

## *Abbreviations*

BEKP	Bleached Eucalypt Kraft Pulp
CBA	Cost-Benefit Analysis
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CICETE	China International Center for Economic and Technology Exchange
CIFOR	Centre for International Forestry Research
CSR	Corporate Social Responsibilities
CTMP	Chemi-Thermo Mechanical Pulp
ESIA	Environmental and Social Impact Assessment
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
GXSE	Guangxi Stora Enso Forestry Co., Ltd
IRR	Internal Rate of Return
NBS	National Bureau of Statistics
NGOs	Non-Government Organisations
NPV	Net Present Value
OHSAS	Occupational Health and Safety Management System
PPP	Public-Private Partnership
R&D	Research and Development
RMB	Ren Min Bi (Chinese Currency)
SE	Stora Enso
STBA	Southern Tree Breeding Association in Australia
UNDP	United Nations Development Programme
WWF	World Wildlife Fund

### **Measurement Units:**

1 hectare = 15 mu

1 US Dollar = RMB 8.17 yuan

## *Executive Summary*

This report presents the findings, analysis, and recommendations of the Environmental and Social Impact Assessment (ESIA) on Stora Enso's forest plantation project in Guangxi Zhuang Autonomous Region, People's Republic of China, recently undertaken by the United Nations Development Programme (UNDP) during the period of 9 May to 15 September 2005.

### **1. Background on the Partnership and ESIA**

Stora Enso, a Finnish-Swedish joint venture that is a leading global integrated manufacturer of integrated paper, packaging, and forest products, has a commitment to sustainability as the cornerstone of its operations and business strategy. As of August 2005, Stora Enso owns a plantation of 20,000 hectares of eucalypt hybrid trees in Guangxi. By 2010, Stora Enso plans to establish a sustainable fibre base of 120,000 hectares of plantation in southern China to support the development of its pulp and paper industry.

Stora Enso began discussions with UNDP's Liaison Office in Copenhagen for Nordic Countries in 2003 to explore the possibility of forging partnerships between UNDP and Stora Enso. As a result of these discussions and with regard to its forestry project in Guangxi, Stora Enso expressed its interest in exploring possibilities for cooperation with UNDP in China.

UNDP decided to lead and undertake this ESIA, because of its past experience with poverty alleviation and environmental projects in rural China, particularly in western provinces. More recently, UNDP has promoted Public-Private Partnerships by introducing the UN Global Compact to national and multi-national enterprises in China. The compact includes advocacy for Corporate Social Responsibility (CSR), a vision shared by Stora Enso. UNDP hopes this ESIA can help Stora Enso make a positive contribution to the expanding estate of commercial plantations in China and offer a benchmark for operational practices of international standard. It is expected that the findings and methods of this ESIA used could be widely shared, discussed, and critiqued. Environment and social impact assessments are still relatively new in China. UNDP hopes that this ESIA will also prompt interest and serve as a model for similar ESIA's in the context of other large-scale commercial and public projects to be developed in the future in China.

The specific objectives of the ESIA are to:

- Identify the groups affected by the project;
- Assess the environmental, economic, and social impacts of the project on local communities and, if appropriate, the region and society in general;
- Analyze and recommend how the positive effects might be increased and the negative impacts reduced;
- Suggest a monitoring framework, and
- Analyze development prospects and recommend options, including a set of development activities focused on ecosystem sustainability and poverty alleviation that may include establishment of a development fund.

The core prism in this ESIA is to promote the "people centered" concept that harmony between humans and the natural environment can be achieved by adopting the right measures in the business process of large-scale investment projects.

The ESIA analysis is largely based on a sectoral approach, with three main segments: (1) environmental, (2) social, and (3) integrated environmental-social. The guiding principles of the environmental impact assessment in the ESIA are facts and science from the scientific literature, empirical research, and experiments. Expert testimonies using the Leopold Matrix and questionnaires, designed as supplementary instruments to obtain the opinions of experts in various fields, were used to help identify and analyze the impact of eucalypt plantations on the environment and biodiversity. The social assessment used two main methods: (1) an extensive questionnaire-based survey of stakeholders and (2) in-depth interviews of stakeholders conducted by an expert team at provincial, county, and community levels. The integrated social-environmental analysis consisted of three main components: (1) analysis of affected communities' concerns about environmental impacts of eucalypt plantation (based on the social survey), (2) cost-benefit analysis, and (3) scenario analysis. For the cost-benefit analysis, a simplified matrix of potential beneficial and adverse impacts was developed. The scenario analysis presents two scenarios: (a) with Stora Enso and (b) without Stora Enso. It then evaluates each of these scenarios at the national, provincial, and local levels.

The ESIA has followed independent, ethical procedures. First, in no activity had the ESIA served specific commercial purposes and promote the company itself, its products or services. Second, ethical procedures were adhered to all interview processes for both the environmental expert testimonies and social surveys. The participants in such interviews were assured of anonymity, confidentiality and the right to withdraw from the consultation process without forfeit.

