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Forestry Advisory Assistance to the Ministry of Natural Resources

**Towards an Annual
Log Production
of 500,000 m³**

What has to be done?

by

Fritz Horsten
(Chief Technical Advisor)

&

Rewiechand Matai
(Economist, SBB)

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EXECUTIVE SUMMARY

The forest of Suriname constitutes one of its most valuable natural resources. It covers around 90% of the national territory and it is a renewable resource, when managed and utilized in a rational and sustainable way.

*Since the end of the internal war the productive wood sector in Suriname has struggled, working with scarce resources and outdated equipment, fighting for survival, with little positive development as a result. Lately a new spirit can be detected. The organizations of loggers, wood industrialists and entrepreneurs (ABE, ASFA, ASHU, VSB and KKF) have taken several bold initiatives towards a more dynamic sector. Simultaneously the SBB (Foundation for Forest Management and Production Control) has started to operate more efficiently, bringing order and control into the forest production, and it has joined up with the private sector in promoting an increased and more internationally acceptable forest production. It is therefore natural that new bold targets for the future are set now. **One of these new targets, as proposed by SBB, is to reach an annual, sustainable log production of 500,000 m³ in the year 2008.***

*First in this paper the target is set; the benefits and the benefactors by reaching the target are identified and described; and the key stakeholders in the process are defined. Then the national production, consumption and export development of forest products during the past years are presented, followed by evaluations of the possibilities for increasing the annual log production to half a million cubic meters in a sustainable and environmentally acceptable way and for marketing this additional production. Finally some of the most serious constraints towards such an increase are identified and 82 proposals and/or ideas on how to diminish or eliminate them are suggested. They are presented in 8 overlapping groups: 1) **Difficult capital investment climate** (page 11); 2) **Incomplete or counterproductive forest policy and legislation** (page 13); 3) **Lack of markets** (page 17), 4) **Insufficient log transporting infrastructure** (page 23); 5) **Outdated harvesting and wood processing equipment** (page 26); 6) **Inefficient forest management** (page 27); 7) **Ineffective management of forest enterprises** (page 30); and, 8) **Inadequate forest education, training and research** (page 31). A summary of the 82 proposals and/or ideas is presented after the Executive Summary.*

An annual harvesting volume of 500,000 m³ logs will approximately double the present production, including the illegally cut and transported volumes. It should be possible to reach the target with an increase of approximately 50% of the present work force, by turning it more efficient and qualified, and thus better paid. It will correspond to an additional employment of approximately 1,750 new operators, mainly in the rural areas.

An additional harvested volume of 250,000 m³ will represent a commercial value increase of around 25 million US\$, if half of it is traded on the local market and the other half is exported. It will lead to an export earning increase of 20 million US\$, if half of the exported volume is leaving the country as sawnwood or plywood. The increased production in the forest sector will correspond to a value adding of around 24 million US\$. An estimate indicates an increase of the share of the forest sector in the GDP from 2.3% to around 7%.

The payment of forest charges of an additional 300,000 m³ of logs will correspond to an annual contribution of around 5 billion Surinamese Guilders to the National Treasury, according to the proposed new system of forest charges.

Such an injection of employment, production income, export earnings and fiscal income will have a thoroughly vitalizing socio-economic effect benefiting the whole community.

To reach the target will not be an exclusive effort of the forest and wood sectors. The most constraining limitations on production today can in no way be solved by the wood sector, including SBB, - alone. It will imperatively demand the active cooperation of several outside stakeholders, first of all the credit institutions, the legislators and the Government, supported by an aggressive contribution of the trading community.

Doubling the present annual log production to 500,000 m³ in 5 years may seem optimistic. Nevertheless, analyzing the existing situation and the potential development conditions it seems a reachable goal, but it is essential that several constraining factors will have to be removed and that there is a growth in constructive and imaginative thinking, especially in the fields of making credit available, legal reforms, marketing and road building.

The log production increase will necessarily not be immediate, but it will have to follow a series of simultaneous and successive phases. Among the first initiatives which have to be taken are: Idle concessions must be cancelled, and new concessions with areas of at least 25,000 ha must be given to companies with knowledge and equipment to exploit and manage them rationally in a sustainable way. Existing wood industries must update and complement their present equipment. The national credit institutions must be persuaded to invest in the forest and wood sectors. Foreign companies interested in participating and financing joint ventures must be identified and contacted. A national road network plan must be elaborated. The legislation for new incentives for road building, import of equipment, etc. will have to be approved. An aggressive marketing campaign will have to be initiated with production of information material on the forest and wood sector, on tree species, etc. and with Internet access to the same type of information. A new comprehensive forest policy and its implementation legislation must be approved.

The task of increasing the annual log production to 500,000 m³ is huge. It will demand the full efforts of energy, imagination and cooperation of all its different stakeholders. The identified constraints and proposals to be diminished or eliminated will constantly evolve, and as development will move forward, new challenges will arise. No single 'magic' measure will solve the situation. It will be hard but gratifying work, and with the participation and collaboration of all the process stakeholders (politicians, credit institutions, traders, educationists, loggers, wood transporters, forest dwellers, SBB, etc.), there seems to be no impediment to reaching the full target before the year 2008.

Acknowledgements:

Adrian Whiteman, economist of the Forest Policy and Planning Division of FAO, **Andrew Mitchell**, independent forest consultant, and **Maureen Playfair**, Head of the Planning Department of SBB, read drafts of the document and all contributed valuable ideas for improvement.

SUMMARY OF ALL THE PROPOSALS AND/OR IDEAS¹

0. Introductory sections

- 1 *to recommend to the Government, as a conservation precaution and gesture, to declare that commercial log harvesting South of the 4° N latitude will not be authorized until a thorough integral land use planning exercise has taken place to determine its most appropriate use. (Page 6)*
- 2 *to make obligatory that any new mining activities are preceded by a necessary period, where the timber resources are fully harvested, through short-term Incidental Cutting Licenses, before the start of the strip-mining. (Page 6)*
- 3 *to investigate techniques and financing options for turning some abandoned agricultural lands and mining areas again by replanting of fast-growing tree species to serve specific uses. (Page 7)*

1. Difficult investment climate

1. *to provide the national credit institutions with realistic information about the development perspectives of the logging and wood industry sectors, thus convincing them to revise their present policy. (Page 10)*
2. *to approach the IFC, IDB, the Islamic Development Bank and other foreign credit institution for investment support. (Page 10)*
- 3 *to have approved explicit implementation rules to the Investment Law to enable the country to attract serious long-term investors. (Page 10)*
- 4 *to have more of the major log and processed wood producers taking charge of their export themselves. (Page 11)*
- 5 *to complete as soon as possible the transitory period with absence of a well-defined national forest policy, incomplete or counterproductive legislation and introduction of sustainable forest management causing investment insecurity, so the investors can have the certainty that the rules, which were valid when they invested do not suddenly change. (Page 11)*
- 6 *to promote and support strongly the creation of joint ventures, combining local experience and foreign financing and trade. (Page 11)*
- 7 *to lower the import taxes for specific forest harvesting, log transport and wood processing equipment. (Page 12)*
- 8 *to treat all companies, foreign and national, equally. (Page 12)*

2. Incomplete or counterproductive forest policy and legislation

- 1 *to have the participatory forest policy formulation process, planned to be organized this year, taking place as scheduled, and after its approval have the forest legislation adapted accordingly. (Page 12)*
- 2 *to bring the SBB-creation and development phases to a successful end as soon as possible, and simultaneously accelerate the efforts to further develop it into a full-fledged Forest Management Authority. (Page 12)*
- 3 *to remove the obligatory linkages between forest harvesting and wood industry. On the other hand in cases where an already established, export-oriented wood industry wants a concession, it should be given*

¹ After each proposal/idea is indicated the page number, where eventual additional information on the issue can be found.

preference, unless another applicant for the concession has significantly better qualifications for exploiting and managing the area. (Page 13)

4 *to have the people of Suriname understand that the forest charges must be seen as a part of the contribution that the forest harvesters are paying to the country for the privilege of using part of the national patrimony for their own benefit. (Page 13)*

5 *to approve the proposal for a revision of the forest charges as soon as possible to enable SBB to continue and consolidate its development. (Page 14)*

6 *to cancel and reissue all idle concessions as soon as possible to companies with the capabilities and intentions to utilize them fully. (Page 14)*

7 *to introduce a new system of issuing of vacant concession areas: through prior public announcements with a fixed date for handing in the applications, thus offering the possibility to select the technically most indicated applicant. (Page 14)*

8 *to work towards a minimum concession size of at least 25,000 ha. (Page 14)*

9 *to modify the present concession limits to make them follow natural boundaries, as much as possible, thus creating efficient forest management units. (Page 14)*

10 *to discuss thoroughly, during the participatory forest policy formulation process, the issue of the HKVs (community forests), and to find a way, satisfactory to all parties, to redimension them, according to the present village population size, to secure that not only the inhabitants of the villages will continue to have access to their traditional uses, but also that the national forest resources are managed and used in a sustainable way. (Page 15)*

11 *to have secured explicitly in the concession agreements the rights of the forest dwellers living inside or whose traditional land use incorporates the use of parts of the concession area. (Page 15)*

12 *to include the obligation of the concessionaires to undertake some social works in all the concession agreements, like the building of a school, a health clinic, a bridge, etc. (Page 15)*

13 *to have the concessionaires assist the villagers in the promotion of the production and trade of Non Wood Timber Products. (Page 15)*

14 *to secure that the already overexploited areas will be included in the new concessions so that the total potentially productive forest area is under continuous forest management. (Page 15)*

15 *to extend the present recommended felling cycle period of 25 years to the double duration, for all concession sizes, to secure full regeneration of the exploited areas. (Page 15)*

16 *to avoid further delays in the issuing of medium and large concessions it is recommended that the rules to be established will be sufficiently flexible that it will be up to the applicant to decide the type and intensity of the stocking evaluation. (Page 16)*

3. Lack of markets

1 *to work on the assumption that the only option for a substantial increased log production is through an increase of exports, either of logs or of processed wood, or of both. (Page 16)*

2 *to secure that the presence of the foreign companies really benefit the country. They must pay the full forest charges, national manpower must be used as much as possible, and the companies must purchase their general supplies through the national market. (Page 17)*

3 *to disallow that logs after having removed the slab wood and just divided longitudinally should be exported as a semi-processed product, gaining an export tax benefit from 20% to 5% according to the present export tax system. (Page 17)*

