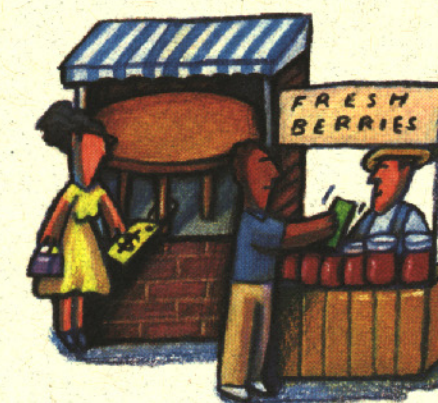
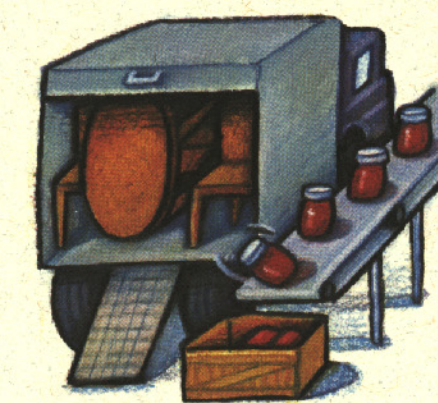
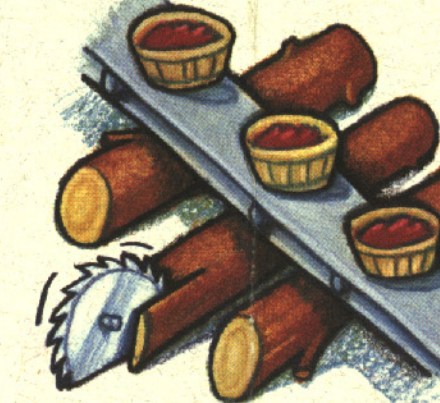


This matrix is designed as a tool to help in the analysis of the existing forest products market system and to encourage more systematic thinking about sustainable forest management (SFM).

Sustainable Forest Products: Opportunity Within Crisis



External Factors	Questions to Consider
<p>Changes in Markets, Product Demand, and Economic Environment</p> <ul style="list-style-type: none"> Absolute demand for forest products is growing as a result of population increase and economic changes. Increasing trend toward globalization of markets and sources of raw materials. Worsening poverty in some areas increases pressure on forest resources as people meet short-term survival objectives. Increasing national debt encourages accelerated exploitation of natural resources. Consumer acceptance of new or substitute products appears to be increasing (public attitudes, ethics and values are changing (e.g. conservation ethic)). New market trends are emerging ("green" marketing and consumerism). Certification movement is increasingly active. 	<ul style="list-style-type: none"> Will globalization accelerate depletion of forest resources as the market seeks lowest forest product costs? Do current forestry practices match changes in market demand? Can lead time for responding to market changes be estimated? Are international trends in "green" marketing having an impact on SFM? What amount of forest products become part of the market system versus local household use, etc.?
<p>Changes in Quality and Size of Resource Base</p> <ul style="list-style-type: none"> Natural and human-made disasters, deforestation, climate change are reducing regenerative capacity of forests. Competing uses for the forest resource base (forest conversion for agriculture, mining, and energy development) are stronger. Common response to forest species scarcity is either to develop technology to harvest remaining population or to identify acceptable substitute species—both impact forest systems. New resource substitution developments (under-utilized species, new management regimes) are insufficient. 	<ul style="list-style-type: none"> Is accurate description available of resource changes in the North and South? What are positive resource changes? Can improved use and management offset increasing stresses on the resource base?
<p>Level of Unustainable Forest Practice and Illegal Harvesting</p> <ul style="list-style-type: none"> Clear resource tenure/ownership is often lacking. Increased numbers of refugees and migrants temporarily using forest systems. Increasing use of extensive swidden agriculture among pioneering populations. Alliances of powerful private interests and corrupt government officials are neutralizing positive impact of SFM policy, regulation, technology, and education, especially in Southern countries. Legal systems appear important to control illegal logging by powerful vested interests and/or small-scale harvesters. Some international logging companies disregard minimal SFM practice and ignore extraction agreements. 	<ul style="list-style-type: none"> To what extent can these kinds of issues influence SFM planning and practice? Are issues of tenure given appropriate attention, and is the relationship between resource tenure and SFM understood? How much of forest products trade moves through illegal channels? Is illegal harvesting increasing as a result of international pressure for "green" products?