## **2. An Outlook on the Industry in China and Guangxi**

China is today the world's second largest producer of paper and paperboard with an aggregate and expanding consumption of an estimated 48 million tonnes in 2003, compared with North America's 105 million and Western Europe's 86 million tonnes. Although national consumption is high, per capita consumption is only 37 kg/capita/yr, compared with 320 kg/capita/yr in the USA, but is expected to reach 65 kg/capita/yr by 2010. China's paper and paperboard sector will grow to 68.5 million tonnes by 2010, which will foster an increase in demand for fibre (non-wood pulp, recovered paper, and wood-based pulp) for all grades of paper.

Given current limited capacity of China to service the raw material needs of its pulp, paper, and wood products industries and pressure to import from world market, China's central government has adopted a series of key targets and measures for the development of the nation's wood fibre resources. These policies include incentives to develop the domestic wood fibre base to reduce China's dependence on imported wood fibre, paper, and processed wood products, and encourage foreign investment in the wood fibre, pulp, paper, and wood processing sectors through a variety of financial and tax incentives.

National-level targets call for the development of 13.33 million hectares of fast-growth, high-yield plantations between 2001 and 2015 requiring a total estimated investment of US\$8.65 billion. The central government is encouraging companies to integrate paper processing facilities with plantations by granting loan interest subsidies to virtually all forms of enterprises that invest in fast-growth, high-yield plantations. Within the national policy context, the government of Guangxi Zhuang Autonomous Region recently designed its forestry sector strategy calling for fast growing plantations for pulp making to be established around existing and new plants: 660,000 ha of fast growing plantations are to be established mainly in the areas of Qinzhou, Beihai, Liuzhou, and Hezhou.

Stora Enso began in 2002 to establish its China plantation of 120,000 ha in 15 counties or cities including Beihai, Fangcheng, Bobai, and Yulin, among others near Guangxi's coast, to provide raw materials to a proposed pulp mill. Stora Enso has started the application process for an integrated forest industry project

in Guangxi, including annual production capacity of about 1 000 000 tonnes of chemical and chemi-thermomechanical pulp, and about 1 000 000 tonnes of paper and board. Guangxi is one of the few places in China where Stora Enso could build a pulp, paper and board mill complex close to the plantations that the ESIA is conducted for. An investment of the size proposed by Stora Enso has the capacity to make possible impacts at the national, provincial and local levels.

### 3. Key Findings and Conclusions

Based on fieldwork results and the highly charged public debates on eucalypt<sup>1</sup> plantations, the ESIA recognizes public concerns in key areas, such as sustained plantation management; equity (large industry vs. small landholders and contracted labour); soils (long term damage, sustainability); water (disrupted hydrological cycle, competition with crops); biodiversity (monocultures vs. native forests and related community benefits, such as medicinal herbs, food etc); and landscape change (extensive plantations landscapes may offend aesthetic values).

When fully operational, the plantation project will bring about a variety of impacts, some potentially positive and others potentially negative. As the following chapters will show, some impacts can already be seen or are more easily predicted. Others are more difficult to anticipate given the lack of available data, especially concerning soil and water samples from areas within the plantation region. Ecological benefits are also anticipated, as the following sections will show.

At its anticipated peak of operation, the project will affect over 100,000 households in land leasing alone. This presents income-generating potential for those choosing to lease out their land, which could bring significant improvements in livelihood. The degree to which households benefit depend, in large part, on the contractual terms of that leasing arrangement and alternative land lease options available to them. In terms of employment, as many as 30,000 individuals will gain income-generating work opportunities. Some of these will be local residents, others will be migrant laborers coming to Guangxi to look for work.

The team did not discover any major “show-stoppers” or social or environmental disasters in-the-making having the potential to jeopardize Stora Enso operations in Guangxi. The ESIA, however, did find major challenges in the social dimensions, while environmental impacts are much more related to plantation operations and therefore can be mitigated through rigorous and disciplined management. The findings and conclusions are presented below by topical area.

#### 3.1 Scenarios: With and without Stora Enso

**National level.** The With Stora Enso Scenario of plantation investments in Guangxi is consistent with Chinese government policies to meet projected needs, will form the foundation for a proposed national target of 2.7 million hectares of plantations committed to pulpwood production. The South Coastal Region is one of the identified priority regions and is suitable for the broad scale cultivation of eucalypts; The Without Stora Enso Scenario would not contribute to policy at the national level and would not change established Government policies regarding establishment in fast-growth, high-yield plantations and encouragement of foreign investment in the wood fiber, pulp, paper and wood processing sectors.

