

World Bank/Sida/Ministry of Foreign Affairs, Government of Finland

**Lao PDR
Production Forestry Policy**

Status and Issues for Dialogue

Volume 2

ANNEXES

June 11, 2001

Forest Policy Matrix

Note: This Matrix was developed to elicit comment from an interagency GOL team that liased with the Review Mission. Remarks entered in the “Government Perspective” Column were provided by the MAF/DOF as unofficial expressions of the GOL view on issues raised by the mission. Key recommendations based on this detailed Matrix have been summarized are refined in the Matrix and Proposed Action Plan attached to the Executive Summary.

Issues	Existing Situation	Proposed Strategy	Government Perspective	Recommended Actions
GENERAL				
Wood Industries Sector	Wood industries sector statistics unreliable and incomplete. Best estimates of installed processing capacity between 2-3 million m3; operating capacity estimates 31% - 59% due to lack of logs, electricity cuts, poor management, volatile markets. Efficiency low by international standards. Conversion factors < 50% due to basic equipment, limited skills & excessive log degrade. Industry capacity far exceeds sustainable forest capacity. GOL continue to encourage investment in integrated, modern wood industries plants without due regard for raw material supply.	Cease issuance of new wood industry capacity until a comprehensive registration system is established and reliable data is collected on which sound policy, planning and monitoring can be based within the sustainable capacity of the production forest resources.	<i>As mentioned in the PMO 11, the Government of Lao PDR has authorized to the provinces in consultation and collaboration for streamlining of the existing wood processing factories.</i>	<p>Impose moratorium on new investments in wood industries processing.</p> <p>Establish inter-ministerial mechanism to evaluate environmental, economic and social viability of the wood processing subsector.</p> <p>Establish registration and monitoring system within MAF/DOF.</p> <p>Rationalize wood industries sector to sustainable raw material supply levels initially in 2-3 target provinces (say Savannakhet, Khammouane and Borikhamsay).</p>
Deforestation	Annual deforestation averages 0.5% with estimates ranging from 0.3 to 2%/year. Up to 60% of annual quotas for conversion of forested land to hydro reservoirs, irrigation schemes, agricultural and rural	Causes of deforestation (fires, shifting cultivation, exploitative harvesting, encroaching agriculture, rural development projects including hydro-reservoirs, transmission lines, roads, agriculture) need to be	<i>During the period of the war, an orange chemical contributed substantial loss of the forest areas and its residual might be one factor to prevent natural regeneration of the forest. Furthermore UXOs is still</i>	<p>Review areas for rural and infrastructure development projects to minimize conversion of forested areas.</p> <p>Introduce sustainable forest management planning,</p>

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	development projects. Shifting cultivation reduced from 246,000 ha in 1990 to 116,000 ha in 1999.	addressed openly and transparently.	<i>denied access, prohibit rural development and sound management of the forest including afforestation in many provinces of the country.</i>	implementation mechanisms and monitoring for village/community and concession models in production forests
Forest Degradation	In excess of 100 species listed as commercial however, of 36 species listed regularly for processing, only 6 (May Dou, May Tekha, May Nhang, May Bak, May Khen Heua and May Deng account for 66% of volume utilized. Valuable species, of high grades and large piece sizes are targeted for harvesting & utilization, resulting in progressive degradation of composition and value of production forest. Harvesting and foraging by villagers for traditional and small-scale commercial uses can further degrade forests.	Modern technology and international markets have demonstrated that lesser known species (LKS), lower grades and harvesting residues can be technically and profitably utilized and traded. Forest managers and wood industries sectors be encouraged to use “run of forest” outturn rather than selectively degrading composition and value of production forests.	<i>It is one failure of the on going projects with donors assistance which focus only to the economic species and based on the market requirement.</i>	<p>Introduce best practices guidelines for harvesting (species lists, directional felling, extraction, log outturn) and landing processing (scaling, grading, documenting).</p> <p>Actively promote use of LKS & low grade logs</p> <p>TA support to GOL, PAFO, DAFO & SOEs in 2-3 target provinces to transfer knowledge and technology in planning, harvest & landing management and monitoring.</p> <p>Review penalties for abuses and wasteful use of forest resources</p>
Production Forest Allocation	Allocation is not systematic, scientifically based, competitive or transparent. Procedures not clear and no procedural guidelines available. Generally allocation outside DOF and MAF through the PM Office or Council of Ministers. Allocations not based upon sustainable forest management principles, but primarily on the	Introduce systematic, scientifically based, competitive, transparent procedures and guidelines for allocation of production forest resources and comply with these procedures. MAF/DOF provide the technical advice to allow informed decision making for sustainable forest management. Agreements and procedures be	<i>The Government of Lao’s policy doesn’t have intention to give the concession or allocation of the production forest to the private company, Community to manage on the commercial use. Forest and forest land allocation policy promote Community Forestry for protection, regeneration (rehabilitation) sustainable use</i>	<p>As for land-use designation below with additional comments:</p> <p>Procedures for land-use allocation be made competitive so that the most appropriate forest managers are appointed.</p> <p>Review sustainable forest management principles,</p>

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	<p>need to supply wood industries and markets with raw materials and GOL with budget revenues. Allocations are short term, primarily to loggers and processors (not reputable forest managers), quotas vary markedly, so exploitative operations are encouraged. No standard long term concession agreement formats or guidelines exist. Operational guidelines exist for felling, roading, landings, scaling, grading and sales. Recent changes so that PAFO and DAFO are responsible for management of production forest resources, but there are severe constraints in capacity and capability so they contract to SOEs who sub-contract to logging contractors, of which a significant % are not Lao thus do not feel responsible or committed.</p>	<p>reviewed to ensure allocation to appropriate forest managers (not loggers) with clearly defined codes of practice, guidelines for harvesting, roading and landing operations. Establish monitoring and evaluation procedures at all levels of GOL for forest, landing, mill and export trade centres. Technical assistance be focused to support PAFO and DAFO to introduce sustainable forest management procedures. Introduce harsh penalties for abuses.</p>	<p><i>of NWFP, Community Forestry has the right for family wood construction about 5m³ from natural forest where the areas have been allocated to the village. Any forest utilization (Timber and NWFP) had to be applied to the village. Any forest utilization (Timber and NWFP) had to be applied to village forestry.</i></p>	<p>procedures and practices and seek forest managers with appropriate experience in this field.</p> <p>Review land-use tenure, instruments, agreements and mechanisms to ensure there are sufficient security of access and use of resource to justify long term commitment, confidence and practices.</p> <p>Establish monitoring and evaluation procedures at all levels of GOL for forest, landing, mill and export trade centres.</p> <p>TA support be provided to DOF, PAFO, DAFO to improve management, monitoring and evaluation, initially in 2-3 target provinces before replication.</p>
Forest Management Planning	<p>Medium term management planning or guidelines to achieve the objectives of the policy and strategic vision do not exist outside FOMACOP, JFM and HIPA. SOEs that undertake most harvesting have annual operational plans rather than management plans. It is proposed that NAFRI will be responsible for guidelines and</p>	<p>Prepare management planning guidelines to support the objectives of policy and strategic vision. Technical support be directed to NAFRI, DOF, PAFO and DAFO to prepare medium term management plans for production forests to support management procedures and practices to achieve sustainable</p>	<p><i>Agreed as mentioned in Production Forest Allocation.</i></p>	<p>Prepare management plan guidelines for concession and village forest management to support the objectives of policy and strategic vision of GOL in sustainable forest management.</p> <p>Review operational plan guidelines for annual operations of concessions and village forestry to conform within</p>

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	<p>procedures for preparation, approval and monitoring of management and operational plans. There is a severe lack of capacity for preparation, approval and monitoring of management plans in MAF, DOF, NAFRI, PAFO, DAFO, SOEs & Companies.</p>	<p>forest management. In a similar way, guidelines for preparation of operational plans be reviewed. Mechanisms for approval and monitoring of management and operational plans be derived.</p>		<p>management plan parameters.</p> <p>Establish the procedures and offices for preparation, approval and monitoring of management and operational plans.</p> <p>Test the procedures for management and operational planning in 2-3 select sites.</p>
<p>Production Forest Management</p>	<p>There is no understanding of sustainable forest management principles or harvesting within annual allowable cuts in the public, private or SOE sectors. This leads to over allocation of annual cuts and inequitable access to forest resources based upon the immediate exploitative needs of the industry and forest product market demand. Practices minimize investment and promote a “frontier mentality” as there is no security of access to forest resources. There is little understanding that the production forest resource is not inexhaustible, but being deforested and degraded at alarming rates. There is no concept of post-harvest management. There is little knowledge that prevailing planning and management of</p>	<p>Introduce forums to discuss sustainable forest management with public, private, and SOEs to coincide with review of designation, allocation and planning procedures. The constraints of the existing system be outlined and the necessary reforms to be achieved highlighted. The aim is to achieve production forest management in phase with forest policy, strategic vision and achievable practices.</p>	<p><i>Agreed with the draft of matrix</i></p>	<p>As for production forest allocation & forest management planning with additional comments:</p> <p>Introduce forums, training workshops and field visits to select sites to discuss sustainable forest management with public, private and SOE organizations;</p> <p>Incentives be derived to encourage long term post-harvest management so that the growing stock for the next cycle is managed in an appropriate way;</p> <p>Introduce a forest certification scheme to assess that forest management practices are sustainable and that impacts of forestry operations are environmentally, socially and</p>

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	production forests is in direct contravention of their forest policy and strategic vision.			economically sound. Consider eco-labelling in tandem with certification.
Harvesting Management & Monitoring	<p>Log production increasing at an ever increasing rate, 1970-79, 1.0 million m³; 1980-89, 1.7 million m³; 1990-99, 5.3 million m³, of which 3.3 million m³ between 1995-99. Source of 1995-99 production 60+% from conversion developments. Production 80% from Central Region, of which 76% from Khammouane, Borikhamsay and Savannkhet provinces, primarily from BPKP and DAFI operations.</p> <p>Harvest management is lax, wasteful and fraught with abuses by SOEs, contractors, field officers and officials so yields of potential revenues to GOL are grossly underpaid. DOF, PAFO and DAFO have neither the capacity nor capability to undertake or enforce improved harvesting and monitoring. There are no codes of harvest practice, standards or guidelines for roading, land locations, felling or extraction. Through poor practices harvest waste can exceed 60% of potential volume</p>	To support production forest management priorities establish a harvesting code of practice, detail guidelines for all harvesting, extraction, landing and transportation operations to minimize environmental damage and maximize harvesting outturn. Procedures, practices and responsibilities be clearly articulated at all levels of GOL, particularly DOF, PAFO and DAFO. Introduce harsh penalties for disloyalty and dishonesty displayed by GOL officers and abuses by SOEs and private sector.	<i>In the fiscal year of 1998-1999, the GoL had the contribution from Finnish Government both in the Technical and Financial to develop the C&I for the sustainable forest management which is the basic requirement for the forest certification and eco-labelling.</i>	<p>Introduce best codes of practice, guidelines for harvesting, roading and landing operations.</p> <p>Detail guidelines for coupe, road and landing selection; directional felling, extraction, log selection, scaling, grading, documentation, transportation, and trade.</p> <p>Review the regulatory framework and instructions to all levels of DOF, PAFO and DAFO and forest managers.</p> <p>TA support to DOF, PAFO, DAFO and SOEs to understand and implement codes of practice, operational guidelines and certification in 2-3 select locations.</p> <p>Review incentives for loyalty of DOF, PAFO & DAFO officers (training, career development etc).</p> <p>Review penalties for abuses.</p>

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	<p>and landing losses of 20+% common due to under-scaling, under-grading, incorrect recording of species and other transfer pricing techniques. There is evidence of gross mismanagement and a lack of loyalty, integrity and commitment by DOF, PAFO, DAFO and SOEs.</p>			
Low Impact Harvesting	<p>FOMACOP and JFM Projects have demonstrated that sustainable forest management and equitable sharing of benefits can be achieved through village based production forestry. The projects pioneered participatory land-use, management and operational planning, boundary demarcation, forest inventories, growth & yield PSPs, pre-harvest inventory, tree marking, village – GOL forest management agreements. Harvesting is done on alternative low rates and densities of logging strictly within annual allowable cuts for sustainable forest management and in accordance with market surveys and secured sales and marketing agreements. Joint scaling, grading and documentation is done between VFAs, PAFO/DAFO and the buyer. Benefits are equitably</p>	<p>Within the production forest estate remnant production forests insufficiently large for concession allocation are suitable for village forest management under low impact harvesting, low intensity logging management on a sustainable basis. Participatory planning, management and monitoring procedures and processes pioneered in Savannakhet province warrant replication in other provinces, within the capacity of PAFO, DAFO and village communities. All procedures have been documented and manuals and guidelines for the full cycle of events have been prepared. Village forest management has proven economically & socially sustainable. With the commitment of GOL and donor support, replication has exciting</p>	<p><i>The existing project has collaborated with the CIFOR to draft the harvesting code, apart from that LPDR is a member of APFC to develop the C&I, Harvesting code and participated in the low impact harvesting training</i></p>	<p>Identify the potential for village based low impact logging in Lao PDR., with particular reference to the remnant areas of production forest in close proximity to villages.</p> <p>Conduct transfer of knowledge and technology to new PAFO & DAFO offices and villages in areas with high potential.</p> <p>Replicate adaptations of proven models and participatory planning in select villages initially in 2-3 provinces, including Savannakhet and Khammouane where institutional investment in transfer of knowledge and technology have already been made.</p>

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	<p>distributed between GOL and participating villages. Guidelines have been prepared for registration of VFAs; conducting PRA; preparing land-use, management and operational plans; forest management contracts, harvesting permits, log sales and income sharing methods. Manuals have been prepared for inventory, pre-logging survey, tree marking, elaboration of cutting, low impact/low intensity logging and silviculture in Savannakhet Province.</p>	<p>prospects in target areas where conditions are suitable.</p>		
<p>Village Land-Forest Allocation</p>	<p>Instruction 822/AF a village system of Land-Forest Allocation for Management and Use is elaborated to define boundaries, define land-use rights and management guidelines on village lands, including forest lands. Land is allocated to families, villages, collectives or divisions for forest reserve, protection, production, regeneration or plantation uses through temporary land management permits for 3 years and permanent land title thereafter. By 1998, 329,689 ha was allocated to 24,794 families in 1,176 villages. Constraints</p>	<p>The Village Land-Forest Allocation depends heavily upon the capacity and capability of poverty stricken villagers to manage reserve, protection, regeneration, production and plantation forests and the resources and extension systems available from local government authorities. It is difficult to see the objectives of sustainable forest management of natural forests being achieved under the Village Land-Forest Allocation Programme.</p>	<p><i>The LSFP (Land allocation and Land Use planning sub programme) has developed some manuals for land use and land allocation and at the moment it is ready for documentation and dissemination.</i></p>	<p>An independent operational audit or review of the land-forest allocation system be undertaken by GOL, NGO, CBO and donor representatives to detail the constraints and opportunities prior to further large scale allocation. (Note: Decree 327, Vietnam has parallels which did not meet objectives and required major redesign).</p> <p>In a transparent manner, evaluate the strengths and weaknesses in redesigning the approach of the land-forest allocation, particularly with respect to management of</p>

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	<p>included lack of fully participatory process; primarily allocation of non-commercial land-use (reserves, protection, regeneration and degraded and barren lands); poverty stricken villagers lack of knowledge or resources for sustainable management of forests; unclear security of land-use rights, crop ownership and benefits; weak extension and monitoring through PAFO & DAFO. As a result, the objective of sustainable forest management of natural forests is not being achieved under the Village Land-Forest Allocation Programme.</p>			<p>forests.</p> <p>Derive an allocation programme in phase with the capacity and capability of PAFO and DAFO offices to provide the necessary training, education, extension and technical support to villagers.</p>
Forest Plantations	<p>Plantations for watershed management, commercial plantations and smallholders aim at quantity at the expense of quality. Of the 57,000 ha planted, less than 50% have survived. Narrow range of species, degraded & barren land available, poor site/species matching, poor genetic stock, no tree improvement, limited silviculture, poor protection, emerging markets, primarily fast growing short rotation species, extremely low growth & yield, low quality and low value forest products for small-</p>	<p>Forest plantation development is an important forestry land use that will become increasingly important in the future. The GOL must provide the legal and regulatory framework to clarify long term land-use and crop ownership rights, access to markets and freedom to transport. GOL, SOEs, commercial investors and smallholders need to define the objectives at the outset. Then identify the most appropriate ecological zones and site for reforestation; most appropriate investors/beneficiaries; the most</p>	<p><i>The Lao ADB project has developed a National Strategy for Sustainable Plantation Forestry. DoF also studied and analyzed the existing policy and legal framework for commercial plantation.</i></p>	<p>Review the legal, regulatory and incentive framework to encourage investors (industrial and smallholder) to invest in forest plantations. Particular attention to long term security of land-use, ownership of crop and freedom to market, transport and process to whomever and whenever the grower chooses without GOL intervention.</p> <p>Review the priority ecological zones and sites available for commercial (industrial and smallholder) and non-</p>