<p>Changes in Policy Environment</p> <ul style="list-style-type: none"> New international treaties and conventions (GATT, NAFTA, ITTA, TFAP, Biodiversity Convention) have been adopted. Local, national, and international development policies now include specific natural resource management (NRM) provisions. SFM advocacy, programs, and pressure from international environmental non-government organizations are growing. Policy support for short-term, profit-enhancing strategies that feature unsustainable forest use practices (e.g. monocultures) is increasing. 	<ul style="list-style-type: none"> What are the implications of the recent world-wide explosion in NRM policy and regulation? Convention have been adopted. What are the main obstacles to policy implementation? Do current systems of incentives and sanctions support NRM policies?
<p>Trends in Regulatory Environment</p> <ul style="list-style-type: none"> Tariffs and restrictions on trade and commerce, logging bans, and environmental standards. Natural resource management laws and legislation that promote checks and balances. Forest use guidelines and management requirements. 	<ul style="list-style-type: none"> Is SFM supported by the current regulatory environment? What are the main obstacles to implementation of regulations? What gaps exist in the regulatory environment?
<p>Intensity of Research and Development Efforts/Access to Innovation</p> <ul style="list-style-type: none"> SFM research agendas are highly diverse and uncoordinated. Inadequate mechanisms exist for SFM research and development (innovation funds, tax breaks, endowments). SFM enhancing equipment for low impact wood/sustainable forest production are ready but not commercially produced. Commercializing innovations is difficult (economy of scale, unfavorable internal rate of return). Wood industry is usually passive rather than active in developing and adopting innovations. Technology trends lead to large, capital-intensive equipment. 	<ul style="list-style-type: none"> What technologies exist that actually contribute to SFM? What new priority problems and opportunities need technical solutions? How can identification of research topics be improved? How can connection between research findings and implementation be strengthened? How can the lag time between technology innovation and adoption be reduced? What is needed to improve mechanisms to finance product and services research and development?
<p>Availability of Education and Information</p> <ul style="list-style-type: none"> Conventional media influence is profound and pervasive, and does not directly or indirectly support SFM. Conservation education seldom addresses producers, wholesalers, and retailers. Temporary conservation fads and trends oversimplify SFM issues. 	<ul style="list-style-type: none"> What are the most cost-effective means of educating the general public in the U.S.? Which organizations and individuals are most effective in development and dissemination of information that has long-term impact on SFM?

	Forest Resource Base	Extraction / Harvesting	Primary Processing	Secondary Processing	Wholesale	Retail	End-Use							
Actors	<ul style="list-style-type: none"> Forest Resource Forest Resource Use 	<ul style="list-style-type: none"> Individuals Families Communities Clan, Ethnic, Geographically Associated Groups Local Enterprises (public and private) 	<ul style="list-style-type: none"> Outsider Enterprises (public and private) Multi-nationals Governments 	<ul style="list-style-type: none"> Sawmills, Plywood Producers, and Veneer Producers (in the solid wood industry) First-stage Bulk Processors (in the special forest products industry) Pulp and Paper Producers 	<ul style="list-style-type: none"> Manufacturers (that add value to commodity products) Furniture, Flooring, Molding, and Millwork Producers Craftspeople (musical instruments, jewelry, hand-made paper, etc.) 	<ul style="list-style-type: none"> Commodity Brokers Importers/Exporters Freight Handlers Intermediary Traders Transporters/Shipppers 	<ul style="list-style-type: none"> Lumber Yards Discount Stores, Do-it-yourself Centers Specialty Product Retailers Mail Order Merchandisers (special forest products) 	<ul style="list-style-type: none"> Food, Drug, Beverage, Cosmetic Industries Personal Care/Accessories Industry 						
Key Features	<ul style="list-style-type: none"> Forest Resource: Forest ecosystems are defined by: ecological processes (nutrient, hydrological cycles); biophysical constraints (rainfall, soil fertility, topography); biological diversity. Forest Resource Use: Management of forest systems is usually based on: human benefits (food, clothing, building material, livelihood, timber, environmental services); conservation benefits (maintenance of flora and fauna populations, environmental services for all species). 	<ul style="list-style-type: none"> Primary harvesters cut trees and forage forest products (the complete range of enterprise forms, resource and land ownership patterns, and forest-related activities and practices are represented). May or may not own the land from which they harvest the raw material. May or may not be primary product producers. Best positioned to see all resources in the forest and identify which resources are used or under-used. 	