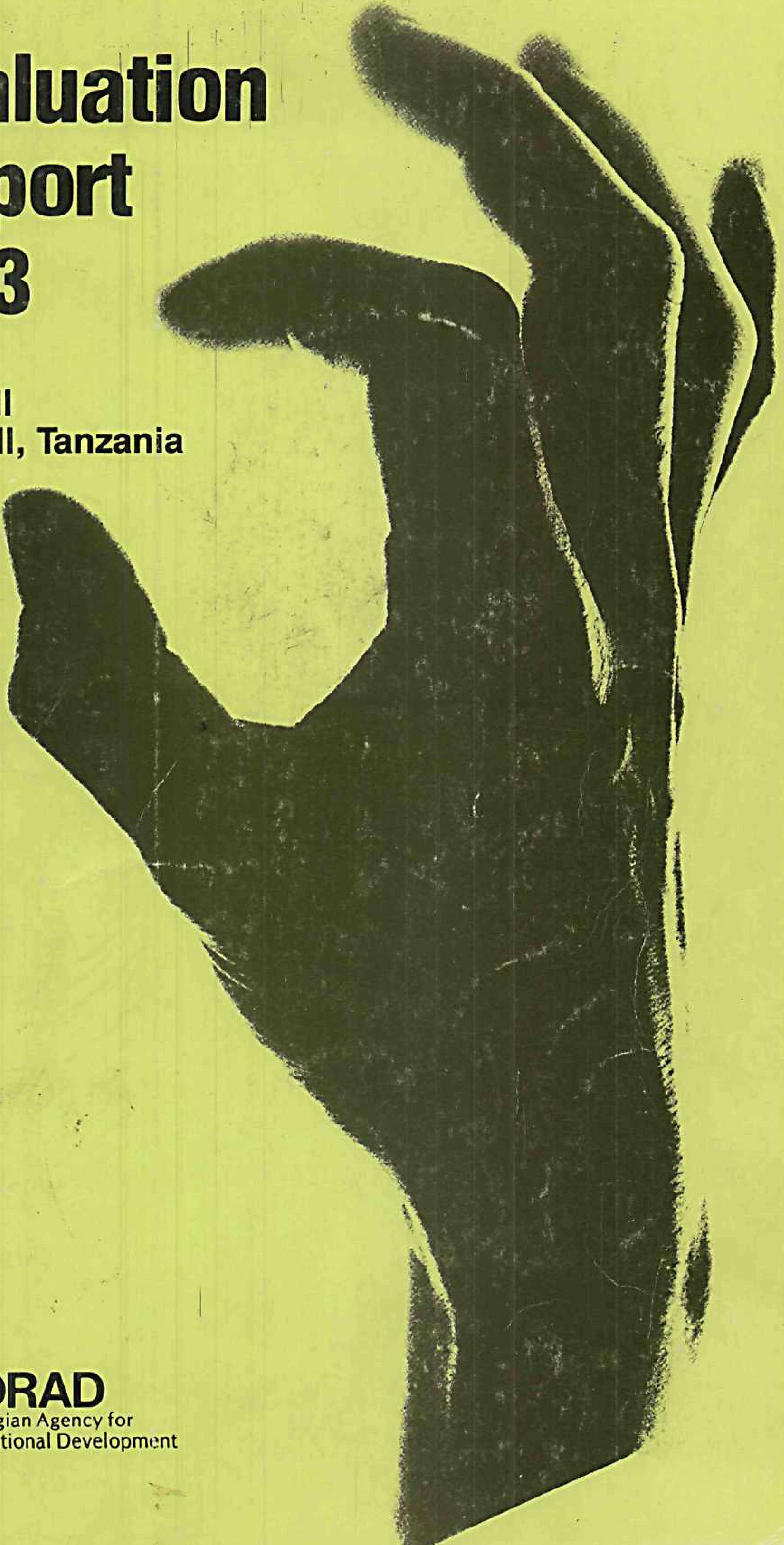
Evaluation Report 3.83

Sao Hill Sawmill, Tanzania



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Norwegian Agency for International Development

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EVALUATION OF SAO HILL SAWMILL

by

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Oslo in December 1983

· Evaluation reports
· Development aid
· Norwegian
- Sawmills
· Tanzania

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The evaluation team wants to express its sincere thanks to all individuals and organisations contacted, especially the staff of Sao Hill Sawmill. Their generous cooperation grately facilitated the evaluation task.

PART I: MAIN REPORT

INTRODUCTION

Background of the evaluation

The Sao Hill Sawmill project commenced operation in 1976 and was evaluated by a joint Norwegian-Tanzanian team in 1977. In 1983 after 7 years of operation it was considered appropriate to evaluate the project a second time and for this purpose the following team members were appointed by NORAD:

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Dr Benno J. Ndulu, Head of Department of Economics, University of Dar es Salaam, Tanzania

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Advisor to the team during field work in Tanzania:
Dr Josephine P. Msangi, Head of Geography Department, University of Dar es Salaam, Tanzania

Interviews of a few persons in Norway involved with the project was carried out as part of the preparations. Furthermore, a two-day search conference with 27 participants who had been involved in the project was arranged; the findings of which are presented in a separate report.

In Tanzania the evaluation team worked four weeks incl. a field visit to the sawmill area and discussions and interviews in Dar es Salaam. A preliminary report was prepared in Tanzania and presented to NORAD (Dar es Salaam), Tanzania Wood Industries Corporation (TWICO) and the Sao Hill Sawmill. Comments on the preliminary report received from Sao Hill Sawmill and NORAD (Dar es Salaam) have been considered in the final report.

On November 11, a consolidated final draft of the evaluation report was sent to NORAD and the Tanzanian team members. The comments have been incorporated in the final report.

Outline of the report

The evaluation report is divided into Part I: Main Report and Part II: Technical Appendices. The main report starts with a brief summary followed by the backgrounds of the evaluation.

In chapter one the history of the sawmill and the aid provided by NORAD is given.

In chapter two the activities of the sawmill itself is evaluated. The first section deals with the present organization of the operations and subsequent sections with production, supply of raw material, markets, personnel and economics of production.

In chapter three the Sao Hill Sawmill project is seen in a wider perspective. This includes its relationships to Forest Division and the Southern Pulp and Paper Mill, the Sao Hill Settlement and effects on the Tanzanian economy on the regional and national level.

In chapter four the external support given to the Sao Hill Sawmill is evaluated including appraisals of the roles played by TWICO, FORINDECO and NORAD.

In chapter five main recommendations are presented under the following headings:

- General guidelines for the Sao Hill Sawmill
- Raw material supply
- Socio-Economic Activities
- Management training and product development
- Continued Norwegian support

The topic "Socio-Economic Impact of the Sao Hill Sawmill" has been dealt with by the team member Else Skjønsberg and is reorted in Appendix F the contents of which Ms Skjønsberg is responsible.

The rest of the report represents the joint findings and recommendations of the evaluation team.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE NORAD SUPPORT

The evaluation team considers the Sao Hill Sawmill, the largest sawmill in Tanzania, a well functioning financially sound enterprise, well integrated in the national economy and the economies of the district and region in which it is located.

The present log intake of about 30,000 m3 is above the initial planned capacity of about 27,000 m3. At the same time the present log intake is far below the levels from 1979 and 1980 when the annual intake of logs was close to 50 000 m3. The initially planned capacity was underestimated, experience has shown that the sawmill allows an annual log intake of about 42 000 m3 without neglecting repair and maintenance. By introducing minor modifications in the sawmill it is possible to increase the annual log intake to 55,000-60,000 m3.

Transport of logs from the logging areas to the sawmill has been a serious bottleneck since the start-up of the sawmill. The location of the sawmill some 25 kilometres from the logging areas during the first 15 years in operation has forced the sawmill to rely on sophisticated technology for transport sensitive to disturbancies; in the present scale of operations at the sawmill is, consequently, limited mainly by the log transport capacity.

The sawmill machinery is simple and reliable. At the present level of technology in the country, and at the present level of production, it is doubtful if any better equipment could have been chosen. The logging system is also reliable, and unit costs are reasonably low. It is not heavily mechanized, and hand tools are used for felling, limbing and cross-cutting of trees. The bottlenecks for the operations are the log transport, and the coordination or vertical integration of the different forestry, transporting and sawmilling operations and also their relation to the maintenance department.

The forest plantations that constitute the raw material source for the Sao Hill Sawmill are by far the largest in Tanzania. Up to now the plantations have produced a surplus of harvestable trees. Many of the trees felled and transported to the sawmill have, however, been of poor quality, as only very few forest stands have been thinned and pruned properly. Lack of long-term agreements regarding the raw material supply between the Forest Division and the sawmill have made planning and implementation of these essential silvicultural operations difficult. Long-term planning of the logging operations and forest road construction have also suffered from this lack of long-term agreements.

The Sao Hill plantations will, in the future, also supply the Southern Pulp and Paper Mill at Mufindi with pulpwood. When producing at full scale, this mill will consume 283,000 cubic metres of pulpwood per year.

Assuming that the Southern Pulp and Paper Mill develops as planned the team expects that about 70,000 cubic metres of sawlogs, of which about 10,000 come from thinnings, will be available annually for the Sao Hill Sawmill.

Lack of spare parts, fuel and transport capacity have had negative effects for the sawmill's production, but much less for the Sao Hill Sawmill than for other sawmills in the country. This is due to the import support within the framework of the balance of payment support given by NORAD, the service procurement of spare parts, and the technical know-how of the sawmill's staff.

The expatriate personnel assistance has, generally, been well designed, has held good quality and suitable size. A negative factor has been a lack of stability and continuity due to frequent changes of expatriate staff.

The operations, especially at the sawmill itself, are functioning well. With some exceptions, mainly on the transport side, the achievements of the Tanzanian work force compares well with Scandinavian standards. Nearly all workers have been recruited from the surroundings, a typical rural area with small family farms, and only a few persons had any experience from large scale industry before the sawmill started production in 1976. The training at the operators' level has, thus, been successful, and the work relationship seems to function well. The provision of free or subsidized meals to the workers seems to have contributed to the high productivity.

Most decisions concerning the sawmill have been taken by the local management. The positive achievements at the sawmill should, to a large extent, be attributed to the local management of the mill and to its Tanzanian work force.

At the time of 1977 evaluation, there were 10 expatriate specialists, mostly in executive positions, working at the Sao Hill Sawmill Project. It was, then foreseen that they would all be withdrawn within three years. This did not happen; and in 1983 there were still six most of which are in advisory positions. The evaluation team noted a lack of systematic training at the management level, which could enable Tanzanians to take over the entire responsibility for direction of operations.

Industrialization has its social consequences and costs. The Sao Hill village is an enclave type of settlement. This might be advantageous in some respects, but it also has its disadvantages. There is a lack of permanency in the settlement. Its population will not be able to grow roots, as every worker who leaves his job, also leaves the area. The inability of the village to provide for the next generation is another effect. Through the introduction of a wage economy, social and other relations are changed, family bonds might be weakened, and money comes to dominate in many relations. As only few women today have a chance of getting paid employment at the mill, their influence and family status might be reduced. Those who suffer the changes the most, are usually those in the families who started out with the least resources, - women, old people and adolescents.

The socio-economic changes are not particular to the Sao Hill Sawmill, and might be less pronounced in this case than in most other cases of industrialization. This is due to the consideration and generosity with which the Sao Hill Sawmill provides social services and has contributed to economic development. The considerable agricultural achievement at Sao Hill, supported by the mill since it started production, is the most positive socio-economic development observed.

During its years of operations, the Sao Hill Sawmill has from time to time been given complementary instructions for its operations or set its own complementary objectives. This is natural for a dynamic company in a new sector. The present evaluation team proposes high productivity for the company as a main objective in the future. The background for this proposal is that the generally low prices for the softwood timber from the Sao Hill Sawmill have been of crucial importance for the rapidly increasing domestic use of this product, and that the currently adapted cost-plus pricing system, although well suited to guaranteed continued profitability, may lead to automatic price increases and thus endanger the competiveness of the products. Extreme care has, thus, to be exercised to control unit costs so that the present price advantage over competing products is maintained.

The conclusion is that the only way for the company to maintain the low competitive prices of the products and at the same time generate good profits is to increase the present level of productivity.

It is important to note that the high productivity desired must be measured as a relation between the sum of outputs from the company and the sum of inputs. In other words, it is the productivity of the entire chain of operations that should be maximized, not that of the individual links in the chain.

These objectives can be translated into the follwing operative guidelines:

- Maintain one line and one shift operation
- Expand operations as far as the main design permits, necessitating, first of all, a significant increase in transport capacity
- Maintain present general level of technology
- Maintain present main products
- Maintain present market direction, i.e. concentrating to the domestic market.

In the opinion of the present evaluation team, one precondition for any investment in the Sao Hill Sawmill to enable it to increase its raw material intake is that a management plan is developed for the Sao Hill Plantation to serve as a base for an agreement with the Forest Division, which manages the forest, concerning the division of forest compartments between the sawmill and the pulp and paper mill. A second precondition is that the sawmill agrees with the Forest Division how to treat the sawlog forests in order to produce sawlogs of a better quality than at present.

Based on these considerations,the evaluation team recommends Norwegian support to TWICO in softwood sawmilling in three fields: continued supports to the Sao Hill Sawmill Project, a programme for management training, and preparatory studies for a new softwood sawmilling project.

Continued support to the Sao Hill Sawmill is recommended in the following three areas:

- expatriate long-term services, phased out over six years
- short-term consultant services for purchases, recruitment, and other technical services, to be carried out within annually agreed budget frames
- balance of payments support enabling investments and purchase of spareparts to be carried out.

Support to a new management training programme for TWICO is proposed to cover the following items:

- expatriate staff, gradually increasing to three
- basic investments in 3 mobile sawmills, including all equipment needed for the initial operations, plus building investments and teaching equipment should be given as a grant
- consultancy services (purchase, recruitments, short term specialists in management and technical subjects).

Finally, NORAD is recommended to finance preparatory studies for the establishment of a softwood sawmill at Mbeya. If the project is found feasible, NORAD is recommended to support the establishment of the sawmill.

Provided that the recommendations given above are accepted by NORAD and TWICO three activities should be undertaken as soon as possible. The first two of them should be seen as preparations for the third. First, an inventory should be made of the Sao Hill Plantation and a management plan should be developed for it. Second, a feasibility study should be elaborated for a sawmill at Mbeya. Third, a NORAD/TWICO programming mission should be undertaken, defining in more detail the continued Norwegian support to softwood sawmilling in Tanzania. This mission should study the follwing three areas of support

- the Sao Hill Sawmill Project
- the proposed management training programme
- the new softwood sawmill which might be recommended to be established at Mbeya.

1. HISTORY OF THE PROJECT

1.1. Introduction

The Sao Hill Sawmill, now operating in an area of pine plantations about 600 km south-west of Dar es Salaam, was incorporated in November, 1974, as Private Limited Company and subsidiary of Tanzania Wood Industry Corporation (TWICO)

Its overall objective is to provide the Tanzanian market with more home-produced timber and thus to reduce imports. mål It was funded jointly by the Tanzania Investment Bank, the Tanzanian Government and the Norwegian Agency for International Development (NORAD). The Sawmill commenced production in 1976.

The Sawmill's prime function is to harvest mature logs from the Forestry Division's plantations in the district, transport them to the mill where they are variously sawn, planed, dried and treated. The Sawmill's location at Sao Hill rests on the fact that it is centrally located within a very large afforested area. Whilst the area currently being logged is some 25 km from the mill itself, new plantations which will be mature in 10-15 years' time are considerably closer. At present, the sawmill operates on one shift and processes about 30,000 cubic metres of logs per year.

Since the company started business, its main function has been production and sales of rough timber. A part of its output has been pressure impregnated against fungi and insects.

In 1978, a planing section for timber and panel boards was established, as well as a boxboard section producing tobacco packages for Tanzania Tobacco Production Company. At present, finally, the company has plans for production of pre-fabricated houses. Almost all the products of the sawmill are sold in the domestic market.

Since 1981, the direct support from NORAD is limited to salaries of expatriate staff consultancy services and training of Tanzanians abroad. In addition, Norway provides Balance of Payment Support to the Bank of Tanzania, of which the Bank annually makes 3 to 5 million NOK available to the Sao Hill Sawmill.

1.2. Stages of Development

During the nine years since it was incorporated, the Sao Hill Sawmill has passed through a few stages of development. Partly, these stages are a natural consequence of the physical development of the mill, partly they are a result of the activities of the successive generations of expatriates. In the absence of detailed objectives for the mill - - except the original goal of establishing a sawmill at Sao Hill capable of converting 27,000 cubic metres of logs into rough sawn timber at a recovery rate of 50% - - each successive management group set its own objectives and formed its own policy. For natural reasons, they then tended to concentrate on their own areas of competence, sometimes neglecting of the overall, long-term development of the company. The following three main stages of development can be distinguished:

a) 1975-1978. During this period, the sawmill was constructed and started to produce. It was a pioneer period, when the mill successfully established itself as an operating enterprise, finding suitable forms for its production, organization, and administration.

b) 1979-1981. During this period, production became the overriding objective for the enterprise, with log intake levels well above the designed capacity of the mill. Less concern was shown for profitability, pricing and marketing policies, and the build-up of administrative capacity. The long-term work of training Tanzanians to take complete responsibility for the enterprise was further, given less attention than desirable.

c) 1981-present. During this period,profitability and consolidation became the leading management principles. A new pricing policy was introduced and new systems for financial reporting and accounting were implemented. An important step in the "Tanzanianization" process was also taken in 1982 when the responsibility for several management positions were transferred from expatriates to Tanzanians.

1.3. Previous Evaluations and Project Reviews

Being the largest project supported by NORAD in the forestry sector, the Sao Hill Sawmill Project has been the object for various evaluations, project reviews, and other studies. Some of these are listed in Annex 4 "References". The discussion in this section will, however, mainly concern the major evaluation carried out in 1977, i.e. during the "pioneer" phase of the project described above, and the subsequent project review made by NORAD in 1978.

After visiting the sawmill, the present evaluation team finds that the available documentation makes it possible to form a fairly accurate picture of the project and its physical development. This is, however, not true for documentation related to expenditures made. Available data on the raw material supply have, further, been found inadequate.

The 1977 evaluation report is surprisingly "up to date" in 1983. This is true particularly for well documented areas like technology and socioeconomic aspects on the Sao Hill community. Descriptions and data presentation are well done in the 1977 report, and few substantial changes have taken place in these areas. The discussion below will concentrate on another aspect of the 1977 evaluation: that of recommendations given and the extent to which these have been implemented.

The general impression of the 1977 evaluation is that appraisals and recommendations are very detailed in some areas and general or absent in others. There are, e.g., detailed discussions and recommendations regarding technology and equipment. The previous evaluation also deals extensively with socioeconomic aspects and social infrastructure, for example giving a number of recommendations for housing. In spite of being judged as generally sound by the present evaluation team, most of these recommendations have not been implemented.

The plans for counterpart training and Tanzanianization drawn up by the 1977 evaluation team have turned out to be overly optimistic; according to that team, the last expatriate should have left the project by early 1981. By the time of the 1983 evaluation there were still six expatriates working at the sawmill. This situation is a close parallel to that of the 1977 evaluation; at that time all expatriates should have left according to the original feasibility study but there were still ten of them. In spite of this finding, the 1977 evaluation team did not elaborate a concrete programme for training, enabling Tanzanian staff to take over as scheduled by the team. It appears that the 1977 evaluation team concentrated its attention to the prevailing operational problems of the project. This impression is strengthened by the fact that the team also neglected to discuss the long-term policy of the Sao Hill Sawmill and the commitment of NORAD to support the project.

1.4. Funding History

The Sao Hill Sawmill was established as a fully-owned subsidiary of Tanzania Wood Industry Corporation, TWICO. Funds to cover investment costs were obtained from Tanzania Investment Bank (TIB), which obtained corresponding funds from Norway on a grant basis. The books of the sawmill at present (June, 1983) show a share capital of 9 million Shillings, Government Grants of 17.8 million Shillings, capital reserves and accumulated profits of 7.3 million Shillings, and long-term liabilities of 6.2 million Shillings.

The evaluation team has attenpted to trace the origin of these figures. The list below contains the major items.

a) May 1973. Norwegian contribution to TIB of 7 million NOK, accounted for as follows:

- Share capital 4.5 million Shillings
- Loan 7.7 million Shillings

b) July 1975. Contribution from TIB to TWICO accounted for as follows:

- Share capital 4.5 million Shillings
- Loan 5.8 million Shillings.

The evaluation team has not been able to trace this contribution to any payment from Norway.

c) August-September 1977. Norwegian contribution to TIB, of 4 million NOK accounted for as follows:

- Government Grant 6.25 million Shillings.

d) 1977-1978. Norwegian contribution to TIB of 5.5 million NOK, to be kept in Norway for purchases abroad for the Sao Hill Sawmill, accounted for as follows:

- Government Grant 8.6 million Shillings

e) 1979-1981. Norwegian contribution (bilateral investment funds) of 2.7 million NOK for investments, accounted for as

- Government Grant 4.5 million Shillings.

f) 1982. Norwegian contribution (balance of payments support) of 1.9 million NOK, fully repaid in Shillings by the Sao Hill Sawmill.

The sum of the items a) through f) above is:

- Share capital 9 million Shillings
- Original TIB loan 13.3 million Shillings (7.1 million repaid by June 30, 1983)
- Government Grant 19.35million Shillings.

These figures do not include the following three kinds of costs:

a) Long-term expatriate personnel, employed by NORAD.

b) Short-term consultancies and scholarships provided by the consultant from FORINDECO or by Bröderna Lindquist.

c) Consultancy services provided directly by NORAD or by other consultant comparies.

Costs for these three items are given in the table below, in millions of Shillings.

	1974	1975	1976	1977	1978	1979	1980	1981	1982	Total
a)		1.9	4.0	3.8	3.3	3.4	2.9	3.8	4.8	27.9
b)	0.7	0.7	0.4	0.5	0.6	0.6	0.4	0.8	0.9	5.6
c)	← 2.8 →				0.1	0.1	1.4	0.6	0.1	5.1
Total	~1.4	~3.3	~5.1	~5.0	4.0	4.1	4.7	5.2	5.8	38.6

Some of the sums given above do not match. Thus, the books at Sao Hill show Government Grants amounting to 17.8 million Shillings while the sum of the various allocations is 19.3 million Shillings. The difference might be explained by the fact that a well functioning book-keeping system was not implemented at the Sao Hill Sawmill until 1982, and that, thus, certain initial Government Grants, possibly obtained as goods sent directly from Norway to Sao Hill, were not correctly entered in the books at the sawmill.

1.5. Present General Situation

The situation at the project meeting the 1983 evaluation team was different from that meeting the 1977 team. In 1983, the Sao Hill Sawmill is firmly established as Tanzania's largest one, it operates efficiently and at a comfortable level of profitability. Problems are no longer related to the operations themselves--except in the case of log transport, the main present obstacle to increased production. The key questions in 1983 are, rather, related to the position of the Sao Hill Sawmill in relation to its surrounding: what are the limits to expansion for the mill given by the forest resources or by the market for its products; how are the Sao Hill Sawmill and the Southern Pulp and Paper Mill at

Mufindi to cooperate; what position is the sawmill to take in relation to its mother company, TWICO, and to the organization managing its raw material. And to what extent is the sawmill to intervene in the development of the Sao Hill settlement? The present evaluation team has tried to concentrate its efforts to questions of this kind.

2. SAO HILL SAWMILL ITSELF

In this chapter, the activities of Sao Hill Sawmill are evaluated. In the first section of the chapter, the present organization of the operations is described. Subsequent sections deal with production in the sawmill, supply of raw material, markets, personnel and economics of production.

2.1. Organization of Operations

Like other sawmills in the country, the Sao Hill Sawmill obtains its logs from a forest placed under the jurisdiction of the Forest Division within the Ministry of Natural Resources and Tourism. In the case of Sao Hill, the forest, consisting mainly of *Pinus patula*, was planted by the Forest Division, which also undertook certain silvicultural operations, such as precommercial thinnings and prunings, to improve the quality of the logs. In order to carry out its operations, the Forest Division also has to construct roads. When the trees in a forest stand are mature, they are made available to the sawmill, which pays a royalty or stumpage fee for the right to harvest them. At present, the fee for a tree is determined by its volume and its diameter at breast height; the price per cubic metre of stem volume increasing with increasing tree diameter.

The trees are felled, limbed, and cut into logs by personnel engaged by the sawmill. The logs are then transported to a road, loaded on lorries and transported to the sawmill. In the sawmill, logs are processed through the "green line", ending up as rough sawn timber of various dimensions with quite high moisture contents. The timber is then dried in the open air in order to reduce its susceptibility to attack by insects and fungi. After trimming it may then be planed, impregnated to improve its resistance to attacks further, or sold as it is.

2.2. Production at the Sawmill

The Sao Hill Sawmill has one line, has circular saws throughout and operates on one shift. Its main machinery, made by Bröderna Lindquist of Sweden, is simple and reliable, without sophisticated hydraulics and other complicated equipment.One result has been that the mill seldom has to stop due to mechanical breakdowns, another that the Tanzanian operators have learnt to operate the machinery well; the sawmill produces the same amount of timber as it would in Norway, though with more men.

The main line of the sawmill consists of the following equipment:

- Double slabber
- Split saw
- Left resaw
- Right resaw
- Double edger
- Slab resaw
- Sorting chain

After being dipped in an anti-blue stain tank, the rough timber is air dried in the timberyard, needing between one and four months there, depending on season. During recent years, 60 to 80% of the production is sold as rough timber, while 10 to 20% is pressure impregnated and another 10 to 20% is planed.

During the period 1978-1981, the sawmill produced packaging material in the form of boxboard for the Tanzanian Tobacco Processing Company (TTPC). Production ceased during 1981 when TTPC no longer demanded that material. In addition to these major products, the Sao Hill Sawmill also has produced wooden houses and furniture on a small scale during 1981 and 1982; the revenue from these lines of activity amounting to 2-3 % of total revenue.

About half the volume of the logs entering the sawmill leaves it as rough timber or other products, while half is turned into various waste products - slabs, off-cuts, shavings, and sawdust. About 40 % of the slabs are delivered to the houses of employees or picked up free of change at the mill by people from the surroundings who use them as fuel or for construction of fences and sheds, shile all the other waste finds no use at present.
The production target for the sawmill when designed was 27 000 cubic metres of log intake and a recovery figure of 50 %. Achieved log intake reached a maximum of 48,000 cubic metres in 1979. Since then, the volume has been reduced to about 30,000 cubic metres in 1983, mainly due to shortage of transport capacity for the logs.

2.3. Supply of Raw Material

In principle, the Forest Division is the raw material producer, while the Sao Hill Sawmill fells the trees and collects its sawlogs in forest stands indicated by the Forest Division, subject to payment of the corresponding royalty to the Forest Division. The Forest Division carries out the following operations:

- Preparation of land for planting
- Production of seedlings in nurseries
- Planting and beating up
- Silvicultural operations such as weeding and pruning
- Thinning
- Fire protection
- Construction and maintenance of roads.

During the exceptional expansion of the planted areas in 1978 - 82 (Phase I of the World Bank Programme) the Forest Division had the capacity only to prepare the land and to plant it, largely neglecting the silvicultural tending programme for the other plantations and also the necessary fire protection. This neglect will have serious consequenses for quality of the wood produced in the next ten to fifteen years, when only few sawlogs will come from pruned or properly thinned forest stands.

The Sao Hill Sawmill carries out the harvesting operations in the mature stands, transports the logs to the sawmill and converts them there. In addition, the Sao Hill Sawmill has had to take a certain responsibility for two of the tasks intended to be carried out by the Forest Division: Construction and maintenance of roads, and thinning. The road network constructed by the Forest Division was originally designed for the operations by the Forest Division itself, thus for light vehicles and light loads, which could easily be brought uphill. The Sao Hill Sawmill to some extent needs a different kind of roads, particularly for harvesting operations: one that can take heavy vehicles and one that minimizes the need of uphill movement of the log trucks.

Thinnings should, thus, be carried out by the Forest Division, with due silvicultural consideration. The Division is, however, poorly equipped to handle both thinnings and prunings, so the sawmill has had to take over the major parts of the thinnings.

The sawmill obtains its logs from the older parts of the Sao Hill Forest Project, of which covered about 33,000 hectares, of which some 31,000 consisted of pine plantation, mainly Pinus patula. This area was reduced by some 4,000 hectares in forest fires during the end of September, 1983, after the evaluation team had left the Sao Hill area.

For the Sao Hill Forest, the evaluation team has developed a preliminary harvesting plan, presented in Technical Appendix C: "Raw Material Supply." This plan, which assumes a desire to produce a high volume of sawlogs, shows that an annual volume of no more than 60,000 to 70,000 cubic metres of sawlogs can be made available for harvesting by the Sao Hill Sawmill during the comming ten years. After that period, the volumes will increase considerably assuming that an intensive - possibly unrealistic - silvicultural tending programme is started in 1984. Possible losses through forest fires, such as that in September, 1983, are not taken into account. The graph from Technical Appendix C showing this assumed development is reproduced in the following page.

The preliminary harvesting plan is a theoretical study, based upon a number of assumptions, of which the most important is the assumed annual wood yield of 15 cubic metres per hectare for the main species. To get more reliable figures, a harvesting plan should be worked out. This should be based upon field assessment of actual standing volumes and actual yield. For the sawlog supply stem quality or avialability of sawlogs should also be assessed.

The raw material needs of the Southern Pulp and Paper Mill might turn out to be different from today's official estimates. The future availability of sawlogs will to some extent be determined by this. Given the present official estimates, however, the yields of sawlogs in the period 1984 through 2006 will develope as shown schematically in Figure 2.1. in the following page.

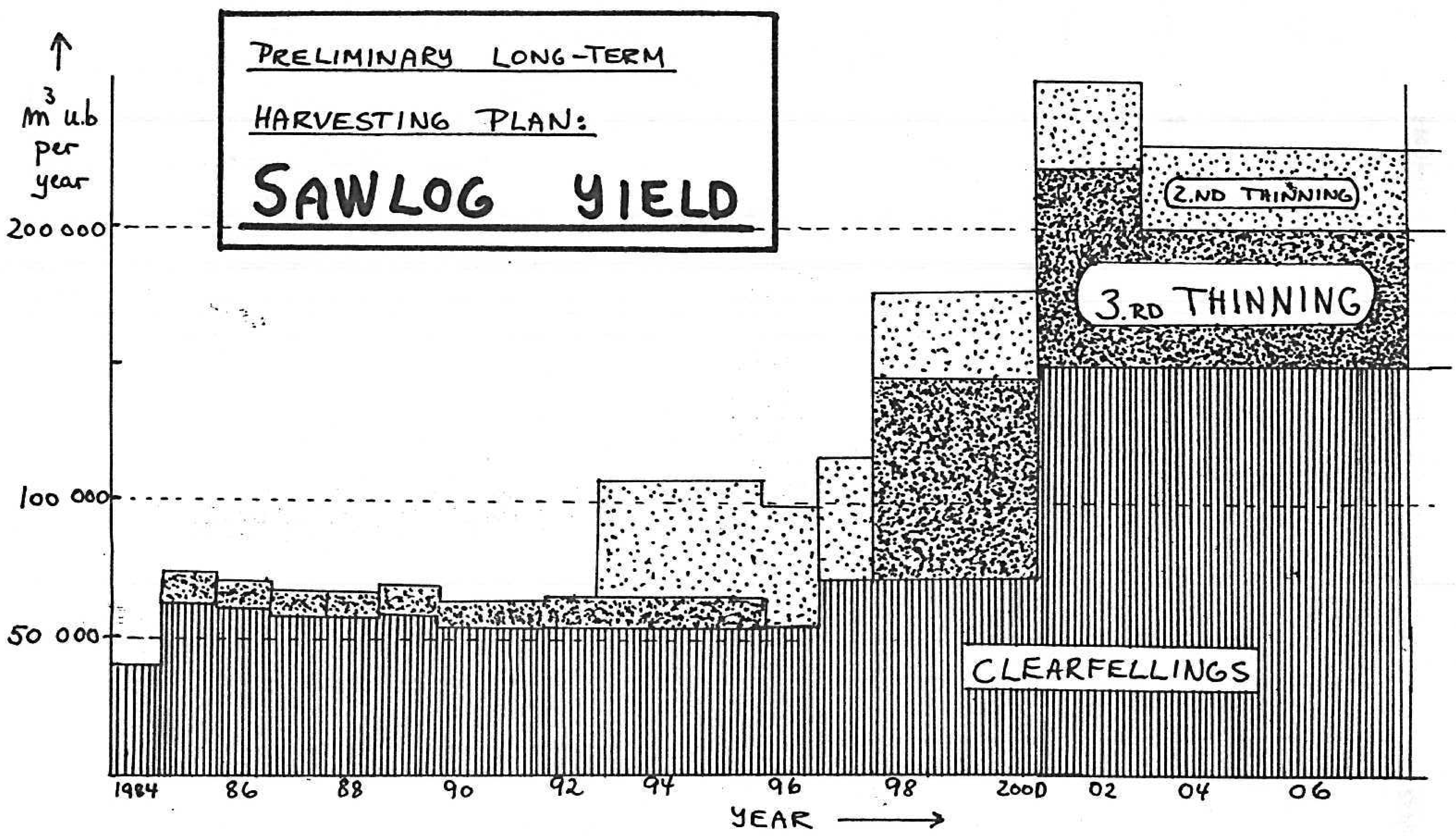

PRELIMINARY LONG-TERM
HARVESTING PLAN:
SAWLOG YIELD
m^3 u.b per year
200 000
100 000
50 000
2.ND THINNING
3.RD THINNING
CLEARFELLINGS
1984
86
88
90
92
94
96
98
2000
02
04
06
YEAR

Figure 2.1.