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	<p>wood processing industry. Lack of security of land-use, crop ownership and access to markets major constraints has been a serious handicap to promoting private (industrial and smallholder) and SOE investment in plantation development. Although plantations will provide a valuable resource, they are not direct substitutes for the high valued, long rotation, large sizes, heterogeneous forest products from natural forests.</p>	<p>appropriate reforestation mechanisms; match sites with species/provenances; and silviculture and rotation for management.</p>		<p>commercial (watershed management, protection) reforestation. The criteria, mechanism, species and benefits are quite different for each.</p> <p>Survey existing forest plantations to detail end use objective, species, regime, success of establishment and silviculture, growth and yield and anticipated wood flows to industry</p> <p>Provide TA support to reforestation in priority sites and investor groups.</p>

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RESOURCE MOBILIZATION				
Land Use Allocation	Principles and guidelines for land allocation to production, protection, conversion and other use categories (including shifting cultivation) unclear.	More apparent procedures for land allocation to be developed. Land use decision to be based on the most beneficial activity within the existing environmental and social framework. Local initiatives to be strengthened.	<i>Agreed as mentioned in Village Land-forest Allocation.</i>	Community based forest management systems strengthened. Prior to land use decisions, particularly reforestation, feasibility of the various options need to be assessed. Land designation should be both transparent and fully enforced; arbitrary land use changes (like turning protected areas to production forests by low-level decisions) should not be allowed. Clear definitions on activities that are allowed and are not allowed a land use category (particularly NBCAs) should be drawn.
Forest Land Use Designation	Existing inventory data and GIS technology available to NOFIP, NAFRI, DOF and MAF is not currently used for systematic, scientifically based forest land use planning for forest designation and allocation. It is not possible to follow a logical planning framework through national, provincial and district levels. There are no consistent criteria for NBCA, protection and production designation and no transparent procedures or guidelines for the process. Land use designations can be ignored by field practices with	Evaluate the GIS planning technology and procedures established at NOFIP and NAFRI and coordinate land-use planning and designation of forest land-use based upon approved criteria, scientific data and transparent procedures through the different levels of GOL. On designation of land-use, GOL at all levels respect and support that decision. Introduce harsh penalties for abuses.	<i>In the National Conference for land registration and land allocation for the fiscal year of 98-99 had agreed to develop the National master plan for Natural Resources management plan which involve with the parties concerned.</i>	Evaluate the GIS technology, planning tools and models available within NOFIP, NAFRI and other MAF and GOL organizations and explore applications in planning and monitoring for land-use designation, delineation, allocation and management. Derive criteria for land-use designations and allocations based upon scientific data, including forestry inputs Derive transparent & formal planning and decision-making

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	<p>harvesting and development encroachment into NBCAs and protection forests. Penalties are not a deterrent. There is evidence that authorizations by authorities contradict designations by other GOL authorities. Contraventions can be both top-down and bottom-up. There is lack of consistent and coherent policy and procedures mutually respected at different levels of government.</p>			<p>procedures to be respected by GOL for land-use designation, delineation, allocation and management, including MAF, DOF, PAFO and DAFO.</p> <p>Introduce GIS technology and applications to DOF and PAFO for their use in planning and monitoring using 2-3 target provinces to test systems (say Savannakhet, Khammouane, Borikhamsay).</p> <p>Evaluate and review.</p> <p>Review penalties for abuses.</p>
<p>Assignment of Management Responsibility and Rights to Benefits</p>	<p>Basis for allocating management responsibilities and rights to benefits unclear and inconsistent across users (Logging Companies, Community Groups, National Budget, Provincial and Local Authorities).</p>	<p>In production forest <i>de jure</i> allocations should match with <i>de facto</i> management. The chain-of- command and management responsibilities and rights should be clear, institutional mandates need to be clear and responsibilities and means should match.</p>	<p><i>According to the decentralization process and based on the PMO. 01/PM//2000 is to strengthening the local staf as from PAFO, DAFO capacity in order for them to efficiently implement the Government socio-economic programmes.</i></p>	<p>Existing mandates of various stakeholders need to be reviewed and made clear. The mandates are to be redesigned to match with the ongoing activities. Distinction between normative authority, implementing authority and commercial activity should be made clear. The regional development enterprises should be audited and commercialized (development functions delinked from commercial activities).</p>
<p>Annual Allowable Cut</p>	<p>LSFP PSP data lost, new PSPs established in FOMACOP and JFM Projects, no reliable growth & yield data available</p>	<p>Establish and maintain a system of PSPs in select forest types and forest plantations to monitor growth, yield, mortality pre and</p>	<p><i>The on going projects have established PSPs in the piloting forest areas, but it seems to be earlier and limited data in term</i></p>	<p>Extend current PSP coverage to other forest types, particularly those targeted for large scale production management and</p>

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	<p>for natural forest growth & mortality, particularly post-harvest. PSPs established in forest plantations. Little or no use of GIS planning tools to calculate national, regional, provincial or district annual allowable cuts for sustainable forest management. The 1989/90 TFAP estimated an AAC of 285,000 m³/year, DOF in excess of 1 million m³/year and in 1999 MRC estimated between 600-700,000 m³/year.</p>	<p>post-harvest. Segregate production forest resources for sustainable management from those for conversion (hydro & irrigation reservoirs, rural development etc) Use data currently available, in association with GIS technology to calculate national, regional, provincial and district annual allowable cuts for production forests. Review AACs as new PSP data becomes available. Adjust annual harvest quotas based upon AACs i.e. capacity of forest.</p>	<p><i>of timing and numbers of PSPs areas to be represented. Therefore it can not apply for the national level yet.</i></p>	<p>those species for plantation develop.</p> <p>Salvage PSP data from LSFP work in Vientiane and Borikhamsay Provinces.</p> <p>Network with near neighbors to gauge growth, yield and mortality in natural forests and AAC calculation procedures.</p> <p>Evaluate the use of GIS technology to assist in calculation of AAC on national, regional, provincial and district basis, initially in 2-3 provinces.</p>
<p>Production Forest Allocation</p>	<p>Allocation is not systematic, scientifically based, competitive or transparent. Procedures not clear and no procedural guidelines available. Generally allocation outside DOF and MAF through the PM Office or Council of Ministers. Allocations not based upon sustainable forest management principles, but primarily on the need to supply wood industries and markets with raw materials and GOL with budget revenues. Allocations are short term, primarily to loggers and processors (not reputable forest managers), quotas vary</p>	<p>Introduce systematic, scientifically based, competitive, transparent procedures and guidelines for allocation of production forest resources and comply with these procedures. MAF/DOF provide the technical advice to allow informed decision making for sustainable forest management. Agreements and procedures be reviewed to ensure allocation to appropriate forest managers (not loggers) with clearly defined codes of practice, guidelines for harvesting, roading and landing operations. Establish monitoring and evaluation procedures at all</p>	<p><i>As mentioned in the PMO. 11/PM/99 and 01/2000, the GoL's policy is to decentralize and to strengthen the local staff as from PAFO, DAFO capacity in order for them to monitor logging activities in the field level (Logging areas) basic (re: to the previous comment).</i></p>	<p>As for land-use designation above with additional comments:</p> <p>Procedures for land-use allocation be made competitive so that the most appropriate forest managers are appointed.</p> <p>Review sustainable forest management principles, procedures and practices and seek forest managers with appropriate experience in this field.</p> <p>Review land-use tenure, instruments, agreements and</p>

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	<p>markedly, so exploitative operations are encouraged. No standard long term concession agreement formats or guidelines exist. Operational guidelines exist for felling, roading, landings, scaling, grading and sales. Recent changes so that PAFO and DAFO are responsible for management of production forest resources, but there are severe constraints in capacity and capability so they contract to SOEs who sub-contract to logging contractors, of which a significant share are not Lao and do not feel responsible or committed.</p>	<p>levels of GOL for forest, landing, mill and export trade centres. Technical assistance be focused to support PAFO and DAFO to introduce sustainable forest management procedures. Introduce harsh penalties for abuses.</p>		<p>mechanisms to ensure there are sufficient security of access and use of resource to justify long term commitment, confidence and practices.</p> <p>Establish monitoring and evaluation procedures at all levels of GOL for forest, landing, mill and export trade centres.</p> <p>TA support be provided to DOF, PAFO, DAFO to improve management, monitoring and evaluation, initially in 2-3 target provinces before replication.</p>
Provincial Logging Quotas	<p>Logging quotas not set according to capacity of resource leading to excessive logging in some areas and under utilization in other areas.</p>	<p>Combination of scientifically assessed allowable cut and market based log markets would ensure more optimal utilization of designated production forests. Well informed forest managers would ensure that market situations are observed and logging volumes optimized also intertemporally to avoid loss of revenue during business slumps.</p>	<p><i>If we are going to manage our potential production forest on the sustainable basic, it would be automatically replaced the logging quotas system for all level.</i></p>	<p>Immediate research activities to establish the annual allowable cut by forest management unit need to be initiated (PSP, inventories, etc.). Promotion of the utilization of lesser-known species. Separate national level (for exports, PMO. issued) and provincial quotas (for domestic markets) to be abolished and issue only one quota.</p>

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INCENTIVE FRAMEWORK				
Royalties and Timber Taxation	Royalties not set in accordance with international market values, reducing Government revenues and promoting inefficient processing. Information on international markets at MCT insufficient.	Market based mechanisms have demonstrated their power in obtaining efficient resource allocation and should be pursued. Royalty collection should also be transparent. Since the number of operators is limited and there is a danger of collusion by the buyers, authorities should be able to control that royalty rates do match with the economic value of the raw material.	<i>DoF has been advised from the Department of Foreign Trade, Ministry of Commerce that LPDR is on the process of reviewing existing policy that related to the Royalties and Taxation and Trade to be applied for the membership of WTO.</i>	Pricing should be competitive and reflect the economic scarcity value of the logs. Single royalty rates to be applied (if further processing need to be specifically encouraged, taxation after processing and/or exports may be considered).
Wood Sales Arrangements	Some sales may be conducted, in violation to legislation, effectively purely demand driven, and even the planning of operations done with the predetermined buyers. Capacity at DOF/PAFOs inadequate to preplan or monitor logging and other forest operations.	Sales arrangements should aim at efficient allocation and utilization of logs. Development of “secondary” log markets (mill-to-mill) and specialized log traders should be encouraged and logging and processing delinked.	<i>Agreed as mentioned in Assignment of Management Responsibility and Rights to Benefits.</i>	Logging rights should be auctioned with established floor prices. Even if some long-term supply contracts were needed, auctions would provide benchmark prices (<i>c.f.</i> log sales in Myanmar). Selling stumpage rather than logs at 2 nd landing. Logging and processing should be delinked to encourage domestic log markets.
Production Forest Management	There is no understanding of sustainable forest management principles or harvesting within annual allowable cuts in the public, private or SOE sectors. This leads to over allocation of annual cuts and inequitable access to forest resources based upon the immediate exploitative needs of the industry and forest product market demand.	Introduce forums to discuss sustainable forest management with public, private, and SOEs to coincide with review of designation, allocation and planning procedures. The constraints of the existing system be outlined and the necessary reforms to be achieved highlighted. The aim is to achieve production forest		As for production forest allocation & forest management planning with additional comments: Introduce forums, training workshops and field visits to select sites to discuss sustainable forest management with public, private and SOE organizations;

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	<p>Practices minimize investment and promote a “frontier mentality” as there is no security of access to forest resources. There is little understanding that the production forest resource is not inexhaustible, but being deforested and degraded at alarming rates. There is no concept of post-harvest management. There is little knowledge that prevailing planning and management of production forests is in direct contravention of their forest policy and strategic vision.</p>	<p>management in phase with forest policy, strategic vision and achievable practices.</p>		<p>Incentives be derived to encourage long term post-harvest management so that the growing stock for the next cycle is managed in an appropriate way;</p> <p>Introduce a forest certification scheme to assess that forest management practices are sustainable and that impacts of forestry operations are environmentally, socially and economically sound;</p> <p>Consider eco-labelling in tandem with certification.</p>
<p>International Log Trade Policies and Intervention in Domestic Log Market</p>	<p>Intervention in forest products markets is excessive and distortionary, reducing the value of resource and Government revenues and leads to inefficient development of wood processing.</p>	<p>Log trade to be managed by the parties (forest managers, traders and processing mills) themselves. The central administration only to provide enabling environment and enforce forest, environmental, etc. related legislation.</p>		<p>Log markets should be commodialised with a diversity of spot trading and longer supply contracts. Exports of both logs and sawnwood to be allowed for all mills and traders.</p>

Issues	Existing Situation	Proposed Strategy	Government Perspective	Recommended Actions
GOVERNANCE				
Forest Legislation and Issuance of Regulations	Accomplishments in enactment of legislative framework need to be followed by promulgation of enabling regulations and administrative procedures with respect to award of use rights, supervisory procedures and accountability and transparency.	In a grand scale the Lao forest legislation is, despite inconsistent and fragmented structure, proving the necessary tools for sustainable forestry. Harmonization of lower level implementation regulation with the existing legislation would improve the situation. Forestry sector development strategies should be compiled in an explicit forest policy document.	<i>Preparation and dissemination of related laws and regulations to government officers, industries and people. Training of Forestry staff in understanding and implementation of the forestry related to the laws and regulations. Strengthening DoF's policy formulation capacity based on accurate monitoring and evaluation.</i>	Overall review of existing regulatory framework. Development of mechanisms to ensure the enforcement of the legislation. Commencement of the development of an explicit national forest policy.
Legal, Policy & Strategic Planning	The legal, policy & planning framework is complex, incomplete, inconsistent and difficult to interpret and apply at all levels of government. The Forestry Act 1996 inadequately addresses village forestry, forest plantations, sustainable forest management practices, wood industry investment or reviewed administrative functions of GOL at all levels. The existing forest policy is outdated and the Strategic Vision for the Agricultural Sector, 1999 does not address the core sustainable natural forest management philosophy and foundations on which it is built. It is considered that the policy objectives can not be achieved under the existing production forest management procedures and	Reviewed policy is necessary to address key issues threatening accelerated deforestation and forest degradation, to provide a new vision of GOL for introducing reforms for sustainable natural forest management (including village forestry), rationalization of the wood industries sector, support to reforestation, and organizational review to deliver planning and technical services. Translate these into strategic plans detailing sustainable practices and procedures. To support policy review the Forestry Act 1996 and regulatory framework also needs review to ensure that key intentions, practices and procedures are clear, concise, complete, consistent and simple to interpret and apply at all levels	<i>The GoL has designated responsibility to MAF (DoF) to develop the framework of strategic vision on Forest Resources Management to the year of 2020 to be presented at the workshop that would be held in Sept. or early of Oct. 2000 and some potential donors would be invited to participate in this workshop.</i>	Dialogue (seminars, roundtable) between GOL authorities, SOEs, private investors, NGOs, CBOs, & donors to address key issues in sustainable natural forest management, clarify policy visions and implementation priorities. In a participatory process involving stakeholders, derive a new strategic plan to detail sustainable practices and procedures to achieve the policy objectives. Review the legal and regulatory framework (Forestry Act 1996 and regulations, decrees, declarations, instructions to support the key issues, visions, plans, practices and procedures for sustainable forest.

