The potential environmental and social impacts of a plantation project in Uruguay

With tools for planning and monitoring

Summary of a report for Stora Enso: August 2009

Acknowledgements

We are grateful for the chance to carry out a study with this degree of freedom and acknowledge the lead taken by Stora Enso in investing in a detailed survey at a time when they could have got away with doing far less. If the study and accompanying tools work, we have an opportunity to help set best practice for fast wood plantations far beyond the current project and country. The tools being developed will hopefully be useful throughout the region – in some cases throughout the world.

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People who have worked as consultants are listed in appendix 1.

Introduction

Development of forest plantations has become one of the most intensely discussed topics in forest management. Proponents believe that plantations can reduce pressure on natural forests, produce a sustainable timber resource, help address poverty and social inequality and perhaps in the long term also supply an important contribution to global energy needs through biofuels. Opponents believe conversely that plantations can increase the rate of natural forest loss, creating a new range of social and environmental problems in the process, reducing local peoples' control over land in favour of large corporations and encouraging further wasteful consumption. Despite efforts to broker agreements about plantations, for example through the auspices of the United Nation's Intergovernmental Forum on Forestry, opinions have, if anything, polarised even further over the last few years.

There are examples of both good and bad plantations from around the world; and enough bad plantations to have created a determined opposition movement. The situation is further complicated because plantations are still developing – becoming more intensive but also being managed more effectively to minimise wastage, environmental damage and off-site effects. A series of international codes and norms have emerged to help provide a framework for good management and best practices: these are increasingly linked to third party verification such as that offered by various certification schemes. The extent to which guidelines are adhered to, and the added value of certification schemes, are both still debated. The process of intensification is not yet over. There is strong pressure to move towards genetically modified trees (see for example Strauss et al 2001) and many plantations already rely on clonal varieties and encourage uniformity. In part because of the rapid way in which plantations are changing we still have a lot to learn about how modern intensive plantations should be managed.

A plantation bears the same relationship to a natural forest as a wheat field does to a meadow: both may have their place in the landscape but the differences need to be understood. There is a great opportunity for far-seeing companies to provide exemplars of high quality plantation management. However, given the problems that have arisen with plantations in some parts of the world, all developments are likely to be viewed initially with suspicion by some stakeholders.

The following document provides an analysis and an assessment of the potential impacts of the plantation project being developed by Stora Enso in Uruguay. It draws from the work of many different researchers, mainly in Uruguay but also based internationally. What follows hopefully reflects the diversity of thinking that has gone into the report. The experts commissioned in Uruguay all had the same terms of reference but tackled them in a variety of ways: some included much more theoretical discussion, some focused on recommendations for the company, others drew more heavily on opinions of local stakeholders etc. This diversity has helped us in understanding the complex set of conditions that relate to the plantation and to make what we hope are a reasonable set of recommendations.

Planned project activities

The project aims to create a sustainable supply of high quality pulp wood in a part of the world where production costs are still comparatively low.

The final plantation estate is intended to cover around 118,000 hectares of actual plantation, including from land owned by the company and from outsourced supplies. The company is looking to purchase around 154,000 hectares. Under current proposals plantations will be mainly of Eucalyptus (*Eucalyptus dunnii* and *E. grandis*) and pine (*Pinus taeda*) at a ratio of 4:1, although this proportion has not been finally decided. If pine were to replace eucalyptus as the dominant species used, this would have implications on the area planted.

The final area owned or leased by the company is intended to cover around 150,000 hectares and will be mainly of eucalyptus and pine at a ratio of 4:1.

The company plans to plant 13,000 hectares per year in Uruguay in the establishment period after an initial planting of 10,000 hectares planted since 2006. Most planting will be on company-owned land (currently plans are that a maximum of 80 per cent of trees should come from land owned by Stora Enso) and there is an active land purchasing programme. Around a fifth of the timber will come from land leased by the company and it is possible that this proportion could increase in the future.

The final plantation estate will therefore be made up of separate holdings of various sizes scattered across the whole plantation landscape and with a network of public roads and railroad used to transport logs to their eventual destination. This model – both scattered holdings and an accompanying outgrower scheme – has been used successfully in other plantation projects in Uruguay.

