Draft ITTO Guidelines on the Conservation, Management and Sustainable Utilization of Lesser Used Species

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IMPACT OF INCREASED UTILIZATION OF LESSER USED SPECIES
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1.0 INTRODUCTION

1.1 Management and Utilisation of Lesser Used Species (LUS)

The dependence of the tropical timber trade on a few species has resulted in the “creaming” of a few prime species, a reduction in the raw material base and an increase in the cost of sawmilling operations. Consequently, the International Tropical Timber Organisation (ITTO) and Governments of some tropical countries have designed programmes to ensure both biodiversity conservation and expansion of the species base, as well as the greater utilisation of lesser used species (LUS). Within the last few years, ITTO alone has sponsored over 25 LUS-related projects, funding for which has totaled over US $5 million. These projects have aimed at preventing creaming of the few traditional high value species; providing raw material for local processors and ensuring the sustained production and supply of timber.

The introduction of lesser used species (LUS) into the market will expand the resource base and make more raw material available to the timber industry while taking much of the pressure off the few primary species. However, successful expansion of the timber industry through increased LUS supply will be dependent on adequate knowledge of the ecological and socio-economic impact of increased harvesting of LUS. Ensuring that LUS are exploited without jeopardising the integrity of the forest ecosystem remains a challenge to foresters and conservationists.

While numerous studies have investigated the effects of increased intensity of timber harvest from tropical forests, none has considered LUS extraction separately. Thus it is difficult to draw definitive conclusions on the ecological, social and economic impacts of increased harvest of LUS alone. However, it is possible to explore the effects of increased LUS utilisation on the grounds of basic silvicultural reasoning such as:

- Increased utilisation will result in heavier harvesting which may lead to over-exploitation and increased damage to the forest stand. A longer than desired felling cycle may have to be used to restore the forest.
- Alternatively, in forests with low harvesting intensity an increase in LUS utilisation may help open the canopy and promote faster growth of the residual forests.

A major objective of the International Tropical Timber Agreement is diversification of trade in timber species. The importance of species diversification is also emphasized in ITTO’s Action Plans with specific strategy elements in each of the fields of Forest Industry, Reforestation and Forest Management, and Economic Information and Market Intelligence. Accordingly, the ITTO has directly addressed the issue of species diversification through projects and pre-projects which involve the use of LUS.

These “ITTO Guidelines on the Conservation, Management and Sustainable Utilisation of Lesser Used Species” have been drawn up in order to help promote the sustainable management of tropical forest resources. The guidelines have a similar format to, and build on, previously published ITTO guidelines. They are based on reports of field trials in Ghana and study visits to Cameroun, Peru, Brazil, Malaysia and the Philippines. The draft guidelines were also reviewed at a national workshop held in Ghana and the comments from the workshop have been included in this report.

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1.2 Definition of Lesser Used Species (LUS)

There seems to be no generally accepted definition of LUS in the literature. However, the term “LUS” has been defined by ITTO as any timber species which is not endangered, whose utilization has not been restricted in any form, and which possesses interesting characteristics and qualities or has the potential to substitute for traditional timber species. Lesser used species can also be defined as timber species which demonstrate promising market potential. By employing these definitions, we can say that LUS tend to:

- have a harvestable size and form.
- occur over an adequate geographic area and in sufficient harvestable volumes to support commercial utilization and promotional activities.
- possess material properties that would allow it to serve as a substitute for traditional timber species.
- possess adequate properties (i.e., physical, mechanical, and processing) so as to be a suitable raw material for industrial remanufacturing operations.

Several terms that have similar meanings to LUS have been used extensively, for example in Malaysia the term that is most commonly used is under-utilised species (UUS), while in the Philippines it is known as commercially less acceptable species (CLAS). Similar terms and definitions in use include lesser known species (LKS), secondary species, new species (NS) and previously unmarketable species (PUS). These terms may be misleading or differ slightly in their meanings, but for the purposes of this document the term lesser used species (LUS) has been broadly defined to include the above definitions.

The term Lesser Used Species, Lesser Known Species, and Secondary Species are often used interchangeably in the literature and within the timber trade. As far as the timber trade is concerned, the perception of these species is essentially negative in that they refer to all species that are not part of the limited group of traditional timber species upon which the great majority of the international timber trade had been historically based. However, in practice these terms possess slightly different connotations. The term LUS implies that the utilization of the species can be increased through appropriate marketing activities while the term LKS refers to the general lack of knowledge regarding the ecology, properties, utilization, and management of a species. Given that a surprising amount of technical information related to the physical, mechanical, and processing characteristics of these species already exists, the term Lesser Used Species would appear to more accurately describe these species.

Apart from differences in definition there are also differences in the concept and promotion of LUS among the tropical timber producing regions. For example, lesser used species with roughly equivalent properties are usually marketed as a timber group such as red woods or as mixed hardwoods in southeast Asia. However, the marketing of LUS in tropical Africa and tropical America is usually done on an individual species basis. The promotion and marketing of lesser-used species on an individual basis appears to be less efficient and effective than using the timber grouping concept.
1.3 Characteristics and Utilisation of Lesser Used Species

Most LUS occur in relatively low stocking volumes per unit area and include second-growth, small diameter trees that are inherently low in lumber recovery and produce limited volumes of lumber, usually more heavily weighted towards the narrower widths. Many LUS also possess have high sapwood:heartwood ratio, non-durable wood and poor machining and finishing characteristics.

The sustainable utilization of the forest resource, including LUS, has also been hampered by the lack of technical information related to the abundance and distribution of the lesser-used species. There is also the problem of the lack of information about their harvestable volume which is fundamental to the sustainable utilisation of LUS. Lack of information on the marketing of LUS and its associated products is another area that needs more emphasis in order to provide an effective linkage between resource availability, product development and marketing in order to help promote sustainable forest management.

