

**Final Report**  
**Large-Scale Land Acquisition for Agricultural Production**

**Mozambique**

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## **INTRODUCTION**

### **Context and Objectives**

To provide guidance to World Bank clients (in government and the private sector) and partners who may be faced with or interested in large-scale land acquisition, the World Bank initiated a multi-country study to gather data to enable them to maximise the long-term benefits from such investments.

The overall objective of the study is to assess to what extent proposed large-scale investments are likely to contribute to economic welfare, given reasonable assumptions on yields, land values and prices. It is expected that this could give rise to a number of benefits: a data bank on benchmarks for project analysis, tools for investment agencies to use for economic analysis and an assessment of the need for further capacity-building in this area.

This report focuses on the case of Mozambique and brings together the results of different background papers produced, looking at the selection of appropriate projects for evaluation, best practices in project review and a project analysis methodology note, combined with a more detailed analysis of selected projects. The projects are identified by ID numbers, for reasons of confidentiality, with a brief description to enable an understanding of the essential characteristics of each project.

For each of the projects reviewed, the objective of the study was to conduct a detailed analysis comprising the following:

1. A thorough review of existing financial analyses of the selected projects, testing the key assumptions underpinning projects' business plans through interviews with key informants and relevant publications.
2. Calculation of economic prices for key tradable and non-tradable assets.
3. Computation of economic rate of return (ERR) and execution of sensitivity analysis.

This country report presents the results of the analysis while the detailed numbers underpinning these results are presented in Excel workbooks submitted to the World Bank.

### **Methodology**

#### ***Project Selection***

A review of 13 projects from the agriculture, livestock and forestry sectors was undertaken before selecting a more limited sample for more detailed technical, financial and economic analysis. Projects were selected according to the criteria laid out in the terms of reference for the study,<sup>1</sup> with emphasis on projects for which data was available in the land dossiers. The proposed selection was sent to the World Bank team for approval. On the basis of these criteria and discussion with the World Bank team, five projects were selected for further analysis:

1. Project A1 – production of ethanol from sugarcane on an area of 18,000 has.
2. Project A2 – production of ethanol from sugarcane on an area of 22,500 has with total title for 30,000 has.

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<sup>1</sup> Namely: projects that have already reached the production stage; the largest projects in terms of both capital investment and land area; and projects representative of different commodities, different types of investors, and different types of land acquisition and contractual arrangements with the government and local communities.

3. Project A3 – production of maize and oilseeds on an area of 10,000 has. However, the review of this project is not presented due to lack of authorisation by the investor.
4. Project L1 – cattle breeding for meat production on area of 240,000 has (DUAT allocated for 10,000 has).
5. Project F1 – plantation of pine, eucalyptus, teak and indigenous hardwoods on an area of 28,970 has.

Information necessary for the more detailed technical, financial and economic analysis envisaged in the study was only made available for one project, namely, Project A1. Although contact was made with investors to obtain the detailed information necessary for such analysis, information was either not forthcoming or the information supplied was incomplete and inconsistent.

Of the other projects investigated, most had not been implemented, despite having received approval several years previously.

### ***Sources of Information***

The principal source of information for the project analysis was the business plans submitted by investors as part of their land request,<sup>2</sup> supplemented by discussion with the investors. Progress of implementation was also discussed directly with investors in order to verify assumptions made relative to key technical and financial variables.

### **Structure**

This report is divided into the following sections:

- The report begins by establishing and discussing the methodology for calculating key financial and economic prices used to derive the net present value (NPV) and internal rate of return (IRR) of the projects under different scenarios, embedded in the context of Mozambique.
- The subsequent section presents the results from the detailed analysis of Project A1 with comprehensive data available, evaluating the different factors that influence those results. It also analyses the data available on the business plans of the remaining projects and assesses the realism of the key assumptions made.
- The third section discusses the project review processes in place in Mozambique, based on existing legislation and a review of a larger sample of projects.
- The fourth section suggests a possible minimum approach that the government of Mozambique could follow with respect to the financial and economic analysis of project proposals on the basis of the existing legal framework and lessons from the project review and analysis.
- The final section presents the conclusions and recommendations that emerge from the analysis and discussion.

It must be noted at the outset that the sample of projects may not be representative of the population of projects. Consequently, care must be taken not to draw strong, generalised conclusions in terms of reality of investor assumptions on the basis of the sample alone. It is

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<sup>2</sup> Investment proposal submissions to the Investment Promotion Centre were not made available by CPI.

likely that the project sample has a bias towards better projects that have more detailed data available in the form of business plans.

## **METHODOLOGY**

This section presents the methodology used to calculate the costs associated with land, labour, water and material inputs, as well as output prices, and the adjustments that need to be made to translate the financial costs and prices into economic values.

### **Land**

#### ***Financial Costs***

The financial cost of land in Mozambique has two components:

1. The annual rent or tax paid by the company to the government for the maintenance of the land title (DUAT) which forms part of the company's annual operating costs. Table 1 presents the current land taxes applied by the government to large-scale (more than 1,000 hectares) agrarian projects (agriculture, livestock and forestry). It should be noted that sugarcane is classified as a "permanent" crop, subject to a lower annual land tax of 4 Mt/ha (US\$0.15/ha) in Maputo province and 2 Mt/ha (US\$0.08/ha) in other provinces for the (foreign-owned) companies studied.<sup>3</sup>
2. Any cost associated with acquiring the land, such as compensation to the local community or government for existing structures on the land or an implicit cost of acquiring the DUAT reflected in the cost of acquiring assets from companies that previously held the land title. For example, one company had to pay US\$3,000 as compensation to the government for buildings on the land; another company paid over US\$4 million to acquire land from an existing title owner via purchase of the infrastructure on the land. This is included in the investment component of the expected costs and income flow of the project.

#### ***Economic Costs***

The summary of the methods for economic analysis submitted as part of the terms of reference specified two possible methods for calculating the economic cost of land, namely:

- The land rental value, where reasonably well-functioning land rental markets exist; or
- The net annual returns from the existing land use, equal to total revenues less all costs, except land, in order to reflect the net value of production forgone when the use of the land is changed from its without-project use to its with-project use.

In the case of Mozambique, where land is state-owned, a transparent land rental market does not exist. In most of the projects analysed, land was being used at low intensity. However, it was possible to get some idea from the companies themselves of the value of the family farm production sometimes scattered around within project areas. The key existing activities included dryland, traditional maize production or community grazing.

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<sup>3</sup> At exchange rate of US\$1=26.178, the average rate for 2009 up to the time of writing.

**Table 1: Annual Land Tax Rates for Large-Scale Agrarian Projects by Classification**

Location	Land category	← Nationals →		Non-Nationals	← Nationals →		Non-Nationals
		Ordinary (MT/ha)	Non-Profit (MT/ha)	All (MT/ha)	Ordinary (US\$/ha)	Non-Profit (US\$/ha)	All (US\$/ha)
<b>A. Agricultural Use excl. Special Cases</b>							
<b>Maputo Province</b>	Standard	48	30	60	1.83	1.15	2.29
	Development zones	24	15	30	0.92	0.57	1.15
	Partial protection zones	72	45	90	2.75	1.72	3.44
<b>Other Provinces</b>	Standard	24	15	30	0.92	0.57	1.15
	Development zones	12	7.5	15	0.46	0.29	0.57
	Partial protection zones	36	22.5	45	1.38	0.86	1.72
<b>B. Cattle-breeding, Wildlife Farming, Permanent Crops</b>							
<b>Maputo Province (excl. Cattle Breeding)</b>	Standard	3.2	2	4	0.12	0.08	0.15
	Development zones	1.6	1	2	0.06	0.04	0.08
	Partial protection zones	4.8	3	6	0.18	0.11	0.23
<b>Other Provinces (incl. Maputo for Cattle)</b>	Standard	1.6	1	2	0.06	0.04	0.08
	Development zones	0.8	0.5	1	0.03	0.02	0.04
	Partial protection zones	2.4	1.5	3	0.09	0.06	0.11

Source: Inception Report, Table 16, p. 54. Conversion into US\$ using average exchange rate for 2009 (Banco de Moçambique - [www.bancomoc.mz](http://www.bancomoc.mz) – statistics).