- 4 *to secure the supply of logs to the local wood industry for export of sawn timber. (Page 17)*
- 5 *to produce small well designed pamphlets, describing a few little known species (outside Suriname), which have superior wood characteristics **and** which can be delivered continuously in commercial quantities, as sawnwood, wood-based panels or secondarily processed wood (windows, doors, furniture, etc.). Such pamphlets should then be distributed aggressively to importers and saw industries in the Caribbean region, and they should be available at all the Surinamese diplomatic offices abroad together with additional information on the forest and wood industry sectors. (Page 19)*
- 6 *to have the wood industry sector make an effort to participate in the major regional trade fairs and in Surinamese trade missions to the region. (Page 19)*
- 7 *to link the production potential of logs from Guyana and Suriname. It will increase the overall offer, thus attracting more big scale importers interested in buying wood from the region. (Page 19)*
- 8 *to strengthen the internal cooperation inside the forest and wood industry sectors, spearheaded by ABE and ASHU, by creating a mechanism, which can coordinate the contacts between buyers and sellers. (Page 19)*
- 9 *to have the forest and wood industry sectors facilitate the access of potential buyers through the Internet by creating individual web sites, offering information on species, quantities, exporters, etc. (Page 20)*
- 10 *to have SBB to prepare immediately a national forest web page with links informing about the forest resources, the forest sector, the forest legislation, the productive sector, etc. (Page 20)*
- 11 *to analyze the option of particleboard as a low value wood industry product. (Page 20)*
- 12 *to analyze thoroughly the option of promoting the investment in a new high technology plywood factory, eventually in a joint venture with importers of the product, which would be able to make use of more of the harder timber species. Such a plywood and/or particleboard factory might become linked with a small veneer factory, which could slice the many decorative Surinamese wood species, and produce decorative plywood or particleboard. (Page 20)*
- 13 *to secure that the traditionally favored export species will as much as possible be reserved for export, while other species, also with superior wood quality, occurring in quantities too small for export, should be preferred for use at the local market. (Page 20)*
- 14 *to promote strongly the improvement of the capability and will of the wood industry sector to expand and diversify their production to allow for a higher percentage of the log production acceptable for export. (Page 20)*
- 15 *to develop a system allowing the chain saw and mobile saws a minor share of the total production, especially for satisfying the lumber necessities of the communities in the interior, but without prejudice to the necessary increased wood export. (Page 21)*
- 16 *to use the opportunity that most of the CARICOM countries have few sawmills, carpentries and other wood processing units by increasing exports of not only primary processed wood (sawnwood and plywood) but also of secondary processed wood (furniture, doors, windows, tools, etc.). (Page 21)*
- 17 *to remove any hindrance towards the export of even second or third grade healthy logs, as long as the exporter and importer have duly agreed. (Page 21)*
- 18 *to elaborate and execute a program for increasing the harbor capacity. Not only the physical processes of storing and loading containers will have to be improved, but also the whole present slow bureaucratic export process will have to be slimmed down. Such a program will also have to include the option of constructing container loading facilities for small to medium size ships in Nickerie, Apoera, Moengo and/or Albina. (Page 21)*

- 19 *to secure the existence of a specialized wood export control unit in Suriname capable of producing internationally acceptable phytosanitary certificates. (Page 22)*
- 20 *to take steps towards a modification of the service methodologies of the Government agencies, including SBB, to enable them to serve the productive sectors with speed and efficiency. (Page 22)*

4. Insufficient log transporting infrastructure

- 1 *to alter the determinations in the law concerning the duration of the concessions to at least a full felling cycle or as this is a discussable figure, to at least 50 years for all concession sizes to allow for a reasonable amortization period, due to the high investment cost of quality forest road building. (Page 23)*
- 2 *to have the forestry sector participate actively in the elaboration of a national road building plan, delineating a well coordinated main road network, which in a rational way will open up for the access to the sustainable use of the Surinamese natural resources, and at the same time serve other public interests. (Page 23)*
- 3 *to have approved in each case the routing of the secondary part of the national road network, as the construction of a road will inevitably open up for a general access to the surrounding area, with in inherent potential for causing environmental damage. (Page 23)*
- 4 *to take the necessary steps to have the Road Authority in collaboration with SBB elaborate a Code of Practice for Forest Road Building and Maintenance to secure minimum standards. (Page 23)*
- 5 *to perform environmental impact assessment of all forest road building initiatives. (Page 24)*
- 6 *to establish a road building incentive by financing partly the secondary road net expansion through a reduction of the annual Concession Area Fee. Another part could come from the already existing contribution from the gasoline price, which should be turned operational for the non-urban road building. (Page 24)*
- 7 *to establish that whenever road building is made through public funding, including incentives, the process should go through public tender. (Page 24)*
- 8 *to introduce strict obligatory rules for maintenance or payment for maintenance of the road stretches used by the log transporters. An option would be to reintroduce the road fee to be paid by the log transporters, to be used exclusively for road building and maintenance. (Page 24)*
- 9 *to introduce the distance between harvesting area and wood industry as one of the criteria for approval of a new wood industry. (Page 24)*

5. Outdated harvesting and wood industry equipment

- 1 *to take steps toward an upgrading of the equipment of most of the existing sawmills, while others should be closed down. (Page 25)*
- 2 *to construct new sawmills, in strategic locations, with equipment better adapted than the old frame saws to handle the current log dimensions and qualities. (Page 25)*
- 3 *to take steps to solve the problem of lack of qualified personnel in the wood industry. (Page 25)*
- 4 *to plan for an increase the number of skidders and other logging equipment to respond to an annual increase of log production of 50,000 m³. Furthermore the inefficient and outdated logging equipment will have to be substituted. (Page 25)*
- 5 *to take steps to secure that the operators of the expensive skidders and bulldozers are duly trained in their operation and maintenance. (Page 25)*

6 to have the logging and extraction workers duly equipped and trained with the recommended safety equipment and procedures. (Page 26)

7 to renew and update the log road transport equipment. Many trucks are hardly roadworthy and do not fulfill the minimum safety regulations. (Page 26)

6. Inefficient forest management

1 to make obligatory the execution of pre-harvesting stock surveys of the annual harvesting areas. By doing so the loggers will be able to get exact information on the qualities and quantities, which can be harvested in the coming logging period, thus giving them time for a marketing effort well before harvesting starts, and simultaneously cutting costs per m³ by increasing the harvested volume per ha. (Page 26)

2 to promote the increased use of improved felling and skidding and other low impact harvesting measures, obligatory measures for forest certification, as those introduced in the CELOS Harvesting System. It will not only benefit the logger but also simultaneously secure less forest damage. (Page 27)

3 to recommend the logging enterprises to take individual steps toward forest certification, if they have intentions of exporting wood to Europe or North America. (Page 27)

4 to have SBB terminate the elaboration of the obligatory management rules as well as a voluntary Harvesting Code of Practice. This should be a stepwise development, starting with basic minimum rules, eventually by adaptation of rules from other countries with similar forest conditions, and then gradually increasing the demands in tune with the increase of capability of the harvesting sector. When terminated the process it will simultaneously lead to that all loggers will fulfill at least 90% of the management planning demands for forest certification. (Page 27)

5 to promote the establishment of private forest management consultant services. (Page 27)

6 to create temporary Forest Management Service Units, in for example JSOC and or CELOS, which can offer technical assistance to the logging community. (Page 27)

7 to introduce a system of different minimum diameter limits, like 30, 40 and 50 cm. (Page 28)

8 to have SBB have strengthen its controlling and advisory presence in the forest by the creation of mobile camps. (Page 28)

7. Ineffective management of forest enterprises

1 to improve the efficiency and productivity of the logging and wood industry enterprises. (Page 28)

2 to reduce the wood waste, preferably by turning it into money (small dimension products, energy, particleboard, charcoal, etc.). (Page 29)

3 to evaluate whether it is in the national interest to have **Bruynzeel** retake its place as a major driving force in the Surinamese forest and wood industry sectors, whether state-owned or privatized. (Page 29)

8. Inadequate forest education, training and research

1 to develop each person working in the logging and wood industry sectors, and including SBB, into as qualified and efficient an operator as possible. (Page 30)

2 to modify the curricula of the different forestry educations to make them respond to the demands of the employment market. (Page 31)

- 3 *to analyze the option of changing the set-up of the university education from a traditional 'old world' academic set-up, into a modular more practical education. (Page 31)*
- 4 *to give priority to the recruitment of forest guards and forest harvesting workers from the rural population, thus stimulating the rural employment and simultaneously assuring that the trained personnel will be adapted to the life in the forest. (Page 31)*
- 5 *to participate actively in the growing regional cooperation in forest education. (Page 31)*
- 6 *to establish a donor-supported program inviting young Dutch-speaking foresters from the Netherlands and Belgium to come to Suriname, for 2-3-year periods, receiving Suriname-level salaries by their employers, but receiving travel costs and a salary supplement by the donor-program. (Page 31)*
- 7 *to pursue vigorously the opportunity of strengthening the forestry education options and the research activities of the University through the presence of **Tropenbos** in Suriname, especially the option of post-graduation in the Netherlands. (Page 31)*
- 8 *to make obligatory, that all foreign companies have Dutch-speaking personnel in both their management and field units with knowledge to the forest terminology. (Page 32)*

A. The target

The forest of Suriname constitutes one of its most valuable natural resources. It covers around 90% of the national territory and it is a renewable resource, when managed and utilized in a rational and sustainable way.

Since the end of the internal war the productive wood sector in Suriname has struggled, working with scarce resources and outdated equipment, fighting for survival, with little positive development as a result. Lately a new spirit can be detected. The organizations of loggers, wood industrialists and entrepreneurs (ABE, ASFA, ASHU, VSB and KKF) have taken several bold initiatives towards a more dynamic sector. Simultaneously the SBB (Foundation for Forest Management and Production Control) has started to operate more efficiently, bringing order and control into the forest production, and it has joined up with the private sector in promoting an increased and more internationally acceptable forest production. It is therefore natural that new bold targets for the future are set now. One of these new targets, as proposed by SBB, is to reach an annual, sustainable log production of 500,000 m³ in 5 years.

First in this paper the target is set; the benefits and the benefactors by reaching the target are identified and described; and the key stakeholders in the process are defined.

Then the national production, consumption and export development of forest products during the past years are presented, followed by evaluations of the possibilities for increasing the log production to half a million cubic meters per year in a sustainable and environmentally acceptable way **and** for marketing this additional production.

Finally some of the most serious constraints towards such an increase are identified and proposals and ideas on how to diminish or eliminate them are suggested. They are presented in 8 overlapping groups: **1) Difficult capital investment climate** (page 10); **2) Incomplete or counterproductive forest policy and legislation** (page 12); **3) Lack of markets** (page 16); **4) Insufficient log transporting infrastructure** (page 22); **5) Outdated harvesting and wood processing equipment** (page 25); **6) Inefficient forest management** (page 27); **7) Ineffective management of forest enterprises** (page 29); and, **8) Inadequate forest education, training and research** (page 30).

B. Benefits and benefactors if the target is reached

This paper will mainly deal with whether and how such a target can be reached, but first it must be fully justified that reaching such a target will really benefit Suriname and the Surinamese people.

An annual harvesting volume of 500,000 m³ logs will approximately double the present production, including the illegally cut and transported volumes. It should be possible to reach the target with an approximate increase of only 50% of the present work force, by turning it more efficient and qualified, - and thus better paid. The increase will correspond to an additional employment of approximately 1,750 new operators (7 workers/1,000 m³), mainly in the rural areas.

An additional harvested volume of 250,000 m³ will increase the commercial total value with around 25 million US\$, excluding the costs of raw materials and machinery required, if half is traded on the local market and the other half is exported. It will lead to an export earning increase of 20 million US\$, if half of the volume is leaving the country as sawnwood or plywood. The increased production in the forest sector will correspond to a value adding of around 24 million US\$. An estimate indicates an increase of the share of the forest sector in the GDP from 2.3% to around 7%, according to FAO calculations, if the other sectors keep constant.

The additional payment of forest charges of 300,000 m³ of logs will annually correspond to an annual contribution of around 5 billion Surinamese Guilders to the National Treasury, according to the proposed new system of forest charges.

Such an injection of employment, production income, export earnings and fiscal income will have a thoroughly vitalizing socio-economic effect benefiting the whole community.

As it will be shown, reaching the target will not be an exclusive effort of the forest and wood sectors. The most constraining limitations on production today can in no way be solved by the forest and wood sectors, including SBB, - alone. It will imperatively demand the active cooperation of several outside stakeholders, first of all the credit institutions, the legislators and the Government, supported by an aggressive contribution of the trading community.