In order to obtain the volumes of sawlogs potentially available from the forest, the Sao Hill Sawmill will, however, have to reach two agreements with the Forest Division: one as regards the distribution of the compartments between the Sao Hill Sawmill and the Southern Pulp and Paper Mill, and one as regards the silvicultural treatments that the tree stands require in order to produce sawlogs of acceptable quality. Provided that these two agreements are reached, the Sao Hill would get access to 60,000 to 70,000 cubic metres of logs per year.

The present log consumption at the sawmill, about 30,000 cubic metres per year, is above the original design capacity of the mill - - 27,000 cubic metres - - but below the highest previous log intake level, which was 48,000 cubic metres, reached in 1979.

Given its present design, the practical capacity of the sawmill is 40,000 to 45,000 cubic metres of logs per year. With some minor improvements in design, the capacity might be increased to 55,000 to 60,000 cubic metres per year. If these improvements are made, most of the sawlogs potentially available from the forest area can be utilized for sawing.

No major problems are foreseen in increasing the harvesting operations of the Sao Hill sawmill to about twice its precent scale, provided that the present technology can be kept and the logging personnel retained. A decisive factor in this respect is how the operations of the Southern Pulp and Paper Mill will influence operations of the sawmill. The problems in road transport, the present bottleneck for increased production at the sawmill, are great, but not insurmountable.

2.4. Markets and Prices

The Tanzanian market dominates completely as purchaser of the products from Sao Hill; exports through TANTIMBER to purchasers abroad increased from 2 million Shillings in 1977 to 3 million in 1979 but declined again to about 1 million in 1982. This poor export performance is explained by weak competitiveness of the Tanzanian softwood timber in terms of both quality and unit cost and by the high domestic demand.

Since 1981, prices are set according to the "cost-plus" principle. In short, this means that prices are set at such a level that the sawmill covers all its operation costs, including depreciation, all its non-operational costs, 10% interest on total capital employed and, in addition, 10 % net profit from production. In Table 2.1. below, the effect of this pricing policy in 1981 can be seen.

Table 2.1. Prices and Price Trends for Different Products of Sao Hill Sawmill

	1978	1979	1980	1981	1982
Rough timber					
- TShs/m^3	586	840	984	1,458	1,590
- Increase since previous year %	-	43	17	48	9
Planed timber					
- TShs/m^3	892	1,027	1,100	1,561	1,865
- Increase since previous year %	-	15	7	42	19
Impregnated timber					
- TShs/m^3	1,014	1,023	1,159	2,221	1,915
- Increase since previous year %	-	1	13	92	-14

During the initial period, the entire production of the Sawmill was sold through TANTIMBER, another subsidiary of TWICO. TANTIMBER was not, however, competent as domestic marketing agent for softwood timber, causing much problems for the Sao Hill Sawmill, particularly as regards payment for timber sold. As a consequence of this experience, the Sao Hill Sawmill took over an increasing share of sales.

2.5. Personnel

After the Sao Hill Sawmill was constructed and the test runs were completed, an implied central objective for the continued support from Norway has been to enable Tanzania to run the sawmill with its own personnel, maintaining high technical and economic standards. That objective was only partially made operational in the form of training programmes for Tanzanian personnel.

The general impression of both the 1977 and the present evaluation team is that training at the level below management is taken well care of in the project. Key tasks within the sawmill operation like running of the double slabber and the resaw are performed skillfully by Tanzanian workers. Generally the efficiency of operations in the sawmill compares well with Norwegian standards. Skills and motivation among workers is an important factor in this respect. There are still, however, areas where further training is needed among personnel on the level below management and there will always be a need for continuous training of new personnel and perfection of skills in various parts of the operation.

Regarding training at the management level, a conclusion from the experience so far is that the counterpart system and on-the-job-training of management have provided some necessary practical experiences to the Tanzanian Management. This form of unorganized skill formation may have been the right choice especially in the build-up phase of the company, as the capacity to perform more formally organized instruction was limited during that time. At present, however, some shortcomings of the informal approach have become evident. Now, the-day-to-day running of production has become more routine. Thus a stage of "maturity" has been reached in the project allowing for a more structured form of management training to supplement informal learning on the job. The fact that the present lack of continuity at the management level among both expatriates and Tanzanians is likely to be maintained places special demands on a functioning management training system.

Expatriate personnel at the Sao Hill Sawmill normally stay only two years, sometimes even less. The complete turn-over of expatriate specialists at such short invervals is harmful for effective learning through the prevailing counterpart system. The fact that several expatriates terminate their contracts at the same time, often during the Nordic summer, compounds this problem. Most often there has been no overlapping at all between two contract periods; the reverse seems to be true -- that there have been extended periods with no expatriate filling the position.

For Tanzanian personnel at the management level, turn-over has been lower than for expatriates except for the first years. Seen from the point of view of the Sao Hill Sawmill, it may still have been too high. One must keep in mind, however, that the Sao Hill Sawmill is only one of several subsidiaries of TWICO and that it is clearly in the interest of TWICO to utilize some of the personnel trained at Sao Hill at other sawmills to improve their performance.

The present logging manager has been at Sao Hill for seven years. The sawmill manager and the maintenance engineer have both been with the company for four years, the general manager and the manager for manpower and administration for two years. The marketing manager, now working as counterpart has had his post for about half a year. Among these six managers, two have been transferred from other TWICO subsidiaries.

While the sawmill must be considered a fairly young company, the rate of turnover among Tanzanian managers has been relatively high. This has been a problem affecting the company's performance and has hampered the possibilities of "Tanzanianization" and withdrawal of expatriates.

As most of the executive positions have now been taken over by Tanzanians, stability of personnel at this level of the organization will be of great importance in the future. If no proper management training and personnel policy is developed within the TWICO group, the performance of the Sao Hill Sawmill will suffer.

2.6. Economics of Production

The Sao Hill Sawmill is a well operating, financially successful enterprise, as shown in its books. Its economics of production are presented in some detail in Technical Appendix A "Economics of Production at Sao Hill Sawmill. In this section, a summary of the Appendix will be made. It will also be discussed whether the total cost for the enterprise is reasonable.

Since 1978, the Sao Hill Sawmill has shown a profit every year with the exception of 1980. It has also repaid about half of its loan from Tanzania Investment Bank, originally amounting to 13.3 million Shillings. Some key financial data for the enterprise are shown in Table 2.2.below.

Table 2.2.Key Financial Data 1978 - 1982.

VOLUME SOLD	1978	1979	1980	1981	1982
	16,824 m^3	23,265 m^3	19,665 m^3	15,783 m^3	15,620 m^3
	1000 Shs.	1000 Shs.	1000 Shs.	1000 Shs.	1000 Shs.
NET SALES	11,154	21,791	20,951	24,094	27,531
Variable costs	3,527	9,682	11,217	12,106	15,769
Contribution	7,627	12,163	9,734	11,988	11,762
Fixed Costs	7,064	11,061	11,269	9,797	10,257
Profit from production	563	1,102	(1,535)	2,191	1,505
Net other incomes/costs	51	(484)	220	15	2,254
PROFIT FOR THE YEAR	614	618	(1,315)	2,206	3,759
	1000 Shs.	1000 Shs.	1000 Shs.	1000 Shs.	1000 Shs.
Liquid assets	6,269	11,049	5,979	9,542	10,493
Stocks	6,049	7,387	12,750	14,166	14,164
Current assets	12,318	18,436	18,729	23,708	24,657
Fixed assets	20,420	15,241	12,971	11,970	15,250
TOTAL ASSETS	32,738	33,677	31,700	35,678	39,907
Current liabilities	916	1,489	580	2,018	1,622
Long term labilities	12,903	11,419	9,936	8,453	6,971
Total liabilities	13,819	12,908	10,516	10,471	8,593
Equity	18,919	20,769	21,184	25,207	31,314
TOTAL LIABILITIES/EQUITY	32,738	33,677	31,700	35,678	39,907

Profitability of the enterprise has shown a generally improving trend from its inception. Since 1981, the adoption of the cost-plus pricing system ensures an estimated
10 % profit over production cost. In fact, the higher rates of profits registered during 1981 and 82 are entirely explained by the adoption of this pricing policy. Change in product mix towards a higher proportion of planed and treated timber did not increase profitability of the enterprise. Unit cost and unit average price have grown more or less at the same rate annually on average.

Continued future higher profit rates though, should arise more from reduction in unit costs and increased production than from continued price increases, as international contractors at current world market prices are likely to switch to imports if prices increase beyond 2,200 Shillings per cubic metre, i.e. the present price level. Moreover , the mill should strive to supply domestic users with low cost timber to hold down on both construction and furniture making costs.

Relative to other sawmills in TWICO, Sao Hill Sawmill remains the most financially profitable. The liquidity position of the sawmill is more than enviable by Tanzanian standards. Over the last two years, the sawmill has been able to maintain a net cashflow of more than 2 million Shillings annually. To date it has never gone onto an overdraft situation. However, this position has tended to generate excess liquidity in the company with high opportunity costs. If reinvested, the funds could have earned a higher return than the interests now earned in the bank. One of the major bottlenecks towards utilization of these funds is the foreign exchange component needed in the expenditures contemplated.

In the books at the Sao Hill Sawmill, only Tanzanian costs are entered, thus excluding the costs for certain inputs given directly by Norway. These inputs are of three kinds:

- Expatriate personnel provided by NORAD
- Short-term consultancies and scholarships provided by the consultant firm FORINDECO or by Bröderna Lindquist
- Consultancy services provided by other consultant firms or directly by NORAD.

In total, these inputs are calculated to have cost about 39 million Shillings or 24 million Nok during the years 1974 through 1982, divided as shown in Table between the years.

Table Norwegian Inputs into Sao Hill Sawmill (million Shillings).

Year	1974	1975	1976	1977	1978	1979	1980	1981	1982	Total
Amount	1.4	3.3	5.1	5.0	4.0	4.1	4.7	5.2	5.8	38.6

In 1982, the profit in local currency shown for the sawmill was equivalent to about two thirds of the cost of the direct Norwegian inputs to the mill, while in all other years the costs of those Norwegian inputs have been much above any profit level shown. The question now arises how to treat the cost for the direct Norwegian inputs into the Sao Hill Sawmill. One alternative would be to include these costs as production costs for the sawmill, letting the mill show substantial losses every year. There are, however, a number of objections to that principle.

a) The sawmill has based its accounting system and its striving for profits on the cost items incurred in Tanzania, excluding the costs for inputs provided directly from Norway. It is not likely to assume that the mill would have behaved in the same way if its accounts had shown also the cost for the direct Norwegian inputs. In view of the excess demand for its products and of the low price level held particularly before 1981, the mill would have been able to pass on a large share of the cost for the direct Norwegian inputs to the consumer in the form of higher prices. Seen in this perspective, the Norwegian inputs have partially been a subsidy to the consumers rather than to the sawmill.

b) All the direct Norwegian inputs have been provided in kind and have been paid directly by NORAD. The costs for them have often not been known by the Sao Hill Sawmill or TWICO. If the costs for these inputs had been known, some of them would never have been asked for.

c) Skill formation at the mill has benefited considerably from the expatriate staff services. This skill formation could be looked at as the build up of human capital. If the workers who obtained the skills are confined to working at the mill through their lifetime, then the costs should be capitalized over the remaining productive years of these workers. The incidence of the costs then should correctly be spread out over at least 20 years, reducing considerably the annual cost during years of actual cost incurrence. But if labour force mobility remains what it is today and if training of workers from other sawmills is undertaken using these trained workers, then investment costs in skill formation should be borne by the economy at large rather than by the sawmill only.

d) In the process of giving their services at the sawmill, some of the expatriates were also experiencing a learning process in contextualizing their knowledge in a new working environment. Should the same expatriates be engaged in starting up a new sawmill in Tanzania or in a similar environment, their efficiency would be higher and the adjustment in the new environment would be easier. Moreover, NORAD would then have an efficient pool of experienced manpower for use in the Tanzanian type of environment.

e) A part of the short term consultancies were only perpherically related to development of the Sao Hill Sawmill itself but met, rather, a need of information of NORAD or the Norwegian public or was related to general development efforts. The consultancies carried out in preparing the Mbao Housing Project is the most costly example of such studies.

In the view of the evaluation team, the costs for the direct Norwegian inputs into the Sao Hill Sawmill should be seen as contributions to the Tanzanian consumers of softwood timber, to the Tanzanian pool of skilled manpower particularly for its sawmilling industry, and to the Norwegian pool of skilled manpower for service in this sector abroad. The remaining true cost for the Sao Hill Sawmill during its past years of operation would, then, be negligible. The team, thus, finds it reasonable to accept the profit levels shown in the books of the sawmill as properly reflecting the financial profitability of the enterprise.

3. SAO HILL IN A WIDER PERSPECTIVE

In this chapter, the Sao Hill Sawmill Project is seen in a wider perspective. It has **worked** with the Forest Division since its inception and it is getting relations to the Southern Pulp and Paper Mill at Mufindi. It also has been intimately involved in the establishment of the Sao Hill Settlement. Finally, the sawmill effects the Tanzanian economy in various ways.

3.1. Relations to the Forest Division and the Southern Pulp and Paper Mill

Sao Hill Sawmill has had a working relation to the Forest Division since it started operating, as the Forest Division is responsible for producing the forest from which the sawmill collects its logs. The sawmill and the Forest Division also share the Sao Hill settlement, which is built on land under the jurisdiction of the Division. While the Sao Hill Sawmill and the Forest Division are often at odds as regards the treatment of the forest and the choice of compartments for logging, the conflicts are known. The Southern Pulp and Paper Mill, on the other hand, is a new entrant on the scene, and a giant one. The sawmill will depend very much on how they develop in the future.

Relations to the Forest Division and to the Southern Pulp and Paper Mill on the other hand, must be discussed and regulated, before operations at the pulp and paper mill reach full scale. The period since the Sao Hill Sawmill started its operations can be seen as a test period, when the sawmill and the Forest Division were discussing how to manage the forests and how to divide the necessary work between themselves, although no formal agreements were ever made. As indicated in section 2.3. above, one practical result of this trial period was that the sawmill took over thinnings and most construction and maintenance of roads from the Forest Division. In general terms, the present situation is that the sawmill would like the forest Division to manage the forests in such a way that sawlogs of better quality are produced. As such logs are more valuable to the sawmill than those it gets now, the sawmill is prepared to pay the Forest Division for the extra efforts needed in striving for quality production or to take some responsibility for activities like pruning.

In the future, the Sao Hill forests will have to be divided into pulpwood forests, managed on rotations of about 15 years, producing mainly for the Southern Pulp and Paper Mill at Mufindi, and sawlog-cum-pulpwood forests, managed on rotations of about 25 years, producing both for the Sao Hill Sawmill and for the pulp and paper mill. In these latter areas, small diameter and low quality wood falling mainly from thinnings but also from clearfellings will be used for pulpwood while good quality wood obtained at clearfellings will be used in the sawmill. A proposal for such a division and a preliminary harvesting plan are developed in Technical Appendix C "Raw Material Supply". A forest management plan, regulating the division into sawlog and pulpwood areas, the management of the forest, and the duties of the three parties involved--the Forest Division, the Sao Hill Sawmill, and the Southern Pulp and Paper Mill--must be drawn up and agreed upon as a precondition to any further investments at Sao Hill Sawmill or in other sawmilling capacity using wood from the Sao Hill forest.

There are other potential complications for the Sao Hill Sawmill arising from the establishemnt of the Southern Pulp and Paper Mill. Competition for experienced manpower is one; the effects may be felt both in the sawmill itself and among the loggers, mechanics, and drivers employed by the sawmill. Intentional or accidental transfer of the more mechanized technology to be employed in the logging operations of the pulp and paper mill is another; the pulp and paper mill plans to use power chain saws for felling while the sawmill uses manual saws; the pulp and paper mill plans to use heavy Timberjack skidders while the sawmill uses lighter and simpler tractors.

The higher degree of mechanization at the Southern Pulp and Paper Mill also implies a threat to the rational division of forest stands between the pulp and paper mill and the sawmill. Logic dictates that small logs go to the pulpmill while big logs go to the sawmill. However, the mechanized and heavy equipment bought by the pulp and paper mill is likely to cause very high costs when used for the harvest of small trees. It is likely to prove less uneconomical if used in harvesting big trees. The converse is probably true for the present light equipment of the Sao Hill Sawmill, while it is probably the most economical for the harvest of sawlogs, it is even more unbeatable for the harvest of pulpwood. While the economics of the harvest of pulpwood should remain a problem for the Southern Pulp and Paper Mill, it is essential that the Sao Hill Sawmill is given the opportunity to continue using its successful harvesting methods for sawlogs and that suitable forest compartments are allocated to it.

3.2. Sao Hill Settlement

Geographically the main "catchment" area for Sao Hill Sawmill impact is Sao Hill itself, the controlled settlement that has grown since 1974 aound the Mufindi District Forestry Division Headquarter and Sao Hill Sawmill. In 1983 Sao Hill, or Ihefu as it is called locally, consists of some 260 households, settled in 112 houses belonging to the sawmill and 109 to the Forestry Division. Both employers have about 20 staff housed in temporary, poor quality huts made by present or previous incumbents from slabs from the sawmill. Sao Hill also has two workers' cooperative shops, one belonging to each community but used by any Sao Hill resident, two social halls, a school, a mosque, a church, and a grinding mill.

Sao Hill is a very different place to live in from other settlements in the area with the possible exception of Brooke Bond Tea Estate at Mufindi. Brick houses of varying sizes with corrugated ironsheet roofs are neatly strung along a network of well-graded roads spreading out according to a plan that clearly indicates abundancy of land. And so it is. At present 1 250 persons (assuming an average of four to a household) share in housing and other amenities, agricultural plots included, in an area of 537 ha.

Nobody is more affected by Sao Hill Sawmill than those directly and indirectly employed by the mill. In veiw of national, regional and even local demand, 343 jobs provided on site by the sawmill may not amount to much, yet one in ten permanently employed in the (Mufindi) district (180 000 inh.) is said to work at Sao Hill Sawmill. 96 % of them are men. Average monthly salary is sch. 1 200, well above other comparable monthly salaries. Altogether about shs. 500 000 are paid as wage (and social costs) to mill workers monthly. Locally that is a lot of money. Yet to the average family it is not. Most of it is spent on food, house rent, keeping children in school, clothes, beer and transport to go home for a funeral, to visit, or be visited by, wife and children and to give or receive a helping hand in the agricultural season.

On the whole, the 'Sawmill community', and the 'Forestry Community' at Sao Hill seem to live in peace and harmony. Though facilities like shop, social hall and football ground are duplicated, they are used by both communities according to need. Other facilities like church, school, and water supply are common. However, as the water supply no longer suffices to supply the whole community, plans are under preparation to construct a separate water supply for the sawmill. That would be contrary to the recommendations made in the Master Plan for Sao Hill of 1981, where a major point is made of "welding the two communities" in order, it is said, to enhance cooperation and avoid the duplication of services. The present evaluation team is not very worried about such duplications. Enforced cooperation, where preconditions for cooperation are absent, is likely to do more harm than having two shops, two dispensaries, two social halls and even two water supply systems. In this case the preconditions seem not to be present, the sawmill being a profitmaking business enterprise with its own budget and the Forest Division a government agency depending on public funds. In fact both Sawmill and Forest Division management see separate investments as an advantage.

At the moment company houses --ordinary and temporary ones-- accomodate half the sawmill labour force, i.e. 170 employees. The remaining 170 live in neighbouring villages (10-20 km away) in their own homes, or in rented rooms in Changalawe and Mafinga. Sao Hill workers from Mafinga town and Changalawe village get free transport to and from work, while workers living in Matanane and Irunda have to cover 12-15 km daily on foot or bike. Most workers of the sawmill ardently wish to be housed at Sao Hill, and many prefer the very poor quality slab houses there to renting a room in Mafinga or Changalawe.

The most peripheral of all sawmill workers are the loggers. Working in the forest, they are too far away to make frequent use of the material benefits, union sittings and the informal social network that invariably develops in an industrial enterprise like Sao Hill Sawmill. So far, the disadvantages of working in the forest have been offset by the loggers being able to live in their own homes, in their own villages. However, this is going to change. From November 1983 logging will be done 20-30 km away from the area where loggers have been recruited from and where they live. To solve the recurrent transport problem the sawmill plans to house the loggers in temporary camps, several men to a room, at the logging site.

Camp-living provides a poor solution for the loggers, their families and also the sawmill. With the increasing competition for loggers from Mufindi Southern Pulp and Paper Mill (SPM), camp-living may be a decisive factor in the loggers' choice of employer. As it is unlikely that the pulp and paper mill will be able to offer loggers higher salaries than the sawmill, it is additional benefits that will determine for whom the loggers will want to work.

At the moment the loggers have a working day of only five hours or less. As long as they stay in their own homes, their short working days give them ample opportunity to supplement family diet and income by cultivation. Thus camp-living will not only deprive the loggers of an extra agricultural income, but also create social problems, as there will be nothing to do for the men after working hours.

For these reasons the evaluation team recommends that the plans of erecting temporary camps for the loggers be reconsidered, and that the loggers be provided with bicycles so that they can continue to live at home and get to work by their own effort. The team believes that bicycles will be less expensive, more reliable and more acceptable to the loggers themselves and their families than company transport, let alone camp life at the logging sites.

Sawmill benefits are many and represent a considerable outlay for the company. Some are, however, obligatory and part of an overall Tanzanian industrial and social policy. Free housing, transport, schooling and medical service are among them. The provision of ploughed fields is not particular to Sao Hill Sawmill; the Forestry Division next door and the National Service at Mafinga do the same for their employees. Workers' Cooperatives are encouraged everywhere by CCM and are quite common. Many companies provide their workers with a midday meal. But Sao Hill Sawmill distinguishes itself by providing its services with generosity and consideration. In doing so some of the services benefit others than the workers and their families (shop, grinding mill, dispensary, roads, slabs), but again, the main beneficiary is definitely the closed community at Sao Hill.

The sawmill plans to extend its social investments. A guest house to cater for customers is almost ready, a "pombe" (beer) shop has been constructed, but may be used for other purposes, such as kindergarden, dispensary and Mother-and-Child clinic which are also planned to be established at Sao Hill. If so, a new Pombe shop should be built. There is also a plan to build a canteen outside the Sawmill gate to cater for customers to the mill and others, to improve the present butchery shed and to assist the Workers' Cooperative to ensure regular supply of meat. Plans and budget allocations also exist to increase the sawmill housing pool with 50 junior staff houses at Sao Hill.

This meets a much felt need among sawmill workers. Many more houses are needed, however, before all mill employees are reasonably well housed in the neighbourhood of the workplace. The need of more houses can best be met by giving the sawmill full authority over future house construction.

Every month some Shs 500,000 are paid to mill employees. A large part of this income is spent on day-to-day consumption. At Sao Hill, the Workers' Cooperative Shop is a main supplier of consumers' goods. During the first half of 1983 the shop's average monthly turnover was about shs. 150,000 and another shs. 20,000 was spent at the co-operative grinding mill. Except for milk, the shop does not get its provisions from local producers, but from the Regional Trading Cooperation (a parastatal supplying cooperative shops with consumers' goods) and from suppliers in Iringa, Mbeya and even Dar es Salaam. Most food items sold (sugar, salt, rice, cooking oil, margarine, and milk) are in short supply in Tanzania.

Recently, a slaughter house, or rather a shed, was built by the sawmill. Several times a week a butcher brings cattle along from neighbouring villages, slaughters it, and sells meat.

Being a controlled settlement, Sao Hill is not open to artisans and craftsmen except during day time. Settlement is not permitted. Some millworkers, mainly among those employed in the carpentry section of the mill, have established rudimentary workshops making simple furniture and fittings in their back-yards. It was said that those who do so have enough orders to last them for a year or more. Partly this is so because all junior staff houses are let unfurnished.

A major concern of all Sao Hill residents is how they will live when their job with the sawmill or with the Forest Division finishes. At that moment they will have to leave the settlement. Consequently it is the ambition of every responsible head of household to save enough money to build a house of his or her own. Given the present salaries and benefits coupled with aspirations about corrugated iron roofs, cement floors, and glass windows this is not possible. This is nothing new. But in 'traditional' society the individual was not responsible for his and her old age. Today, however, young people find it difficult enough to look after their children, let along take economic responsibility for the parent generation. The problem is further accentuated by the fact that unlike among peasants and farmers, children of industrial workers do not accumulate any practical skill that will assure them their livelihood when they grow up.

The improved social services following in the sawmill wake completely leave out adolescents finishing grade 7, who have nothing to do and nowhere to go. Maybe because the mill employees are still young, this has not yet become a serious problem, but it will. Measures should be taken as soon as possible to provide these youngsters with vocational training.

The Sao Hill Settlement has changed considerably since the 1977 evaluation. It is no longer fitting to describe Sao Hill as "somewhat flat and monotonous, sparsely provided with bushes and trees" (p. 42). On the contrary. During the past six years, trees and bushes have been planted everywhere and give Sao Hill beauty and protection against the wind.

The rapid expansion in population foreseen by the 1977 team has, however, not taken place. It was then assumed that over 3,000 people would live at Sao Hill by 1980. In 1983, slightly less than half that number lived in houses owned by the sawmill or the Forest Division. In 1977, 200 people were employed at the sawmill, in 1983 they were 350.

The considerable agricultural achievements at Sao Hill are the most positive socio-economic development since the 1977 evaluation. Contrary to the former evaluation team which suggested that the company land be cultivated on a communal basis organized by the party, the present evaluation team supports the present system of individual fields.
At Sao Hill (like in most other places in Tanzania) the major problem is not undue individual profits, but too little food to enable a family to eat well, and yields from private fields are generally higher than from those cultivated communally.

The cooperative shop is also very different now from what it was in 1977. A new spacious building gives ample room for the shop and the social hall which lie side-by-side. The shop has two people permanently employed and is open most of the day. In 1977, it was run on a voluntary basis and open only three hours daily. The number of merchandise has also increased substantially. During August 1983, 46 items were bought for the shop. Now, like then fresh food (apart from milk occasionally) is not sold, but people no longer have to go by bus to Mafinga to buy meat. Now cattle is slaughtered at Sao Hill and meat sold in a rudimentary butchery shop several times a week.

In their analysis of the enclave settlement at Sao Hill, the 1977 evaluation team points to increased costs of infrastructure and limited number of beneficiaries, need for daily transport of workers living outside, the problem of squatters and of recruiting trained personnel. This evaluation team has added at least two other; the insecurity of tenure and the lack of future for the young people. On the other hand, neither the problem of squatters (which is slowly reduced as new houses are being built) and that of recruiting trained personnel (as Sao Hill is by many considered a good place to work, and even to live in) seem very important.

3.3. Regional and National Effects

The establishment of the Sao Hill Sawmill and its subsequent operations have made an important contribution to the economic development of Tanzania. On one hand, the sawmill has made efficient use of the vast forest recources in Sao Hill. On the other, it has supplied softwood timber to the nation's contruction and building industry. The mill supplies about 60% of the total softwood timber used in the country and also provides some export. In addition the provision of this low cost timber helps to free valuable hardwood for timber export.

The impacts of the mill's activities on economic development of Tanzania can be divided into direct and indirect ones. The direct impacts include contribution to Tanzania's Gross National Product, employment generation and generation or saving of foreign exchange. The indirect impacts are, in general, based on linkages with other sectors in the economy.

The sawmill's contribution to Gross National Product in nominal terms increased rapidly between 1977 and 1982, from 4.9 million shs. to 13.7 million shs. Out of the total value added, 63% was from domestic recources. The value added by the mill as a proportion of the gross value of the output produced averaged 45%, which is above average for the industrial sector in the economy. In the period 1978-82, value added per worker tripled, from 12,101 in 1978 to 38,400 in 1982, again exceeding the national average for the industrial sector in the country.

Since 1977, an average of about 450 persons have been employed by the Sao Hill Sawmill. Taking into account indirect employment generation on the basis of backward and forward linkages with other sectors, additional employment created by the mill's activities could be estimated at about the same number as that for directly employed.

Direct export of timber from the sawmill has been a small proportion of the total timber sales. Softwood timber exports by TANTIMBER, most of which was from the Sao Hill Sawmill, increased from 2 million shs in 1977 to 3.1 million shs in 1979 before declining to about 1 million shs in 1982. This poor performance in export is explained largely be weak competitiveness of the Tanzanian softwood timber in terms of both quality and unit costs. However, to get a fair assessment of the mill's performance in generation or saving of foreign exchange one would have to look also at indirect exports from the mill and the implied import substitution.

As far as indirect exports are concerned one can make two assumptions in the computations.

(i) All the sales to international contractors could be treated as indirect exports, since these contractors paid in foreign exchange and could have imported their supplies on site delivered cost basis if cheaper. For the years 1981/82 and 82/83 the average annual sales to these contractors and other foreign funded projects were 6 million shs annually. For the other years an average of 2 million shs is assumed.

(ii) During the whole period the mill has been in operation, Tanzania has been exporting hardwood. In the absence of softwood production, the hardwood would have been diverted to domestic use, in order to allow construction activity at the actually realized level. Since not all softwood is produced by Sao Hill alone, for the relevant years 70% of hardwood exported volume equivalent could be regarded as Sao Hill's indirect exports. In order to avoid overestimating the indirect exports only 50 % of hardwood export earnings are regarded as indirect exports from the Sao Hill Sawmill.

On the import substitution side, one could regard the total timber sales from the mill as substitution for potential imports. There is considerable excess demand for timber in the country. In the absence of the mill's supply, the timber used from the Sao Hill would have to be imported in order to allow construction and furniture making at the actually realized level.

The value of indirect exports plus actual softwood timber exports will, however, be taken as export earnings from the Sao Hill Sawmill. Between the years 1978 and 1982, the net foreign exchange balance of the mill was 924,000 shs. Thus, the mill not only paid for its own import requirements (directly and indirectly) but also generated some excess for national use. On an annual basis, except for 1980 and 81, all the other years registered positive balance. The details are found in Table 4 below.

Table 4. Foreign Exchange Generation of the Sao Hill Sawmill (1000 Shs)

Year	1978	1979	1980	1981	1982
Operative consumption of direct imports	1,844	2,481	6,098	8,016	4,254
Depreciation import content	3,530	2,947	3,700	2,778	2,762
Total production imports	5,374	5,428	9,798	10,794	7,016
Indirect imports(10% of domestic inputs)	522	1,532	1,269	1,111	1,901
Total direct and indirect imports	5,896	6,960	11,067	11,905	8,917
Direct exports of softwood timber	5,277	3,138	1,167	248	945
Indirect exports (sales to international contractors +50% of hardwood export earnings)	5,053	4,879	5,366	10,296	12,000
Total direct and indirect exports	7,630	8,017	6,533	10,544	12,945
Net foreign exchange generation	1,734	1,057	(4,534)	(1,361)	4,028

The Sao Hill Sawmill is well linked to the national economy in its activities. It purchases inputs from other sectors in the economy within the district of Mufindi, from Iringa, and from other regions of the country. It obtains approximately two thirds of its inputs from the Tanzanian economic sectors. Thus, it has strong backward linkages with other sectors and particularly with Mufindi district and Iringa Region. The development is shown in Table 5 below.

