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**CROSS-SECTOR LINKAGES IN FORESTRY
REVIEW OF AVAILABLE INFORMATION AND CONSIDERATIONS ON FURTHER
RESEARCH**

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ABSTRACT

This paper has been prepared for the Policy and Institutions Branch of the Forestry Department of FAO. Its purpose is to review available information on public policies and cross sector linkages which are important in the context of forest conservation and forestry development. The paper identifies alternative methodological approaches for further investigations and discusses their usefulness for case studies at country and regional levels.

Cross-sector linkages are defined as influences from public policies others than forest policy which have an immediate or indirect influence on the behaviour of land owners, forest users, governmental agencies and non-governmental organisations, and through such agents on forest land uses and sustainable forestry practices. The definition puts emphasis on policy formation and implementation processes. It enhances analysis of the combined outcomes and impacts from laws and policies that address economic, social and environmental issues that influence political decisions on forests and forestry development

With regard to subsequent country specific studies on relevant external policies and on specific linkages with national forest policy programs the paper proposes an integrative research approach based on a combination of elements such as content analysis of relevant legislation, policy programs, and sector studies; interviews with experts and representatives from the forest administration; and interviews with and/or participating observation of users, land owners and forestry managers.

Keywords: cross-sector linkages; inter-policy approaches; network management; inter-administrative co-ordination; public policy analysis

1. Forestry Related Public Policies and Cross-sector Linkages

1.1 Public Policies and Regional Context

The term public policy designates the contents and choices made in specific fields or sectors as determined by dominant plans, goals and actions which regulate important issues of public concern (Parsons 1997: 16). Public policy analysis describes these contents and explains them in relation to the prevailing institutional setting, the polity, and as influenced through political processes, the politics (Schubert 1991: 27). In a state of law public policies are based on constitutionally founded competencies of the state, and are determined through laws, decrees, governmental regulations and rules, and decisions of public authorities.

Several of the available studies on public policies and cross sector linkages that are of importance to sustainable forestry and forest protection have been elaborated by or on behalf of the Food and Agriculture Organisation, FAO. Others have been prepared for the United Nations Economic Commission for Europe, and the World Bank. The studies share a common approach since they rely on similar references and professional experience. They usually list different public policies as relevant to the forest sector and stress the fact that their importance has to be identified in the context of a particular country and at a given time. They provide suggestions on how to differentiate such listings according to regions and determined forest policy goals.

Papers that emphasised the importance of external policies and sector linkages to forest law and to the implementation of national forest policy objectives date from the early 1990ies (Schmithüsen and de Montalembert 1991, de Montalembert and Schmithüsen 1993, 1994). A comprehensive identification of relevant policy domains has subsequently been elaborated (de Montalembert 1994, 1995). The following public policy areas are enumerated as having possible impacts on forest development: macro-economic policies (fiscal, monetary, privatisation and public expenditure); population and social affairs; agriculture and livestock; land use and tenure; infrastructure; fisheries; trade; industry; energy; environment; and tourism. The author provides a matrix which indicates for each sector typical policy instruments, the cross-sector linkages which arise from the instruments, and the likely socio-economic, environmental and political impacts which have an influence on the sustainability of forestry development.