The wood processing technology generally utilized in tropical countries is tailored to large diameter trees and it is poorly suited to the processing of smaller diameter LUS. This contributes to high extraction and processing costs as well as low conversion ratios for LUS compared to the large diameter traditional species. The wood industry is also confronted with technical challenges in the areas of tree identification in the field, timber end-use categorisation and processing efficiency of LUS. Most of the research and databases that have been compiled on LUS are not complete. A comprehensive list of species characteristics is critical for sustaining the timber trade and ensuring its sustainability.

1.4 Incentives for LUS Utilisation

Within the context of the discussion on the more efficient utilization of LUS as a component of sustainable forest management, incentives can be described any form of inducement which will encourage the timber industry to efficiently and cost effectively harvest, process, and market LUS. Equally important is the fact that incentives can be targeted to encourage importers to promote LUS to their industrial customers. Incentives to promote the more efficient utilisation of LUS can take various forms, including favourable export policies, low stumpage prices, monetary grants, low interest loans or credit facilities, and support for marketing activities that encourage the trial and adoption of LUS. However, incentive programmes aimed at ensuring competitive prices and promoting market acceptance are only one component of a comprehensive strategy aimed at encouraging the more efficient utilization of LUS as a component of a sustainable forest management programme.

Policy incentives designed to support the introduction of LUS should be formulated in consultation with the timber industry and local communities. For example, policy incentives might target specific industry segments and identify a range of incentives to encourage the trial use of LUS within the targeted industry segments. Other activities that might be supported by policy incentives include the development of extension, technical training, research programs and institutional capacity building.

To ensure that any policy incentives implemented achieve their targeted goals, it is
important that they are appropriate, focused, and effectively administered. The mix of policy incentives proposed depends to a large extent on the country in question and industry segments being considered. For incentives to be effective, there is also the need to consider the socio-economic and cultural characteristics of the target beneficiaries and markets during the development of the incentive programme. Ideally, LUS incentive policies should incorporate the information derived from a preliminary baseline study of the forestry sector designed to characterize the forest resource and specific the occurrence, type, and distribution of LUS, the processing capability of the forest products sector, and the potential market opportunities for LUS.

1.5 Promotion and Marketing of LUS

In order to assure that adequate supplies of LUS are available for processing, adequate market outlets must be assured. The increasing scarcity and rising prices of timber derived from the traditional timber species, coupled with new log processing technologies, has begun to facilitate the substitution of LUS for the less available, higher priced traditional timber species.

Manufacturers in developed countries are beginning to look towards lower cost LUS as substitutes for traditional timber species. The involvement of manufacturers in the promotion of LUS is essential for the success of any marketing strategy to increase market acceptance. This is because the process of defining and classifying property requirements for end-use is as significant for the producer as for the manufacturer. It is only after the producer understands the raw material end-use requirements of the manufacturer that they can identify and supply an LUS that meets those requirements.

Promotional activities for LUS should be directed towards those manufacturers who display the greatest propensity for trying and adopting LUS. A well designed and effective marketing strategy is essential in influencing the perceptions of potential manufacturers regarding the acceptability of LUS. These favourable perceptions can in turn lead to increased market acceptance for LUS over a shorter time period.

Tropical timber producing countries need to undertake vigorous product development and promotional activities based on the information derived from targeted industrial market research studies. Detailed segmentation analysis of wood manufacturers in developed countries has the greatest potential to support the development of effective marketing strategies and would provide critical support in defining the specific material properties (in both qualitative and quantitative terms) that are required for specific end-use applications.
2.0 STRATEGIES AND ACTIONS

2.1 Strategies
Management activities in many tropical forests have traditionally focused on promoting the growth and yield of the traditional species. As a result, the objectives of biological diversity and species conservation within the context of sustainable forest management have been difficult to achieve. In the future, the forest management practices of tropical timber producing countries must focus on ensuring the sustainable utilisation of all forest resources irrespective of their current economic value. In line with this objective there should not be specific management plans or systems for LUS alone since it is likely that such a system could lead to a reduction in the diversity of plant and animal species occurring naturally in the permanent forest estate.

It is generally accepted that the future supply of timber from tropical forests is inextricably tied to the more efficient utilization of LUS. Increased international acceptance of LUS will provide new opportunities, incentives, and income to forest managers thereby promoting the opportunities for successfully implementing sustainable forest management practices. This is partly attributable to the fact that increased harvesting of LUS invariably leads to increased income; part of which can be invested in the development and implementation of sustainable forest management techniques.

Increased utilisation of LUS can be achieved through a vigorous promotion and marketing strategy involving both end-users and timber producers. The promotion strategy should initially target the domestic markets, since they often accept lower quality standards of cutting and processing. Later, as manufacturers become more familiar with the processing of LUS and their in-service performance, those LUS that exhibit the highest market potential can be targeted for export market development activities.

The promotion and marketing strategy should be based on similarity of characteristics and end-use categorisation. The end-use classification concept, which has one of the greatest potentials for marketing LUS, identifies the important properties (in both qualitative and quantitative terms) to facilitate the efficient grouping of species for specific end-use applications. The classification of both traditional species and LUS based on potential end-uses, with species specific technical information being made widely available to manufacturers, would support the introduction of LUS as substitutes for higher priced traditional species. This process would improve the market acceptance of LUS, promote the development of sustainable forest management practices as well as the more efficient utilisation of the forest resource.
2.2 Actions
The range of actions that forest managers in tropical timber producing countries need to consider in order to promote the more efficient use of LUS as a component of sustainable forest management include: 1) policy and legislation considerations, 2) environmental considerations, 3) social considerations, 4) economic considerations, 5) technological considerations, 6) marketing considerations, and 7) product development considerations.

2.2.1 Policy and Legislation
Develop a collaborative approach to policy formulation at the local and national levels.

Formulate policies which facilitate the conservation and sustainable utilisation of LUS as a component of an overall sustainable forest management strategy.

Develop mechanisms leading to the sustainable utilisation of all potentially usable and commonly available forest species by the timber industry.

Make provision for the periodic review of policy and legislation.

2.2.2 Environmental Considerations
Establish linkages between the natural sciences (e.g., ecology and silviculture), wood science and technology, and forest products marketing disciplines.