Table 5. Geographical Distribution of Backward Linkages in Percent of Total Expenditures

	Mufindi District	Iringa Region	Import Contents (Direct and Indirect)
1977	23	45	46
1982	46	59	33

As pointed out previously, the sawmill sells most of its output to various sectors within the economy. In so doing, it stimulates production mainly in the construction and furniture industries. The host district and region are taking good and increasing advantage of the timber supply, as indicated in Table 6 below.

Table 6. Geographical Distribution of Forward Linkages in Percent of Total Sales

	Mufindi District	Iringa Region	Dar es Salaam (including export)
1977	2	3	70
1982	14	30	38

Through both types of linkages, the sawmill stimulates income generation in other areas of the country and indirectly generates employment in other sectors and areas.

3.4. Environmental Effects

Deforestation in combination with destructive forest fires and the burning of grass and other vegetation is the most serious environmental threath in Tanzania.

The plantation of pine species in a monoculture is not as beneficial for the environment as a well stocked indigenous forest or a mixed species plantation. It is, however, a far better land use than what was replaced: grassland where destructive annual fires were raging or slash-and-burn cultivation, both uses having serious ecological consequences.

The production at the sawmill itself has only marginally negative environmental consequences. Thus, the activities at the sawmill can indirectly be said to have a positive environmental effect.

4. EVALUATION OF SUPPORT GIVEN

In this chapter, an evaluation of the external support to the Sao Hill Sawmill will be presented. Summing up the figures given in section 1.4 "Funding History", above, the following total contributions hade been made to the sawmill.

a) Share capital: 9 million shillings.

b) Original loan from Tanzania Investment Bank (TIB): 13.3 million shillings, of which 7.1 million were repaid by June 30, 1983.

c) Government Grant 19.35 million shillings.

d) Long-term expatriate personnel provided by Norway: 27.9 million shillings.

e) Short-term consultancies and scholarships provided by Norway: 10.7 million shillings.

While all these funds might have had their origin in Norway, not all should be seen as support directly to the Sao Hill Sawmill. Thus all shares are held by Tanzania Wood Industry Corporation, TWICO. The loan from TIB was given with money obtained from Norway, but it is being repaid to TIB by the sawmill. The Government Grant finally, should be seen as a long-term debt to the Government mainly used as operating capital at the sawmill.

In general terms, the evaluation finds the financial arrangements as given above to be suitable for a parastatal company in Tanzania. The forms and conditions under which they were given is, however, open to some criticism. Below, the roles of three of the main actors, TWICO, FORINDECO, and NORAD, will be discussed.

4.1. TWICO as Recipient

Tanzania Wood Industry Corporation, TWICO, was founded in 1972 as a parastatal holding company under the Ministry of Natural Resources and Tourism. During its first few years of existence, a large number of private wood industries all over the country were nationalized, being converted to wholly-owned subsidiaries of TWICO. At that time TWICO came to own a number of industries but was not in a position to take full responsibility for their management. This was the general situation when TWICO was nominated as implementing agency for the establishment of the Sao Hill Sawmill. Developments during that period were described by the 1977 evaluation team (pp 121-122), providing some details of the shortcomings of TWICO as responsible for the preparation of feasibility studies, hiring of consultants, evaluation of tenders, making the financial arrangements and recruiting of Tanzanian personnel.

For natural reasons, TWICO was not familiar with the technology employed at the Sao Hill Sawmill. Matters were, however, made worse by frequent changes of staff assigned to the project. Further, according to the 1977 evaluation term, financial control over the project was not nearly as tight as it should have been, probably due to lack of financial experience among TWICO staff.

It appears that the nomination of TWICO as implementing agency for the establishment of the Sao Hill Sawmill was done without any evaluation of its capacity for that task. Had such an evaluation been made, it would have been obvious that TWICO was underqualified and needed external support in order to carry out its duty properly.

When the Sao Hill Sawmill Project was in its inception, the effects of an unqualified holding company were damaging and required corrective measures from Norway. The situation today is different. Today, the Sao Hill Sawmill is a functioning, financially strong subsidiary of TWICO, able largely to run its own affairs. While TWICO still has problems in managing many of its other subsidiaries, there are few conflicts with the Sao Hill Sawmill. TWICO is receiving a large part of its management fees from the Sao Hill Sawmill, and has, thus, an interest in good production results. The sawmill is likely to maintain its strong and independent position as long as it performs well, as TWICO will concentrate its organizational resources to its many weak subsidiaries.

4.2. FORINDECO as Partner, Other Consultants.

The consultant company FORINDECO (for Forest and Forest Industries Development and Consulting Company (Norway) A/S), formed by eight Norwegian wood processing companies, was appointed by NORAD as technical partner to the Sao Hill Sawmill from the start of the project. The Sao Hill Sawmill was, also, the first project of FORINDECO in a developing country.

The 1977 evaluation team criticized FORINDECO for having made a number of mistakes in the early stages of the Sao Hill project (pp 117-118). The team concludes that those mistakes were made because the newly formed FORINDECO at that time lacked personnel with sufficient experience from developing countries.

The role of FORINDECO was central to the development of the Sao Hill Sawmill during the first few years of the project, just as the role of TWICO was decisive during these years. Since 1975, FORINDECO has played a less central role, carrying out the following tasks:

- Recruitment of long-term expatriate personnel for subsequent employment by NORAD.
- Procurement of equipment and materials for the sawmill.
- Provision of short-term consultancies.

With very few exceptions FORINDECO has recruited well qualified personnel who have done a good job in view of the difficulties they have faced. The recruitment process has been short and the candidates presented have been accepted by NORAD and TWICO with one or two exceptions. The lack of continuity and overlapping periods between the expatriates is not a fault by FORINDECO, but by the recruiting section of NORAD, where the processing time normally has been 6-12 months.

FORINDECO has carried out its purchasing services promptly, effectively, and at a reasonable cost. Deliveries have been closely followed until the goods have arrived at the project. All purchases are properly recorded in a separate account.

Short-term consultancies carried out by FORINDECO have cost a total of about 2.5 million NOK or 4.1 million shillings since 1973. This figure includes both recruitment, purchases, and other short-term consultancies carried out in Tanzania or in Norway. Quite a number of consultancies were carried out in Tanzania during 1973 to 1975, much fewer during 1976 to 1982. During the first half of 1983, the number of consultancies grew again.

At present, the role of FORINDECO in relation to NORAD, TWICO, and the Sao Hill Sawmill is unclear, partly because no agreement of recent date exist, regarding duties and regulations. The evaluation team got the impression, however, that FORINDECO in general acted as a consultant to NORAD rather than to the Sao Hill Sawmill. This has meant that some consultancies have lacked in coordination with TWICO and the Sao Hill Sawmill.

The personnel of FORINDECO has had a professional ambition to involve themselves more directly in the decision-making of the Sao Hill Sawmill. Their unclear role has been frustrating, explaining some conflicts with TWICO and the management of the sawmill.

The consultancies provided by Bröderna Lindqvist AB for the maintainance of the sawmill machinery (in average three weeks per year) have been very efficient.

The consultancies provided by other consulting firms in the fields of housing, water supply and sawmill building design have not been properly adapted to the local conditions. Better solutions than proposed in the consultancy reports would probably have been found by the local personnel in the management of Sao Hill Sawmill or by FORINDECO.

4.3. NORAD as a Supporting Agency.

During the life-time of the Sao Hill Sawmill Project, NORAD has been much more than a mere financing agent. The fact that the sawmill at present is a successful enterprise must, thus, partly be ascribed to the activities of NORAD. In several respects, however, NORAD should be criticized for its activities in relation to the Sao Hill Sawmill Project.

During the initial period of the Sao Hill Sawmill Project, Norwegian assistance was given as budgetary support channeled through Tanzania Investment Bank. The attendant nomination of TWICO as implementing agency was unlucky and NORAD must accept criticism for allowing it to be taken. Many of the problems NORAD has faced later have their origin in this decision. The budgetary form of assistance with no external funds for procurement, and NORAD's passive role in this period, led to many practical problems in the start up phase. Even minor purchases where foreign currency was needed had to undergo a time-consuming procedure, very much contrary to the needs for urgent actions in the critical build-up phase of an industrial enterprise.

Since 1979, support to Sao Hill has been directly project-oriented, signifying a clear improvement over previous practice. The agreement signed in 1979 between Tanzania and Norway also stipulates the responsibilities of the different parties involved. The following three items are of particular importance:

- Most decisions on how to use the Norwegian funds are to be taken by NORAD.
- The consultant (FORINDECO) is to be an advisor to NORAD.
- TWICO is to remain the competent Tanzanian implementing authority.

The evaluation team has a number of critical remarks regarding the role of NORAD in relation to the Sao Hill Sawmill Project during recent years. The most important ones are the following

a) Plans made have been overly optimistic, underestimating problems in implementing the project and, particularly, the problems of enabling Tanzanians to take over the complete responsibility for the project.

b) There has been a lack of long-term planning and an absence of long-range agreements; the lack of new agreements since 1981 between NORAD and TWICO and between NORAD, TWICO and FORINDECO is a case in point. The lack of long-term agreements has made it difficult to hand over full responsibility for the sawmill to TWICO and the management at Sao Hill and has forced NORAD to engage in decisionmaking on a day-to-day basis.

c) The rapid turn-over of NORAD personnel involved in the project, particularly at the NORAD office in Dar es Salaam, has made the project feel the impact of several generations of NORAD staff, having limited experience from industrial project, and holding varying views on how the Sao Hill Sawmill Project should be directed. The NORAD office in Dar es Salaam played a too passive role during the critical start up phase of the project.

d) The recruitment section of NORAD has delayed the arrival of expatriate personnel. Candidates proposed by FORINDECO have not been processed and employed as required by the project but rather in the order they have appeared among other recruitments. The result has been that it has often taken between six and twelve months from the time when a candidate has been proposed by FORINDECO until he or she has arrived in Tanzania. This long time lag has, in most cases, made overlapping impossible between expatriates. The lack of positive impact upon the project by this section of NORAD might partially be explained by the lack of stability among its personnel.

e) Finally, NORAD has not been able to follow costs of the project well. It evidently lacks a suitable system for systematic follow-up of costs. For that reason, many of the cost figures pertaining to the Norwegian contributions to the project given elsewhere in this report are estimates.

The failures of NORAD are partly due to lack of professional experience in NORAD by the time the project started, partly by the inherent inability of a large administrative organization in Norway to follow closely one particular industrial project in Tanzania.

Despite its shortcomings, however, NORAD has in several respects helped the Sao Hill Sawmill to become what it is today. The assistance with expatriate personnel has, generally speaking, been well designed, has held good quality and been of suitable size. Except for the first period of budgetary support, the financial assistance given has also been well adapted to the needs of the Sao Hill Sawmill. In general terms, the activities of NORAD have contributed to stability in the project, for example as regards technology employed, and have given a degree of continuity to the operations of the projects, despite the frequent exchanges of both Tanzanian and expatriate management personnel at the sawmill.

4.4. Sao Hill Sawmill as implementing organization

The first expatriates arrived in 1974, the same year as the Sao Hill Sawmill was incorporated. During 1975 the construction of the sawmill itself, staff houses and infrastructure started on a full scale, and the sawmill commenced production in the first part of 1976.

Due to the weaknessess of the TWICO organization and the passiveness of NORAD at that time, most of the decisions concerning the sawmill had to be taken locally by the sawmill's management.

Since 1975 this practice has been continued, having its positive and negative sides.

Local decision-making has made the management of the mill flexible. The mill's operations and plans have been adapted to the local conditions, and in most cases the needs and reactions of the mill's employees have been understood and taken into consideration. Most decisions taken locally, both by the Norwegian expatriates and the Tanzanian staff, have thus, in the opinion of the evaluation team, been sound. To examplify this, the decisions to provide the workers with a meal and to improve the social infrastructure have contributed to a good work relationship and to the good production results.

The disadvantages has been a lack of stability and continuity due to frequent changes of staff. Several expatriates with no background from developing countries have tried to implement their own ideas too fast, before having acquired the necessary insight in the local conditions. In several cases they have not fully understood to whom they were answerable.

The achievements and work morale of the Tanzanian workers in the forest and at the sawmill has, with some exceptions, been very good as long as the management has been proper and compares well with Scandinavian standards.

The achievements at the Sao Hill Sawmill should thus, to a large extent, be attributed to the local management of the sawmill and its Tanzanian work force. The first group of expatriates, arriving in 1975, played a key role in the establishment of the mill and the good work relationship, and should be specially mentioned.

5. RECOMMENDATIONS AND PROPOSALS

The evaluation team made a number of recommendations and observations related to the operation of the Sao Hill Sawmill in the course of its visit to Tanzania and during later reviews. In this chapter, recommendations are presented under four headings:

- General guidelines for the Sao Hill Sawmill
- The Sao Hill Sawmill Itself
- Raw Material Supply
- Socio-economic Activities

Proposals are, further, made for two groups of activities:

- Management Training and Product Development
- Continued Norwegian Support

5.1. General Guidelines for the Sao Hill Sawmill

At its establishment as a wholly-owned subsidiary of TWICO, the Sao Hill Sawmill was given its main objectives in the Memorandum & Articles of Association of the Company, as follows:

"The objects for which the Company is formed are:

a) To engage in and carry on (i) the business of sawmilling and production, manufacture, assembly, import, export,marketing, distribution and/or sale of all or any of the products thereof or of any business necessary or incidental thereto: and (ii) the business of timber and lumber merchants lumber yard and sawmill proprietors, (iii) the business of pulp and paper manufacture and distribution and sale thereof"

b) To carry on any other business (whether manufacturing or otherwise) which may seem to the company capable of being conveniently carried on in connection with the above or calculated directly or indirectly to enhance the value of or render profitable any of the company's assets, property or rights."

During its years of operation, the Sao Hill Sawmill has from time to time been given complementary instructions for its operations or set its own complementary objectives. This is natural for a dynamic company in a new sector. The present evaluation team proposes high productivity for the company as a main objective in the future. The background for this proposal is the following:

a) The generally low prices for the softwood timber from the Sao Hill Sawmill have been of crucial importance for the rapidly increasing domestic use of this product.

b) The currently adapted cost-plus pricing system, although well suited to guaranteed continued profitability, may lead to automatic price increases and thus endanger the competitiveness of the products. Extreme care has, thus, to be exercised to control unit costs so that the present price advantage over competing products is maintained.

c) The only way for the company to maintain the low competive prices of the products and at the same time generate good profits is to increase the present level of productivity.

It is important to note that the high productivity desired must be measured as a relation between the sum of outputs from the company and the sum of inputs. In other words, it is the productivity of the entire chain of operations that should be maximized, not that of the individual links in the chain.

Against this background, the present evaluation team would like to recommend the following subsidiary objectives for the sawmill:

- to produce softwood timber for domestic consumers at prices acceptable to the market

- to yield an acceptable profit

- to produce at a scale which makes it possible to generate the necessary funds for reinvestments

- to keep a level of technology where the utilization of domestic resources is preferred to foreign inputs

- in the long term perspective to produce export quality softwood timber from trees managed under a proper silvicultural system.

These objectives can be translated into the following operative guidelines:

- Maintain one line and one shift operation

- Expand operations as far as the main design permits, necessitating, first of all, a significant increase in transport capacity

- Maintain present general level of technology

- Maintain present main products

- Maintain present market direction, i.e. concentrating to the domestic market.

5.2. The Sao Hill Sawmill Itself: Recommendations:

The evaluation team is, in general, favourably impressed by the operations at the Sao Hill Sawmill. The mill has suitable equipment and is manned by competent personnel. It produces timber which is easily sold at a price level yielding an acceptable profit for the sawmill and a sizeable management fee for its holding company, TWICO. The Sawmill has passed through a number of phases in its development and can now expand its activities from a position of financial strength, political status and experience in production and marketing.

The evaluation team has six main recommendations as regards the Sao Hill Sawmill itself, related to the following seven matters:

- Vertical integration
- Improved sawmill layout
- Energy
- Waste
- Product mix
- Market direction
- Customers and pricing

5.2.1. Vertical Integration

The evaluation team has studied organization of production and development of productivity at the sawmill. There are indications that the integration between the different operations, from the forest through transport and sawing to planing or impregnation and marketing is not functioning smoothly. In general, the evaluation team recommends that the sawmill should improve such vertical integrating, tying the different operations tighter together. In particular, coordination should be improved between functions that are handled by different departments of the sawmill. One case in need of improvement is coordination between log transport and log intake at the sawmill, another the relation between the two production departments (logging and sawmill) and the maintenance department.

<u>Recommendation 1.</u> It is recommended that the problems regarding vertical coordination within departments are taken up in regular staff meetings with the department head and relevant subordinate staff responsible for various operations to be coordinated. The intention should be to report from the various links in the process, identify problems related to their coordination, and find solutions.

Recommendation 2. It is recommended that coordination problems between departments are taken up in regular meetings between the department heads in question. In particular there seems to be a need for coordination between the maintenance department and the two production departments.

Recommendation 3. It is recommended that the maintenance department should develop a reporting system regarding causes of breakage on vehicles to the logging department. This information could serve as a basis for identification of training needs or disciplinary measures. In general there seems to be a need for stricter management and supervision of log transportation. Revisions of incentive systems, driving in convoy, writing of logbook, etc. may be considered.

5.2.2. Improved Sawmill: Layout

Generally speaking, the sawmill has been working very satisfactorily, with a very low rate of production stoppage due to mechanical breakdowns. The log intake capacity of the sawmill could, however, be increased to 55,000 to 60,000 cubic metres per year, through a relatively simple re-arrangement of the present machinery. There are also plans at the sawmill to increase the planing capacity from 2,000 to 8,000 cubic metres per year.

Recommendation 4. It is recommended that the lay-out of the sawmill should be modified to increase its log intake capacity, but only after a management plan for the Sao Hill Forest Plantation is developed and a long-term agreement with the Forest Division is reached regarding the supply of raw material. A second precondition for investments in increased log intake capacity is that the capacity for transport logs from the forest is increased.

Recommendation 5. It is recommended that the sawmill should increase its planing capacity, again only after the uncertainties regarding supply of raw material are solved.

5.2.3. Energy

At present, electric power to the sawmill is obtained from four diesel generators, each with an output of 160 kW. Normally, three of the generators operate during working hours. More than 300 kW of continuous output is seldom needed. There are two main problems associated with the generators as suppliers of power. One concerns the reliability of power supply; a fire in the generator house caused a production stop on the sawmill of several weeks in 1981, while shortage of diesel oil caused a stop of one month in 1983. The other problem concerns the cost for diesel oil, amounting to the equivalent of about one million shillings per year, to be paid in foreign currency.

The alternatives to diesel generators have been studied at the prefeasibility level: hydropower and steam generated power, using wood waste from the sawmill as fuel. Both have been found to be economically preferrable over the present supply system.

Recommendation 6. It is recommended that a decision is taken soonest possible on a new source of power to the sawmill. The study of steam generated power is based upon a high price for wood waste. The team recommends this price to be reduced, as the waste has no value at present, and the prospects for its future utilization are unclear.

5.2.4. Waste

Much wood is wasted in the process of sawmilling. First 10-30 % of the wood volume in a forest stand to be clearfelled is simply left behind in the forest. About half of the remainder then leaves the saw house in the form of slabs, off-cuts, shavings and sawdust. At present, only a minor share of that volume - - 40% of the slabs - - is used, mainly by the residents of Sao Hill, who use it as fuel or construction material.

The forest waste could, at least in theory, be sold at roadside to the Southern Pulp and Paper Mill as pulpwood. The mill waste might also be sold as pulpwood; alternatively it could be used as fuel at the sawmill, in order to generate electric power.

Recommendation 7. It is recommended that the Sao Hill Sawmill should prepare itself for discussions with the Southern Pulp and Paper Mill and the Forest Division regarding the potential use of forest waste as pulpwood. The sawmill should, however, study the following questions before an agreement is made to sell pulpwood to the Southern Pulp and Paper Mill:

- Change of logging system, enabling a separation at roadside between sawlogs and pulpwood.
- Agreement regarding prices and quantities with the pulpmill.
- Agreement with the Forest Division regarding differentiated stumpage rates for sawlog trees and pulpwood trees.
- Profitability for the sawmill to sell pulpwood at roadside.

The waste wood from processing in the sawmill could be used in a variety of ways. Slabs could be chipped and sold to the Southern Pulp and Paper Mill either as fuel or as raw material for pulp. Wood wastes at Sao Hill could be burnt these to generate electric power, or they could be convented into charcoal briquettes and sold to other consumers.

Recommendation 8. Is it recommended that the Sao Hill Sawmill should carry out a feasibility study regarding alternative uses of the wood waste from the sawmill. The evaluation team believes that it will prove quite attractive to use a part of this waste as fuel for a power generating plant at the sawmill. For social reasons, the present practice of giving away slabs to the local population for use as fuel or construction material should be continued.

5.2.5. Product Mix

There was a drastic change in product mix in 1982, when the company shifted its production towards planed and treated timber in view of the changing demand. However, based on the 1982 cost accounts, it is quite clear that the most profitable product was rough timber, followed by planed timber and impregnated timber. This problem was only partially solved in 1983 through price increases for planed and impregnated timber. This shows that the current product mix is based more on new product introduction than profitability.

During recent years, the sawmill also has some sideline production of furniture and prefabricated houses, operated when excess labour time has been available. These products have yielded some 2-3 present of gross revenues.

Recommendation 9. It is recommended that the main products of the mill should remain rough timber, planed timber and impregnated timber. The side line activities should remain a sideline, as too much diversification might lead to compounded management problems and as furniture and prefabricated houses are more economically produced near the final markets.

Recommendation 10. It is recommended that the production volumes and the prices for planed and impregnated timber should be determined with more regard to profitability. The recent trend towards production of planed and impregnated timber is, however, generally supported.

Recommendation 11. It is recommended that increased utilization of impregnation capacity should be achieved through the production of impregnated aucalypt poles. This product is probably highly profitable and will also save the country some foreign exchange through import substitution. The raw material is also abundant in the locality. Careful market research for the product should be undertaken.

5.2.6. Market Direction

Most of the production at the Sao Hill Sawmill is sold in the domestic market. Some export to Zambia took place two years ago. Market investigations have been done in the Seyshelles, Mauritius, Reunion and Zambia. Contacts have also been established with timber dealers in the Middle East.

The conclusion of the experience gained is that the competition in the export market is very tough. Exports have to be subsidized by the government, as the quality of the products and the unit costs are not competitive at present. The domestic marketing conditions are very favourable. It is expected that a doubling of the production can be sold. The demand for planed and treated timber has increased considerably during the last year.

Recommendation 12. It is recommended that the domestic market should remain the dominant one for the sawmill. Direct export should not be a major goal. Instead, export should indirectly be promoted by increased substitution of hardwood in the domestic market in order to release hardwood for export. Tanzania has attractive hardwoods and the international prices are about three times the prices for softwood. Foreign currency should also be saved through sales to internationally financed projects.

5.2.7. Customers and Pricing

As pointed out above, the major market for the sawmill's products is the domestic market. However, softwood timber is a new product in the country for construction and furniture making, thus requiring some re-orientation among the users of this product for continued future expansion of the market. So far the company has faced no problems with marketing their products domestically through TANTIMBER and direct customer service at the mill site.

It is important to note though that the generally low prices for the softwood timber has played a crucial role in promoting the use of this new product domestically. Care should be taken not to erode this advantage through the currently adopted cost-plus pricing system. Efforts at minimizing unit costs should be stressed to maintain this advantage while maintaining high profitability for the enterprise.

The following recommendations are derived from this general policy.

Recommendation 13. It is recommended that the Sao Hill Sawmill in cooperation with TWICO should institute a training program, for carpenters at the mill, in using softwood for furniture making and other products to promote its expanded use.

Recommendation 14. In order to avoid the potential overconqestion at the mill resulting from a high number of small lot buyers, marketing should be oriented towards bulk sales. This would provide for more control and easier handling of the stock to the customers. It will also ensure the delivery of properly seasoned timber which is important for the company's goodwill.

Recommendation 15. It is recommended that contractual sales to selected customers should be introduced. This would facilitate planning of stocks and also of production. Record keeping and recovery of debts would also be facilitated.

Recommendation 16. It is recommended that a fixed proportion of the supply from the mill should be set aside for retail sale, mainly to satisfy local demand. Retail for such deliveries should take into account increased handling costs.

Recommendation 17. It is recommended that priority should be given to sales to international contractors, as such sales earn foreign exchange for the country.

Recommendation 18. In the long run it is recommended that a grading system for timber should be introduced with differential prices to avoid the current average lot system practiced at the mill.

5.3. Raw Material Supply: Recommendations

At present the supply of logs to the sawmill constitutes the main obstacle to increased production. The raw material is inadequate both as regards quantity and quality. These problems are discussed in this section, under three headings:

- Raw material quantity
- Raw material quality
- Organization of raw material supply.

5.3.1. Raw Material Quantity

At present, the transport capacity for logs limits the production at the sawmill. This bottleneck should be eliminated as soon as possible.

Recommendation 19. The capacity to transport logs from the forest to the sawmill should be increased as soon as possible through improvement in the operations of the transport system, complemented by acquisition of new transport capacity. In the first phase, transport capacity should be made to match the present log intake capacity of the sawmill, or 40,000 - 45,000 cubic metres per year. If the sawmill capacity is increased to 55,000 - 60,000 cubic metres, as recommended in Recommendation 4 above, then transport capacity will have to be further increased.

5.3.2. Raw Material Quality

The logs reaching the sawmill often have poor quality, being too short, of small diameter or not straight, or with too many or too big knots. This is because the forest stands did not receive the proper silvicultural tending, such as thinning and pruning.

Recommendation 20. It is recommended that a management plan is made for the Sao Hill Forest Plantation. The plan should include a sawmill logging circle, where a full silvicultural tending programme, including thinnings and prunings should be undertaken in order to improve the sawlog quality. In this sawmill logging circle, all the *Pinus patula* compartments planted from 1960 to 1969 should be included, as well as the major part of the compartments planted from 1970 to 1977. Of the large areas planted from 1978 to 1982, only a relatively small part of the highest quality stands need to be included. The Sao Hill Sawmill and the Forestry Division should consider a gradual transfer of pruning and thinning operations from the Forestry Division to the sawmill.

Recommendation 21. It is recommended that the stumpage or royalty should be highly differentiated, depending on quality. In such a system high quality sawlogs should fetch a high price, whereas low quality wood should fetch a low price. This princip system could turn out to be an important tool for the optimal utilization of the forest resources and lead to a higher recovery rate at the sawmill.

5.3.3. Organization of Raw Material Supply

A new factor, of strategic importance for the log supply to the Sao Hill Sawmill, has now entered the picture: The Southern Pulp and Paper Mill at Mufindi. When the new escarpment road is constructed, the transport distance between the two mills will be approximately 60 kms. As much of the forest area supplying the Sao Hill Sawmill lies between the sawmill and the pulp and paper factory, stiff competition for wood can be expected.

The management at the Southern Pulp and Paper Mill expects the mill to produce at full capacity, which means a log intake of 283,000 cubic metres per year, from 1986 onwards. If this production target is reached, and if the Sao Hill Sawmill is producing at its planned capacity, there will not be a large surplus of wood up to 1992, even if no losses occur through forest fires or other calamities.

Moreover, the pulp and paper factory will use heavier logging equipment than the sawmill (chainsaws, Timberjacks). In this situation, it can be expected that both parties will prefer the large diameter trees obtained through clearfellings in the older compartments, and will try to avoid the thinnings; the Sao Hill Sawmill because it needs sawlogs of large enough top diameters for its production of sawn timber, and the Southern Pulp and Paper Mill because its heavy equipment is poorly adapted to the harvest of small diameter trees obtained in thinnings.

Recommendation 22. In order to regulate the conflicting interests between the Southern Pulp and Paper Mill, the Forest Division, and the Sao Hill Sawmill, to make long-term planning possible, and to secure an optimal utilization of the forest resources, the evaluation team strongly recommends that a long-term agreement regarding the utilization of the Sao Hill plantation is made by the three involved parties. This agreement should be a precondition for future investments in the sawmill.

Recommendation 23. When the Southern Pulp and Paper Mill starts its logging operations, there will inevitably be a strong pressure in the Sao Hill Sawmill to change its logging system or technology. It is strongly recommended that such changes should not take place unless absolutely necessary, and not until a study of its consequences has been undertaken.

Recommendation 24. It was pointed at above, in section 5.2.1., that the Sao Hill Sawmill should increase vertical integration from forest to marketing. For that reason, it is here recommended that the sawmill should keep its own logging department, striving to integrate it better, particularly with the sawmill department. This also leads to the conslusion that it would be disadvantageous for the sawmill if a horizontally integrated logging enterprise was created, providing pulpwood to the Southern Pulp and Paper Mill and sawlogs to the Sao Hill Sawmill.

5.4. Socio-economic Activities: Recommendations

The Sao Hill Settlement is, in many ways, a good place to live in, much due to the varied social services provided by the Sao Hill Sawmill. It has certain shortcomings in comparison with Tanzanian villages in general. In the view of the evaluation team, these are mainly related to the inability of the settlement to develop and grow naturally. One major problem is lack of housing, another the lack of alternative economic opportunities and services normally found in a village.

In this section a few proposals are made for improved socio-economic conditions, particularly for the inhabitants of the Sao Hill Settlement. The proposals are presented under the following needings:

- Housing
- Employment
- Agriculture, food production and nutrition
- Health, Education and Recreational activities

5.4.1. Housing

The evaluation team considers the housing problems mentioned above at the Sao Hill Settlement to be serious in a long-term perspective. The team is aware of the activities of the now defunct Mbao Housing Scheme and of the recent Norwegian decision to support the construction of new houses in the settlement.

A NORAD grant will provide the Sao Hill Sawmill with 40 additional company houses. This will, however, not solve the housing problem. It is the ambition of every worker to own their home. It is feared that the Sawmill may loose employees to the Southern Pulp and Paper Mill. Housing, in terms of private ownershop to a home, will more than anything else disincline people to change employer.

Recommendation 25. It is recommended that is should be investigated whether it is possible to change the status of the settlement. One way to do this might be to give the Sao Hill Sawmill more authority over the settlement, perhaps through a long-term lease of the land from the Forestry Division.

Recommendation 26. It is recommended that the Sao Hill Sawmill consider to establish a revolving fund to provide permanently employed workers with a housing loan up to shs. 20,000 preferably for purchase of cement and corrugated iron sheets.

Of all the sawmill employees the loggers are least privileged. So far, logging has been carried out in the vicinity of their homes, but this is now ending. In the future, it is planned to lodge loggers in temporary camps at logging site. The evaluation team believes this to be a socially poor solution.

Recommendation 27. It is recommended that loggers should be provided with bicycles or other means of transport, enabling them to continue to live at home, rather than lodging them in camps at the logging sites. The bicycle alternative is likely to be the least expensive and probably the most reliable.

5.4.2. Employment

Industrial employment has far reaching consequences for the division of labour and authority within the family. This often has consequences for the status of women and the situation for children. Sao Hill Sawmill provides few jobs for women; only 14 out of over 300 employees are female.

Recommendation 28. It is recommended that the situation of women and children is looked into, and that more women are employed by the mill. Possible fields of employment for women are within the planing, trimming and carpentry units, within transport, production of working outfits for mill employees, and production of wooden toys. It is also recommended that a research project be carried out with emphasis on the economic strategies pursued by families in paid employment at Sao Hill.

5.4.3. Agriculture, food production and nutrition

The considerable agricultural achievements at Sao Hill is the most positive socio-economic development since the 1977 evaluation. 360 acres of agricultural land is ploughed by sawmill tractors free of charge, and shared by 343 mill employees. Also seeds,pesticides and fertilizer are provided distributed to the employees, and paid for in installments on their salary.

A meal is provided to all workers five days each week.

Recommendation 29. It is strongly recommended that the sawmill continues and increases its present support of agricultural activities, and give basic advise in the fields of food production and nutrition, in order to diversify and increase the production of food.

5.4.4. Health, education and recreational activities.

The dispensary is small, there is no resting room, and it is located in the heart of the sawmill complex. Due to this a majority of the dispensary patients are sawmill employees.

Apart from football and netball no recreational activities are organized in Sao Hill. Spare time is spent at home, in the garden (shamba) or talking with friends over a glas of beer.

Recommendation 30. It is recommended that a new dispensery is set up outside the sawmill, giving women, old people and children easier access to its services.

It is furthermore recommended that more recreational and educational activities should be organized, and that a POMPE shop should be built at a suitable location.

5.5. Management Training and Product Development: Proposal to the Sao Hill Sawmill and TWICO

In this section, three interrelated proposals are made. One concerns the need to organize training for present and future sawmill personnel at the management level, one treats the possibility to create new production capacity using logs from thinnings in the Sao Hill Plantations, and one deals with the need of product development and information to customers of the sawmill.