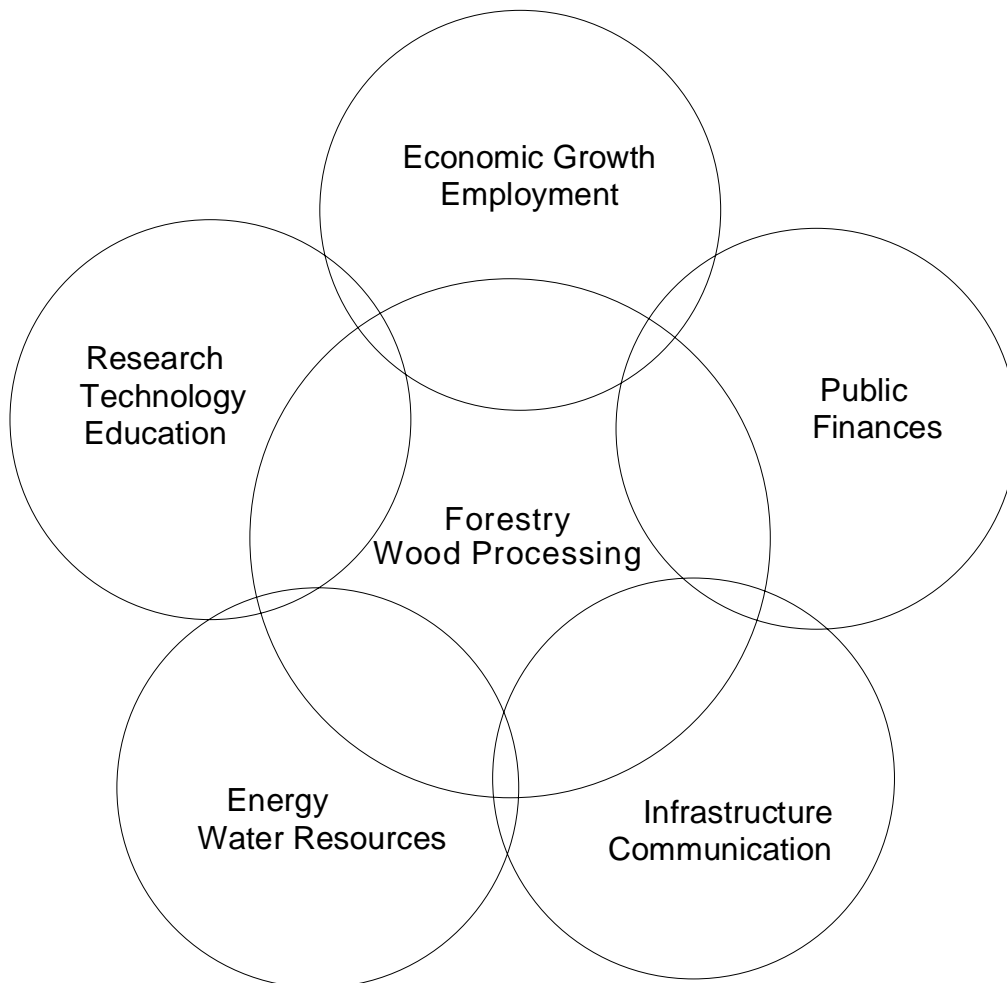
The study on the policy context for forestry and forest industry development in Europe provides considerable material on policy linkages related to the following four categories of forest policy objectives: (i) forest resources, forestry and wood supply; (ii) wood-processing industries; (iii) international trade in forest products; and (iv) markets and demands for forest products (Peck and Descargues 1997,1997). The authors review the general context, the aims, and the likely trends of external public policies which they consider as influential in their study. Emphasis is put on policies that influence access to intermediate and end-use markets for wood and processed forest products. The prospects for access to raw-material supply, and possible impacts on the relationship between major competitors and alternative materials and products are examined. The findings are resumed in a summary matrix for each policy area indicating policy instruments with important links to the objectives of forestry development and industrial wood processing. The potential impacts on the forest sector, and in particular on future demand and supply of wood, are analysed. The scale of impacts on demand and supply is assessed in case that the identified external policies would change substantially from their present direction. The timeframe in which such changes could show noticeable effects on the forest and wood processing sector is estimated.

Causal relations between non-forest-sector policies and tropical deforestation processes have been analysed (Kaimowitz and Angelsen 1999). The authors present a dense synthesis of major cross-sector linkages among different policy areas. The paper is interesting in as much as it gives clear recommendations for policy makers in international organisations and at national level on how to take linkages into account. As their focus is on policies and linkages that are already well documented they have not developed a special matrix.

The range of laws and public policies of importance to the forest sector has been identified and structured based on the distinction between policies and impacts mainly related to forestry and wood processing development, and policies and impacts that have an influence mainly on sustainable forest resources utilisation (Schmithüsen 1998, 2000). Together these external public policies in their country specific combinations have substantial positive and negative linkages to and effects on the development and implementation of forest policy programmes. There is the more general framework of public policies related to economic growth, employment and social affairs; research, technology and education; energy, infrastructure and communication which sets the conditions for the development of the forestry and wood processing sector (Figure 1).

There is also an increasingly complex network of legislation and policy programmes which most countries have created during the past 30 years and which affects directly and indirectly forest conservation and sustainable forest management. This refers, for instance, to environmental protection, nature and landscape conservation, land-use planning, and urban