## Labour

The market wage was used for both financial and economic analysis as there are no major labour market distortions in Mozambique.<sup>4</sup> However, information on labour costs was not always made available by the projects, with operational costs often presented as a lump sum.

## Water

### Financial Costs

In Mozambique, the cost of water to the agricultural sector is subsidised by the government, with the final cost depending on the particular river basin, the sector and the size of undertaking. Table 2 presents the water charges published in the Official Government Gazette for different sectors and scales of activity for the river basins of Umbeluzi, Incomati, Limpopo and Save in southern Mozambique (overseen by ARASUL). The table also includes the water rates charged by the regional water authority in the centre of the country (ARACENTRO).

As can be noted from the table, large-scale agricultural projects in the south of Mozambique would be subject to a charge of between 0.096 Mtn/m<sup>3</sup> and 0.273 Mtn/m<sup>3</sup> while users in the industrial sector would pay between 0.159 Mtn/m<sup>3</sup> and 0.454 Mtn/m<sup>3</sup>. According to ARASUL, the charge to the industrial sector reflects the cost of operating and maintaining the water system while the rate paid by the agricultural sector does not cover the full operational and maintenance cost. Neither charge includes depreciation to ensure that the cost of re-investing is covered.

In the case of central Mozambique, the water use charges have not been updated since the mid-1990s and do not reflect the cost of operating and maintaining the water system. These rates are in the process of being updated but no results were available at the time of the study.

**Table 2: Water Rates for Different Sectors and Water Systems, June 2009 (Mtn/m<sup>3</sup>)**

Type of User	ARASUL				ARACENTRO <sup>1</sup>
	Umbeluzi	Incomati	Limpopo	Save	
Agriculture					0.04
- Family Sector (<1 ha (common use))	0	0	0	0	
- Subsistence Agriculture >1ha	0.04	0.04	0.04	0.04	
- Commercial Sector <50 ha	0.136	0.084	0.048	0.048	
- Commercial Sector 50-1,000 ha	0.227	0.139	0.08	0.08	
- Commercial Sector >1,000 ha	0.273	0.167	0.096	0.096	
Industry	0.454	0.279	0.159	0.159	0.07
Water Supply					0.07
- Large Systems	0.454	0.279	0.159	0.159	
- Small Systems	0.227	0.139	0.08	0.08	

**Note:** 1. ARACENTRO's water rates do not distinguish between different scales of production.

**Sources:** Ministerial Diploma no. 21/2007 on gross water rates in ARASUL's jurisdiction; phone interview with ARACENTRO.

### Economic Costs

Water is becoming a key constraint in the southern part of Mozambique but is judged to be plentiful in the centre and north of the country. In line with the recommendations in the

<sup>4</sup> Mozambique has a statutory minimum wage, which is in line with market wages.



guidelines for economic analysis, the cost of water for the purpose of economic analysis is taken to be the full cost of supply.

While the existing water rates for agricultural production were applied in the financial analysis of the projects, the economic cost of water was taken to be the rates applied to the industrial sector for the relevant water basin. In the case of the ethanol project in the centre of Mozambique, an average of the industrial rates in the southern water basins was applied as no information was available on the full cost of water supply by ARACENTRO.

### **Output Prices**

Market prices were used for both financial and economic analysis. More information on prices for specific goods is presented in the discussion of the individual projects.

### **Input Prices**

Information on the taxes and tariffs charged on material inputs was obtained from the Mozambican Customs Code coupled with provisions in the Investment Law and its Regulation on fiscal benefits for each company. Table 3 presents information on the level of VAT and the tariffs levied on inputs and vehicles.

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**Table 3: Taxes and Import Tariffs, 2009**

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<b>Tax</b>	<b>Level (%)</b>
VAT	17.0%
Tariffs	
- inputs <sup>1</sup>	2.5%
- vehicles <sup>2</sup> (class K)	5.0%

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**Notes:** 1. Fertilisers, seeds, etc.

2. Class K, which is subject to exemptions up to 2012 for most projects under investment legislation

**Source:** [www.alfandegas.gov.mz](http://www.alfandegas.gov.mz)

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According to the Customs Code, agricultural inputs are exempt from VAT payments. Furthermore, most companies were exempt from paying tariffs on imported vehicles under the fiscal benefits afforded by the Investment Legislation.

Due to the low level of tariffs levied on imported inputs, it was decided that market prices would be applied in the calculation of economic values of tradable inputs, putting aside the need to deduct tariffs and taxes from the financial values. No subsidies are provided on the inputs in the projects considered.

### **Public Sector Co-financed Investments**

None of the projects analysed used infrastructure established by the government specifically for the use of the project, such as roads, irrigation and power supply. However, there were cases where the projects themselves built infrastructure that provided benefits outside the community and this was factored in as a negative cost in the economic analysis.

## **PROJECT SUMMARIES AND ANALYSIS**

This section presents a brief summary of each project as well as the key results of the financial and economic analyses undertaken.

### **Project A1: Ethanol production from sugarcane**

#### ***Project Summary***

## *Production Plans*

Project A1 plans to develop 18,000 ha for the production of ethanol from sugarcane. The business plan submitted to the government and made available to the consultant foresees an annual production of 213 million litres of anhydrous ethanol to be sold on the international market, including South Africa, the EU, US and Japan. However, the cash flow analysis is based on total production being sold to the EU where the returns are projected to be higher. Ex-factory ethanol prices are projected to be US\$0.61/litre in the fourth year of the project, rising to US\$0.72/litre in the eighth year.

The project also estimates the production of 82.500 MWh of electrical power to be sold to the national grid from 2012 at a price of between US\$.04/KWh and US\$.05/KWh.

The original business plan projected that cane production would be based initially on the planting of traditional varieties in use in Mozambique, acquired from an existing sugar estate. With all cane to be irrigated under centre pivot, the project assumes average cane yields of 120 tonnes per ha in the first five years of each planted area and 110 tonnes per ha in the subsequent years. However, analysis of the data in the business plan derived cane yields of approximately 130 tonnes per harvested ha in the sixth and subsequent years of the project to deliver a total volume of approximately 2.3 million tonnes of harvested cane. Replanting was assumed to begin in the tenth year of the project.

Annual water use is projected at 10,000 m<sup>3</sup>/ha and access to water was guaranteed by the relevant regional water authority.

Ethanol yield per tonne of cane is assumed to be an average of 93 litres in the business plan, with a season length of 40 weeks.

Factory plans include space for equipment for second-generation technology to extract fermentable sugar from ligno-cellulose (bagasse and leaves) which would increase ethanol yields in the future.

## *Investment*

The total estimated investment cost for the project is US\$280 million, with approximately US\$107 million for agricultural development and US\$173 million for industrial processing and infrastructure. 40% of this total value was assured by the company before implementation.

## *Socio-economic Impact*

The project foresees the creation of 2.673 jobs, with 2.325 jobs in agriculture and 348 in processing. All jobs are projected to be full-time. They do not include figures for cane cutting, which is to be outsourced and mechanized.

## **Financial Analysis**

### *Key Results*

Table 4 presents the results of the base case scenario for the financial analysis of Project A1 as well as its sensitivity to changes in key variables, namely, cane yields, ethanol yields, ethanol prices and start-up time. For the purposes of the analysis, it is assumed that the residual value of the investment made in land development, such as the irrigation system, is factored into the analysis as a positive inflow in the last year of the project, embodying the value of the transfer of assets.

According to the table, the project would earn positive NPVs at a real interest rate of 8%, calculated over a project lifetime of 10 and 15 years, and IRRs of 8.04% and 17.98%,

respectively, for the same periods. While the IRR for 15 years may be below what some institutional investors would require in a relatively high risk environment, it is above the cost of borrowing in South Africa, one of the main sources of funds for the project.

**Table 4: Project A1 - Summary of Base-Case Results and Sensitivity of Financial Analysis to Different Variables**

Variable	NPV at 8% (US\$)		IRR (%)	
	10 years	15 years	10 years	15 years
Base Case Scenario	339,731	170,063,592	8.04%	17.98%
Ethanol Prices				
- Lowest Annual Price	(124,267,396)	(41,359,070)	-10.32%	5.01%
- Highest Annual Price	42,002,937	209,315,159	12.74%	20.93%
Cane Yields				
- Historical Mozambique Yields	(165,909,334)	(90,369,734)	-17.95%	1.57%
- Good South African Yield (140 mt/ha)	43,633,596	233,860,434	12.74%	21.52%
Ethanol Yields				
- Brazil Average (82 litres/tonne cane)	(60,358,615)	75,765,692	0.65%	12.70%
Project Start-up Time				
- 12 months delay	(31,633,627)	138,090,235	3.46%	17.41%

### *Sensitivity Analysis*

The sensitivity analysis reveals that the project results are most sensitive to changes in ethanol prices and cane yields.