Study the effects associated with the increased utilisation of LUS on microclimates, nutrient cycling, mortality and natural regeneration.

2.2.3 Social Considerations
Develop LUS utilisation programmes that take into consideration the needs of the timber industry and local communities who are dependent on the forest for their livelihood.

Stimulate the economies of local communities through greater access to the economic benefits derived from the increased utilisation of LUS and other non-traditional forest products, including increased stumpage royalties, access to new employment opportunities, and awareness of environmental issues.

Promote policies that do not contribute to increased social bias in resource use and consumption.

Minimise the negative impacts (including environmental, economic, and social) associated with the increased utilisation of LUS. Generally, increased harvesting of LUS results in both winners and losers. The winners are operators in the export market, forestry workers, traders in wood products, and producers of fuelwood and charcoal. The winners remain unaffected by the loss of other functions of the resource. The losers on the other hand are people whose domestic use rights with respect to food, health and shelter are diminished through the increased unsustainable harvesting of LUS.

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2.2.4 Economic Considerations

Develop a promotional strategy for LUS that incorporates the following components:

- adoption of foreign exchange regime conducive to long term development of LUS on the international market;
- large scale production of sawn timber;
- simultaneous development of industrial integration, placing emphasis on secondary or value-added processing industries.

Develop programmes to improve the economic pricing of secondary processing industries.

Improve the efficiency of LUS harvesting and processing operations in order to maximize employment opportunities and increase profitability.

Introduce efficient processing technology in order to improve the productivity of capital employed in the wood industry.

Develop investment profiles based on alternative technology and processing that will support improved financial and economic returns.

Emphasize value-added processing of LUS.

Integrate primary and secondary processing industries for greater efficiency.

2.2.5 Technological Considerations

Assemble and compile technical information on LUS in tropical countries.

Collect and collate information on the properties and uses of LUS which might be of use as industrial wood either in local or export markets.

Determine the basic and technical properties (physical, mechanical, processing, and finishing characteristics) of selected LUS and disseminate information to end-users.

Develop a field and laboratory guide for the easy identification of LUS trees and wood.

Develop an efficient and cost effective computer-based yield allocation and species selection process from different producing areas for a number of end-uses.

2.2.6 Promotion and Marketing

Promote local demand and marketing of LUS.

Provide market information to producers and potential end-users of LUS.

Identify the factors that either promote the acceptance of LUS or restrict their acceptance in key markets.

Explore opportunities to promote the increased use of LUS in new markets and end-use applications.
2.2.7 Product Development

Improve the level of technological knowledge in lumber companies to enhance the quality and productivity in industrial processing operations.

Study the range of products that can be developed from individual LUS, assess market potential for these products, and manufacture prototypes of those products that exhibit market potential.

Develop training, educational programmes and research activities which are targeted at improving the efficiency of the domestic timber industry.

Develop training programmes aimed at providing domestic manufacturers with new product design expertise.
3.0 POLICY AND LEGISLATION

Forest policy and planning are conducive to the sustainable management and utilisation of forests. However, forest policy is constantly changing and affecting the capacity of the forestry sector to respond to the challenges of sustainable forest management. This change may require action to strengthen the process of policy formulation at the local and national levels to make it more focused and responsive to the needs of the forestry sector and local communities.

Most national forest policies focus on ensuring the availability of wood supplies while paying little attention to the relationship between industrial timber production, sustainability, and local communities. There is a need to recognise the value in bringing forest dependent communities into the forest policy-making process in order to make them the real stewards of forests.

Principle 3.1

Forest policy and planning agencies responsible for the management and sustainable utilisation of LUS need to be responsive to the values, needs and aspirations of forest dependent communities at the local and national levels. The policy development process should recognise the role of local communities and guarantee their domestic use rights concerning LUS and other forest resources.

Principle 3.2

Sustainable utilization of LUS requires that national policy measures ensure effective forest management leading to the continuous supply of forest products for industrial development, human welfare, and maintenance of ecosystem productivity.

Recommended Action 3.2.1

Develop national forestry development plans that provide the framework for sustainable forest management such that:

- the needs and concerns of local communities are taken into consideration in the development of forest policies.
- provisions are made for regular policy revisions, based on the results of new scientific and technical information and stakeholder expectations.

Principle 3.3

Implement legislation to reduce the unsustainable harvest of traditional timber species by providing incentives that promote the utilisation of LUS as a component of a sustainable forest management policy.
**Recommended Action 3.3.1**
Develop the capacity of forestry sector agencies and the timber industry to
- perform a comprehensive forest inventory assessment,
- manage and sustainably utilise LUS,
- successfully promote LUS in domestic and international markets, and
- ensure the protection of critical sites and promote the preservation of social norms and values.

**Principle 3.4**
Forest policies must seek to support fair timber prices and facilitate the introduction of LUS in domestic and international markets. Policy mechanisms should also provide incentives to make LUS utilisation attractive to the domestic and international timber industry.

**Principle 3.5**
National forest legislation must provide adequate support to policies that promote the sustainable utilisation and management of LUS. Effective regulations and laws must provide for the protection of the permanent forest estate to ensure a sustainable supply of forest products.

**Recommended Action 3.5.1**
Revise existing forest and environmental laws and regulations at the local and national levels to ensure the sustainable management of forest resources, including LUS, and the equitable distribution of the economic benefits derived from the forest.

**Recommended Action 3.5.2**
Disseminate widely, the laws and regulations that protect and sustainably manage all forest resources, so that communities, government and private sectors can understand, accept, implement and support the sustainable management of LUS.
4.0 ENVIRONMENTAL CONSIDERATIONS

The promotion and increased utilisation of LUS will have positive and negative impacts on the environment. The effects of these impacts have to be considered, particularly any adverse impacts, to forestall possible deleterious consequences. Care should be taken to ensure that the human disturbances associated with the increased utilisation of LUS do not diminish the long-term capacity of forest ecosystems within the permanent forest estate to provide a sustainable supply of forest products or to maintain their ecological functions.