Figure 1: Public Policies with Impacts on Forestry and Wood Processing

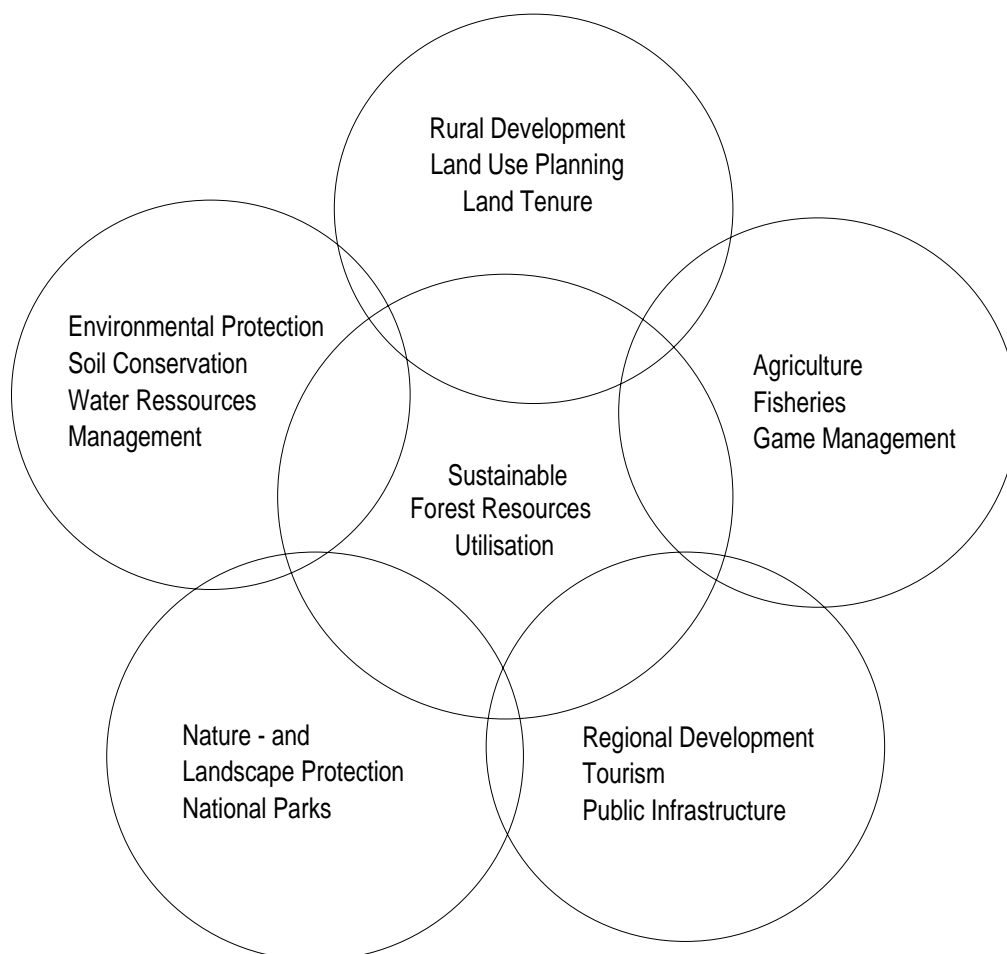


Source: Schmithüsen 2000; IUFRO World Series Volume 10: 12

and rural development. There are also relevant sector policies and their supporting body of legislation which were adopted at an earlier stage but have been modified and amended considerable in the meantime. This includes regulations and policy objectives related to agricultural development; water protection and uses; fishery, hunting and wildlife conservation; and national parks. (Figure 2)

The studies which have been reviewed highlight variations of the importance of relevant cross-sector linkages as a function of the prevailing ecosystems and of the economic and social context that determines opportunities and limitations of alternative land-use opportunities. Forestry related policies and cross-sector linkages have, for instance, been put in relation to broad ecological regions and prevailing socio-economic conditions (de Montalembert 1994: 9-10). He distinguishes four ecological zones and considers additional socio-economic criteria. With regard to forest areas in the lowland humid tropics the differences between countries with high population densities and those with low population densities appeared of particular importance. The author summarises case studies for various countries in the tropics in order to show typical cross-sector linkages and their range of variation (de Montalembert 1995: 26-28). In the following we resume de Montalembert's regional classification and comment on the impacts which result from policy linkages.

Figure 2: Public Policies with Impacts on Sustainable Forest Utilisation



Temperate and boreal forest in industrialised countries with market economies: In these countries the forest area is at present fairly stable and protected by effective forest regulations. In fact, there are regional trends of an increase in forest vegetation due to natural succession and/or afforestation in areas with abandoned or marginal agricultural lands. Important policy objectives are the protection of trees and forests in urban areas, the maintaining of biodiversity in areas with intensive forest production, and the promotion of multifunctional uses generating income and improvement of living conditions in rural areas. Cross-sector linkages arise from policies addressing urban and rural development; infrastructure and energy consumption; as well as environmental protection, and nature and landscape conservation. Traffic, energy, infrastructure, rural development and agricultural policies may have important effects on the local distribution of forests. Environmental, nature conservation and landscape protection policies are likely to influence policy objectives concerning economic and sustainable wood production and the ecological variability of forests. Positive effects result from linkages between land use, environmental and forest policies. More difficult is the co-ordination between forest policy aims and the objectives of traffic, energy and infrastructure policies. Co-ordination problems are common between nature and landscape protection, game management, and intensive forest production.

Temperate and boreal forests in countries in transition to market economy: These countries face at present fundamental changes both in the general national policy framework as well as within the forestry and forest industry sector. Supplying forest products to rapidly growing demand of national markets, and earning foreign exchange through exporting timber and processed products are important factors within the take off of the national economy. A whole range of policy changes are induced through the restitution of forest lands to their former private and communal owners; the privatisation of wood harvesting, transport and wood processing; the privatisation of the end-markets for wood and forest products; and the creation of new marketing circuits between producers and consumers. Important cross-sector linkages result from policies on macro-economic development, privatisation of the industrial sector, land tenure and restitution, as well as from a new role of the state and of public agencies and forest administrations. At the same time the importance of policy linkages to sustainable natural resources management, rural and urban development, and environmental protection and nature conservation has gained considerable weight. In this respect we have similar developments as in countries with an established market economy system.