The plantation system will be intensive, aiming at a rapid (7-8 year) growth cycle for eucalyptus and 14-15 years for pine. The overall objective of the project is to establish a raw-material base for a future pulp mill somewhere within the area and the location studies to identify the most suitable site are ongoing. However no investment decision concerning the mill has been made as yet. The first prerequisite for the investment decision is the successful establishment of the necessary plantation base, which will take in any case some years. In addition several other factors will affect the future decision making including amongst others the overall cost of fibre and prevailing market conditions.

Stora-Enso sustainability policy

Stora Enso has made a company-wide commitment to sustainability. The current report is a contribution to this process.

"Stora Enso is committed to sustainability – economic, environmental and social responsibility underpins our thinking and our approach to every aspect of doing business".

Sustainability issues are handled directly in the Group Executive Team, with support from the Sustainability Action Team. The group's attitude to sustainability is outlined in the following statement (Anon undated a): "Stora Enso is committed to sustainability – economic, environmental and social responsibility underpins our thinking and our approach to every aspect of doing business. The Group builds accountability into its operations by being transparent and engaging in open dialogue with stakeholders. Group-wide targets and clear governance are used to monitor and measure how well Stora Enso performs in terms of sustainability". This is part of a wider commitment outlined in a *Code of Ethics* statement (Härmälä 2006) quoted below:

Box: Extract from the Stora Enso Code of Ethics statement

Stora Enso is committed to sustainable business practices. Sustainability is one of the Group's key success factors, and is seen as inseparable from good corporate governance. Stora Enso expects that its management and employees follow ethical principles in their work. This statement sets out a code of fair and ethical conduct to be followed by the management and employees of the Group. **Stora Enso's Code of Ethics is based on policies and principles established by Stora Enso's Sustainability management.** The principles and practices referred to in this Code of Ethics statement are found in the following documents:

- ✓ Stora Enso Corporate Governance
- ✓ Stora Enso Communications Policy and Principles
- ✓ Stora Enso Electronic Communications Media Policy
- ✓ Stora Enso Financial Code of Ethics
- ✓ Stora Enso Anti-Fraud Policy
- ✓ **Stora Enso's Sustainability Policy**
- ✓ **Stora Enso Corporate Social Responsibility Principles**
- ✓ Stora Enso Occupational Health and Safety Policy
- ✓ Stora Enso Competition Law Compliance Programme

The management of Stora Enso will be responsible for monitoring and enforcing these policies. Any violation of these polices, principles and guidelines will be closely examined, and the necessary action will be taken. [*Our emphasis*]

Further quotations from the company's sustainability report explain how the commitment to sustainability is applied in practice [our emphasis].

"Management systems in the areas of environment, forestry, occupational health and safety and social responsibility help units to recognise the most important sustainability aspects of their operations, develop action plans and follow-up on performance on a regular basis.

"Stora Enso has established sustainability due diligence procedures, which are used in mergers, acquisitions and divestments, to identify and mitigate possible risks. ***Greenfield projects must additionally undergo environmental and social impact assessments***. Sustainability is an essential part of Stora Enso's risk management. Potential risks related to sustainability could result in material or reputational damage if not pro-actively managed."

Forest certification

Forest certification is a process whereby an independent auditor assesses performance of forest management against an agreed set of criteria and, if the operation passes, awards a certificate of assurance. A number of forest certification schemes exist with different standards and approaches. Stora Enso has traceability systems in place for all its wood fibre and pulp, 90 per cent of which are third party certified (2006). In addition, 55 per cent of the wood fibre used by the group comes from certified forests (with or without chain of custody certification) (2006). Stora Enso "promotes forest certification and aims globally to increase the volumes of wood originating from third-party certified forests." It works with more than one forest certification system including PEFC, FSC, SFI, CSA, ATFS and CERFLOR (Grönroos 2007). Stora Enso is also committed to certification of the operations in Uruguay, but that this will not take place immediately and the actual certification system has yet to be selected.

Some further principles related to forest certification and plantations management (Anon, undated b) are outlined below and overleaf.

"Forest certification is a process whereby an independent auditor assesses performance of forest management against an agreed set of criteria and, if the operation passes, awards a certificate of assurance".