Issues	Existing Situation	Proposed Strategy	Government Perspective	Recommended Actions
	practices.	of GOL		management
Intersectoral Oversight and Control	Department of Forestry has responsibility but not mandate to control forest resource, other agencies and interests (logging companies) have undue influence.	Clarification of rights and responsibilities should be clear. One single line authority (MAF/DoF) should be in charge of normative management of the state forest estate. Operational activities should be subject to competitive commercialization.	<i>Agreed and as indicated in Assignment of Management Responsibility and Rights to Benefits.</i>	Restructuring of the management chain of the forest resource. To be based on a) scientifically acceptable procedures and b) clear mandates of the actors. PAFOs' position to be clarified as part of the MAF line administration or part of provincial administration (with MAF having means to halt clearly unsustainable practices).
Information Systems	No authority consolidates national forest statistics on utilization, revenue flows, trade, stakeholders, etc. Some information may be collected but quality of the data is not controlled nor are any results disseminated. The little statistical information published is unreliable, inconsistent and incomplete.	Forest statistics and other reliable and impartial information should form the basis for decision making and resource allocation. Statistics should be collected, combined with scientific research and inventory data and constantly improved.	<i>Agreed which mentioned in the draft paper.</i>	Immediate review of existing data being collected: quality and coverage. After verification and consolidation of data national forest statistics to be published. Coverage of the statistics to be gradually increased.
Foreign trade monitoring and customs controls	Despite cumbersome administrative export formalities, it appears likely that transfer pricing and misreporting at customs is rampant leading to economic and fiscal loss to the country.	Rule of law enforced and revenue/rent collection made efficient. Treating all traders equally.	<i>The GoL has made big effort by issuing out the PM decree no. 193/2000 Concerning the anti-corruption drives.</i>	Strengthening anti-corruption drives. Training of customs staff to be able to spot misreporting, Cross-checking log sales data with trade data and frequent surprise checks to sawmills and traders' warehouses. Chain-of-custody verification (to be introduced with certification).

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Table 1: Land Area and Forest Land

Provinces	<u>Land Area</u> (Ha)	<u>Forest Land</u> (Ha)	<u>Forest cover</u> (%)
<u>Northern region</u>	9,692,500	3,570,777	36
Phongsaly	1,627,000	667,070	41
Luangnamtha	932,500	531,525	57
Oudomxay	1,537,000	414,990	27
Bokeo	619,600	303,604	49
Luangprabang	1,687,500	371,250	22
Houaphang	1,650,000	594,000	36
Xayabury	1,638,900	688,338	42
<u>Central region</u>	9,578,400	4,984,464	51
Vientiane Municipality	392,000	125,440	32
Xiengkhuang	1,588,000	746,360	47
Vientiane	1,592,700	637,080	40
Borikhamxay	1,486,300	966,095	65
Khammuane	1,631,500	962,585	59
Savannakhet	2,177,400	1,197,570	55
Xaysomboon	710,500	349,334	49
<u>Southern region</u>	4,409,100	2,612,659	58
Saravane	1,069,100	577,314	54
Sekong	766,500	413,910	54
Champasack	1,541,500	940,315	61
Attapeu	1,032,000	681,120	66
<u>Total:</u>	<u>23,680,000</u>	<u>11,167,900</u>	<u>47</u>

Source: Department of Forestry, MAF, 1995

Table 2: List of National Biodiversity Conservation Areas (NBCA)

No.	Name of NBCA	Area(Ha)	Location
1	Yot Nam Thoon(Phou Dendin)	222,000	Phongsaly
2	Phon Leuy	150,000	Houaphanh
3	Nam Et	170,000	Houaphanh
4	Nam Sam	70,000	Houaphanh
5	Nam Ha	69,000	Luang namtha
6	Nam Poui	191,200	Xaiyabury
7	Phou kha khouay	200,000	Vientiane-Borikhamxay
8	Phou Phanang	70,000	Vientiane Municipality
9	Nam Kading	169,000	Borikhamxay
10	Nakai Namtheun	353,200	Khammouane
11	Phou Hinpoune	150,000	Khammouane
12	Hin Namnor	82,000	Khammouane
13	Phou xanghea	109,900	Savannakhet
14	Se Bang Nouane	150,000	Savannakhet-Saravane
15	Phou xiengthong	120,000	Saravane
16	Dong Houa Sao	110,000	Champasak
17	Se Pian	240,000	Champasak-Attapeu
18	Dong Ampham	200,000	Attapeu
19	Se Sap	133,500	Saravane
20	Dong Phouvieng	197,000	Savannkhet
Total		3,156,800	

Source: DOF, MAF, 1998

Table 3: Production Forests and Log harvested 1980-1996

Provinces	No of Zone	Production Forests		Log harvested 1980-96	
		Area(ha)	Volume(m ³)	Area(ha)	Volume(m ³)
Northern	28	969,222	18,773,270	153,457	1,293,369
Phongsaly	2	65,129	976,806	17,336	61,371
Luangnamtha	1	13,000	900,000	6,400	24,000
Oudomxay	3	54,400	559,000	12,750	59,400
Bokeo	7	97,500	6,790,000	41,300	193,009
Luangprabang	1	2,800	59,000	1,200	4,800
Huaphanh	5	306,395	2,997,679	27,760	221,730
Xayabury	9	429,998	6,490,785	46,711	729,059
Central	49	1,300,829	51,201,710	260,609	6,213,426
Vientiane.Mun.	2	56,000	871,417	7,600	160,000
Xiengkhuang	4	223,282	2,839,482	11,800	154,251
Vientiane	8	122,726	4,396,156	30,316	491,947
Borikhamxay	8	268,938	8,616,026	26,714	233,443
Khammuane	6	196,100	15,546,394	84,600	4,269,790
Savannakhet	13	332,192	12,129,750	52,101	512,281
Special Region	8	101,591	6,802,485	47,478	391,714
Southern	14	217,123	7,918,544	42,937	348,730
Saravane	4	72,699	3,143,706	14,767	203,505
Sekong	3	45,541	1,320,580	6,900	62,589
Champasack	3	53,018	1,758,711	7,020	54,924
Attapeu	4	45,865	1,695,547	14,250	27,712
Total:	91	2,487,174	77,893,524	457,003	7,855,525

Source: Department of Forestry, MAF, 1996

Table 4: Personnel in the Forestry Sector (1999)

	<u>Men</u>	<u>Women</u>	<u>Total</u>
Forestry Department	71	14	85
Provinces	<u>1761</u>	<u>368</u>	<u>2129</u>
	1832	382	2214
<u>Education Status</u>			
High level	476	40	516
Middle level	990	242	1232
Primary or low level	<u>366</u>	<u>100</u>	<u>466</u>
	1832	382	2214

**Table 5: Summary of National Quotas and Actual log Production
1994/95 – 1998/99**

Year	94/95	95/96	96/97	97/98	98/99	Total
	<u>Thousand</u>					
	<u>m³</u>					
<i>Quota</i>	<u>610</u>	<u>712</u>	<u>680</u>	<u>540</u>	<u>450</u>	<u>2992</u>
Production Forest	178	244	189	247	157	1015
Dam Sites	432	468	491	293	293	1977
<u>Actual log Production</u>	<u>874</u>	<u>659</u>	<u>559</u>	<u>465</u>	<u>613</u>	<u>3170</u>
Production Forest	204	263	170	257	198	1092
Dam Sites	670	396	389	208	415	2078
<i>Quota utilisation%</i>	<u>143</u>	<u>92</u>	<u>82</u>	<u>86</u>	<u>136</u>	<u>106</u>
Production Forest	114	107	90	104	126	108
Dam Sites	155	84	79	71	142	105

Source: Department of Forestry (DOF)

Table 6: Forest Processing and Wood Product Export - Import

<u>Type of Processing</u>	<u>Number (1999)</u>
Sawmill	109
Plywood factory	2
Resaw shops	18
Furniture factory	38
Parquet factory	3
Rattan factory	3
Bong Bark factory	1
Bamboo factory	5
Chainsaw	725
Log Trucks	1425

Year	Wood Export				<i>Import</i>
	Log	Sawn Wood	Finished and Semi finished Products	<i>Plywood</i>	<i>Paper</i>
	Volume 1000m ³	Volume 1000m ³	Volume 1000m ³	Volume 1000m ³	Tons
1994-95	150.3	88.2	10.5	8.5	
1995-96	238.8	177.5	11.2		8,635
1996-97	82.7	119.5	1.1	18.2	3,537
1997-98	70.7	36.2		19.0	
1998-99	28.2				
Total	570.7				

Source: DOF, MAF.

Table 7: Fund Utilization in Forestry sector 1998 –1999

No	Items	Plan	Utilized	Rest	Utilization%	Remark
A	Budget(1000Kip)	665,750	615,736	50,014	92	
1	Salary	367,625	367,625	0	100	
2	Administration	118,125	68,111	50,014	57	
3	Contribution	148,000	148,000	0	100	
4	Investment	32,000	32,000	0	100	
B	Foreign AID(1000USD)	14,714	8,842	5,872	60	
1	SIDA	4,892	3,185	1,706	65	
2	WB/Finnida	4,096	2,310	1,786	56	Grant-Loan
3	GET	1,451	1,138	313	78	
4	IDA	1,516	367	1,149	24	Loan
5	FININDA	980	720	260	73	
6	GOI	150	85	65	56	
7	Plantation-ADB	1,427	834	593	58	Loan
8	Others	207	202	0	100	

Source: DOF, annual statistics.

Table 8: Forestry Sector Budgets 1994/95-1997/98

Year	1994-1995	1995-96	1996-97	1997-98
Budget 1000K	<u>693,821</u>	<u>497,353</u>	<u>678,875</u>	<u>468,851</u>
Salary	264,321	290,753	486,600	256,251
Administration	37,400	44,000	20,275	8,400
Contribution	220,500	108,600	110,000	123,000
Investment	171,600	54,000	62,000	81,000
Foreign AID	<u>8,703</u>	<u>10,351</u>	<u>16,140</u>	<u>7,181</u>
1000\$				
Grant	8,703	6,896	11,772	5,381
Loan	-	3,455	4,368	1,800

Table 9: Royalties paid 1994/95 –1998/99

<u>Year</u>	<u>Plan</u>	<u>Actual</u>	<u>Royalties Paid</u>			<u>Ave. Exc. Rate K/USD</u>
	Volume 1000m ³	Volume 1000m ³	Volume 1000m ³	Value 1000USD	Value 1000KIP	
1994-95	610	874	380	28,340	20,405,136	720
1995-96	712	659	504	32,947	30,620,672	929
1996-97	680	559	312	20,952	19,380,472	925
1997-98	540	465	134	4,704	13,055,412	2775
1998-99	450	613	371	18,894		
Total	2,992	3170	1701	105,837		

Source: DOF and Ministry of Finance

Table10: Forest Export From 1994 –98

<u>Items</u>	1994	1995	1996	1997	1998	5Years
	Unit in 1000 USD					
Timber	57,507	80,560	70,582	41,500	40,772	290,921
<i>Rattan-Bamboo</i>	133	149	150	179	473	1,084
NTFP	3,835	73,008	71,056	877	10,077	158,853
Total	61,475	153,717	141,788	42,556	51,322	450,858
Share of all Export Value	28%	41%	43%	24%	20%	33%

Source: Ministry of Trade

Table 11: Forest Export for the First 6 Months 1999

No.	<u>Items</u>	Units	Quantities	Amount (USD)
1	Log	m ³	10,707	4,017,600
2	Sawnwood	m ³	34,179	6,089,908
3	Plywood	m ³	1,642	2,953,750
4	Veneer	m ³	13,723	2,789,700
5	Parquet	m ²	411,587	4,910,370
6	Rattan-Bamboo	pieces	117,876	209,585
7	Benzoin	kg	125	568,027
8	Cardamom	kg	10,839	3,614,310
Total				25,153,250
<i>All Export Value</i>				119,497,047
Share of All Export Value				21%

Source: Ministry of Trade

Table 12: Socio – Economic Indicators

1994/95 – 1997/98

<u>Items</u>	<u>Unit</u>	1994-95	1995-96	1996-97	1997-98
1- Population	Million	4.6	4.7	4.8	4.9
2- GDP Per Capita	USD	340	370	380	300
3- <u>Share of GDP by Sectors</u>	%	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
- Agriculture Forestry	%	54	53	51	51
- Industry-Handicraft	%	19	20	21	21
- Services	%	27	27	28	28
4- Growth rate of GDP	%	7.0	7.5	7.4	6.7
5- GDP(Fixe value 1990)	Billion (Kip)	835	893	958	3,400
6- Inflation	%	19.4	16	14.2	58
7- <u>Budgets</u>					
- National Income	Billion (Kip)	164.5	230.1	255.9	337.3
- Expenditure	Billion (Kip)	303.6	365.8	407.8	884.8
- Balance	Billion (Kip)	(139.1)	(135.7)	(151.9)	(547.5)
8- <u>Public Investment</u>	Billion (Kip)	181.9	205.5	248.6	589.4
- Internal Capital	Billion (Kip)	36.5	47.7	63.2	153.8
- External Capital	Billion (Kip)	145.4	157.8	185.4	435.6
9- <u>Commerce</u>					
- Exports	Million (USD)	274	363.2	406	330
- Imports	Million (USD)	465	639.5	683	630
- Balances	Million (USD)	(211)	(276.3)	(277)	(300)

Source: National Planning Committee.

Table 13: Greater Mekong Sub-Region: Country comparison

<u>Country</u>	<u>Area</u> (sq. km)	<u>Pop'n,</u> <u>Million</u>	<u>Pop'n</u> <u>Growth</u> <u>Rate,%</u>	<u>GDP,</u> <u>\$ million</u>	<u>Per</u> <u>Capita</u> <u>GDP,\$</u>	<u>Literacy</u> (%)	<u>Human</u> <u>Development</u> <u>Index</u>
Cambodia	181,040	10.7	4.9	3,160	295	69	156
Lao PDR	236,800	4.7	2.4	1,840	392	55	138
Myanmar	667,000	45.5	1.9	11,400	250	80	133
Thailand	513,115	60.0	1.2	180,000	3,000	94	52
Vietnam	332,000	75.4	1.9	23,400	311	94	121
Yunnan,PRC	394,000	40.5	1.4	16,200	400	75	
GMS	2,324,000	221		236,000	995		

Source: Asian Development Bank, Lao People's Democratic Republic, Environmental Profile, September 1997.

Table 14: Foreign Investment

	<u>Projects</u>	<u>Value (Million USD)</u>	<u>%</u>
<u>Total value of Investment</u>		5,574.977	100.00
<u>(From 1988 to 7/1995)</u>			
Include:			
Internal Capital		979.837	17.58
External Capital		4,595.140	82.42
<i>Number of Projects approved</i>	586		
- Agriculture	55	50.664	0.91
- Garments	68	67.813	1.22
- Industry and Handicraft	101	120.581	2.16
- Forest Industries	32	71.393	1.28
- Mines, Petrol	27	310.836	5.58
- Commerce	92	54.294	0.97
- Hotels, Tourist	31	389.924	6.99
- Bank, Insurance	10	46	0.83
- Consultant	37	6	0.12
- Services	80	23.612	0.42
- Construction	34	57.4	1.03
- Communication, Transport	12	110.6	1.98
- Electricity	7	4,264.8	76.50
<i>31 Countries invested</i>			
<i>The first countries:</i>			
- Thailand	228	1,944.1	42.31
- U.S.A	37	1,515.820	32.99
- South Korea	15	394.085	8.58
- France	61	310.976	6.77
- Australia	41	134.088	2.92

From **1988 to 7/1997** there were 656 Projects approved with **Amount 6.8 Billion USD**.

Source: FIMC

Table 15: Economic Indicators: 1993-1997

	1993	1994	1995	1996	1997
Nominal GDP(US\$ million)	950,973	1,107,753	1,419,089	1,725,689	2,202,545
GDP per head (US\$, study estimates)	296	336	352	365	382
Real GDP growth (%)	6.1	8.4	7.9	6.9	7.2
Agriculture growth rate (%)	2.7	8.3	3.1	2.8	5.8
Industry growth rate (%)	10.0	10.7	13.1	17.3	6.4
Services growth rate (%)	7.7	5.5	10.2	8.5	10.0
Consumer price inflation (%)	6.3	6.8	19.4	13.0	30.6
Exports (US\$ mill)	247.9	305.4	311.0	323.0	382.3
Imports (US\$ mill)	431.9	564.1	589.0	690.0	611.4
Current account balance (US\$ mill)	-29.5	-72.5	-126.0	-244.0	-356.8
Foreign reserves (US\$ mill)	63.3	61.1	92.5	166.7	135.5
External debt (US\$ mill)	480.6	588.5	675.4	802.7	940.5
Unemployment rate (%)			2.4		
Average annual exchange rate (kip/\$)	716	719	925	954	1,257

Source: Ministry of Finance, Vientiane and Asian Development Bank.

