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DU/RAF/87/117

Technical report: The Development of Mozambique's furniture and joinery industry in the PTA context*

Prepared for the Preferential Trade Area for Eastern and Southern African States (PTA)
by the United Nations Industrial Development Organization,
associated agency of the Food and Agriculture Organization
of the United Nations, which acted as executing agency for the
United Nations Development Programme

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* This document has not been edited

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ABSTRACT

Stephen J Taylor, The Development of Mozambique's Furniture and Joinery Industry in the PTA context, January/February 1991

The report reviews the status of Mozambique's secondary woodprocessing industry with respect to market conditions, level of technology, product development and supply and utilization of plantation-based materials, in cross-reference with the situation in the PTA subregion. It outlines opportunities for increased exports and for exchange of experience within the PTA. The report also provides terms of reference of proposed technical assistance activities to be undertaken at subregional and national level aimed at increasing the operative efficiency of the sector.

INTRODUCTION

1.	TITLE OF MISSION:	Survey of Mozambique's secondary wood industries in the PTA context
2.	MISSION EFFECTED BY:	Stephen J Taylor Consultant in Secondary Wood Industries
3.	PERIOD OF MISSION:	28 January to 8 February 1991
4.	TITLE AND NUMBER OF PROJECT:	Intra-Regional Co-operation in Development of Plantation-based Forest Industries - RAF/87/117 (UNDP-funded regional project)
5.	EXECUTING AGENCY:	Food and Agricultural Organization of the United Nations (FAO)
6.	CO-OPERATING AGENCY:	United National Industrial Development Organization (UNIDO)
7.	SUB-REGIONAL INSTITUTIONAL RELATIONSHIP:	Secretariat of the Preferential Trade Area for Eastern and Southern African States (PTA) Headquarters: Lusaka, Zambia
8.	OBJECTIVES OF MISSION:	a) To participate in a survey of existing secondary woodworking enterprises. b) Assess technical, managerial and commercial situation of those enterprises within the PTA context. c) To make recommendations on rationalisation and development of the enterprises (as appropriate)

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CHAPTER I - SUMMARY AND CONCLUSIONS

1. SUMMARY

Mozambique's secondary wood industry, a mixture of state owned and private enterprises, is suffering from a run-down of its production resources consequent upon (in no small measure) the continuing regional insecurity. A national infrastructure which has declined over the past twenty years and a grave shortage of foreign exchange have both contributed to the poor state of the industry and its inability to satisfy even the current (reduced) effective demand.

The country still possesses commercially exploitable indigenous hardwoods and this availability combined with a prejudiced resistance to the use of 'inferior' plantation timbers makes it difficult for the production units to effectively market pine based furniture.

Within the industry as a whole, there is a good supply of basic wood-working machinery, but due to a lack of spares or process materials much of the equipment is standing idle. Government plans to de-nationalise state-owned enterprises and to encourage foreign investment should, in time, lead to redevelopment of the country's manufacturing base. Of especial significance so far as plantation timber usage within the PTA sub-region is concerned, would be the revival of the particle-board mill at Beira (currently working at about 30-40% of installed capacity) which, if combined with the rehabilitated veneer production unit could produce veneered panels for the sub-region.

2. CONCLUSIONS

2.1 Mozambique's secondary wood-products industry is in desperate need of an input of capital and especially foreign exchange, to put its idle machinery back to work.

2.2 Employment policy legislation currently inhibits worker motivation, and by requiring basic wages to be paid irrespective of whether the production unit is in operation or not (due to power shortages) the manufacturing units are unable effectively to control their costs.

2.3 In general, wood-working machinery is seen as an adjunct to traditional artisanal methods of manufacture, and design and production methods, planning and costing procedures tend to reflect this philosophy.

2.4 Raw material supplies, both in terms of regularity and quality, are unreliable.

2.5 Management training at both organization/planning level and technical level is recognized as being badly needed (but it should be noted that there could be a language problem).

2.6 There is, in absolute terms, very little exporting of secondary wood products, although IFLOMA (particle board mill) has managed some exports albeit at world prices which fail to recover direct costs.

2.7 One enterprise "PROLAR" which manufactures a wide range of brushes (including toothbrushes) could very easily be reorganised to become an exporter within the PTA region, and with effective marketing, an exporter to hard-currency areas.

2.8 It is desirable to bring together in a fewer number of manufacturing units the workable machinery that is presently scattered in a number of non-viable factories.