C. Production, consumption and export of wood from Suriname

In **Table 1** some forest products statistics covering the years 1980-2001 are presented. In 1980 the log production was 300,000 m³ and in 2000 it was registered as approximately half of the 1980 volume. Statistics are only as good as the raw data, and the presented forest production data should be treated with care. The initial data from before the internal war should be considered quite accurate, as they were registered while LBB (the old Surinamese Forest Service) still was an operational institution. Then came the production decrease during the internal war. Afterwards the statistics show little recovery. Much of the production infrastructure was destroyed, and simultaneously the ability of LBB in collecting reliable data was also diminished. In 1996 an increase was registered when the first foreign logging companies (**Musa, Tacoba** and **Berjaya**) started field operations, and at the same time the Pokigron road was rehabilitated, opening up for a large new area for logging. Their efforts soon dwindled, but also the ability of LBB to collect statistical data continued to decrease. In August 1999 the collection of statistical forest data passed over from LBB to SBB. In 2000 the log production again showed an increase when the second wave of foreign companies (**Fine Style** and **Ji Shen**) became field operational, - and at the same time SBB introduced a tighter production control and more reliable statistics.

The log production volume for the year 2001 indicated in **Table 1** of 156,900 m³ is based on the waybills presented by the log transporters to the SBB. It therefore does not include all the cut logs. Many trees are felled but the corresponding logs are left in the forest, either for being or becoming defect during felling or skidding, or for being overlooked by the extraction personnel, or for lack of buyers. Substantial quantities are still transported on both road and river without waybills, even though the SBB has increased its control, supported by most of the loggers and log transporters. A systematic under-measuring of the volume of the harvested and transported logs, by some companies, is being registered. Illegal export of substantial quantities of logs is taking place over the Corantijn River. Finally, a steadily increasing log volume, which is not reported to SBB, is annually being converted into sawnwood by chain saws and mobile saws (Woodmizers and Lucas Mills). How much the total of these unregistered volumes of cut logs represent is difficult to estimate, but it will most probably be at least in the range of 50,000 m³/year.

Table 1. Suriname - Forest Products - Production, Consumption and Exports

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	x 1,000 m ³ ¹⁾																					
Industrial roundwood consumption + waste	272,6	239,2	231,2	188,3	172,1	212,1	165,9	112,0	188,4	121,3	115,0	106,1	116,9	96,0	92,3	93,6	185,0	149,9	121,6	74,3	163,2	148,9
Industrial roundwood exports	25,6	24,9	15,4	13,0	8,9	7,4	6,6	3,7	10,7	4,4	0,4	0,0	3,6	1,2	7,9	14,3	27,0	31,0	22,0	17,3	10,1	8,0
Industrial roundwood production²⁾	298,2	264,1	246,6	201,3	181,0	219,5	172,5	115,7	199,1	125,7	115,4	106,1	120,5	97,2	100,2	107,9	212,0	180,9	143,6	91,6	173,3	156,9
Sawnwood consumption + waste	60,8	55,8	43,0	40,4	35,0	49,1	51,3	41,3	71,1	42,1	43,8	39,2	42,2	40,5	38,5	28,5	36,7	34,3	35,6	25,8	46,6	57,3
Sawnwood exports	12,4	7,6	16	7,3	5,4	4,8	3,1	1,2	0,8	0,9	0,2	0,3	0,5	0,9	1,5	3,3	3,3	6,7	5,4	4,2	7,4	8,0
Sawnwood production	73,2	63,4	59,0	47,7	40,4	53,9	54,4	42,5	71,9	43,0	44,0	39,5	42,7	41,4	40,0	31,8	40,0	41,0	41,0	30,0	54,0	65,3
Triplex consumption + waste	4,8	4,3	7,2	8,3	6,4	9,7	4,5	3,3	4,5	5,2	4,4	4,6	5,8	3,7	3,1	2,1	3,5	4,5	6,3	4,1	4,7	4,8
Triplex export	13,8	14,7	12,5	9,9	7,5	4,2	3,8	3,3	4,3	3,1	1,6	1,0	1,8	2,3	3,8	3,9	5,7	4,9	2,9	2,2	0,7	0,3
Triplex import	n.d.																0,7	1,6	1,8	1,9	1,4	1,9
Triplex production	18,6	19,0	19,7	18,2	13,9	13,9	8,3	6,6	8,8	8,3	6,0	5,6	7,6	6,0	6,9	6,0	8,5	7,8	7,4	4,4	4,0	2,6
Particleboard consumption + waste	1,7	2,4	3,7	1,0	2,6	2,5	1,8	0,7	0,9	1,1	0,5	0,1	0,1	0,0	0,0	0,0	0,1	0,5	0,3	0,6	0,3	0,8
Particleboard export	4,0	3,5	3,1	2,0	0,9	0,7	0,4	0,3	0,4	0,3	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Particleboard import	n.d.																0,1	0,5	0,3	0,6	0,3	0,8
Particleboard production	5,7	5,9	6,8	3,0	3,5	3,2	2,2	1,0	1,3	1,4	0,5	0,2	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

n.d. = no data / ¹⁾ The import quantities of Triplex and Particleboard are given in tons. For comparative reasons 1 t has been equalled with 1 m³ / ²⁾ Including hewn squares+A8

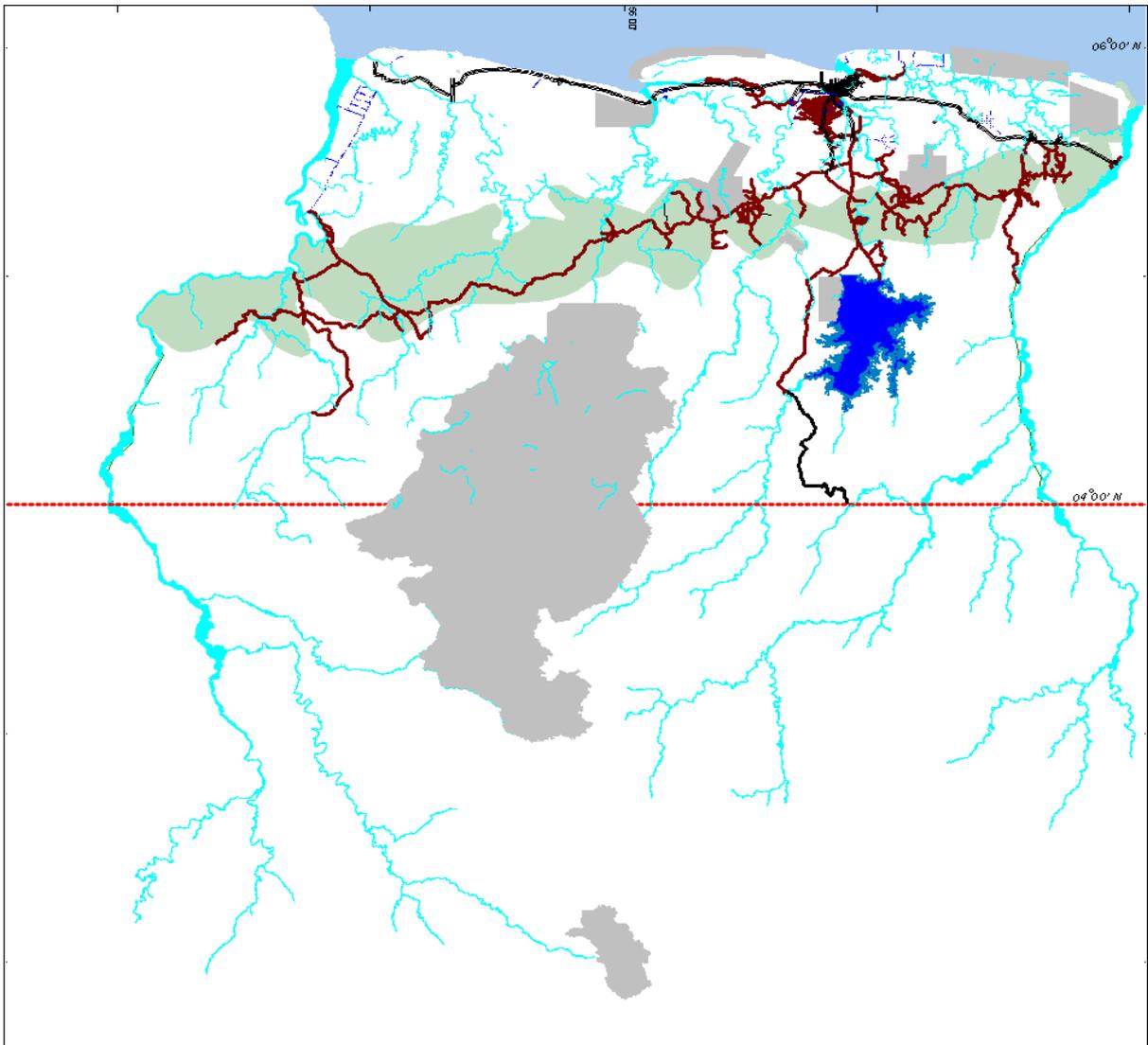
Source: LBB (1980-1998) & SBB (1999-2001) The data collection responsibility passed over from LBB to SBB in August 1999, causing incomplete data for that year.

D. The forest resource

The very first question one will have to ask, when such a substantial increase of the national log production is proposed, is whether the forest resource will be able to support it in a sustainable way. Through the years the log harvesting has taken place principally in the so-called Forest Belt (*Bosgordel* in Dutch), a 25-75 km broad loosely defined area stretching WSW to ENE between the border rivers, 50-100 km from the coastline, where the combination of transport infrastructure and timber resources permitted exploitation. See **Map**. It is an area with winding outer limits, composed of narrow ribbons around the roads and some of the major rivers. It is full of unharvested irregular patches, some of which are of considerable size. With the opening up of new roads the Forest Belt has gradually increased in area. The net area size of the Forest Belt can be estimated to be around 1,500,000 ha, equivalent to approximately 10% of the forested area of Suriname.

Whether or not the Forest Belt will support a sustainable annual log production of 500,000 m³ depends of several factors. The size of the total area of the Forest Belt is open to discussion, as is the percentage of the total area, which can be characterized as log productive, eliminating swamps, rivers, creeks and lakes with their protective forest, terrain with slope greater than 30%, villages and their agricultural land, roads and their conversion forest zones, protected areas, mining fields, etc. Also the period, which the forest will need to recover from one logging intervention to the next one (the felling cycle) is open for discussion. As is the average volume to be harvested from each hectare of log productive forest.

