Guangxi Rural Poverty Alleviation Pilot Project

Environmental and Social Management Framework

Guangxi Foreign Capital Poverty Reduction Project
Management Center
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Introduction

The World Bank Loan Guangxi Rural Poverty Alleviation Pilot Project is large integrated poverty reduction cooperation between the Chinese government and the World Bank, which has been included in October 2014 in the National Development and Reform Commission (NDRC) and Ministry of Finance (MoF) ´s 2015-2017 World Bank candidate projects.

The proposed Project covers 10 counties in Baise and Hechi Cities. They are: Tiandong, Tianlin, Leye, Donglan, Bama, Fengshan, Dahua, Du´an, and Pingguo County, and Yizhou City (county level city). All of the selected counties/city are characterized by a particular high level of poverty combined with poor natural resource conditions, difficulties in water management, limited availability of farm land, low levels of technology and a high percentage of ethnic minorities. The objective of the Project is to *increase income opportunities for rural households in selected poverty counties of Guangxi.* This would be achieved by piloting innovative organizational arrangements. The total proposed investment is RMB117273 0000 Yuan among which US $10000 0000 will be loaned from the World Bank. The Project includes four components : Increasing Poverty-Oriented Value Chains; Improving Public Infrastructure and Services; Increasing Investment in Poor Areas; and Project Management, Monitoring and Learning

Implementation of the proposed Project is in line with China´s and Guangxi´s relevant policies. Since December 2011 when the Central Government promulgated and commenced China Rural Poverty Reduction and Development Program 2011-2020, the number of poor people of rural areas has largely decreased and infrastructure and services in poor areas have been improving, and as well economic development and farmers‘ income have been improving. By the end of 2014 China has still 14 special poor areas and 592 counties prioritized for the national poverty reduction program. At the same time, the number of poor villages was 128000; the number of poor households was 29485000 and the number of poor population was 70170000. The target for poverty reduction is: by 2020 economic development continues to increase and at the same time, under the current standards (average net income per capita is 2300 yuan according to constant price of 2010), the poor people in the rural areas are lift out of poverty, which means there are no more poor counties and food and clothing, as well as education, health care and housing for these people are secured; increase in disposable income per capita is higher than national average level and the indicator of public services is closed to national level.

The No.1 document of the Central Government in the 2016 declares that poverty must be terminated and to achieve this target, poverty reduction efforts must be accurate. For accurate poverty reduction, it is necessary to have different policies for different targeted groups. For 50000000 poor people actions such as industrialization, migration and resettlement shall be taken, and the other 20000000 poor people who are not able to work shall all be taken into the Low-Income security system.

A restrict poverty reduction responsibility and accountability system must be implemented at all government levels so that policies are sufficient, departmental cooperation is strengthened, and resources are allocated and social involvement is mobilized

In 2015, the Government of Guangxi Zhuang Autonomous Region issued its own 13th Five Year Poverty Reduction Plan, in which poverty reduction target is specified as: by 2020, the 5380000 people under the current standards, the 54 poor counties and the 5000 poor villages are all lift out of poverty. More specified, in the first 3 years 1200000 people are lift out of poverty, the 4th year another 930000 people and in the 5th year the achievements of poverty reduction efforts shall be consolidated and all poor people are lift out of poverty.

To implement accurate poverty reduction, it is needed to accurately identify poor households: set up a poor household dynamic adjusting mechanism and develop an accurate identifying indicator system which comprises comprehensive elements and priorities in line with the situation of the poor areas. The purpose is to accurately identify poverty in a bottom-to-top manner using such a system. Identifying poverty includes several steps and processes: visiting poor households, assessment, calculating, publicizing, reviewing and checking to make sure identification is open and transparent. Accurate poverty reduction takes sub villages as basic units. All 5000 poor villages are required to be accurately identified to find out the causes for poverty and what sort of efforts are needed to reduce poverty. As the causes for poverty of each household are different, support and efforts for poverty reduction should be differentiated. For villages with extremely poor resources, infrastructure and public services, it is needed to develop resettlement plans. It is important and necessary to set up mechanisms to identify villages and households who have got rid of poverty and how they should quit from the system, as well as standards, processes and follow-up policies. Accurate identification of villages and households who have got rid of poverty must be done each year at both government and household levels to make sure they do not get back into poverty.

Following *Guangxi´s Main Functional Area Plan*, Le Ye, Feng Shan, Dong Lan, Ba Ma, Du'an and Da Hua Counties which have been selected as Project Counties, belong to the Major Ecological Areas, namely fragile but important ecological areas with limited environmental capabilities. These areas do not have the conditions for intensive and large-scaled industrialization and urbanization activities. Therefore, increasing productivity of ecological product should be prioritized and any intensive and large-scaled industrialization and urbanization activities must be limited. Tian Dong, Tian Lin and Yi Zhou Counties belong to the Agricultural Product Areas, namely with larger cultivated land area for agricultural development. These areas have conditions for intensive and large-scaled industrialization and urbanization activities. However, to achieve sustainability, it is recommended that increasing agricultural productivity should be considered as the major task and large intensive industrialization and urbanization activities shall be limited. The proposed project activities are in line with *Guangxi´s Main Function Zoning Plan.*

1. Purpose and Scope of the ESMF

The project by design takes a framework approach and specific locations and activities of the sub-projects will only be known during implementation. According to the requirements of World Bank´s Safeguards Policy OP4.01 Environmental Assessment, the environmental impact from the Project can be managed by the *Environmental and Social Management Framework (ESMF) which* should comply with both China´s EIA laws and World Bank´s safeguard policies.

The purpose of the ESMF is to guide the Guangxi PMO and county PIUs on the environmental and social screening and subsequent assessment of sub-projectss during implementation, including sub-project specific action plans that have to be developed in compliance with domestic laws, regulations and World Bank safeguard policies.

The scope of the ESMF includes environmental and social screening to determine sub-project category, potential environmental and social issues and sub-projects specific instrument (e.g. an EMP). The ESMF also includes a generic environmental management plan (EMP); a generic pest management plan (PMP), a resettlement policy framework (RPF), and a Minority Group Development Plan as annexes.

The generic EMP applies to sub-projects which would have impact on the environment during the implementation and operational periods, and it applies to implementation agencies, supervision agencies and monitoring agencies. It is needed to have extra measures to meet environmental protection requirements if the EMP does not fulfill requirements of Sub-projects.

The RPF applies to Sub-projects which may lead to resettlement. It addresses the whole resettlement processes. It applies to the implementation, supervision and monitoring agencies.

The generic PMP applies to plantation activities primarily. It addresses how pests are prevented and controlled and how integrated pest management are carried out It applies to the implementation, supervision and monitoring agencies.

The IPDP applies to minority groups involved in the Project. The purpose is to make sure minority groups are fully involved in the planning and decision making processes.

2. Project Description

The Project is to increase income generation opportunities through demonstration of value chain development models in selected poverty counties of Guangxi. The project will involve 10 Counties, i.e. Ping Guo, Tian Dong, Tian Lin, Le Ye Counties in Bai Se City and Dong Lan, Ba Ma, Feng Shan, Da Hua, Du'an and Yi Zhou (county-level city) Counties in He Chi City, including 54 Townships and 113 Administrative Villages.

The project comprises four components, which are summarized below. The project would be implemented over a period of six years.

2.1 Project Components

Component 1: Improvement of Pro-Poor Value Chains *(US$94.18 million, of which IBRD US$63.24 million).* This component aims to address market failures in the development of agricultural and non-agricultural rural value chains and key industries with a particular focus on increasing the value of economic activities of targeted farmer cooperatives. The Component comprises the following two sub-components:

a) *Cooperative Development Fund (CDF) (US$61.87 million, of which IBRD US$30.93 million),* would provide grant financing to newly or existing cooperatives (about 10 per county and 130 over the project implementation). The CDF would be managed by the selected farmer and non-farmer cooperatives who will implement their investment plans for value chain development. These investment plans would be initiated by cooperatives and formulated jointly with the help of technical experts, agro-enterprises, and county governments. Cooperatives would need to provide a beneficiary contribution at levels reflecting the financial capacity of the individual cooperatives. Investment proposals would be subject to appraisal and approval by the county and provincial PMOs. Funds could be used by the cooperatives to invest primarily in the fixed value adding production and processing equipment and facilities, nurseries, advanced breeding stations, equipment for improved seed production, storage facilities for agricultural produce, and other small-scale cooperative level infrastructure, goods, and related capacity building and technical assistance services. The allocation of a proportion of the CDF fund for investments in capacity building and training of cooperatives would be mandatory. The cooperative training activities supported through the project would cover management and technical topics, and quality of the training activities delivered would be a special area of focus in the training plans. Specific measures would be taken to ensure participation of women in cooperatives both as individual members and in management boards.

b) *Matching Grant for Enterprises (MG) (US$32.31 million, of which IBRD US$32.31 million)* would provide matching grants to finance enterprise investments, which demonstrate linkages and benefit sharing arrangements with targeted cooperatives of poor farmers. It is expected that some 20-30 grants could be awarded to eligible enterprises individually or in partnership with farmer cooperatives. These grants will be identified during the project implementation. Numbers of poor farmers participating in value adding income generation activities and fair benefit sharing arrangements would be key selection criteria for such matching grants. The grants would be provided based on the application process which includes transparent evaluation and competitive selection process (the details will be defined in the Operational Manual). To ensure ownership and to demonstrate commitment, the selected enterprises would need to match the grant amount with their own funds at negotiated level of cost-sharing requirement (at least 70-80 percent), which would need to come from the enterprises own resources and/or from commercial lending. Grants would focus on the investments with public good characteristics and which improve product quality, processing and marketing, production of value added agricultural products, food safety promotion and improvement, income-generating activities for poor farmers, new product development, and provision of services in the selected project areas. The management and implementation of this subcomponent would be done at the Regional level.

Component 2: Improving Public Infrastructure and Services *(US$62.79 million, of which IBRD US$19.92 million).* This component would support the establishment and strengthening of public infrastructure and service systems in support of value chain/key industry development under Component 1 and would include two subcomponents:

a) *Rural Infrastructure (US$53.58 million, of which IBRD US$10.72 million),* which would be identified, to the extent possible, to complement the CDF investments under the Component 1. The component would support: (i) rehabilitation and construction of production road infrastructure, such as off-grade access roads to village/cooperative production areas or processing and marketing facilities, and rehabilitation and construction of tractor roads, field tracks, and foot paths; (ii) rehabilitation and construction of small-scale irrigation and drainage infrastructure and construction of small water storage facilities; (iii) establishment of IT and telecommunication infrastructure and procurement of information infrastructure and equipment; and (iv) rehabilitation or construction of public market facilities, electricity supply and other infrastructure and procurement of related equipment.

b) *Risk management (US$9.21 million, of which IBRD US$9.21 million),* which would support the development of comprehensive risk assessment and risk mitigation plans for each industry. The plans would consider: (i) production risks (e.g. natural disaster, outbreaks of diseases, etc.), (ii) marketing risks including potential risk of food safety and food quality violation and the impact on consumer trust by the project beneficiaries or outside fellow producers/suppliers, and (iii) financial risk such as cash flow constraints and working capital requirements. The risk management and mitigation plans would identify responsibilities of different stakeholders (producers, processors, public and private sector actors, such as food safety testing and quality institutions, insurance companies, etc.) and identify gaps and bottlenecks, which will be addressed under the project. The project investment would follow priorities identified in the risk mitigation plans and could include, *inter alia*, investments in food safety testing and control (tests according to a testing regime or if necessary additional training and equipment for the related public sector testing/controlling institutions, such as FDA offices), initial subsidies for crop and livestock insurance schemes etc. as part of the risk management plan implementation. Marketing risks mitigation support could include developing and registration and protection of local/regional brands, geographical indication as well as strategic product marketing and promotion. The component would finance mainly TA and consultant services, equipment and crop and livestock insurance subsidies.

Component 3: Enhancing Investments in Poor Areas *(US$10.41million, of which IBRD US$10.41vmillion).* This component would improve and facilitate investments in poor areas by existing and new micro-entrepreneurs and business entities, such as Small and Medium Enterprises (SMEs), migrant returnees, or cooperatives and would include two activities:

a) *Business Incubation (US$8.55 million, of which IBRD US$8.55 million),* which would support the setting up and operation of Business Incubation Centers (BICs) in each county, which will provide support for existing and start-up businesses. The BICs would support development of marketing skills and enable market linkages by reducing information asymmetries, building trust, and creating shared value between value chain actors. They would also provide training for financial management skills and help enterprises with access to appropriate financing products by facilitating linkages with partnering financial institutions. In addition, BICs will offer business development services such as training (business management, business planning), and provide assistance with navigating regulatory requirements, standards, and compliance. Other services could include promotion of business networks and fairs and media events to promote the products of participating enterprises. Finally, the BICs would offer to their clients office facilities and meeting rooms with reliable internet connection to enable sales, procurement, and management functions to operate in a professional environment. The component would provide seed funding in the form of grant but the BICs are expected to become financially sustainable over time through generation of its own revenue to reach a point where it can cover its on-going operating expenses through earned revenues. The component will finance equipment, TA and related consultancy services, necessary office

equipment and operating costs associated with running of business incubation centers (e.g. 100% during year 1-2 and 50% from year 3 onward).

b) *Improved Access to Financing (US$1.86 million, of which IBRD US$1.86 million)*, will support, in cooperation with local finance institutions, the scaling-up ongoing government program of a comprehensive credit rating system for the farmer cooperatives and cooperative members in the project counties. The credit rating will be will be developed based on the set of criteria established by financial institutions, which involves qualitative assessment translated into a specific scale. The approval and loan pricing by financial institutions will be linked to this rating. The project will finance TA and related consulting services which will be related to the collection of the relevant information from cooperatives and its members which will be used to develop the credit ratings by local financial institutions.

Component 4: Project Management and M&E *(US$10.02 million, of which IBRD US$ 6.18 million).* This component would aim to strengthen and develop the administrative and technical capacity of staff of the Project Management Offices at the county, prefecture and regional level to manage the project effectively. The component would in particular aim to establish a monitoring and evaluation and impact evaluation system in order to enable the learning from the pilot nature of the project with an external professional monitoring agency to be engaged under the project. The component would also support regular supervision, progress monitoring, acceptance checks, and safeguards implementation supervision and monitoring.

2.2 Relevance of Components and Development Objectives

After the Project is completed, 100 farmer cooperatives and 10 business incubations will be established in project areas; Facilities and infrastructure for industrial development are improved; Production conditions in project areas are improved; A foundation for farmers 'income generation is well laid and pilot projects play a demonstration role

In project implementation, farmer cooperatives will be the main body of implementation. Participatory methods will be used to make sure project households are involved in all processes so as to foster their awareness and competencies in participating in community development and management. Competent professionals for poverty reduction will be developed and trained to improve poverty reduction efforts in poor areas. International cooperation in poverty alleviation areas will be strengthened. Objectives of all components will be achieved.

2.3 Sub-project eligibility

In accordance with World Bank´s safeguard policy OP4.01, Environmental Assessment, sub-projects adopted into the Project should not have any major potential impact on the environment, i.e. Category A projects; Annex 1 provides principles and examples for screening of environmental assessment classifications.

According to China´s *Management Directory of Environmental Impact Assessment (EIA) Categories for Construction Projects 2015*, environmental impact assessment documents are classified as three: EIA report, EIA tables and EIA registration forms. However, the Environmental Protection Department of Guangxi has issued *A Directory of Construction Projects not Included in Review and Approval of Environmental Impact Assessment* which stipulates such projects are not required to go through EIA review and improvement.

All sub-projects will not have any potential major impact on the environment. They are activities which are required to provide tables and registration forms but not asked to go through the review and approving process. Requirements for formulation of EIA documents are in Table 2.3-1 and Table 2.3-2.

Locations of sub-projects should avoid sensitive areas. Store houses should be located in

legally established industrial areas. Others should follow urban development plans if they need separate locations.

Table2.3-1 Classification Catalogue of Construction Project EIA (extract)

Category	Report	Tables	Registration table	Meaning of environmentally sensitive area
Agricultural Reclamation	More than 5000 Mu; in environmental sensitive areas	Others	/	Nature reserve, Scenic spots, the World Cultural and Natural Heritage, Domestic water source protection areas; basic grassland, important wetlands, water resource area, Erosion control, and Eutrophic waters
Agricultural bases	All	/	/	Nature reserve, Scenic spots, the World Cultural and Natural Heritage, the drinking water source protection areas; basic grassland, important wetlands, water resource area, Erosion control, and Eutrophic waters.
Livestock and poultry farms, farming community	Annual number of pigs: 500 (other livestock equivalent number of pigs)	/	others	Nature reserve, Scenic spots, the World Cultural and Natural Heritage, domestic water source protection areas, Eutrophic waters; residential areas with facilities for health care, education, culture, studies, administration and office; Cultural relics protection units, protected areas with special historical, cultural, scientific and ethnic significance.
Food and feed	Annual processing 250,000 tons and above with fermentation process	Others	/	
Plant oil processing	Annual oil producing 300000 tone and above; Annual plant oil fine processing 100000 tone and above	Others（except for repackaging）	Simple repackaging or mixing	
Slaughter	Annual slaughter 100000 heads (or 1000000 pultry) and above.	others	/	
Meat and	/	Annual	Others	

pultry processing		processing 20000 tones and above.		
Egg processing	/	/	All	
Fruit and vegetable juice, and other soft drink production.	Production of original juice	Others	/	
Other food production	/	Except for hand-made and simple repacking	Handmade or simple repacking	
Vehicle roads	New road construction or upgrading, ; 1km or above independent tunnels in environmental sensitive areas,1km or above independent bridges in environmental sensitive areas（not including road maintenance）	Others（matching facilities and maintenance not included)	Matching facilities and maintenance	Nature reserve, Scenic spots, the World Cultural and Natural Heritage, domestic water source protection areas; basic farmland and grassland, forest parks, geoparks, important wetlands, water resource area,, and Eutrophic waters ; Natural forests, rare and endangered wild animals and plants naturally concentrated area, the natural spawning grounds of important aquatic organisms, feeding grounds, winter grounds and migration routes, natural fisheries, water resource area, Erosion control, and land desertification protected areas, closed and semi-enclosed seas, eutrophication of waters ; residential areas with facilities for health care, education, culture, studies, administration and office Cultural relics protection units, protected areas with special historical, cultural, scientific and ethnic significance.
Warehouses (excluding oil tanks, gas storage, coal storage	Toxic, hazardous and dangerous goods warehousing, logistics and distribution projects	Others	/	
Real estate developmen t, hotels, restaurants,	/	Construction area of 50,000 square	others	Nature reserve, Scenic spots, the World Cultural and Natural Heritage, the drinking water source protection areas;

and offices		meters and over. Construction area of 50,000 square meters and above. environmentally sensitive areas		
Tourism	other	Others	/	
Wholesale and retail market	/	Business area of 5000 square meters and above	Others	

Table2.3-2 Classification Catalogue of Projects not included in the Approval Process

Project Categories	Note
Timber Processing	Micro enterprises but not involves houses, schools and hospitals.
Household enterprises including Livestock breeding, aquaculture projects. Household enterprises: livestock and poultry, aquaculture projects, and farm upgrading.	Re-submit application when scale does not meet No.6 stipulated in Guangxi's Livestock and Poultry Management Mandatory
Village roads under 4th grade.	
Household irrigation systems, Water conservancy, irrigation facilities ; maintenance of current systems.	

Note ：Environmentally sensitive area was defined in reference to Directory for Category and Management of Construction project EIA.

3. Legal and Regulatory Framework

3.1 Applicable National Laws and Regulations

National laws and regulations applicable to the Project:

（1）Environmental Protection Law of China （2015)
（2）Environmental Impact Assessment Law of （2002；
（3）Water Law of China（2002；
（4）Agriculture Law of China；
（5）Animal Husbandry；
（7）Water Pollution Control Law of China（2008)；
（7）Forest Law of China (1998）
（8）Solid Waste Pollution Control Law of China（2005）；
（9）Noise Pollution Control Law of China（1996）；
（10） Atmospheric Pollution Control Law of China (2000）；
（11） Water and Soil Conservation Law of China（2010）；
（12）Wild Animal Protection Law (1988）；
（13）Cultural Relics Protection Law of China (2002)；
（14）Land Management Law of China (revised in 1998）；
（15）Mineral resources of China （revised in 1996）；
（16）Cleaner Production Promotion Law of China（2002）；
（17）Nature Reserve Regulations of China（1994）；
（18）Implementation Regulations for Water and Soil Conservation Law （1993）；
（19）Wild Plant Protection Regulations of China（1996）；
（20）Implementation Regulations for Aquatic Wildlife Protection Law（1993）；
（21） List of National Key Protected Wildlife （1989）。
（22）Regulations for Safety of Place of Origin for Farm Products
（23）Animal Plague Control Law
（24）Regulations for Pollution from Large-Scaled Animal Husbandry
（25）Regulations for Feed and Feed Additive Management
（26）Regulations for Emergency Animal Diseases

3.2 World Bank Policies

The Bank has 10 safeguard policies. Policies involved by this Project are in Table 3.2-1。

T3.2-1 World Bank Safeguard Policies and Policies Applicable to the Projects

No	Policy	Applicable	Note
1	OP 4.01 Environmental Assessment	Yes	Category B, Environmental and Social Management Framework prepared, Information disclosure and public participation undertaken, according to OP4.01
2	OP 4.04 Natural Habitats	Yes	Not create notable degradation or change in natural in habitats. Principles and measures for protection of natural habitats included in sub-project screening and general environmental management plan

3	OP 4.09 Pest Management	Yes	No funding for pesticide and chemicals. A small number of plantation activities will involve pesticide. The Framework provides guidance for application of pesticide
4	OP 4.11 Physical Cultural Resources	No	The Project involves no Physical Cultural Resources
5	OP 4.36 Forestry	No	No funding for activities which have impact on forest or those dependent on forest
6	OP 4.37 Safety of Dams	No	No dam is involved
7	OP 4.12 Involuntary Resettlement	Yes	Resettlement Policy Framework is prepared
8	OP 4.10 Indigenous Peoples	Yes	Minority Group Development Plan is prepared
9	OP 7.50 Projects on International Waterways	No	No international waterway is involved
10	OP 7.60 Projects in Disputed Areas	No	No disputed area is involved

4 Environmental and Social Baselines

4.1 Summary of Natural Environment

4.1.1 Location

The Project covers 10 Counties in Baise and Hechi Cities which are in the Northwest of Guangxi, including Tiandong, Tianlin, Leye, Donglan, Bama, Fengshan, Dahua, Du´an, Pingguo Counties and Yizhou City (Locations are in Figure 1), with a total land area of 32672.5 square kilometers. The Project Area is located in the joining area of Karst Mountains and flat land, where Karst Mountains and mix and Karst Mountains take up 52% of the total project area.

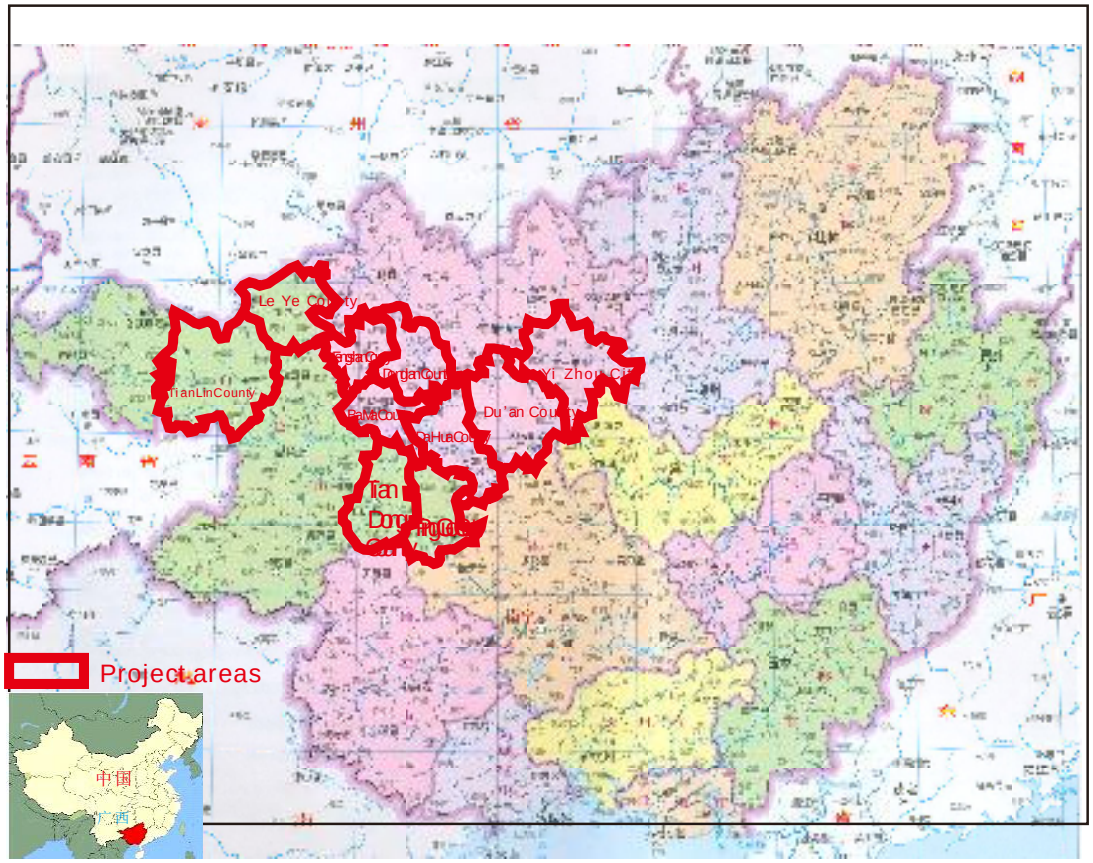


Figure 1 Project Location

4.1.2 Environmentally Sensitive Areas

Several sensitive areas are covered in the 10 Project Counties. Nature Reserves include: Chenwang Laoshan Nature Reserve in Langping Township Tianlin County; Orchidaceae Nature Reserve in Yachang Township Leye County. Scenic spots include Crystal Cave, Bai Niao Yuan and Panyang River in Bama County; Da Shi Wei natural pits in Leye County; Jin Lang Wan in Yizhou City; Liangfeng Cave in Donglan County; Qi Bai Nong in Dahua County. Geoparks include Leye-Fengshan World Geopark. However, sub-projects of the proposed Project involve none of the above sensitive areas, Distribution of nature reserves is in Figure 2.。

4.1.3 Surface Water System

Rivers running through Baise City: Youjiang River, Leli River, Xiyang River, Tuoniang River, Buliu River and Longxu River. Rivers running through Hechi: Longjiang River, Diao River, Red River, Panyang River, Baidong River and Ling Qi River. Surface water system of Project Area is in Figure 2. All Project Counties have domestic water protection areas. Therefore, sub-project locations involve no domestic water protection areas. Details are in Figure 4-5