Stora Enso's principles for the development of forest certification

I. Credible forest certification systems must:

- ✓ Take into account national and regional characteristics such as natural conditions, forest ownership structures and legislation, to ensure they are widely applicable
- ✓ Formulate certification criteria through open stakeholder dialogue.
- ✓ Include social, economic and environmental aspects in criteria.
- ✓ Promote continuous improvements, through procedures similar to those used in Environmental Management Systems.
- ✓ Require independent third party audits.

II. Stora Enso supports the mutual recognition of credible forest certification systems

III. Forest certification systems should complement the environmental and quality management systems used in wood procurement.

Discussion at one of the expert workshops during the assessment

Stora Enso's principles for plantations

Stora Enso's tree plantations are intensively managed, primarily for specific commercial purposes. In our view, sustainably managed plantations are economically profitable, enhance local welfare and have an important role in the conservation of native ecosystems.

- ✓ We recognize the increasingly significant role of tree plantations in global industrial wood production and actively promote sustainable plantation development.
- ✓ We apply a holistic approach in establishment, development and management of tree plantations.
- ✓ We design and manage plantations in a landscape context by recognizing them as part of local land use.
- ✓ We do not convert natural forests, protected areas or areas in the official process of designation for protection into plantations unless that is clearly in line with the conservation regulations.
- ✓ We recognize indigenous peoples' legitimate rights to traditional land and land use.
- ✓ We use environmental and social impact assessments and other participatory tools in seeking sound land-use decisions.
- ✓ We consider an open dialogue with all stakeholders as fundamental.

Summary of the study and overview of main conclusions

The study provides an independent expert assessment of a developing plantation project in Uruguay. It first provides a background analysis of current concerns about plantations and makes a judgement of whether or not these are likely to apply in Uruguay. The report then summarises detailed information about the region in which Stora Enso is establishing its plantations. The suitability of the area and potential problems are discussed from both environmental and social perspectives. Recommendations are made for management and monitoring and some tools are described. The report does not in most cases provide an analysis of Stora Enso's performance, because the project has not been running long enough. Nor does it assess management plans in any detail because these remain incomplete, although there are drafts of a management manual and an Integrated Management System and these have been studied and where appropriate comments have been made. It does outline a monitoring system that will allow the impacts to be measured and, hopefully, any problems addressed.The study was conducted from 2006 to 2008. Initial meetings took place in May 2006; field work was undertaken late in that year and the final report completed late 2008.

The Stora Enso project aims to create a sustainable supply of high quality pulp wood in a part of the world where production costs are still comparatively low. The final plantation estate will cover ~118,000 hectares and consist mainly of eucalyptus (*Eucalyptus dunnii* and *E. grandis*) and pine (*Pinus taeda*) at a ratio of 4:1, planting at a rate of 13,000 hectares/year. Stora Enso intends to buy ~154,000 hectares and to lease additional land, with outsourced supplies proving around a fifth of total volume. The plantation will aim at a rapid (7-8 year) growth cycle for eucalyptus and 14-15 years for pine. The overall objective of the project is to establish a raw-material base for a future pulp mill and location studies to identify the most suitable site are ongoing.

The current study has four main aims, to:

- ✓ Provide a background analysis of potential impacts from the plantation project, particularly from a social and environmental perspective, using information from around the world

- ✓ Assess the current situation within the area being investigated for possible plantation sites with respect to physical, biological and social conditions and also to understand the attitude of local and national stakeholders

- ✓ Suggest the main areas where Stora Enso should focus management efforts from environmental and social perspectives

- ✓ Develop a series of tools that could help to achieve these aims, including a monitoring system

Plantations have been criticised from various perspectives: especially because of their environmental impacts, the social effects of large plantation projects and the political implications of large off-shore companies buying land and running major projects in poorer countries. Stora Enso can do nothing directly about the last of these, but we believe that it is in a strong position to provide leadership in designing a world class plantation project that can address the social and environmental issues that have been of concern to campaigners.

1. Overall conclusions

The main conclusions follow, put into context with three assumptions and two caveats. Following the analysis, we believe that:

- ✓ The project should be economically viable;
- ✓ Social benefits will probably outweigh costs;
- ✓ Environmental costs can be contained at an acceptable level;
- ✓ There are some potential environmental benefits if the project is managed correctly.