2.9 There is a need for the forestry and the down-stream wood products manufacturing industry to thrash out mutually acceptable dimensional and quality standards.

CHAPTER II - FINDINGS

1. Demand and Supply of Furniture and Joinery and General Performance of the Sector

1.1 The Present Situation

The market consists mainly of the indigenous population with just a small proportion of Asians and Europeans. The total population was estimated at 15 million in 1988 rising through 21 million in year 2000 to 41 million in 2025 (World Development Report 1990).

Although the domestic market for secondary wood products has been seriously adversely affected by the fall in urban housing construction over the past decade, nevertheless due to other overriding factors (shortage of basic raw materials, shortage of foreign exchange to service machinery) the industry is currently unable to satisfy existing demand. Since the principal limiting factor at the moment is raw material supply, then there should be an incentive to use available material more efficiently, but due to lack of organizational and technical know-how this is not being achieved.

The Government's recent publication 'Strategy for Sustained Economic and Social Developments 1991-1993' records in general a reduction in centralised control and a continuance of a policy of encouraging direct foreign investment, the promotion of joint ventures and the 'divestiture of enterprises to both the domestic and external sectors'. This latter policy is significant so far as the furniture industry is concerned since the six largest

companies in the capital city are all state owned and all on offer for outside bidders.

The principal raw materials currently being used are indigenous hardwoods (Ubmilla, Chamfuta, Jambire, etc) some, but very little plantation pine. There is a reluctance by the manufacturers to use pine as their customers attitude (they say) is 'real furniture is hardwood furniture: pine is for beer-crates!' and, in any case, Mozambique is one of the few African countries with significant reserves of hardwoods.

1.2 Future Development

Current predictions of GNP per capita growth over the next decade would not appear to auger well for an expansion of domestic demand for furniture, however, with the predicted population growth and anticipated urbanisation, then potential demand for industrially manufactured furniture should increase. To tap this potential market it will be essential for the industry to improve its manufacturing efficiency and thereby lower its costs and prices. At the right price and despite existing prejudices, even pine would become acceptable.

One undoubted growth area will be in the demand for institutional furniture for schools since given the predicted population growth and the Government's commitment to education as a priority (Plano Trienal de Investimento Publico 1990-1992) much new school construction and furnishing and re-furbishing of older schools, will be necessary.

2. External Trade in Wood Based Products

2.1 The Present Situation

Of negligible significance. Such as has taken place has been of an indirect nature eg the supply of goods to diplomatic embassies and staff quarters in Maputo. More upstream, IFLOMA (Industries Florestais de Manica EE) State manufacturers of particle board and treated poles (using both soft and hardwood materials) have managed some exports to Zambia, Botswana, Zimbabwe, South Africa and Taiwan, but with total production only some 30-40% of capacity, costs are not being recovered on products, of necessity, priced at world levels.

2.2 Future Development

There will be a demand both within and without the PTA countries for efficiently manufactured furniture using hardwoods (in either solid or veneer form) and Mozambique with its reserves and with rehabilitated communications facilities (road, rail, port) could make a contribution to satisfying such demand and the opportunity for joint-venture projects (eg the supply of manufactured components) to developed countries must be seized upon. This will require manufacturing improvements to have been implemented so that a reliable supply of consistent quality components can be guaranteed at acceptable prices.

The brush company "Prolar" (see Annex I) has a real potential for export within and without the PTA countries.

3. Review of Production Facilities

3.1 General Status

The Mozambique industry is, in general, in a very run-down condition stemming from several decades of adverse factors, including:

a) Almost continuous civil war.

b) An unreliable supply of right quality material in sufficient quantity.

c) Shortage of foreign exchange to maintain and service equipment.

d) Irregular supplies of power and water.

e) Limited managerial expertise (in terms of planning, cost control and resource utilisation)

f) Tool maintenance equipment and qualified personnel are in short supply.

g) A generally poor infrastructure.

These problems affect the industry as a whole but it is worth distinguishing between the two sectors - public enterprises and private enterprises.

3.2 Public (State) Enterprises (see Annex I)

In physical size, employee numbers, product ranges and turnover, these represent the bulk of the secondary wood industry in Mozambique and they are located principally in the main centre of population, the capital city Maputo.