Principle 4.1
The utilisation of LUS will generate increased impacts on the environment, particularly on vegetation and soil, stream flow, nutrient budget, erosion, and sedimentation. National forest management plans should reflect these consequences in the allocation and determination of allowable cuts.

Recommended Action 4.1.1
Identify and study the potential impact of the increased utilisation of LUS on forest soils, water, and fauna and develop mitigative strategies for these negative impacts.

Principle 4.2
The increased utilisation of LUS must not result in the degradation of the permanent forest estate and harvested forests should be replanted and restored after harvest operations using appropriate silvicultural treatments.

Recommended Action 4.2.1
Avoid the use of inappropriate harvesting practices and equipment which are likely to have an unreasonably high impact on soil, water and residual forests.

Recommended Action 4.2.2
Allocation of contracts for the harvest of tropical forests should be linked to the completion of Environmental Impact Assessments (EIA’s). Forestry agencies must specify the conditions under which an EIA will be performed as well as the conditions under which logging operations must comply. A protocol for the execution of EIA’s must be provided to ensure that effective implementation is guaranteed.
Principle 4.3
Natural forests are susceptible to environmental degradation following severe logging activities and therefore reduced impact logging techniques must be utilized in forests where excessively negative environmental impacts can be expected to occur.

Recommended Action 4.3.1
Institute efficient harvesting control measures to reduce the impact of logging operations on the environment and minimize the generation of logging residue.

Principle 4.4
The utilisation of LUS will increase harvest volumes as the number of species harvested increases. Harvest volumes should be conditioned by sustainable levels of yield.

Recommended Action 4.4.1
Conduct studies of the wood processing industry to determine the potential to efficiently process increased harvest volumes, including logging residues. Encourage the wood processing industry to integrate logging residues into their raw material mix.

Recommended Action 4.4.2
Determine the sustainable harvest volume for individual forest concessions and require that timber companies operate within those levels.

Principle 4.5
Increased utilisation of LUS will lead to a larger number of timber species being exploited, which could have a negative impact on the conservation of biodiversity. Reforestation, and where necessary, restoration of logged over areas will be necessary following harvest operations within the permanent forest estate. Any management intervention must give particular consideration to the preservation of rare, threatened and endangered species, the restoration of stocking levels of over-exploited tree species, and the maintenance of genetic diversity within naturally occurring species.

Recommended Action 4.5.1
Harvesting of LUS can result in a reduction in species diversity (both flora and fauna) occurring naturally in the permanent forest estate.

Principle 4.6
Current harvesting practices are focused on a relatively small number of traditional timber species. Increasing the number of LUS harvested, and the volume of timber derived from LUS, will help to ease the pressure on the traditional timber species, thereby helping to promote their conservation.
Recommended Action 4.6.1
Develop biodiversity conservation strategies aimed at reducing deforestation, achieving sustainable forest management, and strengthening the capacity of forestry sector agencies to effectively monitor and regulate the increased utilisation and conservation of LUS.

Recommended Action 4.6.2
Develop programmes aimed at identifying unique national resources where biodiversity conservation is required.
5.0 MANAGEMENT CONSIDERATIONS

Maintaining a sustainable supply of LUS to satisfy market demands is dependent on the efficient management of the forest resource. In general, the sustainable management of LUS must be based on a clear statement of the objectives of sustainable forest management, the extent of the forest resource, and adequate planning and control of harvest operations to ensure sustainable production. This should be without prejudice to biodiversity conservation. Management systems should seek to supply LUS in perpetuity at sustainable levels for the purposes of maximising social, economic and environmental benefits.

Principle 5.1
Proper planning of forest operations will enhance the sustainable production of LUS and ensure that the resource is not over-exploited. Planning and control of timber harvest operations should be based on adequate knowledge of the stocking levels and distribution of LUS within the permanent forest estate. Knowledge of forest ecology and species dynamics constitute an essential component of sustainable management planning, with the long-term objective of guaranteeing that forest removals are balanced by growth, while at the same time ensuring biodiversity conservation.

Recommended Action 5.1.1
Formulate forest management prescriptions based on

- clearly stated objectives for the sustainable management of LUS within the permanent forest estate.
- availability of national statistics on stocking, growth, demand and supply of LUS to facilitate the planning and control of management and harvest activities. Data collection on LUS should be integrated with biodiversity surveys and monitoring systems as a component of a routine sustainable forest management plan.

Recommended Action 5.1.2
Ensure adequate forest planning and implementation capacity at all administrative levels to promote the integration of LUS within the context of a sustainable forest management plan.
Recommended Action 5.1.3
Prescribe the annual allowable cut (AAC) to include LUS to ensure sustainable timber production. Annual allowable cut from the permanent forest estate need to be set conservatively until sufficient and reliable information on LUS dynamics becomes available.

Principle 5.2
The development and implementation of an effective LUS management plan within the framework of a sustainable forest management plan is necessary to ensure the sustainability and conservation of LUS.

Recommended Action 5.2.1
The harvest of LUS within the permanent forest estate should be covered by a sustainable forest management plan that provides:

- the framework and establishes the linkages between the various components of the sustainable forest management system.
- for silvicultural systems that ensure the successful regeneration of both traditional timber species and LUS.
- for harvest controls and yield regulation.
- for an appropriate re-entry period into any permanent forest estate following logging to minimise damage to the growing stock and other forest systems as a result of timber harvesting activities.

Principle 5.3
Monitoring of timber harvest operations are necessary to ensure the effective implementation of the sustainable forest management plan and the achievement of management objectives. Appropriate monitoring mechanisms must be implemented to ensure that the objectives of the sustainable forest management plan are adhered to.

Recommended Action 5.3.1
Provide mechanisms for the regular monitoring of performance and, where necessary, implementation of corrective actions.