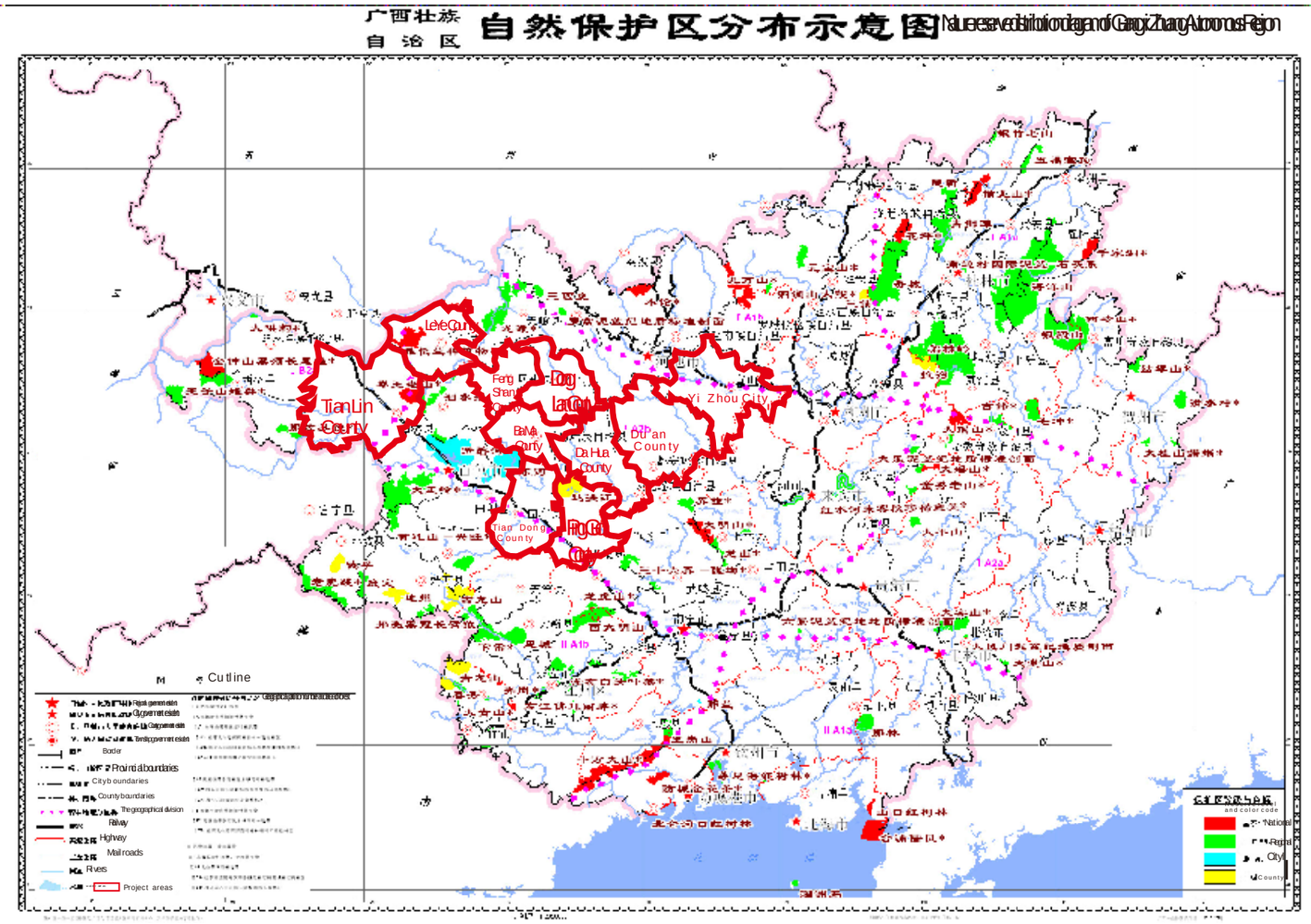


Figure 2 Map of Nature Reserves in Guangxi

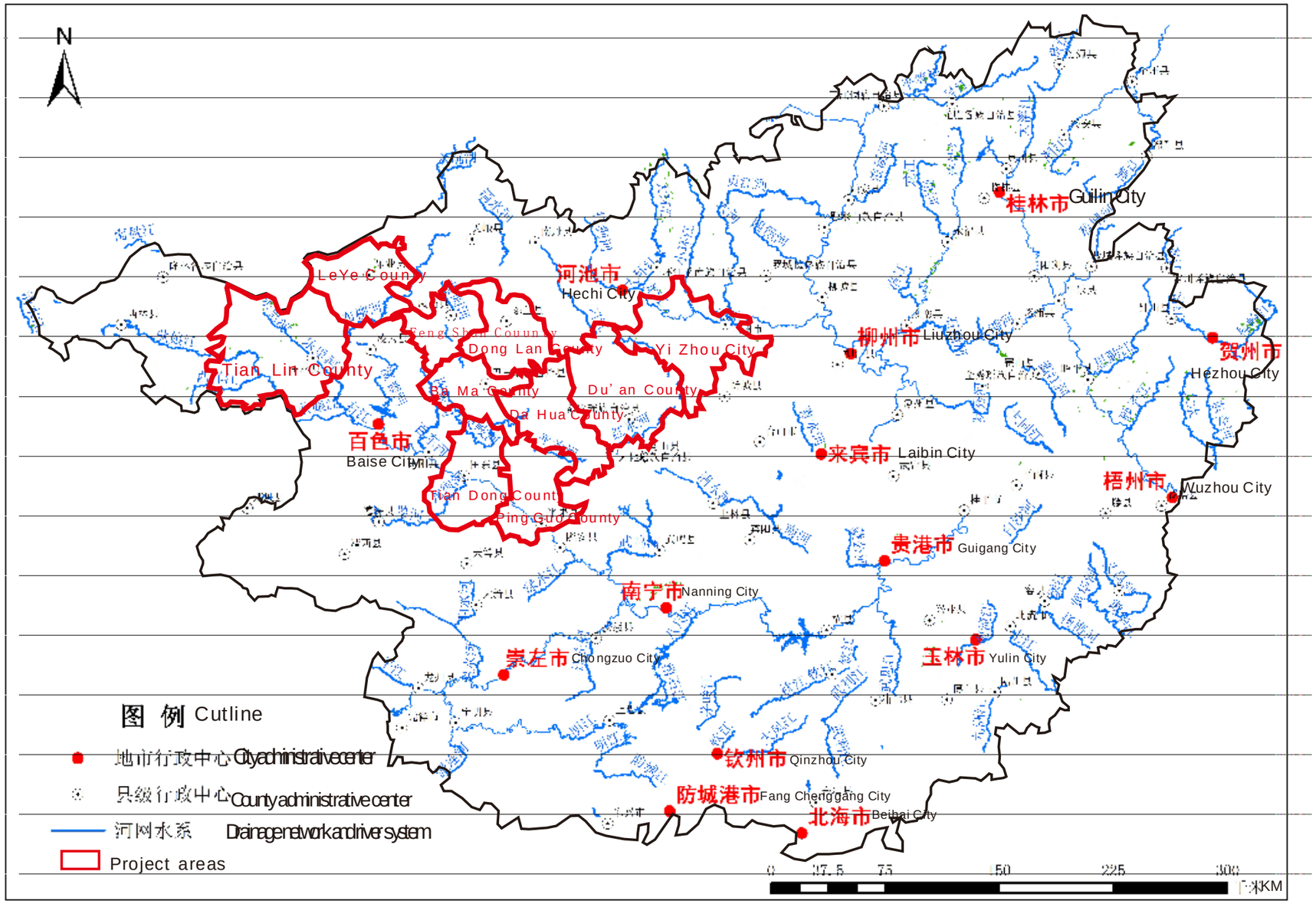


Figure 3 Surface Water System in Guangxi

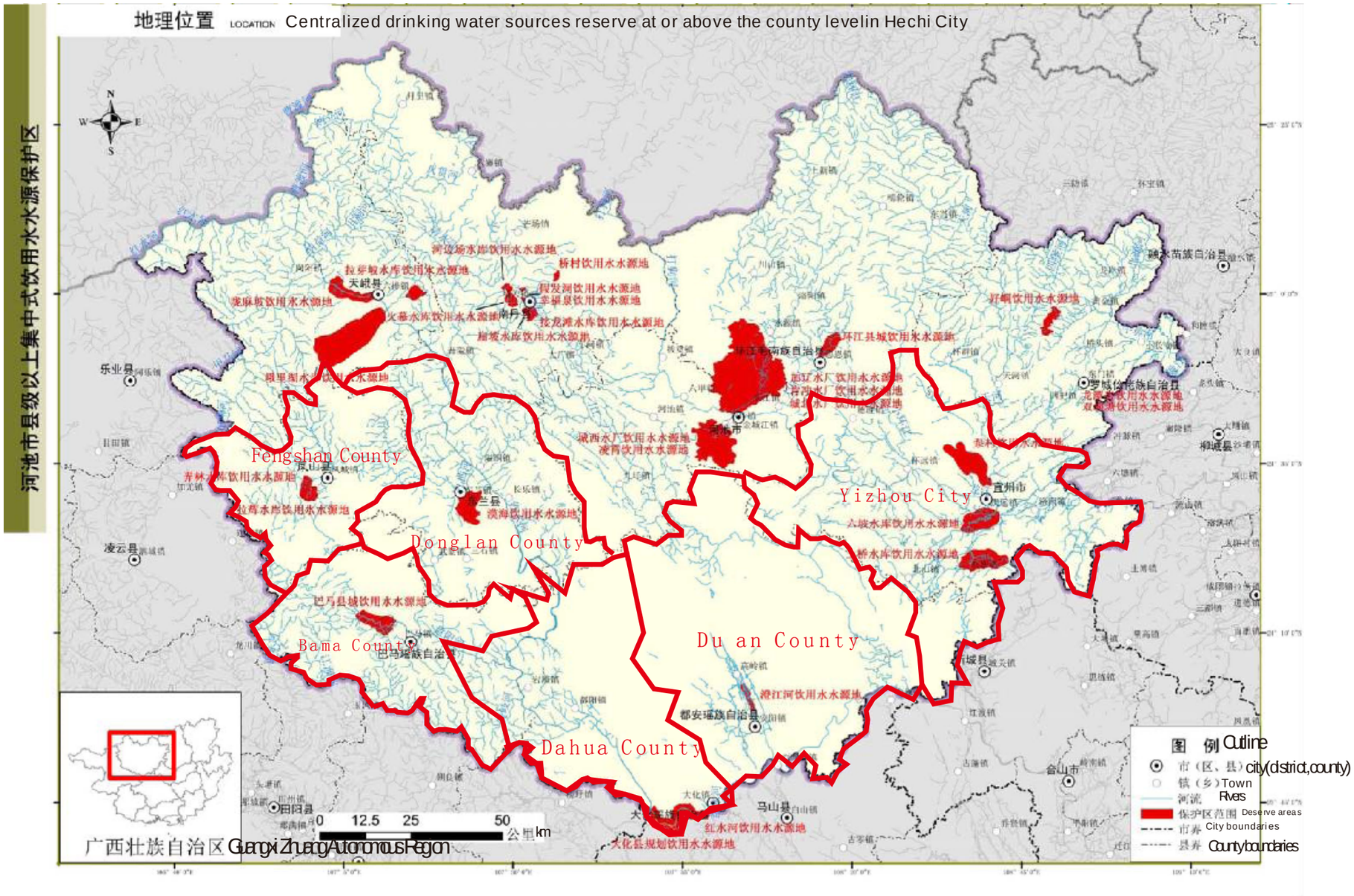


Figure 4 Drinking Water Source Protection Areas in Hechi

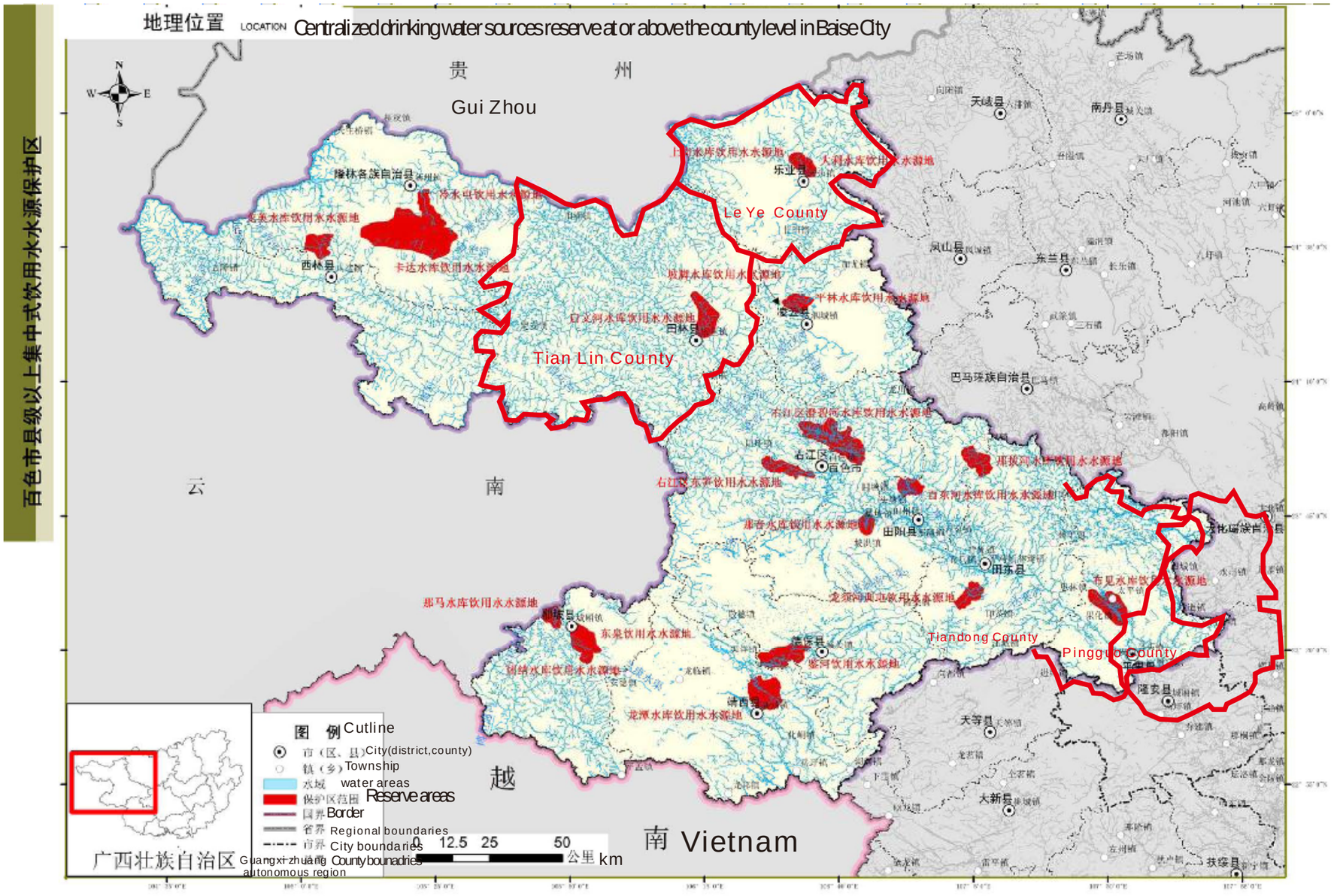


Figure 5 Domestic Water Source Protection Areas in Hechi

4.1.4 Biodiversity

（1） Baise City is in sub-tropical area. It is warm all year round, with plenty of heat and rain. Most of the plants are evergreen and can growth through the year. Forest covers 2700 tree species. Cash trees include Fir, Pine, Oak and Bamboo as well as fast growing species, nearly 100 fast growing species including youtung, camelia, anise, tea and cinnamon. Rare and specious species include: Clams wood, gold plum, rosewood, dyke tree, cedar, Douglas fir, cedar iron Kennedy, plum, and leaf clams. Fruit species include banana, mango, almond, orange, pear, longan, plum, walnut, chestnut, persimmon, plum, litchi, hawthorn, pineapple, fruit safflower. Crops include rice, corn, soybeans. Cash crops include sugar cane, tea, tobacco, coffee. Herbs include 110 species: Tianqi, honeysuckle, Ganoderma lucidum, basil, Poria, Amomum, Radix, Huang Jing, ring grass and aspartame. Mushrooms include different fungus. Starch crops include more than 20 varieties. Oil plants include 19 varieties such as sesame, peanuts, tea, tung oil, cubeba, canola and tallow tree. Fiber plants include 19 varieties. Chemical plants include more than 100 varieties such as niu ganzi, bayberry, mountain locust, Jacaranda trees, and valonea. Aromatic plants include Magnolia, Osmanthus maudiae, rose, and vanilla. Pasture includes 93 varieties

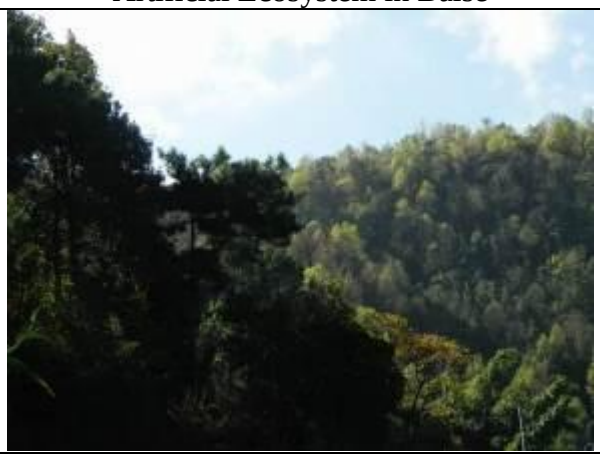
Baise City has over 100 wildlife, including over 20 rare and protected species: loris, langurs, bears monkeys, rhesus macaques, clouded leopard, serow, forest musk deer, black deer, tufted deer, sambar, golden cat, civet, small Indian civet, pangolin, otter, south snakes, spot hornbill, silver pheasant, golden pheasant, copper chicken, duck, giant salamander (giant salamander), distributed in Jinxi, Xilin, Lingyun, Napo, Tiandong, Tianyang and Youjiang. Rare beasts such as Tiger, leopard, bear and spotted deer could be found in Tianlin and Leye Counties.

（2） Hechi City is located on the edge of the south sub tropic area, the transition area between hilly area in Northwest Guangxi and the Yunnan-Guizhou Plateau. Forest vegetation comprises broad-leaf evergreens. Plants include 203 families, 697 genera and 1850 kinds and tree species include 84 families, 250 genera and 532 kinds, such as Camphor, Dutch, birch, alder, mangrove tree, neem, camphor, jujube, acuminate., among which 143 kinds are evergreen, 98 are deciduous trees, 60 are rare and protected species: White bean fir, Taxus, Amentotaxus clams, dyke tree, lobular red beans, gold Li, Ma Gua, Namu, incense trees, silver magpie, paliurus, Rhoiptele. Herbs include 162 species. Oil plants 16 species, feed plant 20 species, pasture 240 species and fiber plant 14 species. , 。

Animal species in Hechi include over 60 species, among which 10 national 1st class protected species are, 23 are 2nd class and 11 are 3rd class protected species. Two are rare species and others 16 species.

Natural Ecosystem in Baise

Natural Ecosystem in Baise

	
Artificial Ecosystem in Baise	Natural Ecosystem in Hechi
	
Natural ecosystem in Hechi	Artificial ecosystem in Hechi

4.2 Socio-economics

4.2.1 Population and Demographics

The Project involves 10 Counties in Hechi and Baise Cities, covering 54 townships, 117 administrative villages (95 are prioritized for 13th FYP poverty reduction program) with a total population of 4013800, among which 666300 are poor villagers, taking up 16.6% of the total population.

4.2.2 Minority Groups

In the 10 Project Counties, the population of minority groups is 3487278, taking up 87.3% of the total population. Population of Han Chinese is 508434, taking up 12.7% of the total population. The main minority groups are Zhung and Yao. The population of the Zhuang people is 2975626, taking up74.5% of the total population, while the Yao has 459960 people, taking up 11.5% of the population. Other minority groups include Dong, Gelao, Shui and Maonan with a population of 51692, taking up 1.3%of the total population.

4.2.3 Economic Development

In 2014, net income per capita of the rural population in the 10 Project Counties was 5989 yuan, 2343 yuan (or 29%) less than provincial level which was 8332 yuan. Household income comes mainly from household business and off-farm work, which takes up over 85% (average 91.9%.

4.3 County-Specific Environmental and social Baselines

4.3.1 Du'an County

4.3.1.1 Physical Environment

Du'an Yao Autonomic County is located in the center of Guangxi, on the slope area where the Yunnan-Guizhou Plateau is extending into the basin in Guangxi. Between Longitude 107 ° 29'-108 ° 41 ', and latitude 23 ° 42'-24 ° 35'. Hong Shui River (the Red River) runs through the west and south part of the county. Its neighbor counties include Xincheng in the east, Mashan and Pingguo in the south, Bama and Donglan counties in the west and Yishan and Hechi in the North.

Du'an, which is 121 km from east to west long and 99 km from north to south, covers a land area of 6468.5 square kilometers, taking up of 2.74%of Guangxi´s total land area or 19.99% of Hechi´s total land area.

As the slope area where Yunnan-Guizhou Plateau extends into the basin of Guangxi, the North and West parts of the county are higher than the South and East parts. The main water system, the Red River with its two branches (Cheng River and Diao River) , runs throughout the county from northwest to southeast. Rocky karst mountains which dominate the landscape, covers 5452.44 square kilometers or 84.29% of the total land area of the County. Therefore, it is also called a Kingdom of Karst Mountains. Other landscapes include hilly land area 561.14 square kilometers or 8.67%of the total land area and basin (or flat) land for 397.42 square kilometer or 6.14%of the total land area. The summit elevation which is in Bansheng-Qi Bai Nong Area is 900-1100 meters, while the valley floor elevation is 600-800 meters. The lowest part which has a summit elevation of 400-600 meters is the valley in the downstream of the Red River in the south, while the valley floor elevation is 130-200 meters. The lowest valley is only 112 meters. The total topographic gradient is 8 ‰.

The surface water system in the County is not well developed. The river density is 0.0889 per square meter. There are nearly 100 rivers but most of them are seasonal streams. Only 17 of these streams have over 20 square kilometers of catchment area. T. he total catchment area is 3363.7 square kilometers. The total average annual flow is 131.9 cubic meters per second. The maximum total flow in the flood period is 4447.4 cubic meters per second, while in the dry season; the minimum total flow is 5.5 cubic meters per second. Rivers with over 50 square kilometers of catchment area, which means they are worth developing, include the Red River, Diao River, Chengjiang, Fulong River, Mianshan River, Banling River, Yema River and Tonggeng River. The normal flow of the Red River, Diao River and Cheng River is over 25 cubic meter per second.

Severe mountain desertification area is 1610.53 km², medium level 116.49 km² and mild level 31.76 km². Degradation in Du'an is severe, Details of degradation is in the following table 4.3-1. Distribution of degradation in Project Areas is indicated in Figure 6-7.

Table 4.3-1 Mountain Degradation in Du'an County

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Hechi	Du'an	Yongji Village Yongán Township	Mulberry and Silk Cocoons	Degraded land	Severe degradation
		Liuli Village Chengjiang Township	Chicken	Non-degradation land	No degradation
		Yuanli Village Bao An Township	Chicken	Potential degradation land	No degradation
		Wudong Village Gaoling Township	Goat	Potential degradation land	No degradation

		Yijiang Village Gaoling Township	Goat	Degraded land	Mild degradation
		Jiacha Village Gaoling Township	Goat	Potential degradation land	No degradation
		Nongming Village Gaoling Township	Goat	Degraded land	Extremely severe degradation
		Fuxing Village Gaoling Township	Goat	Potential degradation land	Medium degradation
		Jiating Village Gaoling Township	Goat	Degraded land	Severe degradation
		Jiaquan Village Gaoling Township	Goat	Potential degradation land	Mild degradation

4.3.1.2 Socio-economics

Du'an has the largest Yao ethnic group. Aside from Yao, there are other 12 ethnic groups including Zhuang, Han, Miao, Mulao, Maonan and Shui ethnic groups. The total population is 702100, among which 186500 are poor people (25.6%) and 666500 (94.9%) are from minority groups. Net income per capita of rural residents is 2478 Yuan.

4.3.2 Dahua County

4.3.2.1 Physical Environment

Dahua Yao Autonomous County is in the northwest part of Guangxi, covering the middle stream of the Red River. It is an area where the edges of Hechi Prefecture, Du'an County, Bama County and Nanning Prefecture joint, 130 kilometers from Nanning, the capital city of Guangxi, Dahua covers a land area of 2716 square kilometers. Its water ways come from Guizhou and run down to Guangzhou.

Dahua is located on the end of Yuan-Gui Plateau. Duyang Mountains run throughout the County from north to south. The sea level of the north part is between 500-800 meters. The highest mountains are the Bansheng-Qi Bai Nong mountain areas whose sea level is between 900-1000 meters. The highest peak, Nong Er Mountain which is 1108-meter-high, is Qi Bai Nong Township. The sea level in the south is between 150-300 meters. The County is dominated by the landscapes: Karst mountains, erosion hills and valleys. Karst landscape covers the largest area. The typical karst landscape is mainly made up of peaks and valleys. The County has thousands of peaks and valleys. Qi Bai Nong Township itself has 1300 valleys and only 324 of them have inhabitants.

Total length of surface waterway is 474 kilometers. River density is 0.16 km/km². The main river is the Red River which runs through the County for 160 kilometers with 9 branches for 117.2 kilometers. It has been confirmed that there are 14 ground rivers with a total length of 1242 kilometers and the average flow is 0.89 m³/s.

Severe mountain desertification area is 634.83 km², medium level 116.49 km² and mild level 31.76 km². Degradation in Dahua is severe, Details of degradation is in the following table 4.3-2. Distribution of degradation in Project Areas is indicated in Figure 6-7.

Table 4.3-2 Mountain Degradation in Project Areas in Dahua County

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Hechi	Dahua	Renliang Village Dahua Township	Grape	Degraded land	Severe degradation
		Longma Village Dahua Township	Grape	Non-degradation land	No degradation
		Jiacheng Village Duyang Township	Grape	Non-degradation land	No degradation

		Jiasi Village Liuye Township	Grape	Degraded land	Medium degradation
		Longkou Village Dahua Township	Mandarin	Non-degradation land	No degradation
		Dunsu Village Dahua Township	Mandarin	Non-degradation land	Mild degradation
		Duyang Village Duyang Township	Mandarin	Degraded land	Medium degradation
		Zhongwu Village Duyang Township	Mandarin	Non-degradation land	No degradation
		Wucheng Village Duyang Township	Mandarin	Non-degradation land	No degradation
		Huashan Village Liuye Township	Mandarin	Non-degradation land	No degradation

4.3.2.2 Socio-economics

There are 11 ethnic groups including Zhuang, Han, Miao, Mulao, Maonan, Man, and Shui ethnic groups. The total population is 460500, among which 123400 are poor people (26.8%) and 416600 (90.5%) are from minority groups. Net income per capita of rural residents is 4555 Yuan.

4.3.3 Donglan County

4.3.3.1 Physical Environment

Donglan is located in the northwest of Guangxi, between east longitude 107 ° 5'-107 ° 43 ' and latitude 24 ° 13'-24 ° 51'. Its neighbor counties include Hechi City in the east, Fengshan County in the west, Bama and Du'an Counties in the South, and Tiané and Nandan Counties in the north. Donglan is 308 km from the regional capital of Nanning. The length from north to south is 68 km and the width from east to west is 65 kilometers. The total area is 2415 square kilometers.

Donglan is located in the southern edge of the Yunnan-Guizhou Plateau, northwestern part of Guangxi. Tilt from northwest to southeast, the north part of the County is higher than the south part. Rivers run from north to south into the Red River. The dominant landscape is karst hills, slopes, peaks and valleys.

Rivers in the County belong to the Red River system. All run from northwest into the Red River except that Dongping River runs into Panyang River in Bama County. The Red River runs through and exits the County from Dayong in Datong Township. Aside from the Red River, there 250 rivers running through the County. Each of the nine rivers including Baying River, Banlong River, Pola River, Lanyang River, Jiuqu River, Banlao River, Pohao River, Sanjia River and Dongping River, covers a catchment area of over 40 km². Except for Baying River which originates from Fengshan County, all rivers originate from Donglan itself. The total length of all rivers is340.7 kilometers (not including the Red River) and the total catchment area is 2415 km². The average annual runoff is 1.607 billion cubic meters. The maximum flow is 1232.6 cubic meters per second and the flow rate is 0.5767 cubic meters per second in the dry season. Geographical distribution of rivers is uneven. There are more rivers in the soil hilly areas while there are no surface rivers in the rocky mountainous areas. Rivers are deep and are recharged by rain. There is large difference in river flow in wet and dry seasons due to the monsoon climate and the topography and the density of vegetation. The change of flow before and after rainfalls impact irrigation.

Severe mountain desertification area is 177.33km², medium level 542.54 km² and mild level 185.71 km². Degradation in Donglan is severe, Details of degradation is in the following table 4.3-3. Distribution of degradation in Project Areas is indicated in Figure 6-7

Table 4.3-3 Mountain Degradation in Project Areas in Donglan County

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Hechi	Donglan	Jiangdong Village Donglan Township	Camellia oil	Non-degradation land	No degradation
		Banlie Village QieXue Township	Camellia oil	Non-degradation land	No degradation
		Banlong Village Changjiang Township	Camellia oil	Degraded land	Mild degradation
		Antao Village Bashou Township	Camellia oil	Non-degradation land	No degradation
		Weirong Village Donglan Township	Black chicken	Non-degradation land	No degradation
		Banlao Village Aidong Township	Black chicken	Non-degradation land	No degradation
		Liutong Village Aidong Township	Black chicken	Non-degradation land	No degradation
		Qiexue Village Qiexue Township	Black chicken	Degraded land	Medium degradation
		Gengle Village Changle Township	Black chicken	Potential degradation land	Mild degradation
		Renhe Village Sanshi Township	Black chicken	Degraded land	Medium degradation
		Dongli Village Wuzhuan Township	Tourism	Non-degradation land	No degradation

4.3.3.2 Socio-economics

There are 8 ethnic groups including Zhuang, Han and Yao ethnic groups. Zhuang is the majority, followed by Han and Yao. The total population is 307900, among which 66400 are poor people (21.6%) and 280500 (991.1%) are from minority groups. Net income per capita of rural residents is 4018 Yuan.

4.3.4 Bama County

4.3.4.1 Physical Environment

Known as the world's longevity, Chinese Holy Land, Bama Yao Autonomous County is in the Northwestern of Guangxi and is a part of Hechi City, .between the east longitude 106 ° 51'-107 ° 23 ', and latitude 23 ° 51'-24 ° 23' . Its neighbor counties include Baise, Tianyang, Tiandong, Pingguo, Dahua, Donglan, Fengshan and Lingyun Counties. The County covers a total land area of 1971 km^2。

Bama is located on the hilly area where Yunnan-Guizhou Plateau extends into the flat land in the center of Guangxi. Its western part is higher than its eastern part. The sea level is between 500-800 meters. Rocky (karst) mountains take up 30%, soil hills take up 69% and waters take up 1% of the land area.As the land is dominated by thousands of hills, Bama is called ten thousand hills. In the west there is higher karst mountains, while in the other parts there are more slopes. Hills, karst mountains and valleys are the main landscapes.

All rivers in Bama belong to the Pearl River system. The Red River runs on the border between Bama and Du'an is the border between two counties. Other large rivers include Panyang River which originates in Qiaoyin Fengshan County, Lingqu River which originates in the mountains in the west

part of the County and Baidong River and Ceba River which run in the mountains and join in Youjiang River in Tianyang County. The total surface water runoff is 1.1 billion cubic meters.

Severe mountain desertification area is 337.48 km², medium level 120.34 km² and mild level 29.25 km². Degradation in Bama is severe, Details of degradation is in the following table 4.3-4. Distribution of degradation in Project Areas is indicated in Figure 6-7

Table 4.3-4 Mountain Degradation in Project Areas in Bama County

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Hechi	Bama	Dena Village Fenghuang Township	Pig	Potential degradation land	Mild degradation
		Changhe Village Fenghuang Township	Pig	Degraded land	Medium degradation
		Bana Village Xishan Township	Pig 香猪	Potential degradation land	Mild degradation
		Hele Village Xishan Township	Pig	Potential degradation land	Mild degradation
		Poteng Village Bama Township	Tourism	Non-degradation land	No degradation
		Banyang Village Bama Township	Tourism	Non-degradation land	No degradation
		Donglie Village Nashe Township	Tourism	Non-degradation land	No degradation
		Yanting Village Yandong Township	Camellia oil	Non-degradation land	No degradation
		Pingliu Village Suolue Township	Camellia oil	Non-degradation land	No degradation
		Langyin Village Suolue Township	Camellia oil	Non-degradation land	No degradation

4.3.4.2 Socio-economics

There are 13 ethnic groups including Yao, Zhuang, Han and Maonan ethnic groups. The total population is 281700, among which 60100 are poor people (21.3%) and 254100 (90.2%) are from minority groups. Net income per capita of rural residents is 2831 Yuan.

4.3.5 Fengshan County

4.3.5.1 Physical Environment

Fengshan County is on the south edge of the Yunnan-Guizhou Plateau in the Northwest of Guangxi and is a part of Hechi City. The western point of the County is the east longitude 106°40′50″ and latitude 24°36′10″, the eastern point 107°16′57 and 24°32′15″, the southern point 106°55′20″ and 24°15′30″ and its northern point 107°1′34″ and 24°49′34″, covering 60.9 km from east to west and 63.9 km from north to south. The County Town is located in the center of County. The total land area is 1738 km², dominated by Karst Mountains with small arable land area.

Panyang River, Baying River and Poxin River are the three major rivers running through the central, eastern and southern parts of the County. The total length of the three rivers is 116, .3 kilometers. Their branches include 129 rivers and streams with a total length of 767.81 kilometers. The river net density is 0.44 km/km². The catchment area is 1737.97 km². The total annual flow is 1.19 billion m².

Severe mountain desertification area is 155.22 km², medium level 312.24 km² and mild level 127.83 km². Degradation in Fengshan is severe, Details of degradation is in the following table 4.3-5. Distribution of degradation in Project Areas is indicated in Figure 6-7

Table 4.3-5 Mountain Degradation in Project Areas in Fengshan County

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Hechi	Fengshan	Changzhou Village Changzhou Township	Camellia oil	Non-degradation land	No degradation
		Nale Village Changzhou Township	Camellia oil	Non-degradation land	No degradation
		Na Ai Village Changzhou Township	Camellia oil	Non-degradation land	No degradation
		Banren Village Changzhou Township	Camellia oil	Non-degradation land	No degradation
		BanlunVillage Changzhou Township	Camellia oil	Non-degradation land	No degradation
		Langli Village Changzhou Township	Camellia oil	Non-degradation land	No degradation
		Nalao Village Changzhou Township	Camellia oil	Non-degradation land	No degradation
		Heyun Village Qiaoyin Township	Camellia oil	Non-degradation land	No degradation
		Nawang Village Qiaoyin Township	Camellia oil	Non-degradation land	No degradation
		Shanglin Village Qiaoyin Township	Camellia oil	Non-degradation land	No degradation
		Tongle Village Qiaoyin Township	Walnut	Non-degradation land	No degradation
		Wenli Village Qiaoyin Township	Walnut	Non-degradation land	No degradation
		Pocha Village Jinya Township	Walnut	Degraded land	Medium degradation
		Gengsha Village Jinya Township	Walnut	Degraded land	Medium degradation
		Longwang Village Jinya Township	Walnut	Degraded land	Medium degradation

4.3.5.2 Socio-economics

There are Zhuang and Han ethnic groups. The total population is 219500, among which 59400 are poor people (21, 7%) and 142200 (64.8%) are from minority groups. Net income per capita of rural residents is 2802 Yuan.

4.3.6 Yizhou City

4.3.6.1 Physical Environment

Yizhou City (county-level) is in the North Central part of Guangxi and is a part of Hechi City. The

western point of the City is on the east longitude 106°40′50″ and latitude 24°36′10″, the eastern point 107°16′57 and 24°32′15″, the southern point 106°55′20″ and 24°15′30″ and its northern point 107°1′34″ and 24°49′34″, covering 60.9 km from east to west and 63.9 km from north to south. The County Town is located in the center of City. The total land area is 1738 km², dominated by Karst Mountains with small arable land area. Its neighbor counties include Liucheng and Liujiang in the east, Xincheng and Du'an in the south, Hechi in the west and Huanjiang and Luocheng in the north.

Located between east longitude 108 ° 4'11 "~ 109 ° 2'44" north latitude and 24 ° 0'10 "~ 24 ° 52'5" and with Longjiang River, Guizhou-Guangxi Railway and national road 323 running through, Yizhou is the hub connecting Northwest and Southeast of Guangxi, as well as Guizhou and Human Provinces. The total land area is 3869 km². Karst slopes, hills and valleys are the dominant landscapes. 。

The rivers running through Yizhou belong the Xijiang River system of the Pearl River Basin. Longjiang is the major river which has two branches: Linjiang River (or Jianhe) and Zhongzhou River (or Xiao Huanjiang). Yizhou has totally 295 rivers and streams, among which 211 are seasonal rivers. Duliang River runs into Diaojiang River and Yongding River runs into the Red River. All others are branches of Longjiang. Linjiang and Zhongzhou are two major branches, each of which has a catchment area of over 1000 km². Luoshou River, Wugong River, Yongdai River and Da An River each covers a catchment area of 100-1000 km², and Deqiao River, Siliu River and Zhonghe River each covers a catchment area of 50-100 km².The total river basin area is16216 km², among which 3420.3 km² is within Yizhou. The average annual flow is 393.8 m³/second. Annual runoff is 12.45 billion cubic meters. 。Runoff happens in April-September, taking up 77.5% of the annual runoff. Some rivers flood in the flood season, but dry up in the dry season. The maximum flow is 10,755 cubic meters per seond, nearly 293 times of the low flow which is 36.68 cubic meters per second. The total annual runoff of the City is 2.425 billion cubic meters.

Severe mountain desertification area is 338.09 km², medium level 371.06 km² and mild level 89.97 km². Degradation in Yizhou is medium, Details of degradation is in the following table 4.3-6. Distribution of degradation in Project Areas is indicated in Figure 6-7

Table 4.3-6 Mountain Degradation in Project Areas in Yizhou City

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Hechi	Yizhou	Yantian Village Liu San Jie Township	Mulberry and silk cocoon	Potential degradation land	No degradation
		Gudong Village Liu San Jie Township	Mulberry and silk cocoon	Potential degradation land	No degradation
		Guwen Village Xiangbei Township	Mulberry and silk cocoon	Non-degradation land	No degradation
		Latuo Village Xiangbei Township	Mulberry and silk cocoon	Non-degradation land	无石漠化
		Baitun Village Anma Township	Mulberry and silk cocoon	Degraded land	Severe degradation
		Xiao Ai Village Anma Township	Mulberry and silk cocoon	Degraded land	Severe degradation
		Latan Village Anma Township	Mulberry and silk cocoon	Non-degradation land	No degradation
		Kenba Village Anma Township	Mulberry and silk cocoon	Non-degradation land	No degradation
		Guyu Village Anma Township	Mulberry and silk cocoon	Non-degradation land	No degradation
		Baiwei Village Xiangbei Township	Mushroom	Potential degradation land	No degradation
		Gudong Village Liu	Mushroom	Potential degradation	No degradation

		San Jie Township		land	
		Yantian Village Liu San Jie Township	Mushroom	Potential degradation land	No degradation
		Baitun Village Anma Township	Mushroom	Degraded land	Severe degradation
		Guwen Village Xiangbei Townshi	Tourism	Non-degradation land	No degradation
		Latuo Village Xiangbei Townshi	Tourism	Non-degradation land	No degradation
		Yantian Village Liu San Jie Township	Tourism	Potential degradation land	No degradation

4.3.6.2 Socio-economics

There are Zhuang, Han, Yao, Miao, Mulao, Maonan, Dong and Hui ethnic groups in Yizhou. The total population is 663600, among which 71800 are poor people (10.8%) and 554800 (83.6%) are from minority groups. Net income per capita of rural residents is 3456 Yuan.

4.3.7 Tiandong County

4.3.7.1 Physical Environment

Tiandong County is located in the west central part of Guangxi, covering from north latitude 23 ° 16 'to 24 ° 01' and longitude 106 ° 53 'to 107 ° 26. Its neighbor counties include Pingguo in the east, Debao and Tiandeng in the south, Tianyang in the west and Bama in the north. The easternmost villages are Jinhua in Daowu Township. The southernmost village is Danuo in Jiangcheng Township. The westernmost village is Tuoxian in Bubing Township and the northernmost village is Shimu in Yixu Township. The total land area is 2816 km²

In topography, Tiandong is a basin with mountains in south and north parts and Youjiang River running through the center of the basin. South to the basin are low rocky and soil hills. North to the basin are soil hills and mountains with higher sea level. Among hills and mountains are valleys, rivers, or streams or small basins.

Rivers in Tiandong belong to the Xijiang water system of the Pearl River Basin. Youjiang, Xiangshui, Longxu, Gurong and Lingzhi are the major rivers. Longxu, Gurong and Xiangshui are branches of Youjiang River, while Lingzhi is a branch of the Red River. The total river basin area is 2816 km². The total length is 277 kilometers. The river density is 0.098 km/km². Average annual flow is 371 m³/second. Natural drop if 583.8 meters. These five rivers have only 34 branches (each covers a catchment area of over 10 km²) which cover a total length of 368.05 kilometers.

Severe mountain desertification area is 266.32 km², medium level 3.13 km² and mild level 0.04 km². Degradation in Tiandong is medium, Details of degradation is in the following table 4.3-7. Distribution of degradation in Project Areas is indicated in Figure 6-7.

Table 4.3-7 Mountain Degradation in Project Areas in Tiandong County

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Baise	Tiandong	Lianhe Village Xiangzhou Township	Mango	Non-degradation land	No degradation
		Dingyang Village Xiangzhou Township	Mango	Non-degradation land	No degradation
		Daban Village Zuodeng Township	Mango	Non-degradation land	No degradation

		Xin An Village Zuodeng Township	Mango	Non-degradation land	No degradation
		Fuxing Village Naba Township	Mango	Non-degradation land	No degradation
		Minzu Village Liinfeng Townshi	Bamboo	Non-degradation land	No degradation
		Liangyu Village Silin Township	Bamboo	Non-degradation land	No degradation
		NabanVillageYincha Township	Bamboo	Non-degradation land	No degradation
		LixinVillageYinch Township	Bamboo	Degraded land	Extreme degradation
		Liuzhou Village Naba Township	Bamboo	Non-degradation land	No degradation

4.3.7.2 Socio-economics

There are 8 ethnic groups including Zhuang, Han, Yao, Miao, Hui, Meng, Man, and Shui ethnic groups. The total population is 432000, among which 67100 are poor people (15.5%) and 377000 (87.3%) are from minority groups. Net income per capita of rural residents is 4568 Yuan.

4.3.8 Pingguo County

4.3.8.1 Physical Environment

Pingguo County is located in the west central part of Guangxi, ie. East part of Baise City. Its geographic coordinates are Longtitude 107°21′～107°51′ and North latitude 23°12′～23°51′. Matou Township is the central point of the Baise-Nanning Highway, which is 136 km from the Nanning, the Capital City of Guangxi, and 129 km from Baise City. The middle stream of Youjiang River runs through four townships. The total land area is 2485 km².

The topography is that the middle part of the County is higher than the north and south parts, ie. inclined from the northwest to the east. Youjiang River runs through the southwest part and the sea level of the river banks is 110 meters. Some branches of the Red River run through the north part and their elevation is 200-230 meters. The middle part of the County which is 280-450 meters above sea level, is dominated by karst mountains. The highest point which is 934.6-meter-high, is the peak of Guitou Mountain in Haicheng Township. The lowest part which is 106 meters above sea level which is in Chengguan Township. Two river systems run through Pingguo County: the Red River and Youjiang River systems. The total length of rivers is 456.2 kilometers. The river density is 0.18 km/km². Liming River, Dahong River, and Dasai River run through the northeast part of the County and join into one: the Pingzhi River with a catchment area of 2029.6 km² in Keshang Renshi village Fengwu Township. In the southeast part there are Laijiang, Longma, Xinxu, Dagan and Dale rivers which run into Youjiang.The catchment area of these rivers is 1199 km². There are 26 streams among which 9 are useful. The total annual runoff is 1.42 86 billion cubic meters. There is a large difference in the flow in wet and dry seasons, except for Youjiang River, due to climate, vegetation and other reasons.