In **Table 2** some different alternatives for these variables are presented with the corresponding annual logging productions. It shows a huge variation of the simulated annual log production, from 180,000 to 1,440,000 m³/year. It is important that extreme caution is taken, when the most probable set of variables are chosen. A too optimistic outlook may create forest damage, which will last indefinitely. In **Box 1** a cautious combination is presented where the total area of the present Forest Belt is considered to have an area of approximately 1,500,000 ha. Only 67% of this gross area is considered as log-productive forest area, and an average yearly cutting volume of 15 m³/ha with a 50-year felling cycle is used for the calculation, based on the research experience from Guyana and French Guyane. It gives as a result that the present Forest Belt will be able to produce under rational forest management on a sustainable basis 300,000 m³/year. Based on this set of cautious simulation parameters, it will be necessary to gradually



- LEGEND
-  Paved road
 -  Primary road
 -  Secondary road
 -  Atlantic Ocean
 -  Brokoponde Lake
 -  Rivers
 -  Canals
 -  Original Forest Belt
 -  Reserved Areas



MAP

Log Transport Infrastructure (Roads and Rivers)
 &
 Proposed Southern limitation of future Forest Belt (4° 00' N)

Table 2. Simulation of annual log production in Forest Belt

Total area of Forest Belt	Productive part of Forest Belt	Rotation length	Exploitable volume	Annual log production	
1,500,000 ha	1/2 productive forest	25 year rotation	10 m ³ /ha	300.000	
			15 m ³ /ha	450.000	
			20 m ³ /ha	600.000	
		40 year rotation	10 m ³ /ha	187.500	
			15 m ³ /ha	281.250	
			20 m ³ /ha	375.000	
			50 year rotation	10 m ³ /ha	150.000
				15 m ³ /ha	225.000
				20 m ³ /ha	300.000
	2/3 productive forest	25 year rotation	10 m ³ /ha	400.000	
			15 m ³ /ha	600.000	
			20 m ³ /ha	800.000	
		40 year rotation	10 m ³ /ha	250.000	
			15 m ³ /ha	375.000	
			20 m ³ /ha	500.000	
		50 year rotation	10 m ³ /ha	200.000	
			15 m³/ha	300.000	
			20 m ³ /ha	400.000	
	3/4 productive forest	25 year rotation	10 m ³ /ha	450.000	
			15 m ³ /ha	675.000	
			20 m ³ /ha	900.000	
		40 year rotation	10 m ³ /ha	281.250	
			15 m ³ /ha	421.875	
			20 m ³ /ha	562.500	
50 year rotation		10 m ³ /ha	225.000		
		15 m ³ /ha	337.500		
		20 m ³ /ha	450.000		
2,000,000 ha	1/2 productive forest	25 year rotation	10 m ³ /ha	400.000	
			15 m ³ /ha	600.000	
			20 m ³ /ha	800.000	
		40 year rotation	10 m ³ /ha	250.000	
			15 m ³ /ha	375.000	
			20 m ³ /ha	500.000	
		50 year rotation	10 m ³ /ha	200.000	
			15 m ³ /ha	300.000	
			20 m ³ /ha	400.000	
	2/3 productive forest	25 year rotation	10 m ³ /ha	533.333	
			15 m ³ /ha	800.000	
			20 m ³ /ha	1.066.667	
		40 year rotation	10 m ³ /ha	333.333	
			15 m ³ /ha	500.000	
			20 m ³ /ha	666.667	
		50 year rotation	10 m ³ /ha	266.667	
			15 m ³ /ha	400.000	
			20 m ³ /ha	533.333	
	3/4 productive forest	25 year rotation	10 m ³ /ha	600.000	
			15 m ³ /ha	900.000	
			20 m ³ /ha	1.200.000	
		40 year rotation	10 m ³ /ha	375.000	
			15 m ³ /ha	562.500	
			20 m ³ /ha	750.000	
50 year rotation		10 m ³ /ha	300.000		
		15 m ³ /ha	450.000		
		20 m ³ /ha	600.000		

increase the effective area of the present Forest Belt to approximately 2,500,000 ha to be able to produce 500,000 m³/year in a rational and sustainable way. This seems realistically possible, provided the additional road building is undertaken, inside the present outer Forest Belt limits and by moving them slightly towards the South.

**Box. 1 Maximum allowable cut calculation
in the present Forest Belt**

Present Forest Belt area:	50 x 300 km = 15,000 km ² = 1,500,000 ha
Productive part:	2/3 = 1,000,000 ha
- excluding:	Swamps Lakes rivers & creeks and their protective forest terrain with slope > 15% Villages and their agricultural lands roads and their conversion forest zones Protected areas Mining areas
Harvesting felling cycle:	50 years
Annual harvesting area:	1,000,000 / 50 = 20,000 ha.
Average harvesting volume:	15 m ³ /ha
Annual harvesting volume:	20,000 x 15 = 300,000 m³/year

When logging operations are initiated in pristine forest a practically irreversible process of change of its original composition starts, even though the forest cover as such is being maintained intact. So when the term sustainable is used here, it does not refer to the sustainability of the original ecosystems, but to the sustainability of the forest production. Therefore the forest sector must support the national conservation efforts to maintain a considerable part of the country completely free for log production. *It is therefore recommended*

*that the Government, as a conservation precaution and gesture will declare that commercial log harvesting will only be allowed North of the 4° N latitude, until a thorough integral land use planning exercise has taken place to determine its most appropriate use. See **Map**.*

It will be necessary to perform continuous environmental impact assessment of the initiatives leading to such a substantial increase of production in the Forest Belt area, but if the exploitation activities will obey the existing and new management rules and recommendations under elaboration by SBB, there should be no risk of irreversible environmental damage.

A crucial question is whether there are **alternative uses of these forest areas**, which will create better socio-economic benefits for Suriname, or whether the increased log production will create problems for any of these alternative uses.

SURALCO has mining plans for new areas in both the East and the West, but the **bauxite mining** activities are generally of minor extension, and the necessary road building will benefit the productive forest sector.

Gold mining and log production seldom cause major production conflicts. Nevertheless there is a need to better coordinate the issuing of mining and forest concessions.

It must be obligatory that all new strip-mining activities will be preceded by a necessary period, where the timber resources are fully harvested, through short-term Incidental Cutting Licenses, before the start of the strip-mining.

Ecotourism should not be affected by an increased log production in the Forest Belt, if the established protective zones around the rivers, creeks, lakes and mountainous areas are respected, and if the territory South of 4° N latitude will be kept free of commercial logging.

Neither will the increased log production affect significantly the **non-wood forest production**.

Some areas at the Northern margin of the Forest Belt may be converted to **agricultural land**, if a thorough economic comparative analysis will show positive national socio-economic benefits, avoiding projects, which call for huge deforestation. At the same time *research should*

be started on the techniques and financing options to make some abandoned agricultural lands and mining areas productive again by replanting of fast-growing tree species to serve specific uses.

The interests of the forest dwellers will be affected, positively through increased employment opportunities, a better road system and the start of a process towards defining the limits of the economic zones, but the possibility of negative impacts is there, if not thorough collaboration between the forest communities and the logging enterprises are established.

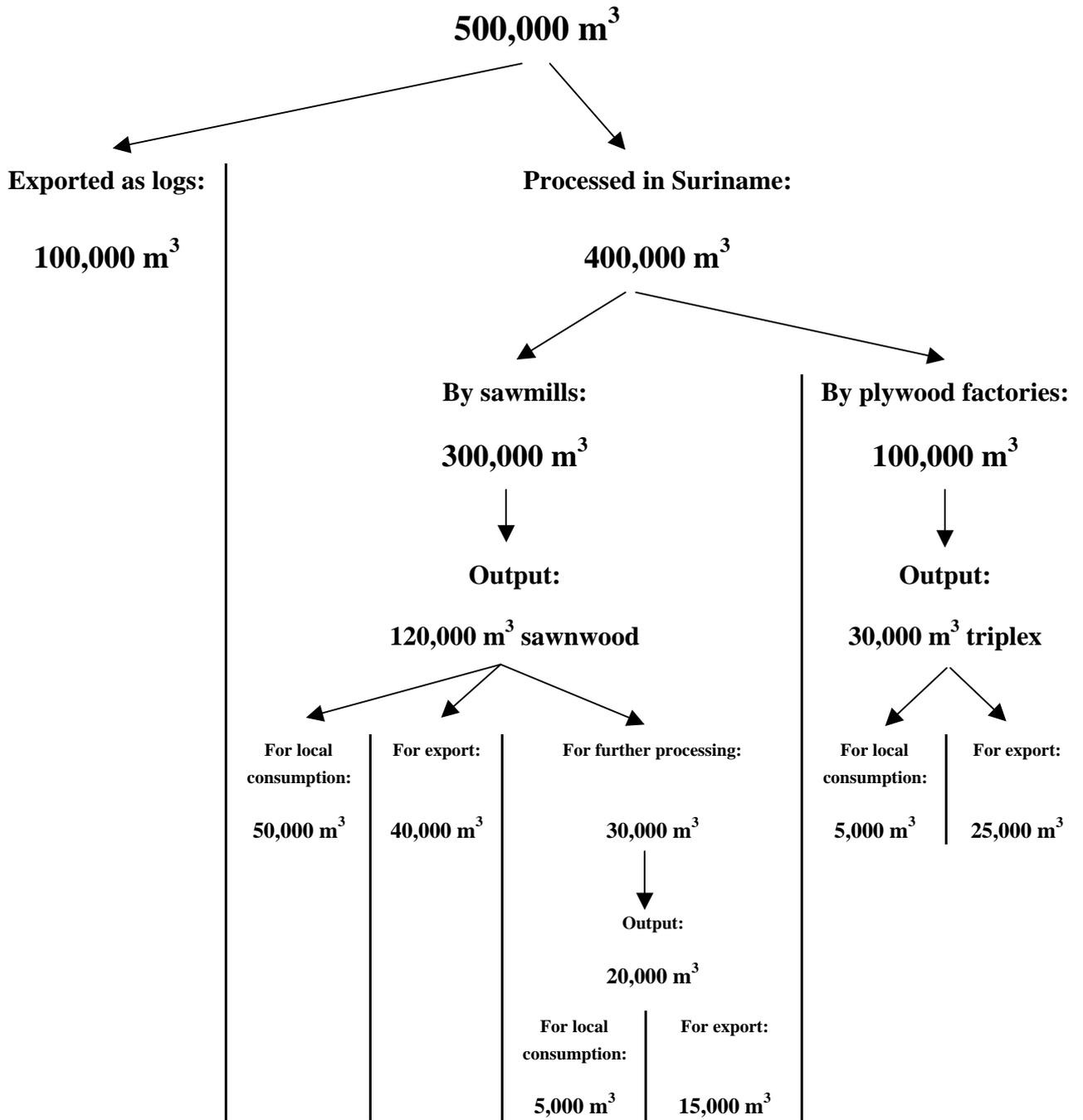
E. Destination of an annual production of 500,000 m³ logs

A crucial question one has to make before starting to increase the log production is what to do with the increased production? Any productive process involves the combination of land, labor and capital. In the forest and wood industry sectors that means trees, workers and harvesting/processing machinery. In Suriname there are abundant trees, few qualified workers and very scarce capital. This suggests that the most economic thing to do with the forest resources is to maximize the use of the trees and minimize the use of labor and capital – i.e. produce and export logs. Frequently the terms processed and value-added are confused. Value-added is what is left over after paying for equipment and raw materials, and it is in log production split into wages (to labor), royalties (to the State) and profit (to the logger). Processing the logs before export does not necessarily mean, that it is the best way of adding value to the logs. Presently the combination of high log production costs, low log/processed wood conversion ratio and relatively low international lumber prices causes that the export of logs presently have a higher value-added per m³ of log than the export of processed wood. Nevertheless it is considered that an extraordinary effort must be undertaken to make a full and increased use of the limiting labor and capital factors and to proceed with the development of the national wood industry.

In **Figure 1** a possible distribution of the destination of the 500,000 m³ at the end of the production increase period is presented. It shows an export of 20% of the logs (100,000 m³) and a national processing of the remaining 80% (400,000 m³). 75% of the log processing (300,000 m³) will take place in the existing and new sawmills and 25% will take place in **Bruynzeel** and in new plywood production units (100,000 m³). Of the sawnwood 1/3 will go for local consumption, 1/3 will be exported as sawnwood and 1/3 will go for further national processing (50,000 m³ for each destination). Of the further processed wood products 20% will be consumed locally (5,000 m³), while 80% will be exported (20,000 m³). Of the plywood production around 15% will be consumed locally (5,000 m³) and 85% will be exported (25,000 m³). As the expected response from the wood industry and trade will most probably be slower than the foreseen increase in log production, it might be correct to increase the log export above the 100.000 m³/year in the initial phase, until the wood industry and trade has increased their capacity to the above mentioned levels.

Figure 1

Destination of total annual log production



Such a distribution will not be possible with the present size and state of the wood industry, even though a FAO sawmill evaluation in 1999 showed an installed capacity of around 600,000 m³/year. Most of the sawmills are equipped with old-fashioned frame saws or mobile saws, of which most of them are not capable of producing export quality sawnwood. Nevertheless the weakest point in the destination strategy presented in **Figure 1** is the plywood production, which at the same time presents the most promising market expansion. **Bruynzeel** working at full installed capacity will only be able to process 20% of the foreseen future production, and presently two of the slicers and one of the stoves are inoperative.