They are currently structured as a number of 'independent and competing' companies within a state umbrella organization (Unidado de Direcao de Mobliario). Between them they have a very

wide range of manufacturing equipment including some modern. sophisticated machinery such as digitally controlled copying lathes, high-speed belt sanders. However, in many cases the equipment cannot be used for one or more of the following reasons:

a) A general shortage of finance.

b) Lack of spare parts (bearings, cutter blocks, etc).

c) Lack of process materials (sand-paper belts, suitable lacquers and adhesives).

d) Lack of knowledge of setting up, running and maintaining the more complex equipment.

It is recommended that a detail survey of the equipment and machinery (type, age, condition, etc) be undertaken with a view of integrating all the production resources into fewer economically viable operations.

Note should be taken of the fact that existing managements are aware of their own limitations and are anxious to seek improvements in their manufacturing methods and control procedures and they would welcome the opportunity to attend 'eye-opener' workshops and specialised management courses.

3.3 Private Enterprises

These may be characterised as being:

a) Relatively small (in size, employees and turnover).

b) Run by very commercially-aware owners.

c) Able to make decisions speedily.

d) Able to access foreign reserves located abroad.

e) In reasonable control over the quality of their raw and process materials (especially when purchased abroad) or, in the case of timber, when they saw their own logs.

f) Motivated by personal interest to effect improvements, overcome problems and reduce costs.

The management of these businesses would also welcome training opportunities to increase their efficiency and thereby turnover and profit margins.

4. Product Design

Most products are visual (but not normally constructional) copies of products seen in foreign (often South African) catalogues. A limited exception to this is the state company "Morfeu" which did receive some exclusive designs under a Commonwealth Fund for Technical Co-operation Project (1988/89). Throughout the industry very little attention has been (able to be) given to design for the modern production methods for which much of the machinery is suitable. This is in part due to a lack of understanding of modern planning methods and of in-depth understanding of the equipment and, in a large part, due to the continuance of an artisanal (craft orientated philosophy) of 'making to order' and for which machinery is seen only as an aid, not as a basis for design and planning. Even companies such as the aforementioned "Morfeu" who do use man-made materials in part make only marginal use of panel products and no use of 'knock-down' or 'knock-up' connector fittings.

The concept of component batch production with its corollary of interchangeability (of parts) manufactured to rigorously controlled dimensional tolerances is one which though comprehended cannot be implemented either because of equipment limitations, or because of poor production-operator skills.

If the state company 'IFLOMA' could guarantee both the quality and quantity of its output, and the veneer plant in Beira is finally refurbished, then there would be an opportunity for the industry to design panel based products for batch production.

There do exist products (tables, chairs, headboards, toys) which use pine exclusively, but they are not significant in the market place (for reasons already given), and they use the raw material very wastefully and, therefore, expensively. This is due in large part to inappropriately dimensioned stock from the sawmills. Re-grading for furniture usage could lead to a fall in manufacturing costs and retail prices and in consequence an increase in effective demand.

5. Timber Utilization

Mozambique is one of the few countries in Africa which still possess commercially exploitable indigenous hardwoods. This, combined with a 'resistance to pine' means that the latter material needs an effective marketing campaign to 'sell' it to manufacturers and consumers alike (except perhaps in the construction industry). However, as earlier indicated, the effective redevelopment of the particle board and veneer production industries could lead to both a significant increase in the consumption of plantation timber and to an extension of

the effective life of the hardwood reserves. Combining board and veneer would also promise a very exportable product, both within and without the PTA subregion.

Where plantation timber is being used quite extensively, is in the unseen framing of upholstered furniture as exemplified by the 'Lusoflex' company in Maputo. But such frames are currently 'unengineered' with a consequent wasteful use of oversized cross-sections of timber and, therefore, excessive material costs.

It is recommended that workshops/seminars be held in which both the Forestry and the Secondary Wood industries participate on, ideally, a national and PTA scale to establish:

a) Optimum timber dimensions.

b) Grading standards for furniture use.

c) Grading standards for timber engineering use.

6. <u>The Development of the Secondary Wood Industry</u>

The first priorities must be to:

a) Train technical and managerial staff to better understand the capabilities of existing machinery and equipment so that new designs may be introduced to take advantage of machine capability.

b) Survey existing equipment and establish the viability and cost of rehabilitating currently broken down machinery.

c) Establish where and in what areas of production new or replacement equipment-needs to be specified.

d) Introduce preventive maintenance programmes.

e) Consolidate a number of non-viable existing businesses into a smaller number with greater potential to become economically viable.

f) Establish within the individual enterprises or as a centralised service to the industry (as would be possible in Maputo) a properly equipped and staffed tool and machine repair/maintenance workshop.

g) Rationalise workshop layouts and institute basic (inexpensive) materials handling techniques (use of pallets and pallet trucks, for example).

h) Establish National/PTA/International quality standards for materials, machining, construction and finishing of products.

i) I.troduce training programmes for management to cover specific aspects such as cost control; production planning and machine loading, quality control, work study.