5.5.1. Management Training

The fact that several expatriates are still working at the Sao Hill Sawmill, albeit as advisers, points to the need to train Tanzanians to assume complete responsibility for operations at the sawmill. Further arguments for a concrete training programme for managers are given in Technical Appendix B. As management personnel is not employed by the sawmill itself but by TWICO, a management training programme should be directed towards TWICO and aim at training of managers at the sawmills falling under the authority of TWICO.

The number of employees at a managerial level within TWICO is at present about 60. This gives a first indication of the number to be trained.

The management training programme is proposed to be developed in more detail by a programming mission, but a few aspects of the envisaged training programme can be mentioned already now, offered as preliminary guidelines for the programming mission. Thus, the present evaluation team considers that the training programme for each participant should cover a total period of about two years, of which the participants spend a part in formal training--theoretical or practical-- and a part in their ordinary jobs. The team suggests that about 15 persons should enter the training programme each year.

As to the location of training, various alternatives should be considered. A guiding principle should be to carry out as much of the training as possible in Tanzania. Some of the theoretical courses could, however, be given outside the country. The practical training should be carried out in a realistic training environment. Training in financial management and management of personnel could either be carrid out at the Sao Hill Sawmill itself or at the new mobile sawmills proposed to be established in the Sao Hill Plantation (see section 5.5.2. below). One distinct advantage of the Sao Hill Sawmill is that it provides an industrial environment, where well established production systems have formed. Practical training, on the other hand, should probably be carried out at the new mobile sawmills in the Sao Hill Plantation, where production management issued are easier to understand and where production could more easily be affected by the trainees.

The evaluation team proposes two categories of trainers for the management training programme. One is the Tanzanian and expatriate specialists working at Sao Hill. The other is a training team consisting of one Senior Management Training Officer and one Training Officer.

The Senior Management Training Officer's tasks would be to investigate carefully training needs on this level of the organization, locate relevant training resources available in Tanzania and abroad and include in the training programme a component of management at the mobile sawmills at Sao Hill. This practical training should be organized so that the trainnees take full responsibility for the small scale sawmills in all aspects of their operation, for periods of up to a few months. It is estimated that two or three persons can simultaneously receive training at the management level at each of the tree mobile sawmills. Further, it must be a task for the Senior Management Training Officer to organize some supplementary formal instruction related to the experiences gained at the mobile sawmill in the practice period. This instruction must take place at the site and take operational and other problems encountered by the trainees as its point of departure.

The expatriate Training Officer would assist his senior colleague, and in particular be responsible for the day-today implementation of the management training programme.

As the training programme will be national in perspective and not only available to Sao Hill staff, the evaluation team finds that both training officers should be responsible directly to TWICO and not to the Sao Hill Sawmill.

5.5.2. Additional Production Capacity

Up to the year 2000, the major increase in harvestable sawlog volumes will come from thinnings, due to the extremely skewed age-class distribution in the Sao Hill plantation.

According to our "Preliminary Long-term Harvesting Plan", more fully described in Technical Appendix C, the thinning volumes of sawlog diameter will be:

1984-91	9 000 m3/year
1992-97	44 000 "-
1998-2002	102 000 "-
2003 and after	80 000 "-

The most economical way of sawing these volumes will probably be at smaller (mobile) mills, located close to the forests to be thinned, and to transport the rough timber to the main mill for blue stain treatment, seasoning and possible further processing. Such decentralized production of sawn timber is in practice often difficult to implement under a large organisation like TWICO. However, the conditions are clearly more favourable at Sao Hill than at other forest projects in Tanzania, due to the strength of the main mill, from where the small units can get the necessary support and obtain the necessary basic services (maintenance, spare parts, fuel, etc), as well as further processing of the rough timber.

In order to prepare for the large increases of sawlogs coming from thinnings in the Sao Hill Forest Plantation in the future, the Sao Hill Sawmill should prepare itself as soon as possible, through the establishment and operation of a few production units specially designed to handle small logs. For this reason, the evaluation team recommends that three mobile sawmills should be set up under the management of the Sao Hill Sawmill. Total investments are likely to be Shs. 1-1.5 million per unit.

The decentralized production of sawn timber at small sawmills poses several problems, mainly in terms of organization, control and workers' transport. But the advantages seem to be larger: Low investment costs (as calculated per cubic metre log input), short log transport distance, simple and reliable technology, a size of operations at each unit which is manageable and flexible, adapted especially to thinnings. Its size also makes it easy to understand and organize the whole production process from felling of the trees to the final production of rough timber, making proper vertical integration feasible. These facts make these small sawmills suitable for the production-oriented aspects of the management training programme outlined in section 5.5.1. above.

5.5.3. Product Development

Increased use of softwood in Tanzania will indirectly increase potentials for export of hardwood and give access to badly needed foreign currency. Today hardwood is commonly used for purposes where softwood should be sufficient. Consumers in Tanzania seem unaware of the potentials of softwood. In order to expand markets for softwood its potentials should be made known. The price of softwood is around one third of hardwood prices in the world market.

For this reason, the evaluation team proposes that an expatriate post as Product Development Officer should be created at the Sao Hill Sawmill. This officer, who should have a background in carpentry, would lead courses for customers in potential uses of softwood and to lead product development at the sawmill. His target group would be the major Tanzanian users of wood, particularly for furniture - but possibly also for construction.

Another important duty of the Product Development Officer would be to adapt the production at the Sao Hill Sawmill to the end uses of the products. One example illustrating the need for that job is the fact that much softwood timber leaves the sawmill green and is also used green in construction, with consequent insect and fungi attacks. From what is said above, it becomes obvious that the Product Development Officer would be an important resource person in the Management Training Programme indicated in section 5.5.1. above.

5.6. Continued Norwegian Support: Proposal to NORAD

The evaluation team has four proposals to NORAD, related to the following issues and to be further elaborated by a Programming Mission:

- Continued support to the Sao Hill Sawmill
- Support to management training and product development
- Preparatory study for a new softwood sawmill.
- Division of responsibilities between Norwegian organization.

5.6.1. Continued Support to the Sao Hill Sawmill

Continued support to the Sao Hill Sawmill is recommended in the following three areas:

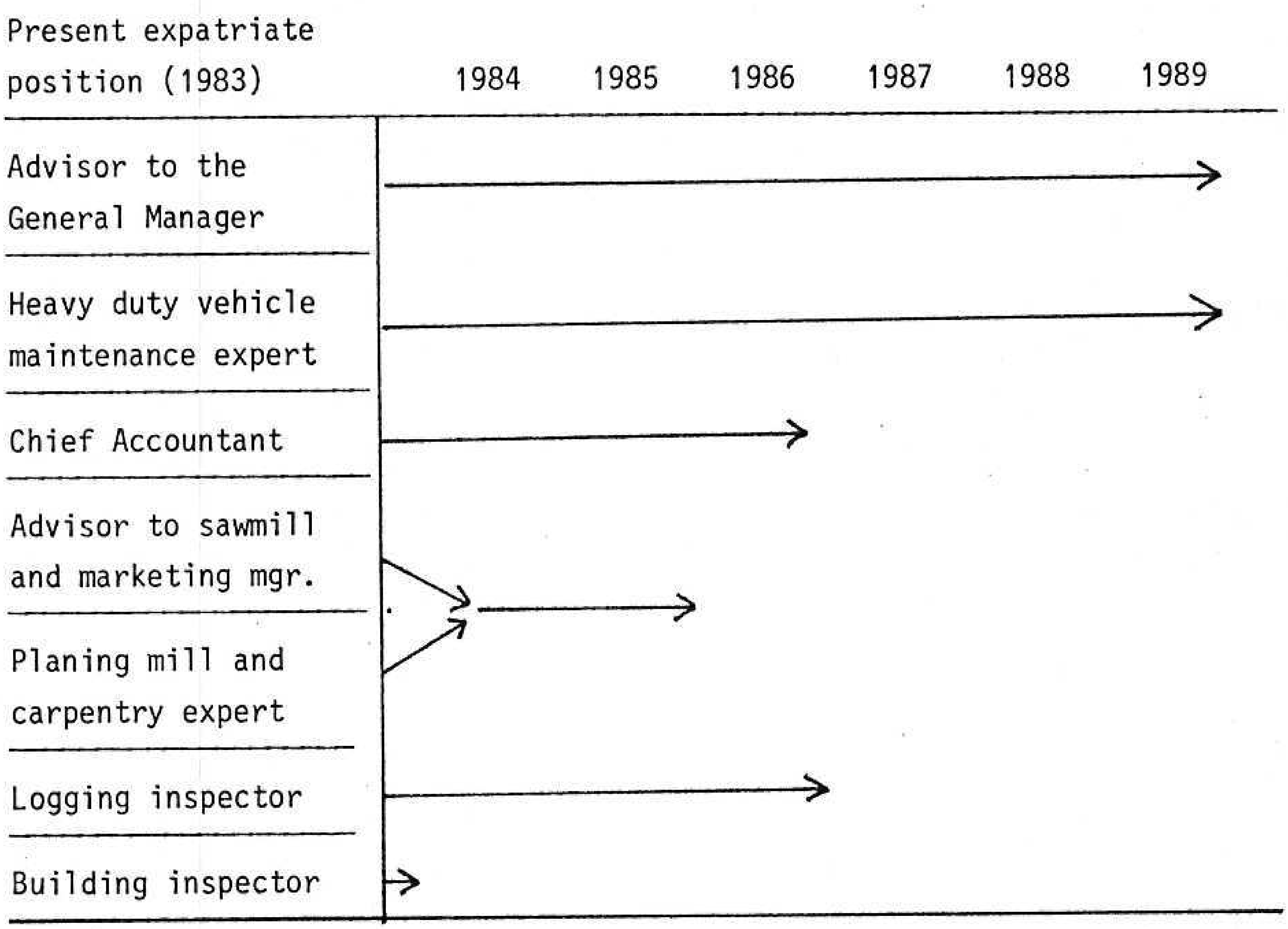
- expatriate long-term services, phased out over six years
- short-term consultant services for purchases, recruitment, and other technical services, to be carried out within annually agreed budget frames
- balance of payments support enabling investments and purchase of spare-parts to be carried out.

Based on the failures of previous predictions, the evaluation team finds reasons to extend the perspective on possible withdrawal of key expatriate positions as far as six years from 1983. The areas which actually need the presence of advisors should be carefully considered and a long term plan for a phasing out programme should be made.

There are several ways to reduce the presence of expatriates and thus sustain the process of Tanzanianization. Among these are:

- Withdrawal of expatriate positions
- Transition of expatriates in responsible management positions into advisory roles
- Combining tasks of presently separate expatriate positions so that one expatriate covers more than one area
- Replace permanently stationed expatriate positions with a scheme for recurring short term consultancies.
- Transition of expatriates into supporting functions like training or product development, rather than direct involvement in the daily running of production.

A possible alternative for consideration is presented below.



As can be seen above, it is recommended that the last expatriates to be withdrawn should be the advisor to the General Manager and the heavy duty vehicle maintenance expert. The figure above also indicates that withdrawals of expatriates from other positions could be considered within a 2-3 year period and that the position of advisor to sawmill/marketing and planing mill/carpentry could be combined into one expatriate position by 1984. The role of the advisor to the General Manager may become especially important if conflicts regarding raw material or manpower should occur in the relation to the Southern Pulp and Paper Mill. Tasks presently taken care of by the building inspector would fall under the proposed product development officer.

The preconditions for phasing out long time expatriate personnel are a certain minimum stability of Tanzanian mana gers and the implementation of a management training programme as proposed.

Short-term consultant services should, further, be made available to the Sao Hill Sawmill as deemed necessary to the management of the sawmill. It is likely that such services would be needed particularly in the fields of purchases, recruitment of long-term expatriate personnel, specialized technical investigations, and preparatory studies for development of the sawmill.

It is also proposed that NORAD should continue its present balance of payments support, enabling the Sao Hill Sawmill to renew and improve its machinery, to replace worn out pieces and to supply the mill with imported consumable articles.

5.6.2. Support to Management Training and Product Development

The evaluation team proposes that NORAD should finance the new project components outlined in section 5.5. above, i.e. the following three activities:

- Establishment of three mobile sawmills
- A product development programme with one expatriate specialist
- A management training programme with two expatriate specialists.

The team proposes, further, that the detailed contents of these three activities should be defined in a joint NORAD-TWICO programming mission.

5.6.3. Preparatory Study for a New Softwood Sawmill

The harvestable sawlog volumes at Sao Hill Forest Project may at present not be large enough for the establishment of a second production line in addition to the expected increased capacity of the existing line to a log input of 60 000 m^3/year.

The evaluation team, however, supports the idea of increased production of softwood timber as a suitable area for NORAD participation, justified by the following facts:

- there are large surplus volumes in several of Tanzania's existing industrial plantations
- sawmilling is a proven industrial activity to utilize these resources for the low-cost production of useful goods, for which there is at present an unsatisfied demand
- partly due to the experiences from Sao Hill, there is in Norway a large pool of know-how as concerns harvesting and sawmilling activities at an intermediate level of technology.

- In Kiwira and Kawetira near Mbeya there are plantations with large harvestable volumes which justified NORAD's financing of the Mbeya sawmill feasibility study in 1979.

The evaluation team proposes Norwegian support to the study of a second major softwood sawmill in southern Tanzania. In the first phase, the existing feasibility study for a sawmill at Mbeya should be updated. If the sawmill is found feasible, Norwegian support should be provided in the following three areas:

- balance of payments support for investments and the purchase of spare-parts and imported consumables
- expatriate services during a run-in period of six years
- short-term consultant services.

The evaluation team does not recommend the establishment of a second production line at Sao Hill at present.

5.6.4. Division of Responsibilities between Norwegian Organizations

The evaluation team has discussed activities by and relations between mainly the following four organizations: NORAD, FORINDECO, TWICO, and the Sao Hill Sawmill itself. In this section, the evaluation team presents views on the responsibilities of the two Norwegian organizations NORAD and FORINDECO in relation to the two Tanzanian ones.

a) NORAD

Formally the responsibility for the sawmill rests with TWICO. By giving financial assistance to the project, however, NORAD has indirect responsibility for how the project develops. Decisions made (or not made) by NORAD will have wide consequences for the sawmill's operations.

The primary role of NORAD is that of financer providing foreign currency for import and payment for expatriates. The evaluation team recommends that NORAD should retain this important function. Further, it is recommended that NORAD should assume responsibility for long-term planning, follow-ups and recurrent evaluations. The evaluation team also recommends that a contract regarding the relationship between NORAD and TWICO in these areas should be made. The contract should be made for a period of three years based on a five year development plan for the Sao Hill Sawmill.

b) FORINDECO

NORAD has delegated the tasks of giving advice the recruiting expatriates to the consulting firm FORINDECO. Thus, services formally provided by NORAD is in practice given by the consultant. The direct relation between FORINDECO and TWICO, the sawmill and its expatriates is unclear. The evaluation team recommends that FORINDECO should act as consultant to TWICO and the sawmill. It is, further, recommended that FORINDECO in the future should take full responsibility both for recruitment, training, and employment of long-term personnel, utilizing services from NORAD only when needed in order to provide adequate services. A contract specifying the mutual obligations and areas of cooperation should be made between the consultant, TWICO and the sawmill. NORAD should negotiate this contract and it should be approved by TWICO. Strengthening of competence and capacity within FORINDECO should be considered in relation to the terms specified within the proposed contract.

6. GENERAL LESSONS LEARNT

The Sao Hill Sawmill is a major joint Tanzanian-Norwegian development effort. The Sawmill has attained a certain level of maturity as an enterprise which enables one to look back and draw generally applicable lessons in development cooperation in this sector. The general areas where lessons has been learnt are presented below:

6.1. Time Perspective of Development

Development is a process of "unfolding of potentialities" and as such is a process that takes time. The development of Sao Hill Sawmill is a similar process and thus in the view of the team, it may take some 15 years for it to function smoothly and independently. The process of developing a whole new industrial subsector with requisite skills and competence that of softwood sawmilling may, however, take twice as long.

6.2. Size of Project

The Sao Hill Sawmill is big in the Tanzanian wood industry context. It produces as much sawnwood as the total production of sawnwood of the other sawmills in the country. Although,large projects do not assure success, the size of Sao Hill Sawmill made it possible to engage the bureaucracy in Dar es Salaam and Oslo to quite antoher extent than would have been possible with a smaller project. The size of the sawmill made its spin-off effects small in terms of establishing new sawmills modelled on Sao Hill since no such mills have been constructed. The Sao Hill Sawmill however has provided the background experience and strength necessary for the establishment of smaller sawmills using softwood, as is now recommended in this report.

It remains to be seen,however, whether its size is adequate to handle possible interference from SPM. This said, it should also be mentioned that the size of the Sao Hill Sawmill is not large seen from a Scandinavian point of view. An enterprise of this size has turned out to be manageable also in Tanzania.

6.3. Planning Horizon

The problems in the present operations of the sawmill and especially in the critical start-up phase would have been reduced if short-term economic returns had been given due weight. The mill would have been able to perform better and it would have been a better investment for Tanzania seen even in a long-term perspective.

The capacity to transport logs from the forest to the sawmill is the main bottleneck for the Sao Hill Sawmill today. The location of the mill is unnecessarily far from the forests that now yield sawlogs. In another ten years the picture will be different, when the young forests around the mill will start to yield sawlogs. The mill was originally planned to be the core of a future wood-working complex. The location of the Southern Pulp and Paper Mill has altered this. Instead of the expected wood-working complex around the present sawmill site, the Southern Pulp and Paper Mill at Mufindi will now absorb any surplus wood from the Sao Hill forest plantations that is likely to be produced over the next 10 years.

6.4. Capacity of Related Organizations

At the planning stage the only organizational capacity that was focused at was that of the Sao Hill Sawmill. Other organizations such as TWICO, TANTIMBER, Tanzania Investment Bank, the Forest Division, FORINDECO and NORAD were basically assumed to be there and were basically assumed to be able to carry out the duties given to them without much problems. Reality has shown these assumptions to be mistaken. Many if not most of the problems the sawmill has expereinced over the years have their origin in performance of surrounding organizations.

6.5. Choice of Technology

A choice of technology in a sawmill of the type of Sao Hill includes sawmill equipment, logging and transport systems. As have been mentioned in the report the sawmill is reliable, however, its proper functioning is dependent of satisfactorily operation of logging and transport systems. The transportation system has especially found to be more costly than anticipated and full of problems mainly due to inproper use of the transport fleet arising from inadequate management control. If this problem can not be solved in the short perspective it is considered necessary to install a certain overcapacity in the transportation system.

6.6. Generation of Knowledge and Competence in Norway

One lesson learnt from the successful establishment of the Sao Hill Sawmill is that Norway has the capacity to provide quite a high number of qualified persons for service at the mill, both for technical and managerial posts. One reason for this was that many Norwegians had previous experience of forestry projects in developing countries and were ready to venture abroad again. Another reason may be that Norway in general is well equipped to provide services in this sector in developing countries, as one still finds many persons with background in forestry, agriculture, and sawmilling at an intermediate level of technology.

Annex 1. Terms of Reference for the Evaluation of TAN 021 - Sao Hill Sawmill

I: Background

The first agreement between Tanzania and Norway regarding the development of the Sao Hill Sawmill was concluded in 1973 and provided for support to the forest industry based on program support via Tanzania Investment Bank. The agreement was changed in 1977 to become a project assisted directly with technical and financial means by NORAD. A first evaluation of the project was carried out in the same year, when the project was still in its start-up period. The latest bilateral agreement was signed on the 6th of November 1979. During the last years the project has been supported by NORAD through the consultancy Fund and has also benefited from the Balance of Payment Support. Tanzania and Norway principally agreed to carry out a second evaluation in 1982, later postponed to 1983.

II: Mode of work

The participants will familiarize themselves with all aspects of the work carried out by the Sao Hill Sawmill Project, and with former evaluations and reports. The work will include talks and interviews with Tanzanian and Norwegian officials and with persons related to the project. It will also entail field work in the area covered by the project. The evaluation shall be undertaken in close cooperation with the Tanzanian authorities and NORAD.

III: Tasks of the evaluation team

1. Objectives

The objective of the evaluation is to review the project from the point of view of practical and project related lessons and experiences, efficient use of total resources invested, and impact of social, economic, and environmental nature. The evaluation team shall retrace the original project goals and explain possible changes that have taken place subsequently. The team shall discuss the adequacy of plans and investments committed to reach the stated goals. Possible goal and interest conflicts, and conflicting interests in the project, should be identified and analysed. The discussion should be guided by Tanzanian and Norwegian development policies. The team shall spell out the rationale of its judgements and make recommendations for the viable continuation of the project, towards the ultimate goal of Sao Hill Sawmill becoming a viable, selfsupporting economic enterprise.

2. Organizational aspects

The evaluation team shall:

2.1 Assess the relevancy and follow-up of recommendations from the previous evaluation and other project reviews.

2.2 Discuss how the division of responsibilities between the parties involved in the project (NORAD, Treasury, Forest Division, TWICO, FORINDECO, and expatriate experts etc.) has been - according to the agreements and in practice, and make suggestions for division of responsibilities in the current phase of organization.

2.3 Consider the role of the consultancy firm FORINDECO in the project, and assess the need for continuing the support of these services.

2.4 Assess the process of "Tanzaniation" of the project, in terms of

- training of national counterparts on different levels, and their preparation to take over the responsibilities and their effectiveness for an optimal operation of the Sao Hill Sawmill itself;

- The main shortcomings and problems in the present organizational set-up, and how they can be controlled eliminated;

- how a further withdrawal of foreign assistance may be achieved, and discuss the possible role of the expatraites and consultants in that respect.

Review the adequacy of the system of statistics and reporting established for the project.

3. Forestry

Due to the integrated nature of the forest activity and the common dependency on the timber resources, the evaluation team shall, to the extent possible:

3.1 Assess the collaboration and coordination between Sao Hill Sawmill, Forestry Division and Southern Pulp and Paper Mill, Mufindi, with respect to the management of the forest resources, and make recommendations for future cooperation and division of work.

4. Technology

The evaluation team shall:

4.1 Make a general assessment of the choices of technology in Sao Hill Sawmill - in logging, timber-transport and saw-milling, in the light of the project objectives.

5. Commercial aspects of Sao Hill Sawmill

The evaluation team shall discuss the present and future policy of manufacturing and product development with regards to business economics as well as to the economy as a whole.

The team shall in general terms consider the desirability of expanding the saw-mill with a second production line, and for this purpose look into the adequacy and capacity of the site infrastructure, the available raw material and the market.

6. Social infrastructure

The evaluation team shall:

6.1 Assess the goals and achievements in establishing adequate community services, (including housing) and functions in Sao Hill and the surrounding project area.

7. Effectiveness and Impact

The evaluation team shall assess the impact and goal achievement of the Sao Hill Sawmill, in terms of:

7.1 Commercial and technical effectiveness of Sao Hill Sawmill as a company in relation to overall Tanzanian/Norwegian investments up to now (capital investments, technical assistance, consultances etc.).

7.2 Socio-economic development effects on the target population and target area, such as employment, income, social progress - and the distribution of these gains. Particular attention should be paid to the permanence and security of the achievements, and to the current emphasis on target groups and basic needs in Tanzanian and Norwegian development policies.

7.3 Integration of the Sao Hill Sawmill activities into the district/regional/national economic development at large (inclusive of backward and forward linkages).

7.4 Macro-economic effects of Sao Hill Sawmill (contribution to GNP, foreign exchange earnings, economic independence).

7.5 Possible indirect spinn-off effects of Sao Hill Sawmill.

IV: Reporting

A preliminary report, containing main conclusions, shall be worked out by the full team in Tanzania. The final report is to be submitted to NORAD within one month after the completion of the field study. The report should comment specifically on three aspects; practical lessons to be learnt, efficiency of total resources invested and impact.

Annex 2. Programme for the Evaluation

In preparation for their visit to Tanzania, the Scandinavian members of the evaluation team arranged a "Search Conference" entitled "Sao Hill Sawmill: Experiences and Future Perspectives", in August, 1983, where about 30 persons participated, most of them with experience as expatriate specialists at Sao Hill.

During the visit to Tanzania, September 6 through October 5, the team followed the programme of visits outlined below, with individual members of the team occosionally following a separate programme.

Date	Organization
6/9	NORAD, Dar es Salaam
7/9	Tanzania Wood Industries Corporation(TWICO)
"	Ministry of Natural Resources and Tourism, Forest Division
8/9	National Development Corporation (NDC)
"	TWICO
10/9	University of Dar es Salaam at Morogoro, Division of Forestry
12-21/9	Interviews, meetings and inspection at Sao Hill Sawmill (SHS) and plantation areas.
13/9	Brook Bond tea plantation
16/9	Forest Division,Sao Hill
17/9	Southern Pulp and Paper Mill (SPM)
22/9	NORAD, Dar es Salaam
"	TWICO
23/9	Ministry of Natural Resources and Tourism, Forest Division.
24/9	TWICO
28/9	NORAD, Dar es Salaam
29/9	Ministry of Natural Resources and Tourism
"	Tanzania Timber Export Company (TANTIMBER)

Date	Organization
29/9	TWICO
4/10	TWICO
5/10	TWICO

Annex 3. List of People Met

NORAD, Dar es Salaam.
- M. Lerheim, Resident Representative
- R. Sørum, Assistant Resident Representative
- Å. Seim, Programme Officer.

NDC (National Development Corporation)
- J.W.A. Musokwa, Senior Development Officer, Forestry

TWICO (Tanzania Wood Industries Corporation)
- V.P. Kimesera, Chairman of the Board
- J.N. Mushi, General Manager
- Kuringe, Head of Planning Department
- J. Holmes, Manpower Development Officer

TANTIMBER (Tanzania Timber Export Company)
- Bgoya, General Manager

MALIASILI (Ministry of Natural Resources and Tourism), Dar es Salaam
- , Permanent Secretary
- E.M. Mnzava, Director of Forestry
- G.P.C. Mbonde, Forest Offices for Harvesting and Industries.

University of Dar es Salaam at Morogoro, Division of Forestry
- J.A. Maghembe, Acting Head
- R.E.L. Ole Meiludie, Lecturer
- J. Hall, Professor of Forest Biology
- K. Koljonen, Lecturer, Forest Economics

Brook Bond Tea Plantation
- Hester, General Manager

Forest Division, Sao Hill
- S.M. Malya, Divisional Manager I
- W.T. Singunda, Divisional Manager II
- M.C.P. Mtuy, Project Manager
- E. M. Ntumbo, Assistant Project Manager

Southern Pulp and Paper Mill

- O.J. Chisholm, General Manager
- A. Shedewha, Engineer

Sao Hill Sawmill, and Sao Hill Settlement

- Ten days were spent at Sao Hill, in frequent communication with employees of the sawmill and other people in the settlement. The key managers met were
- J.S. Nnunduma, General Manager, and
- J. Turkerud, Management Adviser

Furthermore part of the team that stayed longer at Sao Hill had discussions with:

- Representatives from CCM at Sao Hill, Matanane and Irunda, UWT(The planned future womens organization branch), Workers Cooperative, BALOZI(Ten cell leaders), JUWATA, VIJANA.

-People working with the Cooperative Shop, Corn Mill, Guest House, Canteen, Mother-and Child Clinic in Mafinga, Ihefu School, Dispensary, Forestry Division, Mafinga Market, Southern Pulp and Paper Division, Mafinga Market, Southern Pulp and Paper

-Day visits were made to neighbouring town/villages of Mafinga, Changalawe, Irunda, Matanane, Mufindi.

Annex 4. References

The list below contains the main references used by the evaluation team as background material. In addition, documents of various kinds were studied during the course of the evaluation, particularly at the Sao Hill Sawmill, giving the team a picture of the present reality of the operations of the mill.

The main references below are listed in chronological order.

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TECHNICAL APPENDIX A.

ECONOMICS OF PRODUCTION AT SAO HILL SAWMILL

1. Products, Production, and Productivity

Originally, the Sao Hill Sawmill was design to produce sawnwood from some 27,000 cubic metres of logs annually. During its operations, however, new products have been added, production has increased and so has productivity.

1.1. Products

The development of the product mix is shown in Table 1 below. It is evident that the mill has entered a new stage in 1982, when the share of untreated sawnwood in its production fell to 66%, much below any previous figures, due to significant increases in production volumes for planed timber and treated timber.

Table 1. Development of Product Mix

	1978		1979		1980		1981		1982	
	m^3	%	m^3	%	m^3	%	m^3	%	m^3	%
Rough timber	13,390	82	20,872	85	18,786	82	14,930	85	9,767	66
Planed timber	230	1	518	2	1,110	5	1,587	9	2,071	14
Treated timber	1,700	11	646	3	1,658	7	970	6	2,860	20
Boxboard	980	6	2,464	10	1,346	6	113	-	-	-
TOTAL	16,300		24,500		22,900		17,600		14,700	

In addition to the figures above, wooden houses and furniture were produced on a small scale during 1981 and 1982. Revenues from this production account for 2-3 % of total revenues,

1.2. Production Volume

The feasibility study for the sawmill proposed that the installed capacity should be 27,000 cubic metres of logs per year. Real installed capacity was, however, larger. According to interviews, the sawmill at present could annually process 40,000 to 45,000 cubic metres of log volume under bark.

Production at the mill, capacity utilization, timber output, and recovery rate over the years 1977 through 1982 have developed as shown in Table 2 below.

Table 2. Development of Production

	1977	1978	1979	1980	1981	1982
Log input, m^3 u.b.	23,800	32,400	45,000	43,700	34,300	28,400
Capacity utilization %, assuming installed capacity of 27,000 m^3 of logs	88	120	167	162	127	105
Capacity utilization %, assuming installed capacity of 42,000 m^3 of logs	57	77	107	104	82	68
Timber output, m^3	12,100	16,300	24,500	22,900	17,600	14,700
Recovery rate, %	50,8	50,3	54,4	52,4	51.3	51.6

During the first few years, log intake volumes increased rapidly from 24,000 cubic metres in 1977 to 45,000 cubic metres in 1979. In later years, however, production has dropped, the figure for 1982 being 28,000 cubic metres, and the estimate for 1983 being of the same order.

The capacity was overutilized during 1979 and 1980, meaning that service and maintenance was more or less neglected during this period.

The recovery rate, estimated at 50 % in the feasability study, has varied from 50.8 % to 54.4 % during the period.

The last tables in this section (Tables 3A, 3B, and 3C in the next page) gives selected further details on development of production at the sawmill during the years 1976 through 1983.

Table 3 A: Production : Logging, transport, sawing

	1976	1977	1978	1979	1980	1981	1982	1983 (estimated)
Felled volume (m^3 u.b.)	13,542	22,580	32,378	51,460	49,261	40,600	29,000	25,000
Skidded volume (m^3 u.b.)	-	-	-	47,157	46,331	33,800	27,500	25,000
Transported volume (m^3 u.b.)	12,552	22,995	32,597	49,529	44,315	34,600	28,400	25,000
Log input in sawmill (m^3 u.b.)	12,960	23,801	32,400	45,000	43,700	34,300	28,400	25,000
Timber output (m^3)	-	12,100	16,300	24,500	22,900	17,600	14,700	12,900
Recovery rate %		50.8	50.3	54.4	52.4	51.3	51.6	51.5

Table 3 B: Production: Secondary Treatment

	1976	1977	1978	1979	1980	1981	1982	1983
Planed volume (m^3)	-	-	980	2,982	2,456	1,700	2,071	2,300
Treated volume (m^3)	-	-	1,700	646	1,658	970	2,860	4,200
Boxboard volume (m^3)	-	-	980	2,464	1,346	113	-	-

Note. Planing of boxboard is included in planed volumes.

Table 3 C: Average Log Volume

	1976	1977	1978	1979	1980	1981	1982	1983
Average log volume u.b.(m^3)	0.159	0.153	0.182	0.188	0.168	0.176	0.179	0.181

1.3. Productivity

The number of employees at Sao Hill Sawmill increased rapidly from 200 in 1976 to 500 in 1980. At this point, when production volume was at its peak, the mill must be considered as overstaffed. The number of employees was, subsequently, brought down to 357 in 1982. Details of this development appear in Table 4.

Table 4. Employment at Sao Hill Sawmill

Category	1976	1977	1978	1979	1980	1981	1982
Operative labour	170	372	436	447	445	413	313
Non-operative employees	30	30	44	44	56	47	44
Total number of employees	200	402	480	491	501	460	357

Productivity at the mill has varied between 0.15 cubic metre of rough timber produced per manday in 1978 and 1981 to 0.21 cubic metres in 1979.