Principle 5.4
Develop forest management systems that promote a balance between timber harvesting (including LUS utilisation) and other forest uses to ensure that the benefits derived from the forest are optimised in a sustainable manner.
6.0 TECHNICAL CONSIDERATION

Though a vast number of lesser used (but potentially useful) timber species occur in tropical forests, only a relatively small number of species are typically harvested for a variety of reasons. The factors that are most often cited as restricting the utilisation of LUS include: a lack of technical information, the limited availability of LUS supply, low recovery volumes from smaller diameter LUS during processing, and resistance of end-users to using LUS in place of the traditional species with which they are more familiar. The lack of technical information is particularly problematic because this information is a fundamental requirement for processors who are considering using an LUS as a raw material. The scope of requisite technical information encompasses both the manufacturing process as well as in-service characteristics. Without accurate information about the physical, mechanical, processing, and finishing characteristics of LUS, there is little chance of successfully developing markets for them.

6.1 Physical and Mechanical Properties

Principle 6.1
The physical and mechanical properties of wood play an important role in the decision to use an LUS as a substitute for an established species. If LUS were classified based on their properties and appropriate end-uses, and the technical information provided to potential end-users, there is a better chance that some LUS would gain acceptance as suitable substitutes for traditional species.

Recommended Action 6.1.1
Develop technical information to facilitate the classification of LUS based on potential end-use applications.

Recommended Action 6.1.2
Compile information on the biological, physical, mechanical, processing, and finishing characteristics of LUS and make this information readily available to end-users.

Principle 6.2
There is a lack of technical information for many LUS and even when available this information is often incomplete and insufficient to encourage utilisation and support effective promotion activities. The forest products industry is confronted with technical problems in the areas of field identification, end-use categorisation and the processing characteristics of LUS.
**Recommended Action 6.2.1**

Develop manuals for laboratory identification and utilisation of LUS based on their properties and update periodically.

Evaluate the physical and mechanical properties of commercially viable LUS. Develop brochures of technical information for individual LUS and make them widely available to the local processors and timber importers and their customers.

**6.2 Processing Techniques**

**Principle 6.3**

The efficient recovery of lumber from LUS depends to a large extent on the use of suitable machinery and the knowledge of the machining characteristics of each species. It is essential to understand the appropriate cutting patterns in order to maximize lumber and veneer recovery from smaller diameter LUS logs.

**Recommended Action 6.3.1**

Evaluate the processing characteristics of LUS to enhance their utilization and market acceptance.

**Recommended Action 6.3.2**

Promote the downstream processing of LUS into value-added products which provide the best opportunities for their utilisation.

**Principle 6.4**

The processing techniques and the skill of sawmill operators greatly influence the recovery and utilisation of LUS. The concept of best opening face and the use of thin-kerf saw blades to maximize lumber recovery from smaller diameter LUS need to be explored and adapted to tropical conditions.

**Recommended Action 6.4.1**

Determine factors that influence the lumber and veneer recovery rates from LUS to maximise production efficiency.

**Recommended Action 6.4.2**

Promote industry practices that improve lumber and veneer recovery rates to encourage the efficient utilisation of LUS.
Recommended Action 6.4.3
Upgrade the technical skills of workers in logging, sawmill, and veneer operations to facilitate increased production efficiency and minimize waste production.

Principle 6.5
Lumber and other wood products that are not properly seasoned or preserved are susceptible to insect and fungal attack. Drying defects such as checking and warping can be controlled if lumber or wood products are kiln dried. Kiln drying and wood preservation are therefore critical to the efficient utilisation of LUS and are important factors influencing the marketing of LUS.

Recommended Action 6.5.1
Develop suitable drying schedules for lesser used species.

Recommended Action 6.5.2
Encourage the use of environmentally safe and effective wood preservatives and preservation techniques.

6.3 Product Development

Principle 6.6
The timber industry in many tropical countries is largely dependent on the export of logs largely due to the high capital expenditures required to establish and operate manufacturing operations relative to that required to support log exports. The preference of the forest products industry for log exports may also be due to the fact that the net value added through additional processing is lower than the additional expenses incurred. As a result, it is often more profitable to export logs relative to processed wood products in many tropical countries. The manufacture of wood products, whether primary or value-added, is dependent upon several factors: availability of trained workers, access to appropriate processing technology, implementation of effective quality control measures, and access to timely and accurate market information. In addition, the manufacture of value-added wood products also requires the development of product design capabilities and/or the development of strategic partnerships with manufacturers in the target market. Manufacturers need to develop their manufacturing capabilities strategically by manufacturing products for the domestic market before entering more quality conscious export markets or by manufacturing components for export before manufacturing final products.
**Recommended Action 6.6.1**
Identify the appropriate products that can be manufactured from specific LUS. Develop the capacity of the timber industry to manufacture components and finished products from LUS.

**Recommended Action 6.6.2**
Provide economic incentives aimed to help re-tool the timber industry to support the efficient processing of LUS and increase the quality of manufactured products.

**Recommended Action 6.6.3**
Develop training programs to provide workers with the knowledge and skills required to increase labor productivity and efficiency in the wood processing industry.

**Recommended Action 6.6.4**
Improve the level of quality control in the wood industry to enhance product development and manufacturing productivity in the industrial utilisation of LUS.

**Recommended Action 6.6.5**
Encourage the timber industry to move towards the value-added processing of wood to increase mill efficiency.

**Recommended Action 6.6.6**
Standardisation of wood products is essential for the quality control of products for the market. Acceptable standards should therefore be developed to guide LUS product development.

**Recommended Action 6.6.7**
The testing of wood products should be based on internationally accepted standards.

**Recommended Action 6.6.8**
Develop long-term programmes aimed at stimulating and promoting the production, utilisation, and trade of lesser-used timber species on a sustainable basis.

**Recommended Action 6.6.9**
Develop training and educational programmes targeted at the timber industry and aimed at enhancing new product development.
7.0 PROMOTION AND MARKETING CONSIDERATIONS

The acceptance of LUS will be strongly influenced by a guaranteed resource supply and the availability of markets. The growing scarcity of traditional high valued species coupled with more efficient technologies in log processing will promote the substitution of LUS for the traditional species.