<ul style="list-style-type: none"> SFM is influenced by: primary processor's resource needs; local use of resources (vs. resources harvested for export); local/national foreign company involvement; subsistence needs (vs. commercial); degree of monetized (vs. non-monetized) activity; size of operation; land ownership patterns. 	<ul style="list-style-type: none"> Primary processors take base resources (logs, barks, etc.) and complete first-line processing of that resource to produce a commodity product (a product that is not ready for consumer use). First-in-line information link to resource harvesters (loggers, wildcrafters, foragers, etc.). Business strategy is production- rather than market-driven. For solid wood products, most small to mid-sized operations do not own their own timberlands and draw from production-driven log access. Typically primary processors have no linkage to end-users. First-in-line information link to resource harvesters (loggers, wildcrafters, foragers, etc.). 	<ul style="list-style-type: none"> Secondary Processors (SPs) take a commodity product from primary processors and produce either a component product or a product ready for consumer use. SPs usually are small businesses. SPs typically are willing to use non-traditional species in product manufacturing as long as the primary producer level. Small to mid-sized SPs generally do not link with each other to gain buying power. SPs typically use equipment and technology that adapt to multiple species product manufacturing and reduction of wood waste. SPs in wood production typically bear lower up-front costs for new equipment and 	<ul style="list-style-type: none"> Wholesalers act as important intermediaries in the supply/demand system, aggregate diverse supply sources, organize supply and distribution networks, and sometimes mobilize capital for harvesters and producers. Wholesalers are sometimes organized as vertically integrated cartels, controlling transportation and credit. In the South, wholesalers may be very powerful and can strongly influence forest harvesting decisions. In the North, wholesalers have little relationship with harvesting practices and basically respond to retailer-manufacturer needs. 	<ul style="list-style-type: none"> Wholesalers can be used as price, product, and profits. (Others contend that wholesalers are the most effective means of channeling goods and services.) "Regulations and restrictions on wholesalers by governments and citizen organizations are necessary." (Others contend that unrestricted free trade provides maximum benefits and returns for all concerned.) 	<ul style="list-style-type: none"> Unless they also engage in or have strong associations with retail or brand name marketing, wholesalers are usually invisible or unrelated to end-users. Wholesalers have a strong link to retailers and respond quickly to their changing needs. 						
Differing Opinions	<ul style="list-style-type: none"> Forest Resource: "Tree plantations are forests." "Pristine forests contain highest levels of biodiversity." Forest Resource Use: "True SFM is unattainable." "No existing projects have demonstrated SFM." "Human impacts are necessarily negative." 	<ul style="list-style-type: none"> "Traditional knowledge is unscientific." "SFM cannot wait for conclusive scientific data before being applied." "Utilization of more species or all species will lead to SFM." (Others contend that utilization of all species utilization will lead to greater forest destruction.) 	<ul style="list-style-type: none"> "Land ownership will result in better stewardship." "Indigenous people practice sustainable livelihood strategies and have a SFM tradition." "Small is beautiful." "In a free market economy, the marketplace will properly value forest products." "All producers share common interests and goals." "Forests are a renewable resource." 	<ul style="list-style-type: none"> "The only profitable resource from the forest is the wood." "Industry doesn't have to change, it just needs to educate the public." (Others contend that the wood industry needs a major restructuring.) "To improve productivity, technology should be devoted to maximizing output (vs. incorporating and maximizing value-added output)." "Manufacturing technologies employed in operations limit 	<ul style="list-style-type: none"> "All species that can be used are being used." (Others contend that there is little recognition of unused or under-utilized species.) "SFM is important but the value of certification is unproven and probably slight." "Craftspeople are ecologically sensitive businesspeople." 	<ul style="list-style-type: none"> "Wholesalers monopolize prices, products, and profits." (Others contend that wholesalers are the most effective means of channeling goods and services.) "Regulations and restrictions on wholesalers by governments and citizen organizations are necessary." (Others contend that unrestricted free trade provides maximum benefits and returns for all concerned.) 	<ul style="list-style-type: none"> "Sustainably-produced products tend to be sub-standard and nobody wants to buy inferior products." "Retailers always know what the end-users want." 	<ul style="list-style-type: none"> "End-users may favor SFM but unwilling to pay true cost of SFM or certification costs." "Access to information and education will change consumer behavior in favor of SFM." 						