Assumption 1: intensive plantations will remain viable in the face of rising energy and associated costs and changing global markets for long enough to repay investment costs.

Assumption 2: Climate change will not make this area unsuitable for fastwood plantations before investment costs have been repaid.

Assumption 3: Stora Enso will fulfil its written and verbal commitments towards social and environmental best practice.

Caveat 1: social benefits are partly qualitative and vary with perspective. For people who believe that foreign investment on this scale will result in unacceptable loss of sovereignty and rights, costs will outweigh benefits. Our judgement is based on what we perceive to be the majority opinion in the country.

Caveat 2: real environmental benefits (as opposed to minimised environmental costs) will depend on maintaining the detailed planning and conservation management currently applied to the three properties that have been the basis of current planning; the company has said that it has a commitment to do this using outside experts until or if staff are trained to do this themelves.

2. Background analysis

The analysis considers a range of potential or actual social and environmental impacts posed by plantations. Some are inapplicable in Uruguayan conditions, others are potentially real problems that need to be addressed through management systems and social safeguards.

Key ***social*** issues relate to the amount and stability of employment associated with plantations, the impacts on land tenure and rural settlement, workers' conditions and the immediate impacts on local communities from plantation development. Key ***environmental*** issues relate to the changes to the ecosystem associated with large-scale plantation development, including replacement of natural and semi-natural habitats, possible changes in availability of water in the catchment, soil erosion and chemical contamination. In each case the arguments are laid out and preliminary conclusions drawn for conditions in Uruguay.

3. Condition in the plantation area and potential impacts

Stora Enso has identified a general region in which it is seeking to buy or lease land to establish plantations in the centre of Uruguay, mainly southern Tacuarembó and most of Durazno along with parts of eastern Paysandú and Rio Negro and small areas of northern Flores and Florida. The area covers 18 per cent of the surface of Uruguay (approximately 31,500 km^2). The actual area of planting will cover 118,000 hectares or 3.75 per cent of the region being investigated (around 0.67 per cent of the national territory).

Climate

Uruguay lies in the southern hemisphere between 30 and 35 degrees latitude, in a typical temperate, subtropical zone of the earth (CIAB, 1971). In order to work out potential productivity and climatic risks, an **agro-climatological characterisation** was made of the potential planting area. The analysis suggests that:

- ✓ Conditions are apparently suitable for growing plantations of eucalyptus and pine and many successful plantations are already found in the area;
- ✓ There are nonetheless likely to be local and hard-to-predict variations in productivity, due both to geographical and seasonal changes, which will need to be assessed in terms of their impact on productivity;
- ✓ The Stora Enso plantation project is highly unlikely to have noticeable impacts on the overall climate of the region.

Geology

Forest plantations on individual farms scattered throughout the region are unlikely to cause any adverse impact on geology. There are two aspects that deserve particular attention in planning the project:

- ✓ Potential mining areas (kaolin mines and ornamental stones) may overlap with areas of interest for forestry: the government has right of compulsory purchase for mining so it may be worth avoiding planting in these areas;
- ✓ Areas particularly rich with fossil species (only one is known in the study area) will also need attention during the implementation of the forest management plan; they should be avoided or special care should be taken at planning stage.

Soils

The soils in the study region originating from Gondwanian Sediments, referred to locally as Devonian Soils, contain forest priority soil types, as do those originating from the Crystalline Basement. The soils from the Basalt Plains, however, have not been included in the forest law (the overall plantation policy instrument in Uruguay) and are not usually used for timber plantations.

Some soil impacts can be expected as a result of plantation forests operations, including erosion, decreasing surface runoff and the development of a protective forest floor. The first is a negative impact, but the other two can be considered a beneficial soil improvement resulting from the forest cover. Potential negative impacts need to be addressed through planning and implementation: for example planting tree seedlings with minimal soil disturbance. Whether or not erosion occurs at problematic levels depends on choices about the location of plantations and the way that management is planned and implemented. Establishment of

Operational Management Units, as discussed in the report, is an important tool to help avoid or diminish the impacts and contribute to soil and water conservation by identifying areas that are or are not suitable for planting and a third group where planting is possible but where special care is needed. In addition to the need for site assessments, we recommend that:

- ✓ Areas of the calcareous sediments, which generate soils with high calcium carbonate content that can be detrimental to forest growth, should be avoided;

- ✓ The poorly structured and very erosion prone soils of the Libertad Formation will need special attention.