Severe mountain desertification area is 801.44 km², medium level 29.6 km² and mild level 2.64 km². Degradation in Pingguo is severe, Details of degradation is in the following table 4.3-8. Distribution of degradation in Project Areas is indicated in Figure 6-7.

Table 4.3-8 Mountain Degradation in Project Areas in Pingguo County

City	County	Village	Proposed	Degradation Land Type	Status quo of

			Industry		Degradation
Baise	Pingguo	Ponan Village Xin An Township	Dragon fruit	Degraded land	Medium degradation
		Balong Village Guohua Township	Dragon fruit	Potential degradation land	Mild degradation
		Chami Village Taiping Township	Dragon fruit	Potential degradation land	No degradation
		Yangiang Village Taiping Township	Dragon fruit	Degraded land	Severe degradation
		JilinVillage Taiping Township	Dragon fruit	Degraded land	Severe degradation
		Xinmin Village Haicheng Township	Dragon fruit	Degraded land	Severe degradation
		Dingdi Village Haicheng Township	Dragon fruit	Degraded land	Severe degradation
		Gaole Village Haicheng Township	Dragon fruit	Degraded land	Medium degradation
		Liu An Village Jiucheng Township	Dragon fruit	Non-degradation land	No degradation
		Linlin Village Taiping Township	Mulberry	Potential degradation land	No degradation
		Chami Village Taiping Township	Mulberry	Potential degradation land	No degradation
		Longban Village Pozao Township	Mulberry	Non-degradation land	No degradation
		Xingeng Village Jiucheng Township	Mulberry	Degraded land	Medium degradation
		Yongqi Village Haicheng Township	Mulberry	Degraded land	Severe degradation
		Longpai Village Fengwu Township	Mulberry	Degraded land	Medium degradation
		Yongwang Village Bangxu Township	Mulberry	Degraded land	Severe degradation

4.3.8.2 Socio-economics

There are Zhuang, Han, Yao, Miao, Tujia and Maonan ethnic groups. The total population is 512100, among which 46900 are poor people (9.2%) and 483300 (94.4%) are from minority groups. Net income per capita of rural residents is 2966 Yuan.

4.3.9 Tianlin County

4.3.9.1 Physical Environment

Tianlin County is in the northwest part of Guangxi, longitude 105.27°～106.15° and north latitude 23.58°～24.41°., north of the Tropic of Cancer. Its neighbor counties include Baise, Lingyun and Leye counties (city) in the east, Funing County of Yunnan Province in the south, Xilin and Longlin counties in the west and Ceheng County of GuizhouProvince on the other side of Nanpan River. Tianlin is the largest county in Guangxi. The County TownLeli is 270 km from Nanning. The total land area of Tianlin is 5577 km².

Tianlin is on the transition area, the edge of the Yunnan-Guizhou Plateau. Qinglong, Jinzhong, Liushao Mountains stand in northeast, northwest and the south parts. The County is dominated by mountains, karst and soil mountains. Langping, Pingshan, Longche, Pingtang and Gaolong Townships are dominated by karst mountains, covering 28873.33 Ha. (5.2% of the total area of the county). Most of the karst mountains are over 800 meters above sea level. The highest peak is 1900 meters high and the relative height is 500-900 meters. Among thousands of peaks are valleys and caves. Soil mountains are found all over the County, covering 528826.67 Ha., 94.8t% of the total land area. Mountains are high and among mountains are deep valleys. The relative height is between 200 and 1000 meters. Three types of mountains, medium, low and high mountains make the main landscapes.

The Youjiang River system and the Nanpan River system are the main water systems. Youjiang River system comprises Tuoniang River, Leli River and Bagui River, covering 4506.5 km² basin area, or 80.81% of the total land area. While Nanpan River system which includes Banjian River, Jiuzhou River and Baile River which cover 882.8km² or 15.83% of the total land area. The other small rivers make up 184 kilometers and 187.7 km² , taking up 3.30% of the total land area. Years´average flow is 0.20 m³/second. Average runoff is 197.1 million cubic meters and the drop that can be useful is 950 meters.

Severe mountain desertification area is 77.24 km², medium level 26.36 km² and mild level 3.46 km². Degradation in Tianlin is not serious, Details of degradation is in the following table 4.3-9. Distribution of degradation in Project Areas is indicated in Figure 6-7.

Table 4.3-9 Mountain Degradation in Project Areas in Tianlin County

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Baise	Tianlin	Yinbiao Village Baile Township	Mango	Non-degradation land	No degradation
		Bangan Village Baile Township	Mango	Non-degradation land	No degradation
		Boé Village Badu Township	Mango	Non-degradation land	No degradation
		Zhetang Village Badu Township	Mango	Non-degradation land	No degradation
		Nongguang Village Lucheng Township	Mango	Non-degradation land	No degradation
		Sanyao Village Lucheng Township	Mango	Non-degradation land	No degradation
		Wenhua Village Leli Township	Mango	Non-degradation land	No degradation
		Baxin Village Anding Township	Mango	Non-degradation land	No degradation
		Zhenian Village Jiuzhou Township	Mango	Non-degradation land	No degradation
		Pinglin Village Jiuzhou Township	Mango	Non-degradation land	No degradation
		Guanglong Village Jiuzhou Township	Mango	Non-degradation land	No degradation
		Genbiao Village Baile Township	Camellia oil	Non-degradation land	No degradation
		Bangan Village Baile Township	Camellia oil	Non-degradation land	No degradation

		Boé Village Badu Township	Camellia oil	Non-degradation land	No degradation
		Zhetang Genbiao Village Baile Township	Camellia oil	Non-degradation land	No degradation
		Nongguang Village Lucheng Township	Camellia oil	Non-degradation land	No degradation
		Sanyao Village Lucheng Township	Camellia oil	Non-degradation land	No degradation
		Bazhong Village Zhemiao Township	Camellia oil	Non-degradation land	No degradation
		Baheng Village Zhemiao Township	Camellia oil	Non-degradation land	No degradation
		Pinggu Village Lizhou Township	Camellia oil	Non-degradation land	No degradation
		Wenhua Village Leli Township	Camellia oil	Non-degradation land	No degradation
		Balai Village Anding Township	Camellia oil	Non-degradation land	No degradation
		Changjing Village Anding Township	Camellia oil	Non-degradation land	No degradation
		Baxin Village Anding Township	Camellia oil	Non-degradation land	No degradation
		Zhenian Village Jiuzhou Township	Camellia oil	Non-degradation land	No degradation
		Pinglin Village Jiuzhou Township	Camellia oil	Non-degradation land	No degradation
		Guanglong Village Jiuzhou Township	Camellia oil	Non-degradation land	No degradation

4.3.9.2 Socio-economics

There are Zhuang, Han, Yao, Miao and Hui ethnic groups. The total population is 260500, among which 67100 are poor people (25.8%) and 19300 (71.4%) are from minority groups. Net income per capita of rural residents is 3930 Yuan.

4.3.10 Leye County

4.3.10.1 Physical Environment

Leye County is located in the Northwest part of Guangxi or the southeast part of the Yunnan-Guizhou Plateau, covering from longitude 106°10 ' to 106°51 ' and latitude 24°30 ' to 25°03 ' . Nanpan River and Beipan River join in the north and become the Red River. The neighbor counties include Tiané and Fengshan in the east, Lingyun County in the south, Tianlin County in southeast, and Ceheng County of Guizhou Province on the other side of Nanpan in the west and Wangmo and Luodian Counties of Guizhou Province on the other side of the Red River in the north. The County Town Tongle is 460 kilometers from Nanning. The total land area is 2617 km².

The dominant landscape is karst mountains, peaks and valleys.

Nanpan River and the Red River are the two main rivers. Nanpanjiang (Nanpan River) originates in

Qujing in Yunnan Province. Running from west to east, it goes through Xilin County and then become the border between Guangxi and Guizhou Provinces. On the left side of river are Xingyi, Anlong, Ceheng and Mowang Counties of Guizhou Province and on the other side are Xilin, Longlin, Tianlin and Leye Counties of Guangxi. It runs from Badong Village in Tianlin County into Leye County and becomes the border between Leye and Wangmo Counties. In Weigou, Yachang Township in the north of the County, the River joins in Beipanjiang (Beipan River) and from here the joint river is called the Red River which continues running north, through Tiané, Nandan, Donglan, Bama, Duán, Xincheng and Laibin Counties. In Sanjiangkou, Shilong Township in Xiangzhou County, it is met with Liujiang River and from here it is called Qianjiang. Nanpanjiang runs 23 km through Leye County. The width reaches 120 meters. The entry height is 315 meters. The height at joint point is 301 meters. The drop of the River is 14 meters. The total length of the Red River which star

ts in Leye and runs down to where it meets Liujiang, is 659 km long, with 138000 km² catchment area, The Red River in Leye is 51 kilometers long and the width is 150 meters. The drop is 31 meters and the slope is 0.61‰. Although both Rivers are deep, there not conditions for irrigation or to generate power, it can be used for seasonal navigation.

Severe mountain desertification area is 151.56 km², medium level 142.69 km² and mild level 19.93 km². Degradation in Leye is medium, Details of degradation is in the following table 4.3-10. Distribution of degradation in Project Areas is indicated in Figure 6-7.

Table 4.3-10 Mountain Degradation in Project Areas in Leye County

City	County	Village	Proposed Industry	Degradation Land Type	Status quo of Degradation
Baise	Leye	Dacun Village Tongle Township	Kiwi	Non-degradation land	No degradation
		Liuwei Village Tongle Township	Kiwi	Non-degradation land	No degradation
		Dadao Village Gantian Township	Kiwi	Degraded land	Severe degradation
		BanhongVillage Gantian Township	Kiwi	Non-degradation land	No degradation
		Huaping Village Huaping Township	Kiwi	Potential degradation land	No degradation
		Bamu Village Huaping Township	Kiwi	Degraded land	Severe degradation
		Tangying Village Luosha Township	Kiwi	Non-degradation land	No degradation
		Leweng Village Xinhua Township	Tea	Non-degradation land	No degradation
		Linli Village Xinhua Township	Tea	Non-degradation land	No degradation
		Nawei Village Xinhua Township	Tea	Non-degradation land	No degradation

4.3.10.2 Socio-economics

There are Zhuang, Han, Yao, Miao, Yi, Mulao and Hui ethnic groups. The total population is 173900, among which 49500 are poor people (28.5%) and 89800 (51.6%) are from minority groups. Net income per capita of rural residents is 2359 Yuan.

石灰岩地区石漠化土地分布图 Rocky Desertification Land Distribution of Limestone Region

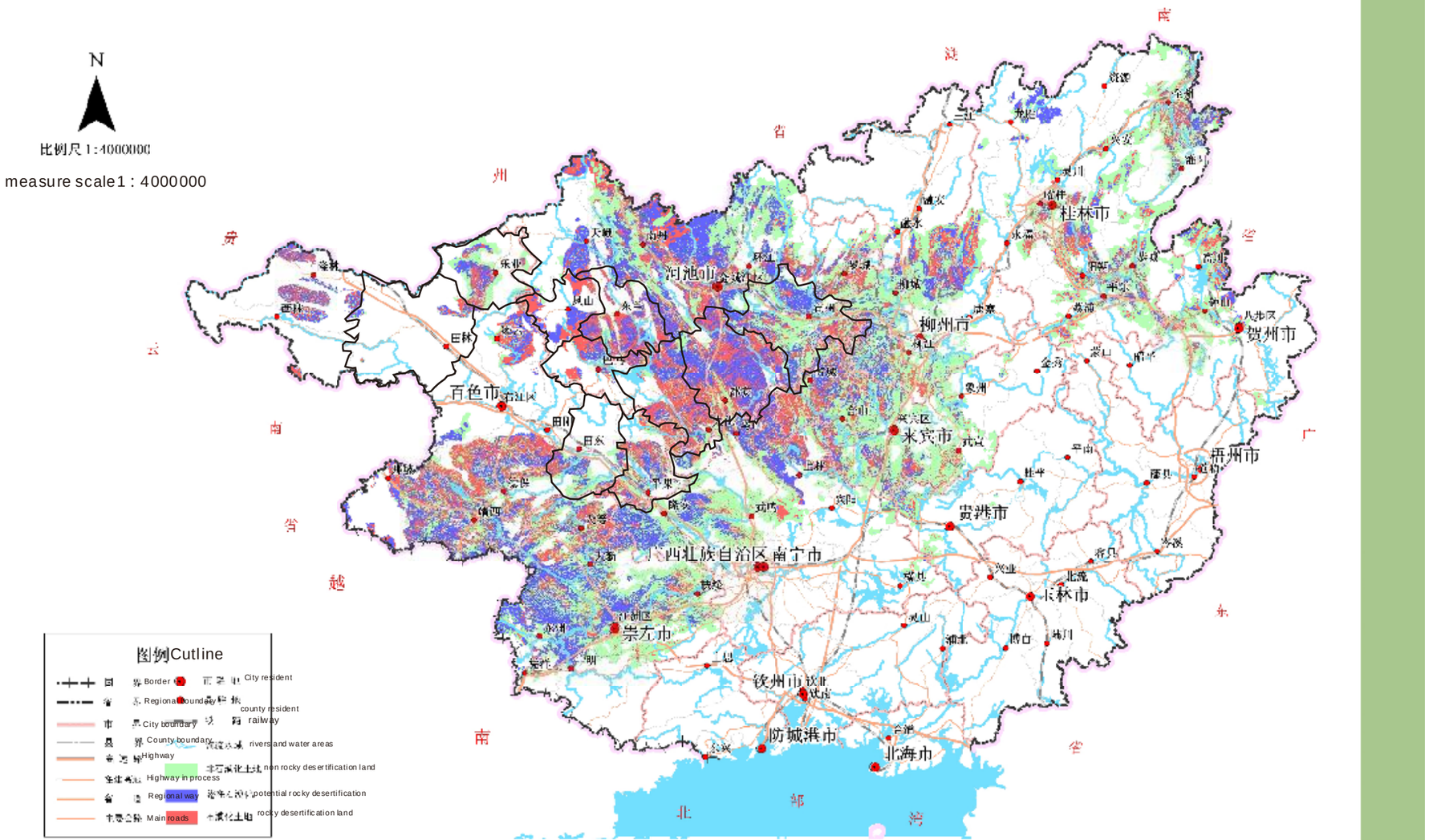


Figure 6 Karst Mountain Degradation land in Project Areas

石灰岩地区石漠化程度分布图 Rocky Desertification Degree Distribution of Limestone Region

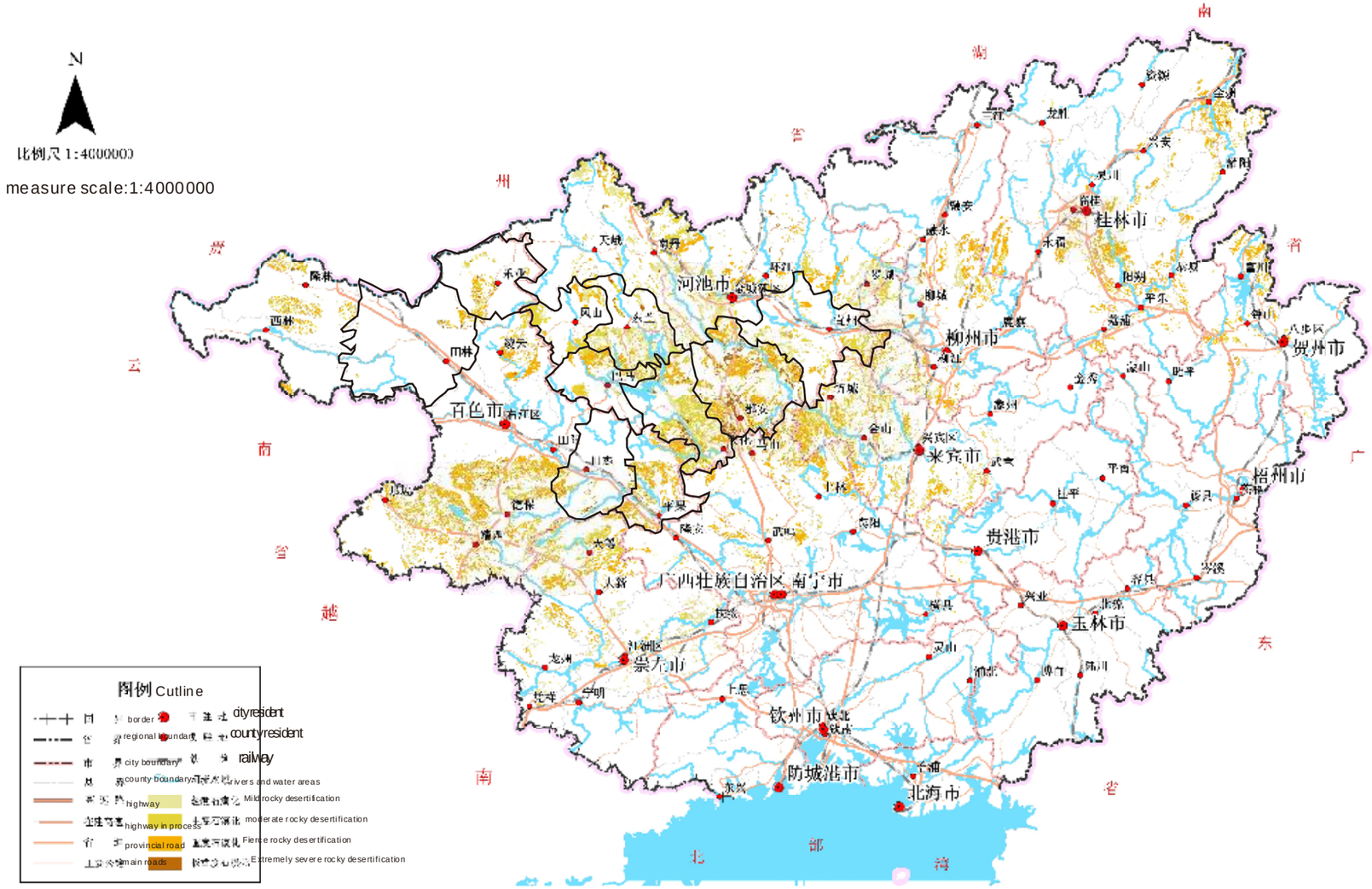


Figure 7 Karst Mountain Degradation in Project Areas

4.4 Main Environmental Issues

4.4.1 Current status of environmental quality

To learn about the quality of the environment, we took the conclusion of the Environment Quality Bulletin 2015 as reference in selecting project areas to make sure they are not in urban estasblished areas and the environmental quality is satisfied.

In 2015, the environmental monitoring station of Hechi City carried out ambient air quality monitoring. Three monitoring points were established and equipped with monitoring systems which monitor 24 hours. Monitored items include SO2 , NO2,, PM10, CO, O3 and PM2.5. The results show that in 2015 the annual average concentration of the sulfur dioxide (SO2), nitrogen dioxide (NO2) and respirable particulate matter (PM10) reached the secondary standard of the "Ambient Air Quality Standard" (GB3095-2012); 24-hour average concentration of nitric oxide (CO) and the daily maximum 8 hours mean concentration of ozone (O3) reached the secondary standard of the "ambient air quality standard" (GB30 95-2012); the annual average concentration of fine particulate matter (PM2.5) exceed the secondary standard of the " ambient air quality standard "(GB3095-2012)

Monitoring on surface water quality by the seven sections of the four major rivers in Hechi City and special monitoring of heavy metals in surface water results show that in 2015 the average quality of seven sections of the monitored surface water meets or exceed III standards of the "Surface Water Environmental Quality Standard" (GB3838-2002). Among them, the compliance rate of the quality of the sections of the Red River in Liupai and Dahua, the quality of the sections of Longjiang in Liujia, Sanjiangkou and Yangmin and the quality of the section of Diaojiang is 100%; and that of Dongjiang Da Huanjiang is 91.7%.

Air Composite Index (AQI) of Baise City in 2015 is at a good level. The number of the good days reaches 323 days. The annual average density of PM10 is 67 micrograms / cubic meter, better than the secondary standard which is 70 micrograms / cubic meter, of the "Ambient Air Quality Standard", decreased by 9.5% compared with 2014. The compliance rate of water quality control at national, provincial and city levels for 14 rivers, lakes and reservoiers in Baise City is 100%. The compliance rate of two centralized domestic water sources at city level and 12 at county level is 100%,

4.4.2 Karst Mountain Degradation

4.4.2.1 Causes

Degradation is caused by natural processes and human factors. Unsustainable development is the major casue.

（1）Human factors. Traditional livelihood in karst area heavily replies on land and natural resources; local communities get used to clear land for farming and herding. With the rapid growth of population, arable land and fuels become ever more scarce. In the past, the people in these karst areas relied heavily on the resource for food and fuel, clear forests to claim land, collect firewood, over grazing and mining all of which degrade the vegetation and cause soil erosion. The mountains lose the protection from vegetation and eventually become bare rocky mountains. This is the typical mountain degradation in the karst areas.

（2）Natural factors. Monsoon is the major climate in Guangxi which is located in subtropical areas. With abundant rainfall, the region's average annual rainfall is generally 1250 ~ 2000mm. In the rain-fed areas the average annual rainfall is 2000mm or more. When it rains heavily and continuously for several days, the land which has lost forest cover loses

protection and soil erosion and sometimes landslides happen, causing desertification. In addition, soil forming in the karst areas is very slow, only 10.4—26t/km² under good humitity and heat. It normally takes 600 to 1,500 years to dissolve a 30-centimeter-thick rock and accumulate 1cm of soil parent material. Soil loss due to lack of vegetation cover has greatly exceeded the speed of soil forming, 6.5 to 17 times. Irreversible soil negative growth is one of the causes of rocky desertification.

4.4.2.2 Degradation Management in Guangxi

Degradation is managed through degradation management programs.

（1）Artificial afforestation, Mountain Closure and Forest Conservation Projects

In the 1980´s, Guangxi commenced a programme including Mountian Closure, Afforestation and Fuel Efficient Actions. At the same time, artificial afforestation was encouraged and trees (bamboo, Rendou and Xiangchun) which were replanted among rocks. Vegetation cover in some karst mountains increases and fuel wood is addressed through continuous mountain closure and afforestation efforts, which has supported the poverty alleviation program.

（2）Rural Ecological Energy Program

In 1997, the government of Guangxi held a field workshop in Gongcheng County to promote the Livestock-Biogas-Plantation model. Since then, Guangxi´s rural energy development entered a rapid development period. In 1998, the Government of Guangxi started a Rural Energy Development Project icovering 100 villages, 50 townships and 20 counties. In 2001, another biogas tank program which was funded by the Ministry of Agriculture was commenced in Guangxi. This program focused on biogas tanks and supported upgrading of kitchens, toilets, livestock stalls, water supply, roads and housing. It was expected to accelerate rural energy development and reduce the use of forest resource, as well improve of rural living conditions through such a program.

（3）Soil and Water Conservation Projects

Soil and water conservation projects were commenced, including farmland protection activities and small catchment management pilot activities, water and soil conservation pilot projects (supported by Central level) in the South and North Panjiang Catchment, the upper streams of the Pearl River (Zhujiang), All of these efforts have greatly improved the erosion and degradation management and management methods and experience.

（4） Resettlement Projects

Since 1993, the Government of Guangxi started a program in which minority groups with harsh natural environment, arable land area per capita less than 0.02 hm2 and problems in food and clothing, are relocated. The resettlement program enables targeted groups to start a new life with better conditions. In one way, it is great support to social and economic development in Guangxi.

（5）Rain Collection Tanks (Water Tanks)

In the karst mountain areas, water supply is always a big problem. In 1997, a domestic water project was commenced and with water tanks established, 1.5 million rural residents´the problem in domestic water was addressed. Building on this project experience, in 1998, a rain collection tank for irrigation activity was implemented. Villagers were supported to set up water tanks at home and in the field to improve irrigation.

（6）Soil Improving Project

Since 1984, Guangxi has been regularly monitoring the soil fertility through 43 monitoring points distributed all over the Province and providing accurate data to improve the quality of farmland. At the same time, new fertilizer development centers and soil experimental bases were established at both provincial and prefecture levels to improve soil fertility and prevent soil from degradation, and increase

productivity.

（7）Cultivated Land Improvement Projects

In responding to the new Land Management Law, Guangxi started a cultivated land improvement project to improve soil, irrigation, roads, woods and shelter belts in all over Guangxi including the karst areas. As a result, farming facilities and the ecological environment are largely improved to enable productivity to be largely increased.

（8）Animal Husbandry and Pastrue Pilot Projects

Since 1998, pasture development and protection has been integrated into animal husbandry and viewed as an important approach to improve animal husbandry. 1. Development of pasture increases pasture supply so it is possible to increase the number of livestock without increasing pressure on natural pasture; 2. It is possible to implement stall feeding, changing the traditional livestock feeding into a more sustainable model; 3. Improving studies and demonstration on pasture development in degraded karts areas.

（9）The Green for Grain Project

The Green for Grain Project was piloted in Donglan and Leye Counties in 2001. In 2002, the Project was fully commenced all over the Province and achievement was notable. Most activities of the Project were implemented in the degraded karst areas. Through the Project, slope vegetation is restored, erosion is mitigated and farmers´income improves. The Project plays an important role in restructuring rural industries.

（10）Karst Degradation Management Pilot Project

In 2001, the Karst Degradation Management Pilot Project was commenced in Guangxi´s 13 counties which were prioritized for the National Poverty Alleviation Program. The Project provided demonstration for degraded land management.

（11）Forest Ecological Compensation Project

In 2001, the government started pilot sites for forest ecological compensation. In 2004, the forest ecological compensation system was implemented and Guangxi was given compensation for public forest and the scale was the same as pilot sites. Implementation of the public forest compensation system largely increases forest managers´ enthusiasm and protection awareness. It is very helpful in enhancing vegetation protection and development and plays an important role in holding back the trend of degradation.

Most of the villages involved in this Project are located in the degraded karst areas. They have limited water resource and arable land area which is the main cause for their poverty. Through discussion with villagers, it is accepted the main approaches for management are: afforstation, mountain closure, ecological energy activities, water tanks, improving soil fertility, the Green for Grain Project (land conversion) and forest ecological compensation project. The proposed Project will support plantation. The crop species (walnut, dragon fruit) selected are suitable for local conditions.

		
Water Tank	Dragon Fruit Growing	Walnut Growing

4.4.3 Other Environmental Issues

Project areas are in poor karst areas which are far away from established urban areas. There is no industrial pollution and the ecological environment is good. Due to poor infrastructure in the rural areas, domestic water is not processed and waste is processed in the incineration established by the New Rural

Development Program. Compared with randomly thrown everywhere, incineration is a much better way but it produces mild air pollution.

Villages which proposed tourism will face a large amount of waste and polluted water when the number of tourists increases dramatically. How to address such problems and make sure tourists have good feelings and experience must be taken into consideration by tourism proposers. For example, the buried micro biological wastewater treatment facilities or make use of the waste disposing systems in the near county town or township to increase disposability should be considered. Crop management in Project villages is still extensive management. Apply of fertilizer is not standard and directed. Animal husbandry is extensive. Stall sanitation is not well managed and animal waste exposes in the open air. Only some biogas tanks use animal waste to produce biogas. Surface water and sanitation are impacted due to uncontrolled waste water. When the proposed Project is commenced, establishment of cooperatives will increase the number of livestock, which means animal waste will increase. Therefore, waste management and environmental capability need to be increased.

There are still no standard design and development for tourism such as homestay or guesthouse. No analysis has been done on the environmental capability. Tourism proposals need to work out protection measures and avoid impact on the environment by good estimate of tourist flow, and avoid too much influence from human activities.

5 Potential Environmental and Social Impacts

5.1 Environmental Impacts

5.1.1 Positive Environmental Impacts

Implementation of components and sub-projects of the proposed Project will follow strictly regulations for environmental protection. Prevention and control measures will be worked out to minimize the impact from project implementation. After the Project is completed, the woodland area will increase by 5591 Ha. Establishment of Bamboo, Camellia, Walnut and Grape will improve water and soil conservation, increase soil fertility, protect water resource, fix sand and mitigate karst degradation, It will be useful in absorbing waste gas, reduce noise, purify air and improve the ecological environment. Development of animal husbandry will provide organic fertilizer, reduce pollution and improve soil fertility. Development of tourism will increase and practice ecological tourist awareness, the environment of the Project Area will be secured and improved by promoting organic fertilizer, efficient chemicals and chemical free pest control approaches by the Project. As well, improved farmers ´competences and environmental awareness will secure the environment improvement of the Project Area.

5.1.2 Environmental Impacts

5.1.2.1 Potential impact from plantation

（1）Impact from implementation

Two types of waste water in project implementation: 1. Ground or soil preparation at the beginning of implementation can cause surface exposure; fertilizer can be washed away and run into rivers, canals and drainage so the suspended substance in the water could increase and affect the near waters; 2. Implementors' produce waste water which would produce organic pollutant and impact the near waters.3.During implementation period, there will be waste gas: ground maintenance, road maintenance and grading, construction of nurseries, burning of tree branches and straws, dust from transportation. The main pollutants include: TSP and PM10. Waste gas from machines and trucks include mainly Nox; waste gas from implementers' burning coal or gas includes SO2. Dust has a greater impact on the environment. NO2 ,SO2 , but they have little impact as the projects are normally in the open air and dust is blown away quickly.

The noise during implementation period would come from transportation, i.e. vehicles. But the construction area is wide and relatively decentralized and the number of vehicles is small, therefore, both urban and rural residents will be less affected.

Topsoil and vegetation will be the solid waste generated from construction of nurseries, sidewalk maintenance and woodland flattening and clearing. However, topsoil can return to the field and vegetation can be used as green manure.

There will not be many workers at construction side as they are local residents who would go home after work. There will not be centralized implementation areas. Garbage generated from implementation workers will be in the village. The New Rural Development Program involves waste disposal, which means waste will be well managed and there will be little impact on the environment.

During the course of land preparing, planting and fostering, there will be damages to the vegetation, which will cause erosion. The number of some species would be decreased in some period.

If camellia, tea trees, mango, mandarin, mulberry and kiwi are established on slopes or flat land, the soil to be used will be a thick layer. In preparing the land (soil), vegetation will be cleared but will cause little soil erosion. When the crops grow to a certain extent, the vegetation will be restored.

If dragon fruit, walnut, grape and bamboo are to be established in degraded karst mountain areas, erosion will happen as slopes are steep, with a thin soil layer and little vegetation. Once the vegetation is damaged, the soil will be washed away and the crops will not survive, and natural disaster could happen. Therefore, it is needed to be careful when preparing land for cropping on karst slopes. Land selection should consider the slope (not so steep), wind, sunshine and drainage (good drainage). And land preparing should be arranged in autumn and winter when there is little rain. Vegetation should be protected instead of being cleared. Damage to vegetation should be as little as possible. In addition to the main crops, it is recommended to grow bamboo, rendou, xiangchun and honeysuckle among rocks, which would enhance restore of vegetation.

（2）Environmental impact from operational period

Application of pesticide and fertilizer will impact surface water and content of N and P will increase. Pesticide will be used for pest control. However, the pesticide to be used will be bio pesticide which has little poison and residue. Therefore, environmental impact is minimized. Pesticide is used only when there is pest epidemic so the application of pesticide is limited.

During operational period, there is potential that pest epidemic happens due to the invasion of alien species and the destruction of human activities on regional ecological balance. Application of pesticide will increase when there is pest epidemic, and can cause damage to others and pollution.

Camellia oil, tea, mango, mandarin, mulberry and kiwi which are proposed for the Project, will be established on slopes and valleys. However, there will be only fruit harvest and pruning. There will not be further clearing (cutting), which would not cause degradation. /erosion. Dragon fruit, walnut, and grape have large root systems which are helpful for environmental improvement (soil conservation). Harvest of bamboo must cut the stems and can cause damage to vegetation. Therefore, it is recommended that rotation should be adopted in bamboo harvesting.

5.1.2.2 Potential impact from animal husbandry

（1）Impact from implementation

Impact from establishment of animal husbandry, mainly establishment of stalls, is the air pollution caused by the dust from digging and moving soil and the transport of cement, lime, and sand, as well as the construction sites. Waste water from cleaning vehicles and drainage can also cause pollution. Other impacts include noise from machines and transportation.

Iin degraded karst areas, establishment of stalls on degraded mountains, quarrying and deforestation are prohibited.

（2）Environmental impact from operational period

Waste water from animal husbandry is generated from cleaning stalls. Such waste water contains high percentage of COD and ammonia nitrogen.

Air pollution from animal husbandry is the fugitive emission of malodorous gases which are generated in stalls, material ground and biogas tanks. Malodorous gas contains ammonia, hydrogen sulfide, methyl mercaptan, methyl sulfide, styrene, acetaldehyde and skatole which can impact the environment and affect the health of the people involved.

Solid waste from animal husbandry include animal waste, residue from biogas tanks and animal dead bodies. Inappropriate disposal can cause impact on surface water and soil.

In animal husbandry in degraded karst areas, uncontrolled goat grazing can cause big problems. The vegetation can be destroyed by goats when grazing is uncontrolled. In some areas, mountains are burnt down in winter to produce new and young grass and leaves for goats, which can worsen the degradation. Therefore, uncontrolled grazing and feeding on karst mountains are prohibited. Animal husbandry must adopt stall feeding and pasture development.

5.1.2.3 Potential impact from tourism

（1）Impact from implementation

When building holiday resorts or guesthouses, digging, filling and bulldozing can cause damages on the environment. i.e. erosion, and spoil the beauty of the natural landscapes. Residue and materials storing in the open air at construction sites and transport of such residue and materials produce dust and pollute the air. Waste water from cleaning vehicles and drainage can also cause pollution. Other impacts include noise from machines and transportation.

（2）Environmental impact from operational period

Tourists and guesthouses produce waste water and rubbish which could cause pollution in surface water when they are not properly disposed. New buildings may not match traditional style and the landscapes. Intensive tourist development can impact the environment and rare and endangered species may be damaged. For example, when using natural pits as scenic spots, environmental capability must be taken into consideration by specification of the number of visitors to avoid impact and damages from over development and human induced activities.

	
Karst Pit	Eroded land in Karst Area

5.1.2.4 Potential impact from implementation of infrastructure activities

（1）Impact from implementation

In implementation, infrastructure activities such as road upgrading, water tanks and irrigation system involve digging, filling and bulldozing, which can cause damages on the

environment. i.e. Erosion. Residue and materials storing in the open air at construction sites and transport of such residue and materials produce dust and pollute the air. Waste water from cleaning vehicles and machines as well as drainage can also cause pollution. Other impacts include noise from machines and transportation. Establishment of road and water tanks on degraded karst mountains which involves digging, quarrying and tree clearing, is prohibited. Degraded karst mountains must be strictly managed using mountain closure and afforestation approaches. Water conservation activities to reduce erosion on karst mountains are encouraged.

（2）Environmental impact from operational period

In operational period, infrastructure sub-projects, e.g. roads, water tanks and irrigation facilities have little impact on the environment. However, noise and dust from vehicles and transportation will produce pollution. Operation of small irrigation (water diversion) systems will make change in water resource management (allocation). Small scale processing factories and market places will produce waste water and other solid waste which need to be properly disposed; otherwise surface water will be polluted.

5.1.2.5 Potential impact from w houses

（1）Impact from implementation

In implementation, establishment of storehouses, market places and small processing factories involve digging, filling and bulldozing, which can cause damages on the environment. i.e. Erosion. Residue and materials storing in the open air at construction sites and transport of such residue and materials produce dust and pollute the air. Waste water from cleaning vehicles and machines as well as drainage can also cause pollution. Other impacts include noise from machines and transportation. Such activities are prohibited in degraded karst mountains as they will involve many people, many vehicles and intensive transportation, which can cause environmental problems.

（2）Environmental impact from operational period

Operation of storehouses will have no environmental impact. However, cold storage involves refrigerant ammonia which has a potential impact on the environment if it leaks from refrigerators. Selection of location for storehouses must follow relevant regulations and environmental risk management plans must be prepared. Waste water from factories and drainage must be disposed and meet biotechnical standards before it is released into surface water body.