7. Training

It is implicit in the preceding paragraphs that the i..lustry is not able to realise its potential without the provision of additional training beyond that currently available within the industry and the technical institutions. Such training is necessary at all levels: skilled operator, supervisory, middle and senior management. The proper development of operator skills requires access (for hands-on experience and demonstrational reasons) to a range of basic woodworking machinery within the institutions (supplemented by in-company training). However,

much supervisor, middle and senior management abilities can be introduced, if not fully developed in a lecture/tutorial environment involving minimum costs.

The development of courses targeted towards these various management strata is not only highly desirable, but likely to be an extremely cost-effective way of using a limited budget provided participating personnel are carefully selected for their in-company influence. Initially developed on a PTA basis such courses with appropriate manuals could, in time, be presented nationally using, ideally, instructors who were themselves taught on the PTA courses.

Thus within the FAO/PTA/UNIDO project, the training courses should cover:

a) Basic wood-machining, product assembly and finishing skills (perhaps next stage developments at the new FAO/SADCC Forest Industries Training Centre at Mutare in Zimbabwe?).

b) Introductory 'eye-opener' seminars for management in general (see Chapter III).

c) 'Extra-curricular' seminars in selected subject areas, eg work study, budgetary control, product costing, at PTA and/or national level.

d) The development for and out of b) and c) above of suitable training manuals for use within existing technical institutions and in-company training. NB There would be a need for such manuals to be available in Portuguese.

Chapter III contains a proposed training programme of the 'eye-opener' category (developed by Unido Consultant P Boretti) and is extended to include a seminar for primary and secondary wood products manufacturing managers.

OBJECTIVES	OUTPUTS	MAIN ACTIVITIES	INPUTS
Objective 1 To expand the manufacturing know how of an initial group of managerial staff in the furniture and joinery industry sector from Mozambique and the other PTA countries aimed at optimizing the benefits of industrialized wood processing.	Output 1.1 60 plant managers and production supervisors gained an appreciation of all critical aspects involved in the serial production of standard furniture and joinery, towards increasing productivity, quality standards and overall operative efficiency. The areas of expanded know how include: selection of machinery; selection of cutting tools; inter-changeability of parts and quality control; product costing; tool and machine maintenance; general techniques of surface staining and coating; plant layout; product design as applied to industrialized production; quality standard specification. (Objective 1 and Activities 1.1 to 1.4 refer)	Activity 1.1 To survey proposed host facilities in Kenya and Malawi in order to discuss Seminar arrangements, prepare a tentative Work Programme and specifications of production supply items (such as quality control instruments, jig accessories, special cutting tools, etc.) to be purchased under the project for Seminar demonstration work. Activity 1.2 To prepare terms of reference for the Lecturers and final Work Programme. Activity 1.3 To conduct 2 General Seminars of two weeks each with 30 participants at each seminar in Malawi and Kenya.	
Objective 2 To provide a basis for: (a) An increasingly relevant role on the part of Polytechnics and Technical Schools in Mozambique and the other PTA countries in stimulating a proper transition of the furniture and joinery sector from artisan methods to the industrial system; and (b) A permanent reference source on plant operation for the management of furniture and joinery plants.	Output 2.1 Produce a set of Woodworking Training/Reference Manuals covering the main topics dealt with in Output 1 above. (Activities 2.1 and 2.2 refer)	Activity 2.1 Collect and review woodworking text books dealing with industrial techniques, in use in Polytechnics and Technical Schools in the PTA. Activity 2.2 Adaptation of existing UNIDO woodworking manuals and preparation of new ones, as required, to cover the topics in Output 1.1	
Objective 3 To provide a decision making basis for the rehabilitation of Mozambique's existing production lines for the manufacture of panel based furniture in view of their potential PTA regional complementary role.	Output 3.1 Produced reports with an appraisal of the constraints preventing the full utilization of the existing machinery at the plants surveyed. The reports are also to provide details and cost of corrective steps to be taken to rehabilitate the equipment which is not in operating condition. (Activity 3.1 refers) Output 3.2 Produced a pre feasibility study for setting up a typical self contained furniture manufacturing operation based on the type of panel line equipment available. The study will include, survey of general market conditions; definition of typical products to be produced; material input requirements; general factory building requirements; general ancillary equipment needs; manpower requirements; general assessment of financial viability; details of further technical assistance requirements. (Activities 3.1 to 3.5 refer)	Activity 3.1 To conduct a survey of the panel line machinery and provide a full inventory of the machinery and accessories available. Activity 3.2 To collect and analyze the local data necessary for the preparation of a pre feasibility study. Activity 3.3 To adopt, for the purpose of preparing a pre feasibility study, a typical panel based modular furniture system suitable for a wide range of uses (wardrobes, bookcases, living room and dining room cabinets, etc). Activity 3.4 To prepare a typical pre feasibility study on the basis of the above. Activity 3.5 To elaborate details of technical assistance required to start regular serial production of panel based furniture.	