**Provincial Level.** The With Stora Enso Scenario will generate roughly a contribution of Rmb 1.1 billion GDP annually. It will offer tax revenues of an estimated tax Rmb 109 million annually. Behai city revenues will increase by Rmb 1.3 billion (from the current Rmb 1.6 bill) at the full Stora Enso pulp mill and plantation. Industry standards indicate that a pulp mill and plantation base of the proposed size can generate about 30,000- 35,000 jobs in the region through the pulp mill, plantation management,

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<sup>1</sup> Throughout this ESIA analysis report, *Eucalyptus* is used for the formal generic name and *Eucalypt* refers to common usage.

harvesting, transport and service and supply industries. Stora Enso's presence will provide an international standard to the plantation and pulping sector in Guangxi, offering transparency and world class commitments to sustainability, the environment and to corporate social responsibility. The Without Stora Enso Scenario would not influence the magnitude and ambitious establishment of a large industrial resource of eucalypt plantations in Guangxi. If Stora Enso withdraws from the project it is highly likely that other companies and investors will fill the void. Should Stora Enso withdraw however, Guangxi faces the prospect of having a large eucalypt plantation resource without a substantial accompanying modern processing facility. This would represent a considerable loss of opportunity to the Region.

**Local Level.** The With Stora Enso Scenario offers landholders and stakeholders the stability associated with 120 000 ha of sustainably managed plantations linked to a modern mill. It brings with Stora Enso's technologies and commitment to Corporate Social Responsibility. This will inject land lease and rental monies in excess of Rmb 72 million annually to local forest farms and farmers in some of Guangxi's poorer counties. In addition to direct employment opportunities through staffing, the project offers labor opportunities of 4.6 million days of labor annually worth approximately Rmb 115 million to the local and migrant labor market. Part of the annual tax revenue generated by the project will flow back to communities in the form of government services and infrastructure. Improvements in the social and environmental impacts have been identified by the ESIA and are manageable and there are no technical impediments to sustainable production from the plantations. With the Without Stora Enso Scenario establishment of plantation eucalypts will remain an attractive land-use option. Field interviews have demonstrated that a strong interest exists with local leaders and entrepreneurs to make investments in eucalypt plantations. Such expansion of the eucalypt resource without the stability offered by a pulp mill, will introduce an element of commodity risk to local farmers. There was strong evidence from the field interviews and inspections that local investors and growers did not share the same commitment as Stora Enso to sustained productivity or social and environmental values.

Eucalypts are a preferred source for high quality fibre for China's expanding modern pulp and paper industries. Given the positive and supportive policies at national and provincial level and the pressing market needs, the EISA team considers it inevitable that the commercial eucalypt plantation estate in southern China and specifically Guangxi will expand substantially. Provided the principles of sustainable plantation management are respected and followed, eucalypt plantations offer an economically, socially and environmentally attractive option for supply of high quality raw material to meet national needs.

### **3.2 Environmental Impacts**

Plantations of eucalypts in Guangxi are largely established on degraded or deforested land or replace low yielding pine plantations or unecomonic fruit orchards. The plantations thus create a new forest resource and will offer a valuable alternative to logging and conversion of old-growth forests in other parts of South East Asia, where governance issues are sometimes a major concern. The results of a review of available literature and experiences on the environmental impacts of eucalypts are consistent with the expert testimonies conducted and indicate that eucalypt plantations will in general not affect water resource and water quality in the region and will be helpful for soil and water conservation.

#### ***Water***

The issue of eucalypts and water consumption will not be a constraint in the high rainfall, high humidity conditions of the areas of Beihai, Yulin, Nanning, and Fangchenggang. There was little information publicly available on water balance at sites with <1200 mm rainfall, such as Dongmen, where the investor should consider introducing wider spacing of plantations to reduce water use per unit area. The team identified a knowledge gap on the impacts of intensive silviculture (such as high fertiliser application) on the water quality of runoff. There is therefore a need to monitor water quality under commercial plantation management.

### ***Soil***

Enhancing the chemical and physical properties of soils will be the foundation for sustained productivity of Stora Enso's plantations. Ongoing experiments in nutrition should be a feature of Stora Enso's R&D program. Stora Enso will operate tractor ripping for site preparation on flat lands and hole site preparation for hilly or mountainous lands. As total soil tillage is not used in Stora Enso's plantations and all roots of harvested trees are kept at site, soil erosion will be substantially reduced.

### ***Tree Breeding, Pests, and Diseases***

Eucalypt plantations in Guangxi increasingly rely on planting material from a very narrow genetic base, presenting a serious risk to productivity through predation by pests or diseases. A disease resistant genetic selection program and a broader selection of high yielding clones<sup>2</sup> selected for wood quality, as well as a disease and pest monitoring program, should be part of Stora Enso's R&D program. The eucalypt rust *Puccinia psidii* poses a potential threat to the eucalypt forest industry in southern China and has recently been recorded in Hawaii. Any proposals to transfer germplasm from South America should be discouraged or given the greatest phytosanitary caution.

### ***Biodiversity***

The biodiversity of a natural forest in Guangxi and that of a eucalypt plantation are not comparable. Local natural ecosystems are very diverse, whilst the biodiversity of mono-specific plantations is limited. Stora Enso has committed itself not to convert native forest to eucalypts. The appropriate comparison is not between eucalypt plantation and biodiverse native forest, but between eucalypt plantation and the human-modified habitats that currently exist on the land that will be converted to eucalypt plantation. These are largely plantations of pine, sugar cane, highly degraded forests, grasslands, bare lands and non-economic fruit orchards. None of these habitats are believed to support significant indigenous biodiversity, either in terms of species richness, genetic diversity or key endemic or threatened species.