Hydrology

The study area includes parts of the Rio Uruguay and Rio Negró catchments and these were studied with respect to flow rate, discharge rates and possible impact of plantation establishment. The specialists concluded that overall impacts on water quality and quantity were likely to be low compared with alternative land uses, particularly agriculture. However, this conclusion will only hold true if best practice is followed, as outlined below. The study area is also characterized by the predominance of aquifers of the fractured type, represented by the Meridional Hydrogeological Province (Crystalline Basement) and Sub-province Cretaceous Basaltic. Calculation of a **vulnerability index** for aquifers, which can vary from 0 to 1 thus indicating a range from zero or negligible vulnerability to extreme vulnerability, helped to identify places that are suitable or unsuitable for planting.

At a **regional scale**, the project could minimise risks to water resources by:

- ✓ Avoiding planting in the Laguna Merin catchment and the River de la Plata catchment, which are also drinkable water source areas and have only a overlap with the area being investigated for planting sites;

- ✓ Identify outcropping areas of the Guarany Aquifer System as this has a relatively high vulnerability index and needs special measures to avoid damaging water resources (again it only intersects with a small part of the study area);

- ✓ Avoiding planting in the Santa Lucia catchment: this is also only a small part of the proposed area and is the main water source for Montevideo, and therefore would be best left as a water source protection area.

At a local **Forest Management Unit scale** the following actions are needed:

- ✓ Carry out a detailed assessment of hydrological resources when identifying a property for purchase or leasing and when planning the plantation;

- ✓ Identify and map the limits of the riparian zones in the catchments of each forest farm, ideally including their seasonal variation, and avoid planting in buffer zones of rivers and streams and close to surface waters;

- ✓ Avoid stream crossings

Biodiversity

Detailed studies were carried out on flora, mammals (large and small), birds, reptiles and amphibians and selected insect groups including some freshwater groups. The study included an initial landscape characterisation based mainly on literature surveys and then on field surveys in some sites. Detailed reports are available including species lists and baseline data are being assembled. Key impacts identified as potentially likely to arise from the plantation include habitat change, chemical change and a potential increase in nuisance species.

The region being considered for plantations is one of the lesser known areas of Uruguay from the perspective of biodiversity and the project has added significantly to knowledge about this area. It contains a relatively rich ecology, particularly related to grassland types and species, and several new discoveries were made during the course of research.

Habitat change: most plantations will be established on former pasture, meaning that trees will replace what is often rich semi-natural habitat. A clear series of steps have been identified to help mitigate this impact:

- ✓ Protect all residual habitats that have legal protection (e.g. *Butia* palm, wetlands, remnants of natural woodlands) and any protected areas – this is a legal requirement;

- ✓ Protect additional key habitats identified as having high conservation interest – e.g. sand dune areas by the Río Negro, high conservation value grassland;

- ✓ Identify important sites (by presence of e.g. rare plants or important breeding birds) and set these aside from planting, including high conservation value grassland: this can either be carried out by experts (the best method) or by site managers and planners using indicator species;

- ✓ Manage set aside land in ways that are likely to maintain biodiversity – e.g. use of optimal grazing pressure and possibly some periods without grazing;

- ✓ Maintain connectivity between natural sites within and around the plantation: this can be linked at a landscape scale to fire prevention policies (e.g. maintenance of fire breaks);

- ✓ Choose land in relation to its history of ecological alteration, being careful not to select highly productive agricultural land but whenever possible selctin areas that have been previously altered by cropping etc, rather than “natural” pasture, ast he latter is likely to have richer ecology

- ✓ Note that the main biodiversity values of the area will usually be on land between the plantations rather than within the plantations themselves although the latter may provide temporary or permanent habitat for some groups (e.g. certain mammals, birds and reptiles).

No detailed regional surveys of habitat quality exist. Identifying and protecting such areas therefore needs to be addressed on a site-by-site basis.