Several of the existing wood industries have equipment, which with limited updating will be able to produce export quality almost immediately, if the necessary financing will be available, but they will also have to complement their log-transforming saws with equipment which can turn the minor dimensions into commercial products. At the same time preparations for the construction of new modern industry units will have to start. The sawmills should probably in general be middle-sized units, placed at strategic locations, with access to energy, manpower and with short log transporting distance, but this will be the choice of the individual investors. The secondary processing industry will have to expand parallel to or together with the sawmills, thus increasing the value of their production. The major wood industry investment will be a new plywood factory, which eventually together with **Bruynzeel** will be capable of producing annually around 30,000 m³ of plywood, which according to the outlined production increase strategy should be operational from 2008.

The outlined destination strategy seems inside the limits of the possible, if the necessary investment credits and incentives are established.

F. Constraints and possible solutions

In the following some of the major constraints impeding or obstructing an increase of harvested log volume are identified, and proposals and ideas for solutions are presented (*in italics*).

1. Difficult capital investment climate

Most of the existing national logging and wood industry enterprises operate with old and insufficiently maintained equipment, which will not be able to produce the needed export qualities and quantities of logs and sawnwood. It will therefore be necessary for those companies to make considerable investments in new and proper equipment. Also for road building and log transport there will be need for substantial initial investments.

Presently the credit institutions in Suriname do not favor the wood-producing sector. The destruction of the sawmills and equipment in the forest during the civil war has made the banks skeptical towards forest investments. Another negative factor is the short duration and the size of the concessions, which do not offer a healthy base for investment. Also the present limited trade perspectives do not support the credit situation.

Nevertheless it will be necessary *to provide the national credit institutions with realistic information about the development perspectives of the logging and wood industry sectors, thus convincing them to revise their present policy*, even though their credit capability might be limited. Also *the IFC (International Finance Cooperation), IDB, the Islamic Development Bank and other foreign credit institutions should be approached for investment support to the private production sector*.

Implementation rules to the Investment Law will have to be elaborated and approved to enable the country to attract serious long-term investors. A legislation complex that clearly specifies their rights and duties. The present situation is almost only attracting foreign investors, with little long-term interest, and mainly interested in hit-and-run operations.

As of 1st June last year a legal disposition, which has caused huge problems for the wood sector, was suspended. That was the rule that made it obligatory that all the export earnings

from wood had to enter the Central Bank immediately, and that the exporter only received the counter value in Surinamese Guilders, at the official Central Bank rate, which in the final stage was around 10% below the *Cambio* rate, but in earlier stages much more. This is a huge step forward. Such a system did not favor the overall interests of Suriname. It obstructed the growth and maintenance of the sector, and it practically obliged the exporters to work with double accounting, one for the National Bank and one for internal use, where the difference between the minimum fiscal values, as fixed in the legislation, and the real export value, was deposited in foreign banks.

Today a considerable part of the wood exports is made by traders with little or no other connection with the productive sector. This means that the productive sector might have little benefit of the canceling of the exchange rate system, and they will still have problems with getting hold of foreign currency. To solve this situation *more of the major log and processed wood producers should take charge of their export themselves*. Meanwhile independent, aggressive traders will be important to assist the parts of the logging and wood industry sector, which have no skills in trading.

Presently conditions are frequently changing, making it difficult for the actual and potential investors to foresee the soundness of their investments. During the present phase with an absence of a well-defined, complete forest policy and with the building-up of a forest management system, which will secure a rational and sustainable use of the forest resources, it will be necessary to make changes in the established rules, but it is *urgent that this transitory period with absence of a well-defined national forest policy, incomplete or counterproductive legislation and introduction of sustainable forest management causing investment insecurity will be completed as soon as possible so that the investors can have the certainty, that the rules which were valid when they invested do not suddenly change*.

The creation of joint ventures, combining local experience with foreign financing and trade, should be strongly promoted and supported.

Presently the productive forest and wood sectors are receiving few incentives from the State, even though an increase of their productive activities will have a vigorous spin-off effect on the national economy. It not only creates employment, specifically giving opportunities to the rural population and to people with minor technical qualifications, but if the target presented

in **Figure 1** is reached the cumulative effect will cause a calculated increase of the share in the GDP of the forest and wood sectors from 2.3% to approximately 7%, considering the situation of the other productive sectors constant.

Fiscal incentives can encourage the productive sectors in several places¹. As rebuilding the industry will call for considerable investments through import of equipment, it would be a stimulating incentive to *lower the import taxes for specific forest harvesting and wood processing equipment*. In the chapter on road building another incentive is outlined. Fuel costs are a significant production cost, and a special fuel incentive has been suggested, but it will be too difficult to control.

An often-expressed worry by the local wood sector is the seemingly preferential treatment that the foreign companies are receiving by the Government authorities. *It must be an unbreakable rule that all companies, national and foreign, are treated equally.*

2. Incomplete or counterproductive forest policy and legislation

The lack of a clearly defined forest policy and its implementation legislation is a serious constraint on the sector development. The existing forest policy as expressed in the legislation and through Governmental and Parliamentary decisions is in certain areas extremely counterproductive, some times causing SBB to be blamed for its actions when it is only fulfilling its mandate as controllers of the legislation implementation. *The participatory forest policy formulation process, planned to take place this year, will have to take place as scheduled.*

After the elaboration and approval of the new forest policy the existing forest legislation will have to be adapted accordingly.

To implement the strategies of the new forest policy, to elaborate the proposals for the new forest legislation and to make fulfill the approved one it is imperative that a dynamic and efficient forest services is in place. It is therefore urgent that *the SBB-creation and development phases will have to be brought to a successful end as soon as possible*. A fully operational forest

¹ In the proposal for new forest charges a substantial incentive has been incorporated to the concessionaires practicing intensive forest management.

service is necessary to secure that not only the interests of the productive forest and wood industry sectors are supported but also that the interests of the huge majority of the Surinamese population are defended. *Simultaneously the efforts to further develop it into a full-fledged Forest Management Authority should be accelerated.*

Among the counterproductive stipulations in the present Forest Management Law is the obligation that medium sized and large concessions can only be issued if they are linked with respectively a sawmill or an integrated wood industry. *These obligatory linkages between forest harvesting and wood industry should be removed at they constitute an impediment for attracting investors. On the other hand in cases where an already established export-oriented wood industry wants a concession, it should be given preference, unless another applicant for the concession has significantly better qualifications for exploiting and managing the area.*

The great majority of the forest resources of Suriname belong to the State, or in other words to the people of Suriname. It is therefore logical that when a part of the population wants to benefit individually by exploiting those resources, then the rest of the population should benefit by the payment of a fee by the users. An effort must be made *to have the people of Suriname understand that the forest charges must be seen as a part of the contribution that the forest harvesters are paying to the country for the privilege of using part of the national patrimony for their own benefit.*

The SBB has presented a proposal for revision of the forest charges system, increasing the annual area fee and decreasing the volume fee and introducing a classification of the commercial species in 3 classes. At the same time it is offering an incentive to the logging companies, which will execute intensive forest management. The objective of this proposal is to activate the many inactive concessions, making it costly to have them lying idle, while at the same time introducing much lower volume retribution for the lower quality and less known species. Simultaneously the creation of a Management Fee, equal to three-quarters of the total forest charges has been proposed, to be paid to SBB, thus making it self-supporting, to enable it to control the rational and sustainable use of the forest resources and to serve as a promoter of an increasingly positive development of the wood sector². When the target is reached the

²

An unfortunate misunderstanding has surged during the preparatory treatment of the proposal, before its presentation to Parliament. Due to a legal imperative the Management Fee will have to be created as a separate (third) part of the forest charges. Nevertheless the total sum of the area fee, volume distribution and the Management Fee will correspond to the original proposal elaborated in collaboration by FAO and SBB.

Management Fee percentage can be reduced to correspond to the financial needs of SBB. It is most important that *the proposal for a revision of the forest charges is approved as soon as possible to enable SBB to continue and consolidate its development*, thus enabling it to increase its service functions to the productive sector.

A considerable number of existing concessions were, before the creation of SBB, issued to persons and companies without any equipment or forest harvesting experience, and with apparently little or no intention of acquiring them. *All these idle concessions should as soon as possible be cancelled and reissued to companies with the capabilities and intentions to utilize them fully.*

It has been proposed by FAO that *when a concession area has become vacant, the SBB should redraw its limits to create a manageable unit, eventually by joining it with adjacent concessions, and then announce publicly, through the newspapers and the SBB-homepage, that the concession is up for re-issuing with a fixed date for handing in the applications. Thus allowing the selection of the most appropriately qualified applicant: the one offering the best options for an efficient and correct exploitation of the area.* The competition will not be on price but on capability to manage the area and to secure an optimal use of the log production. It will not only shorten the concession request period, but it will also secure the best possible exploitation of the concession.

The existence of many small concessions may satisfy some social considerations, but it is a reality that it is not possible to manage rationally these minor concessions in a sustainable way, as their annual production will neither allow for the necessary investments nor for an effective use of the existing equipment. *It is therefore recommended to work towards a minimum concession size of at least 25,000 ha³.*

Presently the boundaries of the existing and requested concessions look on the map like they were the borders of agricultural fields, composed of straight lines meeting in right angles, and even worse, crossing over rivers, roads and other easily identifiable field features. *It will be important gradually to modify the present concession limits to make them follow natural boundaries, as much as possible, thus creating efficient forest management units.*

The existence of huge HKVs (community forests), with little correlation to the actual population size of the village, occupying some of the best productive forest areas, obstructs the efforts to reach a full and sustainable use of the log production potential. *During the participatory forest policy formulation process the issue of the HKVs will have to be thoroughly discussed, and a way must be found, satisfactory to all parties, to redimension them, according to the present village population size, to secure that not only the inhabitants of the villages will continue to have access to their traditional uses, but also that the national forest resources are managed and used in a sustainable way, simultaneously offering financial benefits to the local communities.*

The rights of the forest dwellers living inside or whose traditional land use incorporates the use of parts of the concession area will have to be explicitly secured in the concession agreements. The concession agreements could also include the obligation of the concessionaires to undertake some social works, like the building of a school, a health clinic, a bridge, etc., and to stimulate the concessionaires to assist the villagers in the promotion of the production and trade of Non Wood Forest Products.

Until now the stipulations of the Forest Management Act of a felling cycle period of 25 years have not been respected. Most exploited areas in the Forest Belt have been harvested more than once during the last 25 years. Now certain areas are definitively overexploited. Nevertheless *it is important that these depleted areas will be included in the new concessions, when they will be demarcated and issued, to secure that the total potentially productive forest area is under continuous forest management. The present recommended felling cycle period of 25 years seems to be too short, according to long-term experience from the neighboring countries, and should for all concession sizes be doubled to secure full regeneration of the exploited areas.*

One of the present impediments towards the issuing of medium and large concessions is the problem SBB is facing in developing a unified methodology for the exploratory inventories, as demanded by the Forest Management Act. The original objective was to assure that the requested area should have a sufficient tree stocking for the issuing of the concession, and simultaneously offer the forest services inventory data, which can be used for extrapolation to neighboring areas. It must be the risk and responsibility of the concession applicant to assure

³ The yearly production of a 25,000 ha corresponds more or less to the volume a skidder can extract in one year.

that the requested area has sufficient tree stocking that will make economically sound harvesting possible. Whether it will imply flying over the area, photographing or videotaping it from the air, analyzing existing satellite or aerial photographs, making random field checks or systematic inventories should be up to the applicant alone. The applicant will have to present detailed Business and Management Plans, which will have to prove that he has a solid knowledge to the area and to the general principles of forest management and exploitation. In the Forest Management Act it is up to the Minister of Natural Resources to establish the rules. *To avoid further delays in the issuing of medium and large concessions it is recommended that the rules to be established will be sufficiently flexible that it will be up to the applicant to decide the type and intensity of the stocking evaluation.*

3. Lack of markets

One of the main obstructions towards a substantial increase of the log production seems to be the lack of market. No tree should be felled, unless there is a market for it.