Sustainable utilisation of LUS can be supported through the development of effective marketing strategies. Specific promotional strategies developed for individual industrial market segments aimed at encouraging the substitution of LUS for more traditional tropical hardwoods are important. Equally important to the successful introduction of LUS is the recognition that not all end-users have the same trying and adopting an LUS. As a result, promotional strategies should be targeted towards those individuals who are judged to be most likely to try an LUS.

7.1 Promotion of Lesser-Used Species

Principle 7.1
A well designed and effective promotion strategy can favourably influence the perceptions of potential end-users towards the new species being introduced, contributing to an increased level of market acceptance for the new species over a shorter time period. Promotional activities for LUS should be directed towards those customers who demonstrate the greatest probability of adopting the new species.

Principle 7.2
Manufacturers are becoming more receptive towards the utilisation of LUS in response to the decreasing supply ands increasing price of the more traditional species. The involvement of producers and manufacturers are essential for the success of any promotion strategy. This is because the process of defining and classifying the wood characteristics required for a particular end-use is as significant to the producer as for the manufacturer.

Recommended Action 7.2.1
Target promotional activities for LUS towards those customers who demonstrate the greatest probability of trying the new species.
Principle 7.3
Effective promotional strategies for LUS should be primarily targeted at “niche creation”; the development of new products that can be manufactured competitively in producing countries. Niche creation can facilitate the introduction and acceptance of new LUS products. Products from LUS can find their own niche in the market place if effectively promoted. However, the range of products from LUS has not been studied in any detail, making their promotion difficult.

Recommended Action 7.3.1
Initially focus marketing activities for LUS within the domestic market because of the less stringent demands on quality standards of cutting and grading. Longer term marketing activities can look towards developing export markets as the manufacturing technology advances and a wider range of export quality wood products become available. The initial development of the domestic market is likely to result in the increased utilisation of LUS.

Recommended Action 7.3.2
Organise periodic fairs and wood shows to promote LUS in the domestic and international markets.

Recommended Action 7.3.3
Disseminate technical information on LUS and potential end-use applications widely and provide easy access to the available technical information on LUS.

Principle 7.4
Manufacturers often prefer medium density species which are straight grained, machine easily, and dry with little defect; this is why the traditional species have done well. Promotion of LUS should initially focus on those species which have properties similar to the traditional timber species.

Principle 7.5
End-use categorisation based on individual industrial market segment studies has the greatest potential for promoting LUS. The end-use classification concept defines significant properties of species in qualitative and quantitative terms for each type of end-use application. Species with similar properties can be grouped and marketed towards a specific end-use. Marketing by way of end-use categorisation has the added advantage of ensuring that the LUS will perform well in service, thus increasing the chances that it will be adopted by manufacturers.
Recommended Action 7.5.1
Adopting a strategy of promoting and marketing groups of LUS based on the similarity of their technical characteristics and end-use applications will increase the efficiency of utilizing LUS.

Recommended Action 7.5.2
Marketing studies on LUS must be properly designed and implemented so as to provide the requisite information to facilitate the development of effective marketing strategies.

Principle 7.6
The growing scarcity of traditional or high value species coupled with advanced technologies in log processing, can facilitate the introduction of LUS as substitutes for the traditional timber species. Substitution of traditional timber species by LUS can be promoted through the creation of promotional strategies that make end-users aware of the new species, their end-use applications, and that identify specific traditional species for which the LUS can be used as a substitute.

Recommended Action 7.6.1
Undertake extensive public education programmes targeted towards the wood processing industry and end-users regarding the utilisation of LUS and prospects for substitution for traditional species.

7.2 Marketing of LUS

Principle 7.7
There is a general lack of information on the marketing of LUS and the products manufactured from them. The provision of information on which to formulate marketing strategies is needed in order to promote sustainable forest management by providing effective linkages between resource availability, product development, and marketing strategies.

Recommended Action 7.7.1
Conduct baseline studies which identify the production systems and market opportunities for LUS.
Recommended Action 7.7.2
Initiate studies to help identify the potential and limitations of LUS production and marketing. These studies should aim at helping design appropriate and viable marketing strategies for the long term, to make LUS utilisation attractive to the timber industry.

Principle 7.8
High development costs are often incurred in the marketing and introduction of LUS. These costs, which are usually internal to the timber industry, but whose benefits are shared by all, arise from basic research, promotional activities, and product development trials.

Recommended Action 7.8.1
Identify cost effective marketing and promotional strategies.

Recommended Action 7.8.2
Identify financial incentives to help support the marketing activities required to successfully introduce an LUS into the market.

Principle 7.9
LUS will have greater market acceptance if they are identified as substitutes for specific traditional species. The emphasizes the importance of identifying an effective system for identifying LUS substitutes for specific traditional timber species with similar characteristics. The use of trade names to reflect the association between the LUS and a traditional timber species can help promote the market acceptance of the LUS.

Recommended Action 7.9.1
Grouping of LUS by specific end-use applications can be considered when the limited supply of individual species is likely to restrict their market acceptance and where they can be shown to possess similar technical properties.

Recommended Action 7.9.2
Classify LUS by relating individual species with the traditional species and end-use applications for which they can be substituted.

Recommended Action 7.9.3
Develop trade names to reflect the name of the traditional timber species being substituted to help promote LUS acceptance.
**Principle 7.10**
Discriminatory timber classifications affect the promotion of LUS. Timber classifications based on end use applications would facilitate the more effective marketing of LUS.

**Recommended Action 7.10.1**
Review timber species classification that may discriminate against LUS.

### 7.3 Incentives for Utilisation of LUS

**Principle 7.11**
Incentives to promote LUS production and utilisation can take a variety of forms. These may include favourable policies, monetary grants, low interest loans, or credit facilities. For incentives to achieve their desired goals, it is important that they are appropriate, targeted, and effectively administered.

**Principle 7.12**
LUS production and promotion involves investment in both capital expenditure and capacity building. Consequently, easy access to some form of financial incentives to the industry in the form of lower royalties, tax rebates, or improved market access can make the processing of LUS more attractive.