Use of agrochemicals: use of fertilizers and pesticides is far less than in agriculture, but they will be applied in areas that may previously not have received much treatment and the potential for damage is therefore more acute. Particular care will be needed with ant controls and other insecticides, but care is also

needed with herbicides and fertilizers to avoid contamination of waterways and damage to surrounding vegetation. There is currently an assumption that chemical control is required and we recommend the company to look at other options including non-chemical methods where these are suitable. In particular:

- ✓ Minimise use of any agrochemicals and take care of e.g. leakage, spray drift, over-use;
- ✓ Set application levels suitable for individual sites, based on specific local conditions;
- ✓ Investigate alternatives to those chemicals that currently do not meet the requirements of the Forest Stewardship Council;
- ✓ Investigate other forms of control, including biological control, less toxic traps for leaf-cutter ants etc.

Pest species change: there are populations of wild boar in the plantations and these are an important pest species, whose population can sometimes be increased by plantations in the landscape. Their numbers may need to be controlled if they start to interfere with neighbours or the running of the plantation.

In addition, the company needs to take particular care of the risks from invasive pest species and diseases, both of which are increasing slightly in Uruguay.

Social issues

Social conditions in the study area were investigated through a mixture of desk studies and local interviews; stakeholders were also interviewed at a national level to gauge opinions about plantations.

The four provinces (Tacuarembó, Durazno, Paysandu and Río Negro) under consideration are rural districts in an increasingly urbanised society: even here 84-92 per cent of people live in towns. There are around 10,000 holdings, most of which are relatively large (average 540 hectares) but just under 20 per cent between 1-10 hectares. Most (82 per cent) are single person operations. On farms, 55 per cent of work is outside the wage economy, mainly by the owners or their relatives, while around 70 per cent of paid workers are ranch-hands or manual workers. In the area, 90 per cent of the land is farmed and owned by Uruguayans.

Education levels among the agricultural community are relatively low compared to the rest of the country, with a fifth of people not finishing primary school. This situation changes in the larger farms and 40 per cent of land managers have been educated as far as university level. Although farming (mainly ranching) dominates the landscape, primary industries only contribute around 14 per cent to the economy overall and even in rural areas are a smaller contributor than the tertiary industries. Around three quarters of the land is used as cattle pasture with another 6 per cent planted grassland and the same amount of plantations; the last two areas are both expanding. In plantations eucalyptus are dominant at 71 per cent, with pine at 28 per cent. The total population of the four provinces is something over 300,000 people. They have roughly the average Human Development Index for Uruguay, which is relatively wealthy compared to many Latin America countries. The rate of unemployment is around 10 per cent. There is some poverty and also a general and continuing migration out of rural areas.

Community perceptions

A series of interviews were carried out in ten towns and villages in the study area and the following general conclusions reflect the perceptions of people in these areas. Although both local and national stakeholders are aware of wider social and environmental issues relating to plantations, it is fair to conclude that the overwhelming interest at present is on the economic implications, with a mixture of enthusiasm for the chance of jobs and associated rural revival coupled with concern that the boom will not last and plantations will be another temporary development project for the area. Key issues include:

- ✓ **Employment**: a desire for employment to fill gaps in the labour market and a perception (in some cases based on experience) that the plantation will bring jobs. Employment in plantations seems to be favoured over ranching (which may itself cause tensions). We note that the stated commitment to pay at least the minimum wage would still be very low remuneration although Stora Enso reports that actual wages are at least three times the minimum and twice the minimum agreed in tripartite negotiations between government, labour unions and companies.

- ✓ **Land tenure**: fears of concentration of ownership and loss of sovereignty; to some extent this may be addressed by current plans to lease a higher proportion of land than originally planned.

- ✓ **Boom and bust**: a serious fear that the plantation project will be temporary, arising from previous experience in development projects that were considered permanent and did not last. The company needs to be very transparent in its dealing with stakeholders; currently despite good intentions there is some confusion about what is happening.

- ✓ **Labour**: a desire for decent wages, good job security, health and safety came through clearly in many interviews. The company has committed to meeting requisite labour codes from the International Labour Organisation and could investigate ways to engage more fully with trade unions than has been the case until now.

- ✓ **Other social impacts**: concerns about migrant workers creating social problems, conversely hopes that the social conditions will improve in the area. There have been few reports of social problems arising from temporary of migrant workers (although some some reports of increased prostitution); in fact most stakeholders report increased numbers of families in the area and improving conditions, but this needs to be monitored over time.