The national market is almost saturated, and there are few possibilities to increase the log production for local consumption. On the contrary, the wood wastes which are occurring in Suriname, in the felling, in the extraction, during the transport, in the log yards, in the industry, in the wood markets and by the end users offer ample opportunity to increase the log cut/processed wood conversion ratio, thus decreasing the volume of logs needed for maintaining the same industrial output. The annual consumption per capita of industrial hardwood (roundwood) in Suriname of 0.417 m³/capita⁴, is the highest in South America with the exception of Paraguay, which annually logs and consumes more than 4 million cubic meters of industrial hardwood (0.736 m³/capita), with no formally registered export⁵. *The only option for a substantial increased log production is therefore through an increase of exports, either of logs or of processed wood, or of both.*

Which are the potential markets, and what to do to occupy them?

⁴ FAO Forest Products Yearbook 2000.

⁵ Guyana: 0.334 m³/capita and Brazil 0.370 m³/capita.

According to the destination strategy presented in **Figure 1**, 100,000 m³ will have to be exported as logs. Presently three major Chinese logging companies are working in Suriname, and a Guyanese company works the Berjaya concession. The log exports for the 1st quarter of this year has already increased to around 20,000 m³, so it seems perfectly possible to reach the set target.

Presently the Chinese companies have the financial, technical and marketing capabilities to *The Government must secure that the presence of the foreign companies really benefit the country. The full forest charges must be paid, national manpower must be used as much as possible, and the companies must purchase their general supplies through the national market. It should not be allowed that logs after having removed the slab wood and just divided longitudinally should be exported as a semi-processed product, gaining an export tax benefit from 20% to 5% according to the present export tax system.* It would most probably be possible to increase the log exports even further, but *a priority should be given to the supply of logs to the local wood industry for export of sawn timber.*

The present export market for sawnwood and further processed wood is very limited. The old markets in Europe and the Caribbean dwindled almost away, caused by the incapability of the exporters to compete on price and quality, but perhaps even more important, to secure a steady supply of the required quantities. The need to secure continuity in the deliveries will be an initial problem for Suriname although this should decrease as log production increases. The many small producers and the irregular small harvested quantities of most of the tree species make it recommendable to go for several relative small markets. Most of the European and North American markets demand steady quantities, which are too large for the local producers. Furthermore the increasing demands for certified wood will also gradually close some old traditional markets, as it is hardly realistic to believe that the forest certification process will have advanced sufficiently to overcome that barrier before the end of the targeted growth period, the year 2008. On the other hand, if a continuous 500,000 m³ log production is reached, it might be possible to recapture some of the potentially ‘fatter’ markets in Europe and North America with certified logs or processed wood.

It therefore seems that the most obvious market for sawnwood and further processed wood to recapture and increase is the Caribbean market. With its membership of the custom-free **CARICOM**, Suriname has an advantage. Also the needs of each of these island states are

so relative small that they should not present a problem for the Surinamese exporters to satisfy continuously. The sea freight costs for the Caribbean countries should be possible to bring below those for Europe, if a freight route with regular departures is set up.

It will therefore be interesting to study closer the possibilities for expanding exports to the Caribbean region. In **Table 3** is presented the import of wood for the **CARICOM** countries and for some other countries in and around the Caribbean during the years 1996-2000. For each wood product [industrial roundwood (logs), sawnwood+sleepers and wood-based panels (plywood)] is listed the yearly import quantities, both in **Total** values and in **Hardwood** (Hw) values. This separation is important, as it shows that despite the majority of the imported total volumes is consisting of 'cheap' coniferous construction wood, imported mainly from USA and Canada, there are also substantial quantities of imported hardwood.

The quantities of hardwood imported as **industrial roundwood** to the **CARICOM** countries are insignificant (0-6,000 m³/year), as most of them have few or no sawmills. The same is the case with the other Caribbean countries (31,000-71,000 m³/year), and in both cases the trend is downwards. For hardwood **sawnwood+sleepers**, the **CARICOM** countries imported 19,000-33,000 m³/year with no clear trend, while the other Caribbean countries imported 305,000-913,000 m³/year with a strong initial increase followed by stagnation. For **wood-based panels**, all made of hardwood, the imports to the **CARICOM** countries have grown during the period from 95,000 m³/year to 149,000 m³/year, while the growth in the other Caribbean countries have been even stronger from 536,000 m³/year to 1,246,000 m³/year. Comparing the Surinamese export volumes for the same period, as presented in **Table 1**, of 10,100-31,000 m³/year of industrial roundwood, 3,300-7,400 m³/year of sawnwood+sleepers and 700-6,700 m³/year of wood-based panels, it is evident that there is a huge potential for increasing exports of processed wood to the **CARICOM** and the other Caribbean countries. In **Table 2** the last line presents the wood imports of USA, showing, that despite delivering most of the present import quantities to the Caribbean countries, it imports **more** hardwood, both industrial roundwood, sawnwood+sleepers and wood-based panels, than all the Caribbean countries together, indicating clearly that also the USA is a potential future export market for Suriname.

Then what has to be done to penetrate these potential markets?

Table 3. Import of wood to the CARICOM countries and to some in and around the Caribbean M50

Hw = Hardwood	Industrial roundwood											Sawnwood + Sleepers										Wood-based Panels				
	1996		1997		1998		1999		2000		1996		1997		1998		1999		2000		1996	1997	1998	1999	2000	
	x 1,000 m ³											x 1,000 m ³										x 1,000 m ³				
	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.	Total	Hw.
Antigua & Barbuda	-	-	-	-	-	-	-	-	-	-	11	-	11	-	11	-	11	-	11	-	4	4	4	4	4	
Bahamas	13	-	18	-	12	-	8	-	17	-	98	3	123	2	75	1	84	1	78	2	15	17	14	16	17	
Barbados	1	-	3	2	3	2	3	2	3	2	34	1	71	8	57	11	63	5	63	5	7	16	15	15	15	
Belize	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	0	-	15	-	3	3	4	4	19	
Dominica	1	-	8	-	8	-	1	-	0	-	8	3	9	0	6	1	10	4	7	0	3	2	2	5	6	
Grenada	3	-	-	-	-	-	-	-	-	-	12	-	26	-	10	-	10	-	10	-	3	4	4	4	4	
Guyana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Haiti	4	-	4	-	3	-	0	-	1	-	21	1	18	1	9	2	25	1	22	1	7	8	7	7	4	
Jamaica	17	-	3	-	2	-	1	-	1	-	114	6	137	3	111	3	112	3	221	2	21	31	29	29	51	
Montserrat	-	-	-	-	-	-	-	-	-	-	4	-	4	-	4	-	4	-	4	-	-	-	-	-	-	
St. Kitts & Nevis	1	-	1	-	1	-	1	-	1	-	5	-	5	-	5	-	5	-	5	-	1	1	1	1	1	
St. Lucia	7	-	7	-	7	-	7	-	7	-	15	-	15	-	15	-	15	-	15	-	7	7	7	7	7	
St. Vincent & the Grenadines	-	-	-	-	-	-	-	-	-	-	12	1	19	4	21	4	21	4	21	4	3	4	16	16	16	
Trinidad and Tobago	2	-	2	1	21	1	14	1	10	4	32	10	80	4	47	11	46	8	30	5	21	1	3	41	5	
CARICOM TOTAL	49	0	46	3	57	3	35	3	40	6	367	25	519	22	372	33	406	26	502	19	95	98	106	149	149	
Aruba	1	-	1	-	1	-	1	-	1	-	16	-	16	-	16	-	16	-	16	-	6	6	6	6	6	
British Virgin Islands	-	-	-	-	-	-	-	-	-	-	4	-	4	-	4	-	4	-	4	-	1	1	1	1	1	
Cayman Islands	2	-	2	-	2	-	2	-	2	-	14	-	14	-	14	-	14	-	14	-	5	5	5	5	5	
Costa Rica	5	-	1	-	1	-	5	-	5	-	3	1	7	1	7	1	14	8	30	9	13	12	12	18	26	
Cuba	-	-	-	-	-	-	-	-	-	-	15	13	8	4	8	4	8	4	11	6	7	12	12	12	10	
Dominican Republic	8	-	5	-	14	-	9	-	9	-	234	31	299	27	313	38	327	53	289	46	37	53	47	41	44	
El Salvador	1	-	3	2	4	4	1	1	1	1	72	5	8	1	10	1	66	3	80	9	16	21	25	24	15	
Guadeloupe	5	4	5	4	5	4	5	4	5	4	69	31	69	31	46	8	46	8	46	8	23	23	23	23	23	
Guatemala	3	3	3	3	2	2	1	1	2	2	2	1	2	1	1	0	2	0	3	1	11	11	23	22	27	
Honduras	52	52	-	-	-	-	-	-	-	-	21	1	25	0	16	0	5	0	6	0	9	8	9	9	9	
Martinique	3	3	3	3	3	3	3	3	3	3	29	12	29	12	29	12	29	12	29	12	7	7	7	7	7	
Mexico	26	9	74	35	22	6	34	22	36	15	690	183	965	330	1,430	787	1,090	700	1,250	800	270	314	359	534	874	
Netherlands Antilles	1	0	0	0	1	1	0	0	0	0	45	1	32	2	28	2	35	4	32	2	18	13	16	19	15	
Nicaragua	1	-	1	-	0	-	1	-	1	-	0	-	0	-	1	-	1	-	1	-	6	6	7	19	19	
Panama	5	0	11	6	1	-	1	-	1	-	14	1	9	1	1	0	4	0	6	1	11	9	10	10	15	
St. Pier and Miquelon	-	-	-	-	-	-	-	-	-	-	2	-	2	-	2	-	2	-	2	-	-	-	-	-	-	
Turks & Caicos Islands	-	-	-	-	-	-	-	-	-	-	4	-	4	-	4	-	4	-	4	-	1	1	1	1	1	
TOTAL	162	71	155	56	113	23	98	34	106	31	1,601	305	2,012	432	2,302	886	2,073	818	2,325	913	536	600	669	900	1,246	
USA	524	145	582	200	970	304	1,422	270	1,511	316	43,503	518	43,674	1,160	44,999	1,295	46,303	1,496	47,092	1,682	7,446	9,283	10,679	12,183	14,319	

Source: FAO Yearbook - Forest products 2000

One weakness with the export of Suriname timbers is that their properties and potential end uses are little known outside Suriname. With the publishing by CELOS of the book **Suriname Timber Species** a step forward has been taken, but the book will not be accessible to many people. Instead *small well designed pamphlets should be produced, describing a few little known species (outside Suriname), which have superior wood characteristics and which can be delivered continuously in commercial quantities, as sawnwood, wood-based panels or secondarily processed wood (windows, doors, furniture, etc.). Such pamphlets should then be distributed aggressively to importers and saw industries in the Caribbean region, and they should be available at all the Surinamese diplomatic offices abroad together with additional information on the forest and wood sectors.* In the **Annex** is as an example presented copies of the yellow pages in the telephone books of Barbados and Trinidad and Tobago, where the names and addresses of the major lumber dealers of these countries are listed. *The wood industry sector should make an effort to participate in the major regional trade fairs and in the Surinamese trade missions to the region.*

Another initiative, which can help overcome the low and irregular production quantities of individual species for export, is for the forest and wood industry sectors of Suriname and Guyana to increase their collaboration. It would increase the overall offer, thus attracting more big scale importers interested in buying wood from the region. This does not in any way mean cooperation in trade, but the two countries would mutually benefit if their *information and marketing campaigns, trade names and grading rules were coordinated.*

The present structure of the national logging and wood industry enterprises, with many small companies, does not favor exports. Most of them can only produce quantities too small for entering the export market. *The forest and wood industry sectors should strengthen their internal cooperation, spearheaded by ABE and ASHU, by creating a mechanism, which can coordinate the contacts between buyers and sellers.* Such cooperation is never easy, but by succeeding the private wood sector will show its determination in moving forward.

