxi agricultural university , province forestry science and technology spread a master station , the unit brainpowers such as province forest tree kind of seedling station , province forestry investigation plan research institute helps from the province. For reducing training cost , by giving full scope to every university and institution for scientific research,the province project handles the way being able to adopt the training uniting to coming from all of the various levels project handling , the forest farm and the natural reserve; nature preservation zone high level environment personnel being arranged for giving lectures. If this idea (train combinedly giving lectures) is adopted, the training program will change to some extent so , will adopts on the pattern training person the training being in progress's".

Besides, suggest carrying out a specially appointed training project to the peasant, not only principle and use training content to be that pesticide sigmatism , pest control plan , plant diseases and insect pests manages synthetically, aiming at protecting the environment, handle cost also for lessening. Own right quality if the county project handles, training (content is pesticide usage , pest control and plant diseases and insect pests synthesize a management plan) one day is passed the pattern adopting on the training training person to be in progress by pest control expert so" , the personnel carries out training on the environmental protection supervision that all of the various levels county project handles. That then, these had accepted the environmental protection training superintending a personnel is to be responsible for providing (the usage training content safety and the best being

that pest control , plant diseases and insect pests synthesize the management plan and the pesticide) within their area under self's jurisdiction to local peasant. One kind of possible condition is not to have (ability) right quality if environmental protection superintends a personnel besides, the training to the peasant ought to be provided by every project county forest pest control station expert then then.

8.4 Scientific and technological popularizing and training

Importance extending and training science and technology to be that the project builds props up one of system , importance being an intensive farming , improving forest land productivity and standing forest growth amounts ensures that whose mission is up to the minute , mature result of scientific research of make full use of , training and extension by various form, improve the project technology content and put mass into practice, the forestry improving and improving the grass-roots unit forestry management control personnel and farmers produces the technical ability and managerial and administrative expertise , ensures the project superorder bid to come true.

8.4.1 Contents of scientific and technological popularizing

To improve project construction technology content , to improve the quality and efficiency of an integrated project, we should respond to the main forestry scientific and technological achievement and to actively promote and applicate major scientific and technological achievements in forestry and practical technology of the following:

(1) forestry living diesel oil raw material and their breed breeding technology. Including that the breed breeding , molecule breeding , radiation breeding , neuter department breeding , foreign strains of genetic improvement and practical technology seedlings.

(2) life matter diesel oil seeds of trees cultivating technology. Including that skin-naked tree , camellia grafting clones and upbringing, fertilization technology, betula high-yield dwarf tree-lin cultivation techniques.

(3) forest and environment protection technologies. Including biological control of pest technology, construction of mixed forest technology, biological technology to build forest fire, soil erosion control technology and so on.

8.4.2 Training targets and contents

The main marriage partner who trains is to set up area cities and counties, three-level countryside project administration and technician reach a peasant household, the forest mission training time union every year building handles the technology , protect the environment technology producing , building forest etc. carrying out arrangement , training content to include the project administration , participating in the dyadic forestry plan , cultivating material from all of the various levels project.

(1) Province training: unified arrangement from the province project office, the main target are city and county the main project managers、 technicians and finance staff.The content including foreign investment project management、 digital project management techno-economic policy、 participatory planning and evaluation 、forest management construction design、 project supervision、 monitoring evaluation、 the development of planting materials、promote and using of new technologies、forest safety and environmental protection technology、financial management and so on.

(2)County training: in batches arrangement from the county project office, the main target are the related township (town) the operating entity technical and managerial personnel forestry technicians station technical personnel and on behalf of the farmers and so on..the content including fForestry policies and regulations,project management requirement, participatory planning, construction design, seedling cultivation technology, afforestation technology,

pest control technology,forest safety and environmental protection measures and so on.

(3) Countryside level and manage entity training: arranged by township (town) and the forestry stations operating entity, the main target are project farmers and company workers. The content including all kinds of practical technology and methods of operation, such as seedling afforestation construction technology, economic forest pruning, fertilization, inter-cropping techniques、 pest control technology; forest products harvesting, storage technology; forest products marketing techniques.

(4)Study abroad and training: unified arrangement from the province project office, the main target are city and county the main project managers and technicians. The content is advanced forestry technology and management experience.

8.4.3 Ways of implementation

(1)Forms all of the various levels science and technology extending and training an expert group: The forestry province level science and technology being extended and training an expert group the seedling station , province extending the master station , province forest tree seed by province forestry Academy of Sciences , Jiangxi agricultural university , province forestry science and technology inquires into the plan research institute waiting for the unit expert and province project handle personnel made up of; County level extends and the project training an expert group technician He county by institution concerned of this county (city) handles personnel made up of; The project countryside forestry workstation technician is composed of countryside level or the reason why managing entity extension and the training group , the also absorbable local peasant skilled worker participates in. All of the various levels duty such as extending and training the project technology set, should fulfill technology training , guiding , consulting about and solving a problem.

(2)Holds training class: This is the means improving quality of project managers, technicians, production staff,and also one of the main way of technology and training. Provincial training carried on through lectures and on-site visit, county, township level training carried on through the way of on-site demonstration.

(3)Participatory training: project management and technical relied units provide training places, technology personnel guaid and train the operating entities, farmers and other direct production staff directly and to investigate the production process technology essentials with them, through the exchange, deepen understanding, together.

(4)Distribute all kinds of audio-visual materials and technology reading: province project office organize or trust units to make brochure, reading VCD and CD-ROM technology about nursery, construction design afforestation technology, engineering supervision, forest and environmental protection, project monitoring, financial management, quality management as the operational guidelines for project management and technical personnel.

(5)Model construction lin:according to the construction content , to establish a high standard of Betula trees and camellia lin technology demonstration to provide the place for project management, technical staff and farmers to visit and study. model types of construction plan is 5000hm2,in that, Betula trees is 1000hm2, camellia is 4000hm2.

(6) Technologies contract sum technology investment: Look on the project as backing , carrier and platform , encourage scientific research universities and colleges , all of the various levels forestry technical service organization , technology able person , expert, technology investment works together, or scientific research cooperates by the fact that the technology being in progress with the peasant household contracts a sum, the science and technology extension participating in project grass-roots unit and realness training , realizing science and technology with giving birth to a child combine.

9 Conclusions and Recommendations

9.1 Conclusions

"Jiangxi Biologic Energy Forest Demonstration Base Construction Project"stands in line with the national forestry industrial policies, and it is contained in the state ecological construction strategy and is a demand for bio-energy raw materials forests; the project is also in line with local economic and social development, land use, forestry and other relevant plannings.From its environmental and social impact analysis, we can see that this project does not have great negative impact on the natural environment while its positive impact on the society and natural environment is primary. If the project can be implemented and operated successfully, then we can make full use of the forest productivity and characteristics and advantages of the forest biologic energy, improve the proportion that forestry biologic energy accounts for in the state tatal raw materials energy.Obviously at the same time the successful implementation of the project can make contributions to the state energy planning and development.It also may increase the forest cover rate, ameliorate the ecological environment, reducse greenhouse gas emissions, and actively explore significance of the forest in response to climate change.Furthermore,the construction of the project will promote local economic development and increase their incomes; the project has significant economic, social and ecological benefits .

If all the environmental protection measures could be strictly implemented and the environmental management can be strengthened in the whole process of the project construction, from the environmental protection point of view,the project is feasible.

9.1.1 Project areas to choose

Project construction involves a total of 19 administrative counties (districts). The choosing of project areas should be in line with local conditions, the suitable places planting the appropriate trees.The lands for afforestation should be in accordance with the site conditions, but centralized appropriately for a scale-business.The operater ought to take full advantage of the existing forest operating facilities, environmental protection facilities and infrastructure, or facilities that are under construction, planned to construct in order to avoid duplication of investment;the forest lands should coordinate with the local economic development and land use planning. In a word, the choosing of the project areas is reasonable and feasible.

9.1.2 Environmental impact analysis and mitigation measures

In the implementation phase of the project, if a series of unavoidable problems are not properly handled, they will have negative impacts on the natural environment and social environment in some places. The extent of the environmental and social impact of the project will depend on the implementation of the environmental impact mitigation plan and program.

The potential environmental impacts of the project during the construction period and operation period are as follows:

(1) The impact on soil quality

(2) Soil erosion in the construction period

(3) diseases and insect pests in the operating period

(4) Impact on the biodiversity

(5)The short-term impact of the waste water and solids on the environment in the construction period

For each of the possible negative impact, in order to prevent or reduce the impacts to a minimum extent, we should take corresponding mitigation measures; specific mitigation measures have been presented in Chapter VII.

In sum, the mitigation measures concluded in the report are basically feasible; most of the mitigation measures have practical experience in the neighboring provinces or regions, which plays a positive role in preventing and mitigating the impact and damage to the ecological environment.