Lowland forests in the humid tropics with high population densities: Countries in the lowland humid tropics with high population densities face large scale deforestation due to the pressure for new agricultural and pasture lands, and due to strong demands to generate income from timber exports and industrial wood processing. Cross-sector linkages result from public policies which induce such developments respectively from those which could have positive impacts on forest protection and sustainable forestry development. Major linkages are related to macro-economic, demography, infrastructure, and agricultural policies. Linkages to game management, nature protection and environmental policies exist and gain importance provided that effective national decisions to establish permanent production forests and protected areas have been taken. Positive co-ordination between macro-economic policies and forestry development objectives have so far been weak, and efforts to create more consistent policy networks, such as for instance through Tropical Forest Action Plans, have shown only modest results. As major land use developments are influenced by policy actors outside forestry this experience demonstrates the need to deal with forests in a broader national policy context. Cross-sector linkages between forestry, game management, nature conservation and environmental protection should be co-ordinated in more specific national forestry, rural development and landscape protection programs.

Lowland forests in the humid tropics with low population densities: In countries situated in the lowland humid zone with low population densities considerable areas of tropical forests still exist which show a comparatively low degree of human interventions. However, the process to make these forests accessible through large scale industrial forestry projects, resettlement and land colonisation through national development plans has gained momentum. Frequently too little attention is given to the sustainable development of these forest and to their importance with regard to benefits from non-wood forest products for generating income in favour of the rural population.

Highland and mountain forests in tropical and temperate regions: Highland and mountain forests cover large areas with important protective functions. Strong linkages exist between environmental and forest policies in order to maintain trees and other wooden vegetation for soil and water protection. In densely settled mountain regions the forest area consists frequently of wood-lots on land not suited for agriculture and trees planted around houses. They are part of traditional land-use systems with combined production systems such as agroforestry or sylvipasture land management practices. Cross-sector linkages to agriculture,

rural development, landscape and biodiversity conservation, protection of communication and infrastructure, and increasingly tourist development need particular attention.

Forest and tree vegetation on arid and semi-arid lands: In arid and semi-arid regions trees and forest vegetation play a particularly important role in defusing negative effects of droughts and in lowering the pressure on other land resources. Maintaining the protective as well as the productive functions of the vegetation is a pre-condition for sustainable use of these landscapes and a general objective of rural development and environmental policies. Cross-sector linkages exist primarily with agricultural water resource policies. Strengthening agencies managing forest vegetation and co-ordination with public services in charge of agriculture, water development and soil protection are necessary conditions to create and implement positive policy linkages.

Table 1 compares content and scope of public policies that have been identified by the mentioned authors as having important linkages to forest policy development. Altogether, the range of the listings is rather similar. Linkages considered as relevant by most sources are, for instance, those which result from macro-economic policies; from policies on demography and social affairs; or from agriculture, land use and tenure, energy and infrastructure policies. Differences exist with regard to the degree according to which policy areas and programmes have been detailed. Some of the indicated categories overlap to a certain extent like “the role of the public sector” (Peck and Descargues), “privatisation” (de Montalembert) and “public finances” (Schmithüsen). Or “transportation” (Kaimowitz and Angelsen) could be left ajar to “infrastructure” (Montalambert, Schmithüsen). Among the few issues that are only mentioned by one single author are research and educational policies (Schmithüsen).

Table 2 illustrates different approaches in specifying cross-sector linkages to forestry: As an example the findings from the energy sector have been chosen. The comparison shows that the matrix of Peck and Descargues is fairly comprehensive but mainly with a focus on impacts that refer to wood supply and demand. The matrix of de Montalembert is a more general one. The same refers to the information given by Kaimowitz and Angelsen. A point which does not appear in the studies is that any matrix of this kind would need criteria for weighting the importance of linkages in order to provide comparable information.

Table 1 : Public Policies Influencing Forestry as Identified by Authors

	<i>De Montalembert</i>	<i>Kaimowitz/Angelsen</i>	<i>Peck / Descargues</i>	<i>Schmithüsen</i>
<i>Sectoral policies</i>	<ul style="list-style-type: none"> - Macro-economic policies (fiscal, monetary, trade, privatisation and public expenditure policies) - Population and social affairs - Agriculture and livestock, fisheries - Land use and tenure - Infrastructure - Industry, energy - Environment - Tourism 	<ul style="list-style-type: none"> - Macro-economic policies (fiscal, monetary, trade) - Social affairs (indigenous rights, distribution of lands) - Agriculture - Land tenure - Transportation - Mining, energy 	<ul style="list-style-type: none"> - Economy (and trade) - Demography and social affairs - Agriculture - Land use, rural and regional development - Construction, industry, energy - Environment - The role of the public sector 	<ul style="list-style-type: none"> - Economic growth, employment, public finances - Agriculture, fisheries, game management - Rural and regional development, land use planning, land tenure - (Public) Infrastructure, communication, technology - Energy, water resources - Environmental protection, soil conservation, water resources management, nature- and landscape protection, national parks - Tourism, research, education
<i>Scope</i>	Sustainable development and environmental stability of all forests;	Non-forest sector policies that affect tropical forests	Forestry in Europe	Separated for forestry / wood processing and sustainable forest resource utilisation for all forests
<i>Sources</i>	de Montalembert 1994: 13-15, de Montalembert 1995: 29-31	Kaimowitz and Angelsen 1999	Peck and Descargues 1997, UNECE and FAO 1996	Schmithüsen 2000