Searching for “Suriname Timber” on the Internet, does not find one single response relating to any company willing and able to offer timber for export. At the same time the FAO office in Paramaribo has on several occasions been contacted by persons from abroad requesting information on Surinamese wood exports and on the perspectives for wood sector investment. Trade is of course not made by Internet but the necessary initial contacts are formed. *It is*

imperative for the forest and wood industry sectors to facilitate the access of potential buyers through the Internet by creating web sites, offering information on species, quantities, exporters, etc. Also the SBB should immediately prepare a national forest web page with links informing about the forest resource, the forest sector, the forest legislation, the productive sector, etc.

*One necessary option for increasing production and exports will be to diversify the production. Until 1991 **Bruynzeel** produced particleboard but the production became uneconomic, when the glue import costs grew faster than the export incomes, due to the system of depositing the export incomes in the national bank, and only receiving the counter value in Surinamese Guilders. Particleboard and structureboard are low value wood industry products, and they will not support heavy transport costs, but as the raw material is accessible in almost infinite quantities at a low price, it might become an option if the trade with the **CARICOM** countries will move forward.*

As the plywood market seems to continue to expand in the Caribbean region, the option of investing in a new high technology plywood factory, eventually in a joint venture with importers of the product, which would be able to make use of more of the harder timber species, should be carefully analyzed. Such a the option of investing in a new high technology plywood factory, eventually in a joint venture with importers of the product, which would be able to make use of more of the harder timber species, should be carefully analyzed. A plywood and/or particleboard factory might become linked with a small veneer factory, which could slice the many decorative Surinamese wood species, and produce decorative plywood or particleboard.

An extremely important fact is that the foreign buyers accept in general only logs and processed wood of high quality. It means that for every unit exported, there will have to be produced 1-2 units of inferior quality to be consumed by the local market - or to be wasted. With an annual log production of 500,000 m³, it will mean that at least one third will have to be consumed locally, thus setting alone for that reason a limit for the export quantity. The local market will also want to consume some high quality wood. Nevertheless *it would be advantageous if the traditionally favored export species were as much as possible reserved for export, while other species also with superior wood quality, occurring in quantities too small for export, would be preferred for use at the local market. It is of extreme importance that the wood sector will improve its capability and will to expand and diversify their production to allow for a higher percentage of the log production acceptable for export.*

The growing production of sawnwood by chain saws and mobile saws is definitely solving certain problems, but nevertheless their increasing share of the total lumber production (which in Guyana is said to be almost 50% of the total national sawnwood production), will create dire future problems for the wood export. Presently they can produce low-grade sawnwood cheaper than the established fixed sawmills, thus filling the space where the low-grade sawmill production linked to the export should be traded at the local market. Thus causing a serious impediment to the necessary increase of the wood exports. *A system must be developed to allow the chain saw and mobile saws a minor share of the total production, especially for satisfying the lumber necessities of the communities in the interior but without prejudice to the necessary increased wood export. They can also be introduced in the export process by pre-cutting the logs in areas with difficult access.*

As most of the Caribbean countries have few sawmills, carpentries and other wood processing units, this situation favors the export of not only primary processed wood (sawnwood and plywood) but also of secondary processed wood (furniture, doors, windows, tools, etc.), but at the same time it is important that no hindrance should be put up towards the export of even second or third grade healthy logs, as long as the exporter and importer have duly agreed.

Among the worries expressed by the wood sector is that the Caribbean importers often are 'bad payers', but this should be possible to overcome by the issuing of irrevocable letters of credit.

Among the reasons given for the low exports are the high maritime transport costs. The production is too irregular and small, that big log transporting ships are not willing to schedule periodic visits and will only arrive in exceptional cases. The Surinamese production structure favors more the use of minor ships or of container shipments of processed wood with regular freight ships.

If exports are to be increased more than 10 times, serious problems will arise with the already congested harbor facilities. *A program for increasing the harbor capacity will have to be elaborated and executed. Not only the physical processes of storing and loading containers will have to be improved, but also the whole present slow bureaucratic export process will have to be slimmed down. Such a program will also have to include the option of constructing*

container loading facilities for small to medium size ships in Nickerie, Apoera, Moengo and/or Albina.

Some countries, like Dominican Republic, demand that all imported wood has to be accompanied by phytosanitary certificates, guaranteeing that the wood was free of fungus or insect infection at the moment of loading, issued by an approved institution. It will therefore be *necessary to secure the existence of such a specialized wood unit in Suriname capable of producing internationally acceptable phytosanitary certificates.*

Presently the productive forest and wood industry sectors are complaining about the heavy and slow bureaucracy they are faced with, not only in the export process, whenever they need to deal with Government institutions. *It is extremely important that the Government agencies, including SBB, will modify their methodologies to be able to serve the productive sectors with speed and efficiency.*

4. Insufficient log transporting infrastructure

One of the most constraining factors on log production is the lack of access to the resources in the Forest Belt. Road (or river) access to a forest area is imperative for the area to be exploited for its timber resources. The total length of the present forest road net of Suriname is approximately 2,500 km. Furthermore along the rivers Marowijne, Nickerie, Maratakka, Arawara, Wayambo, Coppename, Tibiti, Saramacca, Suriname, Commewijne, Cottica and Corantijn logging is taking place, and they, including the Saramacca Canal, are being used as transport links with the wood industry

In the introduction it was shown that it would be necessary to increase the effective area of the Forest Belt by around 50% to be able to reach the target of a log production of 500.000 m³/year, including areas inside the present Forest Belt where extensive areas presently have no access. One of the reasons for the stagnation in log production has been the very scarce road system in the Forest Belt. See **Map**. Logs are rarely hauled more than 1.5 km from the roadside, and as very little road building has taken place since independence the loggers have mostly been restricted to operate in areas already logged before. Furthermore some of the existing roads are not accessible any longer because of lack of road maintenance or because

many river bridges have become too weak for log trucks to pass or they have completely broken down (Java, Carolina, Pikin Saron, Witagron and Mapane). When the Pokigron road was rehabilitated with new bridges it immediately caused an increase in log production from that area, but this momentary increase has already dwindled as most of the exploitable, accessible parts have already been logged through. The Chinese companies, **Ji Shen** and **Fine Style**, have recently built new roads to the West from the Brownsweg-Pokigron road, thus opening up new areas. Also the new roads built by **SURALCO** to open mining access to the Nassau area and other places have as a secondary result opened access to new timber resources.

Road building is an expensive investment, and the present forest legislation does not offer any incentive. On the contrary, the duration limits of the forest concessions will make durable road building, capable of carrying loaded log trucks, economically impossible. That explains why the road standard of the Chinese built roads, originally built in short-term ICLs, is so poor. *Due to the high investment cost of quality forest road building it will be necessary to alter the determinations in the law concerning the duration of the concessions to at least a full felling cycle or as this is a discussable figure, to at least 50 years for all concession sizes to allow for a reasonable amortization period.* There is no risk by extending the concession duration, as the forest legislation has the necessary provisions to cancel a concession at any time, if it is not managed according to the legal conditions.

It will be necessary to elaborate a national road building plan, delineating a well coordinated main road network, which in a rational way will open up for the access to the sustainable use of the Surinamese natural resources, and at the same time serve other public interests. Then this national network will have to be supplemented with a secondary network, opening up for the access inside the concessions. *The routing of the secondary part of the national road network will also have to be approved in each case, as the construction of a road will inevitably open up for a general access to the surrounding area, with in inherent potential for causing environmental damage. All forest road building will have to follow technical norm, and it will be necessary to perform environmental impact assessment of all forest road-building initiatives.*

It is most urgent that the Road Authority in collaboration with SBB elaborates a Code of Practice for Forest Road Building and Maintenance to secure minimum standards.

Part of the financing of this secondary road net expansion into the concessions, executed by the proper concessionaires, could as an incentive come from a reduction of the annual Area Fee. Another part could come from the already existing contribution from the gasoline price, which should be turned operational for the non-urban road building. Whenever road building is made through public funding, including incentives, the process should go through public tender.

By using the estimates of **Box 1** and the assumption that a new road opens up for 1.5 km forest on each side, it will be possible to cut approximately 3,000 m³/ha per kilometer new road. If the annual growth of the total log production is going to increase with approximately 50,000 m³, an annual road building of 15-20 km will be needed. Considering that the cost of building a secondary forest road is around 10-15.000 US\$/km, the annual needed investment will be 150-300,000 US\$, corresponding to a cost of 3-6 US\$/m³.

One of the major complaints about the logging activities often heard in conversations with the district commissioners and village captains is the destruction of the road network, including the bridges, caused by the log transporters. If the log production will be more than doubled, this problem will be aggravated, and *it will be necessary to introduce strict obligatory rules for maintenance or payment for maintenance of the road stretches used by the log transporters. An option would be to reintroduce the road fee to be paid by the log transporters, to be used exclusively for road building and maintenance.*

According to the present legislation the Minister of Natural Resources on the advise of the forest service has to authorize the construction of new wood industries. Presently most of the wood industries are located in the immediate surroundings of Paramaribo, rather far from the forest. By locating the wood industries closer to the log resource the transportation investments and costs can be reduced considerably, but at the same time problems with qualified manpower, energy, etc. may counterbalance these benefits. *One criterion for approval of new wood industries could be the proposed location of the wood industry, which preferably should be in a place, where the road transport of logs will be as short as possible, like in Brownsweg or Moengo. Such a measure would furthermore increase the possibility for creating employment opportunities in the rural areas.*

5. Outdated harvesting and wood processing equipment

In 1999 all 65 operational sawmills existing in Suriname were visited by the FAO forestry project and an estimation of the total installed capacity made. At that time it was considered that their installed log intake capacity, with one daily 8-hour shift, was around 600,000 m³/year, even though the actual log intake production was only around 100,000 m³. Many of those sawmills are not capable of producing export quality lumber, as the equipment is outdated, often with very poor maintenance. *It will be necessary to upgrade the equipment of most of the existing sawmills, while others should be closed down. At the same time it will be necessary to construct new sawmills, in strategic locations, with equipment better adapted than the old frame saws to handle the current log dimensions and qualities*⁶.

One of the key factors for the low production in quantity and quality is the lack of trained sawmill operators, saw doctors and saw doctoring equipment. It is crucial that an effort is made *to solve the problem of lack of qualified personnel in the wood industry.*

Also the logging companies are generally working with outdated fragile equipment, causing frequent breakdowns, needing expensive repairs. It will be necessary to invest in new modern log extraction equipment⁷. Even though most of the skidders are old, many of them are used below their present capacity, as most of the logging operations are small and spot wise. A well-managed skidder should be able to extract around 4,000 m³/year, including time for general overhauls during the rainy seasons. With the parameters used in **Box 1** the approximate concession size, which can produce an annual logging quantity of 4,000 m³, is around 20-25,000 ha. *With an annual increase of log production of 50,000 m³, it will be necessary to increase the number of skidders and other logging equipment. Furthermore the inefficient, outdated logging equipment will have to be substituted.* A detailed economic study of the consequences of such a substantial production increase will have to be executed, taking into account the very unequal composition of the log production sector.