The details in the productivity calculations appear in Table 5 below.

Table 5. Productivity at the Sawmill

	1978	1979	1980	1981	1982
Volume rough timber (m^3) 1)	18,461	27,004	24,663	18,481	16,248
Man-years, operative labour	436	447	445	413	313
Man-years, administrative personnel	44	44	56	47	44
Man-years, total personnel	480	491	501	460	357
Man-days, total personnel (240 man-days per man-year)	125,000	128,000	130,000	120,000	93,000
Productivity m^3 per man-day	0.15	0.21	0.19	0.15	0.17

1) The volume of rough timber has been adjusted so as to represent also more highly refined products, such as boxboard. If one cubic metre of a refined product has a mill gate sales price of twice that of rough timber, it has been represented as two cubic metres of rough timber.

The productivity level at the Sao Hill Sawmill is exceptional for Tanzania, as evidenced in Table 6 below.

Table 6. Productivity at Selected Sawmills in Tanzania in 1980

	Production of sawnwood	Cubic metres per man-day
Sao Hill	22,900	0.20
All other sawmills	26,165	0.07
Five best other sawmills		
- Tembo	5,170	0,13
- Arusha	3,900	0.13
- Moshi	1,520	0.09
- Tabora	3,300	0.08
- Mkata	1,660	0.07

Whereas productivity in the sawmill at Sao Hill has fluctuated over the years, productivity in felling operations has shown a slow but steady upward tendency, as detailed in Table 7 below.

Table 7. Productivity in Felling Operations

Year	1976	1977	1978	1979	1980	1981	1982
m^3 per man-day	2.4	2.6	2.6	3.4	3.4	3.5	3.6

The jump in productivity in 1979 coincided with the introduction of a piece rate system as basis for payment to the workers, replacing the former daily wage. The increase since 1980 might, further, be explained by the fact that an increasing part of fellings were carried out as clearfellings rather than thinnings.

2. Markets and Prices

The Tanzanian market dominates completely as purchaser of the products from the Sao Hill Sawmill; direct exports to purchasers abroad have been negligible.

Prices have fluctuated much, as can be seen in Table 8 below.

Table 8. Prices and Price Trends for Different Products of Sao Hill Sawmill.

	1978	1979	1980	1981	1982
Rough timber					
- TShs/m^3	586	840	984	1,458	1,590
- Increase since previous year, %	-	43	17	48	9
Planed timber					
- TShs/m^3	892	1,027	1,100	1,561	1,865
- Increase since previous year, %	-	15	7	42	19
Impregnated timber					
- TShs/m^3	1,014	1,023	1,159	2,221	1,915
- Increase since previous year, %	-	1	13	92	-14
Boxboard					
- TShs/m^3	1,258	1,166	1,267	1,743	1,759
- Increase since previous year, %	-	-7	9	38	1
Average					
- TShs/m^3	662	937	1,065	1,531	1,759
- Increase since previous year, %	-	42	14	44	15

The varying production levels and the fluctuating prices have combined to create a changing revenue composition, as can be seen in Table 9 below.

Tabel 9. Revenue Composition.

A. Revenue from sawmill	1978		1979		1980		1981		1982	
	1,000 Shs	%	1,000 Shs	%	1,000 Shs	%	1,000 Shs	%	1,000 Shs	%
Rough timber	7,973	71	17,537	81	16,605	80	18,948	78	18,202	66
Planed timber	207	2	532	3	690	3	2,653	11	3,193	12
Impr. timber	1,723	16	661	3	19,207	9	2,154	9	5,179	19
Boxboard and minor products	1,233	11	2,873	13	1,705	8	411	2	848	3
Total revenue from sawmill	11,153	100	21,603	100	20,922	100	24,166	100	27,483	100
B. Other revenues	413		212		1,096		306		620	
C. Total revenues	11,566		21,815		22,018		24,472		28,103	

3. Cost Structure

The cost structure was analyzed for 1982 only, as comparisons with previous years was made impossible by several changes in the accounting system implemented in 1982.

For the sawmill as a whole, the cost structure is presented in Table 10, below. It can be observed that, next to the costs for the sawmill itself, and log transport costs, log royalty is the largest cost item.

Table 10. Total Cost Structure 1982 (1000 T Shs)

A. PRODUCTION UNITS	Direction production costs	Indirect production costs	Administration costs	Service departments 2)	Total	%
Log Royalty	3,403	-	-	-	3,403	14
Logging Operations	1,879	35	692	125	2,731	11
Log Transportation	2,580	2	692	1,479	4,753	19
Sawmill	2,965	1,566	1,020	697	6,248	26
Trimming Unit	659	136	915	-	1,710	7
Planing Unit	339	516	275	-	1,130	5
Impregnation Plant	1,458	15	233	171	1,877	8
Boxboard Unit	349	17	231	-	597	2
TOTAL PRODUCTION UNITS	13,632	2,287	4,058	2,472	22,451	92
B. ADMINISTRATION OVERHEAD		-	1,721	-	1,721	7
C. NON-OPERATIONAL COSTS	199	-	-	-	199	1
D. TOTAL COSTS	13,831	2,287	5,779	2,472	24,369	100

1) Indirect production costs: Workers' canteen, dispensary, power supply, saw doctors, sawmill maintenance.

2) Service departments: Water supply, central store, petrol station, garage

Calculated as an average per cubic metre of rough timber produced, costs reached T Shs 1,250 in 1982, divided as shown in Table 11.

Table 11. Cost Structure 1982 per m^3.

	T Shs/m^3 rough timber
Logging costs	
Log royalty	202
Logging operations	111
Indirect production costs	2
Service departments	8
Administration	40
	363
Log transport to sawmill	
Direct production costs	151
Indirect production costs	-
Service departments	85
Administration	41
	277
Sawmill, green line	
Direct production costs	185
Indirect production costs	99
Service department	43
Administration	64
	391
Trimming Unit	
Direct production costs	42
Indirect production costs	8
Administration (including sales unit)	59
	109
Central administration and overhead	110

Total production costs, rough timber T Shs 1,250

If processed further in the planing unit or the impregnation plant, costs increase to about T Shs 1,800, as shown in Table 12.

Table 12. Unit Costs 1982 for Planing and Impregnation

	T Shs/m^3
Planing Unit	
Total costs rough timber	1,250
Direct production costs	178
Indirect production costs	271
Administration	144
Total cost planed timber	1,843
Impregnation Plant	
Total costs rough timber	1,250
Direct production costs	331
Indirect production costs	6
Service departments	69
Administration	94
Total cost treated timber	1,750

In 1982, wages and salaries amounted to about 5 million Shillings, or about 20 % of total costs. Salaries and wages for 1977 through 1982 are presented in Table 13 below.

Table 13. Total Wages and Salaries.

	Workers		Staff		Total personnel	
Year	Total wages	TShs per man-year	Total salaries	TShs per man-year	Total wages and salaries	TShs per man-year
1977	1,206,000	3,200	301,000	10,000	1,507,000	3,700
1978	1,854,000	4,300	538,000	12,200	2,392,000	5,000
1979	2,985,000	6,700	749,000	17,000	3,734,000	7,600
1980	3,514,000	7,900	1,101,000	19,700	4,615,000	9,200
1981	3,484,000	8,400	1,266,000	26,900	4,750,000	10,300
1982	3,675,000	11,700	1,274,000	29,000	4,949,000	13,900

During the period 1977 through 1982, wages rose annually by 31% and salaries by 22%. Figures for the individual years are given in Table 14 below.

Table 14. Increases in Wages and Salaries (Percent over Level of Previous Year).

Year	Wages	Salaries
1978	34	12
1979	56	39
1980	18	12
1981	6	37
1982	39	8
Average	31	22

Other costs have also increased rapidly, particularly variable costs, showing an annual average rise of 58% in the period 1978 through 1982, while fixed costs rose only by an average of 12% annually. Details are given in Table 15.

Table 15. Increases in Fixed and Variable Costs (Percent over Level of Previous Year).

Year	Fixed costs	Variable costs	Total costs
1979	13	98	41
1980	21	38	29
1981	8	33	21
1982	6	33	21
Average	12	58	28

4. Financial Performance

The financial performance of the Sao Hill Sawmill has, generally speaking, been satisfactory, with profits shown for all years from 1978 through 1982 with the exception of 1980. The adoption, in 1981, of the "cost-plus" pricing system now, in theory, assures the company of a profit level of 10 %.

4.1. The "Cost-plus" Pricing System

In order to explain the "cost-plus" pricing system, an excerpt from a memorandum by the management of Sao Hill Sawmill dated 7 June, 1983, is quoted.

> Sales prices are computed to satisfy the basic financial requirement which in business should be covered from sales revenues as follows:-
>
> (a) All operation costs, including depreciation
> (b) All non-operational costs
> (c) 10% interest on total capital employed and
> (d) 10% net profit from production
>
> Re:(a) These are sawmill operation costs including overheads and administration costs absorbed in production centres.
> i.e. (i) Direct Production Costs
> (ii) Indirect Production Cost
> (iii) Overheads/Administration costs
>
> Re:(b) These are company costs incurred on various services which are not in connection with production, i.e. running cost for staff houses, domestic power supply, water supply, partly askari services etc.
>
> Re:(c) 10% interest on capital employed is incorporated in pricing decision due to currency and economic instability as a result of high inflation rate. It is therefore sufficient to remain with 10% as estimated last year, to protect the capital against inflation.
>
> Re:(d) 10% net profit from production supposed to be the minimum return from operations of the company. Net profit after tax will secure the company funds for reinvestment, reasonable expansion in future, dividends, solvency etc.

4.2. Profitability Levels for Products

In reality, profitability may become something else than 10%, mainly because price levels are set in advance of the occurrence of costs, and are based on an estimate of future levels of production. For 1982, the real profit levels for the main products of the sawmill varied between 1 and 27%, as shown in Table 16.

Table 16. Profitability for Different Products

Rough timber	Sales price/m^3	1,590
	cost/m^3	1,250
		340
	340/1,250	
	profitability: 27%	
Planed timber	Sales price/m^3	1,865
	cost/m^3	1,843
		22
	22/1,843	
	profitability: 1%	
Treated timber	Sales price/m^3	1,915
	cost/m^3	1,750
		165
	165/1,750	
	profitability 9%	

4.3. Current Reporting System in the Sawmill

Since 1982, the Sao Hill Sawmill has a well functioning reporting system, making detailed follow-up of costs and incomes possible. The following reports are provided:

A. By the Finance Department.

1. Quarterly financial reports
2. Quarterly cost accounts
3. Semi-annual proposals for price revisions according to the "cost-plus" pricing system.
4. Monthly reconciliation of
   - bank accounts
   - safe and petty cash box
   - current accounts, debtors
   - current accounts, creditors
   - loans to Tanzanian staff and expatriates
   - imprest accounts
5. Weekly cash statements showing
   - inflow during the week
   - outflow during the week
   - list of main payments during the week
6. Daily follow-up of bank deposits.

B. By other Departments

Monthly reports from the various Departments to the Management, normally based on internal weekly reports.

4.4. Financial Performance of the Sawmill

Profitability and other financial data have been computed systematically since 1978. The key data are shown in Table 17 below.

Table 17. Key Financial Data 1978 - 1982.

VOLUME SOLD	1978	1979	1980	1981	1982
	16,824 m^3	23,265 m^3	19,665 m^3	15,783 m^3	15,620 m^3
	1000 Shs.	1000 Shs.	1000 Shs.	1000 Shs.	1000 Shs.
NET SALES	11,154	21,791	20,951	24,094	27,531
Variable costs	3,527	9,682	11,217	12,106	15,769
Contribution	7,627	12,163	9,734	11,988	11,762
Fixed Costs	7,064	11,061	11,269	9,797	10,257
Profit from production	563	1,102	(1,535)	2,191	1,505
Net other incomes/costs	51	(484)	220	15	2,254
PROFIT FOR THE YEAR	614	618	(1,315)	2,206	3,759
	1000 Shs.	1000 Shs.	1000 Shs.	1000 Shs.	1000 Shs.
Liquid assets	6,269	11,049	5,979	9,542	10,493
Stocks	6,049	7,387	12,750	14,166	14,164
Current assets	12,318	18,436	18,729	23,708	24,657
Fixed assets	20,420	15,241	12,971	11,970	15,250
TOTAL ASSETS	32,738	33,677	31,700	35,678	39,907
Current liabilities	916	1,489	580	2,018	1,622
Long term labilities	12,903	11,419	9,936	8,453	6,971
Total liabilities	13,819	12,908	10,516	10,471	8,593
Equity	18,919	20,769	21,184	25,207	31,314
TOTAL LIABILITIES/EQUITY	32,738	33,677	31,700	35,678	39,907

Key ratios desived from Table 17 are presented in Table 18.

Table 18. Key Financial Ratios

	1978	1979	1980	1981	1982
Ratio of profit to production cost (%)	5.8	3.0	-5.8	10.0	14.4
Return on total capital (%)	1.9	1.8	-4.1	6.2	9.4
Return on equity (%)	3.2	3.0	-6.2	8.6	12.0
Stock turnover	1.3	2.7	2.6	2.2	2.5

TECHNICAL APPENDIX B

PERSONNEL QUESTIONS AT THE SAO HILL SAWMILL

1. Administration of Personnel

The management- and supervisory level at Sao Hill Sawmill is recruited and formally employed by its holding company TWICO and thus subject to the personnel administrative policy of TWICO. Lower level staff is recruited directly by the Sao Hill Sawmill and thus subject to the personnel administration of that company.

Manpower among the lower ranks is normally recruited as unqualified General Workers. After a period in service the most motivated and talented are selected for further training. Thus, normally the company does not advertise jobs for skilled workers.

Turnover of personnel is low among general workers. Part of the reason is that it is hard to find alternative employment for the unskilled. There has been some turnover among skilled mechanics for whom alternative jobs have been obtainable.

Generally speaking, turnover of personnel below the management level has not been a problem. Absenteeism, likewise, is not considered a problem for the company.

The Sao Hill Sawmill personnel policy gives the general impression of being "enlightened." On one hand, the company pursues a certain welfare policy by providing facilities for its workers outside the factory gates. These activities are treated in som detail in a separate report "Socio-economic Impact of the Sao Hill Sawmill". On the other hand, within the sawmill, the management of the company is not only concerned with productivity but also with worker satisfaction, commitment, motivation, and stability of personnel.

Training for operators is given high priority. The relationship between management and the union is generally good. Union representatives and shop stewards have attended courses run by the National Institute of Productivity (NIP) where issues like productivity and discipline have been taken up.

In July 1983, when the sawmill had to close down for one month due to fuel shortage, workers were sent on leave with pay. After production had started again, they worked two hours overtime every day for two weeks to catch up. This example illustrated that the workers are committed to keep production going and that they take pride in getting the job done.

2. Productivity and Incentive Systems

Efforts have been made to increase productivity in various parts of the operation. Piece rate systems for loggers and log transport drivers have been introduced. Thus, the normal salary for loggers is based on a requirement of 18 logs per day. Extra pay is given for additional logs. Log transport drivers have an agreement to make two trips a day and get extra pay for additional trips.

There are indications of productivity increases in the felling operations after the piece rate system was introduced in 1979. Inspections at logging sites also gave the impression that this part of the operation is efficiently performed.

The effects of the piece rate payment system used in felling operations may be understood by looking at the social context. The payment scheme implies that the loggers can go home and receive the minimum pay when 18 logs have been produced. This opportunity to gain spare time can be very attractive under the present social conditions where the value of cash is seriously limited by a general scarcity of goods that can be bought for money. Thus increased spare time may be more attractive than extra pay.

Productivity figures may, however, also be affected by other factors, for instance that only clearfelling took place during the period. Further, deterioration of log quality would not show in the productivity figures. Conversely, the present payment system stimulates the production of short logs and small diameter logs. Such logs lead to a decrease in productivity for the sawmill itself. Thus, the payment system in the forest may lead to reduced quality and decreased productivity for the total operation of the Sao Hill Sawmill. Another example of poor coordination of various links in the production was observed at a clear felling site, where conditions for skidding operations and subsequent transportation were made difficult due to poor coordination with felling operations.

The efficiency of log transportation is low when distances and time consumption are considered. The limitations on log transport capacity is probably the most serious operational problem within the company today. There are no indications that the present payment system has improved the situation. The trucks rarely make more than the minimum two trips a day.

Causes of these problems may again, be found by looking at the Tanzanian social context. Transportation of any kind is in high demand in the country. The situation may be comparable with conditions in Norway under the Second World War when no driver would refuse to take passengers. Thus, drivers at Sao Hill may obtain more from taking passengers and doing favours to neighbours and friends than by running an extra trip with logs.

The drivers would not, like the loggers, want to leave work early. They want the trucks running as this gives opportunities to provide transportation services on the side. Such contextual factors should have been better taken into account when the incentive systems were introduced.

Closer supervision and disciplinary action have been suggested to improve log transport capacity. Strict disciplinary measures against drunk driving (which happens) is strongly recommended. Likewise, some form of extended record keeping of time and distances could be introduced and driving in convoys should be considered. While some improvements could be achieved by such action, disciplinary measures in general should be applied with great care. The "enlightened" aspects of the present personnel policy may turn out to be more profitable in the long run than old fashioned "tough" management styles based on closer supervision combined with piece rate incentive systems in isolated parts of the operation.

3. Training of Tanzanian Personnel

Building up of competence in the various areas of sawmill operations is a goal for all parties involved in the Sao Hill Sawmill project. The explicit goals for the project are, however, primarily concerned with production, with no explicit and mutually agreed objectives related to training. Accordingly, no integrated plan for training at all levels of the sawmill's organisation has materialised.

The goals of production and economic viability imply, however, that increased self-sufficiency should be attained and that the project intends to strengthen Tanzanian forest industry in general. Thus, the joint Tanzanian-Nordic review of the forestry sector of Tanzania 1983 presented a number of recommendations for training and manpower development. The general goal of TWICO is, further, to strengthen the competence level within the wood industries in Tanzania and a goal for NORAD's development aid in general and for its assistance to the Sao Hill project in particular is to build up competence. Concern for the training aspect is stressed in various project documents, from the initial feasibility studies to the 1977 evaluation report and the subsequent project review by NORAD (1978).

3.1. Training at the Level Below Management

Tanzanian personnel below the management and supervisory levels is recruited and employed by the mill administration directly. Thus, the Manager of Manpower Development and Administration at the mill has the responsibility for training of this personnel. The staff of the Manager for Manpower development and Administration includes a Tanzanian Personnel and Training Officer (recruited in July 1979). His functions include preparing training proposals for the decision of the Management Team.

Training plans are drawn up annually from recommendations made by Heads of departments. Basic criteria used include previous education of the candidate, needs of the company and the availability of training programme.

Three types of training programmes are normally used:

- Courses lasting for three months or more, given in training institutions external to the sawmill. Expenses for this type of training are covered by TWICO.
- Shorter courses and seminars, which may be provided outside the mill. Expenses are covered by the sawmill.
- On the job training.

Recommendations for long term courses are forwarded to TWICO for final selection and financing. Short courses such as those run by the National Institute for Productivity (NIP) and the National Board of Auditors and Accountants (NBAA) are financed by the mill.

In the period since 1977 a total of 33 employees from the Sao Hill Sawmill have received training of a duration of three months or more. Of these, four received training abroad (Kotka, Finland or Oslo, Norway, under a FORINDECO programme). The Forest Industries Training Institute (FITI) at Moshi is the most frequently used training institution,with 22 employees from Sao Hill receiving training there, most within the field of sawmilling. Training for logging operations were also provided at FITI.

3.2. Training at the Management Level

Training on the management level is an unsolved problem in the project. Expatriates still hold a number of key positions despite clear intentions for their withdrawal. The main reason for this is that the current level of qualification among Tanzanian managers is considered inadequate.

A common educational background among sawmill managers in Tanzania is a university degree. Thus the heads of departments at the Sao Hill Sawmill have university degrees in fields like economics, commerce, public administration, engineering and forestry. By comparison, academic background is rare among Scandinavian managers in the sawmill industry. Recruitment of managers directly from universities with no previous working experience is common in Tanzania. Two of the present six heads of departments at Sao Hill have some formal management training related to the industry. This training had been provided in Finland and Great Britain. Only two of the managers had previous work experience from other sawmills. Thus, four of the present managers had no previous experience from the sawmill industry at the point of recruitment. In other words, there is an obvious need for practical experience and training related directly to the industry to complement the more general, formal education of the managers.

The theories on management training as expressed in the various project documents from the Norwegian side throughout the project have focused on two key concepts: The counterpart system and the On-the-job-training. The counterpart system and the on-the-job-training in practice means that no formally organized instruction is provided and that no systematic appraisal of training needs is made.

The counterpart system and the on-the-job-training practiced at the Sao Hill Sawmill have been based on the assumption that learning and sharing of experiences will take place automatically when an experienced expatriate and a counterpart perform their daily tasks in close cooperation. There is no doubt that learning in this sense has taken place and that counterparts have gained usefull skills this way. There are, however, certain general shortcomings related to a completely informal learning process for the counterparts. A few of these are indicated below.

a) The quality of learning will depend much on individuals. Thus, "unlucky" combinations may yield little learning. The high rate of turnover among expatriates may have had some positive effects seen from a learning perspective, as Tanzanian managers have had some variations in exposure to skills and experience. For the actual operation of the company and performance of management tasks, however, the turnover among expatriates is a problem.

b) The practical experiences gained through day to day operations do not give the counterpart a broad experience of alternative solutions obtainable within the industry in general. Thus, the Tanzanian Manager will have a limited basis from which to make judgements regarding the range of choices of technology available or for the development of new policies. Typically, discussions about investments in technology, market strategies and broad future oriented policy issues have been taken up mostly between expatriates and NORAD or FORINDECO. In order to take full responsibility in such areas, a broadening of experiences and insight is needed among Tanzanian managers at the sawmill.

c) The high turnover rate among Tanzanian managers has also had serious impacts on skill formation. The importance of stability in this respect has been stressed in many project documents and the number of transfers decided by TWICO has been reduced in later years. Still, there are reasons to believe that the need for management training as Sao Hill cannot be seen in isolation but must be considered in a TWICO perspective or even a national one; as a question of generation of competence within the Tanzanian wood industry in general.

4. Tanzanianization of Management

Questions regarding training at the management level are closely related to the objective of Tanzanianization. This objective has been emphasised from the start of the project. The discussion here will initially concern the plans for Tanzanianization expressed in three project documents; the feasibility study by TWICO (1972), the previous evaluation (1977) and the subsequent NORAD project review (1978). A general impression from the history of the project is that problems related to generation of competence on the management level have been underestimated. Plans for Tanzanianization expressed in these documents have one thing in common. They all propose complete withdrawal of all expatriates within a period of three years. In this respect they have all failed. It appears that a few key factors were not considered in the previous documents. The following are among the most important ones:

- The Tanzanian management personnel are employees of TWICO and are subject to transfers to other subsidiary companies of TWICO.
- Even if training was programmed, the envisaged three years is a rather short period for effective training and aquisition of confidence and competence.

As pointed out in the 1977 evaluation report, no plans had previously been made for Tanzanianization except for the informal learning model represented by the presence of counterparts. According to the evaluation report, in 1977 the sawmill had ten expatriates filling the following positions:

- General Manager
- Sawmill Manager
- Chief Accountant
- Chief Administration Officer
- Logging Manager
- Logging Supervisor
- Building and Maintenance Officer
- Mechanical Supervisor
- Trimming and Drying Unit Foreman

Since 1977 there has been a reduction in the number of expatriates. In September 1983 the following positions were filled by expatriates:

- Advisor to the General Manager
- Acting Marketing Manager combined with Advisor to the Sawmill Manager
- Chief Accountant
- Heavy Duty Vehicle Maintenance Expert In-Charge under the local Maintenance Engineer.
- Planing Mill Expert
- Building Inspector

Thus, the number of expatriates on site has been reduced from ten to six. The present situation for each department was as follows:

Administration: The transition of the expatriate Project Manager into the role of advisor to the responsible Tanzanian General Manager took place in July 1982. Within the area of Manpower Development and Administration there is no expatriate.

Logging: The responsible manager is Tanzanian. Since 1980 there has been no expatriate in the logging department. It had been recently decided,however, to recruit an expatriate to the post as Logging Inspector.

Sawmill: The responsible manager is Tanzanian.He was a counterpart until July 1982. The expatriate then assumed the advisory role. The present advisor to the Sawmill Manager also acts as responsible manager of the Marketing Department (see below). Within the sawmill there is also an expatraite in the position as Planing Mill Expert. He also assists in questions related to carpentry.

Marketing: In this new department (established Jan. 1st 1983) an expatriate holds the responsible position. A Tanzanian counterpart is currently under training. In order to prepare him for his future executive responsibility, a structured training scheme was made. He was systematically familiarized with all departments, especially concentrating on aspects of production with relevance for marketing, for example methods of production with consequences for product quality.

Maintenance: The responsible Chief Engineer has been a Tanzanian since June 1982. The expatriate position was then made advisory. In 1983 it was decided to abolish the post of advisor to the Maintenance Engineer. Instead an expatriate acts as Heavy Duty Vehicle Maintenance Expert in-charge of the overall maintenance and administration in the vehicle workshop under the local Maintenance Engineer.

Finance: The position as responsible manager (Chief Accountant) is currently held by an expatriate. There was, at the moment of the evaluation, no Tanzanian counterpart, but a decision had been made to recruit one.

Building Inspector: This expatriate position was intended for the now defunct Mbao Housing Cooperative. The Building Inspector has instead worked with development of prefabricated house elements.

During 1983, three expatriate positions were changed from responsible management positions to advisory roles. The role of advisor was not clearly defined, though the General Manager issued a letter in which he tried to distinguish between the roles of advisor and responsible manager. The letter is normative and appeals to the good will of the parties involved. It falls short of describing in more precise terms the content of the responsibility of the advisor.

Formally, all expatriates at the sawmill are answerable to the General Manager and the Management Committee. The role of advisor implies that formal responsibility for final decisions rests with the responsible Tanzanian manager. In practice, however, the expatriates tend to hold a strong position within the management team. This follows from their competence and access to Norwegian contacts with, for instance, NORAD and FORINDECO.

All expatriates take part in Management Committee meetings. When decisions are made, departments with no expatriates have in some cases held a weak positions. The general impression is that decision making within the company is a rather complicated process. The example of indecision regarding purchase of log transport equipment indicates the weaknesses of the present management structure. The evaluation team sees training of Tanzanian management as an important factor in efforts to overcome this problem.

TECHNICAL APPENDIX C

RAW MATERIAL SUPPLY

1. Organization of Raw Material Supply

In principle, the Forest Division is the raw material producer, while the Sao Hill Sawmill fells the trees and collects its sawlogs in forest stands indicated by the Forest Division, subject to payment of the corresponding royalty to the Forest Division. The Forest Division carries out the following operations:

- Preparation of land for planting
- Production of seedlings in nurseries
- Planting and beating up
- Silvicultural operations such as weeding and pruning
- Thinning
- Fire protection
- Construction and maintenance of roads.

The Sao Hill Sawmill then carries out the harvesting operations in the mature stands, transports the logs to the sawmill and converts them there. In addition, the Sao Hill Sawmill has had to take a certain responsibility for two of the tasks intended to be carried out by the Forest Division:
Construction and maintenance of roads, and thinning. The road network constructed by the Forest Division was originally designed for the operations by the Forest Division itself, thus for light vehicles and light loads, which could easily be brought uphill. The Sao Hill Sawmill to some extent needs a different kind of roads, particularly for harvesting operations: one that can take heavy vehicles and one that minimizes the need of uphill movement of the log trucks.

Thinnings should, in theory be carried out by the Forest Division, carrying them out with due silvicultural consideration. The Division is, however, poorly equipped to handle both thinnings and prunings, so the sawmill has had to take over the major parts of the thinnings.

The Forest Divison sells wood in the form of standing trees to the Sao Hill Sawmill, at a certain price per cubic metre of stem wood. That price increases with increasing breast height diameter of the trees. The Forest Division calculates with an average price per cubic metre of T Shs 70, while the sawmill reckons it pays an average of T Shs 100 per cubic metre of sawlog bought. The difference between these two figures cannot fully be explained even it a considerable proportion of the stem wood measured by the Division does not reach the sawmill as logs, but is, instead, left in the forest in the form of tops or other logging waste.

The Forest Division has particularly aimed at achieving high area targets for planting and at the production of pulpwood. Pruning, and thinning have been neglected or delayed to the detriment of wood quality, and fire protection has been inadequate. Spacing has increased; to-day's 1380 trees/hectare is too low for production of quality sawlogs. In seed collection, more emphasis should be put on selection of seed from quality trees.

2. Annual Areas of Plantation and Consequent Labour Requirements

During Phase 1 of the World Bank programme at Sao Hill Forestry Project there has been a rapid expansion of planting activities. The areas planted annually have increased as follows:

1960-64:	Less than 400	hectares/year
1965-69:	550	"
1970-73:	680	"
1974-77:	950	"
1978-82:	More than 4000	"
1983- :(plan)	2000	"

During this period of expansion, the silvicultural tending operations have to a large extent been neglected, with negative consequences for the future stocking and sawlog wood quality.

It is now necessary to embark upon a large scale silvicultural programme to improve the quality of the sawlogs, in order to produce sawn timber of acceptable quality for the export market in 10-15 years, and probably also in order to meet future quality requirements in the domestic market.

Negative effects of a very rapid expansion of planted areas are well known from forestry projects in various countries. During the initial years, there is often a substantial increase in the planting targets, and the fulfillment of those is the predominant measure of success.

However, as the plantation areas grows, increasingly larger areas have to be protected from fire, and increasingly larger areas have to be weeded, pruned and thinned. In many cases the cumulative effects of these tasks are underestimated, and the result might be that the organization is overtrained and a partial lack of control of the forestry activities may follow.

Following the initial land preparation, nursery activities and planting operations, a reasonable silvicultural programme aimed at producing quality sawlogs can be as follows:

1st	year:	1-2 weedings, beating up.
2nd	" :	(Weeding).
4th	" :	Access pruning.
7th	" :	First high pruning.
10th	" :	First thinning.
11th	" :	Second high pruning.
15th	" :	Second thinning.
20th	" :	Third thinning.

In addition to this, the planted areas have to be protected from fire, illegal cutting, grazing or cultivation until they are harvested.

In order to make a rough estimate of the future labour requirements at Sao Hill Forestry Project, the following assumptions are made:

A silvicultural programme is started in 1984 for the compartments in the sawmill logging circle.

Labour requirements for different silvicultural operations can be estimated as follows:

Land preparation and planting	25	man-days per hectare
Nursery work, plant production	25	"
Weedings, beating up (1-2 year)	15	"
Access pruning (4th year)	10	"
First high pruning (7th year)	15	"
First thinning (10th year)	50	"
Second high pruning (11th year)	(10)	"
Second thinning (15th year)	60	"
Third thinning (20th year)	70	"

The areas for beating up, weeding, pruning and thinning are given in the following page, where the labour requirements are also calculated. Based upon those tables and the assumptions given above, the labour requirements can roughly be estimated as follows:

Year	Planting, land preparation forest nursery	Silvicultural tending operations
1978-82	200 000 MD/year	10 000 MD/year
1984-88	100 000 "	118 000 "
1989-92	100 000 "	169 000 "
1993-97	100 000 "	225 000 "
1998-2002	100 000 "	307 000 "

Note: Fire protection is not included.

The figures indicate that the work required within forestry primary production will increase much, despite the fact that the planting targets were halved to 2,000 hectares per year, from 1983. It should be noted, however, that only a part of the areas planted up to 1982 are to receive silvicultural treatments, as the pure pulpwood forest receive no such treatment. 36% of the areas planted in 1978-1982 and 50% of the areas planted in 1983 and later years are to receive such silvicultural treatment.

Areas for beating up, weeding, pruning and thinning 1984-99, "Preliminary Harvesting Plan": (hectares/year)

Activity	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Beating up	4000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Weeding	4000	4000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Pruning, access	4000	4000	4000	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500*)
" , first high	1440	1440	1440	1440	1440	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
" , second high	--	--	--	--	--	1440	1440	1440	1440	1440	1000	1000	1000	1000	1000	1000
Thinning, first	--	--	--	--	1440	1440	1440	1440	1440	1000	1000	1000	1000	1000	1000	1000
" , second	--	--	--	--	--	--	--	--	--	1440	1440	1440	1440	1440	1000	1000
" , third	300	300	300	300	300	300	300	300	400	400	400	400	--	--	1440	1440

*) 500 hectares/year eucalyptus species.