Table 2: Approaches for Specifying Linkages - Example Energy Sector

Policy Area C: Energy		Policy Area C: Energy			
Policy objective	Policy instrument/linkage	Impact on the forest and forest industries sector (particularly on the supply and demand of wood)	Scale of impact ¹ on:		Timescale ²
			SUPPLY	DEMAND	
1. Diversify of energy sources (away from fossil fuel and towards alternatives)	Taxes on use of fossil fuels; subsidies and grants for research and development of alternative fuels	1 (a) increased afforestation as energy plantations	***		M
		(b) increased harvesting of thinnings, small-sized and low quality wood, incl. forest and logging residues, for use as energy	****		S
		(c) increased use of urban waste, notably waste paper, for heat and power		***	S
		(d) increased use of industry and post-consumption residues for heat and power		**	S
		(e) development of wood-based liquid and gas fuels for transport and other uses		**	L
		(f) fuller integration of electricity generated by wood-processing industries into national grids		*	M
2. Raise energy self-sufficiency and security	Subsidies and grants for R&D and use of domestically available resources	2 (a) as 1 above, esp. (a), (b), and (c)	****	****	M
		(b) develop wood use for local (community, institution, hospital, farm, military, etc.) heat and power generation		**	M
3. Improve energy conservation	Subsidies and grants for research, development and use of energy-saving technology, equipment, buildings, etc.	3 (a) increased demand and production of sawnwood as low energy cost product	**	**	M
		(b) greater use of wood-based products, esp. Sawnwood, for insulation of buildings		**	M
...		...			
... (up to 5)		... (up to 5.c)			

¹ On a scale of * (= little impact) to ***** (= very significant impact). This is intended to show the possible extent of impact on wood supply and demand should policy be changed from its present direction.

² This column is intended to show how soon after a policy change has been initiated an impact might begin to take effect: S = within 5 years; M = within 15 years; L = not before 15 years

Energy		
Policy instruments	Cross-sectoral linkages arising from policy instruments	Impacts on sustainability of forest development (social-economic-environmental-political)
Pricing and distribution	Availability and prices of fuels for domestic uses and small-scale industries; and of petrol for mechanization and transport	Harvesting and increased commercialization of wood for fuel in forests and woodlands; urban and rural demand for woodfuels; expansion of agriculture through forest clearing and marginal land cultivation
Energy self-reliance; research/development of alternative fuels	Increased forestation; harvesting; use of urban waste or industrial residues; integration of electricity systems	Better management of forests; improved forest industrial development
Subsidies and grants to develop carbon sinks	Research, development and use of technologies to reduce carbon and other emissions	More forests allowed to grow to old age; preservation of forest resources

de Montalembert 1995: 31

Energy and Mining

- Energy and mining can provide needed foreign exchange and products and services.
- Energy and mining projects in forested areas often have direct negative impacts on forests and forest dependent people. Energy generation and mining locations, indigenous territories, and protected areas overlap a great deal.
- These projects can have substantial indirect effects on foreign exchange rates, government revenues, the balance of political power, and access to forested areas. On average, countries that depend heavily on petroleum and mining exports seem to have lower deforestation when export prices are high because this leads the exchange rate to appreciate.

Best practices

- The points made previously about public scrutiny and discussion, transparency, and the need for regular monitoring in the case of transportation investments also apply here.
- Clear mechanisms, that do not automatically favor energy and mining projects, should be put in place for resolving overlapping land claims.
- Bank CAS, macro-economic, and sector reports should assess the indirect effects of petroleum and mining activities on forests and poverty in highly petroleum and mineral dependent countries.
- Bank hydroelectric projects should include components to ensure the long-term maintenance of their resource base. Bank efforts to privatize public energy companies should take this into account.

Kaimowitz and Angelsen 1999: 5

1.2 Law and Policy Development at National Level

A considerable number of studies review forest legislation and policy developments at national and sub-national levels and contain information on public policies and cross-sector linkages that influence forestry development. This is the case, for instance, for a series of forest policy papers on various countries that have been published for the African, Asian and Latin American region (FAO1993, FAO 1996, FAO 1998). More specifically with law developments in America, Asia, Africa and Europe deal the volumes of the FAO Law Development Service that have been produced recently (FAO1998, FAO 1999, Cirelli 1999, Cirelli and Schmithüsen 2000). A considerable amount of country papers, mainly for Europe and North America but also for other continents that deal with forest and forestry related legislation and policy programmes have been prepared by members of the IUFRO Research Group on Forest Law and Environmental Legislation. The current bibliography demonstrates the broad geographical distribution and the growing range of research topics addressed (IUFRO Research Group 6.1300 Bibliography Online, Schmithüsen and Iselin 2000).