There is no evidence that eucalypts as introduced species has any direct impact on biodiversity at the genetic and species levels. No cases of eucalypt spreading outside of their planted forest ecosystems into the natural flora have been recorded in China.

Guangxi is highly diverse and contributes significantly to China's overall biodiversity, but this biodiversity has been threatened by loss, degradation and fragmentation of habitats, and by hunting and over-collection of valuable species. Many species are threatened with extinction in Guangxi, and the needs of these species and their habitats should be considered by any development project, particularly if project sites are near or adjacent to key natural habitats, such as existing or proposed nature reserves. Issues such as hunting and collection of forest products by migrant workers and fragmentation of natural forests need to be considered when siting and managing plantations.

Stora Enso project areas accounts for only 5 percent of the total land area of the counties involved. The assessment indicates that no obvious landscape and biodiversity changes will be caused by this project alone. However, the project must be considered in the context of larger changes in Guangxi's landscape. Besides Stora Enso, several other companies and private investors also have active plantations and, in total, eucalypt plantations will account for around 40 percent of the total commercial plantations in Guangxi. About one tenth of Guangxi is considered suitable for fast-growing plantation forestry, and by 2010, the area of intensively managed forest plantations established with all species will reach 1.0 million ha. Most of this is expected to be concentrated in the south and south east of the province.

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<sup>2</sup> Throughout this ESIA analysis report, the technical term "clones" of eucalypts refers to simply vegetative propagules through a conventional tree breeding methodology in plantation forestry.

Although most of the original vegetation in Guangxi was lost long ago, an intricate mosaic of agricultural ecosystems and native and planted-forest ecosystems co-exist and shape the landscape today. This landscape variation is very diverse and to some, aesthetically attractive. Landscape diversity may provide significant benefits to the industry in the long-term by reducing risks from pests and disease. Management at a landscape level should be one of Stora Enso's major considerations for the long-term sustainability of its eucalypt plantations. Genetic diversity is critical for the success of plantation forestry as it affects adaptability and resistance to the physical environment and to biotic disturbances. Because of the ease of hybridization and vegetative propagation of eucalypts, rather than using biodiversity at the species level in plantation operations, more clones of eucalypts should be developed and used, especially, at landscape level.

### **3.3 Social Engagement**

Effective and positive engagement, especially between the company and those renting land, is critical to the success of the project. A number of specific recommendations to facilitate constructive communication follow below. Stora Enso's plantation program directly involves more than 10 different types of local affected groups (e.g. farmers renting land, migrant labour, state farm staff, etc.). When functioning fully it will affect a population on the order of 650,000 people in 130,000 households through land rental alone. While offering potential income opportunities, especially on formerly unproductive wasteland or slopeland, this project also offers substantial challenges in engaging and communicating effectively. Poor initial engagement with affected communities could present considerable risks to Stora Enso's plantation business. Should communities refuse to rent land, or offer labour or, in the worst case, prevent Stora Enso from conducting its legitimate operations through civil disobedience, the business attraction of the Guangxi project will be diminished.

#### ***Information Flow and Gap***

A critical need exists to improve the flow of information from the company to its "village rental" and other stakeholders and to ensure greater transparency in the process. A striking finding of the survey is that stakeholders have a strong desire for information on the company and its plantation project. Survey results also show that while stakeholders do have some information on the project, they rarely get it directly from Stora Enso. Information relating to land rental must reach those who use the land, not simply village and community leaders. Although the scientific review and expert testimonies conducted do not suggest negative environmental impacts, the large scale survey and expert fieldwork found that people appear genuinely worried about the environmental impacts of eucalypt on human, animals, crops, soil, and water. Local communities and households should be given the information they need to alleviate their fears. In addition, some of the ecological concerns voiced may actually have been a means of indirectly expressing overall dissatisfaction with the rental, in which case the roots of this dissatisfaction (e.g. rental terms, participation, etc., as discussed elsewhere) must be addressed.

#### ***Land Rental Decision Making Process***

In terms of village land use rights, land rental in village areas includes both private and collective land<sup>3</sup>. The ESIA found participation in the decision to rent collective land to be weak. The majority of project village households surveyed indicate a small group of people had represented their community in making the collective rental decision, while only about 30 percent indicated that the collective had followed the legal procedure of at least two-thirds vote for the decision of collective land rental. Some village households renting private land also expressed a feeling of not having been given a choice in the matter.

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<sup>3</sup> "Private land" is here defined as land for which the household has been granted individual use rights by the collective. "Collective land" as used here may refer either to land for which a lower level of collective unit (e.g. villager's small group) has been granted use rights by a higher level collective unit (e.g. administrative village) that owns the land or to land that is owned directly by the same level of collective as that using the land.

These results are likely linked much more closely to the traditional practices of public decision-making in the areas involved than to any special characteristics of Stora Enso's project.