9.2 Recommendations

In order to prevent the negative impacts of the project on the environment and in order that the project can be successful, it is proposed that the construction of the project should take dynamic program of the environmental monitoring and management so that when there is unexpected adverse environmental impact occurring in construction or operation phase of the project, we can take further measures.In addition, the project managers should strengthen the monitoring of the ecological environment, have strict reforestation lands choice, and ensure that there is a certain preventive distance between the project areas and the ecologically sensitive areas。The project should speed up selection of the updated nursery stock and relevant research. Before updating nursery stock the program ought to do a plot test in advance, need to re-prepare the feasibility study report, and take environmental impact assessment according to the altered or extended project regulations. As for the unavoidable ecological impact, the treatment measure should be “who destroyed, who compensate, who restore”.The relevant unit compensates the environment according to the impact and the extent of damage; ecological compensation expense should be included in the cost of the project.

9.2.1 Program in the latter period

The provincial officials who are responsible for the environment protection should prepare the reports in different phases to ensure that the results of the environmental management plan (EMMP) can be further integrated into the project design and the implementation of the environmental management plans have dynamic methods.

The reports in different phases include:

The report after the completion of the preparatory work of the project construction, for reference of the project construction;

The annual report on the construction and implementation of the project

The annual report on the monitoring of the project in the operation phase

The final report to evaluate all the overall impacts and sum up the successful operation process of the mitigation measures

If there is any significant adverse environmental impact which is unexpected occurring in any phase of the project, there should be sufficient time to have a re-assessment and take further measures.The above-mentioned reports in different phases should be submitted to the provincial project office, European Investment Bank, as well as all the level agencies for review and evaluation if necessary.

9.2.2 Public participation

From the results of the survey we can see that the public are very concerned about "Jiangxi Biologic Energy Demonstration Base Construction Project"; the majority of people support the project believing that the project is necessary and it will improve their living environment and economic conditions; they are willing to accept the adverse impact of the project in the construction period.

Some of the people hope the project can be implemented as soon as possible in order that the project can increase the forest covering areas in Jiangxi Province and improve the environment. Residents in the project areas want to obain technical trainings and job opportunities.

Section

Jiangxi Biologic Energy Forest Demonstration Base Construction Project Funded by European Investment Bank

Social Impact Assessment

10 Introduction

Social assessment (SA) has become a part of a feasibility study of the World Bank in 1984; in 1997, the establishment of the department of social development, making the work of social assessment be stronger. Since the 1990s, the developmental perspective of "people-centered" and "sustainable development" in international community, promote social assessment receiving increasing attention as the assessment of the economy and environment. They become an important part of project evaluation. The project of European Investment Bank loan biologic energy forest demonstration base construction is the first biologic energy forest construction project sponsored by European Investment Bank in China. It also carries out a full assessment of the project.

Participatory analysis is the basic method of a social assessment. Based on all the levels of society involved at the design of the project, carrying out systematic research, social assessment analyze the composition of project stakeholders. It will assess the various community and social sciences, including sociology, anthropology, as project evaluation tools so that it can provide a comprehensive evaluation of the potential risks which may be lead to negative impact and the possibility of enhancing the positive impact providing a comprehensive evaluation and on how to avoid or mitigate the negative impact and put forward constructive ideas.

The purpose of Social assessment is to improve the overall assessment, and as a tool to support the sustainable development of forestry in China's Jiangxi Province. Regarding of project stakeholders and all levels of society involved at the project, may increase the economic benefits and be beneficial to the benefit of natural resources and effective environmental management. The preparatory work will be more fully comprehensive, and the decisions of relevant items design will be more scientific.

In addition, the project's social assessment process also helps the public to participate in the project, and strengthens the administrative personnel of lender in social work.

Social assessment of this paper uses standardized assessment methods, including public information, public questionnaires, stakeholders and the analysis of local capacity-building, and places a very high value on the equality between men and women and the participation of
the poor.

11 Methods of Social Assessment

11.1 The process of social assessment

11.1.1 The group of social assessment and the progress of work arrangement

According to the procedure provided by the Forestry Department of Jiangxi Province, social assessment is executed by the expert group which contains editorial experts. This work should be started at the design phase of the project so as to ensure the work to timely service the entire preparation stage. The social assessment of this paper started at the July 2008, its results and specific proposals has been provided to the design group in September 2008.

At the preparing meeting of the project of European Investment Bank loan biologic energy Forest demonstration base construction in Jiangxi Province hold by the Forestry Department, the experts of editorial team train the local forestry bureau and forest managers to the environmental and social impact assessment of the project. After training, some public investigations were completed by the local forestry bureaus and forestry managers independently. The group members and local managers are using the " environmental and social impact assessment implementation program of the project of European Investment Bank loan biologic energy Forest demonstration base construction" drafted by the environmental and social assessment group. The group members and local managers visited villagers and farmers and provided information for community-based assessment discussion. It is the foundation of the implementation and monitoring of this report.

11.1.2 Information on the project

In addition to the project's risks and opportunities assessment, the assessment group supports the project for participation in the operation launched in Jiangxi Province. The operation, which started in the above-mentioned method, will train 40 forestry officials and technicians from 19 counties, cities

and. All information of the project are issued to staff, and also sent electronic version to them by e-mail after the meeting.

11.2 Social assessment

11.2.1 Participatory approaches

In the social assessment, participatory methods can ensure that the negative social impact with the project of the various potential risks have a full analysis. As a result of this method, the team can get the local details. According to the recommendations, the team also did a consultation with the farmers to respect their local knowledge and understanding, and on this basis, developing the operation of the project's recommendations will help the project meet the needs of local communities and the future projects well. At the same time, using participatory methods can also increase the number of people including local residents and other stakeholders in the project, because if more information was shared, pre-project work would get more correct decisions.

11.2.2 Interview with the project's stakeholders

After assessment of the social group identified cover the whole range of stakeholders, officers conducted interviews and visits 10 villages in 3 counties. In each villages, visitor have held a semi-structured (semi-structured interview) and interviews with the target groups involved in the discussions, and in these interviews and discussions, the use of participatory rural assessment (Participatory Rural Appraisal) and methods combination with "Groups Survey "and" Individual Farmer Survey". These activities related to the village every 10-15 months the farmers family members. These questionnaires related to the specific conditions can be found in Annex 3. In addition, the group and the provincial Forestry Department's Office of foreign investment projects held a discussion forum with the related counties, townships and village government officials and forest farm staff.

11.2.3 Sampling survey

As the project is not related to minorities, nature reserves, scenic spots, heritage areas, it has become to the survey of a sample selection of villages and farmers which is carried out in accordance with the following criteria:

(1) Pilot counties should be representative of the ecological of the region (valley) characteristics. And the forest resources have a larger ecological pressure, taking into account the suburbs of cities and remote rural areas of the county; the recommended project in the region is representative.

(2) From each area in the forest area of southeastern, northwest, southwest Jiangxi Province, we should elect a county that the forest resources are broadly representative and can reflect the differences in the Jiangxi forest resources and diversity .

(3) From the each elected county, we selected 4 villages as samples, including a relatively rich village, a middle-level village, as well as a relatively poor village.

12 Framework of the Policies and Laws

This section will make the following analysis:

The important features of the project-related framework of policies and laws; the potential differences between social security policies of the European Investment Bank and policies and laws of this project as well as the important legal framework which is being planned.

12.1 Biologic energy forest project

12.1.1 Framework of state laws and policies on the forest and land

(1) Afforestation

As early as the beginning of 1949, the government promulgated a series of forestry-related policies and regulations. Although they were several years old, the forestry policies were basically stabile over the years.

For example, the revised "Forest Law" has few changes compared with the original text fundamentally. The concepts of “forest" and "wasteland" which are different to it of the farmland in the revised "Forest Law" are completely similar to that of the original text. The afforestation development and reforestation areas planning also rely on the concepts of “forest" and "wasteland” which are used to classify the types of the land by a long time. People's Republic of China Forestry Law stipulates that the construction of the forest must be based on the forest operation, based on widely forest protection, vigorously afforestation and the combination of utilization and planting in order to keep a sustainable development.At the same time, the first paragraph of Article VIII of the law also stipulates that forest logging must be in a quota in order to encourage afforestation and increase the forest cover.

These laws of the promotion of afforestation co-exist with logging policies on the protection of natural forest. The change from using natural forest to artificial timber and the determination of logging rights both took place in August 2002.At that time, the State Forestry Administration adjusted the

artificial timber utilization management policies in order to meet the needs of the socialist market and the forestry development, to speeding up the change from using natural forest to artificial timber.The quota use of the forest resources has been changed to the permit system that is based of classification. The use of the forest resources should be further market-oriented and on the basic principles of technology and sustainable management and development .

(2 Use of the land

Lands to plant biologic energy forest and that of agricultural cultivation are not competitive with each other because of different division of the forest land.