A second important source of information are publications and reports which focus more directly on specific external policies and assess their positive and negative impacts on forests and natural vegetation as well as on forest resources utilisation and management. This approach has been chosen usually by economists and policy analysts interested in linkages that result from macroeconomic programmes, and social and political developments. Research of this kind has come forward from authors associated with multilateral development institutions and deals mainly with forestry issues in the tropics and subtropics (Repetto and Gillis 1988, World Bank 1993, FAO 1994, Contreras 2000). Important research is in particular undertaken by CIFOR in co-operation with other national and international institutes and non-governmental organisations. It is regularly made available to interested policy makers and policy analysts (CIFOR Porex Listserve – D. Kaimowitz).

There is also a large number of unpublished working documents and governmental reports that have come forward in the context of multilateral and bilateral technical co-operation projects. Unfortunately this kind of documentation is usually not readily available.

Most of the earlier legislation and policy studies focused on changes and improvements of national forestry programmes as defined by forest laws and implementing decrees, governmental regulations and administrative rules. They lack in general a meaningful reference to the objectives and instruments determined by other public policies and do not analyse the impact on implementing the prevailing forest policy framework. More recent studies are more explicitly concerned with this subject and identify a considerable range of policies and legislative instruments that are material for forest conservation and forestry development. The IUFRO Research Group 6. 1300, for instance, has launched an increasing number of country studies that review the impact of legislation and public policies, mainly related to environmental, nature and landscape protection, and their relevance for implementing national forest policy programmes.

Studies concentrating on forestry in highly industrialised countries focus on the growing impact from policies dealing with environment, water resources, clean air, soil protection, land uses, wildlife management, nature conservation and biodiversity. Major research issues are to identify the effects which result from such policy programmes, to examine the consistency of the various legal requirements, and to investigate the process of change which takes place in modifying the rules and regulations governing forest uses and forestry practices.

Integrating forestry management and planning within the broader context of rural development, agriculture, landscape management and nature protection has become a major issue in the European countries and several examples have been documented (Cirelli and Schmithüsen 2000, Schmithüsen et al. 2000). The forest law of Portugal in its section 13, for example, sets up an inter-ministerial commission for preparing integrated management plans. Other countries like Belgium, Italy or Spain are regulating agricultural and grazing uses in forests. Land use policy is also an important factor with many cross-sector linkages with forestry. In the case of Switzerland, land use planning and the forest authorities have been arguing on the future value of land that is overgrown again with forest vegetation. Landowners tried to avoid that overgrown building land was redefined as forests, as this would have lowered the value of their property. The Swiss forest law of 1991 regulates this conflict by providing that forests can only be converted to building land if the forest administration allows clearing. Once land is declared as building land, clearing of forests does not require a permission through the forest administration. In Turkey the limits of the

country's permanent forest area have been determined with great efforts in order to stop large scale clearings. They did not bring a real settlement due to the adverse impacts from other policies and unsettled land use conflicts with major land user groups.

For countries in transition, the main cross-sector linkages in forestry result at present from privatisation and land tenure policies (Cirelli 1999). Countries in Central and Eastern Europe are particularly alert to adjust land tenure, wood processing and forest management practices to the rules of a market economy and to the standards set by the European Union (Glück et al. 1998, Csóka 1998). One of the driving forces that affects at present the forestry and wood processing sector is internationalisation with regard to competitive markets, international environmental standards, and sustainable management of forest resources. Policy linkages, and in particular those from environmental policy, are largely similar to those found in other industrialised countries (Schmithüsen et al. 1999, Schmithüsen et al. 2000).

The available documentation from North America confirms the considerable impact that results from environmental and nature protection policies on forest resources development (Schmithüsen and Siegel 1997, FAO 1998). Several papers review, for instance, the network of environmental regulations at the Federal level in the United States as well as the particular relevance of air, water and soil protection legislation; landscape and nature protection regulations; and laws that provide for a closer integration with renewable natural resources management at the national and local level (e.g. Cabbage and Siegel 1997, Siegel 1997, Hickmann 1997, Gaddis and Cabbage 1997, Hodges 1997, Le Master et al. 1997). Important issues, both in the USA and in Canada, are forest management practices on public and private lands and the impact which results from external policies addressing land ownership and land uses, public resources allocation and taxation, public land management versus privatisation, and local government (e.g. Wear and Steward 1997, Flick 1997, Luckert and Haley 1997, Wallace 1997, Hickman and Hickman 1997, Kaiser and Royer 1997, Siegel and Martus 1997).