Table 16: Land and Forest Allocation.

Provinces	Actual allocation of Land and Forest to		
	<i>All Families</i>	Villages	Areas (Ha)
<u>Northern</u>	11,253	817	119,205
Phongsaly	-	13	-
Luangnamtha	-	6	-
Oudomxay	-	151	-
Bokeo	4,370	114	7,051
Luangprabang	565	84	7,699
Huaphanh	-	4	-
Xayabury	6,318	445	104,455
<u>Central</u>	4,873	198	23,411
Vientiane.Mun.	-	45	-
Xiengkhuang	-	12	-
Vientiane	618	16	-
Borikhamxay	-	6	1,001
Khammuane	-	70	-
Savannakhet	-	11	22,410
Special Region	4,255	38	-
<u>Southern</u>	8,668	161	187,073
Saravane	-	6	-
Sekong	-	18	12,435
Champasack	6,551	101	117,770
Attapeu	2,117	36	56,868
TOTAL	24,794	1,176	329,689

Source: Department of Forestry, MAF, 1998

Table 17: Plantation and Shifting cultivation.

<u>Year</u>	<u>Plantation</u>	<u>Shifting cultivation</u>
1994-1995	8,800	179,000
1995-1996	11,800	172,600
1996-1997	11,100	158,800
1997-1998	9,000	132,500
1998-1999	6,300	140,800
Total	47,000	

Source: DOF, MAF

**Table 18: Logging cost to second Landing in Khammouane Province
1999 – 2000**

No.	Items	Restricted Category	Controlled Category	<u>Unit: USD/m³</u>
				Pine
1	Inventory	0.25	0.25	0.25
2	Felling	2.50	2.00	2.00
3	Skidding (1 st Landing)	3.00	2.00	3.00
4	Transport to 2 nd Landing	10.00	6.00	5.00
5	Charge at 2 nd Landing for technician	0.25	0.25	0.49
6	Administration at 2 nd Landing	0.75	0.75	0.75
7	Fee for formality	0.15	0.15	0.15
8	Fee for village	3.00	2.00	-
9	Fee for District	4.00	3.00	2.00
10	Skidding road preparation	1.00	1.00	1.00
11	Logging company charge 15%	3.74	2.61	2.20
12	Bank Interest 12.5%	3.58	2.50	2.10
13	Logging tax 10%	3.22	2.25	1.89
Total Cost		35.44	24.76	20.83

- For logging in the country, they use almost state enterprises, making sub-contract with private truck's owners to do transport and with local people for cutting.
- The principal state enterprises consist of DAFI, Phoudoi, ADS, and provincial companies. In some area, they use Vietnamese companies to do logging particularly at the border with two countries (Khammouane, Savannakhet)

Table 19: Actual logging by provinces 1998-1999

Provinces	<u>Plan</u> (m³)	<u>Actual</u> (m³)
Phongsaly	1,000	2,334
Luangnamtha	2,300	4,165
Oudomxay	4,000	2,208
Bokeo	1,000	1,613
Xayabury	31,000	11,774
Luangprabang	500	0
Vientiane	10,000	695
Vientiane.Mun.	1,000	704
Special Region	5,000	1,245
Huaphanh	4,000	830
Xiengkhuang	8,000	5,307
Borikhamxay	38,118	48,319
Khammuane	285,481	285,481
Savannakhet	99,496	90,164
Champasack	7,500	8,381
Saravane	3,000	2,285
Sekong	8,000	5,709
Attapeu	12,500	10,290
ADS	8,000	1,987
Nam leuk	40,000	17,795
Dong Kapho	2,000	000
Nam Ngum	15,000	959
Phoudoi	120,000	111,248
FOMACOP	7,000	000
Total	713,895	613,313

Source: DOF.

Remark: First Quota: 450.000m³ and New Quota added: 263,895m³.

POTENTIAL FOR GOVERNMENT AND VILLAGE FOREST MANAGEMENT

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LIST OF ABBREVIATIONS

AAC	Annual Allowable Cut
AG	Annual Growth
AGR	Annual Growth Rate
DOF	Department of Forestry
FCMP	Forest Cover Monitoring Project
FM	Forest Management
FOMACOP	Forest Management and Conservation Project
GFM	Government Forest Management
GIS	Geographic Information System
GOL	Government of Laos
NBCA	National Biodiversity Conservation Area
PC	Productivity Class
VFM	Village Forest Management

INTRODUCTION

A modeling analysis was performed to determine:

- the proportion of the national forest resource is potentially suitable for *Production Forest Management* (FM), and
- the proportion of it could be allocated to villages for *Village Forest Management* (VFM), including an estimate of which proportion of villages would benefit from this, and the proportion would remain available for *Government Forest Management* (GFM).

The objective that analysis was *not* to quantify in **absolute terms** how much land could be allocated for VFM. Rather it was or to define rules for such allocation. Rather to model a scenario on the basis of reasonable assumptions for a better understanding of the **relative amount** of resources accessible to villagers and to Government under such assumptions. Hence, the analysis does *not* prescribe which specific areas should be allocated for VFM and which for GFM.

The analysis was based on existing data sets available in Lao PDR, used geographical information system (GIS) technology currently used by several government institutions and at a level of detail appropriate for a national overview. This level of detail, however, may not be appropriate for smaller areas, such as districts. Problems related to local geographical characteristics can only be solved through a land use planning process at the local level.

DATA ANALYSIS

Suitability Model

The model used in this analysis was based on the following assumptions:

Land is potentially suitable for FM if it is:

- sufficiently productive, i.e., covered by forest of adequate density and quality
- not within a protected area¹
- not steeply sloped (30 degrees or less)

Land is further:

- suitable for *Village Forest Management* (VFM) if it is close to a village (within a certain distance from the village location), and therefore easily accessible to villagers
- suitable for *Government Forest Management* (GFM) if it is relatively far from a village
- the total area that can be allocated to a *particular* village is the area that is suitable for VFM and
- within the boundary of this village.

Village boundaries, since they have never been consistently mapped, were modeled using a procedure (Thiessen model) which imputes boundaries between sets of mapped points.

¹ Protected areas at the provincial level could not be taken into account in this analysis, since they have never been comprehensively mapped. It can be assumed, however, that the majority of important protected areas at the provincial level are covered through the exclusion of areas located on steep slopes, 1.7 million ha, 81 % of which are located outside NBCAs.

The analysis further investigated which areas are easily accessible under *current* transportation conditions, regardless of whether they are close to a village or not:

- Areas are considered easily accessible under *current* transportation conditions if they are within less than 3000 meters from existing major transport routes (main roads or Mekong River).

Input Data Sets Used

The following data sets were used as inputs in the analysis:

- Forest and Land Cover (based on the results of the MRC/GTZ Forest Cover Monitoring Project [FCMO].)
- Slope (based on the MRC/GTZ watershed Classification Project)
- National Biodiversity Conservation Areas (NBCAs)(Derived from data compiled by the Center for Protected Areas and Watershed management)
- Transportation: Main roads (based on data compiled by UXO Lao), Mekong River (based on Watershed Classification Project, Nam Ngum Lake (based on FCMP)
- Village center locations (based on UXO Lao)

The forest and land cover data set was simplified into *productivity classes*, where “productivity” means the potential of a given class to produce timber.

- 1 Unproductive:** e.g., Dry Shrublands (Savannah), Grasslands, Permanent Agricultured
- 2 Very Low Productivity:** Heavily Disturbed Deciduous Forest, Forest Regrowth, Evergreen Shrubland, Bamboo
- 3 Low Productivity:** Heavily Disturbed Evergreen / Mixed Evergreen Forest, Deciduous Forest
- 4 Medium Productivity:** Disturbed Evergreen / Mixed Evergreen Forest
- 5 High Productivity:** Dense Evergreen / Mixed Evergreen Forest²

Class 1 is not suitable for FM. Class 2 may have a certain potential for *future* FM, and covers a very large area, but *at present* its productivity is very low and of only marginal significance. Therefore, only classes 3, 4, and 5 were considered potentially suitable for FM. The simplified classes can be understood as a *qualitative* ranking of the original forest and land cover classes mapped by the FCMP in terms of their productivity (i.e., class 5 is more productive than class 4, which is more productive than class 3) This only allows a quantification of *areas* suitable for FM.

2

Original FCMP Class:	went to	Productivity Class
54,62,64,81,82,91,92,93,94,95,96,97,99	went to	1
22,40,61,63	went to	2
13,19,20	went to	3
12,18	went to	4
11,17	went to	5

(for the original classification scheme please refer to the FCMP Technical Notes)

Data Treatment

For the analysis, the entire country was broken down into area units of 0.25 ha, which was the unit of the most accurate input data set (slope). For each area unit, the following distances were calculated:

- distance from the nearest major transport route (main roads or Mekong river)
- distance from the nearest village center location

The data sets were further analyzed through a GIS system in various combinations using simple algebraic expressions such as:

[Productivity = High] AND [Slope < 30 degrees] AND [not inside NBCA] AND [within 3000 meters from the next main road or from the Mekong river] AND [within 4000 meters of the next village]

Deduction of Annual Growth Rates (AGR)

It was equally important, however, to rank the productivity classes in *quantitative* terms (e.g., annual growth rate is 0.5 m³ in class 5, 0.3 m³ in class 4, etc.). This, in addition, allows an analysis of the resources available for FM in terms of *volumes* harvestable under optimum management conditions. Given the lack of growth and yield data, Annual Growth Rate (AGR) estimates had to be deduced from actual harvesting figures as reported from sustainably managed forests.

FOMACOP reported that the actual harvesting rate of commercial species at the village forestry project sites was 0.2 m³/ha/year. Assuming that in a sustainably managed forest the volume of commercial species harvested does not exceed their (net) annual growth, this figure could be used as an indication of the (net) *Annual Growth Rate* (AGR).

The reported annual harvesting rate of 0.2 m³/ha/year is an average. However, indicative AGRs were required for each productivity class. Therefore, the areas of different productivity classes in the FOMACOP project sites were calculated.³ AGRs were then estimated by combining the results of this area calculation with the reported annual harvesting rate of 0.2 m³/ha through a simple linear optimization model. This model used the following constraints:

- average AGR over all productive classes (3 - 5) in the entire national area must equal 0.2 m³/ha (i.e., must equal the annual harvesting rate reported by FOMACOP under the assumption that growth and harvesting are in an equilibrium and that no extraction and landing waste occurs)
- AGR in the highest productivity class must not exceed 1 m³/ha (conservative assumption based on the AAC figure of 1.16 m³/ha given by FOMACOP / J. Carle in the comparison of Low Intensity / High Intensity Harvesting Schemes)

The results were then rounded to the closest multiple of 0.05 for the ease of reading. The areas⁴ and the resulting AGR estimates are given in Table 1 below.

³ This was done by overlaying the GPS map of the FOMACOP project sites with the reclassified forest and land cover data set (i.e., the productivity classes).

⁴ Note that these forest areas differ somewhat from FOMACOP's own estimates. FOMACOP's statistics list 49,818 ha of Dry Dipterocarp forest (corresponding to 61,869 ha in PC 3) and 39,942 ha of Mixed Deciduous Forest (corresponding to 35,305 ha in PCs 4 and 5), total 89,760 ha of Forest (corresponding to 97,151 ha in PCs 3, 4, and

Table 1 Annual Growth Rates (AGR)

Productivity Class	Area (ha)	Area (%)	AGR Estimate (m ³ /ha)	AGR Ratio % (0.15 eqv 100 %)
1	8,008	4.8	---	---
2	60,674	36.6	---	---
3	61,869	37.3	0.15	100
4	32,067	19.3	0.30	200
5	3,216	1.9	0.45	300
Total 3 – 5	97,151	58.6	---	---
Total	165,833	100.0	---	---
Average	---	---	0.20	---

The calculation of the Annual Growth (AG), based on the AGR estimates, is done as follows:

$$AG (m^3/year) = AGR (m^3/ha/year) * Area (ha)$$

The term AG as used in this analysis is based on actual *harvesting* figures and therefore:

- Is *conservative* when looking only at the FOMACOP areas, since the actual AG in these areas will most likely exceed the reported harvesting rate.
- Reflects *only* the growth of those species harvested by FOMACOP. The growth of other (e.g., commercially less valuable) species is not reflected and would have to be added on to obtain overall growth rates.
- Already includes the subtraction of potential losses (e.g., through harvesting waste or through the exclusion of stream buffer zones from harvesting).

The AG may be different in areas outside FOMACOP for the following reasons:

- The AG may be lower in virgin (un-managed) forest areas, due to the static nature of a mature forest (growth + mortality approaches zero).
- The AG may be lower in (over-) exploited forests due to poor silvicultural treatment, e.g., if the future growing stock of commercially valuable species was not properly nurtured / managed.
- The FOMACOP areas are lowland / hill forest areas. The AG in mountain forests may be lower due to adverse environmental conditions, such as poor soils.
- A positive AG of commercially valuable species may be reached only through proper forest management.

In this analysis, Annual Growth (AG) is used to indicate what volumes could *potentially* be harvested from a given forest area under a sustainable, optimum production forest management regime. AG is related to the Annual Allowable Cut (AAC), yet concept expresses different aspects. The AG is a potential, which, if realized through proper production management, may become the AAC. In other words: the AG in an accessible area may be the same as the AG in an inaccessible area, yet their AACs are different. In the accessible area the AAC might equal the AG, whereas in the inaccessible area, the AAC would be nil, since inaccessibility means absence of proper production management. The AG cannot be used for the estimation of an AAC without more specific data, planning, management and monitoring criteria and indicators in place.

5). This may be due to the exclusion of areas actually located inside the project area from mapping by the village associations. This may also be due to different approaches to area calculation (manual versus GIS based).

Various sensitivity tests have been carried out with the AGR estimates. The results of this analysis, as far as resources allocation for VFM versus resources allocation for GFM is concerned, are sensitivity only to the ratio of the AGR estimates, not to their absolute magnitude.

RESULTS

The tables below display the *Areas* of different productivity classes. By multiplying these by the *Annual Growth Rate* (AGR) estimates above the *Annual Growth* (AG) of different productivity classes are obtained (tables 2A, 3A, etc.). Percentage values refer to the entire country area or to the entire AG, respectively.

Overview of the Entire Resource

Table 2 totals the productivity class areas over the country (see Map 1). The largest area is found in class 2, which includes vast areas of regenerating former shifting cultivation and evergreen shrubland in the northern part of the country, and may contain small pockets of remnant forest. Classes 3 to 5 are considered potentially suitable for FM; their total area is 35.8 % (before access constraints are deducted), a figure lower than the current forest cover estimates, which range from 40 % to 47 %. This is a result of the exclusion of extremely degraded forest types, such as heavily disturbed deciduous forest.

Productivity Class	ha	%
1	4,715,983	20.5
2	10,043,625	43.7
3	2,762,013	12.0
4	3,914,349	17.0
5	1,542,614	6.7
Total 3 – 5	8,218,975	35.8
Total	22,978,583	100.0

Table 2 A shows the corresponding *Annual Growth* (AG), based on *Annual Growth Rate* (AGR). Even though class 5 occupies only 6.7 % of the country area, it accounts for approximately one third of the national Annual Growth.

Productivity Class	m ³ / year	%
3	414,302	18.1
4	1,174,305	51.4
5	694,176	30.4
Total 3 – 5	2,282,783	100.0

Table 3 displays the results of Table 2 classified into slope categories (less and more than 30 degrees). Areas on slopes of more than 30 degrees are important for watershed protection and, by international standards, excluded from logging. Therefore, they are not considered suitable for production forestry and have been excluded from further analysis. More than half of this area, however, is either totally unproductive or of very low productivity.