#### *— Ethanol Prices*

According to Table 4, a reduction in ethanol prices to the lowest average price over the past five years would decrease the IRR from 8.04% to -10.32% over a project life of 10 years and from 16.93% to 5.01% for a project life of 15 years.

Table 5 presents the calculation of ex-factory ethanol prices for Project A1. These were derived from EU ethanol prices, f.o.b. Rotterdam, from 2006 to 2009, and adjusted by deducting international freight cost estimates (from E D & F Man) and fobbing costs between the project and the nearest port (from the project's business plan). These prices were then adjusted to 2007 levels (the year of submission of the project) using the manufacturing unit value index presented in the World Bank commodity prices sheet.

**Table 5: Derivation of Ex-Factory Ethanol Prices for Exports to the EU, 2006-2009 (US\$/litre)**

	Rotterdam Fuel Ethanol (f.o.b.)	International Freight <sup>1</sup>	Fobbing Cost to Beira <sup>2</sup>	Ex-Factory Price	Ex-Factory Price (Basis 2007) <sup>3</sup>
<b>2006</b>	<b>0.78</b>	<b>0.10</b>	<b>0.02</b>	<b>0.66</b>	<b>0.70</b>
<b>2007</b>	<b>0.77</b>	<b>0.10</b>	<b>0.02</b>	<b>0.65</b>	<b>0.65</b>
Jun-08	0.88	0.10	0.02	0.76	
Jul-08	0.93	0.10	0.02	0.82	
Aug-08	0.89	0.10	0.02	0.77	
Sep-08	0.89	0.10	0.02	0.78	
Oct-08	0.80	0.10	0.02	0.68	
Nov-08	0.71	0.10	0.02	0.59	
Dec-08	0.70	0.10	0.02	0.58	
<b>2008</b>	<b>0.84</b>	<b>0.10</b>	<b>0.02</b>	<b>0.72</b>	<b>0.67</b>
Jan-09	0.67	0.10	0.02	0.55	
Feb-09	0.64	0.10	0.02	0.52	
Mar-09	0.60	0.10	0.02	0.48	
Apr-09	0.58	0.10	0.02	0.46	
<b>2009</b>	<b>0.62</b>	<b>0.10</b>	<b>0.02</b>	<b>0.50</b>	<b>0.46</b>
<b>Average Prices</b>	<b>0.75</b>	<b>0.10</b>	<b>0.02</b>	<b>0.63</b>	<b>0.63</b>

Notes: 1. For tanker of 10-12,000 tonne lots, assuming market picks up later during the year. Source: E D & F Man  
2. MPEL assumptions in business plan.  
3. Using the MUV.

A review of these prices indicates that average annual prices, on an ex-factory basis, have ranged between US\$0.50/litre and US\$0.72/litre between 2006 and the first four months of 2009, with an average price of US\$0.63/litre. The average real price (basis 2007) over the four-year period was the same, US\$0.63/litre. The lowest prices over this period have been experienced in the first part of 2009, reflecting oil prices that are below projected levels for the medium and long run. If 2009 prices are excluded, prices for the previous three years averaged US\$.68/litre in current terms and US\$0.67/litre in 2007 prices.

The switching value for ethanol prices is approximately US\$0.665/litre for a project life of 10 years and just under US\$0.54/litre for a project life of 15 years. This implies that the project's assumptions with regards to ethanol price levels are reasonably robust if ethanol prices return to the levels prior to the slump in 2009.

#### — Cane Yields

The project's projected cane yields are much higher than levels in Mozambique and the region. Table 6 presents cane yields for harvested area by milling company in Mozambique between 2003 and 2008. For the purposes of the sensitivity analysis, the point of reference is the average historical yield of the best-performing sugar estate, as the industry's average yields are dragged down by some estates with very poor growing conditions. Even taking the best average yields (approximately 87 tonnes cane/ha) the IRR for 10 years is reduced to -17.95% and is just under 1.6% over 15 years.

The company justifies its high projected cane yields on the basis that it judges the soil conditions in the project area to be much better than for existing sugar estates as well as the fact that tops and leaves will also be crushed. However, the project will have to make sure that they do achieve close to their planned yields: an approximate switch value for the cane yields is 129 tonnes cane/ha for a 10-year project analysis period and just over 107 tonnes cane/ha for 15 years.

**Table 6: Historical Cane Yields in the Mozambique Sugar Industry, 2003-2008** (tonnes cane/ha)

	2003	2004	2005	2006	2007	2008	Weighted Av. Yield
<b>Marromeu</b>	71.73	60.86	59.51	54.94	46.32	61.69	<b>58.48</b>
<b>Mafambisse</b>	51.69	50.77	61.20	45.89	46.07	50.55	<b>51.01</b>
<b>Xinavane</b>	82.69	74.36	85.64	83.06	82.26	77.52	<b>80.92</b>
<b>Maragra</b>	84.46	81.15	95.03	85.49	91.71	85.60	<b>87.28</b>
<b>Weighted Av. Yield</b>	<b>71.28</b>	<b>65.28</b>	<b>72.02</b>	<b>64.64</b>	<b>62.92</b>	<b>67.94</b>	

Source: CEPAGRI - Balanço Anual do PES de Açúcar, 2008

#### — Ethanol Yields

The project anticipates an ethanol yield superior to the current average in Brazil of 82 litres/tonne cane. If this lower yield is factored into the analysis, the projected IRR falls to less than 1% over 10 years and under 13% over 15 years.

#### — Project Start-up Time

With analysis of the first 10 years of the project life, a one-year delay in the start-up of the project reduces the IRR to under 3.5%. However, analysed over 15 years, a delay of one year in the start-up time reduces the IRR by less than one percentage point relative to the base case scenario.

At present, the project is about 15 months behind its original implementation schedule. According to the project proponent, this time slip derives from several factors, including: a delay of between eight and nine months in the approval of the project by the Mozambique Government; a delay of one year in seedcane planting as a result of having to kill off initial seedcane planted, which had become infected; a longer wet season in 2008/09 than normal; and, more recently, the impact of the global financial crisis, where a delay of about six months in obtaining finance is expected. However, these delays are not cumulative and the project proponents feel that it will be possible to catch up as time goes on.

### **Economic Analysis**

#### *Key Results*

Table 7 presents the results of the base case scenario for the economic analysis of Project A1 as well as its sensitivity to changes in key variables, namely, cane yields, ethanol yields, ethanol prices and start-up time. In addition, the table includes results for changes in the opportunity cost of land.

According to the table, the project would earn a positive NPV at a real interest rate of 8%, calculated over a project lifetime of 10 years and 15 years. The analysis estimates ERRs of 11.02% and 20.25%, respectively, for the same periods, both higher than for the financial analysis.

The key differences between the financial and economic analyses reside in the following variables, namely:

- Cost of land: prior to the development of the project, it is calculated that approximately 100 hectares of land was cultivated for dryland production of maize, using traditional varieties, with an approximate value of US\$25 and US\$50 per hectare. An approximate net value of US\$30 per hectare is assumed and multiplied by 100 hectares to derive the opportunity cost of land, which is below the land rent charged by the government. The small area of land cultivated reflects the low

population density of the region as well as lack of inputs to cultivate more extensively or intensively.

- Cost of water: given that the charges for water use by the central region water authority do not reflect the full cost of operating and maintaining the water system, a full cost of water supply was calculated on the basis of the average cost to industrial users in the southern part of Mozambique. This increased the cost of water from US\$16 per hectare in the financial analysis to US\$100 per hectare in the economic analysis. The project assumes a water use of 10,000 m<sup>3</sup>/ha per year, so total water use is calculated on the basis of the number of hectares under cultivation each year.
- Contribution to public infrastructure: the project has budgeted US\$2.7 million for the construction of a single-lane bridge across the river bordering the project, which will be used by the local population as well as the project, constituting an economic benefit. Given the complexities of attributing a value to the social benefit of the bridge, it was assumed that the economic value would be at least equal to the investment cost. As such, all the value was incorporated as an economic benefit (or negative economic cost).