Investigations on forest related public policies which deal with major issues and problems in the developing world have started already in the 1980ies to examine positive and negative influences that result from external policy programmes. This is particularly true with regard to causes of deforestation, a subject which has found considerable attention over the years. At present there is a clear trend towards country studies that analyse more explicitly relevant

external linkages by using more comprehensive and sophisticated research methods. Linkages are seen as being complex, varying in accordance with a particular social and economic context, and depending on the prevailing political situation. Of particular importance are policies related to macroeconomics, agriculture, transportation, mining, land tenure and planning and environmental protection. Instead of a merely descriptive approach research methods rely on empirical case studies, literature reviews, analysis of laws and documents, and expert opinion panels.

A valuable source of information offers a series of country studies that have been elaborated and distributed by CIFOR and/or international research institutes and non-governmental organisations (CIFOR Poley Listserve). Recent studies deal, for instance, with the role of national parks in maintaining tropical biodiversity (Bruner et al. 2001), land use and watershed management (Aylward forthcoming), land tenure and resource governance (Mandondo 2000), reforestation, environmental aspects and public incentives (Jagger and Pender 2000), paper production and environment (Abramovitz and Mattoon 2000), the political economy of pulp and paper (Barr 2000), and the impact of technological change on agriculture plantations respectively forest losses (Wunder 2000). Another context where policy linkages have gained considerable attention is the work of the International Panel on Climate Change (IPCC 2001).

The emphasis in developing country research on examining external policies that affect the development of the forest cover and of forest land uses can probably best be shown by reviewing some investigations and publications addressing large scale deforestation processes as occur at present in the humid forests of the tropics (Amelung and Diehl 1992, Angelsen and Kaimowitz 1999, Rudel et al. 2000). Some of the major studies that have been undertaken in this field go clearly beyond the narrow scope of forest policy analysis and look explicitly for important cross-sector linkages. The newer the text, the more are linkages to other policies made explicit and self-evident (e.g. Contreras 2000). In fact one of the key assumptions in this research is that deforestation in the tropics is primarily determined by broad economic, population and land development policies. Changes of such trends can consequently only follow from changes of these policies, and much less from implementing forest policy objectives in an isolated manner. An indication for this situation are the findings of one study which estimates that around 86 to 94 percent of deforestation in the tropics are due to an increase in agricultural land uses, 2 percent due to infrastructure and development projects

and the remainder, though less than 10 percent, due to unsustainable timber production (Amelung and Diehl 1992: 118).

Already in one of the first scientific studies which had addressed systematically relevant influences of external policies similar arguments have been presented (Repetto and Gillis 1988). Their book on public policies on the misuse of forest resources presented a series of important country studies for Indonesia, Malaysia, the Philippines, China, Brazil and West Africa. The book, already published in the late 1980ies, shaped a new understanding in the following political debate on the conservation of tropical forests and influenced strongly subsequent research work.

Repetto and Gillis showed that macroeconomic policies had a strong and often decisive influence on speeding up the process of deforestation in all of the countries studied. This happened for example through income tax incentives for logging and processing firms, through tax subsidies like generous depreciation provisions or subsidies for forest clearing, and through indirect subsidies in form of artificially cheap credits for large scale pasture development. These policies – sometimes together with the trade policies of industrialised countries – favoured exports of raw materials and large-scale clear-cutting of forests. Missing the opportunity of processing timber in their own country, the nations did not only loose a considerable part of their primary forest cover but also billions Dollars of revenues. Other sector policies found to exacerbate deforestation are related to agriculture, resettlement and new infrastructure. The findings showed that such policies had important negative external effects on forests and sustainable forestry, and failed to incorporate the real social and environmental costs from deforestation.

Other studies with similar findings followed. A FAO/World Bank agricultural review demonstrated that migratory pressure on the tropical moist forests in Ecuador was due to poor land utilisation in other regions of the country (FAO and World Bank 1993). In Argentina, forests were converted to agricultural land due to poor macroeconomic policy that reduced job alternatives and increased the demand for subsistence agriculture and additional grazing land (World Bank 1993). Inefficient industrial and fiscal policies in the Philippines were incentives for exporting logs in raw form rather than to convert them into processed forest products. Forestry missed the opportunity to earn additional income from added value to forest products and deforestation rose (FAO 1994). Irrigation and power generation policies in Sri Lanka

aimed at reducing poverty and unemployment but diminished in fact considerably income opportunities from the forest sector (Abeywickrema 1987).