Table 3 OF TABLE 2: PRODUCTIVITY CLASSES ...
... ARE LOCATED ON SLOPES OF

Productivity Class	LESS THAN 30 DEGREES		MORE THAN 30 DEGREES	
	ha	%	ha	%
1	4,417,646	19.2	298,337	1.3
2	8,913,480	38.8	1,130,145	4.9
3	2,576,814	11.2	185,199	0.8
4	3,564,350	15.5	349,999	1.5
5	1,396,449	6.1	146,165	0.6
Total 3 – 5	7,537,613	32.8	681,363	3.0
Total	20,868,738	90.8	2,109,845	9.2

Table 3 A shows the corresponding AG per slope category. Altogether, 8.7 % of the AG is excluded from utilization due to the steep slopes involved.

Table 3A OF TABLE 2 A: ANNUAL GROWTH ...
... ARE LOCATED ON SLOPES OF

Productivity Class	LESS THAN 30 DEGREES		MORE THAN 30 DEGREES	
	m ³ / year	%	M ³ / year	%
3	386,522	16.9	27,780	1.2
4	1,069,305	46.8	105,000	4.6
5	628,402	27.5	65,774	2.9
Total 3 – 5	2,084,229	91.3	198,554	8.7

Table 4 contains the results of the left half of Table 3 classified by their location inside or outside of National Biodiversity Conservation Areas (NBCAs). About one quarter of class 4 (medium productivity) and more than one third of class 5 (high productivity) remaining after exclusion of steep slopes are located within NBCAs. Areas in the right half of this table have been excluded from further analysis since legally they are not available for forest management.

Table 4 OF TABLE 3: ON SLOPES OF LESS THAN 30 DEGREES ...
... ARE LOCATED WITHIN NBCAs

Productivity Class	NO		YES	
	ha	%	ha	%
1	4,124,758	18.0	292,888	1.3
2	8,162,631	35.5	750,849	3.3
3	2,235,435	9.7	341,379	1.5
4	2,659,056	11.6	905,294	3.9
5	793,852	3.5	602,598	2.6
Total 3 – 5	5,688,343	24.8	1,849,270	8.0
Total	17,975,731	78.2	2,893,007	12.6

The areas of classes 3 to 5 in the left half of this table are those potentially suitable for FM. They account for 24.8 % of the entire country area (see Map 2), and are about twice the size of the area of 2,487,000 ha designated as production forest by DOF.

Table 4 A shows the corresponding AG. It stresses the fact that a significant proportion of medium to high productivity forests are located within NBCAs; only 65.3 % of the total AG is potentially suitable for FM.

Table 4 A OF TABLE 3 A: ON SLOPES OF LESS THAN 30 DEGREES ...
... ARE LOCATED WITHIN NBCAs

Productiv	NO	YES
-----------	----	-----

Class	m ³ / year	%	m ³ / year	%
3	335,315	14.7	51,207	2.2
4	797,717	34.9	271,588	11.9
5	357,233	15.6	271,169	11.9
Total 3 – 5	1,490,265	65.3	593,964	26.0

The average AG in the area potentially suitable for FM can now be estimated to be about 0.26 m³/ha/year⁵. Assuming – realistically - that the area of 2,487,000 ha designated by DOF as production forest is of average forest composition, the AG in this area would be 646,620 m³/year.⁶ Assuming – optimistically - that the production forest area contains the entire productivity class 5 area (793,852 ha) and that the remainder of 1,693,148 ha⁷ is entirely composed of productivity class 4, the AG in this area would be 1,000,072 m³.⁸ This figure is remarkably close to DOF's AAC estimate of 1,000,000 m³/year.

Table 5 classifies the results of the left half of Table 4 by their accessibility from major land or water transport routes, i.e., from roads or the Mekong river (see Map 3) . The figures in this table can be interpreted as the rather easily accessible part of the area potentially suitable for FM (left half of the table) and that part of that area which would require significant investments in infrastructure (right half of the table). Only about two fifths of the area potentially suitable for FM are located within less than 3000 meters distance from major roads or from the Mekong river.⁹

Table 5 OF TABLE 4: NOT LOCATED WITHIN NBCAs ...
... ARE LOCATED WITHIN 3000 M FROM ROADS OR MEKONG

Productiv Class	YES		NO	
	ha	%	Hectares	%
1	2,564,734	11.2	1,560,024	6.8
2	2,420,549	10.5	5,742,082	25.0
3	928,552	4.0	1,306,883	5.7
4	748,954	3.3	1,910,102	8.3
5	144,209	0.6	649,643	2.8
Total 3 – 5	1,821,715	7.9	3,866,627	16.8
Total	6,806,998	29.6	11,168,733	48.6

The easily accessible area (1,821,715 ha) is smaller than the area currently designated as production forest by GOL (2,487,000 ha). It may be assumed that the production forest (of which comprehensive maps apparently do not exist) includes the entire easily accessible area, and that the logging pressure in such areas is higher than in not easily accessible areas. Therefore, over-exploitation is even aggravated in easily accessible areas.

Table 5 A shows the corresponding AG. Even though about two fifths of the area potentially suitable for FM have easier access (Table 5), it accounts for only slightly more than one quarter of the total AG. The immediate reason is that the easily accessible area contains a lower proportion of productivity classes 4 and 5, which are more frequent in the less easily accessible area. Over-exploitation of the easily accessible areas might have caused the transition of forests from classes 4 and 5 into the less productive class 3.

⁵ 0.26 m³/ha/year = 5,688,343 m³/year divided by 1,490,265 ha

⁶ 646,620 m³/year = 2,487,000 ha * 0.26 m³/ha*year

⁷ 1,693,148 ha = 2,487,000 ha - 793,852 ha

⁸ 1,000,072 = 793,852 ha * 0.45 m³/ha/year + 1,693,148 ha * 0.30 m³/ha/year

⁹ This is a conservative estimate, because the road data set has not been comprehensively updated since the early 1980s.

Table 5 A OF TABLE 4 A: NOT LOCATED WITHIN NBCAs ...
... ARE LOCATED WITHIN 3000 M FROM ROADS OR MEKONG

Productiv Class	YES		NO	
	m ³ / year	%	m ³ / year	%
3	139.283	6.1	196.032	8.6
4	224,686	9.8	573,030	25.1
5	64,894	2.8	292,339	12.8
Total 3 – 5	428.863	18.8	1.061.402	46.5

It may also be assumed that most development conversion (and the logging associated with it) takes place in the vicinity of existing infrastructure, i.e., again in easily accessible areas. This would add an aggravating factor to over-exploitation, since development conversion completely removes the potential for future annual growth.

Resource Allocation for VFM and GFM – The 4000 Meter Scenario

In this section, a scenario is developed under which all areas potentially suitable for FM within less than 4000 meters distance from village locations would be allocated for VFM, and all remaining areas for GFM (see model assumptions in section 2.1).

The allocation of all areas potentially suitable for FM located within less than 4000 meters from village locations to such villages for management would result in a total VFM area of about 3 million ha (Table 6, left half). This would amount to an average per capita allocation of 1.96 ha.

Table 6 classifies the results of the left half of Table 4 by their distance from villages using the distance threshold of 4000 meters. With slope and NBCA constraints deducted, 13.4 % of the country area could be allocated for VFM, and 11.3 % for GFM. Slightly less than half of the area allocated for VFM would be in the least productive class 3, while GFM would control more of the more productive classes 4 and 5 (7.9 %, in contrast to 7.2 % for VFM). See Maps 4 and 5.

Table 6 OF TABLE 3: NOT LOCATED WITHIN NBCAs ...
... ARE LOCATED WITHIN 4000 M AROUND VILLAGES

Productiv Class	YES		NO	
	ha	%	ha	%
1	3,529,313	15.4	595,445	2.6
2	6,162,083	26.8	2,000,548	8.7
3	1,437,447	6.3	797,989	3.5
4	1,357,691	5.9	1,301,365	5.7
5	292,146	1.3	501,706	2.2
Total 3 – 5	3,087,283	13.4	2,601,059	11.3
Total	12,778,679	55.6	5,197,052	22.6

Table 6 A shows VFM and GFM would receive about even shares of the AG, with the allocation of more forests of the productive classes 4 and 5 for GFM compensating for its smaller total area.

Table 6 A OF TABLE 3 A: NOT LOCATED WITHIN NBCAs ...
... ARE LOCATED WITHIN 4000 M AROUND VILLAGES

Productiv Class	YES		NO	
	M ³ / year	%	m ³ / year	%
3	215,617	9.4	119,698	5.2
4	407,307	17.8	390,409	17.1
5	131,465	5.8	225,768	9.9
Total 3 – 5	754,390	33.0	735,875	32.2

Table 6-1 classifies the results of the *left* half of Table 6 by their accessibility from major land or water transport routes. The figures in this table can be interpreted as the rather easily accessible part of the area allocated for VFM (left half of the table) versus the part of the area suitable for VFM which would require significant investments in infrastructure (right half of the table). Practically half of the area that could be allocated for VFM would be located within less than 3000 meters from major roads or the Mekong river.¹⁰

Table 6-1 OF TABLE 5: WITHIN 4000 M AROUND VILLAGES ...
... ARE LOCATED WITHIN 3000 M FROM ROADS OR MEKONG

Productiv Class	YES		NO	
	ha	%	ha	%
1	2,409,185	10.5	1,120,128	4.9
2	2,184,767	9.5	3,977,316	17.3
3	753,866	3.3	683,580	3.0
4	605,530	2.6	752,162	3.3
5	110,652	0.5	181,494	0.8
Total 3 – 5	1,470,048	6.4	1,617,235	7.0
Total	6,064,000	26.4	6,714,679	29.2

Table 6-1 A shows the corresponding AG. Since the easily accessible area contains a lower proportion of productivity classes 4 and 5, proportionally less AG would be allocated for VFM within less than 3000 meters distance from major roads or the Mekong river.

Table 6-1 OF TABLE 5 A: WITHIN 4000 M AROUND VILLAGES ...

¹⁰ This is a conservative estimate, since the road data set has not been comprehensively updated since the early 1980s.

... ARE LOCATED WITHIN 3000 M FROM ROADS OR MEKONG

Productiv Class	YES		NO	
	m ³ / year	%	m ³ / year	%
3	113.080	5.0	102.537	4.5
4	181,659	8.0	225,648	9.9
5	49,793	2.2	81,672	3.6
Total 3 – 5	344.532	15.1	409.858	18.0

Table 6-2 contains the results of the *right* half of Table 6 classified by their accessibility. Only about one seventh of the area that would remain for GFM is located within less than 3000 meters distance from major roads or the Mekong river.

**Table 6-2 OF TABLE 5: NOT WITHIN 4000 M AROUND VILLAGES ...
... ARE LOCATED WITHIN 3000 M FROM ROADS OR MEKONG**

Productiv Class	YES		NO	
	ha	%	ha	%
1	155.549	0.7	439.896	1.9
2	235,782	1.0	1,764,766	7.7
3	174.686	0.8	623.303	2.7
4	143,425	0.6	1,157,940	5.0
5	33,557	0.1	468,150	2.0
Total 3 – 5	351.667	1.5	2,249.392	9.8
Total	742.998	3.2	4,454.054	19.4

Table 6-2 A shows the corresponding AG. Since the easily accessible area contains a lower proportion of productivity classes 4 and 5, proportionally less AG than area available for GFM is located within less than 3000 meters distance from major roads or from the Mekong river (only about one ninth). The easily accessible AG allocated for GFM is only about one third of the average amount of timber harvested from production forests over the past 5 years (242,600 m³). However, there is a potential of 651,545 m³, significant parts of which could possibly be realized through well-targeted investments in infrastructure and proper forest management.

**Table 6-2 A OF TABLE 5 A: NOT WITHIN 4000 M AROUND VILLAGES
... ARE LOCATED WITHIN 3000 M FROM ROADS OR**

Productivity Class	YES		NO	
	m ³ / year	%	m ³ / year	%
3	26.203	1.1	93.495	4.1
4	43,027	1.9	347,382	15.2
5	15,101	0.7	210,667	9.2
Total 3 – 5	84.331	3.7	651.545	28.5

Summary at the National Level

Table 7 and Figures 1 and 2 summarize the findings of this section.

Table 7: Resources Available for Forest Management

Productivity Class	1	2	3	4	5	3 - 5	Total
Area (ha)							
Total	4,715,983	10,043,62	2,762,013	3,914,349	1,542,614	8,218,975	22,978,58
minus Steep Slopes	298,337	1,130,145	185,199	349,999	146,165	681,363	2,109,845
minus NBCAs	292,888	750,849	341,379	905,294	602,598	1,849,270	2,893,007
FM – Potentially	---	---	2,235,435	2,659,056	793,852	5,688,343	---
VFM - Close to Village	---	---	1,437,447	1,357,691	292,146	3,087,283	---
• Easy Access	---	---	753,866	605,530	110,652	1,470,048	---
• Difficult Access	---	---	683,580	752,162	181,494	1,617,235	---
GFM - Far from Village	---	---	797,989	1,301,365	501,706	2,601,059	---
• Easy Access	---	---	174,686	143,425	33,557	351,667	---
• Difficult Access	---	---	623,303	1,157,940	468,150	2,249,392	---
Area (%^A)							
Total	20.5	43.7	12.0	17.0	6.7	35.8	100.0
minus Steep Slopes	1.3	4.9	0.8	1.5	0.6	3.0	9.2
minus NBCAs	1.3	3.3	1.5	3.9	2.6	8.0	12.6
FM – Potentially	---	---	9.7	11.6	3.5	24.8	---
VFM – Close to Village	---	---	6.3	5.9	1.3	13.4	---
• Easy Access	---	---	3.3	2.6	0.5	6.4	---
• Difficult Access	---	---	3.5	5.7	2.2	11.3	---
GFM – Far from Village	---	---	3.0	3.3	0.8	7.0	---
• Easy Access	---	---	0.8	0.6	0.1	1.5	---
• Difficult Access	---	---	2.7	5.0	2.0	9.8	---
Annual Growth (m³ /							
Total	---	---	414,302	1,174,305	694,176	2,282,783	---
minus Steep Slopes	---	---	27,780	105,000	65,774	198,554	---
minus NBCAs	---	---	51,207	271,588	271,169	593,964	---
FM – Potentially	---	---	335,315	797,717	357,233	1,490,265	---
VFM – Close to Village	---	---	215,617	407,307	131,465	754,390	---
• Easy Access	---	---	113,080	181,659	49,793	344,532	---
• Difficult Access	---	---	102,537	225,648	81,672	409,858	---
GFM – Far from Village	---	---	119,698	390,409	225,768	735,875	---
• Easy Access	---	---	26,203	43,027	15,101	84,331	---
• Difficult Access	---	---	93,495	347,382	210,667	651,545	---
Annual Growth (%^B)							
Total	---	---	18.1	51.4	30.4	100.0	---
minus Steep Slopes	---	---	1.2	4.6	2.9	8.7	---
minus NBCAs	---	---	2.2	11.9	11.9	26.0	---
FM – Potentially	---	---	14.7	34.9	15.6	65.3	---
VFM – Close to Village	---	---	9.4	17.8	5.8	33.0	---
• Easy Access	---	---	5.0	8.0	2.2	15.1	---
• Difficult Access	---	---	4.5	9.9	3.6	18.0	---
GFM – Far from Village	---	---	5.2	17.1	9.9	32.2	---
• Easy Access	---	---	1.1	1.9	0.7	3.7	---
• Difficult Access	---	---	4.1	15.2	9.2	28.5	---