5.1.3 Mitigating Measures for Environmental Impact

In responding to environmental impact from implementation and operation of various sub-projects, the Framework has identified mitigating measures. Details are in Table 5.1-1 and Annex 2. There is still uncertain in the Project, that is, new projects could be adopted during the implementation period. Mitigating measures should follow Annex 2, with degradation situation taken into consideration.

Table 5.1-1 Proposed mitigating measures

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
Baise	Pingguo	Ponan Village Xin An Township	Dragon Fruit	Degraded land	Medium degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Balong Village Guohua Township	Dragon Fruit	Potential degradation land	Mild degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Chami Village Taiping Township	Dragon Fruit	Potential degradation land	No degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Yangiang Village Taiping Township	Dragon Fruit	Degraded land	Severe degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		JilinVillage Taiping Township	Dragon Fruit	Degraded land	Severe degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Xinmin Village Haicheng Township	Dragon Fruit	Degraded land	Severe degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Dingdi Village Haicheng Township	Dragon Frui	Degraded land	Severe degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Gaole Village Haicheng Township	Dragon Frui	Degraded land	Medium degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
							karst areas
		Liu An Village Jiucheng Township	Dragon Frui	Non-degradation land	No degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation
		Linlin Village Taiping Township	Mulberry	Potential degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Chami Village Taiping Township	Mulberry	Potential degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Longban Village Pozao Township	Mulberry	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Xingeng Village Jiucheng Township	Mulberry	Degraded land	Medium degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Yongqi Village Haicheng Township	Mulberry	Degraded land	Severe degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Longpai Village Fengwu Township	Mulberry	Degraded land	Medium degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Yongwang Village Bangxu Township	Mulberry	Degraded land	Severe degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
	Tiandong	Lianhe Village Xiangzhou Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Dingyang Village Xiangzhou	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
		Township					
		Daban Village Zuodeng Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Xin An Village Zuodeng Township 村	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Fuxing Village Naba Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Minzu Village Liinfeng Townshi	Bamboo	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Liangyu Village Silin Township	Bamboo	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		NabanVillageYincha Township	Bamboo	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		LixinVillageYinch Township	Bamboo	Degraded Land	Extreme degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Liuzhou Village Naba Township	Bamboo	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
	Tianlin	Genbiao Village Baile Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Bangan Village Baile Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Boé Village Badu Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Zhetang Village Badu Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Nongguang Sanyao Village Lucheng Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Sanyao Village Lucheng	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
		Township					
		Wenhua Village Leli Township	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Baxin Village JAnding Townshi	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Zhenian Village Jiuzhou Townshi	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Pinglin Village Jiuzhou Townshi	Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Guanglong Village Jiuzhou Township	果 Mango	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Gengbio Village Baile Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Bangan Village Baile Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Boé Village Badu Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Zhetang Village Badu Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Nongguang Village Lucheng Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Sanyao Village Lucheng Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Bazhong Village Zhemiao Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	通用的种植类环境减缓措施
		Baheng Zhemiao Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Pingbu Village LizhouTownship	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Wenhua Village Leli Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
		Balai Village Anding Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Changjin Villag Anding Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Baxin Village Jiuzhou Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Zhenian Village Jiuzhou Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Pinglin Village Jiuzhou Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Guanglong Village Jiuzhou Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
	Leye	Dacun Village Tongle Township	Kiwi	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Liuwei Village Tongle Township	Kiwi	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Dadao Village Gantian Township	Kiwi	Degraded Land	Severe degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		BanhongVillage Gantian Township	Kiwi	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Huaping Village Huaping Township	Kiwi	Potential degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Bamu Village Huaping Township	Kiwi	Degraded Land	Severe degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Tangying Village Luosha Township	Kiwi	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Leweng Village Xinhua Township	Tea	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
		Linli Village Xinhua Township	Tea	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Nawei Village Xinhua Township	Tea	Degraded Land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
	Donglan	Jiangdong Village Donglan Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Banlie Village QieXue Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Banlong Village Changjiang Township	Camellia oil	Degraded Land	Mild degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Antao Village Bashou Township	Camellia oil	Degraded Land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Weirong Village Donglan Township	Chicken	Non-degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation
		Banlao Village Aidong Township	Chicken	Non-degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation
		Liutong Village Aidong Township	Chicken	Non-degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation
		Qiexue Village Qiexue Township	Chicken	Degraded Land	Medium degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Gengle Village Changle Township	Chicken	Potential degradation land	Mild degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Renhe Village Sanshi Township	Chicken	Degraded Land	Medium degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Dongli Village	Tourism	Non-degradation	No degradation	Negative impact if not well	General environmental mitigating

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
		Wuzhuan Township		land		managed	measures for plantation
Hechi	Bama	Dena Village Fenghuang Township	Pig	Potential degradation land	Mild degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Changhe Village Fenghuang Township	Pig	Degraded Land	Medium degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Bana Village Xishan Township	Pig	Potential degradation land	Mild degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Hele Village Xishan Township	Pig	Potential degradation land	Mild degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Poteng Village Bama Township	Tourism	Degraded Land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation
		Banyang Village Bama Township	Tourism	Non-degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation
		Donglie Village Nashe Township	Tourism	Non-degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation
		Yanting Village Yandong Township	Camellia oil	Degraded Land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Pingliu Village Suolue Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Langyin Village Suolue Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
	Fengshan	Changzhou Village Changzhou Township	Camellia oil	Degraded Land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
		Nale Village Changzhou Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Na Ai Village Changzhou Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Banren Village Changzhou Township	Camellia oil	Degraded Land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		BanlunVillage Changzhou Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Langli Village Changzhou Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Nalao Village Changzhou Township	Camellia oil	Degraded Land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Heyun Village Qiaoyin Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Nawang Village Qiaoyin Township	Camellia oil	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Shanglin Village Qiaoyin Township	Camellia oil	Degraded Land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Tongle Village Qiaoyin Township	Walnut	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Wenli Village Qiaoyin Township	Walnut	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Pocha Village Jinya Township	Walnut	Degraded Land	Medium degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Gengsha Village Jinya Township	Walnut	Degraded Land	Medium degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
							karst areas
		Longwang Village Jinya Township	Walnut	Degraded Land	Medium degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
	Du’an	Yongji Village Yongán Township	Mulberry and Silk Cocoon	Degraded Land	Severe degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Liuli Village Chengjiang Township	Chicken	Non-degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation
		Yuanli Village Bao An Township	Chicken	Potential degradation land	No degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Wudong Village Gaoling Township	Goat	Potential degradation land	No degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Yijiang Village Gaoling Township	Goat	Degraded Land	Mild degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Jiacha Village Gaoling Township	Goat	Potential degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Nongming Village Gaoling Township	Goat	Degraded Land	Extremely severe degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Fuxing Village Gaoling Township	Goat	Potential degradation land	Medium degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
							karst areas
		Jiating Village Gaoling Township	Goat	Degraded Land	Severe degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Jiaquan Village Gaoling Township	Goat	Potential degradation land	Mild degradation	Negative impact: worsening degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
	Dahua	Renliang Village Dahua Township	Grape	Degraded Land	Severe degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Longma Village Dahua Township	Grape	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Jiacheng Village Duyang Township	Grape	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Jiasi Village Liuye Township	Grape	Degraded Land	Medium degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Longkou Village Dahua Township	Mandarin	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Dunsu Village Dahua Township	Mandarin	Non-degradation land	Mild degradation	Positive impact: improving degradation	General environmental mitigating measures for plantation
		Duyang Village Duyang Township	Mandarin	Degraded Land	Medium degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Zhongwu Village Duyang Township	Mandarin	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Wucheng Village Duyang Township	Mandarin	Non-degradation land	No degradation	Positive impact: prevent degradation	General environmental mitigating measures for plantation
		Huashan Village	Mandarin	Non-degradation	No degradation	Positive impact: prevent	General environmental mitigating

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
		Liuye Township		land		degradation	measures for plantation
	Yizhou	Yantian Village Liu San Jie Township	Mulberry and Silk Cocoon	Potential degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Gudong Village Liu San Jie Township	Mulberry and Silk Cocoon	Potential degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Guwen Village Xiangbei Township	Mulberry and Silk Cocoon	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Latuo Village Xiangbei Township	Mulberry and Silk Cocoon	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Baitun Village Anma Township	Mulberry and Silk Cocoon	Degraded Land	Severe degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Xiao Ai Village Anma Township	Mulberry and Silk Cocoon	Degraded Land	Severe degradation	Negative impact if not well managed	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Latan Village Anma Township	Mulberry and Silk Cocoon	Degraded Land	No degradation	No impact	General environmental mitigating measures for plantation
		Kenba Village Anma Township	Mulberry and Silk Cocoon	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Guyu Village Anma Township	Mulberry and Silk Cocoon	Non-degradation land	No degradation	No impact	General environmental mitigating measures for plantation
		Baiwei Village Xiangbei Township	Mushroom	Potential degradation land	No degradation	No impact	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Gudong Village Liu San Jie	Mushroom	Potential degradation land	Potential degradation land	No impact	General environmental mitigating measures for plantation and mitigating

City	County	Village/Township	Proposed Industry	Degradation Land Type	Status quo of Degradation	Impact on Degradation	Mitigating Measures
		Township					measures for plantation in degraded karst areas
		Yantian Village Liu San Jie Township	Mushroom	Potential degradation land	No degradation	No impact	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Baitun Village Anma Township	Mushroom	Degraded Land	Severe degradation	No impact	General environmental mitigating measures for plantation and mitigating measures for plantation in degraded karst areas
		Guwen Village Xiangbei Townshi	Tourism	Non-degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for tourism
		Latuo Village Xiangbei Townshi	Tourism	Non-degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for tourism
		Yantian Village Liu San Jie Township	Tourism	Potential degradation land	No degradation	Negative impact if not well managed	General environmental mitigating measures for tourism

5.2 Social Impacts

Formulation of social impact follows the Social Impact Assessment Report. Social impact assessment provides assessment on project impact on the poor, women, minority groups and land requisitioned.

5.2.1 Analysis on project impact on the poor group

5.2.1.1 Positive impact

（1）Enhance industrial restructuring and develop direct industrial chain in market demand .

The traditional model, still the main model in project village is farming on household basis. Farmers involve in only production. Industry is not developed. Farm product is challenged by the market due to low production and quality. The Project will use the market as the entry point and try to largely increase poor households´income by supporting development of local specialties which would have better market expectation. The Project will also support development of Farmer Cooperatives and assist Cooperatives to establish connection with markets ends. It is expected to use such project intervention to improve rural economic development and restructure rural industries, and eventually improve the income of rural poor residents.

（2）Enhance organizational level of farmers and improve farmers´ competences and management skills

Individual household business is the main model currently. It is hard to improve marketing due to small scale of production and the lack of information. The Project will support setting up farmer cooperatives and through the cooperatives, put poor households together to form larger strength so that their production scale, quality and price are increased, It is as well expected to use Cooperatives to reduce the costs for farming and develop better markets. The Cooperatives, after established, should provide technical training and management training for poor households (members) as well as information. And through training and information provided by FC, poor households update their skills and knowledge, develop new competences and adopt new and better management models for their production.

（3）Improve infrastructure to improve rural residents´ production and living conditions

The Project will improve the infrastructure in project areas so that villagers in project areas have the basic conditions for development of various specialties. Improved infrastructure will mean that the poor villagers have opportunities for development as infrastructure for production, tourism and for their own living is improved, which is significant for improving health and living standard of the targeted groups.

（4）Increase farmers ´income by enhancing development of local specialty industries

The Project aims to increase poor households´income by enhancing the development of the existing specialty industries, e.g. expanding production scale, increase standardization and industrialization, as well as reduction in costs and increase in quality to secure better prices.

（5）Drive economic development in project areas

The Project will drive the development of related industries and rural economy. It is helpful for industrialization and restructuring. When the market is developed and expanded, there will be more opportunities for income generation. At the same time, enterprises such as processing factories and storehouses will be set up and employment will be increased.

5.2.1.2 Potential risks

（1）Livelihood risks

The costs for some of these industries are high. Poor households lack the start-up funds. The high costs and low affordability will directly affect the enthusiasm of households involved as well as the economic benefit of the Project.

（2）Technical risks

Market based and chemical free, which is oriented for specialty industries, will need intensive management. However, poor households are still used to the extensive management model. This will not only affect the quality of the product but will break the industrial chains developed by the Project. Economic and credit losses will happen when the quality required by the sales companies is not fulfilled.

（3）Market risks

Problems which may be raised in quality control, whether consumers accept the product and unpredictable problems will create risks for poor households who have only one product structure. Some industries, for example tourism, have not developed models to follow. How to develop a stable market is unclear.

（4）Risk sharing

How to develop a profit sharing mechanism between Leaders of FC and poor households to achieve win-win result are a challenge and also one risk.

5.2.2 Project impact on women

5.2.2.1 Expected positive impact

（1）Positive impact on family and production

Industrial development provides opportunities for women to work at home. They can work and look after their families at the same time. Production can be organized in the form of cooperatives. Women´s workload is reduced as they can take work suitable for labor force of the family. Women´s income will increase if product quality is increased and the market is stable

a.Improved women´s competencies

Women´s skills, abilities and awareness will be increased by participating in training and operation of FC.

b.Improved living standard

Income will be increased by participating in project implementation and living standard will be improved. Women who handle social affairs for the family will be more confident. Participation in FC opens a wider door for women expose themselves to the community, through which they learn new things and information.

c.Improved status at home and outside

When women must stay home looking after their families they have little income so their status is low. When they are involved in FC they have better income while looking after their families at home. Their skills, competences and awareness increase so their status both at home and outside increases. Women participating in FC and training have a voice. In FC and training they are involved in discussion, recommendation and decision making so their voice is heard.

5.2.2.2 Potential risks for women

Social and economic surveys, interviews, workshops and internal discussion were undertaken to assess impact on women. The results indicate that in general the Project will enhance women´s development and address problems of women and their families, and enhance women´s strategic status. However, there is potential risk that women benefit little or are excluded from the Project if there is little gender awareness in project design, implementation and management. The potential risks are:

（1） Low level participation of women in FC

a.Low level participation of women in FC management and decision making. In over half of the existing FCs, there are no women managers. All FC leaders or directors are men. In some FCs, there are women at management level, but they work as assistants and are not involved in decision making. Therefore, in designing the Project Operation Manual, it is needed to specify the involvement of women in management and detailed measures for increasing gender awareness.

b.Low level participation of women in specific activities in FC. Members of FCs are households with men´s names. It is very rare that households join in FCs in the name of women except that the man and the woman join in two different FCs. In connection with the market, sales and related decision making involve mainly men. Women rarely are involved in decision making. Only when the man is not at home, the woman has a chance to participate. Even though, women have no voice in such cases. In related training, participants are mainly men. If such trend is not reversed, the gap between men and women will be expanded, which will create negative impact on women.

（2）Increase women´s workload

In industrial development of FCs, there will be both employment opportunities and increased workload for women. If women from poor households obtain profit not by shares of land and investment, instead, by providing labor force (working), their workload will be largely increased.

5.2.3 Impact on minority groups

Minority groups in project areas support the Project and the development of FCs. Project activities will bring no conflict to their original livelihood, culture and traditions. No potential risk has been found from the perspective of development of minority groups in social impact assessment.

Identification, analysis and screening of minority groups show that there are Zhuang, Yao, Miao and Maonan ethnic groups in project areas, and it is more important that they are the vast majority, taking up most of the population. These ethnic groups have their own features in social structure, culture, traditions, languages, social communication and religions which are different from the main stream. To identify the real need of these groups and make sure project activities and implementation fit in their culture, World Bank social specialists and the assessment team decided there is a need to formulate a Minority Group Development Plan which is in Annex 5.

5.2.4 Impact from Land Acquisition and Demolition

It has been confirmed that Land acquisition and demolition will be involved in Component 1-3: development of Industrial Chains; Infrastructure; Poverty Reduction Industries and Financial Support) in Bama, Leye and Pingguo Counties. It is predicted that collective and state own land is involved. Component 1 in other counties will involve land use and adjustment inside the community, as predicted. Some ground structures and attachment will be broken down or removed but no houses are involved. The scale and number of households are not clear. Plans are being worked out. As required by the Bank, a Resettlement Policy Framework has been formulated and the details are in Annex 3.

5.3 Existing Environmental Management Issues and Management

Household business is the current crop farming model, without technical support or instructions. Application of pesticides and fertilizer is under guidance of the local Plant Protection Station. Fertilizer or pesticides is Manure or compound fertilizer or low-toxicity biological pesticides

The same as in animal husbandry, household business is still the major model, without developed and standard stalls. Animal waste goes into the field after composting. It is rarely used for biogas tanks. Waste water from stalls is not disposed.

5.4 Analysis on Impact of Project Activities

Analysis on impact of project activities is indicated in the following table:

Table5.1 Analysis on Impact of Project Activities

Environment / Activity	Natural Environment			Social Environment		
	Ecosystem	Solid Waste	Air	Living Standard	Compensation	Local Economy
Afforestation						
Mulberry	+/-		+	+		+
Camellia	+/-		+	+		+
Walnut	+/-		+	+		+
Mango	+/-		+	+		+
Infrastructure						
Passage	-	-	-	+	-	+
Water Tank				+	-	+
Storehouse	-	-	-	+	-	+
Tourism						
Homestay Hotel	-	-	-	+	-	+
Livestock						
Pig	-	-	-	+	-	+
Goat	-	-	-	+	-	+
Chicken	-	-	-	+	-	+
Note: “+” means benefit/profit “-” means negative impact “+/-” means both						

6 Gap Analyses

The proposed project is a World Bank loan project. It is needed to follow not only the Bank's relevant safeguard policies, but also the host country China's laws and regulations. Analysis is carried out as the following table, 6.1-1 to analyze the difference between the Bank´s policies involved by the Project and China relevant laws and regulations.

Table6.1-1 World ´Bank´s Safeguard Policies and China´s Laws and Regulations

No.	World Bank Policy	Law of China	Stipulation of China´s Laws
1	OP 4.01 Environmental Assessment	Environmental Protection Law of China	Pollution prevention facilities should be designed, implemented and operated together with the main project. Pollution control facilities shall meet the requirements of the approved environmental impact assessment documents, and are not allowed to dismantle or idle. Department responsible for approving environmental impact assessment documents should publicize the document after receiving the document, except for matters involving state secrets and commercial secrets, documents should be fully disclosed; If it is found that a document is not open for public comments, the implementing agency is asked to publicize the document for public opinions.
		Environmental Impact Assessment Law of China	Environmental impact assessment must be objective, open and fair. Any impact from planning or implementation on the environment must be considered, providing accurate data for decision-making. The Government encourages relevant entities, experts and the public, in an appropriate manner, to participate in environmental impact assessment. Implementers should prepare an environmental impact report, environmental impact statement or fill out environmental impact registration forms (hereinafter referred as the environmental impact assessment document) 1. An environmental impact report is needed to be prepared to comprehensively assess any potential significant environmental impact. 2. An environmental impact assessment statement (form) is required if the project could cause mild environmental impact, 3. If the impact is minor, which needs no environmental impact assessment, it is needed to fill out environmental impact forms.
		Soil and Water Conservation Law of China	Local government at various levels shall, according to soil and water conservation plans, adopt Enclosure and Protection, Natural Restoration measures and should organize afforestation to expand the area of forest and grass coverage, conserve water resource and reduce soil erosion. In areas where there is severe soil erosion and the ecosystem is fragile, activities which may cause erosion are prohibited or limited, and plants, sand shell, crust and lichen are strictly protected.
2	OP 4.04 Natural Habitats	Wildlife Protection Law of China	Wildlife and its habitat are protected. Illegal hunting or damage is prohibited. Wildlife responsible department in the State Council and at local levels should

			designate nature reserves for wildlife. Protection and management of wildlife and its environment needs to be strengthened. Zoning and management of nature reserves follow the State Council´s regulations.
		Nature Reserve Protection Law of China	Ecosystems well preserved in nature reserves, habitats for rare and endangered species should be designated as core areas where no one is allowed to enter. and studies are not allowed unless it is approved. A buffer, area can be designated out the core area. Only studies are allowed in the buffer area. Outside the buffer area is the experimental area where people can conduct experiment, education, learning and tourism, as well as acclimation, and breeding of rare and endangered species.
3	OP 4.09 Pest Management	Agriculture Law of China	Governments at all levels should establish systems for safe use of production materials. Farmers and others are not allowed to sell pesticides, medicine, feed additives and production materials which are out of date and prohibited to use. Agriculture authorities should guide farmers and production operators to adopt biotechnology in disease and pest prevention and control.
		Animal Husbandry Law of China	The government above county level should organize animal husbandry authorities to strengthen monitoring, supervising and management of animal husbandry environment, and quality, as well as trading and transportation management.
		Animal Epidemic Prevention Law of China	Veterinary authorities of local people's governments above the county level organize the implementation of compulsory immunization program. The township government, urban neighborhood offices shall organize compulsory immunization within their jurisdiction. Units or individuals who keep animals must perform obligations in compulsory vaccination and follow the requirements of the veterinary authorities.

4	OP 4.11 Physical Cultural Resources	Cultural Relics Protection Law of China	Local government is responsible for protection of cultural relics within its jurisdiction. The department in charge of protection of cultural relics within the government above county level implements supervision and management over the cultural relics within its jurisdiction. 。 Government at all levels shall pay attention to protection of cultural relics and balance the relationship between economic development, social development and protection of cultural relic Infrastructure and tourist development must follow relics protection principles and should not have any damage on cultural relics.
5	OP 4.36 Forestry	Forest Law of China	Forestry Sector of the State Council and government at provincial level shall strengthen protection and management by designating reserves in typical forest ecological area, forests for growth and reproduction of their rare animals and plant, and natural tropical rain forest areas and other natural forest area with special conservation value. Regulations for nature reserves are produced by forestry administrations of the State Council and submitted to the State Council for approving. Rare and spacious species outside nature reserves and plant resource with special values in forest areas shall be seriously protected. Deforestation and collection of such species are prohibited unless approved by provincial forestry department.

It is indicated in Table6.1-1 that china has laws and regulations corresponding to the Bank´s safeguard policies involved in the Project. There is not a large gap between World Bank´s safeguard policies and China´s laws and regulations.

7 Procedures to Address Environmental and Social Security Issues

7.1 Summary

Figure 8 indicates the procedures for processing environmental and social security issues for sub-projects adopted by the Project. The main procedures include:

1. Proposal. Sub-projects can be proposed by FC (individual households submit applications to FC) or enterprises. The proposals will then be submitted to County Project Offices. At county level, the proposals will be screened using the review forms in Annex 1. Referring to related national policies and regulations, the Provincial Project Management Office will identify the level and the feasibility of the proposed projects.

2. After screening, the project applicant is asked to prepare environmental and social impact assessment documents. Some will be asked to submit general environmental management plans and disease and pest management plans if the proposal involves land requisition, a resettlement plan is needed to prepare in accordance with the resettlement policy framework. Minority group development plan applies to projects whose implementers are minority group.

3. Following the above documents, the first projects will be reviewed by the Bank to ensure the operation of the projects, and then by provincial PMO, according to the situation of the sub-projects.

4. Public Participation and Information Disclosure. Information disclosure can be conducted on the internet, in newspaper or posters. Information includes basic information of the project, EIA processes, and conclusion of the EIA and how the public obtains EIA report. EIA report can be electronic or paper. Public involvement shall adopt questionnaire, interview, consultation and others. The first projects will be the first projects will be responsible by the Bank, disclosed by the Bank on the Bank´s website. Sub-projects approved later which are responsible be provincial PMO, will be disclosed on local public notice board and government websites. 。

5. Project Implementation. First, the implementer of the project must be clear. In general, implementers are households, cooperatives or enterprises. And then the supervisor can be identified. Normally, supervisors are County PMO, Environmental Protection Bureau or Water Conservation Bureau. Supervising shall be undertaken in a quarterly basis. Supervising content includes operation of environmental facilities and implementation of water and soil conservation measures. If any environmental issue is found, County PMO shall be informed and the implementing agency is asked to take actions immediately.

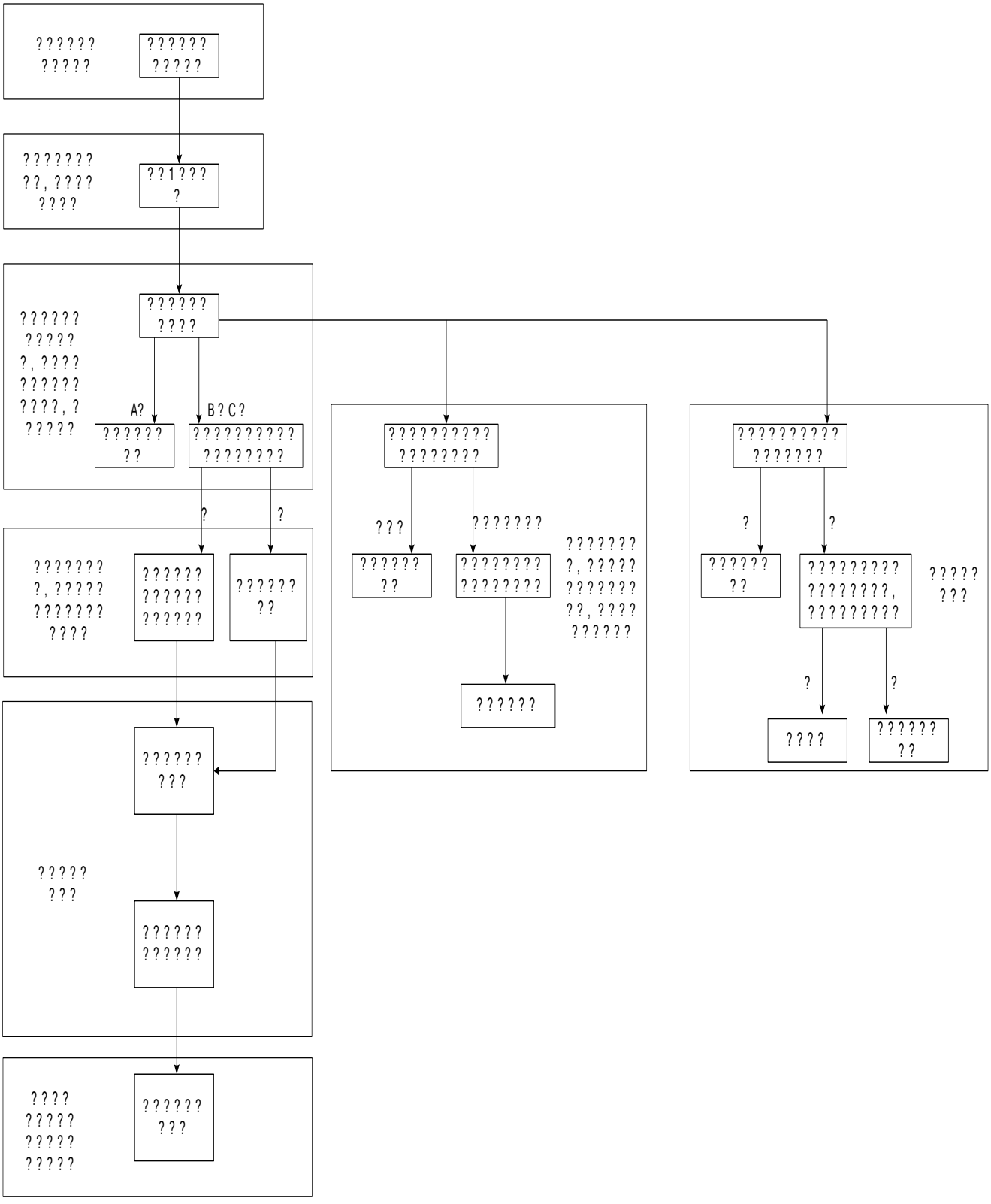


Figure 8 Procedures for Processing Environmental and Social Problems

7.2 Screening of sub-projects (step1)

Sub-projects under the Project will be specified during the Project implementation period. Only those which meet the conditions for entering the Project are funded. According to principles for entering the Project, any sub-project classified as Category A, i.e. with potential major environmental and social impact, will not be adopted.

Project planning uses participatory approaches. Sub-projects are proposed by FCs (individual households submits application to FCs and enterprises (which are funded by counterpart funds) during the Project implementation period. The first screening is conducted at county level by County PMO. The proposals are then screened at Provincial level using Annex 1 to identity the category of the project. If the project is identified as Category A, it will not be supported by the Project. If a project is classified as Category B or C that means it will go into next step. Provincial and County PMOs save the completed and signed screening forms.

Annex 1 provides guidelines for filling environmental and social screening forms for security issues.

7.3 Preparing Environmental and Social Documents （step2)

Annex 2 and 4 provide general environmental management plans and general disease and pest management plan. They apply to the first sub-projects entering the Project. The later sub-projects, if needed, will be improved by the applicants according to the environmental and social issues. 3 provide a resettlement policy framework. Sub-projects involving land requisition and resettlement must provide resettlement plans which shall be prepared by the social impact assessment agency entrusted by the PMO.

Plantation projects- the Project will support dragon fruit, camellia oil, walnut, bamboo, grape, mandarin, kiwi and tea. Which will be established on karst mountains and slopes? Annex 2 Part 1, Project General Environmental Management Plan provides requirements for selection of locations, species, implementation, land preparing, planting and maintenance. They must have the impact in reducing erosion, water pollution, pesticide, agricultural solid waste and potential physical cultural resource. For the plantation in degraded karst areas, the General Management plan provides special requirements for seeds, nursery, planting and management.

Annex 4, Disease and Pest Management Plan provides approaches, measures, implementation arrangement, management and monitoring which are based on IPM.

Sub-project owners (FC and enterprises funded by counterpart funds) should provide supplement to the General Environmental Management Plan, according to the environmental and social screening for plantation sub-projects.

For animal husbandry, the Project would support pig, goat, yao chicken, black chicken and mulberry and silk cocoons. Main stalls include small scaled pig styles, goat stalls and chicken stalls.， Annex 2 Part 2 , general environmental management plan provides requirements for selection of locations, implementation and operation for animal husbandry. They must have the impact in reducing erosion, water pollution, noise, smell, solid waste and potential. For the plantation in degraded karst areas, the General Management plan provides measures for preventing erosion, vegetation damage and waste pollution.

Annex 4, Disease and Pest Management Plan, provides requirements for IPM principle based Livestock disease control, veterinary methods used and implementation arrangements,

Project owners (FC and enterprises funded by counterpart funds) should provide supplement to the General Environmental Management Plan, according to the environmental and social screening for animal husbandry sub-projects.

For infrastructure sub-projects, the Projects would support small-scale activities such as roads, water tanks and water diversion facilities. Part 3 of Annex 2 general environmental management plan provides requirements for selection of locations during design, implementation and operation periods. They must have the positive impact in reducing erosion, air and water pollution, noise, smell, solid waste and potential. For the plantation in degraded karst areas, the General Management plan provides measures for preventing erosion, vegetation damage and waste pollution, avoid potential reverse impact on physical cultural resources. This plan provides measures for erosion control and prevention, vegetation damages and soil and water conservation.

Project owners (FC or village committee) should provide supplement to the General Environmental Management Plan, according to the environmental and social screening for small-scaled sub-projects.

Storehouse sub-projects---The Project supports development of warehouses, refrigerators, small farmers market, and small-scale processing enterprises. Part 4 of Annex 2 generic environmental management plan for small scaled infrastructure, provides requirements for selection of locations during design, implementation and operation periods, as well as measures for reducing erosion, air and water pollution, noise, smell, solid waste and potential. For the plantation in degraded karst areas, the General Management plan provides measures for preventing erosion, vegetation damage and waste pollution, avoid potential reverse impact on physical cultural resources. In degraded karst areas, such sub-projects should be avoided.

Project owners (FC and enterprises funded by counterpart funds or village committee should provide supplement to the General Environmental Management Plan, according to the environmental and social screening for warehouses sub-projects.

For tourism----the Project would support tourism related sub-projects, including home stay and guesthouses. Part 4 of Annex 2 provides general environmental management plan for tourism, provides requirements for selection of locations during design, implementation and operation periods, requirements for coordination between buildings and artificial landscapes, measures for reducing erosion, air and water pollution, noise, smell, solid waste and potential cultural resources. Dissemination of environmental protection knowledge is required.

Sub-project owners (FC or Village Committee) should following screening of environmental and social problems which may be raised from tourism, and provide necessary supplement.

7.4 Public Consultation and Information Disclosure （Step 3）

Information disclosure and public consultation of the Project includes two types of documents: 1. Environmental and Social Management Framework and attachments. 2. Environmental and social documents of sub-projects which will be prepared during implementation period.

In compliance with OP4.01, information disclosure and public consultation has been undertaken for the Environmental and Social Management Framework and its attachments, and Social Assessment when preparing the Project. Details are in Chapter 9.

During project implementation, in principle, information disclosure and public consultation shall be conducted for environmental and social documents of sub-projects. Impact of sub-projects should be considered. Sub-project design and implementation should be combined with public participation (consultation). Information disclosure and public consultation must meet the requirements of national regulations and the Bank´s OP4.01.

Owners of sub-projects are responsible for information disclosure and public participation,

and submit the records of public participation and environmental and social documents to provincial PMO. Provincial PMO save the submitted documents in sub-project file

Content of sub-project information disclosure and public consultation should include:

- When shall the public be informed to participate? Sufficient time should be given to the public to participate (not less than two weeks. The documents should be publicized in sub-project areas, such as village committee, information center of the local government.
- How and where shall public participation be undertaken? Meetings, interviews and questionnaires.
- Main environmental and social problems
- Agreed measures to address the above environmental and social issues.

The above records of public participation should be together with environmental and social environment documents publicized at local level.

7.5 Review and Approval (Step 4)

Within the Project Management Framework, provincial PMO is responsible for review and approve all environmental and social documents. If a sub-project, according to the EIA Law and other regulations, is required to be submitted to department in charge for improvement, the owner of the sub-project must prepare documents and submit for review and improvement.

7.6 Implementation, Supervision, Monitoring and Reporting (Step 5)

Environmental and social documents must be enforced and implementation. Sub-project owners must make sure the environmental management plan, pest management plan, resettlement plan and minority group development plan are implemented. Provincial, City and County PMOs supervise sub-project owners to make sure the measures are implemented.

In designing sub-projects, owners must make sure environmental protection and selection of locations and other environmental protection instruments are included in detailed activity design. Sub-projects which need contractors or implementing agencies, should integrate measures into bidding documents and construction contracts, to make sure contractors or implementing agencies implement environmental protection instruments.

When implementing sub-projects, owners will regularly report to County PMO on project progress. Progress reports should include implementation progress of environmental and social documents, including environmental and social issues and instruments adopted. County PMOs submit documents to provincial level. If problems are found, PMO at all levels should be called for meetings with related departments to identify problems. Field visit to identify solutions should be undertaken if necessary.

Provincial PMO should submit 6 month report on project progress, including implementation progress of environmental and social action plans of all sub-projects, main problems and solutions and schedule.

8 Grievance Redress Mechanism

During project application and implementation, the complaint and grievance mechanism is developed in a transparent and effective manner to address complaints of villagers and guarantee successful implementation and land compensation of the project. The grievance mechanism can also be applied to address the relevant problems during project implementation period. The basic grievance channels are as follow:

Phase 1: If villagers are not satisfied with project implementation, they can make an oral or written grievance to the Village Committee which will make records of the oral grievance and respond to all grievances in 2 weeks.

Phase 2: If villagers are still not satisfied with the responses of Phase 1, they can make grievance to the Township PMO after receiving the response. The PMO should respond in 2 weeks.