In "People's Republic of China Land Law," the 14th article stipulates that the change of land from arable to non-arable by communities and individuals has to obain the approval of the people's government above the county level.

In "Land Management Law," the 36th article stipulates that the occupation of in the non-agricultural construction must be economical; if there are wastelands, the occupation of cultivated land is prohibited. Besides, the law prohibits the occupation of basic farmland to develop fruit growing and fishing.

12.1.2 Legal and policy framework in Jiangxi Province

(1) Afforestation planning

Similar to the national legal framework, the Forestry Law in Jiangxi has also given a great deal of attention on artificial afforestation.

According to the third article of "Jiangxi Forest Regulations" , the construction must be based on widely forest protection, vigorously afforestation and the combination of utilization and planting in order to keep a sustainable development .What is more , strengthening the forest construction in the hills , mountains and plains, as well as the establishment of forest ecosystems and forestry industry are included in the "Regulations". Article IV of the "Regulations" further pointed out that governments at all levels should organize the preparation of the long-term forestry planning in the administrative district,

and integrate the long-term forestry plan into the national economic and social development plan.

Governments at all levels should gradually increase the funding for the development of forestry and integrate the common forest compensation, forest fire-prevention, forest diseases and pests prevention, forest and wildlife protection, eminent tree breeding, scientific research and promotion of the forest and so on into the same level financial funds budget.

Governments at all levels should strengthen the lead of the forestry work. The official must clearly realize duties of the forest industry construction in his or her term of office, effectively managing forestry construction, including the forest cover, forest reserves, afforestation, forest fire prevention, forest diseases and pest prevention, forest land protection, wildlife protection and so on.

(2) Development of biologic energy forest

Jiangxi is the primary area of Camellia and one of the center areas of Camellia; the history of planting tea is over 2,300 years.The area of Camellia across the province covers a total area of 1120ten thousand acreage, accounting for 7.14 percent of the province's forestry land, 77.5 percent of the total Economic forest land, with an annual output of 50 million kilogram of tea-oil. The area of Camellia ranks the second; tea oil production ranks the second in the nation. In Jiangxi there are 45 counties (cities, districts) with the area of Camellia over 10 million acreage, 8 counties over 30 million mu and 147 towns with the area of Camellia over 1million acreage,200 villages with the area of Camellia over 5000 acreage.

After a long time practice of tea trees planting and sicentific research,Jiangxi Province has seleted 43 Camellia good clones producing 50 kg tea oil per mu ,which have passed the provincial cognizance .And 25 of the 43 good clones including "Gan No 1",selected by Jiangxi Academy of Forestry ,hvae got the state identification.At the time ,the Jiangxi goverment has construted four seedling cultivating bases including Jiangxi Academy of

Forestry,Asia forest center of the State Academy of Forestry,Ganzhou Institute of Forestry and forest trees seedling courts in Jingxian County.

The development of biologic energy industry in Jiangxi is in a state of backwardness.Betula trees have in a long history of planting in Yudu County, Jiangxi Province, and the planting technology is mature. The planting of this kind tree is more receptive to the masses and has a great potential for development.In order to develop the betula trees industry, the following four areas of work needs to be concentrated on. First, we should determine the Kuangtian County as the breeding base in the province, protect the existing seed-trees and set up files for these trees. All the seeds should be bought and sold by the provincial government. The collected seeds should be cultivated on the spot by setting up breeding base. We should do scientific research and comparison tests in different land types, different density , different methods of breeding and different fertilizer so as to further master the growth habits of the Betula trees; set up training bases in Kuangtian County so that the planting technologies can be promoted around Jiangxi by CDs.Second, enlarging the area of the light skin trees. In this way, not only can we increase of people's income,but also increase the green area.Third, finishing the provincial development planning of the light skin trees as soon as possible. In three years of time we try to achieve the target of 100 million acreage of cultivated area and introduce big companies like China National Petroleum

to invest on the light skin trees in Jiangxi.Fourth, the science and technology should support the development of Betula trees.

Jiangxi Forestry Development Events

Decades	Forestry activities	Details

Since 1991	Beginnng to develop the forestry industry by World Bank loans	The province has implemented three projects of World Bank loans, "National forestation Project", "Development of forest resources and protection of the project," "Poverty-stricken areas of forestry development projects," "National forestation Project" with a total investment of 237,169,000 yuan, of which World Bank loan 140,429,000 yuan, and supporting domestic funds 96,740,000 yuan; intensive plantation building 95,000 $hm^{2.}$.The implementation of the project help the province basically eliminated barren hills Yilin, breed back-to cultivate forest resources, alleviate the demand and supply of wood contradiction and increase forest cover. "Forest resources development and protection project" with a total investment of 198,038,100 yuan, of which World Bank loan 118,822,900 yuan, and supporting domestic funds 75,573,100 yuan; construction of fast growing timber and bamboo cultivation 52,800 hm^2. Until the end of 2000, the projects had completed the size of the total 60,600 hm^2. The implementation of the project have played a very good role model on the provincial party committee and government's goal which is made "A mountain of recycled Jiangxi Province" and "Cross-century green project" strategic objectives. "Forestry development projects in poverty-stricken areas" with a total investment of 303,824,800 yuan, of which the World Bank loan 166,000,000 yuan, domestic support 137,824,800

In 2004	Farm Land Back-to Forest Land Project	In 2004 the country had adjust the forest structural, adaptive for the task of Grain for Green Project, and the completion of task is 3,568,200 hectares in total(including Beijing and Tianjin sandstorm source projects 350,600 hectares), of which, farmland reforest 1,016,600 hectares, Yi Lin forestation of barren hills and wasteland is 2,551,600 hectares. Forestation in the area has created eco-forest, accounted for 80.84%, and more than 25% slope land cultivated land area of more than accounted for 40.06 percent. Completion of the annual grass area is 123,300 hectares. 12 western provinces and autonomous regions (including the Xinjiang Production and Construction Corps) completed a total of 2,064,300 hectares task of returning farmland to forests, returning farmland to forests account for a total forestation area of 57.85 percent. In 2004, cash grain farming 15,905,000 tons. Annual investment 23,574,000,000 yuan, of which food-owned discount 17,355,000,000 yuan, saplings 2,981,000,000 yuan.

In 2004	"Jiangxi Afforestation Project" Funded by the Japanese government	In 2004, full implementation of the Japanese government loan, "Jiangxi forestation Project" began. The total amount of loans for the degree of 7,507,000,000 yen, and supporting domestic funds with a total investment of 700,000,000 yuan, based on public participation, through the enclosure, alteration, upbringing, and other new ways of forestation, the development of shelter forest, timber forest, economic forest reach 219,000 hm^2. The project will not only expand the total amount of forest resources, improve the quality of forests, improve the ecological environment and increase their income, but also promote non-public forestry development, and promote forestry classification management reforms to improve the sustainable development of forestry in our province and promote social sustainable economic development. As of now, the completion of the forestation area reaches 171,000 hm^2, investment 380,000,000 yuan.

In 2008	"ONE BIG,FOUR SMALLS"Project of the afforestation in Jiangxi Province	According to the "Ecological Province, Green Development" strategy, we should protect the green ecological advantages, and promote the realization of farmers and increase forest coverage to 63% in the province. enhancing the effectiveness of the green hill, to speed up the pace of greening the foot of the mountain, especially in the seat of government, the county seat, the local forestation of towns, villages, farmland and forest green, green channel, industrial parks and green land mine exposed to upgrade the overall level of forestation, to build a full-featured, well-structured, effective significant forest ecological system, in order to speed up the construction of green Jiangxi and make new contributions to Jiangxi.

12.1.3 Forest property rights reform

The content of the forest property rights policy reform is "clear property rights, to reduce taxes and fees, to standardize the circulation, to relax operation" and "Who planted who owns, joint-planting joint-owning, reforestation makes wealth". Since 2004, the forest property rights have been very clear because of the reform; it has also fully mobilized all sectors of the community's enthusiasm for afforestation.

After several years of efforts, Jiangxi Province's forest property rights reform has been mainly completed in April 2007.The reform mostly benefits the forestry peasants. According to the forestry sector statistics, the forestry farmers in Jiangxi increase their incomes obviously in the recent years. The average price of timber is up to 50.42%, the average price of Bamboo is up to 79.47%,

Penny-foot in the major producing areas such as Tonggu, Yifeng, Fengxin bamboo which average selling price from 5-7yuan each one up to 16 yuan each one,have been more than doubled. Forest trees circulation price increases, the province fir circulation prices are from 500yuan each acreage up to more than 1000yuan each acreage,the highest is more than 3000yuan;the barren hills average annual flow price is from 17yuan each acreage up to 50yuan each acreage.The total economic value of forest of the province is 136,748,000,000 yuan before Lin change,after lin change is up to 203,256,000,000yuan, value-added48.6%.In 2006 the province forestry farmers income reached 490.7 yuan, value-added 32.5%.