**Table 7: Project A1 - Summary of Base-Case Results and Sensitivity of Economic Analysis to Different Variables**

Variable	NPV at 8% (US\$)		ERR (%)	
	10 years	15 years	10 years	15 years
Base Case Scenario	27,395,742	210,025,078	11.02%	20.25%
Opportunity Cost of Land				
- Zero Opportunity Cost	27,415,872	210,050,756	11.02%	20.25%
- High Opportunity Cost (RSA rental cost)	25,000,243	206,969,344	10.75%	20.03%
Ethanol Prices				
- Lowest Annual Price	(97,211,384)	(1,397,585)	-5.67%	7.90%
- Highest Annual Price	69,058,948	249,276,644	15.67%	23.28%
Cane Yields				
- Historical Mozambique Yields	(138,853,323)	(50,408,249)	-12.46%	4.49%
- Good South African Yield (140 mt/ha)	70,689,607	273,821,920	15.58%	23.75%
Ethanol Yields				
- Brazil Average (82 litres/tonne cane)	(33,302,604)	115,727,178	4.04%	15.10%
Project Start-up Time				
- 12 months delay	(9,574,598)	173,054,738	6.65%	19.72%

### *Sensitivity Analysis*

The sensitivity analysis reveals that the project's economic results are most sensitive to changes in the ethanol prices, cane yields and ethanol yields.

#### *— Ethanol Prices*

A decrease in ethanol prices to the lowest values in the last four years reduces the ERR to a negative value for a project life of 10 years and to just under 8% for a 15-year project analysis. Conversely, an increase in ethanol prices to the highest yearly average over the same period boosts the ERR to nearly 16% over a 10-year project and to more than 23% over 15 years.

The switching value for ethanol prices is approximately US\$0.63/litre for a project life of 10 years and US\$0.505/litre for a project life of 15 years. In the case of a 15-year project life, these prices are below historical trend indicating that the project's assumptions on prices are reasonably robust.

#### — *Cane Yields*

Even taking the best average yields (approximately 87 tonnes cane/ha) the ERR for 10 years is reduced to nearly -12.5% and is just under 4.5% over 15 years. A yield level close to good average South African yields would boost the ERR to nearly 24% over 15 years.

The switching values for cane yields using economic costs and prices are marginally lower than those for financial analysis: approximately 122 tonnes cane/ha over 10 years and 95.5 tonnes cane/ha over 15 years.

#### — *Opportunity Cost of Land*

The project is not particularly sensitive to changes in the value of the land. Reducing the opportunity cost of land to zero increases the ERR only marginally, while an increase in the opportunity cost to a level close to existing South African rental rates for undeveloped agricultural land<sup>5</sup> diminishes the ERR by less than half a percentage point over 15 years.

The switching value of land is high compared to potential rates for undeveloped agricultural land in central Mozambique: approximately US\$4.09 million per year (US\$227 per hectare) over 10 years and US\$24.5 million per year (US\$1,361 per hectare) over 15 years.

#### — *Ethanol Yields*

The ERR is slightly more robust in the face of lower-than-expected ethanol yields, at just over 4% over 10 years and over 15% over a 15-year period. However, in both cases, this is still significantly below the rates in the base case scenario

#### — *Project Start-up Time*

With analysis of the first 10 years of the project life, a one-year delay in the start-up of the project reduces the IRR to under 6.7%. However, analysed over 15 years, a delay of one year in the start-up time reduces the IRR by less than one percentage point relative to the base case scenario.

### **Project A2: Sugarcane for ethanol**

Project A2 was awarded title for 30,000 has in 2007 for sugarcane cultivation for ethanol and, possibly, sugar production. The majority of the company's shares belong to a foreign investor.

#### ***Production***

According to the Government's final presentation of project to the Council of Ministers, the project proposal assumes harvesting of 2.6 million tonnes of cane on 22,500 has under drip irrigation, based on an assumed annual cane yield of approximately 120 tonnes/ha. Land is projected to be prepared and planted over four years, with the bulk planted in the second and third years of the project at a rate of 10,000 has. per year.

With an ethanol yield of approximately 82 litres/tonne cane, in line with Brazilian levels, this would result in a production of 110 million litres of ethanol in the third year of the project and

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<sup>5</sup> Taking cost of renting undeveloped agricultural land in South Africa at a monthly rate of approximately US\$20/ha. Source: [www.freepropertyads.com](http://www.freepropertyads.com).

221 million litres of ethanol per year from the fourth year of the project. The project might also use part of the sugarcane to produce sugar, with production of up to 142,500 tonnes of sugar, in which case ethanol production would be reduced to 136 million litres.

However, in the company's development plan, submitted in support of its land application, ethanol production was initially projected to be 1.25 billion litres, based on an ethanol yield of 250 litres/tonne cane and an implied cane production of five million tonnes. This level of yield has been achieved under laboratory conditions, using second generation technology to extract fermentable sugars from cane juice, tops and fibre; however, such technology was not commercially viable at the time of the project's submission and continues not to be commercially viable at present.

The company expects to produce 116 GWh of electrical power per year up to year three of the project, with an output of 212 GWh per year from the fourth year of the project. Doing a simple calculation of energy output per tonne of cane, this is equivalent to 78.5 KWh per tonne of cane, double the energy output per tonne of cane predicted by the other ethanol project analysed.

### ***Market***

The company presented a broad description of target markets, identifying the domestic, regional and EU markets as key markets for ethanol sales, and the EU and international markets for sugar sales.

However, no ethanol and electricity sales prices or predicted sales volumes to each market were presented and no revenue streams were included in the development plan submitted.

### ***Investment***

Total investment was projected to be US\$510 million over 15 years, including the replacement of the drip irrigation system at replanting of the sugarcane after 10 years. Detailed information on annual investment costs, broken down by category, was presented in the land application procedure. Having surpassed a total investment value of US\$500 million, the project became eligible for additional fiscal benefits under the Investment Legislation.

No operational costs were presented.

### ***Feasibility Analysis***

While the data presented on the project did not enable the project feasibility to be analysed and some of the data presented was inconsistent, it is possible to comment on some of the assumptions contained in the data made available:

- Similar to the previous ethanol project, the level of projected cane yields is high relative to existing good cane yields in the Mozambique sugar industry. Consultation with existing sugarcane companies in southern Africa, where some cane is grown under drip irrigation, revealed there to be some doubt as to whether the yields could be achieved.
- The projected ethanol yield of 250 litres/tonne included in the company's business plan -of cane is unrealistic in the near future.
- In addition, in order to achieve the ethanol output that would result from such an ethanol yield, the project would need to produce five million tonnes of cane, which is inconsistent with the area requested and the estimated cane yields.



- The planting schedule assumed in the project proposal is ambitious logistically although it is not impossible if the topography is relatively flat and the company can muster the necessary funds. However, during the key period of recuperation of planted area, which spanned five years as part of the rehabilitation of the sugar sector in Mozambique, the existing sugar industry planted an average of only 4,000 has per year. This was done by the management teams of the four sugar estates. While certain factors constrained the pace of land development during that period, such as availability of sufficient seedcane and relatively limited financial resources, it is an indication of what can realistically be achieved. Since 2007, Project A2 has developed only 125 has of land. Although problems of access to water for irrigation have been cited as the principal reason for the lack of development, it could be challenging for the original planting schedule to be fulfilled.

### **Project L1: Cattle**

Project L1 was awarded title for 10,000 has in 2008 for cattle grazing and breeding. The majority of the company's shares belong to a foreign investor.

#### ***Production***

According to the simplified development plan submitted to the government as part of the company's land request, the company planned to put 1,000 head of Brahman cattle on the 10,000 has. However, in the investment proposal that accompanied the land request, a simple business plan envisaged a total of 240,000 has stocked with 24,000 head of cattle. In both cases, a ratio of 10 has per head of cattle was assumed, based on extensive production in a semi-arid area.

With an annual extraction rate of 0.8 assumed in the business plan, the company projected a total of 19,200 head of cattle per year for meat production. The plan assumed an average weight of 225 kg per head, although other documentation submitted by the company presented weights of between 730 kg per head and 1,000 kg per head for each male and between 455 kg per head and 640 kg per head for each female.