**Recommended Action 7.12.1**
Initiate incentive programmes aimed at ensuring fair resource prices for LUS in order to encourage the timber industry to utilise LUS.

**Recommended Action 7.12.2**
Develop mechanisms to promote fair pricing and market access for LUS products.

**Principle 7.13**
Promote the increased utilization of LUS in accordance with national economic development policies, and an adoption of a foreign exchange regime which is conducive to long term development of LUS on overseas markets. This will sustain increased production levels.
Recommended Action 7.13.1
Formulate policy incentives on LUS in consultation with the timber industry and local communities. Policy incentive programmes should identify the appropriate categories of LUS production lines and the type of incentives required to adequately support each category. Other areas that policy incentives should address are the development of extension and research programs, manpower development and institutional capacity building for LUS production.

Principle 7.14
The type of incentive package developed depends very much on the target group. This calls for thorough knowledge of the socio-economic and cultural characteristics of the target beneficiaries and markets.
8.0 SOCIO-ECONOMIC CONSIDERATIONS

Lesser Used Species make important contributions to the domestic economy. They are processed as charcoal and fuelwood for both domestic and commercial purposes and have often been used traditionally as building and construction materials. Some LUS have medicinal properties and constitute essential components of the health treatment for some rural communities.

Increased commercialization of lesser used species has had both positive and negative impacts on rural communities. The positive impacts include an increase in jobs and rural family income levels which are defined to include forest revenues, royalties, and raw materials supply. The negative impacts include threats to fragile habitats and increased access to forest resources leading to increased degradation of the forest environment.

The prime economic objective of the promotion and marketing of LUS is to strengthen the capacity and provide the necessary fiscal and policy incentives to enable the log processing industry to produce quality wood products in adequate quantities to capture or supply the growing market. Processing or converting LUS into desirable products may mean the utilisation of a mixture of species in the conversion process. This is because many LUS are not available in sufficient quantities to justify harvesting. Unit production costs may also be affected by smaller production runs, higher inventory costs, additional sorting requirements, and more complicated production controls.

8.1 Social Considerations

Principle 8.1
The utilization of LUS should not only meet commercial objectives, but should form an integral part of community development, working to enhance local economies. The indigenous people are dependent of the forest for their food, medicinal and energy needs. However, the increased utilization of LUS can disrupt or disregard local claims and needs for the forest, and local people are often arbitrarily displaced or unnecessarily disadvantaged. This has been a source of conflict between the local communities and timber companies in the past.

Recommended Action 8.1.1
Develop mechanisms for long term consultation with local communities based on existing local norms and procedures.
**Recommended Action 8.1.2**
Collect information on the importance of LUS in the socio-economic development of the local community to support the formulation of effective policies on LUS utilisation.

**Recommended Action 8.1.3**
Conduct studies into the possible effects of increased harvesting of LUS on various stakeholders in local communities and incorporate local people’s perspectives in forest management plans.

**Principle 8.2**
The cultural and traditional rights of local communities relating to their use of forest resources, including LUS, should be respected and guaranteed provided that such uses do not diminish the long-term capacity of the forest to sustainably provide products and services. The domestic use rights of members of local communities to enter the permanent forest estate and harvest forest products should not be adversely affected by the increased utilisation of LUS.

**Principle 8.3**
There may be competing or conflict uses of LUS between local communities and timber companies. These conflicts can lead to local people being denied the right of access to obtaining the LUS to meet their food security or satisfy their energy, constructional and medicinal needs. A situation like this may worsen rural poverty and create unnecessary social tension.

**Recommended Action 8.3.1**
Plan logging operations to avoid the destruction of major species that are significant in the socio-economic development of the rural people. Harvest plans should be developed based on the species requirements of local people.

**Recommended Action 8.3.2**
Promote participatory forest management in order to incorporate the needs of local communities in the conservation and utilization of natural forests.

**Recommended Action 8.3.3**
Develop forest resource accounting procedures and laws, regulations and/or codes of practice for forest operators to ensure that forest managers take community needs and aspiration into consideration when preparing yields for timber harvest operations.
Principle 8.4
Indigenous knowledge about LUS is essential in determining the potential commercial value of species and the domestic market for those species. Indigenous knowledge is a key element of the social capital of the poor and their main asset to invest in the struggle for survival, to produce food, provide shelter, energy and medicine. It helps to shape local vision and perception of environment and society.

Recommended Action 8.4.1
Forest managers should:
- develop a data base of the indigenous knowledge on LUS for planning purposes and publish them to facilitate a country network to exchange ideas.
- raise awareness on the importance of important LUS and prepare national policies to promote the cultivation of these species.
- help build the local capacity to cultivate those LUS that are important to the socio-economic lifestyles of local communities.

Principle 8.5
Sharing forest management responsibilities with the local communities can promote a better relationship between stakeholders (particularly local communities and forest managers), improve product flows, promote species diversity, support the sustainable management of species that are important to local communities, and increase forest revenue to forest dwellers. Well integrated community participation in LUS resource planning is essential to the development of LUS utilisation at the local level.

Recommended Action 8.5.1
Initiate dialogue between the forestry sector and other sectors of the economy in order to harmonize sectoral policies and actions for the integrated development of other planning activities that influence forestry activities.

Recommended Action 8.5.2
Introduce new planning, management and control policies for LUS activities based on collaborative forest management principles.

Recommended Action 8.5.3
Develop mechanisms for consultations with local communities, women’s groups and other relevant organizations to ensure the full participation of stakeholders in resource management.
8.2 Economic Considerations

**Principle 8.6**

The sustainability of LUS promotion and marketing programmes depend first and foremost on the rate of returns on investments made over time. The more immediate the returns, the higher will be the interest generated. On the foregoing basis, LUS utilisation and marketing programmes can be sustainable if the positive economic benefits are substantial. The successful utilisation and promotion of LUS depends on their availability, cost, quality, and technical properties.