Jiangxi Province's forest property rights reform has made progress in a certain degree, but it need to be strengthened so that the reform can be completive. The government must continue to reduce the taxes and fees in order to best benefit the civilians. All the legal taxes and fees have to been public to make the forest farmers understand and accept. Meanwhile the government must be supervised by the public to assure that the burdens of the farmers not rebound and increase.The work now is to deepen the reform of the management of forest harvesting, to supervise the transfer of the forest collective operation rights, to deepen the financing of forestry reform, to improve the social service system in order to help farmers make good use of the mountains, and operate the mountains.

The ultimate goal of the forest property rights reform is to make the mountains and hills more green, the water clearer, the farmers richer and the environment better. The principles are considering the economic, social, ecological efficiency entirely , giving top priority to ecological benefits all the time, and combinating the forestry ecological construction and industrial development.

12.2 Laws and policies about the women

(1) The national legal framework

To achieve equality between men and women is a basic national policy of China. China "Constitution" expressly provides that "women enjoy equal rights with men in the political, economic, cultural, social and family life." Since 1994, on the basis of the implementation of the "Law on the Protection of Rights and Interests of Women", China has promulgated "Law on Maternal and Infant Health Care", revised the "Marriage Law" and other laws and regulations, which were strengthened by the followed "China Outline for the Development of Women (1995-2000) "and" Outline for the Development of Chinese Women (2001-2010) " for the development of the real problems. These outline paid special attention to many issues related to the basic rights of rural women.

(2) Local legal framework in Jiangxi

Jiangxi government has taken similar measures in order to safeguard women's legitimate rights and interests and the equality between men and women. At the same time, the women can greatly make their contributions to the socialist modernization construction. According to the "People's Republic of China Law on the Protection of Rights and Interests of Women" (hereinafter referred to as the "Law on the Protection of Rights and Interests of Women") and other relevant national laws and regulations, combined with the reality of this province, the implementation approaches of the "People's Republic of China law to protect women's rights" was passed on February 22, 1994 in the eighth meeting of the VII Standing Committee of Jiangxi Province.In order to effectively safeguard the legitimate rights and interests of women and children, especially when dealing with the major issues and cases related to women and children's rights and interests, the implantation of the policy need a coordinated unit and all parts assume their respective responsibilities It can also promote the realization of the basic national policy of equality between men and women.

A joint meeting system to safeguard the legitimate rights and interests of women and children has been established in 2004 after the approval of Political and Legal Committee of Jiangxi Province.

13 Assessment of constructing biologic energy forest project

13.1 Project areas

13.1.1 The main features of the project areas

During the period of social Assessment, Jiangxi Forestry Department has selected 3 counties (municipal district) from 19 counties (city districts) in the region of Jiangxi to participate in the forestation projects in the county project, Suichuan County in Ji'an , Lichuan County in Fuzhou, Xiushui County in Jiujiang.

13.1.2 Land use related to this project

With the basic completion of the reform of forest right and the processing of consolidation, Jiangxi forest right conduct more thoroughly. Forest and other land use rights belong to all farmers, except the forest owned by the countries. The land use of the project mainly involves all of the forest owned by farmers. Due to the other cultivation activities in recent years, the remaining forest land that can be used for forestation owned by countries is few. The land of this project mainly comes from some of the barren hills, slopes and secondary or defective forest belong to farmers.

13.1.3 Poverty in the project areas

(1) Poor counties

Absolute poverty population in Ganzhou, Ji'an, Jiujiang, Shangrao, etc.of Jiangxi is more than 100,000. From the regional point of view, the rural poor population of Jiangxi Province is concentrated in south of Jiangxi Province, mainly in Ganzhou, Ji'an and Fuzhou, which account for 66.2 percent of the poverty-stricken population. Total number of 461,100 of the population account for 57.14% of the province's poverty-stricken population live in 21 key poverty alleviation and development counties. These poor people concentrated in the mountains, so they will be involved in this project. There are 30% of the village

inspected by the social appraisal team are poor villages. The per capita annual income of local residents is between 1000-2000 yuan. The main reason resulted in poverty of local residents is:

①It is located in remote mountainous areas and the areas are isolated with outside world, and lack of arable land.

②Frequent natural disasters lead to crop failures.

③ Lack of information, education and market caused by traffic inconvenience

④There are no technical and financial resources for the development of agriculture-forestry because of low production of the forest.

At present, most of the villages have highways. But the roads are poor; people can't pass through encountering rainy or snowy days; some villages do not have the roads. The administrative villages inspected have an access to transmission networks basically. Poverty still exists.

(2) Poverty alleviation policies

Poverty alleviation policies, including tax exemption and the promotion of local economic development projects. Since 2005, the country has exempted the 592 state-level poverty-stricken counties from the agricultural tax. Jiangxi Provincial Poverty Alleviation Office responds to the request of the state and the province, to focus on the five anti-poverty efforts: First, anti-poverty policy. We will resolutely implement the central and the provincial anti-poverty policy. By 2007 the province will ensure completion of the 50,000 population of the relocation task of helping the poor immigrants. The second is the development of poverty alleviation. We should put accelerating the development of poverty-stricken areas in the first place, by promoting the industrialization of agriculture, in particular the development and growth of agricultural industrialization leads enterprises to enhance value-added processing of agricultural products, leads

farmers to increase income. Third, getting employment of poverty alleviation policies. 21 countries focused on poverty alleviation and development counties should do a good job, every village must set up files of surplus labor, and after signed labor contracts with the park and companies to implement targeted training, to promote the transfer of surplus laborers on the spot. Fourth, mutual assistant poverty alleviation policy. To continue the departments, units and the poverty of the village linked to poverty alleviation. Fifth, community poverty alleviation policy. To organize the fund-raising charities and social poverty, to qualified enterprises to help poverty-stricken areas through the development of supporting industries, and other means to carry out poverty relief. Provincial Poverty Alleviation Office will strengthen the province's anti-poverty work in co-ordination and planning, combined with the length of further deepening and refining the program.

13.2 Project stakeholders

This chapter will analyze all stakeholders involved in the project. Because this project is the first biologic energy forest construction projects in Jiangxi Province, it is bound to run its operations and its causes and effects and to involve all aspects related to the project stakeholders at all levels of interest, so it is necessary to determine the framework for stakeholders. Table 13-1 and Table 13-2 respectively list the projects of all types of direct and indirect stakeholders, and the role they will play in the project.

13.2.1 Direct stakeholders

13.2.1.1 Peasant households

(1) Difference between different peasant households

Peasant households in the use of the term that seems to be misleading in Chinese, because it covers different situations the projects involved in sharp contrast to. In the project, the county's poorest farmers may live in extreme poverty in the villages, where are no ready-made land available for cultivation or no road for traffic. And at the other extreme is the large number of peasant

households, whether living in rural areas or living in cities and towns, they are individual entrepreneurs. Before committed to forestry projects, in their town or village they have a certain status. Perhaps they have the main industry in rural areas, or have industrialization in the town, or have got a job of the administrative staff. Between the two extremes, it is peasant households, which account for a large proportion, so-called "ordinary farmers."

(2) Difference in different participating ways

Almost all peasant households surveyed, that is, 99% of the total number of farmers have expressed their interest in participating in the project, but also showed their participation in different ways.

- Poor peasant household

Since they do not have the number of forestland under contract, in general the majority of poor farmers are willing to do seasonal work. Most of young farmers, as well as many of the smaller age of farmers living in mountainous areas, leave away from home to do the long-term or seasonal work. Engaging in forestation is a job that does not need too much tree-planting skill, so it is generally beard by the poorest members. Poor families and the less poor households have family members working outside their hometowns.

- Average peasant household

Planting trees is a traditional livelihood for a number of farmers especially those in the mountainous areas. In recent years, as other sectors of a part of helping the poor and women’s federation, an increasing number of farmers involves in forestation. Local forestry department provides free seedlings. When farmers were asked if they are willing to directly provide loans to invest in reforestation, answers are different: in the mountains, 90% of peasant households said they preferred to sign contracts with the company to participate in the production of co-operation arrangements;while in better development forestry counties of Jiangxi, more than 40 percent of the farmers expressed their

willingness to invest in reforestation loans, mainly linked to family-based forestation.

- Individual entrepreneurs

Generally they have been engaged in forestry operations in support of the local forestry departments and has a certain economic strength. Some of them were contracted to land as early as a way to engage in planting Betula trees, Camellia oleifera, cedar, etc.;having a certain amount of cultivation technology, they also had considerable experience in management. There is a lot of restrictions for them such as the lack of funds or loans to the poor way, and thus products output they grown is relatively low. These individual entrepreneurs generally carry out large-scale forestation, generally in the scale of 100 hectares to reach even more than 200 hectares. According to the survey data of social appraisal team, the well-off peasant farmers account for less than 10% of the total number.