With the average weight of 225 kg per head of cattle, the business plan estimated an annual production of 4,320 tonnes of meat.

Contact with the investor revealed that this project has not yet been implemented.

#### ***Market***

Aside from an aggregate estimate of the total consumption of meat in the domestic market, based on estimated per capita meat consumption and population statistics, no information on markets was presented as part of the company's application.

#### ***Investment***

In order to develop 240,000 has and purchase the cattle to stock that area, the project foresees a total investment of 240 million rands (approximately US\$25 million) to be spent as presented in Table 8:

**Table 8: Investment Costs by Category for 240,000 has Project**

<b>Item</b>	<b>Cost per Item (rands)</b>	<b>No. of Items</b>	<b>Cost (mn rands)</b>	<b>Cost (US\$ mn)</b>
Cattle purchase	6,000	24,000	144	15.0
Water and facilities for 24 lots of 10,000 has each	1,000,000	24	24	2.5
Slaughterhouse and processing	12,000,000	1	12	1.3
Vehicles and equipment	12,000,000	1	12	1.3
Roads, dams, fencing	666,667	24	16	1.7
School/Clinic	4,000,000	1	4	0.4
Feedlots	4,000,000	1	4	0.4
Tanning	8,000,000	1	8	0.8
Plane	8,000,000	1	8	0.8
Generators, workshops, storerooms, irrigation	8,000,000	1	8	0.8
<b>Total</b>			<b>240</b>	<b>25.0</b>

Annual investment for the first five years of the project was provided but not broken down into the different categories presented above and came to a total of 102.4 million rand (approximately US\$10.7 million).

### ***Feasibility Analysis***

No feasibility analysis was presented and the data presented on the project did not enable the project feasibility to be analysed independently, being either incomplete or inconsistent. However, it is possible to comment on some of the assumptions contained in the data made available:

- The lack of market analysis is a reason for concern because there is no possibility for the government to evaluate market volume or returns and it indicates a lack of foundation for feasibility analysis by the investors themselves.
- The stocking rate of 10 has per head of cattle is lower than normally used in Mozambique for extensive breeding in semi-arid areas (seven has per head of cattle). Indeed, a comment was made to this effect by the provincial livestock services in the area, which recommended that a smaller area be allocated. However, the investor stated that the total area was necessary to obtain financing for the project and the stocking rate was passed by the government.
- The different cattle weights assumed in the business plan appear ambitious as the live weight of such cattle would normally be approximately 500 kg and would take five years to reach this level in the feeding conditions anticipated in semi-arid areas.
- The extraction rate of 80% projected in the business plan also appears unlikely and would depend on a herd comprising all females with an extremely high calving rate.

## **Project F1: Plantation forestry**

Project F1 has land title for an area of just under 29,000 has in one of the main forestry regions of Mozambique, granted in 2006. The area requested was reported to be degraded, previously used for agricultural activities and/or deforested.

The original investment proposal was submitted in conjunction with another forestry company for total of 100,000 has and was approved by the government. However, a separate business plan was submitted by company for the land request, which is the basis for the following analysis.

### ***Production and Technical Efficiency***

The objective of the project is to plant pine, eucalyptus, teak and indigenous hardwoods for harvesting and wood production.

The main business plan provided talks about a potential concession area of 200,000 has of which 91,000 has would be planted. However, the summary cashflow presented refers to a planted area of 68,500 has for wood production, planted over 11 years. Over the same period, it is stated that 70,000 has of protected *miombo* areas would be created.

The area of 68,500 has would be planted under pine (24%), eucalyptus (31%), and teak and indigenous hardwoods (45%) at a planting rate of between 3,000 has and 6,000 has per year.

No information was provided on the number of trees that would be planted per hectare.

Average annual growth rates are projected to be 12 m<sup>3</sup>/ha per year for pine over a full rotation of more than 20 years, and 16 m<sup>3</sup>/ha per year for eucalyptus over an 18-year rotation. No figures were given in the business plan for the growth rates of teak and indigenous hardwoods, although the final harvest was reported to be planned for 25-30 years after planting for teak and a minimum of 30 years for indigenous hardwoods.

Before final felling, two thinnings for pine and eucalyptus and three for teak are expected to be carried out, the first during years 6-7, the second during years 11-15 and a final thinning for teak during years 19-22. A graph on harvested volume is presented in the plan but the underlying data was not made available.

The business plan states that there are about 1,400 ha of mature pine forests ready to harvest, with a growing stock of around 120,400 m<sup>3</sup>. During the first five years of the project, wood would be harvested from this area and prepared in the project's sawmill for construction timber and timber houses.

According to the business plan, Chikweti has a sawmill with a capacity that will reach a production of 5,000 m<sup>3</sup> sawn wood during the first year of the project. In the second year of the project, the targeted production is 7,500 m<sup>3</sup>.

### ***Market***

The business plan states that, during the first five years, the main products will be construction timber and timber houses for the domestic and regional (Malawi) markets. In the medium to long term, the products will primarily be exported, presumably in the form of logs, although this is not specified in the plan.

The local demand for construction timber was high at the time of submission of the business plan, such that all production was being sold locally, wet, at "good" prices, at a rate of 100 m<sup>3</sup> per month. The market price for rough, low grade timber in the project area at the time of submission of the business plan (2006) was US\$275/m<sup>3</sup>. Market prices (wholesale or retail,

not specified) were also quoted for Maputo (approximately US\$300/m<sup>3</sup> for sawn, planed construction wood and US\$190/m<sup>3</sup> for rough, low grade construction wood) and Malawi (US\$200-250/m<sup>3</sup> for rough, low grade timber with a premium of US\$40/m<sup>3</sup> for treated wood). Given the high transport costs from Maputo to the project area, it was felt that good prices were guaranteed for project output.

When production reached the target of 7,500 m<sup>3</sup> per year, the company intended to supply other markets.

Table 9 presents estimated ex-plantation prices for the wood produced by the project.<sup>6</sup> Estimates were based on an average of the prices obtained from “several forest research institutions and studies”, although specific references were not supplied.

**Table 9: Projected Ex-Plantation Prices for Wood Production (US\$/m<sup>3</sup>)**

<b>Species</b>	<b>Price</b>
Pine	25
Eucalyptus	20
Teak	
- Thinnings	60
- Final harvest	180
Indigenous hardwoods	
- High value	500
- Low value	100

Source: Company Business Plan

### ***Investment***

According to the company plan, the total cost envisaged for establishing 68,500 has in the first 11 years of the project is US\$78.7 million, with an average cost per hectare of US\$1,150, broken down into nursery costs (30%), silviculture costs (40%) and other, unspecified costs (30%).

### ***Feasibility Analysis***

The business plan presents graphs on projected profit and loss and accumulated cash flow over 30 years but the underlying data was not made either available in the document nor via subsequent contact with the investor. According to the graph, the project would start making a profit after 11 years, with profits increasing over the next 19 years in line with projected harvested volumes. Accumulated cash flow would be negative for the first 19 years, with positive cash flow increasing steadily over the following 11 years.

On the basis of a total investment cost of US\$78.7 million and projected total revenue of US\$764 million, the business plan projects an “interest calculated according to present value” (assumed to be the IRR) of 13%.

Most assumptions presented in this project appeared reasonable, although the level of detail and explanation was not sufficient to undertake in-depth analysis of the assumptions:

- The IRR of 13% is not deemed to be ambitious but may be rather on the low side for a forestry project to attract funding.

<sup>6</sup> The business plan does not identify the basis of the prices but in subsequent contact with the investor, it was confirmed that the prices were ex-plantation.

- The IRR might be boosted by more attractive prices for teak, which could potentially achieve higher levels.
- Most of the technical performance indicators appeared to be reasonable, with growth rates being within acceptable parameters.

## **PROJECT REVIEW PROCESSES – “BEST PRACTICES”**

The previous section revealed the paucity of detailed technical and financial information in the business plans submitted to the government or available from investors. In some cases, investors have more detailed information than submitted in business plans to the government but are reluctant to make it available for the purposes of the study because of confidentiality issues or time available for discussions with an outside party. In other cases, the investors themselves did not have the information necessary for a detailed project design or analysis.