While it would be difficult and inappropriate for Stora Enso to attempt to directly influence the collective decision-making process, both the company and the government should make greater efforts to ensure that private land rental is in all cases fully voluntary and transparent. Generally, findings suggest that farmers have made a rational choice to rent out their land, despite the possibly lower income per mu relative to other options, because of certain constraints such as the financial strength, know-how, and economies of scale needed to develop the alternatives. Farmers, however, lack an advocate in the rental process to help them make decisions and consider the longer-term implications. Also, while findings do not indicate that middle-persons (either those that "introduce" rental opportunities to the company or those that rent land from others and then re-rent to the company) benefit excessively from their role, there is a need to monitor their benefits. Ideally, given increasing divisions (in terms of income) in rural China, Stora Enso would cooperate directly, to the extent possible, with those renting out their land, so as not to promote such divisions.

The ESIA team also revealed that dissatisfaction with the rental process on collective land could originate not in actions made by the company, but in the decisions over whether or not to rent collective land and how collective rental income is spent. In contrast to findings on private land rental, in which households are indeed the final decision-makers, the analysis found participation in decisions over community land to be weak. These decisions are made completely separate from the company, and separate to the company's lease terms, but might influence overall impression of the company and the desire to lease land in the future. This conflict is best resolved at the local village level, but could be moved along with support and encouragement from the company given the stake that all entities have in making land leasing a win-win situation.

Stora Enso also rents land from state forest farms. Results indicate that state farm staff in project areas, as a group, do not strongly support land rental to Stora Enso, are not involved in the decision (though their involvement is not legally required) to rent, and are not very aware of rental terms. Interestingly, however, 83% of state farm households who participate in work on Stora Enso plantations and who responded to the surveys revealed that their annual cash income had increased by 2872.2 yuan. Findings suggest a need to explore further the issue of participation of state farm workers in rental decisions or at least ensure they are informed and benefit from the rental.

### ***Concerns Regarding Fuelwood***

Results suggest the poorest in the community still depend on fuelwood collected from collective and private use forest land. Fieldwork uncovered perceptions that these people will be denied access to fallen woody branches or woody harvesting residues in areas under Stora Enso's management. Discussions with Stora Enso managers suggest that, while the company wishes to keep leaf and bark residues on site for soil protection, nutrient recycling, and water conservation, it is willing to allow collection of fallen woody branches and woody harvesting residues for fuelwood. This important message has not yet reached the affected people.

### ***Records of Village Stakeholders***

Accessible records of village stakeholders will be an important tool for the company as it strengthens its contacts with village and community stakeholders. Computer-based systems will be very useful and the company should upgrade its information systems to accommodate a database including, to the extent possible, the name, location, and nature of rental of each and every household involved in the project. The database might also keep a record of company liaison with and information flow to each of these households.



### ***Perceptions of Slowness***

Some villagers are concerned about Stora Enso being "slow" to develop the land. They worry they will not receive rental payments. Particularly, when Stora Enso does not develop the land for some time after rental, their concerns tend to grow. Findings indicate that in some cases rental payments have been delayed because of slowness in determining exact land area and borders, while, these issues are not unique to Stora Enso, and are typical of land boundary issues in rural China.

## **3.4 Employment, Special Populations and Other Issues**

Stora Enso plantation work presents an opportunity near to home for those locals that do not wish to out-migrate, though may not offer as many months per year of work as out-migration. Across survey groups, results indicate that respondents are not dissatisfied with their working conditions as compared to the alternatives, but nor do they believe their working conditions are particularly good compared to other options.

### ***Employment Opportunities***

Full-scale plantation employment generation once operations have reached steady state is estimated to be between 12,400 and 14,400 full-time jobs. A rough industry standard for all direct and indirect jobs, both related to plantations and the pulp mill itself and based on the scale of the planned mill, is 30,000 to 35,000 full-time jobs.

### ***Work Contracts, Wage, Emergency Services, and other Employment Issues***

The survey and expert fieldwork indicate that most employment on Stora Enso plantations (handled by contractors that develop the plantations for Stora Enso) is in compliance with local labor regulations and that serious employment problems have not emerged. Yet, there are a number of key areas with regard to employment that Stora Enso may wish to be aware of. First, contractors rarely have formal written contracts with the workers that they employ and have verbal agreements instead. According to officials at the Guangxi Labor Bureau, if work is both for over three months and for 30 or more hours per week, then, contractors should be providing work contracts. Based on wage rates quoted in fieldwork, the minimum wage level set by the Labor Bureau is in most cases being met by Stora Enso contractors. Labor disputes have not become an important issue for workers involved in Stora Enso plantation development, though Stora Enso should be aware that such disputes do occur in the plantation contracting business. Serious on-the-job health and safety problems are uncommon among those working on Stora Enso's Guangxi plantations, though one important issue identified in the field is workers' lack of access to emergency services for cases such as urgent illness, injury, or exposure to natural disasters. Lacking permanent local accommodation, most migrants live in simple work sheds or tents near the work site. Living conditions, while typical for this type of work, are poor.