OBJECTIVES	OUTPUTS	MAIN ACTIVITIES	INPUTS
Objective 4 To provide the basis for the improvement of tool maintenance methods of the furniture and joinery industry in S / sub-Sahara and in the other PTA countries in order to attain: longer life span of costly imported machine cutting tools; quality improvement of machined parts; reduced safety hazards in the use of machinery; and reduced material reject rate.	**Output 4.1** Three Project Profiles on the setting up of tool maintenance units within small and medium scale furniture/joinery plants, or as self contained Tool Maintenance Centres. The Profiles include: workshop layout; specifications and estimated cost of machinery, accessories and suppliers for a two year operation; specifications of storage arrangement for tools and supplies; lighting requirements, etc. (Activity 4.5 applies) **Output 4.2** Trained 24 senior technicians in carrying out the maintenance of machine cutting tools in use in the furniture/joinery industry such as: planing knives, moulding cutters, routing cutters, standard circular saw blades, carbide tipped circular saw bladen, blades for band resawing, mortising chains, square chisel mortiser bits, and boring bits. The participants would subsequently act as counterparts in similar courses to be conducted at a national level. (Activities 4.1, 4.2, 4.3, and 4.4 refer) **Output 4.3** Extended utilization of the Project Profiles and Data Sheets prepared for the training course for the benefit of the PTA furniture/joinery industry as a whole. (Activity 4.6 refers)	**Activity 4.1** To survey the tool maintenance workshop of the Wonca Furniture Factory and the WUAFC Tool Maintenance Centre of Addis Ababa which, being representative in the PTA of well equipped tool maintenance facilities for the furniture and joinery industry quality, for hosting the Tool Maintenance Training Courses. **Activity 4.2** To prepare specifications of supplies and accessories to be purchased for the purpose of conducting the training courses. **Activity 4.3** To prepare training Data Sheets and visual aids as a basis for conducting the maintenance courses. **Activity 4.4** To conduct 1 training courses on Tool Maintenance Techniques of one month duration each for 8 PTA trainees at a time. **Activity 4.5** To prepare Project Profiles as a reference on the setting up of tool maintenance units. **Activity 4.6** To reproduce and distribute widely, in the secondary woodprocessing industry, the Project Profiles and Data Sheets prepared under the project.	
Objective 5 To expand the capability of efficiently utilizing, in Mozambique and in other PTA countries fast growing plantation timber species (such as Pinus patula, Eucalyptus spp and Cupressus lusitanica) in the furniture and joinery industry as well as in building construction.	**Output 5.1** Report on the use of Eucalyptus in the PTA and overseas for the production of furniture, joinery, structural building components and wood based panels. (Activities 5.1, 5.2, 5.3 and 5.6 refer) **Output 5.2** Manual on standard wood treatment and wood processing requirements of Eucalyptus, Pine and Cypress, to cover subjects such as: kiln drying; cutting speeds; cutting tool geometry with respect to main wood machining operations; choice of surface coating material and methods; dipping against blue stain and pressure treatment of Pine; choice of adhesives for standard and structure applications ; choice and dimensioning of joints in chair manufacture. The manual shall also propose a set of minimum quality standards for furniture intended for intra PTA trade and for government contracts. (Activities 5.4 and 5.6 refer) **Output 5.3** Reference Manual on the design of standard roof trusses made of Pine and Cypress, and on the design and fabrication of roof trusses made of Eucalyptus poles as practised in Ethiopia. (Activities 5.5 and 5.6 refer)	**Activity 5.1** Review the experience gained by the International Timber Group in Bvumbwe, Malawi and by Woodwork PTY, Mbabane, Swaziland, in the manufacture of furniture components, joinery and structural building components made of seasoned Eucalyptus. **Activity 5.2** Review the experience gained by ETHALCO and ECAFCO plants in Addis Ababa, Ethiopia in the manufacture of fibreboard and particle board made of Eucalyptus. **Activity 5.3** Compile information on overseas experience in the utilization of Eucalyptus in the primary and secondary wood processing industry. **Activity 5.4** Compile information from African and overseas research institutions, including Bureau of Standards, on woodprocessing requirements and durability and performance standards as applicable to the use of Eucalyptus, Pine and Cypress in furniture and joinery production and structural building applications. **Activity 5.5** Compile information from African research institutions and ministries of works on the use of Pine, Cypress, and Eucalyptus in the design and fabrication of roof trusses. **Activity 5.6** To reproduce the report and manuals of the outputs 5.1, 5.2 and 5.3 for wide distribution to the industry, wood research institutions and ministries of works in the PTA.	