This section looks more closely at the information submitted to, and taken into account by, the government when it takes a decision on whether or not to award a land title (DUAT) to a project proponent. The analysis of the project review process is not restricted to the four projects presented and discussed in the previous section but draws on a slightly larger sample of nine projects that were originally considered for selection for more detailed review.

### **Project Review Approaches**

The starting point for the evaluation of the project review process in Mozambique is the understanding of the legal framework that governs project analysis and approval in the country. The increased pressure on land due to the wave of interest in land acquisition associated with the biofuels boom and the rise in global food prices has already led to a dramatic shift in the position of the Mozambican government over the last two years in relation to the way that large-scale projects should be evaluated.

While the government remained keen to encourage new investments, there has been a move away from purely facilitating investment towards selecting good quality, sustainable investments.<sup>7</sup> This change in the government’s position has been reflected both in recent adjustments to the legal framework governing project review and in the application of existing legislation.

This section of the report looks at legislation influencing the technical, financial and economic analysis of large-scale agrarian projects and how it has been applied, namely the Land Law of 1997 and its Regulation,<sup>8</sup> and the Investment Law of 1993 and its Regulation.<sup>9</sup> While legislation exists that is relevant to the assessment of the environmental impact of projects, this does not form part of the terms of reference for this report, and is not discussed.

Until recently, the process for evaluating land title requests and the evaluation of investment proposals linked to these requests were quite separate. However, several steps have been taken to synchronise the two processes and to provide more detailed guidelines on the

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<sup>7</sup> The increased demand for land highlighted the need to be cautious in the allocation of land, a factor which suddenly appeared to be much scarcer than previously thought. It also revealed the opportunity that Mozambique had to be more selective compared to previous years where the country felt that investment was hard to attract.

<sup>8</sup> Law no. 19/97 of October 1 and its Regulation, approved by Decree no. 66/98 of December 8.

<sup>9</sup> Law no. 3/93, of June 24 (the Investment Law) and its Regulation, approved by Decree no. 14/93, of July 21, and subsequently altered by Decree no. 36/95, of August 8.

information to be submitted and evaluated for large-scale agrarian projects.<sup>10</sup> These steps are presented in this section.

### **Land Acquisition**

According to the review of the land legislation and its application in the case of the nine projects in the sample, the land application process has tended to be essentially administrative, focused principally on minimising land conflicts with local communities, via community consultation, with consideration of only some basic technical parameters.

These parameters are contained in a model development plan that was established in 2000 by the Ministry of Agriculture:

- For agricultural projects, it presents information on the crops to be produced each year and the area under each crop, with additional information on any construction that may take place.
- In the case of livestock, the *pro-forma* development plan provides information on the number and type of livestock, the existence of fencing and any constructions that may take place.
- For forestry, investors are required to present information on the type of planting (percentage area under each species), area developed each year and constructions planned.
- For ecotourism, the simplified plan includes information on the type of wild animal, number of heads and constructions and fencing planned.

No information on investment costs is presented.

One factor behind the relative lack of technical focus of the project review process is the lack of guidance in the land legislation about what to include in a project evaluation or *parecer*.

However, the level of detail and rigour in project analysis in the project sample depends on the sector and the period in which it was analysed. The project review undertaken revealed that there was a wide variation over projects in terms of quality of project design, technical competency of project proponents, and availability and quality of information, as well as the depth of project evaluation by different government departments.

In the meantime, the review showed that the process has evolved to include more detailed consideration of a wider range of technical efficiency indicators and elements of financial analysis to assess whether an individual project is feasible. Most of the agriculture projects in the project sample had been subjected to a more rigorous analysis, partly reflecting the type of technical capacity present currently in the government and partly reflecting the fact that the projects had been submitted more recently.

No analysis was undertaken by the government in any case to attribute the costs and benefits to the economy as a whole. However, a programme based in CEPAGRI aimed at strengthening investment analysis capacity<sup>11</sup> refers to the need to introduce elements of social and economic cost-benefit analysis into government evaluation.

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<sup>10</sup> Council of Ministers Resolution, 70/2008 of December 30.

<sup>11</sup> *Promoting sustainable and poverty-reducing investments in biofuel production in Mozambique: Programme Formulation - Final Report*, ECORYS Nederland B.V., Nedworc and Mekon Ecology, July 28, 2008.

## ***Investment Proposals***

While provisions exist in the investment legislation for financial analysis and assessment of a company's technical and financial capacity, application of the legislation has changed over time. The provisions of the legislation were used to carry out a relatively exhaustive analysis when the legislation was first applied. However, the legislation began to be applied in a more simplified manner over time. This reflected concerns both domestically and of international institutions about the need to facilitate investment and pressure to reduce what were perceived to be administrative barriers.

### ***Strengthening the Link between Land and Investment Legislation***

Until recently, the process for evaluating land title requests and the evaluation of investment proposals linked to these requests were quite separate. The land title process concentrated mainly on the administrative steps laid down by the Land Law and its Regulation, while investment proposals were evaluated by CPI. The main point of connection between the two processes was the technical evaluation or *parecer* that the relevant sectoral Ministry was required to produce, stating whether or not the Ministry was in favour of the project and land title request. However, as discussed in the previous sections, no model or template was established for these *pareceres*.

As a consequence of the surge in expressions of interest for large tracts of land, the government made two changes to the project review procedure. Firstly, it tightened the link between the processes for awarding land titles and approving investment proposals. Whereas previously a proposal for a large-scale investment project could be approved by the Council of Ministers independently of the land process, from 2007, investment and land requests had to be submitted together to the Council of Ministers, with the two processes being launched simultaneously.<sup>12</sup> In addition, the Provincial Governor had to submit an evaluation of both the land request and investment project.

Secondly, at the end of 2008, the Council of Ministers approved the introduction of Investment Guidelines (Resolution 70/2008). These are applied to large-scale projects, defined as more than 10,000 hectares, establishing the type of information required for the presentation of projects to the Council of Ministers for their analysis. This now represents the legal basis for the evaluation of large-scale agrarian projects.<sup>13</sup>

These guidelines brought together existing legislation that governs land acquisition and investment proposal approval and made sure that information required by law is presented, including data on project cash flow and the technical and financial capacity of a proponent. In addition, it established a model for a project's development and business plan, filling a gap in the existing legislation. This model establishes the need for a company to provide information on its project's production and business plan over the first 10 years of the project, including data on:

- Planted area and production, by crop, and industrial production, providing the basis for an analysis of production and technical efficiency indicators, such as agricultural yields.
- Cost and revenue flows, identifying annual investment in agriculture and processing, and information on target markets and expected prices.

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<sup>12</sup> Circular no. 009/DNTF/07 of October 16, 2007, on the basis of the "necessity and urgency to impose common procedures in relation to some subjects relating to the processing (*tramitação*) of steps to obtain DUATs, with the objective of greater institutional efficiency and due synchronisation with the Law and Regulation (*of the Land Law*)".

<sup>13</sup> The type of information required by the Investment Guidelines is presented in detail in Annex D of the Inception Report for Phase I of the study in Mozambique produced by Simon Norfolk.

- IRR and sensitivity analysis.

There is no provision for economic analysis in the Investment Guidelines.

The Investment Guidelines reinforce the government's role in evaluation, providing government institutions with a more objective and legally-justifiable means of obtaining information from investors and bringing out more technical and financial aspects of project analysis. However, there are several outstanding issues with respect to the Guidelines:

- They do not apply legally to land requests of 10,000 has and under, leaving a question mark over the procedure to follow for those projects and the level of detail of information that can be requested from the investor. In principle, most of what is required in the Guidelines already exists in law and applies to smaller projects. However, some government institutions feel that the volume of information and level of detail required is too great for smaller projects.
- While the Guidelines present a list of information required, it still leaves some room for interpretation by investors about the type of variables and level of detail required.<sup>14</sup>
- The current version that has been published is directed at the analysis of agricultural projects and the Guidelines have not yet been adjusted to reflect technical parameters for livestock and forestry projects, including the time period that should be analysed for each sector. Even in the case of perennial agricultural crops, such as sugarcane, it may be necessary to have data for the first 15 years of the project, in order to allow the project to reach full production.
- The calculation of IRRs and execution of sensitivity analysis is still undertaken by the investors themselves, resulting in a less transparent analysis than desirable.
- No cut-off levels or reference points are established for a project IRR to act as guidance for decisions on project viability.
- A similar lack of guidance exists for the assessment of the technical and financial capacity of the project proponents and the technical efficiency indicators, although some presentations of projects to the Council of Ministers have started to include some comments and benchmarks on this.