Labour requirements: (1000 Mendays)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Weeding, beating up	60	45	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Pruning, access	40	40	40	15	15	15	15	15	15	15	15	15	15	15	15	15
" , first high	22	22	22	22	22	15	15	15	15	15	15	15	15	15	15	15
" , second high	--	--	--	--	--	14	14	14	14	14	10	10	10	10	10	10
Thinning, first	--	--	--	--	72	72	72	72	72	50	50	50	50	50	50	50
" , second	--	--	--	--	--	--	--	--	--	86	86	86	86	86	86	86
" , third	21	21	21	21	21	21	21	21	28	28	28	28	--	--	101	101
TOTALS	143	128	113	88	160	167	167	167	174	238	234	234	206	206	307	307

3. Preliminary Long-term Harvesting Plan

The evaluation team has compiled a preliminary harvesting plan as per mid September 1983.

The heavy losses caused by the large forest fires in the end of September 1983 are not included, as the team could not assess the areas and the age distribution of the compartments damaged by fires. The figures given in this report are, however, slightly lower than those presented in our preliminary report of October 6, 1983, as the figures for planted area 1978-82 have been revised.

The harvesting plan is based upon figures for planted areas and certain assumptions for the yield of sawlogs and pulpwood. The planted areas 1960-69 are given in reports from Forest Division, Dar es Salaam (Micski), the planted areas 1970-77 are given in compartment lists and maps and in the present logging plan for SHS (Salehe), and the planted areas from 1978 up to 1981 are given in World Bank Report No. 4548 of June 13, 1983. The total area of this adds up to 31 255 hectares of pines. Approximately 2 000 hectares of eucalyptus plantations are not included in the following yield forecast.

3 .1. Assumptions

a) Areas planted

For the calculations of harvestable volumes, the planted areas are grouped and annual averages calculated for the following periods:

1960-64	(5 years)
1965-69	(5 years)
1970-73	(4 years)
1974-77	(4 years)
1978-82	(5 years)

From 1983 onwards, it is assumed that the annual planting target is 2000 hectares/year, as a total of afforestation and reafforestation activities.

The average planted areas are as follows:

Period	Pinus patula Cupressus lus.		Pinus elliottii Pinus radiata etc.	
	Per year hectares	Total hectares	Per year hectares	Total hectares
1960-64	148	740	236	1180
1965-69	339	1695	220	1100
1970-73	340	1360	345	1380
1974-77	800	3200	150	600
(Total 1960-77)		(6995)		(4260)
1978-82	4000	20000	-	-

In addition to this, around 2000 hectares of eucalyptus plantations have been established in the last few years. These are not included in the pulpwood yield figures, as it has been assumed that they will be needed for the supply of wood fuel to the Southern Paper Mill at Mufindi.

Of the annual planting target for the coming years of 2000 hectares/ /year, it is assumed that 1000 hectares/year are compartments for sawlog production (Pinus patula), managed under a silvicultural system where thinnings and pruning are included. These compartments are to be harvested after a rotation of 25 years, whereas the remaining 1000 hectares/year are harvested after 15 years. This is a simplification, as part of this area will be stocked by eucalyptus, being harvested earlier (after 8 years). By this simplification, the yield of eucalypt wood after 15 years will be roughly equivalent to the accumulated yield of the first seedling rotation and the second rotation from coppice. Yield from subsequent rotations from coppice are not included in the results.

b) Increment

The yield or mean annual increment (MAI) of Pinus patula and Cupressus lusitanica is assumed to be 15 m^3 u.b./year per hectare, and the same yield figure is used for the eucalyptus species. The yield (MAI) for Pinus elliottii and Pinus radiata as well as other pine species is expected to be 12 m^3 u.b./year per hectare.

The normal rotation for compartments of the sawmill logging circle is 25 years, but some premature harvesting will take place as the compartments of Pinus patula planted 1960-64 only measures 740 hectares and will not be sufficient for the harvesting 1985-89.

For the pulpwood logging circle a rotation of 15 years is expected, but some areas will be harvested after 14 years in 1992. The Pinus elliottii and Pinus radiata compartments are expected to be harvested at a somewhat longer rotation, 15 to 24 years.

The rotation of 15 years for the eucalyptus species, is, as explained above, a simplification to facilitate the yield calculations.

c) Harvests in pulpwood forests

The compartments for pulpwood will normally be harvested after 15 years, giving a net volume of 225 m^3 u.b. per hectare at that age (Pinus patula and eucalyptus species.)

All the Pinus elliottii and Pinus radiata compartments established 1960-77 will be harvested for pulpwood, according to the following schedule:

Planted 1960-64:	Clearfelling 1984 ..	200	hectares
	" 1985 ..	400	"
	" 1986 ..	583	"
	Total (age 22-24 yr)	1183	hectares
Planted 1965-69:	Clearfelling 1987 ..	551	hectares
	" 1988 ..	551	"
	Total (age 19-22 yr)	1102	hectares
Planted 1970-73:	Clearfelling 1989 ..	690	hectares
	" 1990 ..	690	"
	Total (age 17-19 yr)	1380	hectares

Planted 1974-77: Clearfelling 1991 .. 600 hectares
Total (age 14-17 yr) 600 hectares

Totally these compartments are calculated to yield 982 000 m^3 u.b. in the period 1984-91.

Of the Pinus patula compartments, the following areas are to be harvested for pulpwood at an age of 15 years:

Planted 1969-64:	Nil.
Planted 1965-69:	Nil.
Planted 1970-73:	20% or 70 hectares/year
Planted 1974-77:	50% or 400 "
Planted 1978-82:	64% or 2560 "
Planted 1983- :	50% or 1000 "

Part of the area planted 1978 will be harvested 1992 at an age of 14 years.

These clearfellings will give the following volumes per year:

Period	Area/year	Volume/year
1985-88	70 ha	15 750 m^3 u.b.
1989-92	400 "	90 000 "
1992 (14 yr)	2000 "	420 000 "
1993-97	2160 "	480 000 "
1998-	1000 "	225 000 "

Additional volumes will come from thinnings in compartments managed for sawlog production, and from clearfellings in the same compartments, as specified in d) below.

d) Harvests in sawlog forests

The following areas are to be harvested mainly for sawlogs but with complementary yields of pulpwood at an age of 22-25 years:

Planted 1960-64:	100% or 148 hectares/year
Planted 1965-69:	100% or 339 "
Planted 1970-73:	80% or 270 "
Planted 1974-77:	50% or 400 "
Planted 1978-82:	36% or 1440 "
Planted 1983- :	50% or 1000 "

It is assumed that the remaining volumes in areas planted before 1960 will provide enough raw material for the operation of the Sao Hill Sawmill in 1984.

It is, further, assumed that an average of 300 hectares will be clearfelled every year from 1985 to 1996, and 400 hectares/year from 1997-2000. By this programme 5200 hectares will be clearfelled up to the year 2000, or approximately the area planted 1960-77 and managed for the production of sawlogs, again with complementary yields of pulpwood.

From 2001 onwards clearfellings will start in the areas planted 1978-82, the first 2-3 years being premature harvesting at stand age 23 years and 24 years. The area being planted in the 5-year period 1978-82 will by this be clearfelled over a 7-year period, averaging 1030 hectares/year.

After 2008 the compartments planted after 1983 and managed for sawlog production will be clearfelled at an age of 25 years, 1000 hectares/year.

This gives, summarized, the following rotations:

Planted	60-64:	Harvest.	85-86 and partly -87.	Age	23-25	years
"	65-69:	"	partly 87 and 88-92.	"	22-23	"
"	70-73:	"	93-95 and partly -96.	"	22-23	"
"	74-77:	"	partly -96 and 1997-2000	"	22-23	"
"	78-82:	"	2001-07	"	23-25	"
"	83- :	"	2008-	"	25	"

And the following areas for clearfelling:

Period	1985-96:	300	hectares/year
"	1997-2000:	400	"
"	2001-07:	1030	"
"	2008- :	1000	"

The stands planted after 1966 up to 1977 will be thinned once, 5 years before clearfelling. This thinning will start in 1984/85 and go on up to 1995.

The stands planted from 1978 onwards and managed for production of sawlogs will go through a full thinning programme: Thinnings at age 10 years, 15 years and 20 years.

For unthinned compartments the following per hectare figures have been used for the estimate of net sawlog and pulpwood volumes:

Age when harvested	Sawlogs	Pulpwood	Total volume m^3 u.b.
25 years	210	165	375
24 "	205	155	360
23 "	200	145	345
22 "	195	135	330

For thinned compartments planted 1966-77 (one thinning only), the following figures are used:

Age when harvested	Sawlogs	Pulpwood	Total volume m^3 u.b.
(Clearfelling)			
25 years	190	85	275
24 "	185	75	260
23 "	180	65	245
22 "	175	55	230
(Thinning)			
17-20 yrs.	30	70	100

For compartments planted after 1978 and managed for sawlog production under a full thinning programme, the following average yields are expected:

Age yrs.	Sawlogs	Pulpwood	Total volume m^3 u.b.
10 (1.thinning)	--	40	40
15 (2. ")	30	30	60
20 (3. ")	50	25	75
25 (clearfell.)	150	50	200
Totals	230	145	375

This is the same yield forecast as given by the World Bank for the Sao Hill Forestry Project (Report No. 4548).

3.2. Total Wood Yield

The figures given above would indicate the following total volumes, from the clearfellings in pulpwood forests, from clearfellings in sawlog forests (given sawlogs and pulpwood) and from thinnings in sawlog forests (giving sawlogs and pulpwood).

a) Clearfellings in pulpwood forests (m^3/year)

Period	Sawlogs	Pulpwood
1985 - 88	-	16 000
1989 - 91	-	90 000
1992	-	510 000
1993 - 97	-	480 000
1998 -	-	225 000

b) Clearfellings in sawlog forests (m^3/year)

Period	Sawlogs	Pulpwood
1984	35-45 000	--
1985-89 (unthinned)	58-62 000	41-48 000 (m^3/yr)
1990-96 (thinned once)	53-54 000	18-19 500
1997-2000 (" ")	72 000	26 000
2001-07 (thinned 3 x)	150 000	50 000
2008- (" ")	150 000	50 000

c) Thinnings in sawlog forests. For areas planted 1966-77:

Period	Sawlogs	Pulpwood
1984-91	9 000	21 000 (m^3/yr)
1992-95	12 000	28 000

For the areas planted 1978-82, the thinning volumes are:

Period	Sawlogs	Pulpwood
1988-92	--	57 6U0 (m^3/yr)
1993-97	43 200	43 200
1998-2002	72 000	36 000

For the areas planted after 1982, the thinning volumes are:

Period	Sawlogs	Pulpwood
1993-97	--	40 000 (m^3/yr)
1998-2002	30 000	70 000
2003-07	80 000	95 000
2008-	80 000	95 000

d) Total wood harvestable during the year 1984 until stable production has been obtained in 2003.

Year	Sawlogs	Pulpwood
1984	44-54 000	92 000
1985	71 000	191 000
1986	70 000	229 000
1987	67 000	217 000
1988	67 000	341 000
1989	62 000	360 000
1990	62 000	328 000
1991	62 000	301 000
1992	66 000	525 000
1993	109 000	610 000
1994	109 000	610 000
1995	109 000	610 000
1996	97 000	582 000
1997	115 000	589 000
1998	174 000	357 000
1999	174 000	357 000
2000	174 000	357 000
2001	252 000	381 000
2002	252 000	381 000
2003 and later	230 000	370 000

PRELIMINARY LONG-TERM HARVESTING PLAN.

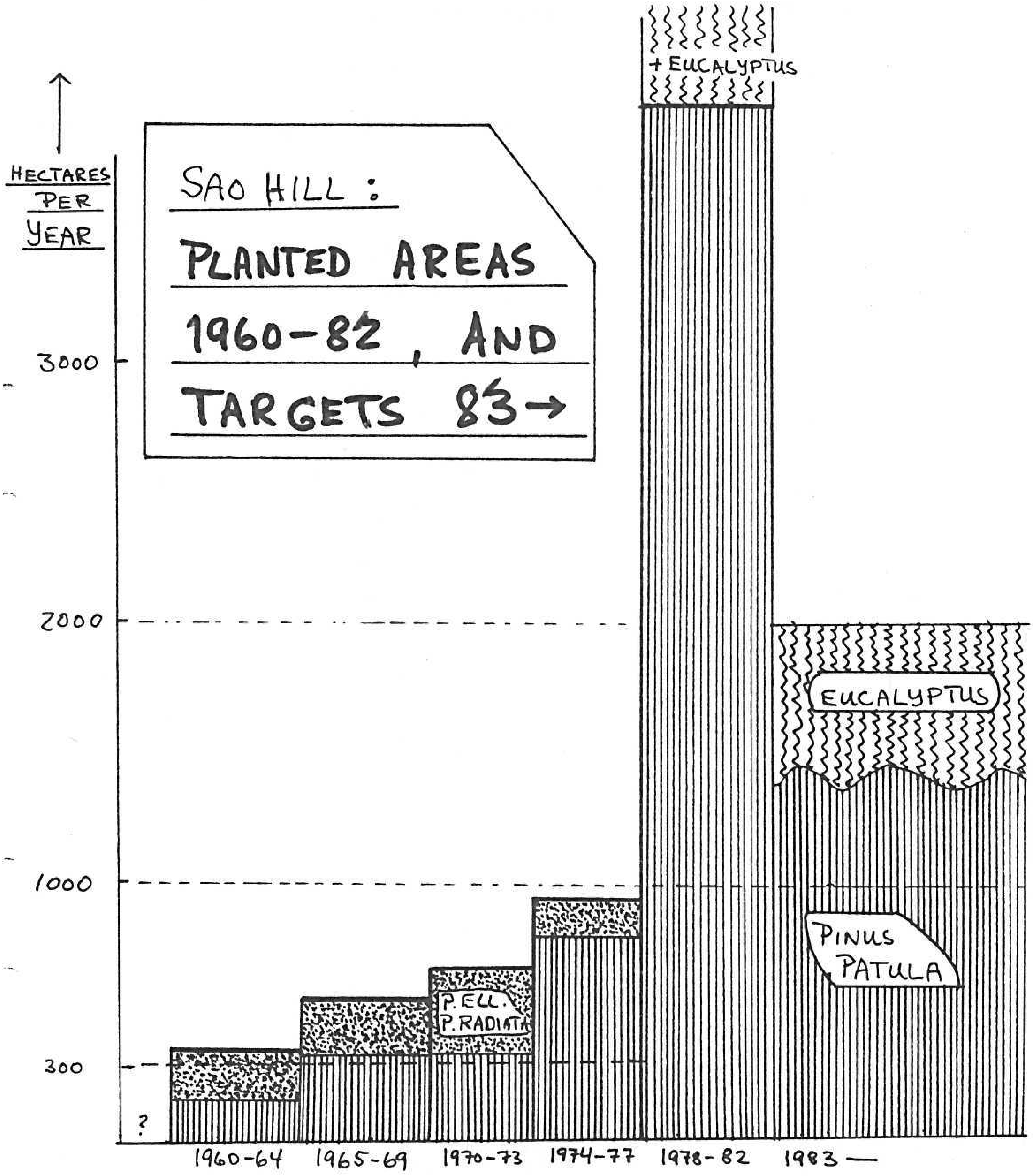
ANNUAL HARVESTABLE VOLUMES, Pinus patula, SAWLOGS, 1000 m^3 u.b.

Compartment group	84	84	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
Clearf. pl.50-59	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
" pl.60-77	--	62	61	58	58	53	53	53	54	54	54	54	54	72	72	72	72	--	--	--	--	--	--	--
" pl.78-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	150	150	150	150	150	150	150
Second thinning	--	--	--	--	--	--	--	--	--	43	43	43	43	43	30	30	30	30	30	30	30	30	30	30
Last (3) thinning	9	9	9	9	9	9	9	9	12	12	12	12	--	--	72	72	72	72	72	50	50	50	50	50
TOTALS	49	71	70	67	67	62	62	62	66	109	109	109	97	115	174	174	174	252	252	230	230	230	230	230

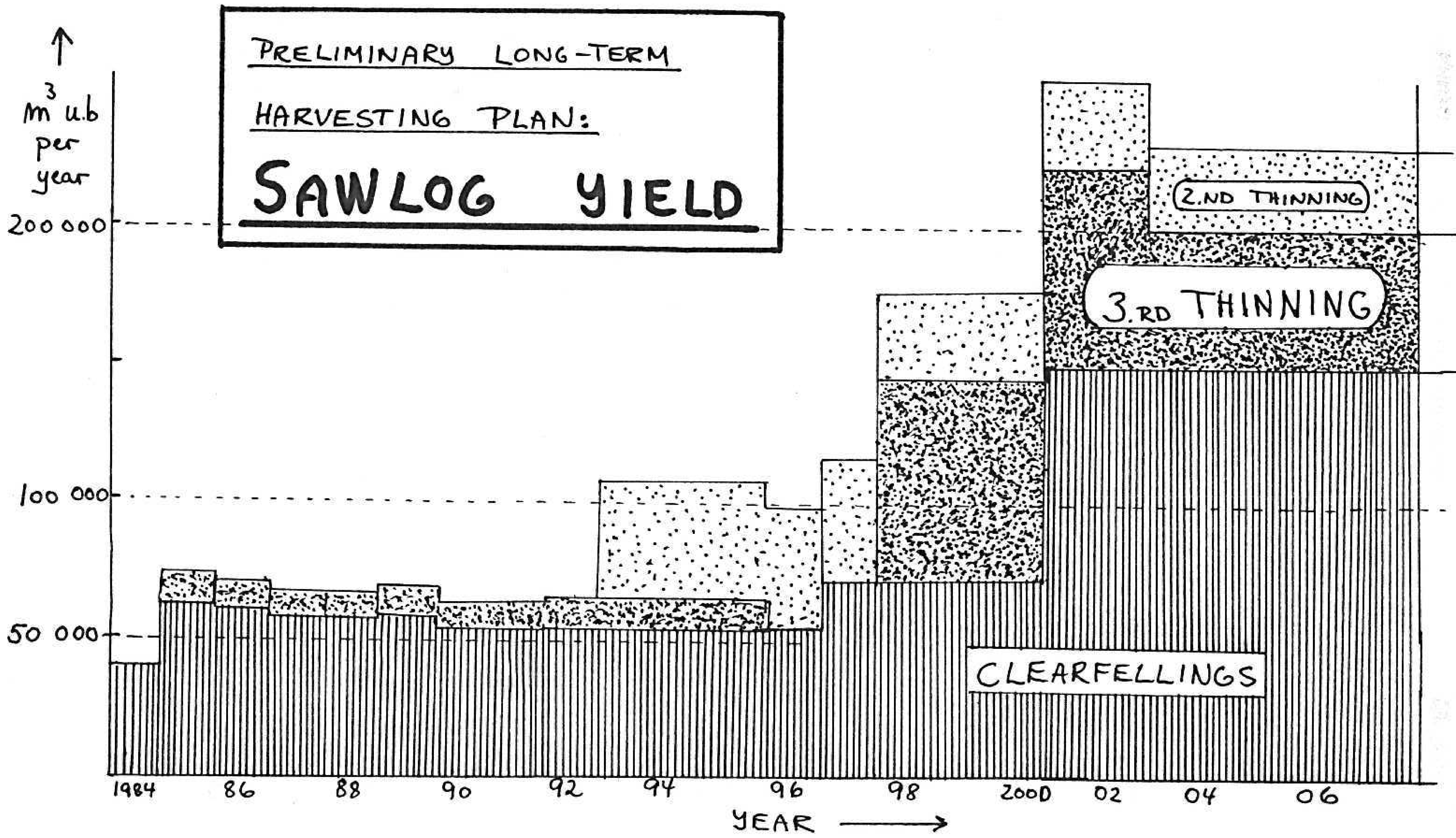
ANNUAL HARVESTABLE VOLMUES, PULPWOOD, 1000 m^3 u.b.

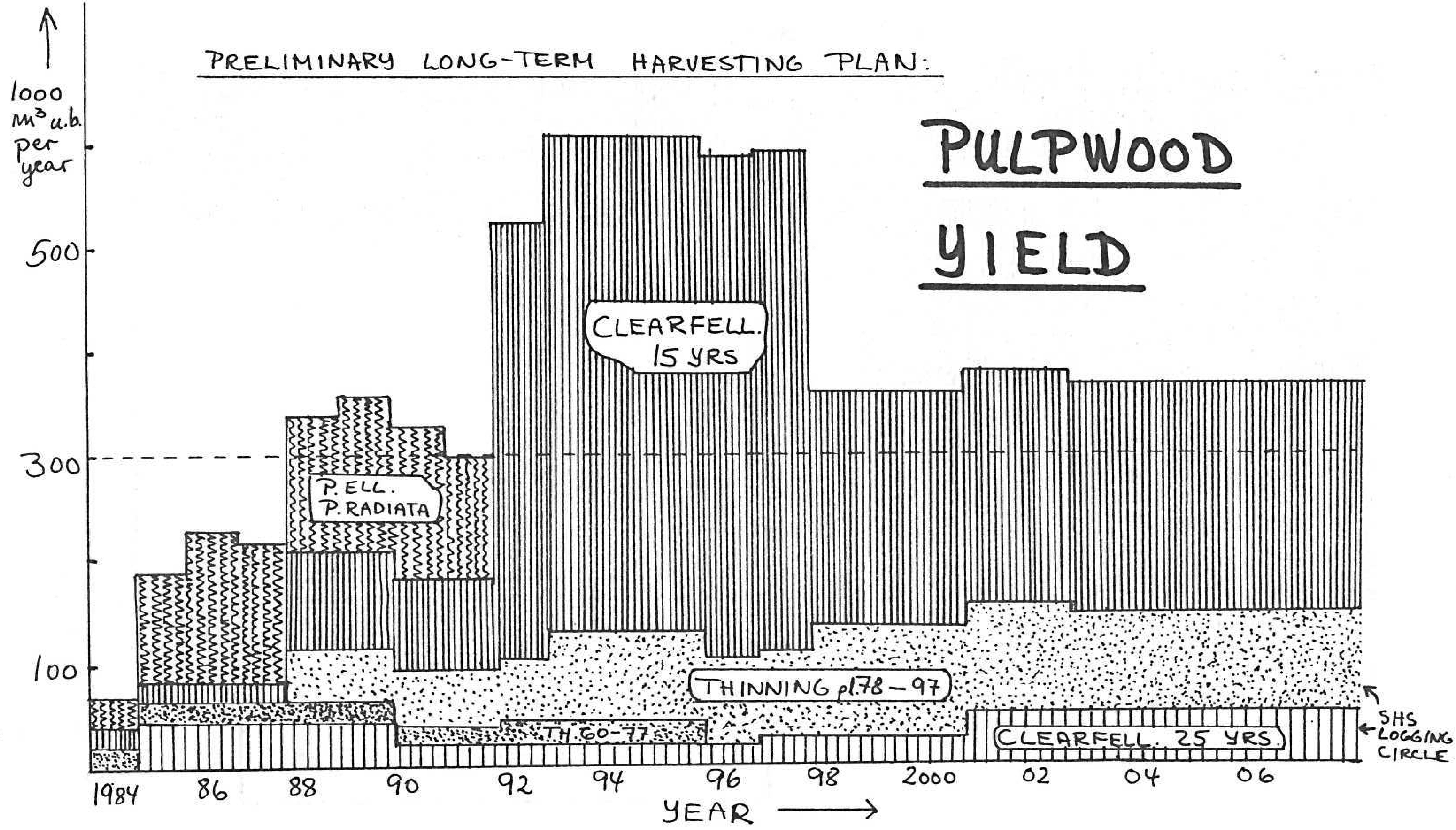
P.ell.+P.radiata	55	106	147	139	132	149	141	114																
Clearf. P.patula (at 15 years)	16	16	16	16	90	90	90	90	420*	480*	480	480	480	480	225	225	225	225	225	225	225	225	225	225
From sawlog comp. cut at 22-25 yrs	--	48	45	41	40	42	18	18	19	19	19	19	19	26	26	26	26	50	50	50	50	50	50	50
Thinning pl.60-77	21	21	21	21	21	21	21	21	28	28	28	28	--	--	--	--	--	--	--	--	--	--	--	--
Thinnings pl.78-82	--	--	--	--	58	58	58	58	58	43	43	43	43	43	36	36	36	36	36	--	--	--	--	--
Thinnings pl.83-	--	--	--	--	--	--	--	--	--	40	40	40	40	40	70	70	70	70	70	95	95	95	95	96
TOTALS	92	191	229	217	341	360	328	301	525	610	610	610	582	589	357	357	357	381	381	370	370	370	370	370

*) Premature cut (14-15 years)



SAO HILL :
PLANTED AREAS
1960-82, AND
TARGETS 83→
HECTARES PER YEAR
3000
2000
1000
300
?
+ EUCALYPTUS
EUCALYPTUS
PINUS PATULA
P. ELL.
P. RADIATA
1960-64
1965-69
1970-73
1974-77
1978-82
1983 —


PRELIMINARY LONG-TERM
HARVESTING PLAN:
SAWLOG YIELD
m³ u.b per year
200 000
100 000
50 000
2.ND THINNING
3.RD THINNING
CLEARFELLINGS
1984
86
88
90
92
94
96
98
2000
02
04
06
YEAR



PRELIMINARY LONG-TERM HARVESTING PLAN:
PULPWOOD
YIELD
1000 m³ u.b. per year
500
300
100
CLEARFELL. 15 YRS
P. ELL. P. RADIATA
THINNING pl.78 – 97
TH 60-77
CLEARFELL. 25 YRS.
SHS
LOGGING CIRCLE
1984
86
88
90
92
94
96
98
2000
02
04
06
YEAR

TECHNICAL APPENDIX D

CONTRIBUTIONS TO NATIONAL ECONOMIC DEVELOPMENT

1. Introduction

The establishment of the Sao Hill Sawmill and its subsequent operations have made an important contribution to the economic development of Tanzania. On one hand, the sawmill has made efficient use of the vast forest recources in Sao Hill. On the other, it has supplied softwood timber to the nation's construction and building industry. The mill supplies about 60% of the total softwood timber used in the country and also provides some export. In addition the provision of this low cost timber helps to free valuable hardwood for timber export.

The impacts of the mill's activities on economic development of Tanzania can be divided into direct and indirect ones. The direct impacts include contribution to Tanzania's Gross National Product, employment generation and generation or saving of foreign exchange. The indirect impacts are, in general, based on linkages with other sectors in the economy.

2. Contribution to Gross National Product

The sawmill's contribution to Gross National Product in nominal terms increased rapidly between 1977 and 1982, from 4.9 million shs. to 13.7 million shs., an increase of 280% over 5 years. This is an annual average compound growth rate of 23%. Out of the total value added generated, 63% was from domestic recources. The value added by the mill as a proportion of the gross value of the output produced averaged 45%, which is above average for the industrial sector in the economy. In the period 1978-82, value added per worker tripled , from 12,101 in 1978 to 38,400 in 1982, again exceeding the national average for the industrial sector in the country. Further details are provided in Table 1 below.

Table 1. Contribution to Gross National Product

	1977	1978	1979	1980	1981	1982
Wages and Salaries and Social Costs (1000 Shs)	1,600	2,689	4,199	5,590	5,400	5,808
Interest (1000 Shs)	1,406	1,204	1,136	1,006	925	947
Rent (1000 Shs)	-	7	-	23	7	11
Profit (1000 Shs)	(493)	614	618	(1,314)	2,206	3,579
Depreciation (1000 Shs)	2,352	3,381	5,884	4,231	3,188	3,184
Total Value Added (1000 Shs)	4,865	7,895	11,837	9,518	11,726	13,709
Value Added From Domestic Resources (1000 Shs)	2,513	4,514	5,953	5,305	8,538	10,525
Value Added Per Worker (Shs)	12,101	16,448	24,109	19,000	25,491	38,400
Ratio of Value Added to Gross Revenue	0.42	0.36	0.54	0.43	0.48	0.49

3. Employment Generation

At its inception in 1975, the mill created 200 new jobs generating an annual wage bill of 1,5 million shs. By the year 1982, the mill's employment size had increased to 357 local employees, generating a wage bill of 5 million shs. This increase in employment has expanded industrial full time job opportunities in an otherwise purely rural environment. It has also increased the number of skilled employees in the sawmilling industry in the country thus contributing to skill formation significantly.

Taking into account indirect employment generation on the basis of both backward and forward linkages with other sectors additional employment created by the mill's activities could be estimated at about the same number as that for directly employed. (This is based on employment generation effect through linkages estimated using the 1970 Input-Output table for the wood industries.) A list of the number of employees is provided in Table 2 below.

Table 2. Employment at the Sao Hill Sawmill 1976-1982.

Year	Employees, Operative Labour	Employees, None Operative	Total No. of Employees
1976	170	30	200
1977	372	30	402
1978	436	44	480
1979	447	44	491
1980	445	56	501
1981	413	47	460
1982	313	44	357

4. Generation or Saving of Foreign Exchange

Direct exports of timber from the sawmill has been a small proportion of the total timber sales. Softwood timber exports by TANTIMBER, most of which was from the Sao Hill Sawmill, increased from 2 million shs in 1977 to 3.1 million shs in 1979 before declining to about 1 million shs in 1982. This poor performance in export is explained largely by weak competitiveness of the Tanzanian softwood timber in terms of both quality and unit costs. However, to get a fair assessment of the mill's performance in generation or saving of foreign exchange one would have to look also at indirect exports from the mill and the implied import substitution.

As far as indirect exports are concerned one can make two assumptions in the computations.

(i) All the sales to international contractors could be treated as indirect exports, since these contractors paid in foreign exchange and could have imported their supplies on site delivered cost basis if cheaper. For the years 1981/82 and 82/83 the average annual sales to these contractors and other foreign funded projects were 6 million shs annually. For the other years an average of 2 million shs is assumed.

(ii) During the whole period the mill has been in operation, Tanzania has been exporting hardwood. In the absence of softwood production, some hardwood would have been diverted to domestic use, in order to allow construction activity at the actually realized level. Since not all softwood is produced by Sao Hill alone, for the relevant years 70% of hardwood exported volume equivalent could be regarded as Sao Hill's indirect exports. In order to avoid overestimating the indirect exports, allowance is made for possible diversion of hardwood exports to domestic use at a 20% level. Thus, effectively 50% of hardwood export earnings can be regarded as indirect exports from the Sao Hill Sawmill.

On the import substitution side, one could regard the total timber sales from the mill as substitution for potential imports. There is considerable excess demand for timber in the country. In the absence of the mill's supply, the timber used from the Sao Hill would have to be imported in order to allow construction and furniture making at the actually realized level.

The value of indirect exports plus actual softwood timber exports will, however, be taken as export earnings from the Sao Hill Sawmill. Between the years 1978 and 1982, the net foreign exchange balance of the mill was 924,000 shs. Thus, the mill not only paid for its own import requirements (directly and indirectly) but also generated some excess for national use. On an annual basis, except for 1980 and 81, all the other years registered positive balance.

The scenario depicited here is on the lower estimate side. If one used the potential import substitution assumption, the net foreign exchange saving would have been much higher. On the basis of the 1982 detailed cost structure of the production process, the import content of the mill's cost of production is 33%, which is below the national average for industrial enterprises.

Thus, although the Sao Hill Sawmill does not export much timber directly, it is a net foreign exchange generator if indirect exports are taken into account. It is also an efficient user of foreign exchange in terms of import intensity of its production process. In tables 3,4, and 5 below, further details of the foreign exchange effects of the sawmill are provided.

Table 3. Foreign Exchange Generation of the Sao Hill Sawmill (1000 Shs)

Year	1978	1979	1980	1981	1982
Operative Consumption of direct imports	1,844	2,481	6,098	8,016	4,254
Depreciation import content	3,530	2,947	3,700	2,778	2,762
Total Production Imports	5,374	5,428	9,798	10,794	7,016
Indirect imports (10% of domestic inputs)	522	1,532	1,269	1,111	1,901
Total Direct and Indirect Imports	5,896	6,960	11,067	11,905	8,917
Direct Exports of Softwood Timber	5,277	3,138	1,167	248	945
Indirects Exports (sales to international contractors + 50% of hardwood export earnings)	5,053	4,879	5,366	10,296	12,000
Total Direct and Indirect Exports	7,630	8,017	6,533	10,544	12,945
Net foreign exchange generation	1,734	1,057	(4,534)	(1,361)	4,028

Table 4. Export Shipments of Cypress and Pine from the Sao Hill Sawmill.