**Recommended Action 8.6.1**

Conduct an economic survey to examine the macro-economic policies of the country to determine the exchange rate regime, business margins, and domestic/export ratios that will sustain profits in the LUS export market.

**Recommended Action 8.6.2**

Study the local economic and financial environment and their influence on LUS utilization, including a cost-benefit analysis of the increased harvesting of LUS.

**Recommended Action 8.6.3**

Identify programmes resulting in maximum productivity of LUS resources through appropriate investments, optimal revenue generation and the equitable distribution of costs and benefits so as not to impair the future availability of LUS products or services.

**Recommended Action 8.6.4**

Ensure that the efficient use of LUS and the equitable distribution of and benefits is provided for. The full net value of the timber resources should be determined to the extent feasible using transparent, market-based mechanisms that take into consideration the full costs of production.

**Recommended Action 8.6.5**

Review forest taxation and royalty systems to make the forest products industry more efficient.
**Principle 8.7**

Increased utilisation of LUS contributes to economies of scale leading to more cost effective logging and forest management which in turn promotes an increased and continuous supply of timber. Log processors who often operate below optimum capacities can become more cost efficient with increased processing of LUS due to economies of scale.

**Recommended Action 8.7.1**

Study the technological policy of the industry to determine the rate of technological adoption and adaptation to allow the processing of a wide range of log sizes and wood densities.

**Recommended Action 8.7.2**

Determine the factors that support the increased utilization of LUS in order to determine the sustainability of increased utilization of LUS. Examine the species availability, financial rewards/profitability, capacity utilization, mill conversion efficiency and the investment linkages necessary for the sustainable utilisation of LUS.

**Recommended Action 8.7.3**

Determine why some LUS are under-utilized and develop a strategy to promote the more efficient utilization of LUS. The investigation should cover financial constraints, markets, technology, technical information, species substitution and the availability of traditional species.

**Recommended Action 8.7.4**

Identify the important industrial processes required for the efficient utilization of LUS (e.g., kiln drying), scale of investment for a minimum sized processing facility and determine evidences of financial profitability of increased LUS utilization. On the basis of available information, suitable incentive programmes may be developed to promote the development of applied research programmes.

**Principle 8.8**

Active promotion of LUS on the international markets would improve economic pricing between primary and secondary processing.

**Recommended Action 8.8.1**

Determine the market requirements for LUS in both domestic and export markets.
Recommended Action 8.8.2
Identify factors that affect the consumption of wood products manufactured from LUS (e.g. price, availability, technical properties, appearance/colour, market promotion strategies and incentives) to facilitate the formulation of policy and management programmes that effectively promote LUS in domestic and international markets.

Recommended Action 8.8.3
Conduct international market surveys to determine the major end uses of LUS and determine whether LUS are used as substitutes or supplements. These should form the basis for promoting the utilization of LUS in domestic and international markets.

Principle 8.9
The timber industry in most tropical countries operate at reduced capacities because of inefficiencies associated with high logging residue generation resulting from the lack of skilled staff, the use of obsolete machinery and the lack of standardisation of wood products. Thus, the actual volume of timber processed is both below the nominal capacity of established firms and forest policy targets. This indicates that there may be over-capacity in the timber industry.

Recommended Action 8.9.1
Governments should develop and implement policies which are aimed at strengthening the wood processing sector.
9.0 INSTITUTIONAL FRAMEWORK AND CAPACITY BUILDING

LUS play an increasingly important role in sustainable forest management and have long-term strategic value for national development. It is therefore important to develop a strong institutional framework with national and international organizations focusing on capacity building and institutional reform.

Principle 9.1
Forest policies governing the sustainable utilization of LUS can be implemented optimally if all stakeholders are involved. This calls for a national interagency network at the local, national and regional levels to facilitate sharing of experiences, collaboration, and coordination for maximum efficiency.

Recommended Action 9.1.1
Develop capacity and strengthen forestry sector institutions to implement forest policies and sustainable LUS utilisation programmes. Prepare and execute training programmes for all categories of forest workers to improve their efficiency.

Recommended Action 9.1.2
Develop operational frameworks, stating clearly the tasks and responsibilities of all stakeholders, including non-governmental organizations and private sector companies, to participate in the sustainable utilisation of forest resources.

Principle 9.2
Sustainable utilization of LUS can best be promoted if there is an adequate and unimpeded flow of information at the national and international levels.

Recommended Action 9.2.1
Promote the exchange of information on a continuous basis at the local, national, and regional levels.

Recommended Action 9.2.2
Organise scientific meetings, seminars, workshops and conferences and other forum that support the sustainable utilisation of LUS.
Recommended Action 9.2.3

Provide adequate funds for institutional strengthening and reforms. Cooperation of all stakeholders should be sought to raise funds for the implementation of programmes leading to the sustainable utilisation of LUS.
10.0 RESEARCH AND MONITORING

Acceptance of LUS in the international market will be influenced by the knowledge of the mechanical and physical properties of the species being promoted, as well as the possible uses and knowledge of the primary species for which they could be suitable as substitutes. This acceptance will be founded on sound scientific research, not only to provide the information needed on LUS, but also to monitor changes in the ecosystem that might result from the increased utilisation of LUS. The major challenge facing research into the conservation and sustainable management of LUS is to identify the need for, and support of, relevant research and incorporating the results of such research into sustainable forest management practices.

Principle 10.1
The successful promotion and acceptance of LUS depends on the knowledge of their technical properties and the degree to which end-users can be assured of a sustainable supply.

Recommended Action 10.1.1
Conduct research into physical, mechanical and processing characteristics of LUS to provide information required for enhancing their promotion. Studies on the ecological, environmental, social, and economic impacts of increased utilisation of LUS should also be performed.

Recommended Action 10.1.2
Conduct research on the utilisation of logging residues to determine the range of potential products that can be obtained from large branches, stumps, etc. This would enhance the more efficient utilisation of the forest resource and reduce pressure on the remaining forest resources.

Recommended Action 10.1.3
Conduct applied research in sawing, drying and preservation of LUS products and components for the furniture and construction industries.