### ***Monitoring as a Safeguard***

Both the land and investment legislation contain some safeguards that enable reversal of government authorisation of unviable projects that have been given the go-ahead, either in the conditions laid down for converting provisional DUATs to definitive titles or via the time limit established for initiating the implementation of an investment project.<sup>15</sup> However, the capacity of the state to monitor investment projects and land title use is extremely weak, so this safeguard measure has, in most cases, failed to operate as a fall-back option.

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<sup>14</sup> For example, the Guidelines request information on prices in different markets but do not specify on which basis they should be presented nor whether information on transport costs should be presented separately.

<sup>15</sup> In principle, an investor has 120 days after being notified of project authorisation to start implementing the project (Article 19(1) of the Regulation of the Investment Law). If this time limit is surpassed, authorisation is cancelled, unless the investor deposits 5% of the total investment value, up to a maximum of US\$500,000, as a sign of good faith (Article 19(2) of the Regulation of the Investment Law). A deposit extends the time limit for an additional 120 days (Article 19(4) of the Regulation of the Investment Law).



## **Lessons from the Project Review Process**

### ***Project Classification***

In the sample of projects reviewed, there was no element of classification, ranking or comparison of different projects or land use. Projects were evaluated on a project-by-project basis and the land process ensures that land requested for a project is reserved for that project for an unspecified period of time, once the community has pronounced in favour of the project.

Where more detailed project analysis was undertaken, comments were made principally on the realism of technical and financial parameters, the level of the IRR (comparison to the London Interbank Operational Rate, LIBOR), the profile of the company and indications of funding possibilities. There was no discussion of net present value or net benefit-investment ratios as measures of project worth.

In cases where critical comments were made on projects, judgement was made principally on the size of the land requested and there is a lack of guidance on the conditions under which a project can and should be rejected, on the basis of the information provided and analysis undertaken.

### ***Information Provided***

The experience with obtaining data from existing business plans contained in project submissions was that not all the data was included that would be necessary for a cash flow analysis, data was presented at different levels of aggregation in different business plans and that data in different parts of the plan was often inconsistent:

- Many plans did not have annual cash flow figures that would enable the calculation of the NPV or IRR.
- In some cases, total investment costs were presented for the lifetime of the project, without a yearly breakdown, and operating costs were not presented.
- Not all business plans included data that allows the verification of key assumptions on project variables, such as prices or yields.
- Some business plans focused on a general discussion of markets without identifying the project's target market or providing price data.
- Where prices are presented, the basis is often not clear leading to difficulty in calculating ex-farm or ex-factory revenues to compare with costs.

While companies may have more detailed data that they retain in-house, the problems with the quality and level of detail of data included in some of the business plans submitted to the government cast doubts on whether all the project proponents have actually verified the feasibility of their own projects. This implies that the government cannot assume that companies have done sufficient research to have a firm basis for declaring that a project is viable.

The review of projects also raises the issue that the government did not have an adequate basis, in terms of data provision, for evaluating projects, at least prior to the establishment of the Investment Guidelines.

### ***Monitoring***

While there are programmes in place to strengthen the government's capacity to monitor land use,<sup>16</sup> the current lack of capacity indicates that it continues to be important that projects are screened and evaluated to ensure that they are viable and beneficial to the country.

## **A POSSIBLE MINIMUM PROJECT REVIEW APPROACH FOR THE GOVERNMENT OF MOZAMBIQUE**

The government's recent experience with the wave of interest in large-scale land acquisitions has underscored the need to have a procedure in place that will discourage speculation and ensure that due diligence of projects has been undertaken.

However, any suggestions directed at making project review processes more exacting need to take into account the implications of such suggestions for government capacity, the time taken to complete an evaluation and the impact on the level of detail that is possible to achieve in analysis.

Suggestions that may imply introducing more complexity into project evaluation processes are particularly difficult when there are conflicting positions about the role of the state in evaluating projects and pressures to simplify procedures and process projects as quickly as possible. This conflict exists not only within the Government of Mozambique but also within and between different multi-lateral institutions, where a more detailed project review process is seen by some as an administrative barrier to private sector development.

As this report has discussed, the Investment Guidelines introduced by the Government of Mozambique provide a good framework for evaluating large-scale land requests and investment proposals. However, it also identified some areas where the provisions established for technical, financial and economic analysis of proposals could benefit from changes.

This section looks at possible complementary measures to the Investment Guidelines, namely:

- Standardising, adapting and extending the Guidelines;
- Introducing a mechanism to undertake an initial screening of large-scale project proposals to act as a filter before spending time on a more detailed analysis at different levels of government; and
- Identifying what external assistance could usefully support the government in the project review process.

The starting point for these suggestions is that they should be done in as manageable a manner as possible, within the country's existing legal framework.

### **Bolstering Current Project Review Processes**

The project review revealed several areas where actions could be taken to complement or bolster the current evaluation approaches.

#### ***Standardising Information Presentation***

It is important to have a uniform model or matrix for the presentation of the information underpinning business plans. This would preferably be in the form of a spreadsheet,

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<sup>16</sup> MCC-funded land tenure services project and CEPAGRI programme to promote sustainable and poverty-reducing investments in biofuel production in Mozambique.

specifying the type of information, the time period and the level of detail for each sector. The layout of the financial and economic analysis worksheets set up by the World Bank could provide a good model.

In addition, it could be useful to transform the layout of the Guidelines to enable a more technical and less legalistic presentation of projects, eliminating some of the repetition in different sections.

### ***Adapting the Guidelines***

As the Guidelines do not currently include parameters for non-agricultural, agrarian activities such as forestry or livestock, it will be important to adapt them to reflect their specific parameters. Annex 1 suggests some key parameters that could usefully be included.

### ***Extending the Guidelines***

It would be beneficial to extend the existing Guidelines to cover several issues that are currently not contained, including:

- Applying the provisions for technical and financial analysis to smaller projects, i.e., equal to or below 10,000 has. The challenge will be to define a limit: a possible option is to define the limit in line with the Regulation of the Investment Law that stated that agricultural projects of over 5,000 has and forestry and livestock projects of over 10,000 has should be considered by the Council of Ministers,<sup>17</sup> effectively classifying them as “large scale”.
- Introducing the need for allocation of provisional water rights explicitly at this stage, rather than waiting until land title is awarded, in order to manage water allocation more effectively and ensure that such water rights do not infringe on community rights.
- Undertaking quick calculations of a project’s IRR and, possibly the NPV, to check an investor’s assertion of project feasibility. If reasonably detailed information on a project’s production plan and cash flow are provided according to a standard template, the calculation of the IRR and NPV should take very little time, using a simple programme like Excel. Most of the project analyst’s time would be spent on verifying technical and financial assumptions underpinning the production plan and cash flow, which has to be done anyway to evaluate the project. The current reliance on investors’ figures limits a government analyst’s ability to comment critically on, and make recommendations regarding, a project proposal.

### ***Greater Guidance on Using the Analysis***

As there is currently no section in the Guidelines for comments and recommendations by the project analyst or guidelines on cut-off points for different indicators of project feasibility, it would be useful to provide greater guidance on how to use the analysis that would result from a reinforced set of investment guidelines, including:

- Providing a clear idea of what the cut-off point for the IRR would be for selecting projects and a greater understanding of how to measure the opportunity cost of capital.
- Benchmarking technical efficiency parameters against national and international references.

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<sup>17</sup> Article 15 of the Regulation of the Investment Law.

Regular monitoring of best practices in the implementation and impact of large-scale projects and the publication of results could also be used to establish minimum thresholds and raise the bar on standards for projects subsequently submitted. However, this implies that the government would need to be flexible and willing to incorporate improvements to the Investment Guidelines in an iterative manner.

It would also be useful if the government could have a mechanism to compare and rank projects to evaluate the best use of its resources, particularly land and water. Introducing simple economic analysis could help to give an indication of this by identifying the “true” cost of using the resources in a particular project. This is of particular benefit where both land and water are becoming increasingly scarce in certain regions of the country.