OBJECTIVES	OUTPUTS	MAIN ACTIVITIES	INPUTS
Objective 6.1 To enable the saw milling forest industries to become more aware of: a) The dimensional needs of the furniture/timber engineering industries in respect of solid timber, particle board, plywood, fibre board. b) The importance of appropriate and reliable quality grading. c) The critical importance of adequately kilned (seasoned) timber in furniture construction. d) An opportunity to obtain a higher price for some of its output. Objective 6.2 a) To make the secondary wood products industry aware of the natural and physical constraints of the basic material that the millers have to process. b) To familiarise them with the advantages /disadvantages of using man made board. c) To re emphasise the benefits derivable from the use of properly seasoned (kilned) timber.	Output 6.1 15 Influential forest products managers will better appreciate the needs of the secondary wood products industries (and in satisfying such needs be able to obtain a premium price for the material). Output 6.2 15 Secondary wood products managers will be better able to design products to utilize more efficiently the better quality and more suitable output of the saw-millers. They will themselves better appreciate the benefits to themselves and the final consumers arising from the use of properly kilned timber. Output 6.3 General an on-going dialogue between these producers (the saw millers) and their consumers (the down-stream wood products industries).	Activity 6.1 Survey the saw-milling industries in the PTA countries to: select personnel able to be articulate on the process of selection and conversion of both softwood (and as appropriate) hardwood logs and prepared to listen to the needs of the down stream industries. Activity 6.2 Select from previously surveyed secondary wood products industry suitable managers able to articulate their material needs (in quality terms) and prepared to listen to and consider the problems of the foresters. Activity 6.3 Select suitable wood science trained personnel able to present technical information comprehendingly. Activity 6.4 Conduct a prototype seminar of 40 participants in one of the PTA countries.	

ANNEX I

EMPRESA FABRICA DE COCCHOES, LDA
"Morfeu"
MAPUTO

HORACIO LUCAS FANDAMELA - Director Geral

Originally established by the Portuguese, this company was taken over on Mozambique's independence and has since been run as a state concern. It operates within a state holding company and is scheduled to be returned to private ownership if a suitable purchaser can be found.

Products -	Cabinet goods, upholstery, mattresses, spring making.
Markets -	Maputo - through retail outlets and direct.
Production Process -	Machine assisted artisanal methods. Some batch production of standard products but mainly 'one-off' production to customer order. No piece-part drawings. No quality control department. No jigs.
Materials -	Timbers - African mahogany, Umbilla, Chanfuta, Jambire, Pine - Mozambique. Cover materials: imported South African Wire/Springs: South Africa/W Germany Adhesives: PVA Mozambique: UF (S Africa)
Timber Conversion Factor -	40%
Moisture Content -	30% on reception and air dried to 20% (no kiln drying)
Machinery -	A wide range of basic and intermediate machines. In 1988 there were 42 machines of which 11 were inoperable ('Mozambique Productivity Assistance to the Furniture Industry' Commonwealth Secretariat 1988). The other inoperable equipment either lack spare parts (bearings, for example) or process materials (eg sanding belts).
No of Employees -	200 (including a separate sawmill) - paid whether there is any production or not (due, perhaps to power failures).

Product Costing - Basically historical per unit/batch with selling prices adjusted accordingly.