Issues	<ul style="list-style-type: none"> Forest Resource: Incomplete knowledge of minimal threshold for maintaining system integrity, including: ecosystem dynamics; flora/fauna interdependence; regeneration mechanisms; species interactions; disturbance. General lack of biological inventories. Knowledge of species interaction is weak. Research skewed toward megafauna and economic species. Forest Resource Use: Lack of generally accepted definition of SFM. Sustained yield confused with SFM. Questionable appropriateness of plantation forestry and other intensive timber management methods. 	<ul style="list-style-type: none"> Serious lack of empirical data on SFM in practice. Social and economic needs outweigh ecological considerations in resource decisions. Only foresters have designed management schemes. Inadequate broad-based input into forest management design (ecosystem perspective). Indigenous knowledge on forest composition and management practices under-utilized. Forest managers lack market intelligence about lesser-known species. Conflicting interests (resource management vs. bottom-line economics) can create tension between forest managers and harvesters. Little linkage between forest managers and secondary processors except in vertically integrated operations. 	<ul style="list-style-type: none"> Harvesters lack access to information and capital for new/inappropriate harvesting technologies and practices. Loggers compete against loggers, often at the expense of improved forest management practices and buying and selling power. Financial returns sometimes too low to be profitable. An exploitative relationship often exists between small-scale harvesters and wholesalers/processors. Factors outside of profit and effort affect resource harvest decisions (e.g. sense of place, dependence on resource base). 	<ul style="list-style-type: none"> Impact of inappropriate harvesting practices on the future value of residual forests is underestimated. Impact of forest access roads is underestimated. Buying and selling arrangements can artificially inflate the value of raw material (e.g. bid vs. negotiated stumpage price). Harvester choice of product completely dependent on transport distance to market (usually a primary processing facility). Factors removed from end-user information and access (market needs, preferences, etc.). Producers lack access to capital and new production technologies. Small to mid-sized producers rarely collaborate to gain buying power for SFM resources. 	<ul style="list-style-type: none"> Manufacturing baseline is volume production. Often times caught in tight profit margin mode with wholesalers who distribute commodity products to retailers. Softwood product producers think and operate differently than hardwood producers. Far removed from end-user information and access (market needs, preferences, etc.). Producers lack access to capital and new production technologies. Small to mid-sized producers rarely collaborate to gain buying power for SFM resources. 	<ul style="list-style-type: none"> Primary processors dictate resource needs directly to harvesters. Information exchange about the forest's unused and under-utilized species for product development seldom occurs between primary processors and harvesters, who are most knowledgeable regarding under-utilized species. Lowest value of product at this level; heavy competition because of non-differentiation of product. "Traditional" species employed in manufacturing (especially true for solid wood products). 	<ul style="list-style-type: none"> Secondary processors lack access to capital for new production technologies and market intelligence for value-added product development. Chain-of-custody problems, certification costs, and production logistics are most difficult at this level because raw materials are received from multiple primary processors. Secondary processors are rarely active supporters of SFM since they are several steps removed from the resource base. 	<ul style="list-style-type: none"> Manufacturers lack access to information on effective product distribution channels that maximize market opportunities. Industry associations at this level are typically based on specific product development (furniture producers, millwork manufacturers, etc.). Few, if any, associations exist to help manufacturers gain access to SFM raw materials. 	<ul style="list-style-type: none"> Depending on geographic locations and product, significant information gaps exist on wholesaler systems. Gaps include: life-cycle efficiency of product processing; service functions provided by wholesalers; profit margins; the structure and impact of wholesale systems (monopolies/cartels in the South, independent operations in the U.S., keiretsu/hobblins in the Pacific Rim). 	<ul style="list-style-type: none"> Wholesalers usually have limited understanding or incentives to support SFM. If wholesalers control transport, they can have a strong influence on prices. Prices at wholesale stage may bear minimal relation to harvesting and production costs and pressures on the resource base. 	<ul style="list-style-type: none"> Retailers generally unaware of forest conditions or of social and economic forces involved in unsustainable forest product extraction. Currently, SFM products only occupy niche markets due to higher price points and limited supply. 	<ul style="list-style-type: none"> Retailers lack an efficient system to transfer end-user market intelligence to product manufacturers. Alternative trading systems are established at retail level but have limited influence on SFM product development. 	<ul style="list-style-type: none"> End-user values/attitudes are different from purchasing behavior. Wood is not being used to its highest and best use. Forest connection to commodity products (paper, building materials, etc.) is less obvious than to high-end solid wood products. Certification credibility is threatened at early stages by consumer suspicion. 	