^A of Total Country Area

^B of Total Annual

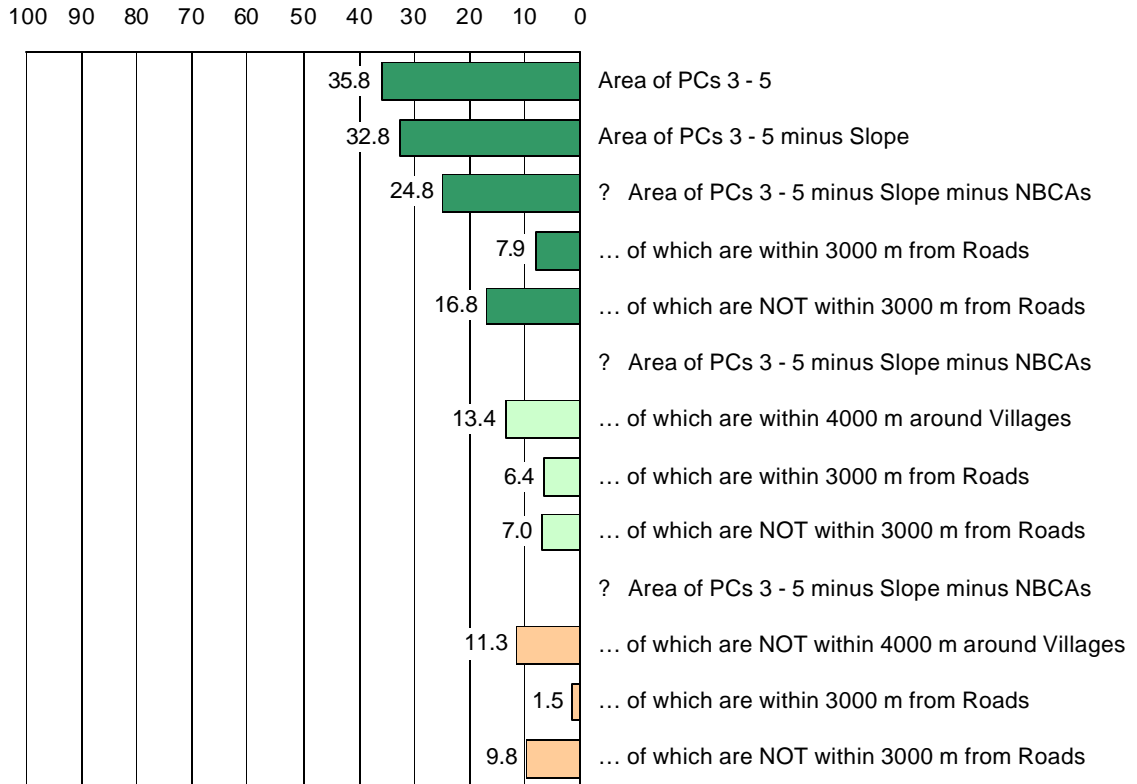


Figure 1: Area Available for Forest Management (% of Country Area)

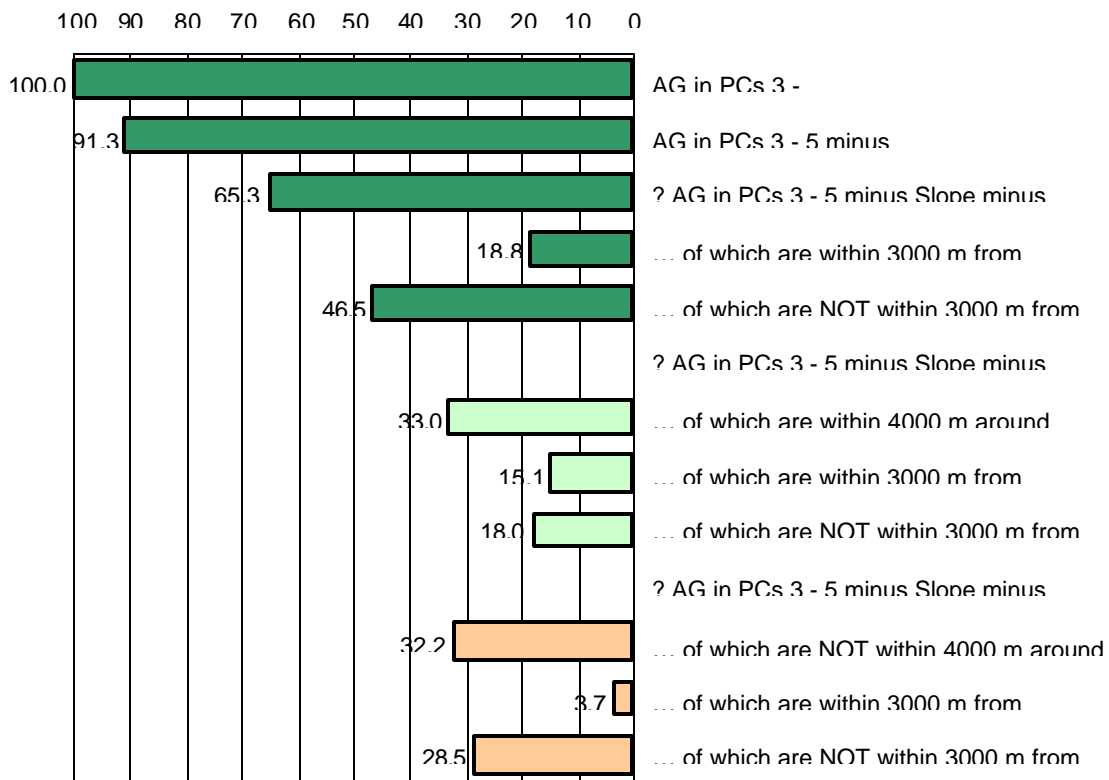


Figure 2: AG Available for Forest Management (% of Total AG)

Regional Differences

The same analysis as discussed in sections 3.1 and 0 was carried out per region.¹¹

Table 8: Resources Available for Forest Management by Region

Region	Country	North	Central	South
Total Area	22,978,583	9,565,980	9,109,749	4,302,855
Area (ha) in PC 3 - 5				
FM - Potentially Suitable	5,688,343	1,332,797	2,682,738	1,672,808
• Easy Access	1,821,715	277,527	915,686	628,503
• Difficult Access	3,866,627	1,055,270	1,767,052	1,044,305
VFM - Close to Village	3,087,283	821,262	1,383,314	882,707
• Easy Access	1,470,048	227,241	767,877	474,930
• Difficult Access	1,617,235	594,021	615,437	407,777
GFM - Far from Village	2,601,059	511,535	1,299,423	790,101
• Easy Access	351,667	50,286	147,809	153,573
• Difficult Access	2,249,392	461,249	1,151,615	636,528
Area (%^A) in PC 3 - 5				
FM - Potentially Suitable	24.8	5.8	11.7	7.3
• Easy Access	7.9	1.2	4.0	2.7
• Difficult Access	16.8	4.6	7.7	4.5
VFM - Close to Village	13.4	3.6	6.0	3.8
• Easy Access	6.4	1.0	3.3	2.1
• Difficult Access	7.0	2.6	2.7	1.8
GFM - Far from Village	11.3	2.2	5.7	3.4
• Easy Access	1.5	0.2	0.6	0.7
• Difficult Access	9.8	2.0	5.0	2.8
Annual Growth (m³ / yr)				
FM – Potentially	1,490,265	306,225	750,901	433,140
• Easy Access	428,863	62,185	221,901	144,778
• Difficult Access	1,061,402	244,040	529,000	288,362
VFM - Close to Village	754,390	185,981	363,753	204,657
• Easy Access	344,532	50,682	187,476	106,374
• Difficult Access	409,858	135,298	176,277	98,283
GFM - Far from Village	735,875	120,244	387,148	228,483
• Easy Access	84,331	11,502	34,425	38,404
• Difficult Access	651,545	108,742	352,723	190,080
Annual Growth (%^B)				
FM – Potentially	65.3	13.4	32.9	19.0
• Easy Access	18.8	2.7	9.7	6.3
• Difficult Access	46.5	10.7	23.2	12.6
VFM - Close to Village	33.0	8.1	15.9	9.0
• Easy Access	15.1	2.2	8.2	4.7
• Difficult Access	18.0	5.9	7.7	4.3
GFM - Far from Village	32.2	5.3	17.0	10.0
• Easy Access	3.7	0.5	1.5	1.7
• Difficult Access	28.5	4.8	15.5	8.3

^A of Total Country Area

^B of Total Annual

¹¹ Provinces grouped according to DOF: **North**: Bokeo, Houaphanh, Luang Nam Tha, Luang Prabang, Oudomxay, Phongsaly, Sayaboury; **Central**: Bolikhamsay, Khammuane, Savannakhet, Vientiane, Vientiane Municipality, Xaysomboon Special Region, Xieng Khouang; **South**: Attapeu, Champassak, Saravanne, Sekong

More than three quarters of both the area potentially suitable for FM and the AG are located in the central and southern region. In the northern region, only about one fifth of the area potentially suitable for FM is easily accessible, whereas in both the central and southern regions more than one third of it is so. However, the proportion of AG easily accessible in both regions is lower than one third, which can again be explained through on-going over-exploitation of easily accessible areas.

Under the 4000 m distance scenario, the central region (where FOMACOP is located) has the largest potential for VFM. It has the highest AG allocable for VFM (363,753 m³/year), and more than half of it (187,476 m³/year) is easily accessible. A similar picture, with a smaller AG, can be drawn for the southern region. But even in those regions, the AG available for GFM under the 4000 m distance scenario is larger than the AG available for VFM. However, only 72,829 m³/year, or slightly more than one tenth of this AG, is easily accessible, which is below the average amount of timber harvested from production forests over the past 5 years (242,600 m³/year). In this situation, government officials focused on short-term revenues are likely to attempt to keep as much as possible of the easily accessible area under government control.

Beneficiary Population

Some 1.5 million persons (34.3% of the number of villages, and hence of population) would potentially benefit from VFM under the 4000 m distance scenario (Table 9). The values in Figure 3 and 4 are based on the entire AG of 754,390 m³/year (Table 6 A) on an area of 3,087,283 ha which could be allocated for VFM (Table 6). The percentages of villages shown in the left hand of Figures 3 and 4 are cumulative. For example, the 46.3 % of the villages which could receive an allocation of 50 ha or more does include the 41.0 % of villages which could receive an allocation of 100 ha or more, and so on. The partial percentages per stratum are shown in the right hand of the Figures. Thus, 5.2 % of the villages could receive an allocation of between 50 ha and 100 ha.¹²

In terms of area, 41.0 % of villages could receive an allocation of 100 ha or more. The majority of them (20.8 %) could receive an allocation between 250 and 999 ha. Only 8.7 % of villages could receive an allocation of more than 1000 ha. In terms of AG, 30.9 % of villages could receive an allocation of 50 m³ or more. The majority of them (18.3 %) could receive an allocation between 100 and 499 m³. Only 2.3 % of villages could receive an allocation of more than 500 m³. This is rather *optimistic*, however, as it assumes that the entire AG can be utilized. It does not take into account the fact that not all areas allocated for VFM are easily accessible (i.e., located within less than 3000 m distance from major roads or the Mekong river), and therefore shows only a potential, which may be realizable only in the future, with improved transportation infrastructure.

¹² These results were obtained analyzing, and aggregating the results for, some 10,000 villages, whose boundaries were defined using the Thiessen model described in numeral 2.1, and overlapping to them the distance to village and distance to road/river criteria.

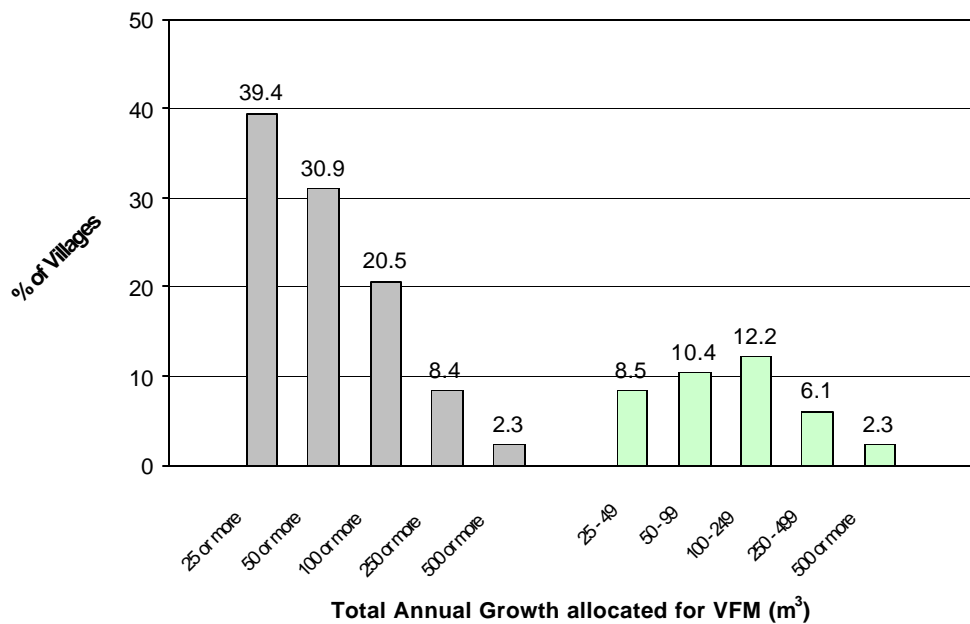
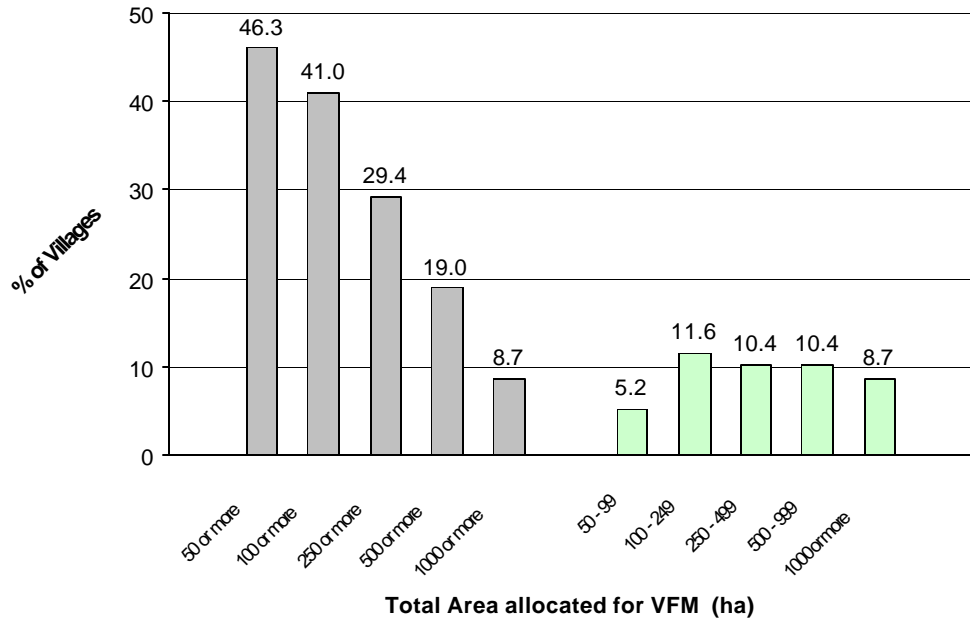


Figure 3: Beneficiary Population under the 4000 m Scenario, Total Area

A more realistic interpretation, based on the more restricted AG of 344,532 m³/year (Table 6-1 A) available from the easily accessible area of 1,470,048 ha which could be allocated for VFM (Table 6-1), is shown in Figure 4. In terms of area, 24.4 % of villages would receive an allocation of 100 ha or more. The majority of them (12.5 %) would receive an allocation between 250 and 999 ha. Only 3.2 % of villages would receive more than 1000 ha. In terms of AG, 17.0 % of villages would receive an allocation of 50 m³ or more. The majority of them (9.2 %), would receive an allocation between 100 and 499 m³. Only 0.6 % of villages would receive an allocation of more than 500 m³.