### ***Women***

Overall, work opportunities on the company's plantations do not appear to be higher for women than for men. Women, however, may appreciate the benefits from the project for different reasons: Some women, particularly those with children, do not want to out-migrate for work and appreciate the flexibility of plantation opportunities. Also, through increased income, their role in decision making is strengthened. A negative impact of involvement on women would be higher work burdens, as most women will still have to perform their traditional household and agricultural activities in addition to their newly found work.

### ***Ethnic Minorities***

The proportion of minorities involved in village land rental to Stora Enso is small, but the counties and districts in which Stora Enso currently leases village land or may lease village land in the future have a minority population of about one million, or about nine percent of the total population of these areas. The main minorities in current and future Stora Enso village project areas are Zhuang, Yao, and Jing.

Minorities appear to be much more prevalent among migrant workers on Stora Enso plantations than among land renters. The ESIA team discovered well-integrated relations between Han and minorities.

#### ***Poor Households***

The large role of migrant labour in the project and the significant proportion of migrants from Northwest Guangxi imply the project areas not to be the poorest within Guangxi. Guangxi has 4,060 "poverty villages." From 2005 to 2010, the province plans to conduct a poverty alleviation program for all these villages in three phases. The first phase will include 1,731 villages. Altogether, there are a total of 150 of these phase one "poverty villages" in the Stora Enso areas, making up about nine percent of phase one poverty alleviation targets.

Poorer households may be more willing to rent land to Stora Enso than others for reasons of: lacking financial resources to invest in their land, insufficient household labor to work on their land, urgent capital requirements for a particular reason, or desire to use the rental money as core investment for shifting themselves out of poverty. Thus, this group deserves special attention from Stora Enso.

#### ***Natural and cultural heritage***

No major structures or sites of natural or cultural heritage significance were identified in the project area. Tombs and burial sites within plantations are believed a common issue to be addressed. While during the field visits and discussions with field managers and villagers, the team did not observe any evidence of conflicts on such an issue. It is believed, future graves can be an issue.

### **3.5 Development Needs**

The most important development priorities of surveyed groups in project areas are: irrigation, roads, medical services, and drinking water. These priorities provide indications to how Stora Enso might integrate its plantations (e.g. through road development) or non-project development work (e.g. work in healthcare, irrigation, or drinking water) to address the most pressing community development needs.

#### ***Micro-Credit***

Results indicate that interest in getting a loan is high among affected groups in project areas and higher than the proportion that believe they can get a loan through existing channels.

#### ***Health Services and Education***

Health services and education are priorities for large proportions of project area respondents. The improvement of community medical services could be integrated into Stora Enso's corporate policy for its field workers' health and safety. Education is also a sector in which needs in the area are strong and which is conducive to development projects.

#### ***Rural Tele-centres***

While village respondents put a low priority (among other options) on telecommunications and the internet, an idea that would combine the company's needs to communicate with stakeholders with a development project is village tele-centres. The concept would call for the installation of a computer with internet connection (when possible) in project area natural villages. Villagers could use the centre to access information on Stora Enso, communicate with the company, and view materials on eucalypt plantations. Meanwhile, these centers could also function as a social gathering venue for entertainment, market information for their household agricultural and other products, information on employment opportunities, etc.

#### ***Eucalypt Plantations***

The survey and fieldwork indicate that some local people would like to develop their own eucalypt plantations, but lack the necessary funding, knowledge, and technology.

### ***Development Initiatives in Migrant Communities of Origin***

Stora Enso may also wish to consider a non-profit development initiative in migrant villages of origin, keeping in mind their top-reported priorities of roads, water supply, medical services, and housing.

## **4. Recommendations for Stora Enso**

Given the complex land tenure issues in southern China, it is highly unlikely that any one company will be able to control the entire resource base necessary to supply a large modern pulp mill. It is inevitable that smaller growers and plantation managers will become an intimate part of the wood supply equation and industry partnerships with smallholders will expand. The ESIA has found that while the issues surrounding sustainable productivity and the environment (specifically water and biodiversity) can be adequately addressed, the greatest challenges facing Stora Enso in its Guangxi operations are those relating to effective and positive engagement with landholders, including private households and collectives, and the surrounding local communities.. To mitigate these existing and potential negative impacts and maintain the “good will” of the plantation project, the following recommendations, organized under four thematic areas, are made by the ESIA team.

### **4.1 Technical Knowledge and Sustained Productivity**

Stora Enso should maintain its commitment to a robust program of applied R&D and maintain its engagement with research providers in China and other countries. Important elements of the R&D program should include:

- Monitoring of water quality of runoff from intensively managed plantations and water use at sites where rainfall is less than 1200 mm.
- Experiments in nutrition to maintain and improve the chemical and physical properties of soils.
- Optimisation of the amount of fertiliser applied in the plantations to minimise leaching while maximising growth.
- A monitoring program for pests and diseases
- A breeding program which seeks to develop (or gain access to) a broader suite of clones as early as possible.
- Consideration of a cooperative breeding program with other commercial eucalypt growers in southern China.
- A program of practical biodiversity conservation which focuses efforts on selected sites and utilises the technical skills within the company.