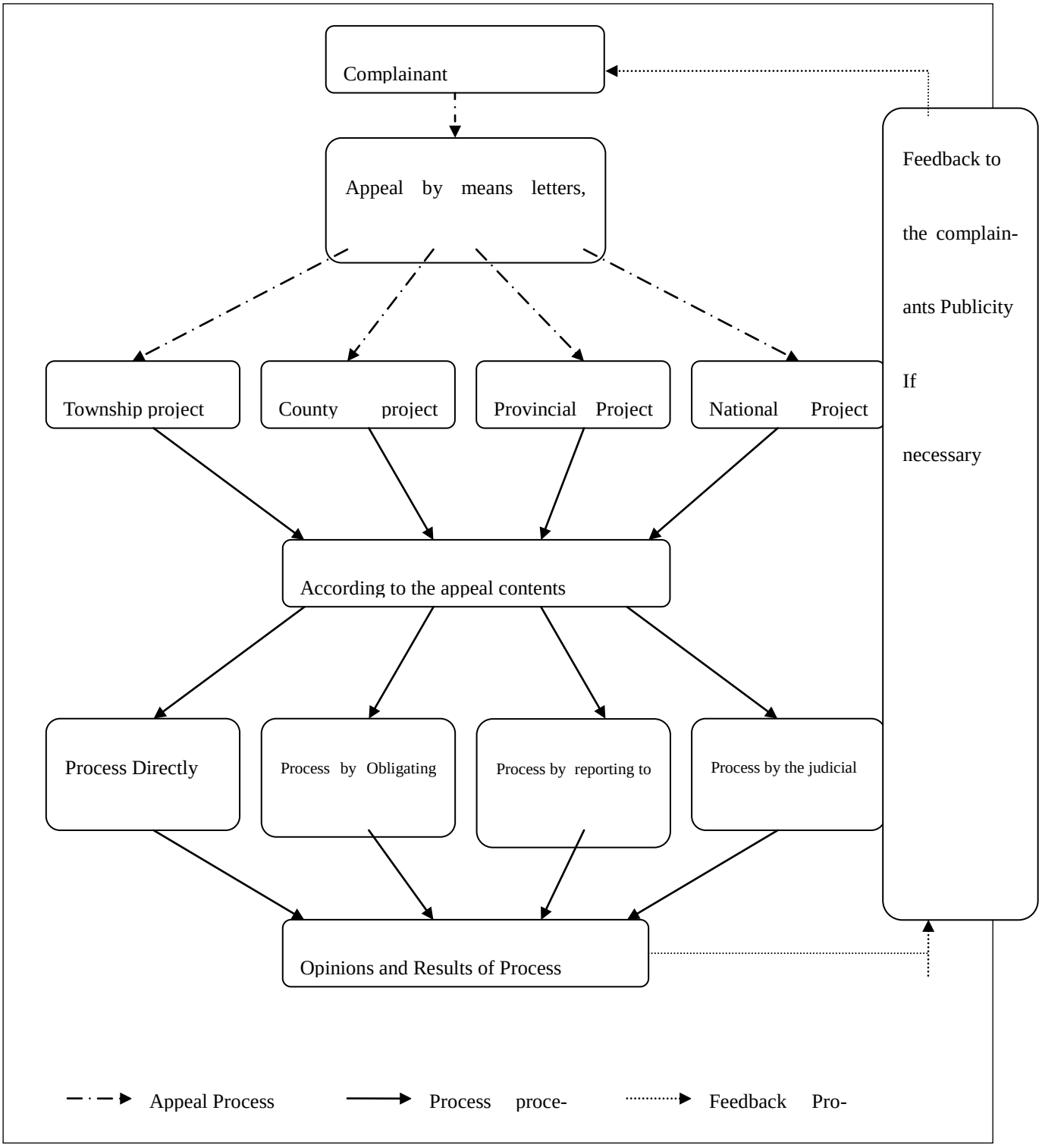
Phase 3: If unsatisfied, villagers can make grievance to the County PMO after receiving the response of the PMO. The County PMO should respond in 30 days.

Phase 4:Those who are still unsatisfied can raise an administrative litigation to the City Courthouse. All grievances and responses will be kept by County PMOs.

The affected can make grievance related to all aspects of project plan and implementation, including the selection of beneficial households. All information on grievance mechanism, accepting agencies, locations, responsibility and contacts will be publicized by meetings and notices to households and improve their awareness of grievance rights.

All relevant institutions will accept project households' complaints and grievances for free. The relevant expenditures will be reimbursed from the unexpected costs of the project. The grievance procedure takes on effect along with the whole project implementation in order to guarantee households' rights of dealing with related issues.

Figure 9 Complaint and Appeal Procedures


Complainant
Appeal by means letters,
Township project
County project
Provincial Project
National Project
According to the appeal contents
Process Directly
Process by Obligating
Process by reporting to
Process by the judicial
Opinions and Results of Process
Feedback to the complain-ants Publicity If necessary
Appeal Process
Process proce-
Feedback Pro-

9. Public Consultation and Information Disclosure

Public participation, as a method, helps to understand the attitude and views of social groups and the common people on construction project, and as an opportunity, involves the general public in environmental impact assessment of construction project for better democratization and publicization. It avoids the one-sided decision-making and lowers the resistance in future implementation. Under the Law of the People's Republic of China on Environmental Impact Assessment and relevant regulations of the World Bank, EIA of construction project must carry out the wide consultation.

1. The general public will be informed on the project objectives, scale, location, possible pollution on the surrounding areas during and after project construction and planned countermeasures. When their comments are widely collected, the project can be better supported.

2. Consulting the local residents' experiences and feelings on their living environment will help to analyze the current condition of all relevant environmental factors, provide an objective basis on EIA and protect the benefits of the public.

According to the real situation, household survey will be carried out in project areas.

Guangxi Foreign Capital Poverty Reduction Project Management Center (Guangxi PMO) and all relevant agencies of 10 project counties (cities) have carried out a series of surveys and public opinion consultancy since Nov, 2014. During the project preparation, the development groups of social assessment and project feasibility reports and EIA agencies have publicized the relevant project information and carried out the informed consultation and adequate public participation in advance.

（1）Publicity and Notices on Relevant Project Information

1）From July 2015 to March 2016, 10 project counties (cities) competed in open way. 117 villages were prioritized from almost 200 villages.

2）In late 2015, 10 project county (city) PMOs have selected 2-3 project villages respectively in each county, held early publication on project objectives and technologies, and promoted the local community to prepare the establishment of the cooperatives.

3） From Nov 2015 to Apr 2016, the project was publicized to the public during social assessment, feasibility study and environmental impact assessment.

（2）Consultancy and Field Survey

Public consultancy and survey on social assessment: SA development group carried out the field visit to the project areas and about 10 Counties (cities) involved from Nov, 2015 to Apr, 2016. By means of questionnaires, meetings and interviews, the group had a fair idea about the production and living conditions of the relevant project households and made detailed records about their comments and suggestions on project implementation. It also made consultancy and interview to the relevant stakeholders through seminars and group discussions. Details are in Table 9.1-1

Public consultancy and survey on project feasibility study: WB Feasibility Study Group carried out the field visit to the project areas and about 10 Counties (cities) involved from Jul to Sept in 2015. By ways of seminars, key-person interviews and community representative discussions, it collected relevant comments and suggestions on project feasibility from key stakeholders, households, leading enterprise representatives, WB office and other relevant governmental staff. With their participation, the feasibility study report was improved. Details are in Table 9.1-2.

Public consultancy and survey on Environmental Impact Assessment: EIA development group carried out the field visit to the project areas and about 10 villages of 5 Counties (cities) involved from Jan to Mar in 2016. By means of seminars and discussions, it made detailed records on the comments of the existing environmental

problems and potential impacts of WB project from village leaders and representatives and integrated them into EIA report. Details in Table 9.1-3.

The SA, EIA and Feasibility Study reports mentioned above are developed on the basis of public participation by means of questionnaires, subject seminars, key-person interviews and stakeholder workshops.

Table 9.1-1: General description about public participation in SIA investigation activities

Type of participation	Time	Venue	Contents of Activity	Participants	People	Note
Informal talks and interviews with relevant departments	July 2015 to March 2016	PAO of all the project counties (cities), WB Office	1. Each department introduced about poverty alleviation status of the department; 2. Discussed about main difficulties in poverty work in the county; 3. Exchanged on the poverty alleviation projects implemented by all the departments; 4. Which works did the initial working department of WB Project participate; 5. Discussed about feasibility of main industries in the project from different perspectives; 6. Analyzed possible impacts of WB project from different perspectives; 7. Problems and difficulties in implementation, as well as suggestions	Leaders from main departments of 10 counties (cities), mostly being leaders from the main departments pegging with the project, such as the Agricultural Bureau, the Forestry Bureau, the Animal Husbandry Bureau, the Agro economic Station, the PAO, the Nationalities Bureau, the Women's Federation, the Development and Reform Bureau, the Communication Bureau and the Tourism Bureau, etc.	A total of 10 informal talks were held in the 10 project counties (cities), including 51 interviews with relevant departments of the government With more than 150 attendants, in which women accounted for 20%	All the leaders of relevant departments were prepared before attending the informal meetings, many of them prepared materials beforehand, and some departments had more than 2 attendants in the informal meetings.
Informal talks with leading enterprises	July 2015 to March 2016	PAO of all the project counties (cities), WB Office	1. Each leading enterprise introduced basic information about themselves 2. Difficulties the enterprise encountered in production and sales; 3. Cooperation status between the enterprise and the cooperatives; 4. Plan of the enterprise to cooperate with the cooperatives in future; 5. Completed a questionnaire	The relevant persons in charge of 19 agricultural companies, the main attendants in the informal talks were the persons in charge of the enterprises, legal representatives or main managers of the main enterprises.	Totally interviewed 19 enterprises, with more than 20 attendants, including 2 women	All being local enterprises from the project counties
Interviews with cooperative managers	July 2015 to March 2016	All the project counties (cities)	1. Basic information about the cooperatives; 2. Main products of the cooperatives; 3.Requirements and procedures for farmers to join; 4. Management of the cooperatives;	Managers' representatives from 23 cooperatives	Totally interviewed 23 cooperatives, with 48 attendants, including 7 women and 36 ethnic minority people	Including cooperatives of non-project villages

			5. Information about the persons in charge; 6. Sales channels; 7. Distribution of interests; 8. Advantages, disadvantages and difficulties in operation			
Discussing with village cadres and villagers' representatives	July 2015 to March 2016	All the project counties (cities)	1. Basic information about the administrative villages; 2. Discussing about production and sales of agricultural products; 3. Development status of leading industries; 4. Conditions of the cooperatives; 5. Status of loans	Village cadres and villagers' representatives from the sample villages	Totally held 29 group discussions, with 141 attendants, including 11 women and 108ethnic minority people	
Informal talks with representatives of poor households	July 2015 to March 2016	29 sample villages in 10 project counties (cities)	1. Advantageous conditions and difficulties for poor households to participate in the main industries 2. Attitudes of the poor households about the planned industries 3. Analyzing and discussing about restrictive factors for developing industries 4. Expectations about establishing cooperatives for developing industries 5. Expectations about the project	Representatives of poor households from 29 villages	Totally organized 29 informal talks with the poor households, with 169 attendants, including 8 women and 150 ethnic minority people	
Informal talks with women's representatives	July 2015 to March 2016	29 sample villages in 10 project counties (cities)	1. Advantageous conditions and difficulties for women to participate in the main industries 2. Attitudes of the women about the planned industries 3. Analyzing and discussing about restrictive factors for developing industries 4. Expectations about establishing cooperatives for developing industries 5. Expectations about the project	Women's representatives from 29 villages	Totally organized 29 informal talks with the poor households, attended by 162 women, including 112 women from poor households and 149 ethnic minority people	
Sampling investigation with target groups	July 2015 to March 2016	29 sample villages in 10 project counties	Conducting questionnaire investigation to the farmers, learning their basic information and livelihood status, as well as their understanding about, attitude	560 farmers	More than 600 people were sampled from 560 households in 29 households, 10	Note: In some families, several people participated in investigation and

		(cities)	toward and needs for the cooperatives and the project		counties for visiting, in which: Women: 210 Poor households: 362 Ethnic minority: 514	feedbacks
Interviewing potential incubation center	April 2016	5 project counties	Held information talks with the enterprises willing to participate in the incubation center, and constituted the idea for operating the incubation center as a company.	Company representatives and PMO staff	Totally 16 people, in which 10 were persons in charge of enterprises, including 3 women	

Source of Data: Collation of investigation data for social assessment

Table 9.1-2: General descriptions about public participation in feasibility study

Type of participation	Time	Venue	Contents of Activities	Participants	Number of people	Note
Holding informal talks with and visiting relevant departments, project townships and leading enterprises	July 2015 to September 2015	All the project counties and cities	1. Basic socioeconomic conditions and poverty status of the county 2. Standards, process and results of selecting the project villages and industries; 3. The development overview of the selected industries, plan, advantages and inputs; 4. Status quo of development of the cooperatives; 5. Ideas and expectations of all the departments and project townships about the project; 6. Overview of leading enterprises, status quo of cooperation with the farmers, and possibility of participation in project construction; 7. Collecting basic data and relevant planning content, etc.	People in charge of Development and Reform Bureau, Poverty Alleviation Office, WB Office, Forestry Bureau, Agriculture Bureau, Animal Husbandry and Aquatic Products Bureau, Tourism Bureau, Financial Office, project townships, representatives from county level project experts consultancy committee, representatives from leading enterprises and representatives from such banks as rural credit cooperatives, etc.	Totally interviewed 141 people, including 20 women	
Interviewing managers of cooperatives, village cadres and	July 2015 to September 2015	All the relevant project villages in all	1. Basic information about the villages, as well as level of understanding about the project, etc. 2. Situation of villages or cooperatives participating in competitive selection of project villages;	Managers of the already established cooperatives, representatives from the cooperatives prepared to be	68 people from 11 villages. In which:Women:	

villagers' representatives		the project counties and cities	Status quo of development and construction preparation of cooperatives, problems and needs; The needs and plan of villages or cooperatives for participating in project construction; 5. Causes for selecting the industries, advantages, development status quo and input – output status, as well as difficulties and needs of industrial development; 6. The means of operation and profits distribution of the cooperatives and the supports to the poor households, etc.	established, party secretaries of the villages, village heads, women's director of the villages, representatives of poor households and women/s representatives	23 Poor people: 30	

Source of Data: Collation of investigation data for feasibility study.

Table 9.1-3: Overview of Public Participation in Consultation in the course of Environmental Impacts Assessment

Type of participation	Time	Venue	Contents of activities	Participants	Number of people	Notes
Informal talks with representatives from communities subject to environmental impacts of the project	January – March 2016	Sampled 10 project villages from 5 project counties, and held informal talks in the villages	Held informal talks with villagers to learn current environmental problems in the project villages, conditions of the project planned to be implemented, and treatment measures for current environmental impacts, etc.	Village cadres and farmers' representatives from the project villages	75 attendants In which: Representatives of poor households: 18 Women's representatives: 21 Ethnic minority people: 58	The main current environmental problems of the project villages included: Lack of water, being stony decertified mountainous areas; the project planned to be implemented in the project villages was goat raising, the status quo is the raising mode of semi-captivity and semi-stocking, with goats bred in small grassland in the mountains, with small scales; the current control measures for environmental impacts mainly included ecological forests, constructing water tanks for storing water, concentrated incineration of municipal solid wastes, and using goat excrements as manure.
Informal talks with representatives from enterprises subject to environmental	March 7, 2016	Poverty Alleviation Office of Leye County	Holding informal talks with the representatives of the cooperatives and the enterprises to learn	Informal talks with the representatives of the cooperatives	13 people attended the informal talks In which: Representatives from	Leye County is a national demonstration county for organic agriculture, where the farmers understand organic agriculture

impacts of the project			the current environmental problems of the project village, the conditions of project planned to be implemented, and control measures for current environmental impacts, and pest control status.	and the enterprises	enterprises: 7 Representatives from cooperatives: 5 Women's representatives: 3	relatively well and the regional environmental problems mainly include: Lack of water, being stony decertified mountainous areas with incomplete infrastructures such as roads; the project currently implemented in the project village include growing tea and kiwi fruit.

Source of Data: Collation of investigation data for environmental impacts assessment.

9.1 Survey Methods

The relevant public participation is mainly a by interview, that is to collect information by interview and questionnaire. Commonly used methods include quantitative and semi-quantitative study. Quantitative survey can obtain more accurate statistic data by questionnaire. Semi-quantitative one can be flexible in survey methods. Social investigation helps to comprehensively and thoroughly understand project impacts on local environment and economy.

9.2 Survey Patterns and Results

9.2.1 SA Survey

SA development group carried out the field visit to the project areas and about 10 Counties (cities) involved from Nov, 2015 to Apr, 2016. By means of questionnaires, meetings and interviews, the group had a fair idea about the production and living conditions of the relevant project households and made detailed records about their comments and suggestions on project implementation. It also made consultancy and interview to the relevant stakeholders through seminars and group discussions.

（1）Respondents and Proportions

SA public consultancy involves the public under project influences. Survey data mainly on respondents' occupation, gender, age, nationality and educational backgrounds, statistic data in table 9.2-1– 9.2-4.

Figure 9.2-1 The statistical table of age status of surveyed households in Project villages

Age	Male		Female		Summation	
	Numbers	%	Numbers	%	Numbers	%
≤6	125	9.16	85	7.4	210	8.4
7-17	215	15.7	150	13.0	364	14.5
18-35	453	33.1	373	32.3	825	32.8
36-50	327	23.9	290	25.1	616	24.5
51-60	209	15.3	185	16.0	394	15.6
≥61	38	2.8	72	6.3	110	4.4
Subtotal	**1366**		**1154**		**2520**	

Figure 9.2-2 The statistical table of education status of surveyed households in Project villages

Education status	Male		Female		Summation	
	Numbers	%	Numbers	%	Numbers	%
Illiterate	155	11.4	259	22.4	414	16.4
Primary school	435	31.8	402	34.8	837	33.2
Junior high school	508	37.2	315	27.3	823	32.7
High school or Technical Secondary School	154	11.3	100	8.7	254	10.1
junior college	110	8.2	72	6.2	182	7.2
Undergraduate	4	0.3	6	0.5	10	0.4
Master degree or above	0	0.0	0	0.0	0	0.0
Subtotal	**1366**		**1154**		**2520**	

Figure 9.2-3 The statistical table of employment status of surveyed households in Project villages

Occupation	Male		Female		Summation	
	Numbers	%	Numbers	%	Numbers	%
Farming	560	41.0	620	53.7	1180	46.8
local business/processing	24	1.8	24	2.1	48	1.9
Soldiers/polices	3	0.2	2	0.2	5	0.2
Civil servant	14	1.0	7	0.6	21	0.8
Retired	1	0.1	0	0.0	1	0.0
Employees in local private enterprises	14	1.0	8	0.7	22	0.9
Long-term migrant workers	219	16.0	116	10.1	335	13.3
Short-term migrant workers	41	3.0	22	1.9	63	2.5
Housewife	8	0.6	9	0.8	17	0.7
Village cadres	66	4.8	13	1.1	79	3.1
Students	276	20.2	200	17.3	476	18.9
Others	140	10.3	133	11.5	273	10.8
Subtotal	**1366**		**1154**		**2520**	

Figure 9.2-4 The statistical table of national characteristic status of surveyed households in Project villages

Nationality	Male		Female		Summation	
	Numbers	%	Numbers	%	Numbers	%
Zhuang nationality	1088	55.1	886	44.9	1974	78.3
Yao nationality	115	41.6	161	58.4	276	11.0
Miao nationality	0	0.0	2	100.0	2	0.1
Maonan nationality	2	40.0	3	60.0	5	0.2
Dong nationality	0	0.0	0	0.0	0	0.0
Han nationality	152	62.6	91	37.4	243	9.6
Others	7	35.0	13	65.0	20	0.8
Subtotal	**1364**	**54.1**	**1156**	**45.9**	**2520**	**100.0**

From table 9.2-1 – 9.2-4, the survey involves people from all walks of life, such as farmers and leaders, aged from the old to the young, educational degree from primary school to university graduates, and ethnic minorities. The SA survey is highly representative, random and convincing.

（2）Survey Contents

Statistic results as follows. (Referring to SA contents)

Figure 9.2-5 The project participation information table

		Han nationality		Zhuang nationality		Other nationality		Total household	
		HH	%	HH	%	HH	%	HH	%
Have you heard of World Bank loan poverty reduction project?	● yes	21	45.7	234	51.5	20	33.3	275	49.1
	● no	25	54.4	220	48.5	40	66.7	285	50.9
Which sources have	● from vil-	17	81.0	146	62.4	14	70.0	177	64.4

you heard of the Project?	lage meeting								
	● heard from other people	4	19.1	39	16.7	3	15.0	46	16.7
	● seen from the publicity	0	0.0	22	9.4	0	0.0	22	8.0
	● form this time of survey	0	0.0	22	9.4	2	10.0	24	8.7
	● others	0	0.0	5	2.1	1	5.0	6	2.2
Have you known of what does the project is planning to do?	● Very clear	5	23.8	40	17.1	1	5.0	46	16.7
	● majority understand	4	19.1	63	26.9	5	25.0	72	26.2
	● litter understand	5	23.8	66	28.2	9	45.0	80	29.1
	● Know very little	5	23.8	49	20.9	4	20.0	58	21.1
	● not clear	2	9.5	16	6.8	1	5.0	19	6.9

Figure 9.2-6 Farmers' attitude and understanding on the cooperative projects

		Han nationality		Zhuang nationality		Other nationality		Total household	
		HH	%	HH	%	HH	%	HH	%
Is it important for your family to increase income through the Project or not?	● Very important	16	76.2	150	64.1	10	50.0	176	64.0
	● important	4	19.1	76	32.5	9	45.0	89	32.4
	● Common important	0	0.0	6	2.6	1	5.0	7	2.6
	● not very important	1	4.8	1	0.4	0	0.0	2	0.7
	● Has nothing to do with my family	0	0.0	1	0.4	0	0.0	1	0.4
Is it necessary to build up the cooperatives?	● necessary	43	93.5	407	89.7	53	88.3	503	89.8
	● Not necessary	3	6.5	47	10.4	7	11.7	57	10.2
Do you and your family willing to dedicate labors or	● Willing	43	93.5	382	84.1	51	85.0	476	85.0
	● Not willing	3	6.5	72	15.9	9	15.0	84	15.0

not?									
What is your attitude to the World Bank loan poverty reduction project?	● Very supportive	32	69.6	308	67.8	34	56.7	374	66.8
	● supportive	11	23.9	128	28.2	23	38.3	162	28.9
	● Indifferent	3	6.5	18	4.0	3	5.0	24	4.3
	● Opposition	0	0.0	0	0.0	0	0.0	0	0.0
	What is the reason for opposition?								

（1）More than half of the respondents haven't heard of the project. Most knows a little about the project through village meetings.

（2）Most respondents accept the cooperatives. 89% of the respondents accept the necessity of cooperative development. 85% of them are willing to increase input and labor, 95.7% supports the project construction.

The survey shows that:

（1）The publicity of the project is not adequate, which should be further strengthened during project implementation. The public participation should be highly improved to make the project widely known.

（2）The public praises highly on the importance and reliance of the cooperative, and are willing to be involved in project implementation. Most of them support the project, which means that the project should be developed in form of the Cooperative for better achievements.

9.2.2 EIA Survey

EIA development group carried out the field visit to the project areas and about 10 villages of 5 Counties (cities) involved from Jan to Mar in 2016. By means of field visits, seminars and discussions, it investigated the environment conditions on the actual industry development, proposed industry prospect and project sites. It also gets a fair idea on the farmers' comments of environmental protection and project implementation by questionnaires.

Figure 9.2-7 The information list of People in surveyed

No.	Name	Gender	Age	Nationality	Occupation	Education statue	Living address
1	Huang ruogen	M	56	Zhuang	farmer	High school	Wudong village,Gaoling township, Du'an County
2	Tang Xiuyou	M	30	Zhuang	farmer	junior middle school	Yuanli village, Bao an Towhshio, Du'an County
3	Zhou Shengke	M	62	Zhuang	farmer	junior middle school	Yuanli village, Bao an Towhshio, Du'an County
4	Han Jian	M	40	Zhuang	farmer	junior middle school	Banlao Vilage,AidongTownship,Donglan County
5	Ban Fengqun	F	46	Yao	farmer	Junior college	Cao wang shan Tea Co.ltd in Leye County
6	Meng Yongdi	M	30	Yao	farmer	Junior college	Nongxiong subvillage,Gengdong Village,Changle Township, Donglan County
7	Chen Yong	M	40	Zhuang	farmer	junior middle school	Banlao Vilage,AidongTownship,Donglan County

8	Liu Zutang	M	60	Han	farmer	junior middle school	Bana village,Xishan Township,Bama County
9	Huang Xiaolan	F	33	Zhuang	farmer	Junior college	Lashi Subvillage, Hele Village, XishanTownship, Bama County
10	Zou Nian si	M	39	Zhuang		Junior college	Shilin village, Tongle Township, Leye County
11	Liang Jiaxi	M	62	Zhuang	entrepreneur	under graduate	Longqu Moutain Tea Factory in Leye County
12	Zhou Ganling	M	51	Zhuang	village director	High school	Dongwen Village, JiuhuaTownship, Leye County
13	Guan Yening	M	34	Han		Technical Secondary School	Xianong eco-food development Co.ltd in Leye County
14	Yang Chang lun	M	49	Han	principal	High school	Changlun Tea Co.ltd in Leye County
15	Lu Tingying	M	46	Zhuang	farmer	primary school	Lewen Subvillage,Xinhua Township, Leye County
16	luo Dong	M	59	Zhuang	farmer	junior middle school	Lewen Subvillage,Xinhua Township, Leye County
17	Luo lisi	M	31	Zhuang	farmer	junior middle school	Lewen Subvillage,Xinhua Township, Leye County
18	Luo Lijia	M	40	Zhuang	farmer	junior middle school	Lewen Subvillage,Xinhua Township, Leye County
19	Huang Anling	M	37	Zhuang	farmer	junior middle school	Lewen Subvillage,Xinhua Township, Leye County
20	Luo Cheng	M	42	Zhuang	farmer	junior middle school	Lewen Subvillage,Xinhua Township, Leye County
21	Zhou Huaxue	M	52	Han	Village cadre	junior middle school	Huaping Village,Huaping Township, Leye County
22	Chen Mingshe ng	M	38	Han	Village cadre	junior middle school	Huaping Village,Huaping Township, Leye County
23	Zhou Huayuan	M	37	Han	village director	Technical Secondary School	Huaping Village,Huaping Township, Leye County
24	Deng Xiangxin	M	48	Han	village party secretary	High school	Huaping Village,Huaping Township, Leye County
25	Chen Sheng dao	M	59	Zhuang	village director	junior middle school	Nalao Village,Changzhou Township,Fengshan County
26	Chen Lankun	M	59	Zhuang	farmer	junior middle school	Lela Subvillage,Nalao Village,Changzhou Township,Fengshan County
27	Zhang Yuan quan	M	58	Han	Village cadre	High school	Wenli Village,Qiaozhang Township,Fengshan County
28	Zhang	M	42	Han	Migrant	junior	NO. Subvillage,Qiaoyin

	Guangju				worker	middle school	Township,Fengshan County
29	Zhu Chao zhong	M	50	Han	farmer	High school	Wenli Village,Qiaozhang Township,Fengshan County

（2）Survey Results

Table 9.2-8 The public opinion of project and the result of survey statistics

Survey contents	Answers	NNT	(%)
1.Have you known of World Bank loan Guangxi Poor Rural Poverty alleviation Pilot Projects?	Known	28	97
	Heard	1	3
	Don't know	0	0
2.How do you think of the local environment statue?	Good	28	97
	Not so good	1	3
	Worse	0	0
3.Do you think are there any main environmental problems in local?(multi-selected)	Air pollution	0	0
	Surface pollution	2	7
	underground pollution	0	0
	Soil pollution	0	0
	Noise pollution	0	0
	Ecological damage	2	7
	Don't know	0	0
4.Do you support the implementation of the Project?	Yes	115	97
	No	3	3

（1）Understanding of the Project

97% of the public knows about the project, 3% heard of the project, which means that the project made an effective publicity in the surveyed areas.

（2）Con the local environmental quality condition

97% grades the local environmental quality as very good or relatively good; 3% as normal, which means that most of them are satisfied with the local environment condition.

（3）Ideas on the main environment of the regional area

The statistic shows that: villagers think the local area with no environmental problems. Only 7% considers the surface water pollution and ecological damage, which means that the public concerns more on the surface water and ecological environment.

（4）Attitudes on the project

The survey shows that: all respondents support the project implementation and construction. During the interviews, the participated households hope to strengthen the project development with great enthusiasm.

（5）Any comments or requirements on the project development?

During interviewing, households provided some personal requirements or comments on the project development and filled out the questionnaires. Main comments or suggestions are: ①hope to fasten the project development ②hope to build preliminary processing facilities (buildings and machinery) of farm product. ③to provide professional technical support and trainings ④to build marketing platform.

（6）Any comments or requirements on environment rehabilitation of the project?

Households also made some comments and requirements on project rehabilitation during project development and implementation: solid waste treatment facility construction (domestic waste, solid waste during industry development, animal waste, etc.), biogas development facilities for waste water treatment of breeding industry, ecological control measure improvement.

The surroundings of the project village built no large-scale factories and industry polluting points. The main environmental problems include shortage of water resources, more rocky villages, inconvenient communication, limited industry development, less tillage land.

The project type and site selection should be decided according to land use conditions and local ecological environment, especially tourism project, development degree and regional eco-environment. The proposed industry has basically in accord with the local environment conditions. For example, Wenli village of Fengshan County, as a rocky mountain village, select the walnut plantation industry for good. Nalao village of Fengshan County maintains the original oil tea forest and applies organic fertilizer. Wudong village of Du'an County raises sheep by semi-captives and builds"grassland" in the mountains. The plantation industry not only improves the living standards of farm households, but also lays effective results on regional environment (stony desertification) improvement.

9.3 Conclusions of Public Participation

According to the survey statistics on SA and EIA, the support rate of the project construction reaches to over 95%. No objection on the project implementation, which shows the public acceptance to the project development. Most villagers and leaders regard the project implementation as to greatly improve the production and living environment of the rural poor, and promote industry development and agro structural adjustment. The project implementation will enhance the development of the second and tertiary industry, increase a lot of employment opportunities, and guiding the development of the regional economy and the alleviation of the rural poor. The respondents hope the project implement as soon as possible. Thus, the local people highly support the project development.

9.4 Sustainable Public Participation

Public participation is a sustainable process from project design, implementation to operation. The relevant information should be fully publicized. The publicity plans should be developed.

9.4.1 Preparation of Project Implementation

During project preparation, the preliminary participation and negotiation with the main stakeholders should be developed and a series of information publicity and public participation activities should also be carried out at the same time. It aims to promote the effective participation of all stakeholders, especially the main ones, improve their awareness and participation, ensure targeted groups and affected stakeholders to be fully informed and involved in the project with supervision, expression and decision-making rights, enhance the success of project implementation and reduce social cost and environmental impacts to the minimum degree during project implementation and operation.

On the other hand, households have few information and participation in project preparation. Thus, it is very necessary to develop a relevant work plan, clarify the possible participation opportunity, method, right and obligation of different stakeholders and institutionalize the participation content by program design in order to guarantee adequate and appropriate participation of direct stakeholders or even badly-affected groups, and the vulnerable like ethnic minorities, poor households and the women.

On 12 May 2016, provincial PMO publicized SIA and EIA of the Project on Guangxi Poverty Alleviation website. http://www.gxfpw.com/html/c7/2016-05/150020.htm:

On 13 May 2016, provincial PMO publicized Social Impact Report and Environmental and Social Management Framework in Guangxi Daily, opening the documents to the public. Guangxi Daily's website is： http://gxrb.gxnews.com.cn/html/2016-05/13/content_1264771.htm, see the following, a copy of Guangxi Daily

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广西日报 2016-05-13

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2016年5月12日

9.4.2 Whole Participation in Project Implementation

Project public participation runs through the whole process from preparation, implementation to operational maintenance, including main contents, participants and their roles, participatory methods and requirements.

9.4.3 Project Implementation Monitoring and Evaluation

Monitoring and evaluation institutions: County PMO is the implementing body of internal monitoring; The independent monitoring agency will be responsible for the third-party monitoring and evaluation.

Monitoring content and indicators: the specific contents and indicators detailed in project implementation manuals.

Monitoring and evaluation includes: mid-term review, post assessment, SA, resettlement monitoring and EIA.

Figure 9.4-1 Public Participation Activities Schedule

Project Stages	Participant Activities	Participant Methods	Participant Objects	Rules and Methods	Responsible Bodies	Results
Project Preparation Stage	Counselor Recruitment	Village Publicity	All villagers and village cadres	Put up the counselor recruitment notice in the villages; Publicize the results of the counselor recruitment in the villages	County project office	The villagers could be informed of the content and result of the counselor recruitment.
	Project Publicity Mobilization	Media Publicity	All villagers	Publicize the basic project situation of the villages in the city/ county/ area	Provincial project office, city/county/area project office	The villagers could be informed of the project information.
		Internet Publicity	All villagers	Publicize the project contents on the institution websites of the poverty alleviation.	City/county/area project office	The villagers could be informed of the project information.
		Village cadres meetings and the general assembly of villagers representatives	All villagers	The county project Office holds the meetings of village head or village secretary in cooperation with the township, and informs the basic project information.	The county project office, project township, village cadres	The villagers could be informed of the project information.
		Village Publicity (notices, banners, and broadcast)	All villagers	Publicize the key contents in the villages, with the publicity time no less than 2 weeks)	Village cadres	The villagers could be informed of the project information.
		Proposals Publicity	All villagers	Village cadres shall send to families after the reception of proposals	Village cadres	The villagers shall be informed of the project information.
Project Implementation Stage	Supervision and Management	Supervising the counselors	All villagers	Villagers shall take part in the supervision of counselors in information publicity and mobilization, cooperative foundation,	Village cadres, city/county/ area project office、	Evaluation of the counselors; Complaint situation of the counselors collected by the Village Committee and project office

				training, industrial development planning and the operation situation.		
		Supervision of the Project construction	All villagers, cooperatives	Supervision of the construction quality by the Villagers	The county project office, construction companies	he villagers could be informed of the construction situation
	Organization and Training	Cadres Training Publicity	Village cadre, counselors, villagers representatives	Basic Project Situation, Industrial development planning, project operation procedures, establishment of stock cooperative, the requirements of the donation by cooperatives, infrastructure construction, and the village publicity and mobilization activities.	The county project Office	Publicity cadres shall be informed the basic project situation, industrial development planning, project operation procedures; Publicity cadres shall be informed the mobilization methods and contents.
		Villagers Publicity Mobilization Training	All villagers	Basic Project Situation; advantages and disadvantages of the operation procedures; industrial development planning, establishment of stock cooperative, the requirements of the donation by cooperatives, infrastructure construction, and the village publicity and mobilization activities.	Village cadres, counselors and villagers representatives	The villagers shall be informed the basic project contents, industrial development planning, and project operation procedures.
		Send out the publicity brochure	All villagers	Project Office shall send the brochures to all villagers by Village Committee.	The county project Office and village cadres,	The villagers shall be informed the basic project contents, industrial development planning, and project operation procedures.
	Construction Information Publicity	Put up the posters	All villagers, cooperatives	Construction personnel shall publicize the construction information once a month, and publicize the construction communicators and the contact information.	The county project office, and the construction companies	Villagers shall be informed of the construction situation
		Villagers' meeting	All villagers,	Villagers meeting shall be held once the construction problems are found,	The county project office, and the	The results of project construction complaints

			cooperatives	and submit after the collection.	construction companies	
	Construction Participation	Villagers volunteer to work	All villagers	Priority shall be given to the job-provision to the villagers in Infrastructure construction. 30% priority shall be given to women.	The county project office, and the construction companies	The situation of volunteer to work of villagers
	Cooperative Operation	Operation Situation Publicity	Cooperative members, all villagers	Cooperative operation and the capital condition shall be arranged and publicized quarterly.	Cooperative council, supervisory board and counselors	Villagers shall be informed of the cooperative operation situation (the sales price of agricultural produce, and income distribution); percentage of members who participate in cooperative activities.
	Environmental Protection Participation	Publicity of the construction situation of Environmental protection facilities	Cooperative members, all villagers	It should be noticed of the environmental protection measures during the construction by stages	The county project Office, counselors and village committee	Villagers shall be informed of the environmental protection measures during the construction and the environmental protection measures.
	Industrial and Cooperative training	agricultural and technological training of villagers	All villagers	According to the local development industrial, the expert training shall be organized. The ethnic minority and women shall be no less than 30%.	County project office, counselors and Village Committee	Investigation results of the training requirements; training plans; training photos; percentage of the impoverish members among those who have participated in the industrial training; percentage of women members among those who have participated in the industrial training
		Cooperative management training	Cooperative managers	The cooperative management shall be trained, and the cooperative members enjoy the equal opportunities to be trained	County project office, counselors and Village Committee	The number of cooperatives with the training experience of operation and management; the training record of the cooperative management personnel
		Send out the training brochures	All villagers	Send out the plantation and cultivation brochures to project areas villagers	County project office, counselors and Village Committee	The situation of the villagers' acquisition of training brochures

Project Operation Stage	Infrastructure maintenance	Appointment of maintenance personnel	All villagers	Dividing the maintenance personnel based on the influences of the infrastructure; the government shall employ the villagers to manage	County project office and Village Committee	The continuous management of the infrastructure
		Maintenance personnel training	Maintenance personnel	Infrastructure maintenance training shall be conducted to the maintenance personnel	County project office, Construction companies and Village Committee	The situation of the maintenance personnel training and textual information
		Maintenance expenditure management	Village Committee, Cooperatives and villagers	Implementation and supervisory system shall be formulated based on the expenditure management of infrastructure maintenance; supervision shall be conducted by the villagers	County project office and Village Committee	Expenditure management of infrastructure maintenance
	Complaints and Appeals	Clarification of the appeals procedures	villagers	Any discontent during the implementation and operation of the project shall be resorted to the complaints system. Detailed procedures are clarified in the Complaints and Appeals procedures.	Provincial project office, County project office and Village Committee	

* All the publicity in villages involved in the Project need to be in the visible, access-able, fixed position.