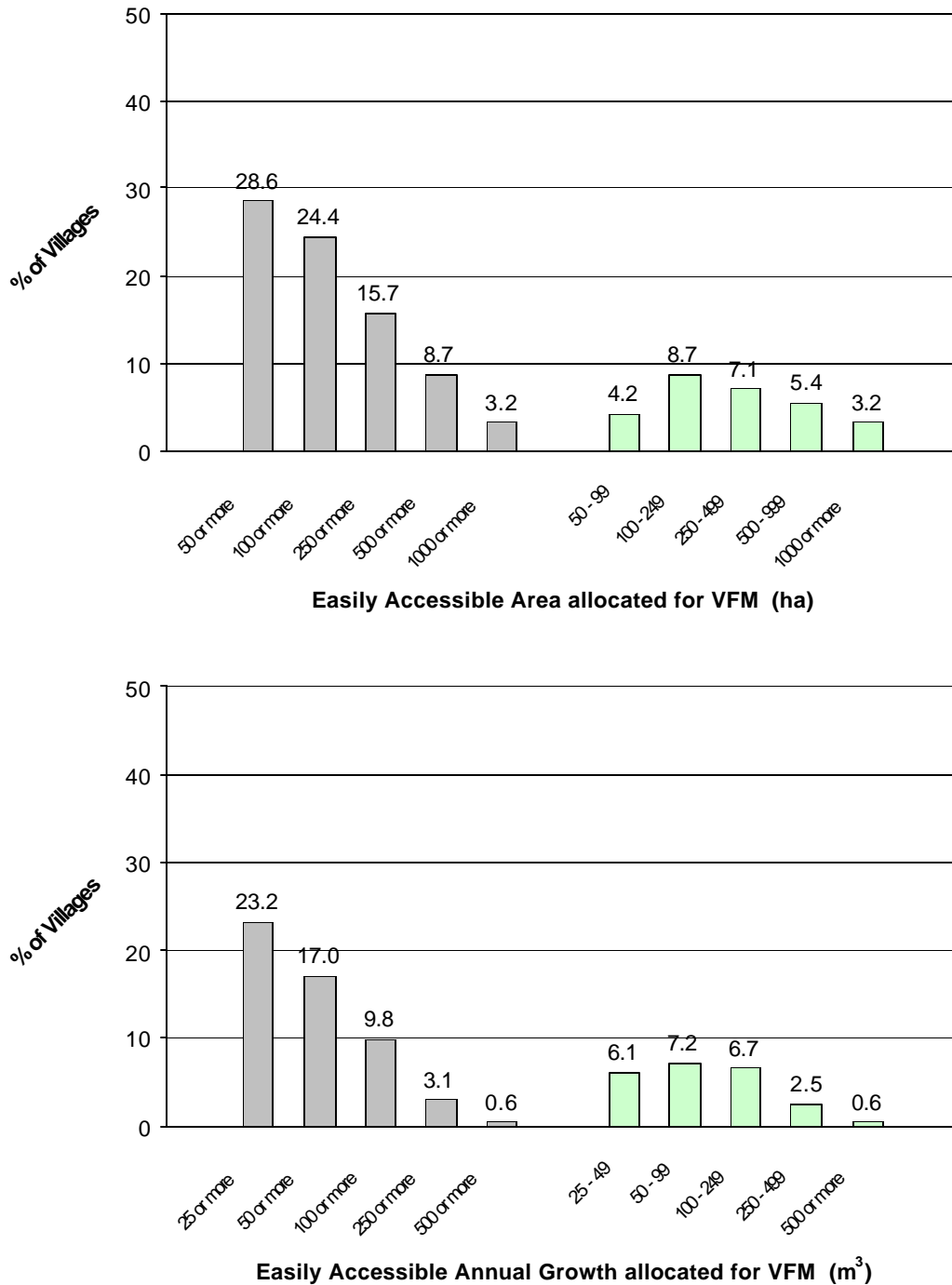


Figure 4: Beneficiary Population under the 4000 m Scenario, Easily Accessible Area

It is not possible to precisely estimate the per capita allocation under the 4000 m distance scenario, because no exact population figures matching the village data used in this analysis were available. However, Table 9 may give an indication of the orders of magnitude involved.¹³

¹³ The average population of a village receiving an allocation of 100 ha or more is only about 75 % of the average population of a village receiving an allocation of less than 100 ha. This figure has been computed based on the

Table 9: Per Capita Allocation under the 4000 m Scenario

Area Allocated for VFM			Population		Area Allocated
ha / Village	Total ha	% of Villages	%	N	ha / person
0 – 100	61,532	59.0	65.7	2,958,217	0.02
100 or more	3,025,751	41.0	34.3	1,541,783	1.96

(based on a total population size of 4.5 million)

The figure of 1.96 ha/person¹⁴ is lower than the area which has been actually allocated under the land-forest allocation program, which is 2.2 ha/person¹⁵. It can, therefore, be concluded that the 4000 meters distance threshold could still be a rather *conservative* scenario and that, depending on local geographic conditions, 5000 meters or more might be considered.

Assuming that the villages can convert the AG into marketable products (timber), and further assuming an average market price of US\$ 150 / m³ of timber, harvesting and transport cost of US\$ 50 / m³, and equal sharing of revenues between villages and government (through tax payments), the 9.8 % of villages which could receive an AG allocation of 100 m³ or more would generate revenues of some US\$ 12.5 million per year, while the 17.0 % of villages which could receive an AG allocation of 50 m³ or more would generate revenues of US\$ 15.3 million per year¹⁶. The majority of these villages (9.2 %, i.e., those receiving an allocation between 100 and 499 m³) would share revenues of US\$10.4 million. A rather tiny proportion of villages (0.6 %, i.e., those receiving an allocation of 500 m³ or more) would receive revenues of US\$ 2.1 million (Table 10).

available population statistics, which match more than half of the villages analyzed here. It has been used as a correction factor to estimate the size of the beneficiary population from the number of villages as follows:

0 – 49 ha: $(59 * 100) / ((59 * 100) + (41 * 75.0)) * 100 = 65.7$

50 or more ha: $(41 * 75.0) / ((59 * 100) + (41 * 75.0)) * 100 = 34.3$

¹⁴ Since the total area involved is rather insignificant, villages which could receive an allocation of less than 100 ha were not taken into account in the calculation of the per capita allocation.

¹⁵ By 1998, the land-forest allocation program had granted rights on 329,689 ha to 24,794 families. Combining this information with the census information that the average family has 6 members, this means a per capita allocation of 2.2 ha (= allocated area / (number of families * family members) = 329,689 ha / (24,794 * 6) = 2.2 ha)

¹⁶ Villages which could receive an allocation of between 25 and 49 m³ were disregarded in the analysis, because VFM in those villages is probably not a profitable concept.

Table 10: Revenues under the 4000 m Distance Scenario

AG Allocation	Total VFM Area ¹⁷			Easily Accessible VFM Area		
	% of Villages	m ³ /year	US\$	% of Villages	m ³ /year	US\$
25 m ³ or more	39.4	737,285	36,864,234	23.2	330,871	16,543,564
50 m ³ or more	30.9	703,324	35,166,212	17.0	306,208	15,310,388
100 m ³ or more	20.5	621,392	31,069,616	9.8	249,955	12,497,739
250 m ³ or more	8.4	391,902	19,595,083	3.1	135,246	6,762,319
500 m ³ or more	2.3	176,804	8,840,196	0.6	42,368	2,118,388
25 – 49 m ³	8.5	33,960	1,698,023	6.1	24,664	1,233,176
50 – 99 m ³	10.4	81,932	4,096,596	7.2	56,253	2,812,648
100 - 249 m ³	12.2	229,491	11,474,533	6.7	114,708	5,735,421
250 – 499 m ³	6.1	215,098	10,754,888	2.5	92,879	4,643,931
500 m ³ or more	2.3	176,804	8,840,196	0.6	42,368	2,118,388

The left half of the table contains an *optimistic* interpretation, which may be realizable only in the future with improved transportation infrastructure, whereas the right half of the table contains a more *realistic* interpretation at present.

Under the *optimistic* interpretation, the total revenue for villages receiving an allocation of 50 m³/year or more (30.9 %) would be US\$35.1 million. The majority of these villages (18.3 %, i.e., those receiving an allocation between 100 and 499 m³) would share revenues of US\$22.2 million. A rather tiny proportion of villages (2.3 %, i.e., those receiving an allocation of 500 m³ or more) would receive revenues of US\$8.8 million¹⁸.

Under the *realistic* interpretation, the total revenue for villages receiving an allocation of 50 m³/year or more (17.0 %) would be US\$15.3 million. The majority of these villages (9.2 %, i.e., those receiving an allocation between 100 and 499 m³) would share revenues of US\$10.4 million. A rather tiny proportion of villages (0.6 %, i.e., those receiving an allocation of 500 m³ or more) would receive revenues of US\$2.1 million.

Government’s total share of revenues from VFM would be US\$15.3 million per year, a figure which would increase as more transport infrastructure is built. This is only the revenue generated from VFM; Government would receive additional revenues from managing the resources which have been identified as GFM. Additional revenues for both the villages and Government would come from village management of areas of productivity class 2, which may have a certain potential for FM but was not taken into consideration in the analysis for the reasons explained above.

It must be highlighted that the above results are determined by the modeling of village boundaries as described in sections 2.1 and 6.1. When implemented through land use planning at the local level, a higher degree of *equalization* would most likely be reached. Therefore, less than 2.3 %, or 0.6 %, of villages would receive an allocation of 500 m³ or more, while more villages would get an allocation between 100 and 499 m³. This would lead to a more even distribution of revenues among villages.

¹⁷ The left half of Table 9 contains an *optimistic* interpretation, which may be realizable only in the future with improved transportation infrastructure.

¹⁸ The absolute magnitude of these revenues is determined by the assumptions made in the model used in this analysis. They may be subject to change in the light of future, more detailed and in-depth knowledge.

SUMMARY

Resources Availability and Accessibility

Only 35.8 % of the country is covered with forests of reasonably high productivity. After deducing areas located on steep slopes and within NBCAs, only 24.8 % or 5.68 million ha, remain as areas potentially suitable for FM. These areas have an estimated total Annual Growth (AG, as defined in this analysis) of about 1.49 million m³/year.

Only about two fifths of the area (1.82 million ha) and one third of the AG (0.43 million m³) suitable for FM are easily accessible – or, in other words, easily exploitable - under *present* infrastructure and transport conditions. The analysis raises concerns about on-going over-exploitation in the designated production forest area, where the Annual Growth is most likely significantly lower than the annual extraction. Over-exploitation appears to be especially serious in those parts of the area suitable for FM that are easily accessible, further compounded by the significant removal of part of the potential for future annual growth through development conversion.

Resource Allocation

A scenario was developed under which all forest areas suitable for FM within less than 4000 meters distance from village locations would be allocated for VFM, all remaining areas for GFM. Under this scenario, 3.1 million ha, or 13.4 % of the country area, would be allocated for VFM, with an average allocation of 1.96 ha per capita, and 2.6 million ha, or 11.3 %, for GFM. However, Government would retain control over more forests of higher productivity. Hence, both VFM and GFM would receive about even shares of the Annual Growth (0.75 million m³/year and 0.74 million m³/year, respectively).

The major part of the area suitable for FM that is easily accessible is in close proximity to villages (1.47 million ha), and would therefore be allocated for VFM under the scenario developed in this analysis. Its AG (0.34 million m³/year) would exceed the average amount of timber harvested from production forests over the past 5 years (0.24 million m³/year). Most of the area and AG for GFM under the scenario developed in this analysis have more difficult access (2.25 million ha). The easily accessible AG for GFM (0.08 million m³/year on 0.35 million ha) would be less than the average amount of timber harvested from production forests over the past 5 years. It can be expected that this is similar under any other scenario permitting extensive VFM. Therefore, government officials focused on short-term revenues may be expected to attempt to keep as much as possible of the easily accessible area under government control, and therefore likely to discourage the concept of VFM.

Significant parts of the AG allocated for GFM, however, which are not easily accessible under *present* transportation conditions (0.65 million m³/year), could be utilized in the future through well-targeted investments in infrastructure and proper forest management.

Regional Differences

The central and southern regions are of major importance for FM. With an AG of 1.18 million m³/year on 4.36 million ha (of which 0.37 million m³/year on 1.54 million ha are easily accessible), more than three quarters of both the area potentially suitable for FM and the AG are located there. The northern region at *present* clearly has the lowest potential for VFM, but it

might have a significant potential for future development in the vast areas of regenerating former shifting cultivation and evergreen shrubland.

Beneficiary Population

A significant part of the Lao population would benefit from Village Forest Management, VFM. At present, revenues of US\$15.3 million could be shared among 17 % of the villages, which would be a significant boost to the rural economy. The more *optimistic*, longer-term perspective indicates that revenues of US\$35.1 million would be shared among 30.9 % of the villages.

Government revenues from VFM, assuming equal sharing of revenues generated from VFM between villages and government, would be US\$15.3 million (*realistic*) or US\$35.1 million (*optimistic*), respectively. On top of that, government would receive the revenues generated from GFM.

Conclusion

The analysis demonstrates clearly that the concepts of VFM and GFM are *not* mutually exclusive. There is plenty of room for both to coexist, taking advantage of their relative comparative advantages in exploiting forests under different location and access characteristics. The next step, for which this analysis might be taken as a point of departure, would be the development of a land use master plan at the national level, which for example would include a refined and more detailed identification of VFM areas versus larger, continuous GFM areas.

REVENUE PROJECTION 2001-2020

Currently resource mobilization arrangements in Lao production forestry are not able to capture the whole value of the resource used. Approximately only 1/3 of the economic value of the logged wood is actually collected by the Treasury and the other 2/3 is lost (*c.f.* Table 19 in Chapter III). Part is lost due to excessive logging waste and never captured, while most is lost due to arrears/non-payment and under pricing. The latter category may not be a loss in the economic sense but presents a loss to the Government and consequently cannot be used e.g. schooling, social programs and other ordinary budget items. Such arbitrary benefit sharing does not fully contribute to national development.

The current forest management system does not support sustainable utilization of the Lao forests and likely leads to declining revenues and continuing misallocation of the revenues. In the coming years most notable decline will be due to the phasing out of logging in infrastructure development sites. Particularly large dam site clearing will cease after NT2 area is cleared. In designated production forests revenues will have a declining trend due to deforestation and degraded forests producing less valuable species.

FOMACOP and LSFP have demonstrated that innovative new approaches in forest management and community participation could reverse the declining trend and introduce sustainability and profitability to commercial forestry in Lao PDR. The country still has— unlike neighboring Vietnam and Thailand – ample forest resource that could, if properly managed, supply the country with constant and increasing revenues.

Fiscal revenue projections demonstrate the likely impact of improved forest management. As a baseline a "business-as-usual"-projection anticipates trends in forestry if no new major changes are made. These revenues were compared to the estimated revenue flow from "improved management"-scenario. This projection was based on extending village forestry and improving the level of forest management in areas under direct GOL management. Revenues and costs under village forestry are shared with the communities involved. Therefore two separate scenarios under improved management were presented: a) gross projection where no revenue/cost sharing were considered and b) a sample revenue sharing scheme of 25% of revenue to VFAs and 75% to GOL and 50% of incremental costs to VFAs and 50% to GOL. The actual revenue sharing will be decided in negotiations between VFAs and GOL and may even differ from one area to another.

There is strong evidence that community based forest management has more efficient incentives and tools for improved forest management and revenue collection than often under-resourced state forest management. The main factors are:

- villagers have better access to the adjunct resource which enables superior monitoring of the forests and their utilisation
- villagers have direct interest in the revenues
- social capital and coherence ensures that officials are likely to protect the interests of the society, the large number of villagers involved hinders corruption

- moving towards sustainable resource utilisation ensures constant or increasing revenue flow both for the communities and GoL.
- low impact logging and local participation will decrease in-forest waste and damage caused to the remaining trees.

Due to the currently unsatisfactory level of revenue collection, village forestry would not only redistribute royalty levels but also increase the total revenue. Assuming that improved forest management and utilisation practices would cut the decline in forest structure and gradually increase average logging, increase royalty levels and, most importantly increase collection rate from current 50% to 80%, village forestry would be a profitable investment also from GOL's fiscal perspective.

GOL revenue projections under improved management and business-as-usual are presented in Table 1, Graph 1 and Graph 2. The projections are based on the following general assumptions (more detailed description in the tables):

Business-as-usual

- separate development site logging phased out by 2006. Some minor land clearing may continue but no new major dam sites will be started.
- after a steady period, deforestation (0.8%/yr.) and degradation cause annual logging to decrease 1.0%/yr.
- average royalty levels decline due to declining log quality and size. O. 10/PM/2000 partly corrects current under pricing
- royalty collection remains low

Improved management

- separate development site logging phased out by 2006. Some minor land clearing may continue but no new major dam sites will be started.
- average logging in production forests first decline due to preparation of management plans and training of VFAs. Later logging increases gradually to 0.25 m³/ha/yr.
- due to competitive bidding, removing market distortions and high quality logs average royalty levels increase gradually to US \$105
- incremental management costs are estimated to be US \$2.5/log-m³ produced
- after a period of institutional restructuring royalty collection gradually reaches 80%.