Year	Value (Shs)	Volume (m^3)	Unit value
1977	2,002,000	1,844	1,086
1978	2,577,000	2,011	1,281
1979	3,138,000	2,365	1,327
1980	1,167,000	764	1,527
1981	248,000	178	1,394
1982	945,000	418	2,261

Table 5. Export Shipments of Hardwood from Tanzania

Year	Value (Shs)	Volume (m^3)	Unit value
1973	8,612,000	7,301	1,180
1974	9,324,000	6,929	1,346
1975	6,461,000	3,184	2,029
1976	9,077,000	4,262	2,130
1977	6,790,000	2,854	2,379
1978	6,105,000	2,093	2,917
1979	5,759,000	1,497	3,847
1980	6,733,000	1,161	5,799
1981	8,592,000	2,016	4,262
1982	11,995,000	1,704	7,039

5. Links with the National Economy

The Sao Hill Sawmill is well linked with the national economy in its activities. It purchases inputs from other sectors in the economy within the district of Mufundi, from Iringa and from other regions in the country. It obtains approximately 70% of its inputs annually from within the economy. Thus, it has strong backward linkages with other sectors.

As pointed out previously, the sawmill sells most of its output to various sectors within the economy. In so doing, it stimulates production in the construction and furniture industries.

Through both types of linkages, the sawmill stimulates income generation in other areas in the country and indirectly generates employment in other sectors and areas.

Details of both backward and forward linkages with other sectors and areas in the economy are given in the tables below. There, some indications are given as to where and in what sectors the direct multiplier effects occur. The indirect multiplier effects have not been included in the chain of the causation effects. So what one sees from the details is only the first round effects of the chain of multipliers.

Forward linkages

Sao Hill Sawmill is the largest single supplier of softwood in the country. It supplies timber to those engaged in building, construction and furniture making, to timber merchants, to building and construction contractors, to government institutions and parastatals, as well as to private consumers. The mill supplies timber to many of the regions in the country and also exports some.

Based on the 1982 sales records, Mufindi district purchased 14% of the mill's total sales of timber, valued at 27,5 million shs. This is a large increase from the 1977 share of 2%. The increase is explained by the large timber requirements for the construction of the Southern Pulp and Paper Mill as well as the increased demand from both government institutions and private users for building purposes in the district. The rest of the Iringa region purchased 16% of the total timber in 1982 compared with less than 1% in 1977. This increase is partly explained by the large timber requirements for the construction of the Makambako-Longea road as well as increased government and private construction needs. It is quite clear from the record that the host district and region has taken good advantage of the cheap but good timber supply from the sawmill.

Outside the host region, the single largest buyer of timber from the mill is Dar-es-Salaam region, with about 38% of the timber sold. This reflects a drop from the 1977 share of 70%, but does not signify reduced absolute levels. The rest of the regions in Tanzania purchased 32% of timber supply from the mill. The largest among these were Morogoro, 14% and Dodoma, 11% with Mbeya and Mwanza purchasing about 4% each and insignificant quantities purchased by the Tanga region.

Out of the 10,414,000 shs worth of timber purchased by Dar-es-Salaam region in 1982, 1,000,000 shs worth was exported through TANTIMBER.

The Sao Hill Sawmill thus has played an important role in supporting the building and construction industry in the country. As softwood becomes more and more acceptable as a substitute for hardwood in this industry, the mill's role will be extended.

In table 5 below, more details are found on the forward linkages of the Sao Hill Sawmill.

Table 5. Direction of Sales of Timber (1000 Shs)

Area to where timber is sold	Recieving Sectors					
	Timber Merchants	Building & Construc.	Government & Parastatals*	Private Consumption	Other	Total
Mafinga (Mufindi) District	189	1,752	920	929	3	3,793
Iringa (Njombe, Makete, Iudewa Districts)	168	1,596	1,582	1,006	17	4,369
Mbeya	-	730	83	161	-	974
Dodoma	862	1,572	402	62	-	2,898
Morogoro	541	1,141	1,348	826	-	3,856
Mwanza	1,037	-	-	-	-	1,037
Tukuyu	-	-	70	-	-	70
Tanga	-	-	72	-	-	72
Dar es Salaam	5,282	1,798	1,254	1,058	22	10,414
Total Domestic Sales	8,079	8,589	5,731	4,042	42	26,483
Export from DSM	-	-	1,000	-	-	1,000
GRAND TOTAL	8,079	8,589	6,731	4,042	42	27,483

*Including sales to Tantimber Branches

Backward linkages

In the process of producing various types of timber, the Sao Hill Sawmill purchases several inputs from within the district of Mufindi, other districts in the Iringa region and from other regions in the country. Thus, directly and indirectly the mill promotes production in the other sectors in Tanzania.

In 1982 the value of production inputs inclusive of labour purchased from Mufindi district constitutes 46% of total input costs. Other districts in the region supply the sawmill 13% of all inputs. The mill purchases 16% of the inputs used from other regions. 25% of the value of inputs used in 1982 were directly imported.

Within the Tanzanian economy, the mill has the highest backward linkages with the host region, Iringa, 59%. Within the region, Mufindi district is the largest supplier of inputs, being mainly labour and sawlogs.

Table 6 below, which runs over two pages, provides further details of the backward linkages of the Sao Hill Sawmill.

Table 6. Backward Economic Linkages in 1982 (1000 Shs)

Type of production inputs	Areas in Tanzania receiving payment for inputs				Imports			Total payment
	Mufindi district	Other districts in Iringa Region	Other regions in Tanzania	Total Tanzania	Direct imports	Indirect imports	Total imports	
1. Forest Royalty	3.402	-	-	3.402	-	-	-	3.402
2. Diesel,Oils & Lubricants								
- Logging	-	785	-	785	-	(314)	314	785
- Sawmill	-	1.635	-	1.635	-	(654)	654	1.635
3. Rubber								
- Logging	-	192	384	576	250	(219)	469	826
- Sawmill	-	10	30	40	56	(15)	71	96
4. Spareparts								
- Logging	-	120	941	1.061	352	(350)	702	1.413
- Sawmill	-	203	-	203	794	(67)	861	997
5. Insurance								
- Logging	-	-	207	207	-	-	-	207
- Sawmill	-	-	74	74	-	-	-	74
6. Miscellaneous Consumables								
- Logging	-	-	-	-	32	-	32	32
- Sawmill	-	-	-	-	-	-	-	-
7. Log Transport by Others	110	-	-	110	-	(18)	(18)	110
8. Misc. Sawmilling Cost								
- Building maintainance	103	-	-	103	-	-	-	103
- Blue Stain Preservative	-	-	-	-	85	-	85	85
- Impregnation Plant Materials	-	-	-	-	1.145	-	1.145	1.145
- Administration Cost	1.804	-	-	1.804	-	-	400	1.804
- Audit Fees	-	-	369	369	-	-	-	369
- TWICO Fees	-	-	1.376	1.376	-	-	-	1.376

Type of production inputs	Areas in Tanzania receiving payment for inputs				Imports			Total payment
	Mufindi district	Other districts in Iringa Region	Other regions in Tanzania	Total Tanzania	Direct imports	Indirect imports	Total imports	
9. Interest Paid	947	-	-	947	-	-	-	947
10. Deprecation:								
- Logging	-	-	-	-	796	-	796	796
- Sawmill	-	-	144	144	2.474	(26)	2.500	2.618
11. Salaries								
- Logging	1.128	-	-	1.128	-	-	-	1.128
- Sawmill	3.302	-	-	3.302	-	-	-	3.302
12. Gross Value Added* (9)+(10)+(11)								
- Logging	1.128	-	-	1.128	796	-	796	1.924
- Sawmill	4.249	-	144	4.393	2.474	-	2.474	6.867
- Total	5.377	-	144	5.521	3.270	-	3.270	8.791
13. Total inputs								
- Logging	1.128	1.097	1.535	3.760	1.430	901	2.331	5.190
- Sawmill	9.668	1.848	1.993	13.509	4.554	762	5.316	18.063
- Total	10.796	2.945	3.528	17.269	5.984	1.663	7.647	23.253

* Exclusive of profits, central administration, salaries, and welfare costs.

TECHNICAL APPENDIX E

NORAD Administration Costs

The present budgeting and accounting system of NORAD does not allow a division of the administration costs at the project level. It is therefore impossible to collect information on the specific administrative costs for the Sao Hill Sawmill Project through an analysis of the NORAD accounts.

The Sao Hill Sawmill Project started ten years ago. During this period many departments and sections within NORAD have been involved in the project and frequent changes of personnel have taken place. For these reasons, the evaluation team has found it impossible to get a realistic picture of the administration costs through interviews or questionnaires.

During recent years SIDA (the Swedish International Development Authority) has devoted much interest and investigative capacity to the division of the administrative costs at the project level. Investigations and trials are still ongoing. At present, the investigators have different views of the possibilities to successfully implement such a system. If NORAD has an interest to develop a new system in this area, cooperation with SIDA is recommended.

According to persons interviewed within SIDA, the most reliable way to calculate the administrative costs for a certain project so far has been to sum the total administrative costs and distribute them to projects according to one of the following two factors or a combination of them.

a) Manyears of expatriate services in the project as a share of total manyears of expatriates for all projects

b) Total contribution to the project in money terms as a share of the total contribution to all projects.

Below, the NORAD administration has been calculated based on a combination of these two factors. The administrative costs for the Sao Hill Sawmill Project have, thus, been calculated to be about 1 % of the total NORAD administration costs.

Based on these assumptions and calculations the administrative costs of NORAD for the Sao Hill Sawmill Project are as follows (figures in '000 NOK)

1974	1975	1976	1977	1978	1979	1980	1981	1982	Total
211	250	293	442	371	534	648	723	816	4,288

APPENDIX F

SAO HILL SAWMILL FROM A SOCIO-ECONOMIC AND POLITICAL POINT OF VIEW

1. INTRODUCTION

Geographically the main "catchment" area for Sao Hill Sawmill impact is Sao Hill itself, the controlled settlement that has grown since 1974 around the Mufindi District Forestry Division Headquarter and Sao Hill Sawmill. In 1983 Sao Hill, or Ihefu as it is called locally, consists of some 260 households, settled in 112 houses belonging to the sawmill and 109 to the Forestry Division. Both employers have about 20 staff housed in temporary, poor quality huts made by present or previous incumbents from slabs from the sawmill. Sao Hill also has two workers' cooperative shops, one belonging to each community but used by any Sao Hill resident, two social halls, a school, a church, and a grinding mill.

Sao Hill is a very different place to live in from other settlements in the area with the possible exception of Brooke Bond Tea Estate at Mufindi. Brick houses of varying sizes with corrugated ironsheet roofs are neatly strung along a network of well-graded roads spreading out according to a plan that clearly indicates abundancy of land. An so it is. At present 1250 persons (assuming an average of four to a household) share in housing and other amenities, agricultural plots included, in an area of 537 ha.

Nobody is more affected by Sao Hill Sawmill than those directly and indirectly employed by the mill. In view of national, regional and even local demand, 343 jobs provided on site by the sawmill may not amount to much, yet one on ten permanently employed in the (Mufindi) district (180.000 inh.) is said to work at Sao Hill Sawmill. 96% of them are men. Average monthly salary is shs. 1200, well above other comparable montly salaries. Altogether about shs. 500.000 are paid as wage (and social costs) to mill workers monthly. Locally that is a lot of money. Yet to the average family it is not. Most of it is spent on food, house rent, keeping children in school, clothes, beer and transport to go home for a funeral, to visit, or be visited by, wife and children.

Perhaps more so than housing, the amenities provided for residents workers contribute to making Sao Hill a special place. They include free electricity, firewood, transport, ploughed fields, water in or near the house, and substantial support to the workers' cooperative shop and grinding mill. But there are drawbacks. Sao Hill is situated in Forestry Reserve land. Settlement is strictly controlled. Only those working for Forestry and Sawmill (and a few others) are accepted as residents. The young people, the second generation, will have to find their jobs and homes elsewhere. And so will the present residents when they retire or stop working for some other reason. This is why many workers maintain a second home outside the community. Families are split. Wives - and or husbands - commute, and women if they stay in one place, find than their husbands have taken a second wife, at Sao Hill, or at home. Sao Hill is an enclave of many advantages but no real development potential. Its population will never be able to grow roots.

Outside Sao Hill the physical presence of the sawmill is hard to detect except in the occasional slab fence erected free of charge from sawmill waste to protect a vegetable garden, pigsty or chicken pen. In Sao Hill such enclosures are all over the place, but they are also found at Mafinga town 20 km away and Sawala village 15 km. At Mafinga and Mufindi (25 km) the local markets have been built entirely or largely by slabs from the Sawmill.

There must be many other visible signs of mill impact. Most mill workers live outside Sao Hill and their salaries however modest are likely to have resulted in at least some material investments. Yet, from a socio-economic point of view, perhaps the most important investment is not immediately visible. So many parents work hard and consume little to enable their children to continue their education as far as the system permits them.

It is not only eduction that is determined by the larger system. The Tanzanian political economy extends into most walks of life, including the way industrial enterprises like Sao Hill Sawmill are run, and with what impact. In the following interaction between sawmill and the society at large will be pursued in some detail. In doing so the point of departure will be taken in the overall objectives of Tanzania's development strategy with its emphasis on equity and participation. The emphasis will be on structures and not on statistical data as it is in structural relationships and not in numbers that potentials and drawbacks of an industrial complex like Sao Hill Sawmill must be sought.

2. SAO HILL SAWMILL IN THE LIGHT OF NORWEGIAN AND TANZANIAN DEVELOPMENT OBJECTIVES

The official understanding of development in Tanzania is expressed as objectives and goals proposed by the party. The Arusha declaration of 1967 articulated a comprehensive overall development strategy which was further specified in Nyerere's paper on Socialism and Self-reliance of 1969 and in his book Freedom and Socialism (Oxford Univ. Press, 1968).

Politically the aim of the country under the party leadership, is to safeguard national independence and enhance nationbuilding through widespread participation in decision-making and sharing of power within a system where officials are accountable to the people. Socially the aim is to construct a socialist society following the African tradition of equality and co-operation. Economically the aim is to secure self-reliance and economic independence, enhance productivity and improve social services on the basis of cooperative work efforts.

In general terms the Tanzanian objectives coincide well with overall Norwegian Development objectives.
How then does Sao Hill Sawmill stand in the light of these objectives? By 1983 it stands well!

1. Independence

Making extensive use of local rawmaterials a forestry based industry like Sao Hill Sawmill certainly constributes to increased national freedom of action. In 1982 15.000 m^3 of processed timber was made available to the Tanzanian public. Some of it substituted hitherto imported wood, and some substituted hard wood making that wood available for export, thus saving foreign exchange. In sum the sawmill saved more foreign exchange than it spent of fuel and imported machinery. The impact of the mill on the national economy is considered in appendix D of this report and will not be repeated here. Neither the question whether the mill's contribution to the economy could or should have been better than it has been.

Sao Hill Sawmill is a joint Tanzanian/Norwegian Aid enterprise. The economic contributions are presented in Appendix A. Also Norwegian technical assistance has been substantial though it is now reduced from 12 persons in 1976 to 6 (soon 7) in 1983.

Per se aid is incompatible with, though it may be conducive to, national independence. Nyerere says so very bluntly: "How can we depend upon foreign governments and companies for the major part of our development without giving to those governments and countries a great part of our freedom to act as we please? The truth is we cannot." "He who pays the piper calls the tune."

Norwegian personnel has had much decision-making power in matters concerning the choice of technology and everyday administration of the sawmill, but as we will show, Tanzanian social and economic policies have determined basic aspects pertaining to work relations and remuneration.

On the very local level the Norwegian impact may have been felt the most heavily. In a project area like Sao Hill expectations as to the omnipotence of foreign aid is quickly roused. The Mbao Housing Scheme is an example. So much hope, trust and savings were invested into the plans of a Workers' Housing Cooperative. But the project that finally took form drawn up by foreign consultants was soon too expensive to be implemented. Today all that is left of the Housing Scheme are 70 disillusioned Housing Cooperative members (most of whom have now terminated their membership) and an expatriat whose job has been redefined to fill functional gaps at the sawmill; a plan of neatly drawn houses, streets, street lightening, football ground with international measurements, water supply system, etc.; and the problem itself: how to provide workers with permanent homes in which they can invest and build a future for themselves and their family.

In itself an incident of little importance, but a reminder of the intrinsic quality of aid is the happenings around the newly constructed pombe (local beer) shop at Sao Hill. The shop was built by the sawmill on the initiativ of the Workers' Cooperative, blessed by the Party - CCM - and much longed for by female brewers and potential male (and female) customers. But it never got started due to objections (as to location) from a NORAD representative.

2. Nationbuilding

The objective of nationbuilding must (i.a.) be considered against the background of parochialism (tribalism) which has prevented cooperation and checked progress in many new (and old) nations.

At Sao Hill people have been brought together from all over Tanzania. Though the large majority (77%) come from Iringa region, there are 8% and 3% from Mbeya and Morogoro regions, 4% from Kilmanjaro and 3% from Mwanza regions. Positions at the mill is determined by education and those coming from the most immediate surroundings hold the lower cadre posts. But in spite of variaton in ethnic background, education and work experience, cooperation seems to dominate work and social relations. We tried to localize conflict on tribal or other grounds but found none.

Skill formation is another important input in nation-building. A large majority of the workers receive on-the-job training. Many develop skills that can be used at least potentially in other settings. This represents a potential valuable spin-off effect of the project, when skilled or semi-skilled personnel terminate their sawmill asignment to work elsewhere. Locally technical spin-off can be found in Sao Hill itself where some people have opened a carpentry workshop in their own back-yard.

Under the heading of "nationbuilding" we will also consider the sawmill's ability to build on and strengthen local institutions. SHS connects with bodies like TWICO, Ministry of Natural Resources and Tourism, Forestry Division, TANTIMBER, Faculty of Agriculture at the University of Morogoro. To all of them we believe Sao Hill Sawmill is an important asset. It is the most profitable among TWICO's subsidiaries, providing the mother company with a net income as well as valuable training ground for sawmill personell. The Forestry Division, Min. of Natural Resources, is benefitted economically by a royalty fee of 3 mill. shs. 1983, and professionally because the sawmill needs quality timber. Also for the Division of Forestry at the University of Dar es Salaam at Morogoro the sawmill represents valuable training ground and is a potential employer.

Are there institutions likely to suffer because of the project? We do not think so. A positive development since 1977 is the presence of the regional administrative authority in the sawmill management committee (board of directors).

3. Participation in decision-making and sharing of power.

The party - CCM - is pivotal in the organizational network which criss-crosses the sawmill and Sao Hill.

At the local level the party branch committee dominates, but the party also works through affiliates like the trade union, the youth organization, the womens' organization and the workers' cooperative.

While CCM has only 176 members among the SHS staff, every worker is a member of JUWATA (Jumuiya ya Wafanyakazi Tanzania), the party trade union. The union leadership sees to it that the workers get their dues, whether it is salaries, uniforms, transport, leave, or whatever. It is also supposed to look into working conditions generally and forward complaints from its members. Chairman and two commiteemembers are represented in the sawmill management commitee, as are CCM officer bearers and specially appointed workers' representatives. Altogether 40% of the management committee members are workers' representatives, and this is as it should be according to party directives.

We are told that there is no antagonism between workers and management. Even the very difficult decision to terminate 105 workers in 1981 to improve sawmill performance and profitability was supported by the workers' representatives. The workers' representatives are said to follow the advice of the management. Asking the union representatives for their plans for the future, we are told they want more jobs, - and more advances machinery. But no suggestions are given how to combine the two.

At least in theory and from an organizational point of view the workers have ample opportunities to participate in decicion-making and to be heard in matters concerning the running of the sawmill. However, when it comes to the future development of Sao Hill community, it is a foreign consultancy firm which have delivered the premises, and not sawmill employees, whether they be management, (Norwegian) advisors, or other staff.

The use of outside expertise poses problems, as does its none-use. Generally, plans prepared by short-term consultants are more elaborate, more costly, more ambitious, and probably more time-consuming when it comes to implementation, than locally made plans. But they may also be better, more comprehensive, more long-term oriented.

According to this evaluation team (and that of 1977, confr. Evaluation report 1977, p. 23) the use of consultants should be limited to fields where local skills, knowledge and experience is not available. There are two major reasons for this. One is the develoment of local expertise, local skills and know-how as the ultimate aim of all development aid. The other is that local expertise is generally obliged to take local conditions and constraints into consideration to a greater degree than external planners, who may not even be aware of some of them. This facilitates the integration of whatever is planned into existing socio-economic, political, material or other structures.

In view of such considerations the evaluation team questions the use of external consultants in connection with the development of the Sao Hill community.

The Sawmill planned and contructed the community as it stands today. Apart from the very small size of some of the junior staff houses, the present residents are well pleased with houses, layout and existing infrastructure. The problem at the moment is not quality, but quantity. Most workers ardently wish to be housed at Sao Hill, and many prefer the very poor quality temporary slab huts to renting a room in Mafinga town or Changalawe village.

At the moment only 114 houses are available and more than half the sawmill staff live outside Sao Hill. This situation cannot be remedied by extensive or expensive planning, but only by converting all available means into sawmill houses.

We think this can best be done by giving the sawmill full authority over the future house constructions. This is in accordance with the overall development strategy of leaving the maximum amount of decisions to those most immediately concerned. It is also according to the wish of sawmill management.

4. Equality

Whether the objective of equality can be considered met by the sawmill is largely a question of definition. The 343 workers in the mill are clearly compartementalized in management, fore- and headmen, skilled and unskilled workers. Pay is allotted accordingly, along a scale ranging from shs. 600 to 4950. Expatriats' salaries amount to between 15.000 and 20.000 shs. per month and are paid directly by NORAD.
Just like in 1977, in 1983 top salary (expatriats excluded) is about seven times that of bottom salary, but the salary structure seems different. Top salary receipients (2-5000 shs. 1983, and 1-2000 shs. 1977) seem to have doubled over the past 6 years, while those with the lowest salary grades have increased with 1/3, so that those with medium salaries are proportionately fewer than before.[1]

Salary scales are determined by SCOPO (Presidential Standing Committee for Parastatal Organizations). At Sao Hill Sawmill a system of bonuses, has recently been adopted which may recuce the validity of our analysis. Loggers for instant who are among the most lowly payd, have with the present bonus system been able to argument their salaries with almost 1/3.

. The present stratification in salaries corresponds to one of housing
28 senior staff houses, of good quality with three or two bedrooms, running inlaid hot and cold water are reserved for the management. The 84 junior staff houses vary vastly in size and quality. The most recently constructed two-family houses are the most adequate, though they only have two bedrooms. Some of the older junior staff houses are so small that they have come to be called "bachelor" houses. Plans exist to convert the twin bachelor houses into one-family houses, a welcome improvement for those who live there. 16 temporarily wooden cabins are even less attractive. They are small, cold and without electricity. Worse off of all are the incumbants in the so-called squatter huts. These huts are however being reduced in number. In the beginning of September 1983 there were 14 such houses some of which burned down during the fire at the end of that month.

The slab huts are very inadequate, and clearly considered so by incumbants and sawmill management. When they are not torn down it is because those living there prefer it to renting a room in neighbouring Changalawe or Mafinga. They do not have electricity, but neither do they pay any rent. Others do. Rates are prescribed by SCOPO; 12% og 7½% of salaries according to salary size.

At the moment company houses (slab houses included) accomodate 170 employees. The remaining 170 live in neighbouring villages (10-20 km away) in their own homes, or in rented rooms in Changalawe and Mafinga, where one room in a mud-and-wattle house costs shs. 40/mth. Millworkers in Mafinga and Changalawe get free transport to and from work, while workers living in Matanane and Irunda have to cover 12-15 km daily on foot or bike.

The most "unequal" of all sawmill workers are the loggers. Working in the forest they are too far away to make frequent use of the material benefits, union sittings and the informal social network that has developed at Sao Hill Sawmill. So far the disadvantages of working in the forest have been offset by the loggers being able to live in their own homes, in their own villages. However, this is going to change. From November 1983 logging will be done 20-30 km away from the area where loggers live. To solve the transportproblem the sawmill will house the loggers in temporary camps, several men to a room, at logging site.

Camp-living provides a poor solution for the loggers, their families and also the sawmill. With the increasing competition for loggers from Mufindi Southern Pulp and Paper Mill (SPM), camp-living may be a decisive factor in the loggers choice of employer. It is unlikely that SPM will offer loggers higher salaries than does the sawmill and additional benefits may determine for whom the loggers will want to work.

At the moment the loggers have a working day of only five hours or less. As long as they stay in their own homes, loggers have ample opportunity to supplement family died and income by cultivating. Camp-living will not only deprive the loggers of this extra agricultural income, but the short working hours are likely to create social problems, as there will be nothing to do for the men after working hours.

For these reasons we recommend not to house loggers in temporary camps, but to provide them with bicycles so that they can continue to live at home and get to work by their own effort. We believe that bicycles will be less expensive, more reliable and more acceptable to the loggers themselves, and their families, than making the loggers depend on company transport, let alone live on site.

Sao Hill residents are recipients of many advantages which external residents have to do without; free electricity, water, firewood delivered at the doorstep, free busride to and from church or mosque on Sundays, and company-ploughed field, company-subsidized cooperative and grinding mill. All workers have access to some of these benefits, but, needless to say, those living 15 or 20 km away are at a disadvantage when it comes to using them.

Inequality does exist inside the sawmill and at Sao Hill, but the stratification we have described above is a reflection of Tanzanian social structures in general. In the light of national differences, those at Sao Hill are modes and of little consequence (possibly apart from the expatriates who necessarily represent an alien element), except for one very basic dimension; that of gender.

Sao Hill Sawmill is a very male company. Of the 14 women employed, five are cooks and six typists/secretaries. In basing itself on male labour, Sao Hill Sawmill hardly distinguishes itself from other enterprises where employees are paid well above minimum salaries.[1]

Because Sao Hill Sawmill strives to optimize working conditions, because the sawmill represents a modern enterprise in a field and an area where little industrial development

[1] The worldwide tendency to couple female labour to minimum wages is confirmed in the immediate environment of the sawmill. In the Forestry Division women dominate the seasonal labour in connection with treeplanting and are paid monthly salaries of about one third of sawmill average wage.

has taken place in Tanzania, because the sawmill's pioneer phase now is over and time has come to consolidate achievement, and because the sawmill still is a development project with support from NORAD, we strongly recommend that Sao Hill Sawmill henceforth actively works to employ many more women.

From the point of view of an employer an important reason in favour of a gender balanced labour force is the improved work relations that often results. With a substantial female labour force, male milieus are known to soften, to get less tough. Besides there are many jobs which women do better than men. Driving is one of them, accountancy is another as women are generally more careful, and less prepared to take risks, than man.

From the point of women, paid employment is not only a prerequisite for a secure income, but also to acquire a sense of participation in development, to develop new skills and aspirations, and to learn the importance of working through organizational and not only social networks.

From the point of view of society we quote President Nyerere: "If we want our country to make full and quick progress now, it is essential that our women live on terms of full equality with their fellow citizens who are men." (Socialism and Agriculture, 1967.)

The argument that sawmill work for women is contrary to Tanzanian tradition is not valid. Traditionally, women were the main "bread" winners of their families. Theirs was the duty to provide every-day food, clothing and even housing for their dependents, - and husbands. The main economic unit was the woman and her children, or the extended family, and the role of the man (husband/brother) was to assist and support the women in their economic endeavours, and of course, to regulate communal affairs.

The argument that women do not have sufficient physical strength to work in a sawmill is not valid. Mill work is generally mechanized and brute force is excerted by very few mill employees. On the contrary, most of women's work, cultivating, carrying firewood and water, is more heavy than sawmill work.

The argument that women are not skilled is not valid. Many male workers were not skilled before they joined the project. They were trained on the job, and so can women be.

The argument that children suffer when their mothers work full-time is not valid. Employment for women does not mean that all mothers with small children should take paid employment. Neither is it so that mothers, who are not paid for their work spend their days at home. The contrary is often the case. In the peak agricultural seasons many mothers spend more than 8 hours in the field, hoeing, weeding and harvesting, and return home more tired than the men who have had an 8 hour day in the sawmill. Besides, paid employment may mean that mothers of small children are able to pay other women to adequately care for their children every day. It is well documented that women spend more of their income to the benefit of their children, than do men.

The argument that women do not need paid work because they are provided for by husbands is not valid. Many husbands fail to adequately provide for their dependents. In Sao Hill women said: "With increased salaries our men take additional wives and drink more beer, even if we need the money for our children." And some women are not married. Besides to make all women economically dependent on men is to perpetuate their status as second rate citizens and human beings. In his paper on Freedom and Development (1968) President Nyerere points to the importance of individual self-reliance: "A man is developing himself when he grows, or earns, enough to provide decent conditions for himself and his family: he is not being developed if someone gives him these things." Neither does a woman.

An employment policy which turns women into economic dependents, or where women are confined to the more or less stagnant informal sector, is a policy of underdevelopment of women.

The argument that women do not want permanent employment is also not valid. The lack of paid jobs was a complaint voiced by many women in Sao Hill. When the sawmill opened a cardboard box section and advertised 14 jobs for women locally, they had one hundred applicants. However, the list soon disappeared to reappear with only 14 names, most of them wives of senior staff. This indicates that even husbands in the higher salary grades are prepared to go into some trouble to find paid jobs for their wives!

In the absence of paid employment women at Sao Hill meet their obligation as breadwinners by cultivating and brewing beer, but only the latter provides them with a cash income. Thus they remain peripheral to the formal economic sector in which their husbands, brothers and sons continue to increase their lead. In the short and long run this is detrimental to women, to the family and to the nation. Women's potential is not tapped and men's role in the family remains lose.

5. Cooperation

"The project gives the impression of having a wellbalanced set of relations between all levels of personnel. There was very little evidence of conflict between different levels.." (Report on an evaluation of the Sao Hill Sawmill project, Tanzania October 1977, p. 102.) So the evaluation team of 1977 concluded and so do we. Also within and between the various units in the sawmill cooperation seems the rule, thoug increased interaction between units may improve sawmill performances. One reason for the good working relations is no doubt the many outlets workers have to voice views, and grievances if they have any. There is the CCM, JUWATA, the Workers' Council, the Management Committee and the Sawmill General Assembly called by the manager twice a year. For this reason it is difficult to see how management-worker relations can seriously deteriorate, except at a purely personal level. But as long as the mill discipline continue to be as moderate as it seems today, and the company runs with a profit from which employees get various fringe benefits, Sao Hill Sawmill is likely to continue to be a good place to work in.

Perhaps too good? Also informal advantages or benefits seem to accrue from mill employment and be shared by workers and their friends and relatives occasionally. By some KUSAIDIA - 'to help out' is a strategy pursued to the disadvantage of the sawmill interests as when it results in the misuse of vehicles, absenteeism, loss of goods, negligence or nepotism. And there are also cases of misuse of power. One insignificant example was the bill of shs. 2000 (i.e. more than 3 months of minimum salary) to cover beer and food consumed during an 8 hours trip from Dar es Salam to Sao Hill by one person (not employed by the mill). But, needless to say, such problems are not particular neither to Sao Hill, nor Tanzania.

Neither are cases of default of payment for goods delivered. In 1983 there were 18 such cases pending. But the sawmill had already tightened up its system to prevent any future free delivery of goods.

It is difficult, if not impossible to assess the economic impact of what may be considered misuse of sawmill resources. Maybe it can just be counted as among the positive spin-off effects, as it certainly makes more resources available to some people. It is difficult to see how such misuses can be stopped unless firmer action is taken against misusers. But to do so may jeopardize the good relationship that exist between management and workers. It is likely that most workers agree that family must be given priority to sawmill. In this there is a conflict of interests between a modern industrial enterprise and traditional family bonds. To educate people to become good workers may be to educate them to deephasis personal relationships.

Relations betewwn expatriat and Tanzanian staff seems good. Foreign influence may be less challenging when it is done from an advisory rather than executive position, as is the case in 1983, even if the nature of the jobs may be much the same.

Cooperation is also said to prevail between sawmill families and those who take their livelyhood from the Forestry Division. But the Women's Organization, UWT branch which united sawmill and forestry women, broke down over the disagreement between leaders as to who was to use the
4 sewing machines given to Sao Hill women by NORAD.

For over a year, machines and UWT have been idle, while plans have developed to form two UWT branches at Sao Hill, one for "Forestry women" and one for "Sawmill women". But the problem is likely to continue, if not between Forestry and Sawmill, then between women who know how tosew and make use of communal resources, and their poorer neighbours.