10 Institutional Arrangements, Responsibility and Capacity Building

The Guangxi PPMO is responsible for project implementation and its environmental management under the leading group instructions at the regional/provincial level.

10.1 Institutional Arrangement Components and Responsibilities

Ten County PMOs are in charge of the specific development of the institutions. Detailed components and responsibilities of environmental management institutions see below Table 10.1-1.

Table 10.1-1 Environmental management responsibilities division of Guangxi poor rural poverty alleviation pilot projects

Stage	Project stakeholders	Environmental responsibilities
Infrastructure category		
Design and preparation	Owners/PMO	1. Be responsible for handling specific design, supervision, construction, equipment and materials procurement. 2. Project bidding and approval work, EIA approval
	Design unit, EIA unit	Design units made the engineering survey and design, and the EIA unit made the preliminary environmental impact assessment
	EPA	To check it whether installed the pollution control facilities or not, whether the design reaches standards and so on.
	County Bureaus of Construction, Water Resources, and Transportation	To supervise and inspect whether the construction and engineering design is reasonable or not, and do the work of bidding and approval, project supervision, construction quality and construction safety
Construction period	Owners/PMO	1. Supervising *Environmental Management Plan* to implement the mitigation measures during construction period; 2. Carrying out the training propaganda of E*nvironmental Management Plan* mitigation measures during construction period.
	County Bureaus of Construction, Water Resources, and Transportation	Supervising all the measures during construction period, to ensure the implementation of civilized construction and production safety
	Contractor, the construction team	Specific implementation of the *Environmental Management Plan* mitigation measures during construction period.
	Farmers/villages	Village committee actively cooperate to safeguard the legitimate rights and interests of the villagers, and to supervise the construction.
Operation period	Owners and operating units	1. Specific implementation of the mitigation measures of *Environmental Management Plan* during operating period; 2. Making sure the operational phase environmental protection, construction progress, quality and safety 3. Be responsible for organizing related environmental monitoring 4. Be responsible for reporting the implementation to the superior PMO and the World Bank on a regular basis.

	Farmers, cooperatives and village collective	1. Specific implementation of the mitigation measures of *Environmental Management Plan* during operating period; 2. Project supervision: protecting the environment, reducing consumables.
	EPA	Guiding and supervising the implementation of *Environmental Management Plan* mitigation measures
	Bureaus of Water Conservancy and Transportation / Roads	Guiding and supervising the implementation of *Environmental Management Plan* mitigation measures ...
Agricultural project activities		
Preliminary design stage	PMO	To make good project approval, train the propaganda backbones, advocate mobilizing the villagers, carry out the *Environmental Management Plan* and P*est Management Plan* training.
	County Bureau of Agriculture and Animal Husbandry, and its affiliated Plant Protection Station	Agriculture and Animal Husbandry Bureau: To boot reasonable adjustment of agricultural industry structure, and the rational allocation of agricultural resources Plant Protection Station: testing soil and making formulated fertilization, monitoring pests and epidemic diseases and pests, providing local dynamic pest data, releasing timely the pests disease conditions, and conducting *Environmental Management Plan* and P*est Management Plan* training.
	Veterinary Station	Carrying out technical promotion and training; also the *Pest Management Plan* training.
	Farmers	Applying for joining a cooperative and to recommend management personnel to take part in the project construction
	Cooperative	Establishing cooperatives or preparatory groups to settle project reporting and approving, designing good sewage facilities for the cooperative
	Village collectives	Organizing the advocacy and mobilization
	EIA unit	To make a scientific analysis whether this project impact environment or not, and make recommendations to optimize the project design!
Implement stage	PMO	1. Regular inspection to the implementation of the measures of the project *Environmental Management Plan* and *Pest Management Plan*. 2. To carry out an *Environmental Management Plan* and Pest Management Plan training. 3. Be responsible for the organization of environmental monitoring 4. Be responsible for reporting the implementation to their superior PMO and the World Bank on a regular basis.
	County Bureau of Agriculture and Animal Husbandry, and its affiliated Plant Protection Station	Plant Protection Station: guiding pest control, promoting pest control technology and guiding farmers to use organic fertilizer and low residue pesticide to promote pollution-free production. Agriculture and Animal Husbandry Bureau: organizing production and introduction of the test seedlings, fertilizers, pesticides, veterinary drugs and other products, and also its demonstration and promotion; organizing and guiding quality monitoring and

		enforcement supervision and management to agricultural inputs, such as seeds, fertilizers, pesticides, veterinary drugs, etc.
	Veterinary Station	Carrying out livestock prenatal, delivery and postnatal services, training and guiding village service personnel, technology demonstration households and large farmers.
	Farmers	Not to use prohibited pesticides, fertilizers; Properly handle garbage and take part in project implementation.
	Village collectives	To take part in project implementation, management, and periodical supervision of which production processes may impact environmental.
	Cooperatives/ processing units	Implementing the project according to environmental requirements and controlling comprehensively the pollution in accordance with the relevant requirements of the sewage enterprises, Introducing new technologies, new varieties, and launching technical training, technical exchanges and advisory services,
	County Environmental Protection Agency	Carrying out environmental supervision and inspection; To organize and guide the project area environmental publicity and education, and popularize environmental science and knowledge of laws and regulations.

10.2 Project Management Institution

10.2.1 Organizational Structure

The Project Management Institutions at Regional, City, County, Township and Village levels are established at the requirements of project implementation and management. The regional government will develop a leading group. The Regional Foreign Capital Center (PPMO) is responsible for the project implementation and management. The same structure will be developed at county level, the county leading group and PMO. The County Poverty Alleviation office is responsible for the daily work and develops a technical committee (advisory panel) to provide technical support. Each project Town government will build Township PMO. Village PMOs are selected and formed by the administrative villages to carry out the village project implementation. The project organizational structure goes as following chart 10:

10.2 Project management agency

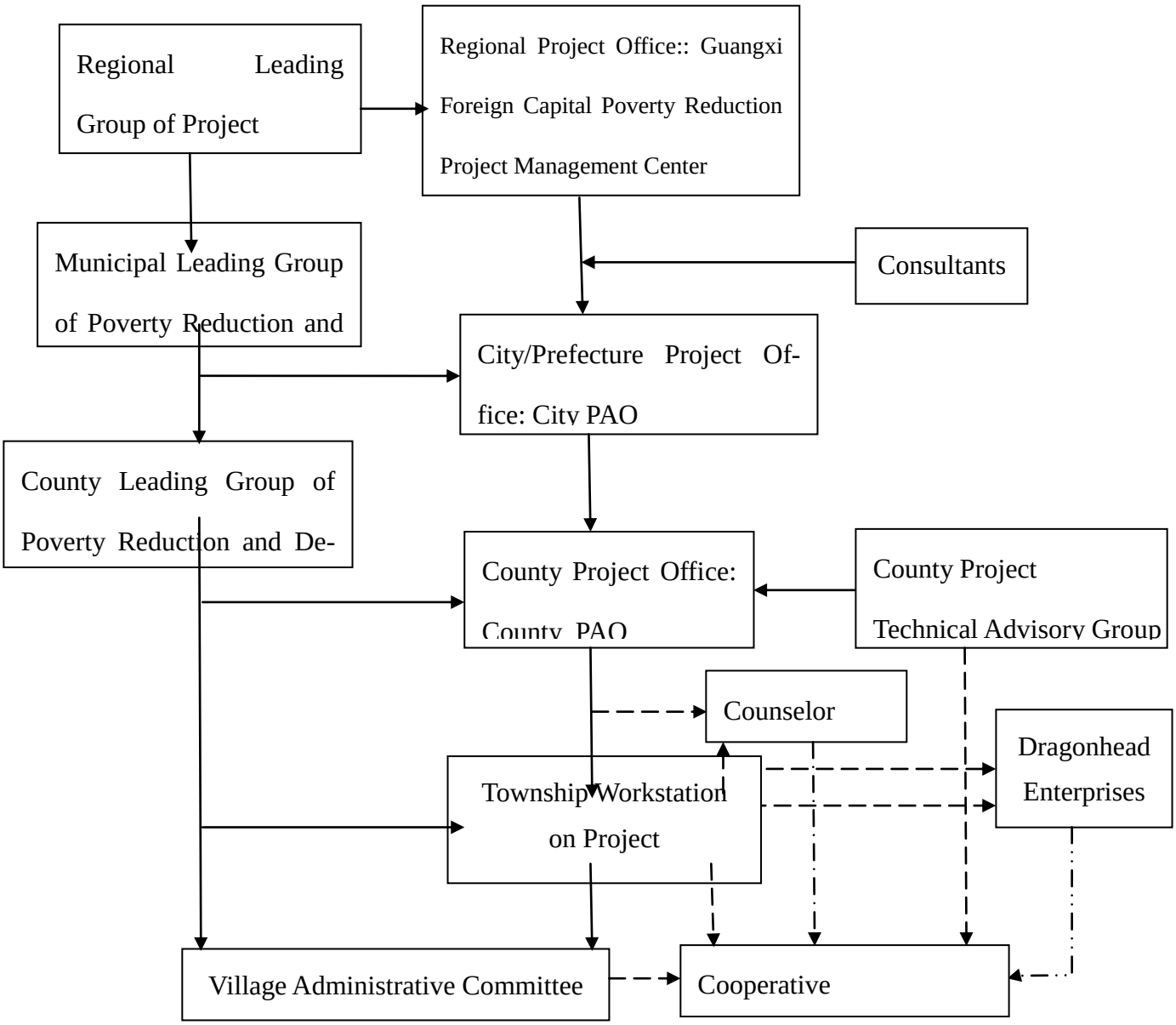

Figure 10 project organization structure diagram

10.2.2 Institution Function

（1）Regional leading group: leader will be the Deputy Chairman of the Regional Government and leading members are composed of leaders from Regional Poverty Alleviation Office, Development and Reform Committee and Financial Development. The leading group is responsible for deciding important project policies and guidelines, approving project overall scheme and implementation plan, raising counterpart funds.

（2）PPMO: the leading group has a division of PMO in Guangxi Foreign Capital Poverty Alleviation Management Center. Regional PMO is an instrumentality of project implementation.

（3）City Leading Group: designating vice mayor as the leader, comprising of main leaders of city poverty alleviation office, development and reform committee and agricultural department.

（4）City PMO: located in City Poverty Alleviation Office.

（5）County Leading Group: designating main County (city) leader as the group leader, comprising of main leaders of county poverty alleviation office, development and reform committee, financial and agricultural departments.

（6）County PMO: coordinated by director or deputy director of County (city) government office. County Poverty Alleviation Office is responsible for the daily management.

（7）County Technical (advisory panel) committee: comprised of leaders and specialists of financial institutions and relevant departments, responsible for project area and industry selection, project planning, cooperative investment proposal justification, project guidance and technical training.

（8）Township PMO: built in town, equipped with adequate work staff.

（9）Administrative Village Management Group: built at village level, comprised of village leaders, women's committee director, village technicians, household representatives (by vote) and supervising the project accomplishment in time, quality and quantity.

（10）The Rural Cooperative: it is a mutual aid organization developed at farmers will with democratic management, based on the family-contract-management system, comprised of producers of the same farm products or providers and consumers of similar farm services. It mainly serves to its members, and provides technology and information on procurement of production materials, marketing, processing, transportation, storage of farm products, and agricultural related business.

（11）Instructors of the Cooperative: providing assistance to county PMOs and the Cooperatives only. No decision-making rights.

10.3 Project Implementation and Management

10.3.1 Project Scheme Management

On the basis of feasibility study completion, PPMO will develop the Project Operational Manual.

The County will select appropriate industry and project areas on scientific basis and instruct project villages and the Cooperatives to develop relevant implementation plans on cooperative investment, infrastructure construction and public services. During the plan development, it will organize the cooperative members and households to obtain project information on basic conditions, restraints and farmers' will and needs, organize relevant agencies, financial institutions and technical specialists to justify and guide the project selection, and give feedback to the project village. The County PMO will integrate the cooperative investment proposals and infrastructure development plans into the County Plan and submit it to PPMO for approval.

10.3.2 Project Plan Management

（1）Annual plan development and reporting. By the end of the year, under the assistance and guidance of County, Township and Village PMOs, the cooperatives will carry out the early investigation, survey and design, hold the village representative or cooperative member meetings, develop annual implementation plan on project industry and infrastructure for the following year, and report it to Township PMO for initial inspection and to County PMO for final approval. The County PMO will integrate the approved plan and submit to PPMO. PPMO will give the whole regional project implementation plan. The County PMO will then separate it to the project areas for implementation.

（2）Annual plan adjustment. Administrative Village Management Group or the Cooperative will identify the annual implementation adjustment plan by villager representatives ' meeting or cooperative member meeting and report it up the line to County PMO for approval. When it is necessary for adjustment by approval, the adjustment plan will be submitted from county project leading group or county PMO to PPMO for approval.

10.3.3 Project Management Monitoring

（1） Project Monitoring: including internal monitoring and external supervision, mainly on counterpart fund-raise, investment plan completion, project quality, achievements, effects and influences.

a.Internal monitoring: supervised by administrative village management group (elected by villagers) on the whole project implementation. Establishing publicity and complaint system. Developing a publicity column and spread relevant information on complaint treatment to ensure smoothen complaint channel. Strengthening file management under the principles of "unified leadership decentralized storage and classified reference". The designated staff by the County PMOs, project villages and the cooperatives will be responsible for receiving, collecting, sorting, filing and storing the files.

b.External supervision: including inspections, supervision, annual financial audits and media supervision by PPMO, city, county and township PMOs. PPMO will develop monitoring indicator system, methods and procedures, and monitoring guidelines to guarantee objective, fair and unanimous monitoring effects according to the project objectives and construction and under the requirements of the World Bank and Project Operational Manual.

（2）Project acceptance. The specific procedure as follows: self-inspection of the cooperative and self-acceptance of implementing agencies -------application by households and initial inspection of township PMO ------acceptance application to county PMO, organizing inspection panel under project design requirements to evaluate the project duration, quality and benefits comprehensively, adjust accounts and supplies, settle funds, file project materials and develop completion report ------ development of acceptance guidelines and comments and organization of selective acceptance by PPMO.

（3）Project evaluation. It is to evaluate the project benefit and effect on the basis of the overall acceptance of project construction and investment. It takes the participatory method to inspect project preparation, implementation, management, acceptance, follow-up management, participation, satisfaction and achievements, and develop project acceptance evaluation report.

（4）Follow-up management. After the completion and acceptance of the project, the managers of large-scaled infrastructure projects will be identified according to construction essence and responsible for specific implementation and management to ensure the sustainable development of the project. The small-scaled community project will be in charge by project management group that is developed by community votes, and managed to ensure sustainable effects by village commonly agreed rules and guidelines. The county financial and poverty alleviation departments organize the relevant technicians to hold trainings on the follow-up construction management and protection for the future managerial staff. The capitals on the cooperative development and the support of the development will be managed according to the cooperative rules and the decisions of the member committee meetings, and be supervised by Township PMO and the cooperative instructors.

10.3.4 Environmental Management

1. Responsibility

Main responsibility of all relevant management institutions

①PMO

Regional, City and County PMOs should assist WB environmental institutions to supervise the project environment.

②City and County Environmental Protection Bureaus

They're responsible for the overall supervision and comments of the project according to relevant laws and regulations, and 'three-simultaneity ' completion acceptance.

③Environmental Supervision

Assisting all sub-project owners or managers to supervise the implementation of the environmental protection measures and providing remedial measures during construction.

Developing detailed management plan according to construction plan, inspecting its implementation and carrying out necessary revision every month. The responsible should report to engineering leaders

about inspection results of environmental management and providing appropriate countermeasures on potential environmental problems every month.

④Design and EIA Agencies

Developing environmental management plan and related implementation scheme on environmental protection measures, and instructing the implementation of the environmental management plan.

2. Environmental Management Contents

The project involves in many counties and cities of many sub-projects. Management contents and staff arrangements at different sub-project stages of environmental management see below, table 10.3-1

Figure 10.3-1 The Environmental management contents of Sub-projects in stages

Stage	Related party of the Project	The key Environmental management responsibilities	personnel allocation
Design and preparation period	County PMO	In charge of connecting and coordinating with the environmental Protection Administration to implement environmental management issues.	2
	Owner	1. Responsible for project design and preparation and such a series of environmental protection management work. 2. To carry out the environmental protection funds. 3. Responsible for the coordination with the government department in charge of environment to carry out the environmental management. 4. Recruit the supervision unit and collect records.	2
	Designing institutions	1. The environmental protection measures should be brought into the design plan and budget 2. Put the mitigation measures of the environmental management plan into the biding document specification.	2
	Assessment institutions	1. Provide technical support for the engineering design of environmental protection work. 2. Compile the environmental impact assessment documents.	2
Construction period	Owner	1. Responsible for a series of environmental protection management during the construction, carry out the environmental protection work funds. 2. Carry out the management and supervision on the environmental protection work during the construction, do the investigation and handling the disturbance or pollution problems appeared in the process of construction. 3. Responsible for the coordination with the government department in charge of environment to carry out the environmental management. 4 track the implementation of environmental management plan, and regularly report to the competent department at the same level and the autonomous region PMO and the World Bank. 5. Accept and handle the public complaints.	2
	Contractor	1. Carry out the implementation of environmental protection measures during construction period according to the bidding documents, contracts and the environmental management plan. 2. Accept the guidance and supervision from project owner, environment supervision engineer and the related functional departments. 3. Accept the technical support from environmental consultancy. 4. Carry out safety protection measures, such as setting indication marks on construction site, and carrying on the fens for the construction site etc, to establish communication with the public, to ensure safety in construction. 5. carry out environmental management plan.	2

Stage	Related party of the Project	The key Environmental management responsibilities	personnel allocation
	Engineering/ environment supervision	1. To supervise the contractor to carry out environmental management plan and in performance of the environmental mitigation measures dressed in the contract. 2. On-site supervision of the implementation of the contractor. 3. Cooperate with construction unit in environmental management. 4. To keep a record and report of the environmental management plan implementation, then regularly report to the owner.	3
	Environmental Supervision	1. According to the project owner's entrust and the environmental monitoring plan, complete the environmental monitoring work during construction and operation period. 2. If it is found the construction abnormal situation, to do the monitoring entrusted by the owners.	According to the entrusted task scope
	Local environmental Protection Administration	1. Carry out the supervision and inspection on environmental protection measures from the owners and construction units. 2. Receive the report on implementation of the environmental management plan which submitted by the owner and PMO and then carry out administrative management according to the report. 3. If it occurred abnormal environment situation in the construction, carry out the emergency measures. 4. Accept public complaints, coordinate and deal with.	1
	TA/Consultant	1. Provide the technical support for environmental protection work during construction, according to the project owner's entrust, and the design research of environmental protection and environmental impact report. 2. Provide the technical guidance on environmental protection work for the contractor, and do the training work of environmental protection during construction period.	unlimited
Operation period	Operation Institutions	1. Responsible for the management of environmental protection after the operation and the implementation and monitoring of mitigation measures addressed in the environmental management plan during the operation period. 2. Responsible for contacting and coordinating with government supervision departments to carry out environmental management work. 3. Environment accident emergency treatment; 4.To do the regular staff training, in order to improve their ability, at the same time carry out environmental protection technology and experience exchange activities actively, to further improve the environmental management work.	2
	Environmental Supervision	1. Complete the environmental monitoring work during operating period according to the project owners' entrust, in accordance with the environmental monitoring plan. 2. Routine surveillance related to the project.	According to the entrusted task scope
	Local environmental Protection Administration	1. To do the environmental protection engineering acceptance 2.To do the manage and supervision of the environmental protection standard during the operational phase. 3.To do the supervision and inspection on the operation of completed environmental protection facilities.	2
	Civil public or NGOs	Social monitoring	unlimited

3. Environmental Management Training

All county and city PMOs should strengthen training on environmental protection during project implementation. Developing training plans, holding training for project owners, construction organization, supervision engineers, PMOs and environmental managers, improving environmental capacity building,

and ensuring environmental protection to satisfy relevant laws, regulations and requirements during project implementation. Training plan as follows, Table 10.3-2

Table 10.3-2 project environmental protection training contents in stages

Stage	Training objects	Training contents	Number of participants	Duration (days)
Preparation period	County PMO	Selection and location of the sub-projects.	2	2
Design period	County PMO	It would be considered of project industrial advantage, regional environmental constraints, the social economic and environmental should be coordinated developed.	2	2
Before Construction period	County PMO, Owner, Environmental Protection personnel	Environmental assessment and social management framework of the project: 1.The main role in the process of project implementation. 2.Policy and regulations. 3.The relevant environmental protection measures and requirements.(genetic environmental management plan). 4. The selection of projects and detailed rules for the implementation and requirements. 5.sustainable public participation and the implementation of the complaint. 6. Resettlement policy framework, pest management plans, ethnic minority development plan.	several	2
	Civil public or NGOs	Public participation, complaint mechanism.	several	1
Construction period	County PMO, Owner, Environmental Protection personnel	The environmental protection measures during the construction, as well as the environmental protection facilities operation and maintenance, environmental protection regulations on construction, planning, supervision, occupational health, health and notice, safety emergency measures and the environmental risk emergency measures.	several	2
	Contractor	1.The simple method and measure to monitor and control construction noise (self-test). 2. The measures and requirements related to environmental management plan. 3.The environmental protection regulations on construction and planning, occupational health, health and notice, safety emergency measures.	2 each in construction section	1
	Engineering/environment supervision	1.The air environmental monitoring and control technology, noise monitoring and control technology. 2. The environmental management plan during the construction, as well as the environmental protection facilities operation and maintenance. 3. The World Bank project management procedures, and reporting mechanism. 4. The monitoring standard, test, method, sample transport, data quality control, equipment used, etc 5.The environmental risk emergency measures, etc. 6.The occupational health, health and safety.	1~2 each in construction section	1

Stage	Training objects	Training contents	Number of participants	Duration (days)
	Civil public or NGOs	Public participation, complaint mechanism.	several	1
Operation period	County PMO	Environmental protection laws and regulations, environmental management, occupational health, health and safety emergency measures and notice, the environmental risk emergency measures.	2	2
	Owner, Environmental Protection personnel	1.The environmental protection measures in operational phase. 2.The regular supervision training related to the project. 3.Pest control management; 4. Environmental risk emergency.	1~2 each in sub-projects	2
	Engineering/environment supervision	1.The air environmental monitoring and control technology, noise monitoring and control technology. 2. The environmental management plan during the construction, as well as the environmental protection facilities operation and maintenance. 3. The World Bank project management procedures, and reporting mechanism. 4. The monitoring standard, test, method, sample transport, data quality control, equipment used, etc 5.The environmental risk emergency measures, etc. 6.The occupational health, health and safety.	1~2 each in project areas	2
	Civil public or NGOs	Public participation, complaint mechanism.	several	1

10.4 Capacity Building

PMO ------ Guangxi Foreign Capital Poverty Alleviation Management Center is regarded as the Project Management Office. It has implemented two WB financed poverty alleviation projects and possessed certain experience and capacity on implementation and management of WB security policy. At current, PMO has nominated two specialized staff for environmental and social security management of the project. In order to further strengthen its capacity, the staff should be well maintained with trainings on WB project management and security policy implementation.

Sub-project owners------including the cooperatives, households and enterprises. PPMO and County PMOs should carry out trainings on environmental and social action plans of the environment and social management framework at project cultivation, design and implementation stages for sub-project owners. The training contends as following table 10.4-1.

Table 10.4 1 The capacity training schedule of sub-projects in stages

Stage	Training objects	Training contents	Number of participants	Duration (days)
Preparation period	Cooperative, Household, Enterprises	1. The introduction of the main purpose of project implementation, object and so on. 2. The environmental and social issues should be pay attention to in the component selection. 3. The relationship between the components and the development of regional industry.	2~4	1
Design	Cooperative,	Project environmental and social management framework,	2~4	2

Stage	Training objects	Training contents	Number of participants	Duration (days)
period	Household, Enterprises	mainly as follows: 1.What is the main role in the process of project implementation. 2. Policy & regulations. 3. The relevant environmental protection measures and requirements (Genetic environmental management plan). 4. The application of sub-project, study on the Attachment 1 Screening Form for Environmental & Social Safeguards Issues. 5. The selection of projects and implementing rules and requirements. 6. The sustainable public participation and the implementation of the complaint. 7. The function of Resettlement policy framework, plant diseases and pests management plan, and ethnic minority development plan.		
Project implementation period	Cooperative, Household, Enterprises	How to use the environmental and social management framework of the project: 1.Attachment 2 the role of genetic environmental management plan plays in the process of project implementation. 2. Sustainable public participation. 3. How to establish complaint mechanisms. 4. If the project involving resettlement should refer to the attachment 3 resettlement policy framework to implement. 5. The implementation of planting and breeding program should refer to the requirements and suggestions addressed in attachment 4 pests management plan. 6. The project implementation should fully consider of minority situation, study on how to use in implementation from attachment 5 ethnic minority development plan.	2~4	2

*The number of training participants means the numbers of every project's owners.

Annex 1
Screening Form for Environmental & Social Safeguards Issues

Annex 1

Guangxi Rural Poverty Alleviation Pilot Project

Screening Form for Environmental & Social Safeguards Issues

Part 1 Screening Form

This form is to be used by the Implementing Agency to screen potential environmental and social safeguards issues of a sub project, determine World Bank policies triggered and the instrument to be prepared for the sub project.

Subproject Name	
Subproject Location	
Subproject Proponent	
Subproject Type/Sector	
Estimated Investment	
Start/Completion Date	

Questions	Answer		If Yes	Documents requirement if Yes
	yes	no	WB Policy triggered	
Are the subproject impacts likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented? Please provide brief description:			OP 4.01 Environmental Assessment Category A	It will not included in the scope of the project support.
Do the impacts affect an area broader than the sites or facilities subject to physical works and are the significant adverse environmental impacts irreversible? Please provide brief description:			OP 4.01 Environmental Assessment Category A	
Is the proposed project likely to have minimal or no adverse environmental impacts?Please provide brief justification:			OP 4.01 Environmental Assessment Category C	No action needed beyond screening
Is the project neither a Category A nor Category C as defined above? Please provide brief justification:			OP 4.01 Environmental Assessment Category B	Limited ESIA or ESMP

Are the project impacts likely to have significant adverse social impacts that are sensitive, diverse or unprecedented? Please provide brief description:			OP 4.01 Environmental Assessment Category A	It will not included in the scope of the project support.
Will the project adversely impact physical cultural resources? Please provide brief justification:			OP 4.11 Physical Cultural Resources	It will not included in the scope of the project support.
Will the project involve the conversion or degradation of non-critical natural habitats? Please provide brief justification:			OP 4.04 Natural Habitats	Addressed in ESIA
Will the project involve the significant conversion or degradation of critical natural habitats?			OP 4.04 Natural Habitats	It will not included in the scope of the project support.
Does the sub-project construct a new dam or rely on the performance of an existing dam or a dam under construction?			OP 4.37 Dam Safety	It will not included in the scope of the project support.
Does the project procure pesticides (either directly through the project, or indirectly through on-lending, co-financing, or government counterpart funding), or may affect pest management in a way that harm could be done, even though the project is not envisaged to procure pesticides?			OP4.09 Pest Management	Addressed in ESIA (Pest Management Plan)
Does the sub-project involve involuntary land acquisition, loss of assets or access to assets, or loss of income sources or means of livelihood? Please provide brief justification:			OP 4.12 Involuntary Resettlement	Resettlement Action Plan Framework
Are there any ethnic minority communities present in the sub project area and are likely to be affected by the proposed sub-project negatively or positively? Please provide brief justification:			OP 4.10 Indigenous People	Ethnic Minority Development Plan

Will the project have the potential to have impacts on the health and quality of forests or the rights and welfare of people and their level of dependence upon or interaction with forests; or aims to bring about changes in the management, protection or utilization of natural forests or plantations? Please provide brief justification:			OP4.36 Forestry	It will not included in the scope of the project support.
Will the project have the potential to have significant impacts or significant conversion or degradation of critical natural forests or other natural habitats?			OP4.36 Forestry	It will not included in the scope of the project support.
Is there any territorial dispute between two or more countries in the sub project and its ancillary aspects and related activities?			OP7.60 Projects in Disputed Areas	It will not included in the scope of the project support.
Will the sub project and its ancillary aspects and related activities, including detailed design and engineering studies, involve the use or potential pollution of, or be located in international waterways?			OP7.50 Projects on International Waterways	It will not included in the scope of the project support.

Conclusion and Safeguards Instruments Required:

The sub project is classified as a Category _____ project as per World Bank OP4.01, and the following safeguards instruments will be prepared:

1. _____
2. _____
3. _____
4. _____
5. _____

Note: Category C projects do not require a Environmental Management Plan and any Environmental protection measures to mitigate negative impacts .

Category B projects will apply a Generic Environmental Management Plan addressed in the ESMF, If needed, it will apply a supplementary EMP.

Category A projects will require Environmental and Social Impact Assessment (ESIA) and Environmental Management Plan, they will not included in the scope of the project support.

Part 2 How to fill in the Screening Form

Sub project environment and social screening form is shown in above. This should be used

henceforth for screening all the sub projects in the Project.This section should describe the screening process to determine:

(i) the potential environment and social issues of a sub project;

(ii) sub project environment category based on the environment and social issues;

(iii) the sub project-specific action plan/s that has/have to be prepared as part of the sub project preparation but prior to its approval.

According to the results of the above screening form, to determine sub projects belong to Category A, B, or C, will respectively has the following three procedures:

(i) Category C projects do not require Environmental management plan and any Environmental protection measures to mitigate negative impacts.

(ii) Category B projects will apply a Generic Environmental Management Plan and Generic Pest Management Plan addressed in the ESMF, If needed, it will apply a supplementary EMP and PMP. If the sub projects refer to Land Acquisition and Resettlement， it requires to prepare the relevant documents base on the Immigrant Resettlement Policy Framework.

(iii) Category A projects will not included in the scope of the project support.

Category A sub projects are those that have potential significant adverse environmental and social impacts that are :

(i) sensitive (i.e., a potential impact is considered sensitive if it may be irreversible - e.g., lead to loss of a major natural habitat, or raise issues covered by OP 4.04, Natural Habitats; OP 4.36, Forests; OP 4.10, Indigenous Peoples; OP 4.11, Physical Cultural Resources; or OP 4.12, Involuntary Resettlement; or in the case of OP 4.09, when a project includes the manufacture, use, or disposal of environmentally significant quantities of pest control products);

(ii) diverse, or unprecedented;

(iii) affecting an area broader than the sites or facilities subject to physical works (e.g., a dam that may affect downstream and the nearby forestry and natural habitats.

Category A Screening Examples

How can a sub project affecting natural habitats be categorized as A?

The project is categorized as A if the screening indicates the potential for significant conversion or degradation of critical or other natural habitats. Significant conversion is the elimination or severe diminution of the integrity of a critical or other natural habitats caused by a major, long-term change in land use or water use. Significant conversion may include, for example, land clearing; replacement of natural vegetation; permanent flooding; drainage, dredging, filling, or channelization of wetlands; or surface mining. Conversion can result directly from the action of a project or through an indirect mechanism (e.g., through induced settlement along a road). Degradation is modification of a critical or other natural habitat that substantially reduces the habitat's ability to maintain viable population of native species.

How can a sub project affecting forests be categorized as A?

A project with the potential for significant conversion or degradation of natural forests is classified as Category A. Natural forests are forest lands and associated waterways where the ecosystem's biological communities are formed largely by native plant and animal species and where human activity has not essentially modified the area's primary ecological functions.

How can a sub project affecting physical cultural resources be categorized as A?

Physical Cultural Resources, as defined under OP 4,11, are movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, pale-ontological, historical, architectural, religious, aesthetic, or other cultural significance. A project that will likely have significant adverse impacts on PCR is categorized as A.

How can a sub project that triggers pest management policy be categorized as A?

Projects that include the manufacture, use, or disposal of environmentally significant quantities of pest control products are classified as Category A. Environmental significance takes into account the impacts, including benefits, on human health.

When is a sub project involving Involuntary Resettlement likely to be categorized as A?

The Bank does not provide specific categorization criteria relating to OP 4.12, Involuntary Resettlement. Generally, projects with significant resettlement-related impacts should be categorized as A. Application of judgment is necessary in assessing the potential significance of resettlement-related impacts, which vary in scope and scale from project to project. Projects that would require physical relocation of residents or businesses, as well as projects that would cause any individuals to lose more than 10 percent of their productive land area, often are categorized as A. Scale may also be a factor, even when the significance of impacts is relatively minor. Projects affecting whole communities or relatively large numbers of persons (for example, more than 1,000 in total) may warrant categorization as A, especially for projects in which implementation capacity is likely to be weak.

When is a sub project involving Indigenous Peoples likely to be categorized as A?

The Bank does not provide specific categorization criteria relating to OP 4.10, Indigenous Peoples. Though the policy applies whenever a group meeting the Bank's definition of Indigenous Peoples is present in the project area, categorization typically reflects the potential significance of any adverse impacts upon such groups. Projects that would require relocation of Indigenous Peoples, that would restrict their access to traditional lands or resources, or that would seek to impose changes to Indigenous Peoples' traditional institutions, are always likely to be categorized as A.

Category B sub projects are those sub projects that have potential adverse environment and social impacts that are less adverse, site-specific; and few if any of the impacts are irreversible.