### **4.2 Awareness Campaign, Participation and Engagement with Society**

As top priority for communications work:

- The company should strengthen its communication practices with local communities and seek expert advice on means through which more effective and transparent flow of information to all levels of affected communities can be achieved.
- The company should address, as a matter of urgency, issues surrounding clarity and transparency of rental agreements, fuelwood collection, and community perceptions of slowness. As a specific module in its communication program, the company (and its Government supporters) should not leave the eucalypt rumors within the communities unaddressed. Brochures, field demonstrations, and face to face meetings with concerned communities should all be a part of a program that seeks to reinforce the environmental credentials of the eucalypt program.

Many problems in communication and lack of participation stem from the actual rental process itself, one that operates within already established local power frameworks that exist largely independent of Stora

Enso, While recognizing this, relationships created between the company representatives, middlemen, decision makers in collectives, local government, and laborers also influence the degree to which households can benefit from new opportunities, on the one hand, or avoid negative impacts of the project on the other. In this light, the company may also wish to employ a number of additional means to support better awareness and participation, such as:

- Maintaining a greater presence of national and foreign staff in the field to help explain the project directly to people.
- Development of peer support groups within villages.
- Establishment and support for forest plantation associations, which include land users and managers, contractors, and other stakeholders.
- Expansion of the functions of the company's Hotline.
- A strengthened schools' program and additions to the curricula.
- Development of tele-centres (web-based information systems) as a part of the school computer program or general village out-reach.
- Regular excursions organized for local communities to plantation sites. In the longer term, an annual opportunity to visit the pulp mill.
- Introduction of communications approaches with sensitivity for gender, ethnicity, and poverty.

### **4.3 Commitment to Stora Enso Corporate Policies**

There is a difference between what is legally acceptable for establishment of plantations in rural Guangxi and the highly regarded Corporate Social Responsibility (CSR) principles of Stora Enso. To maintain a position as an employer of choice for plantation workers in southern Guangxi, Stora Enso should offer a safe and healthy work environment. The following recommendations are offered:

- Stora Enso provides clear guidelines for minimum working conditions and wages to its contractors, and makes these publicly available to the local communities and migrant workers.
- A comprehensive monitoring system is introduced for contractors to ensure that the legal requirements for minimum wages are met and that they follow corporate guidelines.
- The company works with contractors to improve the living conditions of migrant workers, taking into consideration supply of minimum standard temporary accommodation and drinking water.
- Whilst migrant relationships with local communities are wider problems best dealt with by local governments, Stora Enso sets an example through encouragement of its staff to treat migrants well through a corporate culture that encourages respect.
- The company, in consultation with local authorities, develops processes to resolve labor disputes should these arise (especially important given the general absence of written labor contracts between workers and the contractors).

### **4.4 Development Initiatives**

Stora Enso has expressed an interest in continuing to pursue development projects in affected communities. Stora Enso is not a specialized development agency itself. At the same time, in the spirit of Public Private Partnership, Stora Enso may consider cooperating with and engaging international and national development agencies, government institutions, and NGOs to meet priority needs of social and environmental development in its project areas.

The ESIA results indicate that top development priorities of stakeholders in village areas are irrigation, roads, medical services, and drinking water, while for forest farm communities these are medical services, roads, provision for the aged, and improvement of living environment. Education is also an important area for a large proportion of respondents in both groups.

*A social development fund* could be conceived as an umbrella mechanism to meet these above priorities of development needs of the project communities. Such a fund can strategically target the following areas:

- Focusing on drinking water or medical services or expanding work in the education area.
- Introducing a micro-credit mechanism in affected communities, for instance, targeting eucalypt planting, with the corollary benefit of increasing the supply of market pulpwood.
- Establishment of village tele-centers. These could provide computer and internet access in project villages and might also be used by Stora Enso to communicate with villagers about the project and provide them with educational information on relevant topics, such as the impacts of eucalypt plantation, and any information necessary for them to improve their livelihoods.
- Contract consulting firms for micro-entrepreneurship and vocational training to state farm workers and villagers who have rented out their land and want to develop small business or work in non-farming sectors.

Significant opportunities now exist in Guangxi to improve the status of native biodiversity by reducing habitat fragmentation and increasing connectivity through forest restoration. Stora Enso should avoid foreclosing on these opportunities by converting areas that have potential value for this effort, such as lands in or adjacent to existing or proposed protected areas, or land straddling between blocks of healthy natural forest. It is recommended that the company contributes some of its substantial technical expertise to help efforts to restore natural forests by supporting nurseries of key native species, particularly rare lowland species now mainly found in *fengshui* forests, for use in restoration programs.

## **5. Issues and Recommendations for Government Stakeholders**

Whilst the Environmental and Social Impact Assessment of Stora Enso's eucalypt plantation project in Guangxi has an obvious focus upon the company's operations, other needs were identified during the fieldwork and surveys. Three such needs which deserve attention from Government administrations are:

### **5.1 Revenues and Tax**

The study has demonstrated that the Stora Enso project will deliver substantial revenues through taxes, fees, levies and other administrative imposts from local governments. The current ESIA analysis could not identify actual future allocation and expenditure of such tax and revenues. In particular, it is unclear how large a proportion of government revenues from the project will be returned to the plantation communities for environmental and social needs. It is critical that the investment will directly generate sound social and environmental results, while pro-poor redistribution of the tax revenue is fundamentally important for equity and quality service delivery to vulnerable groups and communities.