Prime costs		
Materials -	91.26%	
Labour -	8.74%	
	100.00%	
ADD	16%	Indirect cost
ADD	22%	Profit target
ADD	30%	Duty and Taxes
EX-FACTORY	184%	of Prime Costs
ADD	33%	Factory Sales Tax
ADD	10%	Shop Tax
TOTAL =	269%	of Prime Cost

Problems -

Finance
Foreign exchange
Spare parts
Process materials
Unreliable timber deliveries
Unreliable timber quality
Poor production operator skills
Shortage of managerial expertise

ANNEX I

EMPRESA DE MOBILARIO DE MADEIRA
"Siesta-Pandora"
MAPUTO

Mr Samuel Jose Mahanje - Director Geral

Originally a Portuguese business taken over on independence. Now scheduled to be returned to private ownership. Also under the state holding company.

Products -	Cabinet, occasional, upholstery.
Markets -	Maputo - through retail outlets and direct
Production Process -	Some machining of standard products, but mainly 'one-off' production to customer order using principally hand methods of manufacture. Sometimes use drawings. No jigs.
Material -	Timbers Chanfuta, Madala. Adhesives: PVA Mozambique.
Timber Conversion Factor:	45%
Moisture Content -	Not known but timber not kilned.
Machinery -	A range of basic and intermediate machines with a Bulleri multi-cutter carving machine (a high-tech gift that is not used for lack of information). Approximately 25 pieces of machinery many broken down for lack of spares.
No of employees -	Approx. 94 (paid irrespective of whether any production or not)
Product costing -	Difficult to ascertain a breakdown. Products priced on an historical basis of labour, materials plus various percentages added for indirect costs, taxes, profits, duties, etc. (Similar to "Morfeu")
Problems -	Finance Foreign exchange Spare parts Process materials Shortage of timber Poor operator skills Shortage of management expertise. Reliability of timber supplies.

ANNEX I

MOBILARTE INDUSTRIA
MAPUTO

An ex-Portuguese company taken over on independence. Also on offer to return to private ownership.

Products -	Dining, bedroom, office, kitchen, upholstery.
Markets -	Maputo - retail and direct sales
Production Process -	Principally machine based small batches, but also 'one-off' made to order. No quality control.
Material -	Timbers - Umbilla, Panga-panga, Chafulla, Messassa, Pine, Eucalyptus
Timber Conversion Factor:	Approx 40%
Moisture Content -	Unknown but high - 30%(?)
Machinery -	A wide range of basic machines plus a number of intermediate machines. A maintenance workshop is available but does lack some basic saw and cutter sharpening equipment whilst possessing welding and turning facilities.
No of employees -	127 - paid irrespective of production shut-down for power reasons (Ave. earnings US$327 per month)

Product costing -

Materials	45%
Labour	25%
Indirect	30%
	100%
Profit Target	22%

Problems -

Finance
Very Elastic demand
Low efficiency
Under-utilization of capacity

ANNEX I

"PROLAR"
MAPUTO

A Portuguese company taken over at independence.

Products -	A wide range of brushes and brooms, axe handles, small-scale furniture manufacture.
Markets -	Maputo - retail
Production Process -	Machining of batches. Automatic fibre insertion.
Material -	Timbers - Eucalyptus, Pine, Messassa. Consumption approx 20 m³ per month.
Timber Conversion Factor:	35%
Moisture Content -	20%
Machinery -	A wide range of basic machines plus a number of specialist machines for fibre insertion and wiring, automatic shapers, automatic bristle cleaners, automatic toothbrush machines, brush dipping tank, baking oven.
No of employees -	130 (20% female) - earnings US$308 per month
Product costing -	Not meaningful
Problems -	Finance Timber availability Foreign currency for spares Management expertise
Note:	This Company has a real potential with its automatic equipment to become an exporter within the PTA area and if costs can be controlled/reduced an exporter to hard-currency areas currently purchasing inexpensive brushes from China.

ANNEX I

FABRICA DE BRINQUEDOS
MAPUTO

A state-owned company available for privatisation.