However, this would have to be discussed carefully with the government as the current philosophy tends more towards a simple rationing model, where a limited resource has some ranking of priority uses (e.g., water for human consumption and maintaining the minimum ecological flow of rivers takes priority over all other uses; and the current land zoning exercise is trying to establish areas for food production and biofuel production) and then the resource is allocated on a “first-come, first-served” basis. An option that could be discussed and investigated further is the establishment of a model for competitive bidding for land identified under the land zoning exercise currently being launched and delimited by the government, which would enable the government to compare different projects. However, this would depend on there being a sufficient level of interest in investment and different aspects would have to be thought through carefully. The experience with bidding for oil exploration rights has shown that it can be a complex procedure.<sup>18</sup>

### ***Introducing a Two-Stage Evaluation Process***

It may be useful to establish an initial screening tool at national level to assess whether a project should proceed to a more exhaustive evaluation. This possibility has been discussed at government level in Mozambique, with the idea of screening large-scale projects at national level before allowing investors to begin the land acquisition process at provincial level. However, the form and content of such a screening process has yet to be defined.

Such a screening could include the following type of information to carry out a relatively quick initial assessment of the project, namely:

- Company profile (experience in sector; quick checks on blacklisting/company reputation);
- Area required;
- Expected production;
- Expected yields;
- Total projected investment, broken down into key components for each sector and also expressed on a per hectare basis:
  - Agriculture projects: agriculture (including cost of land clearing, preparation, irrigation and drainage) and processing;
  - Livestock projects: fencing and constructions (feedlots); and processing (slaughterhouse) if included;

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<sup>18</sup> Cramton, P. (2007) ‘How Best to Auction Oil Rights’, in M. Humphreys, J.D. Sachs and J.E. Stiglitz (eds) *Escaping the Resource Curse*, pp. 114-152. Columbia University Press

- Forestry projects: land preparation and planting costs; processing (sawmill).

Initial checks could be carried out on the following parameters:

- Is the crop suitable for production? Cattle breed suitable for country? Forestry specie minimally suitable for country?
- Output vs area:
  - Is the yield sensible? Is industrial output consistent with area requested? E.g., Requests received for 600,000 hectares for production of ethanol that would need maximum of 150,000 hectares.
  - Number of head of cattle vs. area? In line with normal stocking rate for intensive and extensive systems?
  - Wood production vs. area requested?
- Cost per hectare:
  - Cost of land preparation and installing irrigation and drainage systems in sensible range? E.g., some project received proposing land preparation costs of less than US\$1,000 per hectare whereas land for irrigated agriculture in Mozambique costs at least US\$5,000 per hectare.
  - Cost of fencing and constructing water holes and feedlots in sensible range for proposed area and number of cattle?
  - Cost of land preparation and forestry planting reasonable?

### ***Possible Areas of External Support***

While some of the areas discussed above are well within the government's existing or programmed capacity to incorporate into current evaluation procedures, other areas could usefully be the focus of external technical assistance, including:

- Setting up databases for key information and identifying sources of information for keeping databases up-to-date. Areas that would particularly benefit from information on national and international benchmarks include:
  - Production development indicators;
  - Technical efficiency parameters for agriculture, forestry and livestock activities;
  - Market information on prices, distribution costs and trade barriers;
  - Cost information; and
  - Financial indicators.

Annex 2 provides more detail on information that could usefully be included in a database.

- Providing supplementary training in project analysis training and/or making available a manual on practical project analysis in developing countries. In the case of Mozambique, it would be useful to provide introductory training on the role of project analysis and the basic tools involved to the different institutions involved, in one form

or another, in the project evaluation process. More indepth training courses could be directed at the technical staff involved in more detailed analysis, such as CEPAGRI and CPI, with input from specialists in analysis of projects from different sectors. It would also be beneficial to target local entrepreneurs to provide them with the basis for understanding project proposals from foreign investors and make them more active and informed partners in the process. The review and the evolution of the evaluation process also indicated the utility of providing an idea of the minimum standards of project presentation and evaluation, with specific indications of the level of detail required.

- Providing access to, or indications of, sources of information on companies, including their reputation, and technical and financial capacity.

## **CONCLUSIONS AND RECOMMENDATIONS**

This report presented an overview of the current approach to project evaluation at government level and raised some questions about assumptions underpinning projects submitted to the government on the basis of a sample of projects to the extent that data existed and was made available. To try to minimise the possibility that the sample of projects might not be representative of the population of projects, the analysis of the project review methodology took a more general, historical perspective.

The one project analysed in detail in this report appeared to be robust and viable, although a few parameters appeared to be overly optimistic. The brief economic analysis indicated that the project provided a greater net benefit to the economy than to the investor due to the project's contribution to the development of public infrastructure. However, it provided indications that the economic cost of water is greater than the price currently paid by companies. In the context of increasing pressure on water resources in certain parts of the country due to rising population, increased economic activities and climate change, it will be important to think carefully about water use by different projects.

The other projects analysed in less detail lacked sufficient information to evaluate their feasibility although the data provided enabled some assessment of the project variables. Several of the projects made quite strong assumptions about the levels of technical performance that they expected to achieve, which raises some questions about their viability. Most of the projects in the sample had not been implemented, despite having been approved some time earlier. This raises concerns about their viability and is an indication that land that is no longer available for allocation to new investors is lying idle.

The review of the project evaluation process also raised concerns about the quality of data submitted to, and considered by, the government. However, this report noted the proactive position of the government in designing more detailed guidelines on the type of information necessary to consider in project evaluation, triggered by its concern about the scale and pace of interest in large-scale land acquisition in the country.

The final section of the report made suggestions about how the existing guidelines could be strengthened through their standardisation, adaptation and extension in order to provide the government with an effective, yet manageable tool for decisions on large-scale land acquisition proposals.

## **Annex 1: Specific Parameters for Livestock and Forestry Projects to Include in Investment Guidelines**

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### **LIVESTOCK**

#### **Production Development Plans**

Over a period of 10 years, present the following information:

- Breed proposed;
- Stocking rate and feeding system (intensive/extensive system);
- Herd structure;
- Calving rates, mortality rates and culling rates in each year;
- Average weight of culled cows and bulls/steers;
- Meat production per hectare.

#### **Cash Flow**

Present information on costs and revenue over first 10 years of project life, including costs of fencing, feedlots and waterholes.

### **FORESTRY**

#### **Production Development Plans**

Over a period of at least 30 years, depending on species planted, present information on:

- Species proposed;
- Planting schedule;
- Trees planted per hectare;
- Growth rates (m<sup>3</sup>/year);
- Thinning and harvesting schedules;
- Harvested volumes

#### **Cash Flow**

Present information on projected costs and revenues over 20-30 years, including planting and harvesting costs and potential value of carbon credits.

## **Annex 2: Suggested Information for Databases**

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### **PRODUCTION DEVELOPMENT INDICATORS**

- Agriculture: Realistic land preparation and planting schedules; planting and harvesting cycles, e.g., length of period required for reaching maturity;
- Livestock: Livestock stocking rates (area per head of cattle) under extensive and intensive systems; type of pastureland needed; reproduction systems; and
- Forestry: Realistic planting schedules; planting densities; thinning and harvesting periods for different species.

### **TECHNICAL PERFORMANCE INDICATORS**

- Agriculture: Agricultural yields for annual and perennial crops under irrigation and dryland; evolution of yields over the life of the project (e.g., jatropha yields change markedly over time); industrial yields (e.g., oil content and extraction rates, sucrose or fermentable sugars content and recovery rates);
- Livestock: Herd structure; calving rates, mortality rates and culling rates in each year; average weight of culled cows and bulls/steers; possible output of meat per hectare; and
- Forestry: Growth rates.

### **MARKET INFORMATION**

- Commodity prices;
- International freight costs;
- Fobbing costs;
- Tariff and non-tariff barriers; and
- Supply/demand balance in key markets.

### **COST INFORMATION**

- Development costs/ha;
- Input prices, such as fertilisers and seeds (for agriculture and forestry);
- Costs of large equipment, e.g., irrigation, factories of different scales.

### **FINANCIAL INDICATORS**

- Appropriate cut-off points for IRRs, i.e., appropriate reference points for opportunity cost of capital to investor and economy;
- Value of carbon credits for plantation forestry and other activities (e.g., co-generation of electrical power).