In the past, a significant part of the mill door delivered cost of wood in Guangxi was taxes and fees. While these have been reduced substantially, there is still some lack of clarity with regard to taxes and fees. Earlier studies in Guangxi in 2003 identified some 30 different taxes, fees, government charges, and other levies, which were due between harvesting and delivery to the mill gate. In Jiangxi, similar studies have identified some 14 "unofficial forestry fees" imposed by county, prefecture, township and village administrations. Whilst these taxes could potentially benefit the broader community, they have in the past also acted as a serious disincentive to growers of commercially grown wood and successful and competitive wood processors. The issues surrounding tax on commercially grown eucalypt wood in Guangxi are far from clear and there is a pressing responsibility for Governments and administrations at all levels to provide clear and unambiguous rulings.

## **5.2 Advocacy for Viable Land Use Options**

As do most plantation companies, Stora Enso disseminates information about the benefits of plantation forestry as a viable land use alternative. Following government priorities to promote the plantation industry, the provincial government and administrations at city, county and collective levels also disseminate information that is pro-plantation. The ESIA study could not identify any source of impartial advice for farmers and communities wishing to assess and discuss land-use options for their private and community lands. The benefits of impartial, third-party information include better-informed land-users with a greater commitment to the land-use choice they have made. Such an impartial information source would avoid land-users placed at a disadvantage due to lack of information, especially when discussing and negotiating land lease contract terms with companies or forestry bureaux. The ESIA team suggests that such a mechanism be put in place.

## **5.3 Support for Stora Enso's CSR and sustainable plantation policies.**

Whilst Stora Enso has a corporate commitment to CSR and to transparency, these worthy principles can only be delivered within the context of China and Guangxi. If Guangxi is to benefit from Stora Enso's high technical, environmental and social standards, then the Government should be encouraged to work with the company to facilitate achievement of these standards. Examples where such dialogue and cooperation might be required are via accurate mapping of natural habitats not suitable for conversion, equitable and transparent systems for land acquisition, treatment of migrant workers and exchange and transfer of hybrid clones. This issue should remain a regular item of discussion between the company and the Guangxi authorities and is critical in the possible absence of media coverage or supportive NGOs.

## **5.4 Maintenance of Landscape Diversity**

In promoting and expanding the substantial eucalypt plantation base in Guangxi, maintenance of landscape diversity will remain an important consideration in sustainability for all plantation growers. There is a role for the Provincial authorities to offer coordination in southern Guangxi to balance the legitimate commercial needs of Stora Enso, Asia Pulp and Paper, Guangxi Oji Plantation Forest Co and other growers with the needs to maintain healthy landscape diversity.

## **5.5 Monitoring and Adaptive management**

Finally, both the Government and Stora Enso will need to monitor and respond to issues which might affect productivity, the environment or the community. Monitoring systems will provide the data against which Stora Enso's own commitments to Corporate Social Responsibility and sustainable plantation management will be judged. An environmental and social monitoring plan is important and would be integrated with the regular monitoring of plantation productivity and should logically incorporate the elements of maintenance and improvement of site productivity, clone performance, issues relating to soils, quality and quantity of water and biodiversity at species, ecosystem and landscape levels, social issues relating to skills development, poverty, access to infrastructure and services, quality of life, gender and levels of community consultation and participation. Mechanisms should be put in place to provide guidance to plantation managers based on the results of monitoring, so that management practices can be adapted as needed.

## **6. Content of Full Report**

The full report presents the findings, analysis, and recommendations of the environmental and social impact assessment (ESIA) team. It is divided into six parts. The opening part, Part I, provides background on Stora Enso and the geographical, policy, and industry setting in which its Guangxi plantation project is being carried out. Parts II through IV present the ESIA analysis and findings. Part II discusses issues related to the productivity and sustainable management of eucalypt plantations and especially Stora Enso's approach to eucalypt plantation management in China. Part III, "Environmental Impact Analysis," covers project impacts related to water, soil, carbon sequestration, and biodiversity. Part IV, "Social Impact Analysis," presents findings and analysis of social impacts of the project, including results of an extensive survey of households and other stakeholders. Part V presents special analyses integrating social and environmental impacts, including environmental concerns of local stakeholders, a cost-benefit analysis, review of impacts on natural and cultural heritage, a scenario analysis as well as a monitoring framework in issues and risks identified by the ESIA. The ESIA team fully recognizes the importance of the interplay between social and environmental impacts; and, thus, other sections, in addition to the integrated analyses of Part V, address the interplay as appropriate. For example, the environmental discussion of soils covers impacts and suggestions regarding use of tree litter by local communities. The report closes with, in Part VI, a consolidation and presentation of key conclusions and recommendations from the analysis.