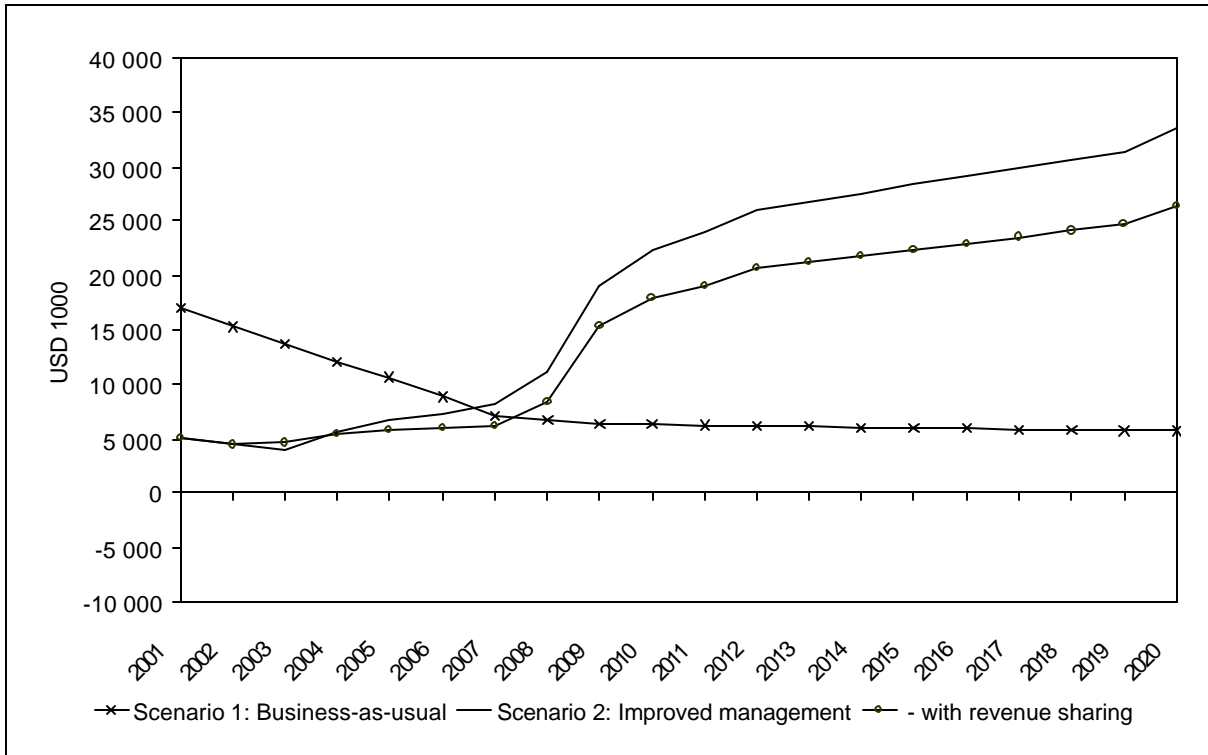
The substantial declines in harvest and revenues as well as higher costs make the net revenues lower in the first years compared to business-as-usual. In total this could be said to correspond to a cumulative investment of US \$40 million spread over a period of six years¹⁹. However, even under these conservative assumptions, investment in village forestry would, in pure fiscal terms, provide an internal rate of return of 17% making it a profitable investment for GOL. Even allowing a 25% share of production forest revenues to be retained by the VFAs and

assuming a 50/50 sharing of incremental management costs the IRR would remain 13%. It needs to be noted that the estimated VFA revenue share is well above that of the VFAs in

¹⁹ In a proper economic or financial analysis this is not an investment. The uncut wood stock could still be logged later. Leaving it unlogged is not a cost; revenues are only rescheduled.

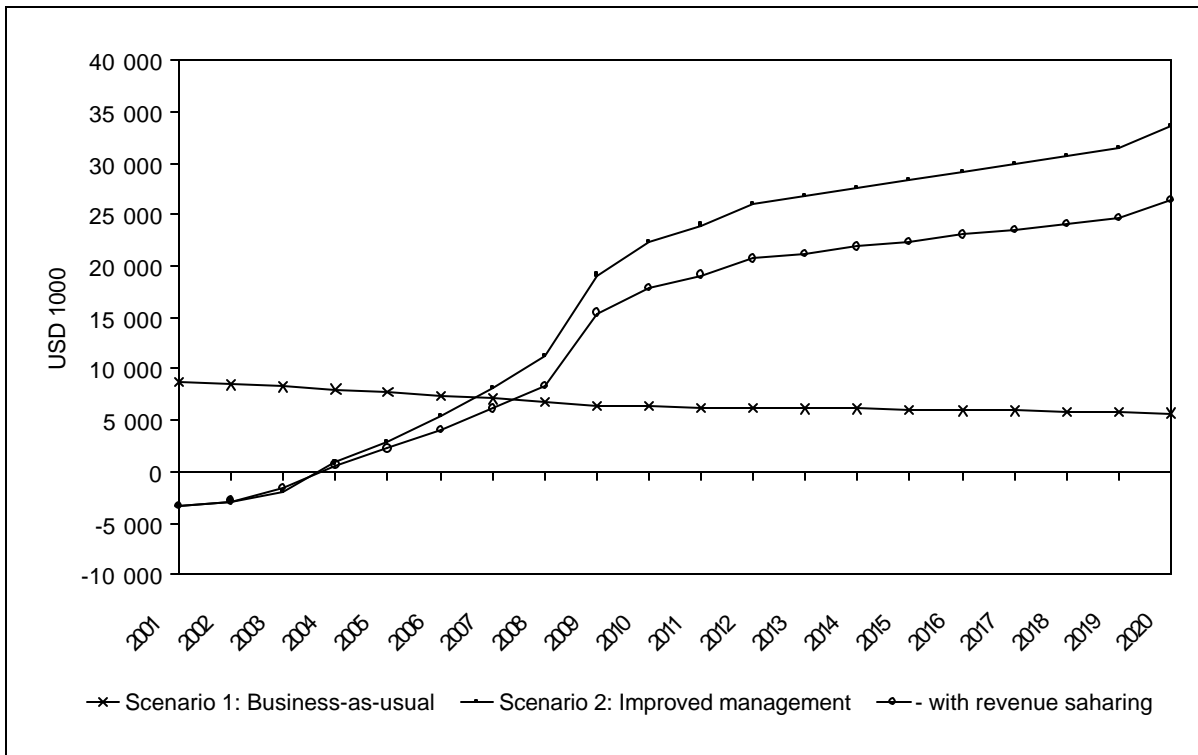
FOMACOP areas are entitled to. In the projection, revenue/cost sharing is estimated to start in 2003.

Graph 1
Fiscal Revenue Flow (2001-2020)



Source: Table 1

Graph 2
Fiscal Revenue Flow (production forests 2001-2020)



Source: Table 1

IRR remains positive even if some assumptions are changed. Sensitivity analysis was made for five cases:

Case 1: Collection rate (row 7 in Table 1) in the Business-as-usual scenario is increased to 70% and in the improved management scenario the range becomes 70-80% (row 15) – the IRR becomes (row 21) 13.1%.

Case 2: Average royalty in production forests remains at USD 78 even under improved management (row 12) – IRR 10.7%.

Case 3: Revenue collection rate reaches only 70% instead of 80% (row 15) – IRR 14.1%.

Case 4: Harvest levels under improved management reach only 0.20 m³/ha rather than 0.25 m³/ha (row 9) – IRR 15.8%.

Case 5: Incremental management costs USD 5/ha (row 17) – IRR 8.7%.

Table 1 Cash Flow Tables

Row	Scenario 1: Business-as-usual	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1: Business-as-usual																					
Production forests																					
1	Net harvest m3/ha	0.120	0.120	0.120	0.120	0.120	0.120	0.119	0.119	0.119	0.119	0.118	0.118	0.118	0.118	0.117	0.117	0.117	0.117	0.116	0.116
2	Production forest area 1000 ha	1 822	1 822	1 822	1 822	1 807	1 793	1 779	1 764	1 750	1 736	1 722	1 709	1 695	1 681	1 668	1 655	1 641	1 628	1 615	1 602
3	Wood production (1000 m3)	219	219	219	219	216	214	212	210	208	206	204	202	200	198	196	194	192	190	188	186
4	Average royalty (USD/m3)	74	72	70	68	66	64	62	60	57	57	57	57	57	57	57	57	57	57	57	57
Infrastructure development sites																					
5	Wood production (1000 m3)	355	295	235	175	115	55														
6	Average royalty (USD/m3)	43	43	43	43	47	51														
Revenue (USD 1000)																					
7	Collection rate	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%
8	Production forests	8 737	8 501	8 265	8 028	7 715	7 406	7 103	6 805	6 400	6 337	6 273	6 211	6 149	6 087	6 026	5 966	5 907	5 848	5 789	5 732
8	<u>Infrastructure development sites</u>	<u>8 243</u>	<u>6 850</u>	<u>5 457</u>	<u>4 064</u>	<u>2 919</u>	<u>1 515</u>														
8	Total revenue	16 980	15 351	13 721	12 092	10 633	8 921	7 103	6 805	6 400	6 337	6 273	6 211	6 149	6 087	6 026	5 966	5 907	5 848	5 789	5 732
Scenario 2: Improved management																					
Production forests																					
9	Net harvest m3/ha	0.077	0.077	0.082	0.110	0.121	0.132	0.143	0.154	0.165	0.176	0.187	0.200	0.205	0.210	0.215	0.220	0.225	0.230	0.235	0.250
10	Production forest area 1000 ha	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822	1 822
11	Wood production (1000 m3)	140	140	150	200	220	240	260	280	300	320	340	364	374	383	392	401	410	419	428	456
12	Average royalty (USD/m3)	78	78	78	78	82	86	90	94	98	105	105	105	105	105	105	105	105	105	105	105
Infrastructure development sites																					
13	Wood production (1000 m3)	355	295	235	175	115	55														
14	Average royalty (USD/m3)	43	43	43	43	47	51														
Revenue (USD 1000)																					
15	Collection rate	54%	57%	61%	64%	67%	71%	74%	77%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
16	Production forests	5 897	6 257	7 090	9 968	12 123	14 551	17 269	20 293	23 638	26 880	28 560	30 610	31 375	32 140	32 905	33 671	34 436	35 201	35 966	38 262
16	<u>Infrastructure development sites</u>	<u>8 243</u>	<u>7 269</u>	<u>6 124</u>	<u>4 808</u>	<u>3 632</u>	<u>1 978</u>														
16	Total revenue (USD 1000)	14 140	13 526	13 214	14 777	15 755	16 529	17 269	20 293	23 638	26 880	28 560	30 610	31 375	32 140	32 905	33 671	34 436	35 201	35 966	38 262
Incremental Costs																					
17	Incremental management cost (USD/ha)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
17	Incremental management cost (USD 1000)	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555	4 555
18	Investment (USD/ha)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5												
18	<u>Total investment (USD)</u>	<u>4 555</u>	<u>4 555</u>	<u>4 555</u>	<u>4 555</u>	<u>4 555</u>	<u>4 555</u>	<u>4 555</u>	<u>4 555</u>												
19	Total net revenue (USD 1000)	5 030	4 416	4 104	5 667	6 645	7 419	8 159	11 183	19 083	22 325	24 005	26 055	26 820	27 585	28 350	29 116	29 881	30 646	31 411	33 707
19b	- from production forests	-3 213	-2 853	-2 020	858	3 013	5 441	8 159	11 183	19 083	22 325	24 005	26 055	26 820	27 585	28 350	29 116	29 881	30 646	31 411	33 707
20	Net change compared to Scenario 1	-11 950	-10 935	-9 617	-6 425	-3 988	-1 502	1 056	4 377	12 682	15 988	17 732	19 844	20 671	21 498	22 324	23 149	23 974	24 798	25 622	27 975
21	IRR (2001-2020)	16.6%																			
Scenario 2 b: Improved management with revenue sharing																					
22	GoL share 75%																				
23	50% incremental costs borne by VFAs from 2003 onwards																				
24	Total revenue (USD 1000)	14 140	13 526	11 441	12 285	12 724	12 891	12 952	15 220	17 728	20 160	21 420	22 957	23 531	24 105	24 679	25 253	25 827	26 401	26 975	28 697
25	<u>Total costs (USD)</u>	<u>9 110</u>	<u>9 110</u>	<u>6 833</u>	<u>6 833</u>	<u>6 833</u>	<u>6 833</u>	<u>6 833</u>	<u>6 833</u>	<u>6 833</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>	<u>2 278</u>
26	Total net revenue (USD 1000)	5 030	4 416	4 609	5 452	5 892	6 058	6 119	8 387	15 451	17 883	19 143	20 680	21 254	21 828	22 401	22 975	23 549	24 123	24 697	26 419
26b	- from production forests	-3 213	-2 853	-1 515	644	2 260	4 081	6 119	8 387	15 451	17 883	19 143	20 680	21 254	21 828	22 401	22 975	23 549	24 123	24 697	26 419
27	Net change compared to Scenario 1	-11 950	-10 935	-9 113	-6 640	-4 741	-2 862	-984	1 582	9 050	11 546	12 869	14 469	15 105	15 740	16 375	17 009	17 643	18 276	18 908	20 687
28	IRR (2001-2020)	12.6%																			

Notes:

Row no.	
1	The average recorded logging of 0.120 m ³ /ha corresponds to the current level of logging outside infrastructure development sites. Forest degradation is estimated to lead to a 0.2% annual decline in average yield.
2	Easily accessible production forest area (see Annex 3). Deforestation is estimated to lead to a 0.8% decline in production forest area.
3	Production forest area * average yield
4	Based on 1997-99 average royalty in production forests. Average royalty rate (also due to degradation) to decline to controlled II category. However O. 10 /PM(negotiations) corrects the under pricing.
5	Development sites phased out in 2006.
6	Based on 1997-99 average royalty in infrastructure development site logging. However O. 10/PM (negotiations) corrects the under pricing.
7	Remains low. 54% based on Annex II. Table 9
8	Revenue actually collected. Management costs not considered (see note on line 17).
9	Average logging estimated to first decline due to "closing" some forests while preparing management plans. Will later gradually increase to 0.25 m ³ /ha. Pukkila (2000) estimates the average sustainable commercial yield in FOMACOP area to be 0.55 m ³ /ha so the national average is a conservative estimate of logging potential in sustainably managed forests.
10	Easily accessible production forest area (see Annex 3).
11	Production forest area * average yield
12	Based on 1997-99 average royalty in production forests. Improved management and operational planning will optimise yield and improve production structure. Additionally, bidding corrects the under pricing.
13	Development sites phased out in 2006.
14	Based on 1997-99 average royalty in infrastructure development site logging. However O. 10/10 (negotiations) corrects the under pricing.
15	Community participation and other changes increase the collection rate gradually to 80%.
16	Revenue actually collected.
17	Community/VFA management is more expensive than the current management system. Management costs are estimated to be USD 2.5/ha higher compared to the current cost level.
18	Modified from FOMACOP data.
19	Total revenue after deduction of incremental costs. 19b only production forests considered. all costs deducted from production forest revenue.
20	Net revenue in/decrease compared to business-as-usual scenario. i.e. net benefit of improved management (net cash flow).
21	Internal rate of return from GoL perspective prior to revenue/cost sharing.
22	From 2003 onwards VFAs would be allocated 25% of gross revenue from production forests.
23	From 2003 onwards VFAs would be responsible for 50% of incremental management costs in production forests.
24	Total gross revenue to GoL (75% of production forest revenue + 100% infrastructure development site revenue from 2003 onwards).
25	Total incremental costs to GoL (50% of production forest costs from 2003 onwards + 100% investments).
26	Total revenue after deduction of incremental costs. 26b only production forests considered. all costs deducted from production forest revenue.
27	Net revenue in/decrease compared to business-as-usual scenario. i.e. net benefit of improved management.
28	Internal rate of return from GoL perspective after revenue/cost sharing.

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