However, on the whole, "Sawmill community" and "Forestry Community" seem to live in peace. Though facilities like shop, social hall and football ground are duplicated, they are used by both communities according to need. Other facilities like church, school and water supply are common. However, as the water supply no longer suffices to adequately supply the whole community, there are plans to construct a separate water supply for the sawmill.

This is contrary to the recommendations made in the Master Plan for Sao Hill of 1981, where a major point is made out of "welding the two communities" (p. 15), in order, it is said, to enhance cooperation and avoid the duplication of services. We think enforced cooperation may to more harm than having two shops, two dispensaries, two social halls and even two water supply systems.

In our view preconditions for close economic cooperation between forestry and sawmill are not present, the sawmill being a profitmaking business enterprise with its own budget, and the Forestry Division a government agency depending on public funds.

Both Sawmill and Forestry Division management see separate investments as an advantage as sawmill investments will benefit Forestry employees.

At the moment staff meetings on the management level between Forstry Division and sawmill have been revitalized and are held monthly. Yet, in spite of this and the fact that the assistant Project Manager at the Forestry Division chairs the sawmill management committee, cooperation between the two seems to be wanting. One example is the failure of the Forestry Division to alert the sawmill management to a fire in a sawmill logging area until after two days.

In appedix C, we have pointed to the negative consequences for the sawmill of the Forestry Division's inability to look after its planation. With increasing competition for timber from SPM, Forestry - Sawmill relations may deteriorate further. The Forestry Division will be less dependent on the sawmill to market their product and may consequently be less susceptible to critizism concerning plantation management.

6. Self-reliance and economic independence

The degree to which Sao Hill Sawmill contributes to national economic independence and self-reliance is discussed in Appendix D of this report. Here we shall consider the issue on the micro level: how people in immediate contact with the mill have their needs met.

The average monthly salary among mill workers is shs. 1200. Though most people earn less, it is our opinion that a net income of shs. 1200 is not sufficient to provide a family with basic necessities. Here is a budgetary example drawn up for a family of two adults and three children:

Item	Price pr. unit (controlled price 1983)		Total
10 kg rice	8,50	shs.	85,00
8 " beans	13,00		104,00
4 " vegetables	6,00		24,00
3 " onions	10,00		30,00
4 " tomatoes	18,00		72,00
4 loaves of bread	6,00		24,00
8 l milk	7,00		56,00
2 kg cooking oil	60,00		120,00
5 " sugar	11,00		55,00
1 " salt	5,00		5,00
1/4 kg tea	8,00		2,00
2 pct washing soap	25,00		50,00
2 pct tiolet soap	5,00		10,00
4 pct matches	0,40		1,60
Transport			20,00
4 Grinding mill	5,00		20,00
Houserent 10%			120,00
4 kg meat	25,00		100,00
Beer			50,00
Clothing (1 shirt costs shs. 250)			250,00
		shs.	1198,60

Sao Hill residents get firewood and electricity free of charge. For those living in Mafinga and elsewhere fuel costs must be added to the budget. 20 l. of kerosine cost shs. 160, 2 bags of charcoal shs. 240.

A family of five cannot eat adequately on 10 kg rice and 12 kg vegetables a month. Fortunately mill workers do not have to. 360 acres agricultural land is ploughed by sawmill tractors free of charge, and shared between 343 mill employees. (Forestry employees, and others have a similar arrangement). Also seeds and pesticides are provided. In the 1982/83 season 800 bags of fertilizer were bought by the sawmill, distributed and paid for in instalments by the employees through deductions in their salaries. Those who for some reason do not cultivate, lend their acre to others and receive a tin of maize or some other consideration in return. Maize is also cultivated at the outskirts of the Sao Hill settlement and on small patches of land inbetween the houses where people hoe the fields themselves.

With an average yield of 7 bags per acre (some are said to harvest 30 bags on one acre), some 2500 bags of maize (probably more) may have been harvested from the company fields. With a controlled price of shs. 240/bag this amount to a total minimum value of shs. 600.000, a considerable contribution to individual and local self-reliance.

Mill-workers at Changalawe and Mafinga also cultivate sawmill fields. Those at Matanane, Irunda and Sawala villages have fields at home which they plough , but they make use of the fertilizer loan and company transport to get the fertilizer home.

Company- and privat fields make most people self-reliant when it comes to the maize staple. Most women, whether they live at Sao Hill or elsewhere also have a vegetable garden where onions, tomatoes, spinnach and cabbage are grown during the dry season. Watering is necessary. And again women at Sao Hill are prviledged in having tap water next door. The most industrious cultivate vegetables at the Little Ruaha river flats, some 10 km away.

Poultry is kept by virtually every Sao Hill household. Some opt for the least labour intensive rearing method, leaving the chicks largely to themselves, while others investe in spacious and solid chicken pens, and even layers. In spite of one egg costing shs. 4, most people prefer to rear chicken. Some keep ducks, and pigs. They are not many, but their success should serve as an impetus to many more families to rear domestic animals.

The considerable agricultural achievments at Sao Hill is the most positive socio-economic development since the 1977 evaluation. Contrary to the former evaluation team which suggested that the company land be cultivated on a communal basis organized by the party, the present evaluaiton team supports the present system of individual fields. At Sao Hill (like in most other places in Tanzania) the major problem is not undue individual profits, but too little food to enable a family to eat well, and yields from privat fields are generally higher than from those cultivated communally.[1]

Even with a substantial supplement of local food production, a salary of shs. 1200 seems inadequate to meet major expenses like clothes, household utensils, or furniture, let alone expenses in connection with marriage (bridewealth) and death.

The discrepancy between needs and the official means to cover them explains why the strategy of KUSAIDIA - to help (each others) out - is often pursued transactions. The result is a thriving informal economy. Prohibitive prices and short- or no supply of basic consumers' goods (rice, sugar, meat, milk) make people resort to barter on an individual and even aggregate level (as when one lorry of maize, 80 bags, was taken to Mbeya and exchanged for 80 bags of rice), and to selling and bartering services or goods (lorry transport, spare parts, timber) that is not theirs to sell or barter. It is not only because

[1] B.C. Nindi: The articulation of ismani social economic structure and its implication for ujamaa vijijini policy. Mimeo. June 1975. (A dissertation for M.A. Univ. of Dar es Salam.)

family loyalties are stronger than company loyalty, but also because extra incomes are sorely needed.

The production of local beer - POMBE - is one much practiced way for women to augment family income. Most women brew. Turnover is quoted to between shs. 200-500 per brew, and some women are said to brew twice and even three times a week. Beer drinking is an integral part of the African cultural heritage, and virtually the only institutionalized recreation at Sao Hill and elsewhere. However, while beer in olden times was free of charge and for that reason open to social control, these days it is very difficult to prevent a person with money from excessive drinking. For this reason, because many employees fail to take their responsibility as main family bread-winner seriously, because needed consumers' goods are not always available, but beer usually is

because other recreational activities are often non-existant, and because so many women brew to raise money, excessive beer-drinking is a problem.

As beer brewing is the only means open to most women to earn money on their own, a vicious circle evolves where husbands decimate their income on beer, and women brew to increase Family Financial resources. One way to break it is to provid women with other means of earning, and centralized beer sale in a beer-hall with regular opening and closing hours.

Due to salaries, bonuses, fringe benefits and subsidiary economic activities, sawmill-workers on the whole manage better than many others, at least on a day to day basis. Malnutrition for example is rarely registered at the sawmill dispensary, thoug respiratory diseases, partly caused by lack of warm clothing and adequate housing, are. However, in a long term perspective, even very careful administration of household resources is not likely to suffice to provide the employees and their families with security.

A major concern of all Sao Hill residents and mill-workers living in Changalawe and Mafinga is how they will live when their job with the sawmill finishes. At that moment they will no longer have or be able to afford to rent a roof over their head. Consequently, it is the ambition of every responsible household-head to save enough money to build a house of his (her) own. With the present salaries (and benefits) coupled with aspirations about corrugated iron roofs, cement floors, and glass windows, this is not possible. Thus from a life-span perspective, todays earnings are insufficient to provide mill-workers and others with security in olden age.

This is nothing new. But in "traditional" society the individual was not responsible for his and her old age. Today however, young people find it difficult enough to look after their own children, let alone take economic responsibility for the parent generation.

The problem is further accentuated by the fact that unlike peasants' and farmers' children, those of industrial workers do not accumulate any practical skill that will assure them their livelihood when they grow up. And it is unlikely that there will be industrial employment for them in the district. This problem is of course not particular to Sao Hill sawmill employees, but one of the costs of industrialization in little industrialized countries.

7. Increased economic production

With its annual production of 15.000 m^3 of sawn timber Sao Hill Sawmill obviously contributes significantly to the GNP. How, to what effect and with what forward and backward linkages is considered in point 3.3 in this report. Here we shall consider possible local productive spin-offs.

In 1982 salaries and social costs amounted to 5,8 million shs. Every month some shs. 400.000 are paid to mill-employees. A large part of people's income is spent on day-to-day consume.

At Sao Hill the Workers' Cooperative Shop is a main supplier of consumers' goods. During the first half of 1983 the shop's average monthly turnover was shs. 150.000. Another shs. 20.000 was spent at the co-operative owned grinding mill by Sao Hill residents and others. Except for milk, the shop does not get its provisions from local producers, but from the Regional Trading Cooperation (a parastatal supplying cooperatives shops with consumers' goods), and from suppliers in Iringa, Mbeya and even Dar es Salam. Most of the items sold including sugar, salt rice, cooking oil, margarin and milk are in short supply in Tanzania. The shop does not create any new value, but is likely to compete for short supplies with other buyers.

For a brief moment the local branch of Tanzania's Women's Organization, UWT, supplied the Sao Hill shop with children's clothes and table cloth, but when strife disintegrated the local branch, the deliveries stopped. As far as we know this was the only example of local production initiated to cover local needs, marketed through the cooperative shop.

The shop certainly does not absorbe all local earnings. More people than mill-employees use it as both prices and supply are very competitive as compared to what is available elsewhere, Dar es Salam included.

The cooperative shop and grinding mill are owned by the sawmill workers, but heavily subsidized by the sawmill. Lately annual return on a member's share has been almost 200%. The cooperative leadership's plans to invest that money in production has come to naught. Due to national shortages, neither a kerosine pump nor a bakery could be established. Now the cooperative is only left with a plan to open another grinding mill, this time in Mafinga.

Being a totally controlled settlement Sao Hill is not open to artisans and craftsmen except during day time. Settlement is not permitted. Some mill-workers have established rudimentary workshops making simple furniture and fittings in their back-yard. It is mostly people employed in the carpentry section of the mill who do so and they are said to have enough orders to last them for a year or more. In spite of one bed costing half a month's salary, i.e. shs. 600, and one chair shs. 250, demand is high as all junior staff houses are let unfurnished.

Recently a slaughter house or shed, was built by the sawmill. Several times a week a butcher brings cattle from neighbouring villages,slaughters it, and sells meat. A cow fetches shs. 2000 $\pm$ 800 while 1 kg meat costs shs. 25. If an average of two cows are sold each week, and one of them eaten by Sao Hill sawmill residents, the total meat-budget will be around shs. 10.000 monthly, or between 2 and 3 kg. per household.

Outside the sawmill entrance there is a rudimentary market. Turnover here is not likely to amount to much. The marketeers come from outside Sao Hill to sell their basket full of cabbage, tomatoes, onions, and sugar canes depending on the season. Next door is the Mbao Sportsclub restaurant selling rice meals, tea and buns. Daily turnover is around shs. 200, or about shs. 5000 a month. Profits pays for the football- and netball team when they go to play in-and outside the district.

Also in neighbouring villages it is difficult to detect any subsidiary economic production caused by the increased flow of money due to sawmill salaries. Still, we will assume that at least some people's earnings is spent on needs met locally by enhances production. Some will also be spent on procuring new means of production; tools, cattle, and other domestic animals.

It is however likely that the annual injection into the local economy of some five or six million shillings not matched by a concomittant increase in the supply of basic consumers' goods, may add to the already gallopping national inflation.[1]

If so, this is another cost of industrialization in an underdeveloped economy, heavily born by all those who are not permanently employed.

8. Improved social services

As already mentioned Sao Hill Sawmill provides its employees with many services. There is
1. the midday lunch, MAKANDE, beans and maize, served thrice a week and meat and rice, twice, free of charge. Workers at the sawmill eat in a spacious canteen, those in the forest in the open air.
2. dispensary offers free medical advice and medicine (by medical assistant and nurse) to workers, their families and nearby villagers. An average of 918 patients per month, or 35 per day make use of the dispensary. "Respiratory" and "digestive" diseases are the largest categories of ailment with 30% and 17% of reported cases. Though it is open to the "general public", four of six patients over the past two years have been adult men. The sawmill employees seem to take advantage of the location of the dispensary, at the heart of the sawmill, to bring even modest ailments to the attention of the medical assistant. While women and children seem to hesitate to do so. For this reason, because noise prevents the staff to do their job properly, and because the present dispensary is very small with no place for patients to if necessary lie down and rest, we recommend that the dispensary be moved outside the mill premisses. If that will make mill employees patients less numerous, we do not think it will be any loss for the company. Besides, in case of serious accidents, patients must be taken to Mafinga hospital anyhow.

As far as we could ascertain the dispensary seems to work well. People are pleased with the experienced medical assistant. The stock of medicines is said at times to be better than that of the district hospital at Mafinga.

3. Medical services beyond what the medical assistant can give is also free (district hospital) or paid by the sawmill (privat hospital) for the employee and his family. In theory, but not always in practice, sawmill transport is made available to take people to hospital, whether they live inside or outside Sao Hill. But particularly among the loggers transport in case of illnesses is not always forthcoming.

4. Workers' Cooperative Shop – is owned by 360 mill-employees, including 26 wives. It is heavily subsidized by the sawmill, in terms of free house, free transport, free eletricity and water. As a result of sawmill support and good management the shop does very well under the existing very difficult Tanzanian supply situation, and prices are kept low. It is also good business for the shareholders who get their divident half-yearly no matter consume.

5. Workers' Cooperative Cornmill – is very popular among women in the area. Prices are less than half those charged in Mafinga and one fifth of those in Dar es Salam. (shs. 5 for 20 kg). Also the grinding mill is heavily subsidized by the sawmill in terms of house, maintenance and energy. Turn-over during the first 6 months was shs. 114.000. The mill, just like the shop, has two people employed.

6. Ploughed fields are provided for every employee, each getting one acre. Fertilizer, seeds and insecticides are made available by the sawmill and deducted in small rates from people's salaries. The provision of the total of 360 acres is the most important contribution of the sawmill to

improved family living, at Sao Hill and also for those living in Mafinga and Changalawe. People from other villages usually cultivate at home, but make use of the fertilizer loan.

7. Working clothes are provided for junior staff twice a year. Some seem to thrive in their working clothes also outside work, something which obviously help them reduce their clothes budget. We suggest that these uniforms be produced locally, as one way to provide local women with an income of their own.

8. Social Hall built by the sawmill, is located in the same house as the cooperative shop. The hall is furnished with soft sofas and tables. Once there was a dart game here, now only a few boardgames are left to compete with beer for male residenst' attention. The hall is used for recreation, restricted meetings and limited local functions. When bottled beer is on sale in the shop, it is consumed here.

9. Mbao Sports Club is run by the party's Youth Organization, VIJANA. Every employee contributes 2 shillings per month and the sawmill gives an equivalent amount. Together with profits from the Mbao Sportsclub tea-room, the club has an annual income of around shs. 20.000. Football (men) and netball (women) are played regularly. A major problem is the supply of sports gear, and a large part of club income is spent on taking players for sports events in various parts of the region.

10. Kindergarden exists at Sao Hill organized by the Forestry Division. Children from both communities used to go, but after the split in the Women's organization, many "sawmill children" were withdrawn, though some still go. The kindergarden has about 90 children and only two teachers. The reason given why sawmill children were withdrawn was that the kindergarden was too far away. Plans exist to open a kindergarden for sawmill children. We very much support this decision and recommend that rather than gathering many children in one place, three smaller kindergardens for max. 30 children be constructed with one teacher

and one mother who will help the teacher and herself receive training in adequate child-care. A mid-morning meal of milk and fruit should be provided.

11. Primary school up to standard 7 provides for 168 students (46% girls) from Sao Hill and surrounding villages (20 children). All children of school age in Sao Hill attend.[1] Last year 2 students from Ihefu primary school went on to secondary school. This is said to be very good as national average is less than 1%. One reason may be that with 10 teachers (all women) the school is considered over-staffed. In Tanzania every trained person is entitled to a job, and female teachers are entitled to work where their husbands are employed, so also in Sao Hill.

12. Free transport is provided for workers living in Mafinga and Changalawe to and from work every day; for women from Sao Hill to the Mother-and-Child health clinic in Mafinga on Wednesday, and to and from Mafinga for Sao Hill church- and mosque-goers every Sunday and on Public Holidays. Free transport is also provided in case of illnesses, and to supply the Workers' Cooperative Shop.

13. Firewood free of charge - in slabs, is delivered at the door to Sao Hill residents. Anybody else can if they pick it up themselves get as many slabs as they want free of charge. Women in villages close to logging sites also benefit when it comes to getting firewood.

14. Free electricity (inc. street lightening) and water for Sao Hill residents.

15. Improved roads in the forest reserve area.

Sawmill benefits are many and represent a considerable outlay for the company. Some are however obligatory and part of an

[1] Contrary to what is reported in the "Master Plan" of 1980, p. 36.

overall Tanzanian industrial- and social policy. Housing, transport, schooling and free medical service are among them. The provision of ploughed fields is not particular to Sao Hill Sawmill, the Forestry Division next door and the National Service at Mafinga do the same for their employees. Workers' Cooperatives are encouraged everywhere by CCM. Many companies provide their workers with a midday meal. But Sao Hill Sawmill distinguishes itself by providing its services with generosity and consideration. In doing so some of the services benefit others than the workers and their families (shop, grinding mill, dispensary, raods, slabs), but again, the main "catchment area" is definitely the closed community at Sao Hill.

The sawmill plans to extent its social investments. A guest house to cater for customers is almost ready, a POMBE (beer) shop has been constructed, but may be used for other purposes, like kindergarden, dispensary and Mother-and-Child clinic. If so a new Pombe shop should be built. Plans also exist to build a canteen outside the Sawmill gate to cater for customers and others, to improve the present butchery shop and to assist the Workers' Cooperative to ensure regular supply of meat. Plans and budget allocations exist to increase the sawmill housing pool with 50 junior staff houses at Sao Hill. We also thing the sawmill should employ a Social Welfare Officer to stimulate Sao Hill residents to economic, cultural- and sports activities.

Improved social services do follow in the sawmill wake, but there is one group that is completely left out: adolescents finishing grade 7 have nothing to do and nowhere to go. Maybe because the mill employees are still young, this has not become a serious problem, but it will. Measures should be taken as soon as possible to provide youngsters, boys and girls vocational training.

3. RECOMMENDATION FOR FURTHER SOCIO-ECONOMIC IMPROVEMENTS

1. Increased female empolyment.

Sao Hill Sawmill provides jobs virtually only for men. We strongly recommend that such a one-sided employment policy be changed. A considerable number of women should also be provided with paid work through the sawmill in the years to come.

The following fields may be particularly suited for women, though there are certainly others:

1) Transport. Women drivers are known to be careful and efficient in vehicle handling and may contribute to improve the delivery performance of the sawmill, provided they are adequately trained.

2) Production of working outfits. This is a subsidiary activity that could be undertaken by the sawmill itself, by the local UWT branch or some other unit with the support and guidance of the sawmill. Training must be provided. (p. 28)

3) Accountancy. Women are known to be reliable and careful handling money. Training must be provided.

4) New Product Development. The production of simple wooden toys,on site or off site seems a very suitable employment for women. Such production should be initiated and supported by the sawmill which should also arrange for the marketing of the products. Training and other support must be given. (See p. 13-15.)

2. <u>Improved conditions for the loggers</u>.

Of all the sawmill employees the loggers are the less priviledged. So far logging has been carried out close to where teh loggers live, but this is now ending.

It is recommended that rather than accomodate the loggers in a camp, to provide them with bicycles or with transport, so that they can continue to live at home. The bicycle alternative is likely to be the least expensive, the most reliable and the most acceptable to the loggers themselves (see p. 11).

3. <u>Social activities</u>.

Apart from football and netball no recreational activities are organized in Sao Hill. Spare time is spent at home, in the garden or socializing over beer, (p.22).

It is recommended that a Social Welfare Officer be employed. His/her duties should include to organize cultural groups (NGOMA groups), sports competition, and annual SHAMBA, BUSTANI (garden) and KUKU (chicken) days when the best growers and poultry raisers are selected and awarded. This will stimulate increased agricultural efforts and discussions on improved methods and give increased recognition to agricultural production, (p. 21). The welfare officer must have access to a welfare fund, (p. 30).

4. Moving to the dispensary outside mill premisses.

A majority of dispensary patients are adult male SHS employees. One reason is that the dispensary is located in the heart of the sawmill complex. The dispensary is noisy, small and there is no resting room. For this reason and to give women and children easier access to its service it is recommended that the dispensary be moved.
The dispensary should be extended with a mother-and-child clinic once a week.

5.. Kindergarden.

Hardly any Sao Hill Sawmill children go to kindergarden. It is recommended that 3 small kindergardens be built, each catering for a maximum of 30 childre, with one teacher and a helper. A morning meal should be served the children, (p. 30).

6. A new POMBE (local beer) shop.

Local beer plays an important part in the economic and social life in Tanzania, and perhaps more so in Sao Hill where other social activities are limited, and money relatively abundant.

It is recommended that a POMBE shop is built at a suitable location. This will make it possible to discourage women from selling at home, provide a more suitable setting for beer drinkers than privat homes, and enable the sawmill and/ or party to limit beer drinking by regulating opening and closing hours, (p. 22.)

7. Housing.

A NORAD grant will provide SHS with 40 additional company houses. This will however not solve the housing problem. It is the ambition of every worker to own a privat home. It is feared that SHS may lose employees to SPM. More than anything else privat ownership to a home, will stabilize the work force of the sawmill.

It is recommended a revolving fund be established to to provide permanently employed mill-workers with a housing loan up to shs. 20.000 preferably in cement and corrugated iron sheets. Housebuilding is a commonly known skill and raw materials apart from cement and corrugated iron sheets are available locally.

8. Research

Industrial employment has far-reaching consequences for the division of labour and authority within the family. It is repeatedly asserted that industrialization in predominant peasant economies adversly affects the situation and status of women, with repercussions also on the standard of living of children. From being an indispensable and in many aspects equal partner in the running of everyday household affairs, women become economic dependents with little say over family matters and family resources. At Sao Hill a unique situation exists to test the accuracy of this hypothesis; the adverse consequences of economic change and paid male employment on women and children.

It is recommended a research project to be carried out jointly by Tanzanian and Norwegian scholars with emphasis on the economic strategies pursued by families in paid employment at Sao Hill.
Household budgets, how the individual family members attain and spend family resources and with what consequences should be the main focus of the study. The overall objective is to shed light on the consequences of industrialization with mainly male labour on the functioning of the nuclear and extended family, and its various members.

4. SOCIO-ECONOMIC PROGRESS AND CHANGE SINCE THE 1977 EVALUATION.

Readers concerned with socio-economic aspects of SHS are referred to the Report on an evaluation of the Sao Hill Saw Mill project, Tanzania, 1977 pp. 42-50, 73-82 and 90-108. The evaluation of 1977 gives a detailed description of infrastructural development, the project's socio-economic impact in Tanzania so far, demographic characteristics of the work force at Sao Hill as of 1977, incomes and standards of living, skill formations, project's effect on women, etc. The same topics have been dealt with here.

Due to the very adequate data base provided by the 1977 evaluation we have however, been more analytical then descriptive. Below, in order to assess some of the few changes that have taken place in the field of social infrastructure, we shall update information in the 1977 report. We shall also comment on 1977 evaluation views concerning women as we find them inadequate.

The rapid expansion envisaged by the 1977 evaluation has not taken place. The report assumed that by 1980 over 3000 people would live at Sao Hill. In 1983 Sao Hill residents amounted to slightly less than half that number. The number of sawmill houses have increased since 1977: 16 senior and 52 junior staff then, and 26 senior and 84 junior houses now. "Slab" houses have been reduced from 30 to 14.

It is no longer fitting to describe Sao Hill as "somewhat flat and monotonous, sparsely provided with bushes and trees". (p. 42.) On the contrary. During the past 6 years, trees and bushes are everywhere and give Sao Hill beauty and protection against the wind. Ondulating hills, meadows, and forests surrounding the settlement also contribute to making Sao Hill very pleasing to the eye, but presumably they were there also in 1977.

In 1977 200 people were employed at SHS, today there are 350. The average age was 25 - so today it is likely to be 31, but we did not make any census so we do not know. Today's average salary is shs. 1200 and total salaries paid shs. 5,8 mill. In 1977 it was shs. 500, per month totaling shs. 1,5 million a year. But consumers' prices have also gone up drastically. This makes the major change since 1977, 300 acres of maize fields ploughed by SHS and cultivated by workers and their families, even a more valuable addition to the sawmill. The cooperative shop is also very different now from what it was in 1977. A new spacious building gives ample room to shop and social hall. The shop has two people permanently employed and is open most of the day. Then it was run on a voluntary basis and open 3 hours daily. The number of merchandize has also increased substantially. During August 1983 46 items were bought for the shop. Now, like then, fresh food (apart from milk occasionally) is not sold, but people no longer have to go by bus to Mafinga to buy meat. Now cattle is slaughtered and meat sold in a rudimentary butchery shop at Sao Hill several times a week.

While the Trade Union, then NUTA, now JUWATA, seems to function in very much the same way then and now, the UWT, Tanzania Women's Organization of 1977 had 80 members and could already point to several positive achievements like literacy courses run at the school, organized local production of beer and production and sales of local handicrafts. The break down of the UWT was a great pity, but hopefully, it will rise again and be able to continue to work for the interests of the women of the area, though through two branches.

The 1977 evaluation team says nothing about the VIJANA - Youth organization and the Mbao Sports club. Possibly they had not yet come into existence.

In 1977 the school had 5 classes and 132 pupils (41% girls) and 7 teachers. The 1977 evaluation predicted that "at least one and probably two new schools will be required at SH over the next five years"(p. 164). In 1983 there were 168 children studying up to standard 7 taught by 10 teachers, and 2 additional class-rooms. Average class size is 24, but standard 1 & 2 have 34 & 39 pupils. The number of young is increasing. In 1983 the school also has an impressive looking school garden. Then and now there is a small school for Norwegian children. In 1977 it was run by Norwegian women on privat basis, in 1983 a teacher was provided by NORAD.

The sex ratio at Sao Hill in 1973 was said to be 134 men to 100 women. In 1983 is is our impression that there might be more women than men at Sao Hill. There are probably two reasons for this. One is that with increased possibilities for agricultural production (including keeping smaller livestock and vegetable gardens) more couples can afford to stay together at Sao Hill, while wives in 1977 had to live outside Sao Hill to be able to continue as family "bread" winners. Second, more men now are able to afford to pay marriage payments for more than one wife in which case one lives at Sao Hill and the other in the home area.

It is particularly the 1977 evaluation team's view on the role of women in industrial employment, which we find necessary to correct. One reason is probably that all the five members of the 1977 evaluation were men. Above we have argued why sawmill employment should also be open to women (p.12-14). Statements in the 1977 report like "The surplus of male labour in the region also makes it difficult for women who have a clearly defined child-bearing role in Tanzania, to find work." And "there are strong cultural taboos against women working in non-traditional roles" seems to us unnecessary gloomy. Women do hold paid jobs in the region, though many men are job seekers, and doing so they successfully "defy cultural taboos", as did the 100 Sao Hill women who in vain applied for employment at the SHS (p.15, this report). In our mind to emphasis women as unfit for paid employment (because all non-traditional jobs are likely to be paid) because they may also be mothers, is to perpetuate the underdevelopment of women that was started during the colonial period. It seems the UWT of 1977 agreed with us. According to the 1977 evaluation report "the local branch of UWT were worried about the lack of employment and educational opportunities for women on the site and were making attempts to improve the situation". (P. 105).

In their analysis of the enclave settlement at Sao Hill the 1977 evaluation team points to increased costs of infrastructure and limited number of beneficiaries, need for daily transport of workers living outside, the problem of squatters and of recruiting trained personnel. We have added at least two other; the insecurity of tenure and the lack of future for young people. On the other hand, neither the problem of squatters (which are slowly being reduced as new houses are being built) nor recruiting trained personnel (as Sao Hill is by many considered a good place to work and even to live in) seem very important in 1983.

Under Future Investments in Infrastructures and Social Facilities the 1977 evaluations lists houses, water and power supply to be in need of future investments and so they are also in 1983. Agricultural investments are however no longer pressing in 1983, except for running costs. Also in 1977 the team recommended that the dispensary be moved outside the sawmill premisses. (At that time the sawmill dispensary was the only one in Sao Hill, while the Forestry Division since then have got their own). we have pointed to other needs in 1983, those of jobs for women, bicycles for loggers, a social welfare officer, POMBE shop, a loanscheme so that permanent employees can build their own houses, and research to help us understand how paid employment affects family relations.

5. GENERAL LESSONS LEARNED

1. Social infrastructure stimulates economic growth

Both from an economic and social point of view Sao Hill Sawmill does well. We think that the many social achievements have constributed to the high productivity in the sawmill, and of course the economic success has been a requisite for the development of the many services provided the workers. What makes the sawmill rather outstanding is that economic and social investments have been going on simultanously, in defiance of a much pracitticed indistrial philosophy of first growth, then distribution.

2. Enclave development is very different from rural development

The building of the sawmill on reserve land has far-reaching consequences. The advantage lies in the social control than can be exerted but the disadvantages are many. The most serious is the total lack of permanency in the settlement, as every worker who leaves the job, also leaves the enclave. The inability of the enclave to provide for the next generation is another serious effect. Due to the isolated situation of Sao Hill, economic spin-offs in terms of increases in the supply of goods and services to the labour force from the local pupolation are also negligible.

3. Women's interests are not considered

Women are virtually absent from Sao Hill Sawmill, whether it be in planning or implementing the project, in decision-making fora concerning future planning and how to redistribute resources, and as workers. The sawmill has contributed to opening up industrial employment to rural men, but done nothing to open up industrial employment for women. Thus it is in fact giving support to a division of labour which confines women to a stagnant and labour intensive informal sector where they work without pay, reserving the modern sector where work is paid, technology developed, training provided and organizational networks encouraged entirely to men. In Sao Hill Sawmill where all organizations take their departure in the sawmill, the Party included, this actively prevent women also from giving voice to their grieveances or demands. Enclave settlement further aggravate women's situation in that almost all women live far away from their family of origin, and they become utterly dependent on their husbands.

4. Local expertise must be actively sought and used

The development of local expertise, local skills and know-how must be considered one ultimate aim of all aid. This implies that the use of external consultants must be limited to fields where local skills and expertise is not available. Another good reason is that local expertise is obliged to take local conditions into account to a much greater degree than is external expertise, and this may be a prerequisite for the integration of whatever is being planned into existing social and economic structures.

5. Industrialization does not take place without costs

The costs are not only economic but also social. Differences and even differential interests develop, between social classes, between men and women, and between different generations. Families and family obligations are broken up. Local skills and know-how is neglected and disrupted. Dietary practices change and deteriorate. Money come to dominate in social and other relations. This is not new and certainly not particular to Sao Hill Sawmill, but part of the picture of industrialization, It is a part that calls for surveillance and concern, particularly because those who suffer the changes the most, are usually those who started out with the least resources.

Appendix 4 is based on three weeks stay in Sao Hill by the two team members I. Msangi and E. Skjønsberg. During that time we met i.a. with representatives from:

CCM at Sao HIllm Matanane and Irunda
UWT - The planned Future Women's Organization Branch
WORKERS' COOPERATIVE
BALOZI (Ten cell leaders)
JUWATA
VIJANA

\+ We also met with people working with
Cooperative shop
Corn mill
Guest house
Canteen
Mother-and-Child clinic, Mafinga
Ihefu School,
Dispensary,
Forestry Division
Mafinga market
Southern Pulp and Paper, Mufindi.

\+ We furthermore made day visits to neighbouring town/villages
Mafinga,
Changalawe
Irunda,
Matanane
Mufindi

And, of course, we talked to managers, workers and expatriats working with Sao Hill Sawmill, both at the mill and in their homes in Sao HIll, Mafinga, Irunda, Matanane and Changalawe.

LOBO, Oslo