Take farmers, or a village on the one hand, while enterprises, or forestry center, or individual households on the other hand; a variety of other forms of joint production arrangements have experienced the practice and the issue discussed in detail in this report showed in 13.3.

13.2.1.2 Village collectives

(1) Differences between different areas

Since the CPC Central Committee and the State Council issued "On advancing a comprehensive system of collective forest rights reform", Party committees at all levels in Jiangxi Province, from the strategic height and the overall situation, are fully aware of deepening reform of the forestry system of property rights of the importance of the difficulty and complexity. Treat resolving it as an important event of the "Three Rurals". Provincial, municipal counties establish forestry ownership system reform leading group and set up specialized offices; township to set up the Office of the property rights reform of the forestry system; to deploy capable personnel at all levels on the lam to do the

work. So far, in Jiangxi Province, forest right need to be carried out a more radical reform, while maintaining the same collective ownership of forest land under the premise of almost all the forest land contract and management rights of ownership of trees into farmers, the establishment of forest land rights of farmers as the main body of people, so that farmers really have the right to operate the woodland, forest ownership and disposal right and the right of the proceeds. After the reform forestland belonged to farmers and state-owned forestry. Collective village hadn't their own forestland. Therefore, village collective in the project mainly plays its organizing coordinating role and become the organizer and coordinator of project and company and the farmers.

Table13-1 Direct stakeholders in artificial forestation projects

Stakeholders	Assumed obligations and benefits
Peasant household	Generally farmers involved in the project to take land out of the company and form a joint venture to participate in the project, and in a certain timber sales after dividends; timber sales after dividends is a generally accepted model of forestation. In addition, there are a part of farmers to organize themselves, to focus on the merging of forestland to form a joint group to form a focus on merging forestation.
	Some farmers take part in the European bank loans projects for forestation and reforestation upbringing as seasonal workers in order to obtain services revenue, but also to learn some techniques.

	Forestry professionals are individual economic entities based forestation as the main industry. Generally such economic entity is a unit family; there are a few people of the partnership. Some forestry professionals have a small forest, certain funds, which generally as a way of land and capital to participate the European of bank loans for forestation projects.
	Breeding professionals earn money through their cultivation of seedlings for sale to the European bank loans involved in reforestation projects
Villages and villagers group	Village collective in the project mainly plays its organizing coordinating role and become the organizer and coordinator of project and company and the farmers.
The County Forestry Project	Forestry Bureau of the project County will be a backbone of smooth implementation of the project in Jiangxi. Forestry Bureau by in the county level will directly operate the activities of project. County level forestry departments make more use of macro-guidance and policies regulators as part of European banks, and become the organizer and coordinator of project and company and the farmers.
Township forestry station	Township forestry station is the agency directly related to the township government and the villagers on behalf of forestry departments and the administrative villages. The township forestry stations will shoulder as raising technical guidance, quality inspection for forestation and reforestation in European bank loans projects.

The implementation of the project's state-owned forest farm (or joint-stock cooperative forestry)	Forest farm project will be the main operator of the project, the European bank loans for forestation projects for the most grass-roots also; a major force between farmers and forestry in the joint venture to create a bio-energy forest was selling the profits of forest products. Forestry has taken place for relationship between forest farmers compensation for the use of the reforestation and forest management, forestation to hire farmers, raising and management of forestry projects run by the county under the direct management of the project

13.2.1.3 County forestry bureau

(1) Multiple effects

As the main agent in county-level forestry, the county forestry bureau generally implements a series of large-scale forestry projects, including forest ecological projects, or timber projects. At the same time, the county forestry bureau in all matters relating to forestry, from policy to economic activity, is important stakeholder. Biologic in the forest plantations, the county forestry bureau has played a coordinating role mostly and provided access of the analysis to participating in the project villages.

Material 1: Feedback of county forestry bureau

When the social appraisal team were having a discussion with the county forestry bureau, the Forestry Administration found that the forest biologic energy projects will be beneficial.

(1) The funds of project construction can solve the shortage of funds for local forestation

(2) The implementation of the project will be taken to scale forestation and intensive management measures so as to effectively enhance the quality of the forest and timber production per unit area.

(3) The promotion of local nursery stock bases and biologic energy-related industries.

(4) In the implementation of the project site preparation, massive labor force is needed in planting, tending, fertilizer, management, etc. It provides a channel of employment for surplus labor, thereby increases the income of farmers.

(5) The implementation of the project will prohibit the bad habits of slash-and-burn farmers in the project area, so as to reduce soil erosion, then effectively protect the environment.

13.2.1.4 The township forestry station

Township forestry is standing between the villagers and township governments, playing a role as a bridge between the villagers. Each township forestry stations in general has 3-4 staff. Most of them are graduated from the professional forestry college or schools and have extensive experience in the country.

13.2.1.5 State-owned forest farms

State-owned forest farms in Jiangxi Province are the focus of forestry stakeholders. Each forest has a number of professionals graduated from the forestry colleges or schools. These technical staff had advanced science and technology for forestation, skilled hands-on skills and a wealth of experience in resource management. State-owned forest farms participate in the forestation project through the form of the village or individual forest owners in a joint operation.

We can see that these economic reforms of the forest farm have been intensified through the study of forestry ownership and management system. State-owned forest farms generally adopt a multi-polar system and introduce groups or individuals to carry out a joint operation with forestry organizations. All of the existing stock of state-owned forest farms remain the same, but the maintenance of public management in addition to some of the dominant, diverse

economic sectors are also under development at the same time. State-owned private way, the system of shares, or a mixture form of these two approaches, and so on, are all included.

13.2.2 Indirect stakeholders

Table 13-2 Indirect stakeholders in artificial forestation project

Indirect stakeholders	Assumed obligations and benefits
Jiangxi Forestry Department	Jiangxi Forestry Department is the highest leader in forestry and forestry management. It is the representative of the Government of Jiangxi Province to formulate the region the forestry development planning, to organize and implement the forestry building activities, and macro-manage the nature reserves, forestry enterprises, township forestry stations, state-owned forest Farm, and the collective forest. Jiangxi Forestry Department projects office will do the implement macro-management of European Investment Bank loan to create a biologic energy forest projects and have the responsibility and obligation to urge the parties to repay. As the guidance of macro-policies and part of the bank's project managers, Jiangxi Forestry Department becomes the organizers and coordinator of the company and the farmers.
The projects county government	County-level People's Government is the local government agency between the range of city (level) and township government. Their participation in the European investment biologic energy forest projects is mainly through legal and policy organizations, companies and farmers to participate in forestation; the projects county government bears the main project loans, and then transfers the loan to the county forestry bureau; forestry departments at the county level are subsidiaries of the county government,

	which has the responsibility to supervise the implementation of the work and the quality of its supervision of implementation; to provide raw materials for the local wood processing enterprises in order to receive the tax revenue and promote the development of county economy.
The projects county Planning Commission	To make the county's main development plan; to coordinate the work of forestry with the county forestry department and the relevant council;to participate in the preparatory work, organize and guide the owners and farmers to participate in this project
The projects County Agricultural Bureau	Forestry Bureau provides the land use situation and the implementation when selecting the project village, and provides technical services of animals and planting grass in European Investment Bank loan to create a biologic energy forest projects.
The projects county National Bureau	To provide details of minorities when Forestry Bureau choose the project villages; to combine the project of the bureau of national implementation with the European Investment Bank loan to create a biologic energy forest project; with forestry in the project area to mobilize and organize the minority villagers to use the resources, labor, capital, etc. To participate in funding projects such as cooperation in the project area and in accordance with the characteristics of minority guidance to address the issue of cooperation in forestation, protecting the legitimate rights and interests of ethnic minorities
The projects county Women's Federation	To provide detailed information on women while Forestry Bureau in the choice of the projects village;to

	combine the project Women's Federation implemented with the European Investment Bank loan to create biologic energy forest projects; with Forestry Bureau to mobilize women's participation in the project
The projects County anti-poverty office	To provide details of helping the poor when Forestry Bureau in the choice of the projects village;to combine the project t anti-poverty office implemented with the European Investment Bank loan to create biologic energy forest projects; with the forestry sectors through reforestation activities to help the poor performance to fulfill the duties
Township government of implementation the projects	In China Township People's Government is the most grass-roots the political institution power. In the European Investment Bank loan to create a biologic energy forest projects it will be the main organization to help the county level people's government, forestry and rural households to participate in forestation; to provide the details of the administrative village when Forestry Bureau in the choice of the projects village; to combine the project township government implemented with the European Investment Bank loan to create biologic energy forest projects; to mobilize the administrative villages involved in the project; supervising the project's quality of the administrative villages in the implementation
The projects county Village Committee	To coordinate the ties of village and county forestry bureau, forestry and the company, to organize the villagers to participate in forestation and fostering. Some of the village put the full barren hill as a (share) in forestation with forestry and companies for co-operation

Farmers in the project area who did not participate in the projects	Farmers in the project area who did not participate projects will acquire methods, experience and technology through the demonstration in the projects area .
Farmers around the projects county	Farmers around the projects county will acquire methods, experience and technology through the demonstration in the projects area.