Category C sub projects are those sub projects that have minimal or no adverse environmental and social impacts.

Annex 2
Generic Environmental Management Plan

Annex 2 Generic Environmental Management Plan

1. The Generic Environmental Management Plan of Planting S*ub projects*

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
Design phase	The location and layout of feasibility study		Alternative comparison, it is in order to avoid potential negative impacts of construction and operation.The project's location should be avoided in nature reserves, scenic spots, the world cultural and natural heritage sites, drinking water sources reserve, basic grassland, forest park, geological parks, important wetland, natural forests, rare and endangered species of wild fauna and flora natural concentrated distribution area, key soil erosion prevention and control area, eutrophication water area, cultural relics protection units and significant history, culture, science, national protected area.Environmental protection facilities and engineering facilities should be designed at the same time, and the cost of environmental protection measures is required to be included in the project investment estimation.	FSR Consultant	EIA Consultant, FSR approval agency , PMO	FSR approval agency, PMO
Construction phase	Planting site	Ecological impact	1. Strengthening the management on construction, to avoid large area excavation, effective use of the existing topography for planting. 2. It is better to choose the planting sites as the existing farming land, if it is needed to change the types of crop, the land use types should be consistent with existing types, such as paddy field to retain for paddy field, dry land to keep for the dry land. 3. The New developed land should comply with the local land planning, please don't change the land use arbitrarily.	Project contractor	Local Environmental Protection bureau	EnvironmentmentalSupervision
	Construction and excavation	Serendipitous cultural relic	If discover cultural relics, must stop construction, protect the scene, timely inform the local department for cultural relics protection, the re-excavation work shall not be done till the end of cultural relics identification and protection.	Project contractor	Local cultural relics competent department	
Operation	Cultivation	Water pollu-	1.It is encouraged the application of organic manure,and high efficiency	Project	PMO	Agricultural

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
phase	activities	tion	organic fertilizer to increase the proportion of organic fertilizer and green manure in use. 2.Reduce the use amount of pesticide, when it is needed to use the pesticide for plants' diseases, choose the high efficiency pesticide with low residue.It is forbidden to use the high toxic pesticide in long residual period, and give preference to use chemical-free pesticide, which is mentioned in pest management plan. 3.Use the scientific soil testing and formula, and strictly prohibit applying fertilizer in the surface of soil, use the method of apply fertilizer in groove or pit, mulch soil, and cover a withered plant grass. 4.Avoid to apply fertilizer and spray pesticide in the rainy season, reduce pollutants into surface water.	contractor		department, Local Environmental Protection bureau
	Cultivation activities	Solid waste pollution	The waste plastic bags, fertilizer bags, pesticide bottle, plastic, and etc which produced from farming activities, cannot be abandoned in the field, it requires unified collection and classification and unified piled up to the nearest garbage dumps in villages, and then re-pass to waste transfer station in towns, finally into the county comprehensive landfill landfill disposal.	Project contractor	PMO	Local Environmental Protection bureau, EnvironmentalSupervision

1.1 The Generic Environmental Management Plan of Planting Sub-projects in Stony Desertification Areas

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
Seedling raising	Planting places selection, soil preparation	Water and soil erosion	Choose the plant nursery in flat, leeward sunning dale and good drainage plots.Soil preparation is better to do in autumn and winter season, deep ploughing,loosening and flatting the soil for the spring sowing. While growing seedlings should choose thick and fertile soil. At the time of soil preparation for curing planting area, sufficient base fertilizer is needed to retain the original vegetation and topsoil as much as possible. Far better to make sure seedlings is erected and root is flared when transplanting, the depth of the planting can exceeded the original seedling, but the graft union	Project contractor	PMO	Agricultural department

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
			should be above outside, treading down and irrigation.			
Nurture Phase	Plantation management	Vegetation finishing and cutting	For perennial crops, such as walnut, tea, camellia, mango, orange, kiwi, etc, while pruning according to site conditions. Where each main branches remain 3 lateral branches in poor soil, if the site conditions are good, then again select and remain 1-2 lateral branches, it is best to keep the balance of the tree's growth.Remove redundant thin bearing basal shoot while it is too much, to enhance ventilation devious to light. For bamboo,and mulberry leaf, it should have planned cutting instead of clear cutting in harvest time. To minimize the weeds removed, in order to protect the growth of understorey vegetation, reduce the rocky desertification in maximum extent, as long as the weeds do not affect the growth of crops. In addition to the main crops as bamboo,Zenia insigins Chun,Chinese toon tree, honeysuckle and other tree species can be grew in stony desertification mountain, they will accelerate vegetation restoration effectively in the rocky mountain . According to the local natural conditions, the scale of planting can be developed in the mid and bottom part of the karst rock mountainous, depressions, valley, and those forestry land, woodland and farmland which water and soil loss is relatively light and the slope and site conditions is quiet good. It can focus on developing new varieties, such as broussonetia, mulberry, honeysuckle, vitis amurensis. Artificial afforestation in rocky mountain can choose the species like dendrocalamus minor, Zenia insigins Chun, vitis amurensis, dal, Acrocarpus fraxinifolius, dalbergiae,Cornus wilsoniana,ect.			
	Fertilization& Pests and diseases controlling	Fertilization and Contamination of pesticide	Applying fertilizers in the strip furrow around the tree trunks and crowns , can effectively reduce fertilizer loss. The prevention of pests should base on the principle of "focusing on the prevention, treated comprehensively".It should pay attention on the physical prevention measures in dealing with pests priority using biological pesticide and low toxicity pesticide, as shown in the pest management plan.			

2. The Generic Environmental Management Plan of Livestock Breeding Sub-Projects

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
Design phase	The location and layout of feasibility study		Alternative comparison, it is in order to avoid potential negative impacts of construction and operation.The project's location should be avoided in nature reserves, scenic spots, the world cultural and natural heritage sites, drinking water sources reserve, basic grassland, forest park, geological parks, important wetland, natural forests, rare and endangered species of wild fauna and flora natural concentrated distribution area, key soil erosion prevention and control area, eutrophication water area, cultural relics protection units and significant history, culture, science, national protected area.Environmental protection facilities and engineering facilities should be designed at the same time, and the cost of environmental protection measures is required to be included in the project investment estimation.	FSR Consultant	EIA Consultancy, FSR approval agency , PMO	FSR approval agency, PMO
Construction phase	Nursing house Construction	Water pollution	1.It should strictly manage in saving water, and reduce construction waste water discharge. 2. Construction waste shall not be dumped into the nearby river.	Project contractor	PMO Local Environmental Protection bureau	Environmental Supervision
		Air pollution	Watering regular on the bare surface within the construction site, keep soil moisture, and reduce the dust on surface; Waste soil should be given on the spot, if it is useless, it should be cleaned up and transported away without delay, and the fence or wind deflector which covered the powder material in its surroundings should be set up temporary, in order to prevent dust diffusion.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau,Environmental Supervision
		Solid waste pollution	It is forbidden to dump the construction solid waste to the nearby rivers or any other rivers in China.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau,Environmental Supervision

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
		Serendipitous cultural relic	If discover cultural relics, must stop construction, protect the scene, timely inform the local department for cultural relics protection, the re-excavation work shall not be done till the end of cultural relics identification and protection.		Local cultural relics competent department	
		Noise pollution	It should be choose the low noise equipment for construction; While Vehicle transportation at night, should be no honking.	Project contractor	PMO Local Environmental Protection bureau	PMO Local Environmental Protection bureau
		Water and soil erosion	1.It is reasonable to arrange the construction time, as far as possible to avoid the storm season to do a large scale excavation and backfill of earthwork, to avoid the erosion and destruction on the surface of soil. 2. Temporary covers of land should be timely recovered. 3. When put the pile temporary, please stack surface soil in the middle of the site, and stack the stone pile up in the surrounding, in order to prevent the soil erosion.	Project contractor	PMO Local Environmental Protection bureau	PMO Local Environmental Protection bureau
Operation phase	Breeding Activities	Water pollution	1.The waste water collected from washed water, sewage and animal urine in the animal breeding nursery, would be discharged into biogas pool or sewage treatment facility for treatment, and then discharge into the planting fields. 2.It is not allowed to discharge sewage into surface water without waste treatment. 3.It should strictly manage the nursing house,temporary junk stacking facilities, cesspool and pipeline for sewage and strictly beware of the leakage which might cause the pollution of land, surface water and groundwater.	Project contractor	PMO Local Environmental Protection bureau	PMO Local Environmental Protection bureau
	Breeding Activities	Air, odor pollution	1. It should enhance the management to the odor pollution by timely cleaning dung and sewage of animals, and periodically cleaning animal sheds to reduce the exposed time of faeces and urine and putrid fodder, to prevent the solid dropping. 2. It should be set a device against the rain and scattering for the temporary solid waste site, build a faeces and urine collection storage device, composting products should be buried in time during use. 3. It is ensured ventilation in animal nursing house, and sprayed deodorant regularly. At the same time to strengthen the management of animal nursing house, use strip type seam floor completely or partly, to ensure the cooling of excrement and urine, then clean out the faeces as soon as possible, strengthen the ventilation in the circle to accelerate the feces drying, it can reduce the odor produced;	Project contractor	PMO	PMO Local Environmental Protection bureau

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
			4. It should keep the livestock body clean; 5. By the application of the block and absorption of plants, it would greatly reduce the stink.			
	Breeding Activities	Solid waste pollution	1. The livestock manure, renewal and biogas slurry can be treated as fertilizer after rotten into fields as far as possible, it is banned to be discarded or storage. 2. It is required to recycle and disposal the animal bodies handled by specialized agencies, if there is not such type of organization, it is needed to dig a deep hole to bury , discarded or storage is prohibited.	Project contractor	PMO, Animal Husbandry Bureau	PMO Local Environmental Protection bureau
	Use of veterinary drug	Epedemic diseases	1.Follow the procedures to immune to epedemic diseases such as avian influenza, foot-and-mouth and etc. Complete the record of Immunizations, carry out immune effect monitoring regularly. 2. Establish regular disinfection system, select the appropriate disinfection drugs of broad spectrum, high efficiency, low toxicity to disinfect. 3. Animals with avian influenza and foot-and-mouth disease, should be killed instead of cured. For acute parasitic diseases and bacterial infectious diseases can use antibiotics or chemical drug treatment. Addressed in the pest management plan.	Project contractor	PMO, Animal Husbandry Bureau	Agricultural Bureau

2.1 The Generic Environmental Management Plan of Livestock Breeding Sub-Projects in Stony Desertification Areas

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
Preparation phase	Nursing house Construction	Water and soil erosion	It is banned to build nursing house in rocky desertification areas and to fetch gravel soil, cut trees,etc.	Project contractor	PMO	Agricultural department
Breeding phase	Breeding	Destruction of vegetation in rocky areas	It is forbidden to graze sheep, cattle, chickens, pigs on the stone mountain, to avoid the animals eat the roots and leaves which will exacerbate water loss, soil erosion and aggravate the degree of rocky desertification. Rear the livestock in captivity, develop the forage grass production, increase forage grass supply, maintain the relative balance of supply and demand, in order to reduce the livestock carrying pressure of natural grassland.			
	Animal	Ambient	Build the biogas tank to dispose the livestock manure, use the biogas to lighting,			

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
	manure treatment	contaminate	cooking dishes, use the biogas water for irrigation of fruit trees, use biogas residue to fertilize fields and feed the fish. Reduce the demand for cutting vegetation in stone mountain to slow down the degree of rocky desertification.			

3.The Generic Environmental Management Plan of Infrastructural Sub projects *of Construction Roads, Water Tank, Water Diversion Facilities*

Phases	Main activities	Negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
Design phase	The location and layout of feasibility study		Alternative comparison, it is in order to avoid potential negative impacts of construction and operation.The project's location should be avoided in nature reserves, scenic spots, the world cultural and natural heritage sites, drinking water sources reserve, basic grassland, forest park, geological parks, important wetland, natural forests, rare and endangered species of wild fauna and flora natural concentrated distribution area, key soil erosion prevention and control area, eutrophication water area, cultural relics protection units and significant history, culture, science, national protected area.Environmental protection facilities and engineering facilities should be designed at the same time, and the cost of environmental protection measures is required to be included in the project investment estimation.	FSR Consultant	EIA Consultant, FSR approval agency, PMO	FSR approval agency, PMO
Construction phase	Construction water and household waste water	Water pollution	1.It should strictly manage in saving water, and reduce the construction waste water discharge; 2. Personnel waste water shall not be dumped randomly, to be treated relying on the nearest living facilities. 3. construction waste shall not be dumped into the nearby river; 4. Do the daily maintenance of the machinery, to avoid the phenomenon of run, drip and leakage. In addition, to cover all the machines in the rain the rainy.	Project contractor	PMO	Local Environmental Protection bureau,Environmental Supervision
	Excavations and fillings	Air pollution	1.Strengthen on the management and civilized construction, discharge the building materials lightly, it should cover tarpaulin while the vehicles are transporting the materials such as lime, ballast, cement which will generate dust.	Project contractor	PMO	Local Environmental Protection bu-

Phases	Main activities	Negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
			2. It can be prevented from raised dust to do watering and cleaning on the construction sites and construction roads. 3.The transportation of building materials and waste soil shall comply with the local relevant traffic regulations (such as bagging, covering or airtight transportation), at the time of shipment is not allowed overload and the soil sprinkling . 4. The concrete mixer should be located in the shed which should be located away from the densely populated areas such as the residents and schools. There would be a spraying and dust reducing measures while stirring to reduce dust emission.			reau, Environmental Supervision
	Earthworks, waste soil transport and disposal, and solid waste generation	Solid waste pollution	1. It is needed to make a waste disposal and transportation plan to avoid overload transportation which will cause dropping of solid waste. 2. It should be classified and centralized storage of the abandoned building materials, and it is suggested to recycle by the collectors for the recyclable materials, and convey the unrecyclable materials to the specified construction waste dumps. It is banned to treat mixed with household waste and discard casually. 3 It is suggested that the generated construction waste to be backfilled on the spot as far as possible, residual waste to be transported to other local construction sites, or sent to the designated place to pile up according to the requirements of local environmental protection department. It is resolutely banned to dump the waste into the nearby river and other rivers in China, pickup to relevant departments for bio-safety disposal and utilization timely and orderly.	Project contractor	PMO	Local Environmental Protection bureau, Environmental Supervision
	construction and excavation	Serendipitous cultural relic	If discover cultural relics, must stop construction, protect the scene, timely inform the local department for cultural relics protection, the re-excavation work shall not be done till the end of cultural relics identification and protection.		Local cultural relics competent department	
	Construction and transportation vehicles	Noise pollution	1. It should be choose the low noise equipment for construction. While Vehicle transportation at night, should be no honking. 2. It is need to take effective noise reduction and vibration reduction measures in construction, such as elastic cushion, cladding, acoustic shield, etc.	Project contractor	PMO	Local Environmental Protection bureau, Environmental Supervision
	construction sites and sur-	Water and soil erosion	1.It is reasonable to arrange the construction time, as far as possible to avoid the storm season to do a large scale excavation and backfill of earthwork, to avoid	Project contractor	PMO	Local Environmental

Phases	Main activities	Negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
	face soil vegetation elimination		the rain on the surface of soil erosion and destruction; 2. Temporary covers of land should be timely recovery; 3. When put the pile temporary, please stack surface soil in the middle of the site, and stack the stone pile up in the surrounding, in order to protect the soil erosion.			Protection bureau, Environmental Supervision
Operation phase	Transportation	Air pollution	1.It is require to cover canvas on transportation vehicle. 2. It is needed to clean the vehicles in time to avoid dust on the road; 3. It can grow green plants on both sides of roads to reduce the influence of the air environment.	Project contractor	PMO	Local Environmental Protection bureau, Environmental Supervision
	Transportation	Noise pollution	It is needed to have a vehicles' speed limit, afforesting the both sides on roads, in order to reduce the impact on the environment.	Project contractor	PMO	Local Environmental Protection bureau, Environmental Supervision

3.1 The Generic Environmental Management Plan of Infrastructural Sub projects of Construction Roads, Water Tank, Water Diversion Facilities in Stony Desertification Areas

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
Preparation phase	Civil work	Water and soil erosion	1.It is banned to build roads in rocky desertification areas and to fetch gravel soil, cut trees,etc. 2. It should be closed management in the stone mountain of rocky desertification area. 3. Take active water engineering measures on block, storage, production, irrigation and diversion to reduce water and soil erosion, conservation of the soil.	Project contractor	PMO	Water conservancy, Environmental Protection bureau

4. The Generic Environmental Management Plan of Storage and Warehouse Sub projects

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
Design phase	The location and layout of feasibility study		1.Alternative comparison, it is in order to avoid potential negative impacts of construction and operation.The project's location should be avoided in nature reserves, scenic spots, the world cultural and natural heritage sites, drinking water sources reserve, basic grassland, forest park, geological parks, important wetland, natural forests, rare and endangered species of wild fauna and flora natural concentrated distribution area, key soil erosion prevention and control area, eutrophication water area, cultural relics protection units and significant history, culture, science, national protected area.Environmental protection facilities and engineering facilities should be designed at the same time, and the cost of environmental protection measures is required to be included in the project investment estimation. 2.If the location is selected in the industrial zone, it must be set in legal formalities and with the complete environmental protection formalities. 3. The independent location should conform to the requirements of the local city planning of land use.	FSR Consultant	EIA Consultant, FSR approval agency , PMO	FSR approval agency, PMO
Construction phase	Construction water and household waste water	Water pollution	1.It should be strictly managed in saving water, and reduce the construction waste water discharge; 2. Personnel waste water shall not be dumped randomly, to be treated relying on the nearest living facilities. 3. construction waste shall not be dumped into the nearby river;	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	Excavations and fillings	Air pollution	1.Strengthen on the management and civilized construction, discharge the building materials lightly, it should cover tarpaulin while the vehicles are transporting the materials such as lime, ballast, cement will generating dust. 2. It can be prevented from raised dust to do watering and cleaning on the construction sites, and construction roads. 3.The transportation of building materials and waste soil shall comply with the local relevant traffic regulations (such as bagging, covering or airtight transportation), at the time of shipment is not overloaded and the soil don’t sprinkling .	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
			4. The concrete mixer should be located in the shed which should be located away from the densely populated areas such as the residents and schools. There would be a spraying and dust reducing measures while stirring to reduce dust emission.			
	Earth-works, waste soil transport and disposal ,and solid waste generation	Solid waste pollution	1. It is needed to make a waste disposal and transportation plan to avoid overload transportation which will cause dropping of solid waste. 2. It should be classified and centralized storage of the abandoned building materials, and it is suggested to recycle by the collectors for the recyclable materials, and convey the unrecyclable materials to the specified construction waste dumps. It is banned to treat mixed with house waste and discard casually. 3 It is suggested that the generated construction waste to be backfilled on the spot as far as possible, residual waste to be transported to other local construction sites, or sent to the designated place to pile up according to the requirements of local environmental protection department. It is resolutely banned to dump the waste into the nearby river and other rivers in China, pickup to relevant departments for bio-safety disposal and utilization timely and orderly.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	construction and excavation	Serendipitous cultural relic	If discover cultural relics, must stop construction, protect the scene, timely inform the local department for cultural relics protection, the re-excavation work shall not be done till the end of cultural relics identification and protection.		Local cultural relics competent department	
	Construction and transportation vehicles	Noise pollution	1.It should be choose the low noise equipment for construction; While Vehicle transportation at night, should be no honking. 2. It is need to take effective noise reduction and vibration reduction measures in construction, such as elastic cushion, cladding, acoustic shield, etc.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	construction sites and surface soil plantation elimination	Water and soil erosion	1.It is reasonable to arrange the construction time, as far as possible to avoid the storm season to do a large scale excavation and backfill of earthwork, to avoid the rain on the surface of soil erosion and destruction; 2. Temporary covers of land should be timely recovery; 3. When put the pile temporary, please stack surface soil in the middle of the site, and stack the stone pile up in the surrounding, in order to protect the soil	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervisio

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
			erosion.			n
Operation phase	warehousing activity	Water pollution	1. The construction and household waste water sites can be treated by septic tank after collection,and then discharge into the municipal sewage pipe; 2. The fields and waste water treatment facilities should be well anti-seepage treatment,to prevent the underground water pollution.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	warehousing activity	Air and odour pollution	1. It should enhance the management to reduce the exposed time of abandoned by timely cleaning, to prevent the solid dropping while transportation. 2. It should be set a device against the rain and scattering for the temporary solid waste site. 3. It is ensured ventilation in construction sites, and spray pesticides regularly. 4. It should be cleaned up timely for the solid waste to avoid the odour from fermentation ; 5. By the application of the block and absorption of plants, it would greatly reduce the stink.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	warehousing activity	Solid waste pollution	The waste plastic bags, rotten vegetables and fruits generated from the sites need to collect unified and piled up to the designated garbage dumps, then transfer to waste transfer station, finally into the county comprehensive landfill landfill disposal.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	warehousing activity	Environmental risks	It Should be reasonable located the site, and prepare the corresponding environmental risk plan to enhance facility management.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision

5.The Generic Environmental Management Plan of Tourism Development S*ub projects*

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
Project design phase	The location and layout of feasibility study		Alternative comparison, it is in order to avoid potential negative impacts of construction and operation.The project's location should be avoided in nature reserves, scenic spots, the world cultural and natural heritage sites, drinking water sources reserve, basic grassland, forest park, geological parks, important wetland, natural forests, rare and endangered species of wild fauna and flora natural concentrated distribution area, key soil erosion prevention and control area, eutrophication water area, cultural relics protection units and significant history, culture, science, national protected area.Environmental protection facilities and engineering facilities should be designed at the same time, and the cost of environmental protection measures is required to be included in the project investment estimation. The design of buildings and artificial landscape should comply with the local folk customs, cultural traditions and natural landscape.	FSR Consultant	EIA Consultant, FSR approval agency , PMO	FSR approval agency, PMO
Construction phase	Construction water and household waste water	Water pollution	1.It should be strictly managed in saving water, and reduce the construction waste water discharge; 2. Personnel waste water shall not be dumped randomly, to be treated relying on the nearest living facilities. 3. construction waste shall not be dumped into the nearby river;	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	Excavations and fillings	Air pollution	1. The earthwork should be stopped in the 4 class or above windy day. 2. Watering regular on the bare surface within the construction site , keep soil moisture, and reduce the dust on surface; 3. It is strictly forbidden to handling waste residue and cement to volley scatters. It is suggested to use enclosed compartment for sporadic materials transportation, to avoid materials dropping which will cause dust; 4. Waste soil should be given on the spot, if it is useless, it should be cleaned up and transported away without delay. When pickup should also be in accordance with the relevant requirements, the pickup vehicle should be covered, and the vehicle speed limit.For earthwork excavation at the same time, in the dry season when construction, should carry on the sprinkler dust, the main operating point may generate dust, such as cement storage area should	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
			be set in downwind of the field, and the fence or wind deflector which covered the powder material in its surroundings should be set up temporary, in order to prevent dust diffusion.			
	Earthworks, waste soil transport and disposal ,and solid waste generation	Solid waste pollution	1. It is advocated civilized construction,and it is needed to make a waste disposal and transportation plan to avoid overload transportation which will cause dropping of solid waste. 2. It should be classified and centralized storage of the abandoned building materials, and it is suggested to recycle by the collectors for the recyclable materials, and convey the unrecyclable materials to the specified construction waste dumps. It is banned to treat mixed with house waste and discard casually. 3 It is suggested that the generated construction waste to be backfilled on the spot as far as possible, residual waste to be transported to other local construction sites, or sent to the designated place to pile up according to the requirements of local environmental protection department. It is resolutely banned to dump the waste into the nearby river and other rivers in China, pickup to relevant departments for bio-safety disposal and utilization timely and orderly.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	Construction and excavation	Serendipitous cultural relic	If discover cultural relics, must stop construction, protect the scene, timely inform the local department for cultural relics protection, the re-excavation work shall not be done till the end of cultural relics identification and protection.		Local cultural relics competent department	
	Construction and transportation vehicles	Noise pollution	1.It should be choose the low noise equipment for construction; While Vehicle transportation at night, should be no honking.To strengthen environmental protection education, and do civilized construction, reduce construction noise and life noise pollution on the surrounding environment; 2. It is need to take effective noise reduction and vibration reduction measures in construction, such as elastic cushion, cladding, acoustic shield, etc. While the vehicles in and out of the construction site should be no honking.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	Construction	Water and	1.It is reasonable to arrange the construction time, as far as possible to avoid	Project	PMO	Local Envi-

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
	sites and surface soil plantation elimination	soil erosion	the storm season to do a large scale excavation and backfill of earthwork, to avoid the rain on the surface of soil erosion and destruction; 2. Temporary covers of land should be timely recovery; 3. When put the pile temporary, please stack surface soil in the middle of the site, and stack the stone pile up in the surrounding, in order to protect the soil erosio.	contractor	Local Environmental Protection bureau	ronmental Protection bureau, Environmental Supervision
Operation phase	Tourism activities and accommodations	Water pollution	It is mainly the waste water and sewage from catering, sewerage should be treated by the facilities such as the oil separation tank, septic tanks,biogas pool and other facilities, it can not be directly discharged.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	Tourists dining and etc.	Air	Mainly is the lampblack, it shall be set up lampblack purifier and special flue for tourist restaurants, to reduce the influence on atmospheric environment.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	Tourism activities and accommodations, etc.	Solid waste pollution	1. The household refuse can be unify collected to the the towns waste transfer station, finally entered the county comprehensive landfill to disposal. 2. Refectory garbage can be unify collected and then sent to the specified point.	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision
	Tourism Activities, etc.	Ecological impact	1.It should be considered of the ecological environment, in particular of plants or animals protection, it should be made a reasonable planning for rational development to avoid negative impact. 2.The waste water and solid waste should be reasonable disposed to avoid the impact on the regional ecological environment. 3. Strengthen the environmental protection dissemination for local residents and tourists, to protect the local natural environment, don't pick flowers and plants, don’t graffito or do any other detrimental activities on scenic land-	Project contractor	PMO Local Environmental Protection bureau	Local Environmental Protection bureau, Environmental Supervision

Phases	Main activities	negative impact	Mitigation/ prevention and control measures	Executors	Supervisors	Monitoring agency
			scape and ecological environment.			

Annex 3
Pest Management Plan

Annex 3 Pest Management Plan

Foreword

The development of Guangxi Autonomous Region is bedeviled with numerous difficulties and problems. It spreads of rocky desertification as the border area. There are some poverty areas in the mountains and some reservoir resettlement regions. Due to the late beginning, weak economic foundation, large population, backward infrastructure and weak industry development, Guangxi has become one of the undeveloped regions suffering from unacceptable poverty. Its main economic indicators are among the worst in China. In order to greatly alleviate poverty and increase income of the poor areas, improve rural development level, cultivate main rural industry and promote the sustainable development of rural economy, Guangxi government takes advantage of the World Bank loans to implement the Rural Poverty Alleviation Pilot Project around the poor regions, mainly eight priority counties of Baise and Hechi City in National Poverty Alleviation and Development List, including Tiandong, Tianlin, Leye, Donglan, Bama, Fengshan, Dahua and Du'an Counties, and two contiguous poor areas such as Pingguo County and Yizhou city. The project areas are located at the transition zone from Karst to the plain of Yunnan, Guangxi and Guizhou provinces and have topographic features in between, among which the Karst accounts for 52%. In total, the project areas involve in 54 villages and towns, 113 administrative villages and 66700 households. Its poverty alleviation industry focuses on developing mango, bamboo，pitaya, mulberry，kiwi fruit，oil tea，walnut，wild grape, orange, silkworm，edible fungi, black chicken, Bama fragrance pig, Yao chicken, goat and rural tourism. The Pingguo County targets on developing pitaya and mulberry industry, Tiandong County on mango and bamboo industry,Tianlin County on mango and oil tea industry, Leye County on kiwi and tea, Donglan County on oil tea, black chicken and tourism, Bama County on fragrance pig, oil tea and rural tourism, Fengshan County on walnut and oil tea industry, Du'an on mulberry plantation and silkworm cultivation, Yao chicken and goat industry, Dahua County on wild grape and orange, and Yizhou city on mulberry plantation and silkworm cultivation, edible fungi and rural tourism.The project de-

velopment is closely related to rural main industry and special agricultural production. In this case, specialists were organized to investigate and interview all project areas. With adequate data and information and under the policy requirements of pest management of the World Bank, the Management Plan on Control of animal and plant disease and Pests was developed and attached with Guangxi Rural Poverty Alleviation Pilot Project.

1. Relevant National Policies and Regulations

1.1National Animal and Plant Protection Policy and Principle

The national control policy on animal diseases and plant pests aims at controlling the hazardous degree of animal diseases and plant pests to the lower level and promoting agricultural quality and sustainable resource use under the IPM concept. That is to protect agricultural resources and eco-environment. For years, national animal and plant protection policy keeps the emphasizing principles of Prevention First, Scientific Control, Lawful Management and Health Promotion, puts high premium on animal and plant quarantine for preventing further attack and spread of diseases and pests, lays more stress on biological control to chemicals，and attaches more importance to the production of pollution-free, green (Standard A) and organic food (Standard AA).

1.1.1 IPM

IPM is the core principle and the significant measure on pest control. It is also the requirement mentioned from Pest Management of The World Bank Operational Policies （OP 4.09）. Since 1975, Chinese government has also adopted the IPM.

Implementing IPM considers not only the economic benefit, but also ecological balance and social safety. Based on this concept, pest control should: keep the prevention first, put agronomy as the basis, take full advantage of the nature on pest control factors and create disadvantage conditions on pest growth according to pest biological features and habits,strengthen early warning, forecast and hazard monitoring, apply biological, physical and chemical measures appropriately according to local conditions，avoid killing or harming pest predators and polluting environment, and control pest damage to tolerable level as possible. Biological control is taken first. Unless it is with little effect and pest damage is severe, chemicals and

veterinary drugs with high effective, low poison and low residues can be applied. And safety chemical application helps to reduce residues in soil or water environment.

1.1.2 Quarantine of Animals and Plants

Animal and Plant quarantine is a national method to prevent crops or animals from disease and pest harm, and weeds from spread to crop areas. China's quarantine starts from 1930s. In 1991, the Entry and Exit Plant Quarantine Law was implemented in China. Over 300 quarantine institutions were established at customs, inland ports and airports to prevent foreign animal diseases and pests to enter and spread in China. These institutions played significant role in preventing animal disease and pest harm. For years, Many pests have been quarantined, such as Medfly and American white moth. The quarantine is divided into three components: National Plant Protection Station of the Ministry of Agriculture responsible for crop quarantine, State-owned Forestry Centre and Seedling Management Station of the State Forestry Administration for tree seedlings quarantine, and National Veterinary Bureau of the Ministry of Agriculture for animal quarantine.

1.1.3Food Safety and Pesticide Residue Detection

Chinese government has paid great attention to food safety. According to animal and plant protection principles of 'prevention first and comprehensive prevention and control', biological-oriented measures will be gradually adopted. Rapid development of green and organic food market stimulates the food price change with less or even none application of chemicals. In order to promote the production of green and safe agricultural product and the authentication of green and organic food, the Green Food Development Centre of the Ministry of Agriculture publicized a Pesticide Application Rules on Organic Food Production to guide the production of Green food (Standard A) and Organic Food (Standard AA).

Regulations on Pesticide Administration and ‘Regulations on Administration of Vaccines and Veterinary Drugs’ were promulgated by the State Council, ‘Standard for Safety Application of Pesticides’, Standard for Safety Application of Vaccines and Veterinary Drugs’ by Ministry of Agriculture to encourage the high-effective use of pesticides, vaccines and veterinary drugs with low toxicity and residue. All producers of pesticides, vaccines and veterinary drugs must abide by the Regulations, Rules and Standards as above during production. These documents clearly stated:

——Strict limits on application of pesticides, vaccines and veterinary drugs for preventing animal diseases and plant pests during agricultural production (It is prohibited to use highly dangerous and toxic pesticides like thionazin, monocrotophos, phorate)

——Agricultural products with excessive residues of the pesticides, vaccines and veterinary drugs are prohibited to enter the market.

——Methods on safe application of pesticides, vaccines and veterinary drugs include: their forms, safety and appropriate use methods, normal and maximum dose, extreme application frequency in one year, and time period from harvest to end since last application.

The Institutes for the Control of Agrochemicals and Veterinary Drugs of the Ministry of Agriculture and other provinces are responsible for monitoring farm product and pesticide residue (vegetables, fruits, grain crops，chicken，eggs and meats in particular）.

1.2. Main Laws, Regulations and Standards

A set of relevant laws, regulations, standards, measures, rules and guidelines was promulgated and implemented as a system from national to local level. With its enforcement, IPM was further promoted to better application.

1.2.1. Main Laws, Regulations and Standards on Plant Diseases and Insect Pests.

(1)The Law of the People's Republic of China on Quality and Safety of Agricultural Products (the Standing Committee of the National People's Congress in April 2006)

(2)Regulations of the People's Republic of China on Pesticide Administration (the State Council, Jan, 2001)

(3)Implementing Measures for Regulations of the Control of Agricultural Chemicals (Order No. 9 of the Ministry of Agriculture on Dec 8， 2007)

(4)Provisions for Quality and Safety of Pollution-free Agricultural Products (Ministry of Agriculture and the State Administration of Quality Supervision, Inspection and Quarantine, Apr 2002)

(5)Standards for Safety Application of Pesticides GB4285-1989 （The National Bureau of Environmental Protection， Sept. 1986）

(6)Standards for Safety Application of Pesticides GB8321.2—1987 (The National Bureau of Environmental Protection, Sept. 1986)

(7)Green food Pesticide Application Guidelines NY/T393-2000 (Ministry of agriculture, Mar. 2000)

(8)National Food Safety Standard—Maximum Residue Limits for Pesticides in Food GB2763-2005

(9)Method for Determination of Organophosphorus Pesticide Residues in Foods GB/T 5009.20-2003

(10)Guideline for Safety Application of Pesticides GB/TB8321.1-8321.8

(11)Regulations on Plant Quarantine (the State Council, revised and promulgated on May 13, 1992)

(12)The Detailed Rules for Regulation on Plant Quarantine (The Agriculture Section) (Ministry of Agriculture, May. 1995)

(13)Antitoxic Regulations for Storage- transportation,Marketing and Use of Pesticides （GB 12475-2006）(Ministry of Agriculture)

1.2.2 Main Laws, Regulations and Standards on Animal Epidemic Prevention

(1)Animal Husbandry Law of the People's Republic of China (Order of the President of the People's Republic of China No. 45 (2006))

(2)Animal Epidemic Prevention Law of the People's Republic of China (Order of the President of the People's Republic of China No. 71 (2008))

(3)Measures for Management of Animal Quarantine (Decree No.6 of the Ministry of Agriculture of the People's Republic of China (Jan, 2010))

(4)Law of people's Republic of China on the Entry and Exit Animal and Plant Quarantine (Order of the President of the People's Republic of China No. 53 (Oct, 1991))

(5)Laws of the People's Republic of China on the Protection of Wildlife (Revised on the Eleventh Meeting of the Standing Committee of the Tenth National People's Republic of China (Aug 2004))

(6)Regulations on Administration of Veterinary Drugs (adopted at the 45th Executive Meeting of the State Council (Mar, 2004))

(7)Regulation on Handling Major Animal Epidemic Emergencies (Decree No. 450 of the State Council (Nov, 2005))

(8) Veterinary Pharmacopoeia of the People's Republic of China (Order No.587 of the Ministry of Agriculture of the People's Republic (2005))

(9)Measures for Examination of Requirements for Animal Diseases Prevention (Decree No.7 of the Ministry of Agriculture of the People's Republic of China (Jan,2010))

(10)Measures for the Examination and Approval of the Bio-Safety Administration of Highly Pathogenic Animal Pathogenic Microbe Labs (Order No. 52 of the Ministry of Agriculture (May, 2005))

(11)Safety Regulations for Biological Dealing with Sick Animals and Sick Animal Products GB16548-2006

(12)Disinfection Requirement for Livestock and Poultry Products GB/T16569-1996

(13)Pollution-free Food - Application Guidelines on Forage and Feed Addictive of Livestock and Poultry NY5032-2006

(14)Pollution-free Food – Drinking Water Quality of Livestock and Poultry NY 027-2008

(15)Basic Terms of Animal Epidemic Prevention GB/T 18635-2002

(16)Veterinary Regulations of Disease Prevention in Middle and Small Intensive Pig

Farms

(17)Veterinary Requirements of Prevention and Control of Diseases for Intensive Pig Farm GB/T 17823-2009

2 Pest Management Experiences and Problems

2.1. Main Experiences

2.1.1. IPM on plants is prioritized by the MOA as an effective prevention method.

According to pest biological features and habits, biological control is taken first combined with quarantine, physical, mechanical and cultivation methods. Unless it is with little effect on pest damage prevention, chemicals and pesticides with high effective, low poison and residues can be applied. IPM recommends alternative chemicals, especially with successful experience on biochemical use and predator protection. For example, trichogramma is feed and released to prevent pest damage. Insect pathogen nematodes can be used to prevent fruit budworms and trunk borers. Some bio-pesticides have been studied and applied to practice, such as Bt bacillus thuringiensis and beauveria chemicals. At current, Guangxi has applied some bio pesticides and biological prevention techniques to some crops.