Products -	Originally wooden toys, but now principally furniture.
Markets -	Maputo - retail
Production Process -	Machine-assisted artisanal - small batch and made-to-order.
Material -	Timber - Umbilla, Chafuta, Jambire, Pine
Timber Conversion Factor:	Not available
Moisture Content -	Not available
Machinery -	A range of basic machines with some new equipment not being used because no know-how eg a CMS copying lathe.
No of employees -	41 earning 30-46,000 Meticias per month (US$280-430)

Product costing -

Material	16%
Labour	16%
Indirect	16%
Profit target	22%
Taxes	30%
Ex-factory price	100%

Problems -

Finance
Timber supplies
Repair/maintenance of Equipment (foreign exchange)
Under-utilization of capacity

ANNEX II

MOVEIS RIBEIRO
MAPUTO

A private company.

Products -	Restaurant tables and seating, beer crates, storage units, desks, bedroom furniture, easy chairs, carved panelling, kitchen furniture.
Markets -	Maputo - retail outlets and direct sales
Production Process -	Machine-assisted artisanal; small batch and 'one-off'.
Material -	Umbilla, Pine (timbers hard to obtain)
Moisture Content -	Not known
Machinery -	A limited selection of mainly basic machines, but a 2 spindle copying lathe is used. Some machines out of action for spare parts.
No of employees -	50
Product costing -	Historical but basis not available
Problems -	Shortage of foreign exchange Timber in short supply Machine spare parts Process Materials

ANNEX II

ORGANIZACOES SIDAT
MACHAVA

Adam Hassan Sidat LDA - Juntiaz Ali Adam Sidat - MD

A private company well integrated vertically and very commercially orientated.

Products -	Cabinet and upholstery (dining, bedroom, occasional, kitchen)
Markets -	Maputo - retail and direct sales
Production Process -	Machine-assisted artisanal, but some standardisation. Small batches and 'one-off' to customer order.
Material -	Umbilla, Jambire, Chanfuto, Pine
Moisture Content -	Unknown but high (no kilning and difficult to air-dry)
Machinery -	A range of basic machines plus a few intermediate machines. Own primary conversion band-saw.
No of employees -	70
Product costing -	Ad hoc and historical. Difficult to obtain a breakdown.
Problems -	Foreign exchange for spares and process materials Reliability of timber supplies Pine boards uncompetitive with Umbilla due to wasteful dimensions.

ANNEX II

INDUSTRIA DE ESTOFOS LUXOFLEX
MAPUTO

Yusuf - Director Geral

A private company which is very commercially minded.

Products -	Upholstery and banquet seating, S African catalogue copies.
Markets -	Maputo - retail and to order. Supplies embassy and diplomatic staff.
Production Process -	Principally artisanal to order but with some products made for stock.
Material -	Timber - Eucalyptus and Pine (for frames) Fabrics - imported S Africa Foam - Maputo and S Africa Springs - imported S Africa Particle Board - Mozambique Adhesives: PVA Mozambique.
Moisture Content -	Not known
Machinery -	Basic woodworking machines. 3 sewing machines (1 new - uninstalled).
No of employees -	30
Product costing -	Not available
Problems -	Space - production area too cramped, not easy to obtain more space Timber availability

ANNEX III

LIST OF PEOPLE MET AND INSTITUTIONS VISITED

MR F M GUNDO	- Head of International Relations Department Ministry of Industry and Energy, Maputo
MR M SAMBUCO	- Managerial Unit of Furniture Ministry of Industry and Energy, Maputo
MS NAZNINA BIQUE	- Ministry of Industry and Energy, Maputo
MR KAID D C FRAQUELLI	- CTA (UNIDO) PROJ/MOZ/86/014 Ministry of Industry and Energy, Maputo
MR MONTEIRO DIOS	- Director Geral Unidade de Direccao de Mobiliario, Maputo
MR HORACIO LUCAS FANDAMELA	- Director Geral Empresa Fabrica de Colchoes IDA "Morfeu", Maputo
MR SAMUEL JOSE MAHANJANE	- Director Geral Empresas de Mobliario de Madeira "Siesta-Pandora", Maputo
MR JUNTIAZ ALI ADAM SIDAT	- Organizacoes Sidat Machava
YUSUF	- Director Geral Industreia De Estofos Luxoflex Maputo
OTHER COMPANIES	- Moveis Ribeiro - Maputo - Mobilarte Industria - Maputo - "Prolar" - Maputo - Fabrica de Brinquedos - Maputo
OTHER PERSONS	- Monica Gronvall (UNIDO) - Maputo - Zacarias Cuna Junior Director Delgado (Maputo) "Ifloma" - Judas Alexandre Honwawa Deputy General Manager and Marketing Manager IFLOMA