A condition for investing in expensive skidders and bulldozers is that their operators are duly trained in their operation and maintenance. It has no sense to put unskilled workers to

⁶ A techno-economical analysis of the needs and costs of turning the wood industry sector fully competitive will have to be executed by specialists.

⁷ Adrian Whiteman, forest economist of FAO, prepared during 1999 and 2000 three detailed reports on the forest harvesting in Suriname, presenting detailed data and proposals for improvement of the present situation, including valuable data on the investment needs.

operate machines costing more than a quarter of million US dollars. Also *the logging and extraction workers will have to be duly equipped and trained with the recommended safety equipment and procedures.*

Also the log road transport equipment will have to be renewed. Many trucks are hardly roadworthy and do not fulfill the minimum safety regulations. Nevertheless, as in the case of the skidders a substantial increase of transported logs could be reached with a well-managed and coordinated use of the existing capacity, especially if the new wood industry is constructed in locations closer to the log resources.

6. Inefficient forest management

Presently most of the minor logging companies, which in number constitutes more than 90% of the loggers, but which in volume only produce 10% of the volume, operate with only slight considerations on forest management and planning. Fortunately the harvesting method used by these small-scale loggers: selective cutting of few trees per hectare, is gentle on the forest and causes little permanent damage. On the other hand the lack of management and planning causes a bad utilization of the existing resources, including both the human resources and the harvesting equipment. It also causes repeated re-entry to the forest never letting it recover and generally degrading the resource.

In the introductory calculation of the maximum allowable cut in the present Forest Belt an average cutting volume of 15 m³/ha is used. Presently most of the loggers cut less than that quantity, because they generally only cut the species and trees, which they have sold or are able to sell. Many trees, which have marketable quality, are not cut. Furthermore species, which presently are not considered marketable, but which have commercial wood properties, are left in the forest. The number of harvestable trees left standing after felling has taken place presents actually in most logging areas a bigger problem than the risk of passing the maximum allowable cut. *By performing pre-harvesting stock surveys of the annual harvesting areas the loggers will be able to get exact information on the qualities and quantities, which can be harvested in the coming logging period, thus giving them time for a marketing effort well before harvesting starts, and simultaneously cutting costs per m³ by increasing the harvested volume per ha.* The introduction of such pre-harvesting stock surveys will also help the loggers in lowering the

logging costs per hectare, by exploiting a higher volume per hectare, and using a shorter and more efficient network of skid tracks. *Improved felling and skidding and other low impact harvesting measures, obligatory measures for forest certification, as those introduced in the CELOS Harvesting System, will also benefit the logger and simultaneously secure less forest damage.*

The European and North American markets are increasingly demanding forest certification. Presently several initiatives are ongoing in Suriname for individual companies to reach forest certification. Unfortunately the existing forest legislation does not promote such goals. The short duration of the concessions does not offer the loggers the opportunity to plan for long-term rational and sustainable use of the forest resources. Nevertheless the forest management measures gradually being introduced as obligatory by SBB will lead to that all loggers will fulfill at least 90% of the management planning demands for forest certification. *Meanwhile private logging enterprises are recommended to take individual steps toward forest certification, if they have intentions of exporting wood to Europe or North America.* The issues of relations with local communities, workers rights, health and safety, access to information, environmental and social impact assessments, etc. will be up to each company.

For the loggers to be able to implement the minimum prescribed forest management it is indispensable that the prescriptions are fully accessible to the users. *SBB will have to finish the elaboration of the obligatory management rules as well as a voluntary Harvesting Code of Practice. This should be a stepwise development, starting with basic minimum rules, eventually by adaptation of rules from other countries with similar forest conditions, and then gradually increasing the demands in tune with the increase of capability of the harvesting sector.*

Owners and managers of most of the existing logging companies do not have presently the knowledge and experience in preparing the necessary forest management plans and executing the pre-harvesting stock surveys. There does not yet exist a national consultancy capacity, which will be able to serve the loggers, at a price where the loggers will also have an economically benefit of the planning exercise. *It is recommended that such forest management consultancy services should be promoted. Meanwhile, it is proposed that CELOS and/or JSOOC create temporary Forest Management Service Units, which can offer technical assistance to the logging community.*

Presently the breast height minimum diameter for harvesting is fixed at 35 cm. This is not logical. Some tree species with excellent wood never reach that size, and are yet perfectly suitable for the preparation of poles and hewn squares, while other are still in full growth at that size. Therefore to secure a sensible forest management, *it will be recommendable to introduce different minimum diameter limits, like 30, 40 and 50 cm*, thus securing not only that the species which reach full development with a diameter less than 35 cm can be cut legally, but also that other species should only be cut, when they have reached more growth than is the case today. That is also important for the plywood-production, where the present conversion ratio caused by the peeling of too small logs, is too low.

By strengthening the SBB an increasing share of the total log production will be registered and the corresponding volume retribution will be paid. For to do this *the SBB will have to strengthen its controlling and advisory presence in the forest by the creation of mobile camps*.

7. Ineffective management of forest enterprises

Most of the reasons for the difficult situation, in which the productive forest and wood industry find themselves, are caused by factors outside the sectors. Without credit possibilities, without proper legislation, without incentives it will be impossible to reach the proposed target. Nevertheless both the forest harvesting and the wood industry companies have ample possibilities to improve their situation.

The forest and wood sectors are constantly complaining over the level of the forest charges. It is rather difficult to accept these protests, considering that the log producers are only paying around 10% of the sales value of the logs in volume retribution, when sold to a saw mill, while at the same time more than 25% of the precious raw material is wasted in the forest or in the industry.

Simultaneously with the support received from external sources, *the forest harvesters and the wood industry will have to improve their efficiency and productivity*. Presently almost all the wood industries are using less than half of the installed capacity. This is caused by old-fashioned and/or incorrectly adjusted saws the conversion ratio is generally extremely low.

Many sawmills make no effort to transform minor dimensions to commercially acceptable products, leaving them as waste. Presently some industry log yards have logs stored for more than 6 months, causing the quality to deteriorate. Efforts must be made to use the existing equipment fully and to make the full and best use of the raw material.

The waste in most sawmills is piled up and then periodically burned. Huge calorific values wasted in that way constitute considerable potential for the production of energy. If the wood trade with the Caribbean countries will increase, there will be sufficient market to install a modern minor industrial unit to produce particleboard to use another part of the wastes. Many of the harder wood species used in the sawmills can produce excellent charcoal, and minor industrial charcoal kilns/retorts installed in the major sawmills will be able not only to substitute the present charcoal imports but also add the product to their export trade offer. By turning part of the wastes into commercial products it will be possible to lower the prices of the sawnwood and plywood, making them competitive not only with those of the imported wood products but also with those of some of the imported non-wood products, which recently has taken part of the traditional wood market. *The wood waste must be reduced, preferably by turning it into money (small dimension products, energy, particleboard, charcoal, etc.).*

The major company in the wood sector is the parastatal **Bruynzeel**, in the process of having a forest concession of 150,000 ha approved, well located in the middle of the Forest Belt, transporting its production by river to its industrial plant in Paramaribo. This consists of both a sawmill and the only plywood factory in the country. Even though their concession, composed of several areas, already exceeds the limits fixed in the legislation, they have nevertheless two more major areas reserved for future use in the Marowijne district in some of the most productive forest, thus keeping them out of production.

Bruynzeel has for years been the major driving force in Surinamese forestry and wood industry, but for years its production output has dwindled. A seemingly major problem with **Bruynzeel** is that the state-owned company is in dire financial trouble without the ability to renew and maintain its processing capacity and quality. Furthermore the company is in heavy arrears with its payment of forest charges. A solution of this problem has to be found as soon as possible. *The Government must decide whether or not it is in the national interest to maintain the company as a driving force in the forest and wood industry sectors.*

8. Inadequate forest education, training and research

With a population of only around 400,000 inhabitants, Suriname faces a lack of qualified national personnel in almost all sectors for the time being. A sector, which can only offer an insecure future, which cannot compete with other productive sectors in salary, and where the work often will have to be executed under difficult conditions far from the comfortable air-conditioned offices in Paramaribo, will have increased employment problems. It is therefore imperative that *a special effort will have to be given to developing each person working in the logging and wood industry sectors, and including SBB, into as qualified and efficient an operator as possible.*

The planned increase will also be conditioned on an increase of around 1,750 new forest and wood sector employees. In the short term the key will be to get skilled technicians – bulldozer drivers, chainsaw operators, road crew supervisors, stock survey team leaders, enumerators, etc. This condition of additional manpower may become the Achilles heel of the log production increase, if it is not taken very seriously by the forest and wood industry sectors, if not there will be others offering better jobs for those 1,750 people.

On paper Suriname is in a good position from the point of view of forest education and training. It can offer not only a university degree, but it has also a middle level technician program (NATIN), and in addition a vocational forestry-training center (JSOOC). Unfortunately the output of these institutions is low – in both quantity and quality. There are several reasons for that situation. Evidently their study curricula are not adapted to the existing employment market. Furthermore the teachers are almost exclusively working part time, with insufficient pedagogic background and already overburdened with responsibilities in their other full time jobs. At the university key issues indispensable for future forest and wood industry enterprise managers are missing, causing that the few graduates will have to find a job in a Government agency or look for it outside the sector. The JSOOC does not have the teacher and equipment capacity to train properly the operators in the log production sector. Meanwhile the private productive sector has to continue to work without the necessary skilled personnel to further develop the enterprises towards higher production and productivity and towards a better resource management. The wood industry organizations have organized short courses in kiln-drying and saw doctoring, but it will be necessary to make such training a permanent offer. *It is*

urgently necessary to modify the curricula of the different forestry educations to make them respond to the demands of the employment market.

An additional option may be to completely *change the set-up of the university education, from a traditional 'old world' academic set-up, into a modular more practical education*, where the curriculum is presented in modules, where the students can combine it with their professional work, selecting short-term courses that will suit his or her particular technical needs.

The recruitment of forest guards and forest harvesting workers should preferably be done among the rural population, thus stimulating the rural employment and simultaneously assuring that the trained personnel will be adapted to the life in the forest.

The increase in log production combined with the simultaneous development of the wood industry and trade will most probably encourage well-qualified Surinamese presently working abroad to return and join the national development process. The young people will also feel more attracted to careers in forestry and wood industry.

At the same time the wood and education sectors must realize that with the present human resource availability, both students and teachers, and with the accessible public funds for forestry education, it will not be possible to produce the sufficient number of sufficiently qualified graduates at the national university, which the forest sector will need. Together Guyana and Suriname will have a much better mutual possibility of producing high quality graduates capable of strengthening the forest sectors of the two countries. *It will be necessary to participate actively in the growing regional cooperation in forest education.* Another option will be to *establish a donor-supported program inviting young Dutch-speaking foresters from the Netherlands and Belgium to come to Suriname, for 2-3-year periods, receiving Suriname-level salaries by their employers, but receiving travel costs and a salary supplement by the donor-program.*

The **Tropenbos** institution worked for an extended period in Guyana and among its most successful results was its postgraduate forestry education program. Now it has abandoned its full program in Guyana, and it has shown interest for taking up activities in Suriname. *This opportunity for strengthening the national forestry education options and the research activities*

of the University should be pursued vigorously, especially the option of post-graduation in the Netherlands.

How ever well the Surinamese personnel in the private productive forest sector will be educated and trained, it will be necessary to rely on the use of an increased number of foreign workers. Presently the personnel of most of the foreign companies hardly speak English, let alone Dutch. The field personnel can generally only speak their mother tongue, making the necessary communication with the local population and the forest guards almost impossible, and likewise the understanding of the forest legislation. *It should become obligatory, that all foreign companies have Dutch-speaking personnel in both their management and field units with knowledge to the forest terminology.*

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