13.2.2.1 Jiangxi Forestry Department

As the highest leadership body in Jiangxi Forestry Services, Jiangxi Forestry Department is under the leadership of in the Jiangxi People's Government. It’s responsible for the development of the Jiangxi Forestry Development Plan, organization and implement forestry-related projects, including artificial timber plantations, forest management and forest products, biologic energy forest, nature reserves and so on. Since the beginning of 1991 starting the implementation of the bank's project, the province has carried out three loans from World Bank, "National Forestation Project", "development of forest resources and protection of the project," "poverty-stricken areas of forestry development projects," a Japanese government loan, " Forestation Project in Jiangxi Province". Three World Bank loan projects have been completed; the Japanese government loan "Jiangxi forestation Project" is currently being implemented.

13.2.2.2 County People Government

The county government has the responsibility to supervise their subordinates as institutions at the county level forestry departments to implement the various tasks and supervise the quality of their work. Mainly through organizing company and farmers the county government participates in this project

13.2.2.3 Township People's Government

Mainly through the township government to help the county government organizations, farmers, forest in order to achieve co-operation contract in the form of forestation and reforestation projects are involved. Township government has the power of carrying out propaganda and mobilization.

13.2.2.4 Natural reserve

Natural reserve management has not only the construction and protection of the nature reserve duty, but also has the responsibility to help and organize peasant communities around the natural reserve to develop production and increase farmers' income without affecting the natural environment and natural resources in the region under the prerequisite. The technical and managerial capacity of natural reserve management staff in the project can play a coordinating role. According to the nature conservation management, this project does not involve in natural reserve.

13.2.3 Farmers involved in the example of the interest (in the village to participate in the meeting)

During the investigation, the social appraisal team found that the farmers participated in this project with the high enthusiasm after aware of the purpose of the project, as well as the conditions for participation in the request. Although the present-day Chinese farmers generally do not want to participate in the meeting in the village, the representatives of the villagers meeting the social appraisal team convened had attracted a large number of farmers to participate in.

Successful factors of the convention:

Before the initiation of social appraisal, the county and township governments, forestry and so on of the project made a great deal of publicity and noticed of the local farmers to participate in the evaluation of the social forum in advance. They have done a great deal of organization for the project evaluation of the social forum, which allow for discussion of the project smoothly.

The use of participatory rural assessment "(PRA) made farmers and other key stakeholders have been more comprehensive understanding on the project's objectives, content, operational procedures and the provisions. Especially poor farmers in mountainous areas of poverty-stricken counties show particular activity. Village cadres and farmers have committed the greatest enthusiasm for forestation activities and looked forward to an early start of the project in the urgent requirements.

Materials 2: example of farmers' participation interest

In Huangbei village and Heyuan village in Heyuan township of Suichuan County, the conference room was packed with villagers participated in village convention for delegates. Some villagers had to stand outside to attend the meeting.

Village party branch secretaries of Huangbei village in Heyuan township of Suichuan County said to the members of the social appraisal team: "A part of our villagers have participated in the Phase I and Phase III of World Bank loans for forestation projects, from which they tasted the sweetness. Other villagers also wait for the opportunity. It benefits the country and people to participate in project activity; therefore, it has many aspects of impact on improving the local ecological environment and increasing the income. "

13.2.4 Discrimination aganist the vulnerable groups

13.2.4.1 Poor communities and poor peasant households

The social appraisal team concluded that people involved in this project belonged to vulnerable group, which was slightly higher or slightly lower than those living in households below the poverty line. Many of these communities, farmers would participate in forestation projects, they were vulnerable to certain major shortage of funds, didn't have enough money for forestation, and poor technology and management, poor anti-risk ability. It is hard for large state-

owned forestry and company to sign a cooperation forestation contract with them.

13.2.4.2 Seasonal workers

Since the mid-1990s, China has removed the restrictions of migration step by step. A large number of poor farmers accessed to the opportunity of non-agricultural jobs. With the recent reform of the forest assigned to farmers, plantation forestry has been greatly developed; demand of foreign seasonal workers increases; many farmers in poverty-stricken areas go outside to serve as seasonal forestry workers. The social appraisal team also covered these seasonal workers in forestation spot of Jiangxi reservoir repair group. These limited surveys provided this information: forestry provided opportunity to these farmers with non-forestry skills. And seasonal workers agreed that the danger of work is not high compared to the coal industry, although living and working conditions were hard. At the forestation site near the city, seasonal workers may be able to access to health care services more easily compared to workers at home, but they generally lived in tents, faced with the risk of animal attacks such as poisonous snakes, wild boar, and so on.

13.2.4.3 Women

In rural households surveyed, 56% of the families the important affairs were by the husband's decision-making, 65% of the families were by the husband and wife co-decision. For such a number of issues: " Who is going to master the affairs retention of domestic mountain forest planting trees," and "Who owns the use right of the family retained forest land," and "Who will take part in forestation", "Who will go to participate in forestation technical training "and" Who is in charge of the harvest of the forest-products", etc. Only 1% of the farmers' families answered these decisions were made by the husband, and 98% of the families made these decisions by the husband and wife together. These findings indicate that women in the family enjoy a high status. Gender factor will not be directly involved in the project evaluation matters. At the same

time we should also note that women account for 40% in the total number of seasonal workers in some places.

13.3 Production arrangements

The phrase “production arrangements”(or forestation management modes) refers to the planting of various types of personnel involving in analysis of the system on the property and/or participate in reforestation personnel, or business and local stakeholders in a contract between the people on the institutional arrangements in Chinese. According to the requirements of the project design team, this chapter gave a detailed assessment on the current practice, as well as the potential "production arrangements" (that is forestation management modes) in the future.

13.3.1 Current production arrangement

Long-term lease of land in the late 1990s has been very common. Although there is a simple phrase: "Company & Farmer" refers to such contractual arrangements, but in fact the form of contract is various. The main tendency in most of the people of the projects is the forestland lease model ; farmers refer to any non-corporate or non-forest, and that is individual farmers.

Type A. "Company & Farmer"

Forestland lease: It is more common today. Not because of any risk, but to guarantee a stable income, although the `income is not high, so farmers tend to compare this mode, especially in a large number of poor mountain land.

Type B. “Forestland & Contractor & Farmer”

This mode is a bank loan to the forest, and then on-lending loans to the contractor (Generally field-based employees) to the base for forestation County farmers to rent land for forestation. The contractor sold the wood products to the processing plant, such as Camellia oleifera and bio-diesel preparation processing enterprises, which owned by forestland. After the income, debt service deducting from the cost of production (including payment of rent farmers), the contractor and the Department of the market share in profits, according to a

certain share of proceeds. Loss is beard by the contractor and the department of market together. From this mode the contractor can get the bulk of the proceeds, sub-forestland. The farmers haven't many gains except rent income.

Type C. "Forestland & Forestry Bureau & Farmer"

In this mode, the specific operation is that forestland and forestation County forest sign a contract to get the land use right, and then Forestry Bureau of the base of the county sign a contract with the village's farmers involved in the project to obtain forestland. The Forestry Bureau will contract out to forestland planting tree through signing the contract. Forestland put money into it, and is responsible for management and protection of forestation. After acceptance checked eligibly, the land is handed over to Forestry Bureau. The two sides divided the profit by a certain percentage. Such cooperative forestation mode is more reasonable for the sharing interests of the business and the farmers. The counties and the farmers on investigation have no interest in this forestation mode on the whole.

Type D." Professional & Farmer"

This is also is a rare forestation cooperation mode currently in Jiangxi Province. Professionals generally have a stronger sense of responsibility and assume sole responsibility for its profits or losses. However, the profit is mediocre because of the lack of capital and technology. In general, there are two co-operation forms:

(1)Joint-stock cooperative system. Shareholders contribute jointly, commission professionals to manage, or co-managed. They share in profits according to the shares of stock.

(2) Professional & Farmer. Such cooperation can be a simple way of the land lease; that is, farmers remise forestland in order to get the rent, wprofessionals put money and management into it. All of the trees belong to professionals. Or take " Joint-stock cooperative system " approach, that is, the farmers bring in business by forestland, while professionals become

shareholders by bankroll and management. The profit of cooperation forestation is prorated.

In the period of social appraisal, other possible methods are also discussed.

(1)"Satellite" forestation

In such mode, through loans or non-loans to support and help neighboring farmers carry out small-scale forestation in their own land according to the contract forestation enterprises as the core area. At present, such mode of forestation is adopted, but farmers interviewed have little interest in it.