- ✓ **Risks to water sources**: fears of streams drying up and reduced water availability. Attitudes are mixed; some people report problems associated with earlier plantations, while other neighbours have not noticed any changes. Monitoring systems need to be applied as described; in addition the community liaison officer should watch out for and investigate specific complaints.

- ✓ **Fire**: concerns that fire will increase and could affect neighbouring properties. Good fire management systems need to be in place: both preventative actions and plans for fast reaction in the event of fire.

- ✓ **Pollution impacts**: concerns about water pollution levels, particularly amongst fishermen in the reservoir. Good environmental management will be needed along with monitoring systems for pollutants, possibly including data collected by fishing communities.

- ✓ **Problem species**: fears of spread of problem species including particularly wild boar.

- ✓ **Gender issues**: possibility of work for women in the plantation. The company can help by creating jobs in a variety of sectors including non-traditional (e.g. harvester operators).

- ✓ **Landscape impacts**: some concern about the impact of plantations on the visual aspects of the landscape.

Concerns of local communities therefore focus mainly on a desire for permanent jobs and hopes (sometimes perhaps over-ambitious hopes) for what a large project might bring. Their fears, which are generally less significant than their positive hopes, centre around issues relating to water availability, increased fire, some increase in nuisance animals and, far more than any of the others, a fear that the project will be another temporary stage in the life of the province and that jobs will not be as long-term as is currently being claimed.

The assessment also compared conditions in Uruguay with various international rights-based approaches to natural resource projects and suggested some broad standards, which are presented in an appendix.

4. Main areas in which Stora Enso should focus attention

The box gives the key areas where we believe Stora Enso should focus its efforts.

Environment: key issues

■ **Biodiversity**: **recognition of the key importance of grasslands and inclusion of conservation measures for grassland within management strategies** including:

- ✓ **High conservation value areas**. Using experts or field keys to identify high value grasslands with rare, endemic or other important species. In extreme cases not buying land if most of a holding is too valuable ecologically to plant; more usually preserving the most valuable grassland areas within a plot. Choosing former cropland rather than pasture where possible.

- ✓ **Good management and restoration** (grassland and other habitats). This covers all high quality grassland but also natural woodland, *Butia* palm areas and wetlands and includes both avoidance of planting and positive management measures to maximise and improve conservation values.

- ✓ **Landscape approaches** to planning, creating a viable mosaic of linked natural and semi-natural habitats: using a series of tools (corridors, stepping stones, multiple-aged forest stands, buffer zones, artificial habitats etc) to maintain biodiversity within the plantation estate. Should include High Conservation Value planning, ecosystem integrity and trade-offs of land use.

■ **Water balance: care to avoid localised impacts on neighbours through**:

- ✓ **Aquifers:** avoiding key areas where aquifers are likely to be negatively affected by plantation operations;
- ✓ **Superficial water quality:** avoiding planting close to standing or running water to reduce impacts on water quantity and quality;
- ✓ **Superficial water quantity:** avoiding over-planting within a single watershed;
- ✓ **Monitoring**: ensuring that changes are measured against a baseline.

■ **Integrated management system**: **building on the Uruguay Forestry Code and focusing on key areas including**:

- ✓ **Agrochemical use** with particular emphasis on worker safety, site-specific fertilizer use, avoiding drift of herbicides and minimum use of safest possible pesticides against ants. Particular care needed in nurseries to avoid worker and offsite contamination.
- ✓ **Worker safety** regarding in particular machinery use, safety equipment, chemical handling.
- ✓ **Outgrower schemes** requirement for application of IMS for all timber used by the company including from outgrower schemes.

A more complete list of recommendations is given in the main report

Society: key issues

■ **Transparency**: **providing more complete and regular information to local communities through**:

- ✓ **Stakeholder involvement:** Regular meetings (including the Landscape Outcome Assessment Methodology [LOAM] process) to ensure that the local communities know what is happening; meeting with workers' groups (including trades unions), local officials and villagers. Specific liaison officers should be responsible for community relations (note that this will usually not be a full time job and may for instance be the local manager but the role should be explicitly identified and terms of reference developed).
- ✓ **Communication**: Publicity materials including leaflets, article in local newspapers, radio interviews etc.