Consequences	<ul style="list-style-type: none"> Forest Resource: In the absence of knowledge and appropriate consultative processes, conclusions about forest systems often made on invalid basic assumptions and paradigms. Natural forest systems are poorly managed. Forest Resource Use: Natural and social systems not seen as interconnected. Deterioration of forest site productivity, functional integrity, critical habitats, and biological diversity. Management ramifications not seen at regional landscape level. 	<ul style="list-style-type: none"> Too much focus placed on timber commodities as management objective. Criteria for SFM too varied, difficult to experience with SFM practices. Inadequate measures of human and natural impacts on natural systems. SFM applications do not achieve full potential due to under-utilization of traditional knowledge and practices. Misuse of species. Wood does not achieve its highest and best use. Oversimplified perception of natural resource management complexities. 	<ul style="list-style-type: none"> Small profit margins and lack of incentives discourage harvesters from adopting SFM practices. Continued inefficient harvesting practices and damage to the forest resource base. SFM failure because of oversimplification of harvester livelihood arrangements and relationship to processors. Collateral damage to ecosystems is enormous and growing (e.g. from road-building). 	<ul style="list-style-type: none"> Resource use decisions not always driven by market logic. Harvest damage can severely limit future sustainable economic development options, including SFM. Inadequate communication between harvesters and processors leads to poor communication of limits of resource base to wholesalers/retailers. 	<ul style="list-style-type: none"> Small to mid-sized producers most negatively affected and in powerless position due to lack of political and financial resources. Operations often viewed by environmental community as "culpits" and are excluded from SFM planning. Understanding of issues and implementation of action typically reactive vs. proactive. 	<ul style="list-style-type: none"> SFM initiatives often fall due to lack of understanding of issues separating hardwood and softwood manufacturing. Since profit margins are often tight and volume is manufacturing baseline, concerns for SFM practices and costs associated with those practices are low priority. 	<ul style="list-style-type: none"> SFM issues and opportunities are often disregarded due to lack of SFM raw materials, chain-of-custody costs, certification costs, and lack of access to market intelligence. Efforts to increase the manufacture of products from waste are often deferred due to lack of access to capital for new production technologies. 	<ul style="list-style-type: none"> Wholesalers are rarely a part of SFM dialogue. Wholesalers typically do not assume the cost of SFM practices in their product price structures, unless dictated by end-users. (Wholesalers are frequently not responsive to upward pressure from resource and processing levels.) 	<ul style="list-style-type: none"> Efforts to control, compete with, or circumvent wholesalers are often unsuccessful due to lack of understanding of the service functions provided and the resources administered by wholesalers. Certification efforts are difficult to undertake and sustain at this level. 	<ul style="list-style-type: none"> Opportunity lost for retailer participation in promoting end-user and producer investment in SFM products. Producer ability to respond to end-user demand is diminished. 	<ul style="list-style-type: none"> End-user purchasing patterns relative to SFM are difficult to predict. Economic forces promote waste of wood resources. End-users are unaware of the source of raw material. End-users often not aware of extent of forest products in commodities. 			