(2) The joint between farmers

A number of farmers join together, particularly in joint management and protection. The project is accepted by a number of farmers, especially in the Counties who have better reforestation, for example, Suichuan.

The survey results show that a small percent (about 10%) of farmers want to participate in forestation through loans, which takes joint family forestation mode, particularly in the Counties who have better reforestation, for example, Suichuan. But most people (about 90%) agree on "Company & Farmer". Farmers lease forestland and forestland is operated by the company, which is more common today. Not because of any risk, but to guarantee a stable income. Therefore, farmers tend to this mode although the income is not high. The farmers were interviewed summed up the beneficial aspects following contractual production arrangements:

Farmers get certain "shares" through selling land use rights rather than in the form of investment. Company and forestry center invest capital and technology. When forests were cut, farmers can get their share of the profits.

Farmers do not have to bear any risk associated with loans, and forestation technology will be guaranteed.

Such arrangement makes large-scale forestation possible. The quality and the economic benefits of forestation are guaranteed.

Farmers are still able to give attention to their farmland in the agricultural season.

Farmers can plant forests on self-contracted barren hills overall.

Farmers can learn practical forestry production technology through technical training provided by the forestry sectors in the process of project implementation.

The project can attract a passel of farmers who is working outside for years to participate in forestation activities.

The projects can give an impetus to related industries (transportation, processing, marketing, etc.) and provide a great deal of job opportunities.

The forest constructed by the projects can provide a good ecological environment for local communities.

Materials 3. The poverty situation of Large-scale forestation area

The branch secretaries in Huangbei Hamlet, Heyuan Village, Suichuan County, said to the social appraisal team, that the village had a more of woodland and forest, most of the labor force was dived into management of the forest by villagers. This not only takes care of the family's agricultural production, but also gains income from forestry operating. Even more, it avoids hardship away from home.

13.4 Analysis of the risks and opportunities

13.4.1 The main risks of the negative impact

(1) Should general farmers loan?

This is a question often encountered in the social appraisal process. Both ordinary farmers and poor farmers all show the most substantial concern for loan individuals invested in reforestation. The construction of biologic energy forest is a project that can bring a benefit in various aspects (economic, social and environmental benefits), but at the same time it has also project possesses various risks (risks caused by technology and management, market risks, natural disasters, risks caused by fire or insect plague, etc.). It’s a danger for farmers

that they can't repay the loan, if they are still struggling for dressing warmly and eating their fill, for example, when encountering natural disasters. Based on several reasons as follows, this is a problem that need to be carefully considered, especially for the villagers in poverty-stricken areas:

In the field of forestation, a certain risk does exist. At present, companyies and forest centers are very interested in forestation in the remote areas. But there are still variables in the future.

Local villagers used to set fire to the hill for the land, which easily causes fires burning biologic energy forest nearby.

Local communities and farmers may not get adequate technical training, as well as the timely supply of materials and repay principal in a timely manner.

Farmers may be encouraged; such circumstances occur from time to time at present - to expand the scale of forestation inappropriately.

(2) Restrictions of the prospect of farmers planting

On the contrary, such situation should also be noted that presently institutions at all levels strongly advise farmers, including those who are in better areas and have expressed the desire of loans, not directly to loan but to participate in the joint enterprise cooperation in forestation program. One of the reasons may be that many farmers applied for a loan in prior period of World Bank-funded forestation projects, but the loan can't be returned eventually. The situation is the result of the following two factors:

(a) Forest they planted may be designated as ecologic forest, so they can not get cutting targets.

(b) The loan amount they were encouraged to apply for is too large.

This situation will make farmers give up the loan aspirations of the project;and that will further shrink much of the woodland areas retained by farmers which are already not too many.

Materials 4. Farmers' views on their own loans

Farmers believe that they will face difficulties in the following areas if they loan for reforestation on their own:

(1) It crops once one year when farmers plant sugar cane, corn and mulberry, and foster silkworm, and some are even a few times cropping a year. But the planting of biologic energy forest needs five or six years before harvesting. Forestry productivity gains slowly so it isn't worthy of invested.

(2) Risk is very high. It's very difficult for individuals to bear the burden caused by forestation failure or fire, storms, blizzards, as well as all of a sudden family illness, etc.

(3) The lack of forestation and management techniques.

(3) Contract with enterprises

Existing contractual relationship with the enterprises shows two types of problems. First, there was a lack of transparency. Villagers and farmers can't understand the accounts of income and expenditure. Perhaps the contract itself is not clear, so that it leads to the uncertainty caused by the distribution of benefits or deductions. The contract between enterprises and farmers should be computer programmed; this is likely to increase the transparency of some. The second is in remote poverty-stricken areas the communities and farmers are lack of market information, such as the price of rent for the land, which makes them weak when negotiating contract.

(4) Land use rights

At present, land lease is widely used. In the social appraisal process, the poor villagers told us that they chosed to lease the land because it could bring income safely and early. But the problem is that the period of land lease is very long. Companies generally will not lease the land for less than 10 years. Assessment shows that the land lease is the land use rights transferred from farmers to enterprises in essence. The current general term is 50 years. In

addition, at the present time, China is different from many other countries in the world on forestland use rights. The use rights can not be used as collateral security official from the Chinese national banking system to get loans; the banks may accept live forest as the mortgage of granting loans, but they do not accept the expedient use of the land. During the implementation of the project or after the period of implementation of the project but in prior to the termination of the land lease period, perhaps this case may change. If such changes occur, by then the official land use rights and the collateral is still in the hands of the company. This situation should be assessed as a potential risk of the project.

(5) Seasonal worker

Due to the lack of basic facilities, poor men and women live in poor living conditions of the site during tree planting period. Sometimes they will encounter poisonous snakes, wild boar, and other animal attacks; their health is seriously threatened.

(6) Competition between forestation and stockbreeding

Some of the projects counties have a high degree of forest cover. In some counties, it is already part of the farmers grazing land or even all of forestation sites of the planning project. In poor mountain districts and counties, animal husbandry has flourished as a livestock to improve the living conditions of poor farmers out of poverty. However, if forestation occupied the farmers' ranch, there would be a negative impact on forestry preventing the development of stock raising.

(7) Social differences

The living standard of the villagers participating in the project will raise, and the income gap between them and those who did not participate in the project among the destitute families will likely to pull more; so the potential risk is the conflict between the project villagers and non-project villagers,and possible conflict between different villagers.

(8) Seedling issues

According to the existing experience of Camellia oleifera and naked-cortex trees, the existing variety of Camellia oleifera is aging; rate of fruit production is very low; the shortening technology of naked-cortex trees needs to improve. Seedling issues is a key point of forestation. The seedlings will have a direct bearing on the latter part of effectiveness. The shortening technology of naked-cortex trees belongs to the technical aspects. Forestation technology will cause follow-up problems if it can't be improved. This is also the potential risk in the process of planting.

13.4.2 Opportunities offered by positive impacts

A viable project, by definition, should bring economic benefits to local stakeholders. In chinese feasibility report it has been referred to as "social benefits." The construction of the project improves forest cover and the ecological environment, and provides employment opportunities in rural areas and increases their income and promotes local economic development to have a positive impact. This chapter will analyze on the positive impact of the project likely to further enhance the opportunities.

(1) Participation

China before all the artificial forestation activities regardless of the decision-making, planning or design, are the "top-down"; that is forestation decision by the leadership of the scale, from planning and design departments to carry out forestation design, including the planting of trees, place and time. That is in the planning and decision-making process which did not seek the wishes of local farmers, did not take the needs of local communities, so was lack of active participation of farmers.

The forestry sector in forestation planning and design often do not have a close relationship between the forestry department of agriculture, water conservancy, environmental protection and other departments to coordinate. Without the support of relevant departments in a number of forestation

projects ,they seldom havecomprehensive benefits. In contrast to the past, currently the project planning and design can be more in line with local needs.

(2) Technical capability

This project will be to enlarge the capacity building for local communities and farmers to provide training opportunities that expand opportunities for the target audience. Including women, the staff will receive training to enable them to participate in forestation. To mobilize more farmers and the surrounding villages to participate in this project is a good way of expanding the scope of benefits, and reducing the interest conflict between the different villiages.

(3) Economic management skills

It is necessary to enter into a commercial contract with the local communities and farmers to carry out economic management training to enhance their business and other stakeholders and the ability to interact so that they know more about the market. The project's ability training can make a meaningful contribution.

(4) Road construction

Forestry and forest areas need to widen the roads and major highways and roads, but the plan generally have to wait until mature trees to be felled for the time to be implemented. This is a good opportunity to improve the area's traffic situation. The broad forest road near the community can be more conducive to the improvement of traffic conditions.