■ **Contractors**: **ensuring that contractors maintain the high standards of the company and employ the full Integrated Management System through**:

- ✓ **Standards** created by clear guidance and terms of reference in contracts setting out requirements for safety, treatment of workers, environmental management and local community relations backed up by training courses for contracted workers where necessary.

- ✓ **Internal evaluation and monitoring** of contractors through a standardised annual monitoring and enforcement system. This should help to provide positive discrimination, leading to a constructive, evolving long term relationship with key contractors and thus ensure stability and encourage companies to have a stake in the long-term future of the project.

■ **Local benefits**: ensure that a reasonable proportion of the benefits reach local communities including by:

- ✓ **Increasing local economic opportunities** including where possible jobs for people from local communities and deliberate use of local services. Ensuring a living wage for all permanent, temporary and contract staff.

- ✓ **Encouraging local benefits** through supporting additional training opportunities for local workers and as appropriate support for other community activities or capacity (e.g. helping to maintain roads used by the company).

- ✓ **Land tenure**: ensuring that purchase or leasing arrangements meet the highest standards.

5. Tools

We have developed or adapted a range of tools that could be useful in implementing these and other recommendations, as part of an Environmental and Social Impact Assessment. These include five tools developed for Stora Enso:

- ✓ **Toolkit for site selection and planning**: a set of indicators agreed by a cross-disciplinary experts' workshop, drawing on in-country research, to help to identify high value areas within sites to aid planning

- ✓ **Methods for monitoring ecosystem integrity**: draft set of indicators that provide an accessible and feasible monitoring system for social and environmental outcomes from the project, again drawing on expert opinion

- ✓ **Recommendations for sustainable landscape planning**: key techniques for planning plantations at a landscape scale

- ✓ **Advice on environmental management systems**: analysis of over 50 codes of practice from around the world and development of best practice, building on the current voluntary Uruguay Forestry Code

- ✓ **Rights-based development**: an overview of rights based approaches and a draft set of guidelines for use in plantation development (in appendix)

Other tools that Stora Enso might draw on

- ✓ **Landscape Outcome Assessment Methodology**: developed by WWF to monitor long-term of outcomes of major development or conservation projects

- ✓ **High Conservation Values**: expansion of the High Conservation Value Forest concept to other ecosystems – in this case grassland

Detailed advice is included on monitoring to measure change in the various sites.

Appendix 1: consultants

The majority of the consultants were from Uruguay and were employed on a fairly short term basis to collect information and take part in the workshops identifying indicators. A small team of global consultants were also used to collect information on specific topics or because they had particular expertise. The following summarises information on all those involved in the assessment.

Physical geography and geology
Coordination: Walter de Paula Lima
Geology: Jorge Montaño Xavier, Mauricio Montaño, Sergio Gagliardi and Ximena Lacués
Climate: José Pedro Castaño, Augustín Gimenez, Laura Olivera and José Furest,
Geomorphology and Groundwater Resources: Jorge Montano
Soils: Gerardo Raul Acosta Bianchi
Surface Water Resources: Marcelo Martin and Daniel Costa
Water Quality: Carlos H. Perdomo and Patricia Barreto

Fauna
Mammals: Susana González
Birds: Mario Clara
Reptiles and amphibians: Santiago Carreira
Insects: Enrique Morelli, Patricia González and Gabriela Bentancur

Flora
Pablo Boggiano (grasslands)
Carlos Brussa (wetlands)
Iván Grela (woodland)

Historical heritage

Arturo Toscano
Andrés Florines

Social issues
Leticia Cannella (anthropologist)
Enrique Gallicchio (sociologist)
Viviana Martínez (sociologist)
Grazia Borrini-Feyerabend (IUCN Commission on Environmental, Economic and Social Policy)
Jessica Campese (TILCEPA)

Forest management
Luis Neves Silva (forester, based in Portugal – deputy coordinator of the project)
Stephanie Mansourian-Stephenson (consultant based in Switzerland)
Jeffrey Sayer (monitoring and evaluation)

Coordinator
Nigel Dudley

Support in Stora Enso
Kaisa Tarna-Mani
Horacio Giordano
Andrea Storace
Bevan Lock