Strategies	<ul style="list-style-type: none"> Forest Resource: Reduce problems caused by information scarcity by supporting research related to: base-line biological inventories; systems approach management; land coalesce management. Forest Resource Use: Demonstrate cost-efficient industrial-scale SFM through large-scale pilot projects supported by coalitions of funders. Increase knowledge of marketable special forest products by funding additional research. 	<ul style="list-style-type: none"> Compile, assess, and exchange knowledge and databases/inventories of SFM practices and products. Foster regional definition of SFM by identifying all stakeholders, pooling perspectives, and attempting consensus. Improve linkage between forest practitioners and forest researchers by supporting unconventional partnerships that combine research and practice. Improve SFM designs by encouraging interdisciplinary teams that include social and cultural perspectives. 	<ul style="list-style-type: none"> Identify how improved technical and scientific information about resource base management can be made more accessible to the harvesters. Identify and document successful forest capitalization strategies for smaller-scale harvesters. Support the establishment of coalitions between innovative practitioners and decision-makers that result in sustainable forest resource use. Increase logger influence by supporting activities that return higher value to forest products at the harvester level (sorting, grading, certified product). 	<ul style="list-style-type: none"> Match resource sustainability with optimal capture of income to local communities (e.g. through regional planning efforts that actively attract high value industries). Encourage projects that evaluate system differences between the North and the South, focusing on information flows, vested interest pressures, access to capital, livelihood issues, access to technology, and SFM opportunity. 	<ul style="list-style-type: none"> Develop mechanisms that increase market intelligence about SFM product demand (from end-users to primary processors). Encourage identification of key wood-based and non-wood-based products with market potential from hardwood and softwood forests by developing a mechanism to assist for land owners, concession holders, and primary processors to take the lead in the process. 	<ul style="list-style-type: none"> Accelerate product development potential from unused and under-utilized species from forests by creating alternative uses of these materials. Optimize resource use to match market demands by evaluating new, more appropriate processing technologies (i.e. making more product with less resource). Reduce process demand on wood supply by identifying alternative resources that can be used. 	<ul style="list-style-type: none"> Develop mechanisms that increase market intelligence about SFM product demand from end-users to secondary processors. Increase secondary processor knowledge about new processing technologies that maximize use of the resource (i.e. making more product with less resource). Demonstrate strategies for increasing buying power of small to mid-sized companies for SFM raw materials. Demonstrate streamlining of secondary processor chain of custody costs and logistics. 	<ul style="list-style-type: none"> Accelerate new product development by evaluating unused and under-utilized species from the forest. Develop "green" product designs and marketing strategies that reflect key features of end-users. Provide consumers with information about existing resource substitutes. Identify how fair and appropriate certification can gain public trust. 	<ul style="list-style-type: none"> Support applied research by capable organizations (non-governmental organizations, trade associations, consultants, etc.) that address wholesale system information gaps and identify issues and opportunities for promoting SFM within the wholesale stage. The research should focus on specific forest producers and geographic areas where efforts are either underway or have strong prospects. 	<ul style="list-style-type: none"> Design, initiate and finance a small number of pilot projects that influence wholesalers to support SFM objectives through collaboration, encouragement, and appropriate incentives. 	<ul style="list-style-type: none"> Support research into resource substitutions favoring highest/best use of wood products. Identify how to increase retailer participation in SFM certification processes. Create a framework for information transfer from retailers to producers on the importance of SFM products and establishing chain of custody. 	<ul style="list-style-type: none"> Determine how "green" producers can work with mainstream, mass marketers on SFM issues. Implement strategic alliances or collective partnerships among retailers, wholesalers, and producers to enhance sourcing of sustainable forest products. Improve quality of information on consumer behavior, attitudes, and willingness to bear SFM costs. 	<ul style="list-style-type: none"> Support end-user common interest groups to improve communications with manufacturers. Establish recognition awards for manufacturers that most notably respond to end-user interest in sustainable harvested forest products (e.g. end-user selection committees). 	<ul style="list-style-type: none"> Support marketing research that more accurately tracks changes in end-user preferences.