In project areas, economic crops are mainly fruit trees. When severe pest damage occurred, farmers rely heavily on chemicals with low toxicity and high effect. In this case, chemical method is inevitable. The frequency of pesticide spray is changing with pest types and crop conditions.

2.1.2. Animal immunization has been widely accepted as animal epidemic prevention measure by households.

Healthy animal will be vaccinated a certain antigenic substance for stimulating its specific antibodies and reducing the risks of being easily infected. Well organized and planned vaccination is an effective measure on prevention and control of animal epidemic diseases, especially on immunization of serious animal epidemics, such as foot-and-mouth disease, bird

flu and swine fever. Animal vaccination can be carried out both routinely and under contingency circumstances. Routine vaccination is implemented for healthy animals systematically in regions where some epidemic diseases are occurring more frequently or with potential threats. What we called the vaccination is this planned one. Contingency vaccination is carried out to quickly control and exterminate animal diseases in epidemic and the threatened areas. All vaccination must be operated strictly according to instructions and to ensure immunization safety and quality.

2.2Existing Problems

From strategic perspective, appropriate prevention is inevitable, otherwise the abrupt occurrence of pests and epidemic diseases will caught people unprepared. Also, integrated control and prevention is very necessary because localized application of pesticides for every household is difficult to control the situation of the whole affected area. Reasons as follows, the IPM concept hasn't been widely accepted by households. The forecast and warning on pests are often delayed. Mass prevention and control are not widely covered. Households are heavily relying on chemical application and gradually increasing its amount. The area of chemical application is enlarging, which further deteriorates the eco-environment. Pesticide resistance is building up.

From control system's perspective, the system fund is very limited and the system itself has obvious blind sides. Localized and scattered prevention is the mainstream and control techniques are not widely accepted by households. Reasons as follows. Local agrotechnique extension centers have insufficient funds and technicians. Pest control can only focus on pests and diseases with severe damages. The whole system is in urgent need for improvement, so is the technique. The technicians of all levels are in shortage, and the research and extension of biological and physical prevention technology are in slow development pace. Simple prevention measures lead to less success. The project has totally stopped the use of chemicals with high toxicity and residues. However, households still lack of prevention awareness and select inappropriate methods and timing, which causes more application of pesticides with

more frequency and more costs. The gradual pollution of agricultural area-source and wastes is disadvantage to the sustainable development of agriculture.

Main problems on prevention of animal epidemic diseases are: weak infrastructure, incomplete technical support, substandard immunization density, insufficient funds and technicians of county epidemic prevention agencies, high mobility and low professional skills of the village health workers, inadequate supervision of epidemic disease prevention, weak prevention awareness of some farm managers.

2.3Main Causes

Currently, most counties and cities of Guangxi such as Bama, Du'an, Leye, Pingguo, Tiandong counties, and the project areas, have established the monitoring, forecast, prevention and control system on main plant pests and animal epidemic diseases. Others are isolated cases. For example, Donglan County only has plant protection station and epidemic disease prevention station. They can only control some usual pests and epidemic diseases. For some explosive and epidemic pests and diseases, they're in passive position on prevention of taking stop-gap and simple measures. The prevention is not widely covered and its effects are unstable. The total control capacity requires great improvement.

2.3.1. Lack of information on occurrence and prevention of animal diseases and plant pests

Farmers have little access to knowledge on the occurrence of animal diseases and plant pests, and the application of pesticides and veterinary drugs for prevention, but through watching TV programs on agriculture or reading technical books and application guides on pesticides. Although the local agricultural administrations held some training courses, technicians from counties or towns provided some consultancy services, and the manuals and textbooks of crop protection technology provided methods on the occurrence of animal diseases and plant pests and the application of pesticides and veterinary drugs for prevention, most farmers were difficult in timely and accurately obtaining relevant information on animal breeding, plant cultivation and prevention of animal diseases and plant pests.

2.3.2. Lack of concept on alternative chemical use and common sense on safety use of chemicals

When choosing prevention methods of pests and epidemic diseases, farmers consider mainly their effectiveness on generating maximum profits. They prefer chemical prevention methods of quick and better effectiveness. The alternative chemicals will only be applied when higher net incomes are produced. Thus, it is significant for farmers to realize the advantages and disadvantages of all optional methods, and to change their conventional concept on animal and plant protection through cultivating high-valued green and organic foods.

Under normal field conditions, farmers rarely wear protective clothing, helmet, mask and gloves when spraying pesticides manually or automatically. Lacking of self protection awareness, they are vulnerable to acute pesticide poisoning and chronic pesticide residues over-accumulated within their body. In Guangxi, chemicals can be easily purchased from agricultural material shops and crop hospitals of almost all counties and towns. Farmers purchase chemicals at will in any time and the rest stored randomly can easily cause accidental poisoning.

3 Pest Management Methods

3.1. IPM Principles

IPM was revised as an strategy for pest prevention and control on the basis of IPC in 1966 version by UNFAO in 1972. It emphasizes on natural control with other prevention measures in coordinating and organic way. According to pest biological features and habits, IPM will firstly strengthen monitoring, and then consider appropriate control methods like quarantine, physical and mechanical methods, cultivation techniques and biological prevention measures. Unless it is with little effect on pest damage prevention, chemicals and pesticides with high effective, low poison and residues can be applied.

The strategy of pest prevention will be developed with consideration of the economic benefit, ecological balance and social safety as well . Based on this concept, pest control of the

project area should: take full advantage of the nature on pest control factors, create disadvantage conditions on pest growth according to pest biological features and habits, apply biological, physical and chemical measures appropriately according to local conditions， avoid killing or harming pest predators and polluting environment and control pest damage to tolerable level as possible.

3.2 Strict Implementation of WHO Guidelines and Requirements on Pesticide Classification

The WHO Recommended Classification of Pesticides by Hazard was approved by the 28th World Health Assembly in 1975. To deal with the new situation, WHO revised the classification (table 3) in 2009. Pesticide toxicity is mainly classified by the acute oral and dermal toxicity to the rat, since these determinations are standard procedures in toxicology.

WHO GHS classification as follows.

Table 3-1 WHO GHS classification(2009)

GHS Class	Symbols	Oral LD50（mg/kg)	Dermal LD50（mg/kg)
Ia	Extremely hazardous	<5	<50
Ib	Highly hazardous	5-50	50-200
II	Moderately hazardous	50-2000	200-2000
III	Slightly hazardous	>2000	>2000
IV	No hazardous	≥5000	≥5000

Pesticide prevention must strictly follow the requirements on WHO Pesticide Classification Guidelines . Class I must be forbidden. Class III and IV are given priority to application.

4. Main Pest Control Measures in Project Areas

All counties in the project areas have different natural conditions and plant crops, but their pest control measures are essentially similar, including agricultural practices, physical,mechanical, biological,ecological and chemical prevention.

4.1. Non-chemical Prevention and Control Technical Measures in the Project Areas

4.1.1. Agronomic Cultivation

Main measures: ①breeding and planting disease-resistant varieties ② strengthening water, fertilization, tillage and weeding management ③ paddy-upland rotation. Study shows that: breeding and planting disease-resistant varieties is the most important way of preventing and controlling animal diseases and plant pests. Appropriate fertilization, irrigation, tillage, weeding and rotation measures can improve crop resistance to pest harm and cut down pest population and density. The measures of selecting disease-resistant varieties and implementing appropriate water and fertilization plan can be applied to project crops like mango, bamboo, dragonfruit, mulberry, kiwi fruit，oil tea，walnut，wild grape, orange, silkworm and edible fungi, for pest prevention and control.

4.1.2Physical and mechanical prevention

It is commonly used for pest control because （1）low cost: no purchase of chemicals, cheap labor; (2) effective: very effective to preventing some animal diseases and plant pests; (3) safe: non-pollution, environmental and predator safety. Mechanical and physical methods can cut down a great deal of pest population and lower pests' resistance to drugs.

Physical and mechanical methods can artificially decimate many plant pests like longhorn beetle, phalaenae, caterpillar and scarab on mango, bamboo, dragonfruit, mulberry, kiwi fruit，oil tea，walnut，wild grape, orange, silkworm and edible fungi, effectively reduce pest population and mitigate pest damage.

4.1.3. Biological Prevention

It mainly takes advantage of pest predators and microorganism inoculant to prevent and control animal diseases and plant pests in human, animal and environmental friendly way. At current, microorganism inoculant is more widely applied to project plants, including antiseptic (trichoderma,streptomycin) , pesticides (bacillus thuringiensis(Bt), beauveria bassianna), insecticides (matrine, rotenone). But, the effect of bio-prevention is not as quick and stable as that is of the chemical pesticides. Its cost is also higher. In this case, many households prefer chemical pesticides to biological prevention methods.

According to survey and information collected, non-chemical prevention methods for project plants as follows.

Table 4-1 Non-chemical Prevention Methods for Plant Pests in Project Areas

Plants	Diseases & Pests	Non-chemical Methods	Plants	Diseases & Pests	Non-chemical Methods
Mango	Chlurnetia guttive ntris WaLker	prunning, coating tree stems and main branches in winter	Pitaya	measuring worm	artificially killing the adult worms
	Erosomyia mangiferae Felt	loosening the soil, damaging pupation area		slug caterpillar moth	trapping the adult with the light
	Deporaus marginatus Pascoe	loosening the soil, damaging pupation area		anthrax	Prunning, fertilizing P,K
	anthracnose	cleaning the orchard, cutting or burning the sick branches and leaves in winter		Black Rot	strengthening cultivation management, more P,K fertilizer, less N fertilizer
Mulberry	mulberry small weevil	Pruning and burning dried branches	Walnut	Atrijuglans hetaohei Yang	Trapping and killing by black lights, artificially killing the adult worms
	Apripona germari	artificially killing the adult worms		Juglans regia L	coating lime in winter
	Porthesia xanthocampa Dyar	artificially killing the adult worms		Blank Canker	more fertilization

	Ginkgo Mulberry Disease	Prunning, weeding, applying more organic fertilizer		Mould	Disinfecting bacteria bed
Citrus	Whitefly	Prunning sick and weak branches, tillage and weeding	Edible Fungi	Flies	bait trapping and killing
	Scale	releasing predators of parasitic wasp, ladybug, lacewing fly and parasites		mole cricket	bait trapping and killing
	Phalaenae	properly budpicking and prunning		maggot	bait trapping and killing
	Scab	Cutting down sick branches and leaves	Oil tea	HoMeneuyasp	artificially killing
Kiwi fruit	cypris	cleaning the orchard,prunning the branches		scarab	artificially killing
	scarab	artificially killing		articulatum	Prunning sick branches
	brown blotch	cleaning dried branches and fallen leaves			
	Powdery mildew	cleaning dried branches and fallen leaves			

4.1.4. Chemical Prevention Method

Chemical prevention has its obvious advantages: 1) a wide variety of optional pesticides; 2) available at anytime, no seasonal restraints; 3) quick and high effectiveness, that is the most obvious advantage. But, the pollution of chemical pesticides threats human and animal health. The insecticides killed many natural predators of targeted pests and stimulated many pests' resistance to pesticides. When the population size of a kind of pest is quickly enlarged, and causing great damage to agriculture, chemical prevention is the most effective measure. It's a common concern on pesticide types, practices, amounts, timing and residue duration (mainly for vegetables, teas and fruits). In order to guide the safe application of pesticides, meet WB's requirements on environmental protection management plan, and according to the project

content, IPM practices and WB's Operational Policies (OP 4.09), the recommended pesticide list as follows.

Table 4-2 Recommended Pesticide List

Pest Name	Diseases and Pests	Pesticides	Pesticide Classification (WHO)
Dragonfruit	scab, anthracnose, fusarium wilt, Black Rot stem wilt spiny white fly Red spider, measuring worm scarab	streptomycin sulfate, mancozeb, Mancozeb, thiabendazole, thiophanate methyl acetamiprid, Imidacloprid Avermectin , deltamethrin Cyfluthrin, cypermethrin, deltamethrin	III III III III、IV III
Fruit mulberry	Scletotiniose mulberry small weevil, Apripona germari	Chlorothalonil, thiophanate methyl, thiabendazole Cyfluthrin, cypermethrin, chlorpyrifos	III III
mango	Anthracnose, powdery mildew, bacterial black spot, excavate Butler, Chlurnetia guttiventris WaLker, Erosomyia mangiferae Felt, Lawana lmitata Melichar, Rhytidodera bowrinii white	thiabendazole, thiophanate methyl Propargite, Avermectin, acetamiprid Imidacloprid, Esfenvalerate, pirimicarb	III III、IV III
Oil tea	Anthracnose, sooty blotch, soft rot Moth, tent caterpillar moths, Macrocentrus parametriates ivorus He et Chen, geometrid moth	thiophanate methyl, cypermethrin , thiabendazole, Cyfluthrin, chlorpyrifos, cypermethrin,	III III IV
Kiwi fruit	Root rot, brown spot, canker, powdery mildew White scale insect, green leafhopper	Chlorothalonil, bromothalonil, thiophonate-methyl, mancozeb, streptomycin sulfate Chlorpyrifos, deltamethrin	III III III IV
Citrus	Canker Anthracnose,scab,black rot Red spider, arrowhead scale	Tuzet, mancozeb, streptomycin sulfate thiophanate methyl, thiabendazole, bromothalonil propargite, chlorpyrifos, Avermectin	III III III
Walnut	Canker Black spot, twig blight, canker, measuring worm, Dyscerus juglaus, leaf beetle, longhorn beetle Red spider	Chlorothalonil, bromothalonil, thiophonate-methyl Chlorothalonil, Tuzet, mancozeb, Zhongshengmycin, streptomycin sulfate, Chlorpyrifos, Cyfluthrin, cypermethrin propargite, Avermectin	III I I I I V I

			I I III、 IV
Grape	scab ,Anthracnose, white rot, gray mold brown spot Downy mildew Powdery mildew, clearwing moth , fruit-piercing moth, thrips, green leaf bug, mites, aphid, mealy bug leafhopper	Chunleimeisu, azoxystrobin, validamycin, propamocarb hydrochloride, Chlorothalonil, thiophonate-methyl, Azoxystrobin, validamycin, propamocarb hydrochloride, thiophonate-methyl, triadimefon, propiconazole Chlorpyrifos, Cyfluthrin, cypermethrin, Avermectin, deltamethrin propargite, Avermectin, acetamiprid, Imidacloprid, cis	III III III III III IV、 III III、 IV
Edible fungi	Mould mushroom mosquito , flies, mole cricket, maggot	Thiabendazole, Avermectin, deltamethrin	III IV、 III

Based on the oral and dermal LD50 (mg/kg of body weight) values, WHO and Chinese government developed the Acute Toxicity Classification Criteria respectively. WHO classified pesticide toxicity into IA: extremely hazardous, IB: highly hazardous, II: moderately hazardous, III, slightly hazardous, IV: no hazardous, equivalent to China's criteria from extremely poisonous, highly poisonous, moderately poisonous, slightly poisonous to no poisonous.

Table 3 listed the recommended pesticides, which is in accordance with WHO classification of pesticides by hazards and China's acute toxicity classification criteria. The listed pesticides all in category III: low poisonous and IV: no poisonous. What with "※" is listed as biological pesticides, categorized in no poisonous. The recommended pesticides fully follow WHO and China's relevant policy requirements. The pesticides in WHO IA and IB category and China's Forbidden Pesticide List are entirely forbidden to apply in project areas.

5 Main Control Measures on Animal Epidemic Disease in Project Areas

5.1. Scientific Management

To strengthen breeding management, take comprehensive measures and effectively reduce animal disease attack. Including: ①site selection for better epidemic quarantine. Scientific arrangement on functional areas. ②mobility control of farmers and items, such as animal population, sanitation and pathogen control. ③establishment and improvement of quarantine system, like disinfection, immune, application system, innocuous system on dead animals and pollutants, insect disinfestation，deratization, and epidemic reporting system.

Animal breeding is promoted in scale, intensive and standard. Consideration will be fully taken on breeding scale, environmental capacity and epidemic risk for building a healthy breeding style. Animal houses should be well cleaned and ventilated. Animal feed should be properly mixed and avoid moldy forage. Water should be clean. No mixed breeding with other animals. Bio-safety management system should be developed to improve biological safety level.

5.2. Immunization, Insecticide, Disinfection and Sterilization

Immunization against animal diseases like bird flu and foot-and-mouth disease according to procedure. Development of immunization records with regular effect monitoring. Immunization to antibody below standard. Chemical insecticide will be applied in prevalent areas of parasitic diseases in due course.

Building regular disinfection system and applying disinfectants of broad spectrum, high effectiveness and low hazard. People passing in or out should be disinfected by Ultraviolet, spraying disinfectant, wiping feet on the disinfected doormats, using disinfecting pool or hand-washing disinfecting trough. Vehicles passing in or out should be cleaned first, and disinfected entirely. Apparatus and tools should be disinfected by spraying, high pressure cooking and fumigation. Animal houses should be cleaned before disinfection and alternatively applied with different disinfectants. During disinfection, health workers should

be well equipped to reduce the potential harm.

5.3. Appropriate Remedy for Specific Situation

Animals suffering from bird flu and foot-and-mouth diseases must be killed other than treatment. Those from parasitic and bacterial acute infectious diseases can be treated by antibiotics or chemicals. The strict control on medication safety should be carried out for breeding farms. Developing a sound medication record system. Strictly implementing the medication guidance on drug holiday and the prescription by licensed veterinarian.

5.4. Cleanup Mechanism of Infectious Diseases

Animals are examined in positive of a certain epidemic disease should be eliminated, stamped out and innocuously treated strictly according to relevant technical regulations and treatment rules. Animal farms are encouraged to carry out cleanup measures such as quarantine, disinfection, stamping out and elimination.

5.5. Innocuously Treatment

Infectious animal carries a large quantity of pathogen and becomes the source of contamination. Farm households should actively cooperate with animal husbandry and veterinary administrative of all levels to stamp out infectious livestock and poultry with brucellosis, sheep pox, foot-and-mouth disease and bird flu. Under the supervision of local animal hygiene authorities, infectious animals, dead sick body, abortion, stillbirth and infectious forages should be innocuously treated.

5.6. Prevention and Control of Main Animal Epidemic Diseases

According to the real condition of the project areas, the relationship among epidemic control, public and environmental health and breeding industry should be arranged in overall and sustainable way. The epidemic control pattern suitable for the project animals will be explored positively.

(1) Prevention plan implemented in different diseases, regions and stages. The main

diseases of high hazardous to health safety and animal husbandry should be controlled with better plan. Regularly assessing the hygiene conditions and prevention effects of animal groups. Implementing control plans on main epidemic diseases and zoonosis. Gradually moving the control emphasis from effectiveness to stability, and to elimination at last.

(2). Implementing healthy breeding strategy for livestock and poultry. Building healthy breeding concept, strengthening the source control of epidemic diseases, actively promoting self breeding and herd closure modes, improving self-sufficiency and health condition of breeding animals, developing health standards and carrying out epidemic disease cleanup plan for breeding animals. Regularly monitoring animal health.

(3)Implementing promotion strategy on standardized scale-breeding. Greatly supporting scale, standard and intensive breeding, gradually reducing free-range ratio of livestock and poultry and multi-area circulation of living animals. Improving breeding methods and cleaning up breeding environment. Better developing supervision system on epidemic prevention conditions of livestock environment, increasing biological safety and providing preconditions on epidemic control. Guiding households to implement quarantine, regular monitoring and strict disinfection together and reducing the occurrence of animal epidemic diseases. Main epidemic diseases and their management plan as follows, table 5-1, 5-2.

Table 5-1 Main Epidemic Diseases and Management Plan

Livestock	Disease Name	Management Plan	
		Prevention	Control and Treatment
Chicken	highly pathogenic avian influenza	Vaccination	Stamping out, pollution-free treatment and terminal disinfection
	Newcastle disease virus	Vaccination	
	Marek's disease	Vaccination	

	Infectious bursal disease (IBD)	Vaccination	
	Avian leukemia	Quarantine, elimination, cleansing	Quarantine, elimination,pollution-free treatment
	Salmonellosis	Quarantine, elimination, cleansing	Quarantine, elimination,pollution-free treatment
	Chicken Coccidiosis	Vaccination	Feeding or injecting sulfas or other anti-coccidiosis drugs
	Other parasitic disease	Feeding Ivermectin + albendazole, zental	Ivermectin + albendazole, zental
Pig	foot-and-mouth disease	Vaccination	Stamping out, pollution-free treatment and terminal disinfection
	Swine fever	Vaccination	
	HP-PPRS (Porcine Reproductive and respiratory syndrome)	Vaccination	
	Porcine Pseudorabies	Vaccination	
	swine plague	Vaccination	Injecting or feeding sensitive antibiotics
	parasitic disease	Feeding or injecting Ivermectin	Injecting Ivermectin
sheep	sheep pox	Vaccination	Stamping out, pollution-free treatment and terminal disinfection
	foot-and-mouth disease	Vaccination	
	Sheep Clostridium perfringens disease	Vaccination	Injecting or feeding sensitive antibiotics

	infectious pleuropneumonia		Vaccination	Injecting or feeding sensitive antibiotics
	Ectoparasite disease		Injecting Ivermectin	Injecting Ivermectin
	helminth	nematodiasis		
		fluke disease	Feeding albendazole, zental	Feeding albendazole, zental
		cysticercosis		

Table 5-2 Commonly Used Vaccines

Animals	Diseases	Vaccine	Remarks
chicken	Marek's disease	herpesvirus of turkey(HVT) live vaccine (FC-126 Strain)	
	Bird flu	Recombinant AI Inactivated Vaccine (H5N1 Subtype,Re-1 Strain)	
		AIV bivalent of H5 and H9 （H5N1-re-6+H9N2-re-2）	
	Newcastle disease virus	NDV live vaccine (Clone 30 strain)	1. Combined Newcastle Disease and Infectious Bronchitis Vaccine, Live (HB1 + H120) 2. Newcastle Disease,Infectious Bronchitis and Egg Drop Syndrome Vaccine,Inactivate
		NDV live vaccine (HB1 strain)	
		NDV live vaccine (LaSota strain)	
		NDV live vaccine (v4 strain/Clone 92 strain)	
		NDV live vaccine (VG/GA strain)	
	Infectious Bronchitis (IB)	IB live vaccine (H52 strain)	
		IB live vaccine (H120strain)	

		IB live vaccine (M41 strain)	d（LaSota + Strain M41＋ HSH23）
	Infectious bursal disease (IBD)	IBD Thermo-stable Vaccine Live（Strain B87）	
		Live vaccine (X strain)	
	Coccidiosis	transgenec E.tenella (Coccivac – B strain)	
pig	foot-and-mouth disease	Type O live vaccine （O/Mya98/XJ/2010 strain+O/GX/09-7 strain）	
		Type O synthetic peptide vaccine (polypeptide 2570 +7309)	
	Swine fever	cell live vaccine (Shimen C strain cell vaccine)	
		Swine Fever Vaccine, Live (Rabbit Origin) (Shimen C strain cell vaccine)	
		Swine Fever Vaccine， Live （Spleen and Iymph tissue origin）(Shimen C strain cell vaccine)	
	HP-PPRS	Inactivated vaccine (JXAI Strain)	
		live vaccine （TJM-F92 Strain）	
		live vaccine（JXAI-R strain）	
		live vaccine （HuN4-F112 strain）	
	Porcine Pseudorabies	live vaccine (Bartha-K61 strain）	
	Swine fever- swine erysipelas	Swine Fever－Swine Erysipelas and Pasteurella Multocida Vaccine, Living	
	piglet necrotic enteritis	piglet necrotic enteritis live vaccine	
sheep	FMD	Foot and Mouth Disease Bivalent Vaccine, Inactivated(Type O, OS Strain + JSL strain)	
	sheep pox	Attenuated Capripoxvirus Vaccine	
	Sheep Clostridium perfringens disease	Clostridium perfrigens vaccine, inactivated (clostridium perfringens type B C58-2, type D C60-2, Clostridium septicum C55-I	Braxy, Preventing lamb dysentery, struck, enterotoxemia
	infectious pleuropneumonia	Caprine Infectious Pleuropneumonia Vaccine，Inactivated (C87-1 strain + Y-98 strain)	

Epidemic diseases should be prevented at first priority. Some bacterial, mycoplasmosis and parasitic diseases can be treated by sensitive drugs. Common veterinary drugs should refer to those ingredient drugs and their preparation listed in Pharmacopoeia of the People's Republic of China, Veterinary Pharmacopoeia, or National Standards, and be applied under the instructions of licensed veterinarian.

Table 5-3 Common Vaccines

（1）Tilmicosin Premix	（2） Lincomycin Hydrochloride Soluble Powder
（3）Amoxicillin Soluble Powder	（4）Colistin Sulfate Premix
（5）Florfenicol Powder	（6）Yansuan Duoxihuansu Kerongxingfen Doxycycline Hyclate Soluble Powder
（7）Tylvalosin Tartrate Premix	（8）ampicillin soluble powder
（9）Sulfachlorpyridazine sodium soluble powder	（10）Lonicerae and Forsythiae Powder
（11）Chaihu Injection	（12）RadixIsatidis Injection
（13） andrographini injection	（14）shuanghuanglian mixture
（15）Houttugnin Amopoules injection	（16）Benzylpenicillin Potassium for Injection
（17）Compound Amidopyrin Injection	（18）Ceftiofur Sodium for Injection
（19）Ivermectin Injection	（20）albendazole

6. Implementation Arrangement on Pest Management Plan

6.1. Institutions and Responsibility

The project relies on the existing plant protection and veterinary stations of Baise city, Hechi city and 10 other counties (cities). Project Management Offices at Regional, city and county levels are responsible for pest management. Regional PMO develops the general pest management plan, guides and supervises the pest control on main industry of the project counties. City PMO is responsible for guiding and supervising the implementation of the pest management plan of all counties. County PMO is in charge of guiding households to

implement and complement the IPM according to the project's real requirements, training agrotechnicians and farmers on IPM practices, monitoring the specific implementation of IPM, and timely reporting problems and their solutions to city and regional PMOs. The plant protection and veterinary stations of the project county participate in the implementation and training work of Integrated Management of Animal Diseases and Plant Pests.

6.2. Mechanism and Procedures of Pest Management

The purchase,storage and application of pesticides, vaccines and veterinary drugs in project area will strictly abide by relevant national laws and regulations. County PMO will guide households on control and management according to the following procedure.

6.2.1. Personnel Management of Pest Management Plan

The project will arrange specialized people on pest management and identify annual tasks, targets and responsibilities.

6.2.2. Cost Management

The procurement of pesticides, vaccines and veterinary drugs should strictly follow the cooperative operation manual, procurement brochure and financial management requirements. Households should carefully keep the records of procurement, distribution and application for auditing procurement expenditures.

6.2.3. Implementation Management of Pest Management Plan

IPM joint meeting will be regularly held with county PMOs, plant protection and veterinary stations, managers of the cooperative and household representatives, in order to summarize and report the actual implementation of IPM and timely solve and adjust the existing problems. Annual report from County PMO to regional PMO should include the implementation of IPM and its relevant training, performances and existing problems. The achievements of IPM implementation should be widely publicized to accelerate the extension

of the demonstration in different ways.

6.2.4. Procurement, supply and application management of pesticides, vaccines and veterinary drugs

（1）According to the actual and potential situation on animal diseases and plant pests during project industry development, the recommended procurement list of pesticides, vaccines and veterinary drugs (table4-2, 5-2, 5-3) should be developed. The pesticides, vaccines and veterinary drugs on the list must be issued with product registration license and manufacturing license. Those Unrecommended in the list should not be purchased, applied and reimbursed. Under the same condition, biological pesticides and products with low poisonous should be prioritized for procurement. If it necessary to purchase those not in list, the specialist panel should be organized, and the recommended must be approved by Regional PMO.

（2）According to the actual situation of plant pests or livestock epidemic and parasitic diseases, the planned pesticides and dosage should be listed in annual work plan. Under the cooperative operation manual, procurement brochure and financial management requirements, households can purchase at their needs. The households should carefully keep the records of procurement, distribution and application for auditing and monitoring .

（3）Pesticides, vaccines and veterinary drugs in list must be purchased from companies with business permit. The procurement must meet the requirements of the cooperative operation, procurement and financial management manuals.

7. Training and Technical Service

The county PMO should develop the general training plan and budget attached, including: training frequency, participants, location, training plan and relevant materials. The annual training plan should be reported to the Regional PMO for approval in advance. The attached budget is comprised of material preparation and training costs (per participants/per day).

Payment is based on: （1）developed training materials; (2) training course record under monitoring (participants, trainers and duration)

The Regional PMO will reimburse the relevant expenditures according to the detailed training plan and attached budget submitted by county PMO. The training plan and budget as following Table 7-1.

Table 7-1 Training Plan and Budget

Contents	Host	Trainee	Frequency person-time *day per year	Total person-time *day	Schedule (yearly)	Estimated Cost (ten thousand Yuan)	Remarks
1. Regional/ Provincial							
（1）Laws and regulations, Pest Management Plan	PPMO	Cm, Ct	20	40	Year 1, 3	1.6	400 Yuan/person. day
（2）Pest control technology on forest and trees	PPMO	Cm, Ct					
（3）Pesticide procurement, management and safety application	PPMO	Cm, Ct					
Sub-total			20	20		1.6	
2．City, County Level							
（1）Pest Identification, prevention and integrated management techniques	CPMO	Tt, Ft,	40	120	Year 1,2,3	4.8	400 Yuan/person. day
（2）Pesticide Safety application techniques	CPMO	Tt, Ft,					400 Yuan/person. day

Contents	Host	Trainee	Frequency person-time *day per year		Total person-time *day	Schedule (yearly)	Estimated Cost (ten thousand Yuan)	Remarks
Sub-total			40		120		4.8	
Total							6.6	

Note: PPMO: Provincial/Regional PMO, CPMO: county PMO, Cm: county PMO managers, Ct: county technicians, Tt: township technicians, Ft: technicians of counties, towns Fm: project village leaders, households or household representatives.

8 Monitoring on Pest Management

8.1. Monitoring Objectives and Key Points

Monitoring is the most effective way in defending the spread of epidemic diseases and nipping it in the bud. Scientifically setting monitoring points, building strict monitoring network, early obtaining the distribution and trend of epidemic pathogens . Scientifically assessing immunization effect. Effectively defending main exotic and new diseases, regularly analyzing the epidemic situation, scientifically studying the control circumstances, providing scientific basis on project decision-making.

Plant pest monitoring focuses on: pests and diseases that have occurred and not occurred but with hazard on mango, dragonfruit, mulberry, kiwi fruit, oil tea, walnut, wild grape, citrus, silkworm, edible fungi.

Animal epidemic monitoring focuses on: foot-and-mouth disease, highly pathogenic avian influenza, brucellosis, Newcastle disease virus, Swine fever, HP-PPRS (Porcine Reproductive and respiratory syndrome).

8.2. Building Monitoring Points

The project involves in 10 counties (cities). The county monitoring sample points should be set according to the project area distribution. Each county should have at least 2 town-level points, mainly at the new project areas. The monitoring points help to obtain information on animal diseases and plant pests, trace and monitor the procurement, distribution and safe application of pesticides, vaccines and veterinary drugs. The plant protection and veterinary stations are responsible for monitoring related work at the same level.

8.3 Monitoring Plan

The County PMO is responsible for the occurrence of all pests of monitoring points in project areas. The Joint Plant Protection and Veterinary Stations will collect observation or survey data, which will then be reported to the direct City PMO and Provincial PMO by the County PMO. The Regional/Provincial PMO will publicize the development situation and trend forecast on animal diseases and plant pests.

The monitoring budget on pest management should clarify the unit cost of monitoring capacity building and other monitoring works (per person per day). Monitoring expenditure will be reimbursed on: (1) developed monitoring plan and records on pest management. (2) the actual publicity on monitoring data of pest occurrence, and the procurement and safe application of pesticides, vaccines and veterinary drugs (publicizing times, monitoring records). Provincial PMO will approve the detailed annual estimates on pest management and the specific monitoring plan as following Table 8-1.

Table 8-1 Pest Management Monitoring

Monitoring plants and livestock	Diseases and Pests	Location	Frequency	Estimates
一、Pest occurrence				
Dragon fruit	scab, anthracnose, fusarium wilt, Black Rot stem wilt spiny white fly Red spider, measuring worm scarab	Pingguo County	Twice/growth cycle	

Mulberry	Scletotiniose mulberry small weevil, Apripona germari	Pingguo County	Twice/growth cycle	
Mango	Anthracnose, powdery mildew, bacterial black spot, excavate Butler, Chlur- netia guttiventris WaLker, Erosomyia man- giferae Felt, Lawana lmitata Melichar, Rhytidodera bowrinii white	Tiandong and Tianlin County	Twice/growth cycle	
Oil Tea	Anthracnose, sooty blotch, soft rot Moth, tent caterpillar moths, Macrocentrus parametriates ivorus He et Chen, geometrid moth	Fengshan, Donglan and Tianlin County	Twice/growth cycle	
Kiwifruit	Root rot, brown spot, canker, powdery mil- dew White scale insect, green leafhopper	Leye County	Twice/growth cycle	
Citrus	Canker Anthracnose,scab,black rot Red spider, arrowhead scale	Dahua County	Twice/growth cycle	
Walnut	Canker Black spot, twig blight, canker, measuring worm, Dyscerus juglaus, leaf beetle, long- horn beetle Red spider	Fenshan County	Twice/growth cycle	
Wild Grape	scab ,Anthracnose, white rot, gray mold brown spot Downy mildew Powdery mildew, clearwing moth , fruit- piercing moth, thrips, green leaf bug, mites, aphid, mealy bug leafhopper	Dahua County	Twice/growth cycle	
Edible Fungi	Mould mushroom mosquito , flies, mole cricket, maggot	Zizhou City	Twice/growth cycle	
二、 Epidemic Diseases (antibody qualified ratio, positive detection rate)				
Chicken	highly pathogenic avian influenza, Newcas- tle disease virus	Donglan County	Once/6 months	
Sheep	foot-and-mouth disease type O and Asian type I, sheep pox, Brucellosis, infec- tious pleuropneumonia （C87-1 strain+Y- 98strain）	Du’an County	Once/6 months	
Pig	foot-and-mouth disease type O, Swine fever, HP-PPRS (Porcine Reproductive and respir- atory syndrome)	Bama County	Once/6 months	