13.5 Proposals on project planning and design

(1) Up-to-date participatory process yet to be designed

The key of all proposals is to allow the projects county and farmers to participate in the project. A participatory design guideline should be constituted for biologic energy forest. The guide should be ready for the next phase of the project through technical assistance to the development and planning. The key elements of procedure should be:

Open and transparent information; different views in the open discussion of the contract should be given adequate opportunity to express and to the communities and farmers to set aside sufficient time to enable them to make a final decision.

Taking full account of local people's views of choosing tree species.

Dividing grazing land before forestation design.

Organizations should have public information, particularly land-use contract-related information.

Helping communities to improve their existing rules about forests, such as specific measures about the promotion of resolving the conflict.

(2) Set clear measures to guarantee public access to information

Even if Forestry Bureaus at the county level successfully complete responsibility for the project,with a high degree of community involvement, they are still not a "third party". On the contrary, they are the direct stakeholders, and local staff may not have the ability to provide information and training for the community. Project requires a new and innovative way to ensure that vulnerable communities in remote areas have the same access to information about the construction of biologic energy forest. A training program should be formulated in the capacity building which can combine information service and financial management skills training. The social appraisal team positively recommends to forming an independent or semi-independent entity, such as a way of commissioning one institute as a contractor to carry out the above-mentioned activities. A comprehensive classification of information is also planned, then provided to the farmers and villagers through various training teacher. In addition, the community or farmers should get information by contacting with the college directly.

(3) Several measures for alleviating loan risk of farmers

Farmers who have the abilities and the wills can individually or in combination apply for a loan for project. In order to avoid the risk that they

cannot return the loans, experts of project design group on loan should adopt a series of special measures as follows:

- Set up the maximum loan limit in a reasonably low level for individual professionals and change the past practice of lending large sums.
- Ensure the timely provision of technical services.
- Provide grass seedlings simultaneously when providing tree seedlings.To encourage small-scale forestation individual to retain a degree of diversity management, combine the planting of trees and stockbreeding to reduce the risk.

(4) Diversification of production means (forestation mode), as well as non-long-term arrangement. At the same time not allow to transfe land use rights in the process of leasing land.

The social appraisal report support a diversity of the production methods (forestation mode);the information should be open and public.It requires to present a separate strict version in the land lease contract.And it should be as the following:

- The maximum duration of the contract should be stipulated.
- In the life of the contract,the value of the land approved by the contract should be re-approved on a regular basis,for example once every 6 years.
- It is not a transfer of land-use rights from communities or farmers to the enterprises to pay an annual rent of land. When the contract is terminated, either the normal or the termination because of the bankruptcy, farmers or community must have the right to recover the land use rights.On the contrary, particularly in poor rural areas, the contract should stipulate the land-renter provided land rent in advance every year.

(5) The fee to improve the living conditions of seasonal workers should be listed in the the economic and financial budget.

The fee to improve the living conditions of seasonal workers should be listed in the the economic and financial budget. It should also include the cost of appropriate medical expenses, as well as expenditure for setting up simple health facilities and so on.

13.6 Project monitoring

(1) Cognizance on the farmers in the monitoring system

It is difficult to distinguish individual professionals, small-scale planting farmers, as well as benefit sharing and non-benefit-sharing, and so on who have handled all loan applications in the monitoring report. But it is very necessary to recognize farmers who gain benefit..

(2) Computer program

As to the cases of the contract of the villages and farmers involved in the project, computer programmed monitoring system should be adopted in order to make it is more transparent and to increase the flexibility of the implementation of the contract.

(3) Monitoring the risk of social impact

A special mechanism need to be set up so as to reduce the potential risk on the issue of land use and signing the forestation contract, as well as on the issue of resource using constraints.

14 Summary of the implementation of the social assessment report

14.1Methods

14.1.1 Social assessment methods

During the design period of Jiangxi biologic energy forest demonstration projects, an independent group had finished a social impact assessment with the assistance of the Forestry Department in Jiangxi Province. The work began in July 2008. In September 2008, the draft report was worked out after revision according to the group of experts' recommondations.Jiangxi biologic energy forest demonstration base construction project is the first forestation project of European Investment Bank in Jiangxi, which includes social impact assessment.The social impact assessment uses participatory methods, training grassroots cadres , widely distributing promotional materials in the project areas.

14.1.2 Social activities and forms

Four experts involved in the Jiangxi biologic energy forest demonstration project base reached 10 villages of 3 project counties,making survey with farmers, forest courts, relevant government departments and companies.

In the survey, experts had an informal discussion with forestry workers, farmers, village cadres, county government departments, forestry units, the principal of the company. County-level working Group made a similar investigation on social assessment projects in other areas, completing survey to about 150 farmers.

14.2 Analysis of the project beneficiaries

14.2.1 Participation of farmers

The detailed analysis shows that:

There are few farmers who directly use the loans for biologic energy forest construction;they are mainly some of the better-off farmers or individual employers in remote counties. In the poverty-stricken areas, farmers involve in the project by land lending or being seasonal workers. In relatively affluent

counties (for example,Suichuan County), nearly half of the farmers are interested in self-planting by loans, agreeing of the basic mode of families forestation together.

14.2.2 Joint venture arrangements

In Jiangxi, joint forestation between farmers or village and enterprises have a long history. In this project, the scale of the joint venture is increasing, and more and more commercializing. The central question now is not to transform cooperation forms of the project by the project, but to improve the transparency and justice of contracts that the vulnerable rural households make in the project.

14.3 The definitive main risks and opportunities

14.3.1 Overview

The negative impact and positive opportunities of the construction of biologic energy forests in Jiangxi was analyzed ,and a series of positive impact of project monitoring and evaluation have also been identified. The details are shown in Table 14-1.

Table 14-1 The construction of biologic energy forest in Jiangxi

Negative social impacts and risks	Opportunities
1.Due to communities and households' limited ways of understanding the project and their poor business abilities, they often act not enough professionally when negotiating coordination with the companies. 2.The poor transparency the joint venture enterprise contract transparency, and the farmers' not enough understanding of the contract, may lead to unfair benifits division.	1.The communities' bargaining and management capabilities will be improved through capacity-construction. 2.It can provide employment opportunities for the rural areas and increase their income and living conditions. 3.The project will promote local development obviously. 4.The project management and

3.With the growing size of the land rental, farmers will no longer participate in the project lack of land if the government came out relevant reform programs continually. 4. Farmers are concerned about their loans achievement. Few farmers directly participate in the project, which may result in the reduction of small-scale forestry in the next step of forestry development. 5.Communities or rural households have credit risk; they may not get enough technical support to manage the forests. The private companies may account for a larger share of the loans. 6.Forestry and stockbreeding will compete in terms of land use. The project will reduce the opportunity to develop stockbreeding in poor communities. 7.In accordance with the existing experience of Camellia oleifera and naked-bark, the quality of nursery tree needs to enhance. Poor nursery tree quality may have negative impact on the late production.	construction are very good. Farmers have high enthusiasm and great interest in planting, which paves the way for farmers to participate in reforestation. 5.The roads built for biologic energy forest will connect with the existing roads network; 6.A large number of farmers will have the necessary technologies through capacity construction; 7.To improve forest cover and the ecological environment.

14.3.2 Capacity construction, project monitoring and evaluation

Table 14-2 Capacity construction, project monitoring and evaluation

Negative impacts and risks of society	Opportunities
1.The monitoring system failed to distinguish between different farmers to participate in different business modes and the distribution of benefits.	1.To develop non-technical information and training programs for the community cadres and enhance the community's ability to negotiate with large enterprises for the joint venture; 2.The computer system will provide accurate data for the number of beneficiaries of the monitoring project and promotion of rural households involved in the project.

14.4 Proposals of the project design

Detailed proposals on the biologic energy forest projects were made on the description of the proposal, as is the following points:

14.4.1 Participatory design

The key to all proposals is to let county projects and farmers to participate in the project design. A participatory design guideline should be made for forest biologic energy. At the time, the detailed design of the participatory forestation should be paid to the project county prior to the forestation project.

14.4.2 Information publicity and capacity construction

We have identified a number of departments and non-technical training to increase the business community and the transparency of the contract, so that communities have the ability to participate in the contract to create biologic energy development. Construction of biologic energy forest also needs to be enhanced. It should invite the local forestry department of information and outside experts who were involved in these activities. Ideally, there should be a semi-autonomous unit to provide information, such as forestry and Design Institute to do the design and delivery of information.

14.4.3 Land lease

During the construction of biologic forest, we need to take a series of measures to reduce the risk of leasing the land. With particular emphasis on: in the project, land use rights will not be able to transfer for commercial operators in any land lease contract.

14.4.4 Farmers' participation in the project

For all the forestation projects, the challenge is to allow farmers maximize the participation,to develop a more appropriate contract for the poor farmers. For example, the contracts for which the company need to pay every year, including technical support contracts for farmers, and so on. Design the loan program to allow farmers to participate in the loan with low risk.The monitoring program should include the monitorings of the number of farmers, the actual loan amount and modes of joint operation.