A more recent study examines the reasons for the low deforestation rate and the regeneration of the forest cover in Gabon (Wunder 2000). The findings were that cross-sector linkages supported in a positive manner sustainable use of forest resources. As since the 1970ies, Gabon's economy strongly benefited from oil exports, the author inquired on the direct and indirect effects of the oil wealth on forestry. The direct effects seemed to be rather small, as the construction of infrastructure for the petrol industry did not lead to a significant loss of the forest cover. On the other hand, the oil companies created jobs in industry and services, and generated investments in urban infrastructure. Due to decreasing revenues from export crops, low competitiveness of import-competing products, and high transport costs a large proportion of the younger rural population migrated into larger settlements and cities. Farming activities were reduced, the state's effort to support large-scale agroindustry development failed to a considerable extent, and transport infrastructure concentrated on the newly built railway. Pressures on the forest cover decreased and deforestation slowed down. In summing up these findings one has, however, to keep in mind the comparatively low population pressure that exists in the country.

In examining the reasons for deforestation and degradation processes in developing countries, recent publications refer self-evidently and explicitly to external policy interventions. In an analysis for Central America, agricultural, land tenure, infrastructure and road construction policies have been identified as the most important sector policies interfering with sustainable forestry and forest protection (Kaimowitz 1996, World Bank 1991: 33). In a recent study on the causes of forest decline the author states that there is usually a complex combination of market failures, policy and institutional failures, social disparities and cultural factors at work (Contreras 2000: 20). He identifies government policies that in many cases influence the quantity and quality of forests. Transportation policies, in particular road construction, but also the construction of railways and water transport facilities do not account with the substantial impacts on forests through increased accessibility and changes in settlement patterns. Policies to gain additional agricultural and pasture land usually do not incorporate the costs of wood and non-wood products that cannot be harvested anymore due to the reduction in forest area. Policies that lead to greater land tenure inequality, land speculation and insecurity of land tenure make the poor poorer and force them to gain land through

deforestation. For structural adjustment programmes and macro-economic policies, similar effects may be found. Another reason for forest clearings are concession tenures that offer incentives to a mere exploitation of timber without taking the costs for regeneration of the resources potential as well as social and ecological costs into account.

The studies which have been presented provide largely a qualitative analysis of public policies that induce a reduction of the forest cover within a country. They do not aim at quantifying the impact of external factors on deforestation and forest degradation. An exception is the already mentioned assessment of the combined effects of different economic activities on deforestation which has been conducted in the 1980ies for 40 tropical countries. The figures of the following table illustrate that by far the most important direct cause for deforestation was the conversion of forests to agriculture and pasture. Other important factors were the expansion of the forestry sector, mining, the establishment of dams and hydro installations, and road construction (Amelung and Diehl 1992). However, as the authors point out, the figures provided are only of an indicative nature and reliable to a limited extent. Most official data sources are weak, often restricted to moist evergreen forests and do not include degradation effects. Estimation procedures for the causes of deforestation rely on the extrapolation from a few major parameters only. The indirect and underlying causes are not looked at and many complex relationships and impacts remain hidden.

Table 3: Sources of Deforestation in Tropical Countries, 1981-1990 (percent), (Amelung and Diehl 1992: 118)

	<i>Brazil</i>	<i>Indonesia</i>	<i>Cameroon</i>	<i>All major tropical countries</i>
Forestry	2	9	0	2-10
Agriculture	91	90	100	86-94
Shifting cultivators	15	59	79	41-49
Permanent agriculture	76	31	21	45
of which:				
Pastures	40	0	0	24
Permanent crop	4	3	3	3
Arable land	32	28	18	18
Mining including related industries	3	0	0	1
Dam construction	2	0	0	1
Other (e.g. road construction)	2	1	0	2

1.3 Policy Networks and Policy Linkages

The term “segmentation” is used to describe a situation where political steering concentrates on specific sectors and where decisions over the boundaries of different government departments are missing or rarely taken (Nohlen et al. 1998: 576). However, most problems in the real world relate to many different issues and don't respect the borders of a legally defined policy field or the competencies of governmental departments. Sector policies need co-ordination with regard to their objectives, instruments, and potential impacts. Government departments in charge of defined policy areas cannot function well if they act independently from each other. Decisions and impacts from one policy area are a dynamic element which may affect directly or indirectly several other sectors (Sabatier 1988: 23). Policy analysis provides insight into which policies are interconnected and which consequences follow from the linkages for political steering processes.

Some public policies have a high degree of interconnection and show strong linkages. Others are less influenced by external policies or have less impact on other policy issues. A useful classification can be made according to the criteria of public intervention. Public policies may, for instance, be classified in the following three categories according to the kind of tasks which the state respectively government intend to fulfil (von Prittwitz et al. 1994):

- the establishment of an institutional framework and of public security as for example through defense, foreign, constitutional or data protection policies;
- the establishment of a framework for socio-economic production and cultural integration as for instance through economic, finance, infrastructure, migration or culture policies;
- and the promotion of development and security of subsistence as through technology, environmental or educational policies.

The first and the third category have strong and varying linkages with a numerous other policy areas. Policies that establish a constitutional political framework and an institutional basis for public security are linked to most other policy areas as they provide the foundation for state interventions in general through guaranteeing the rule of law. Policies promoting development and security of subsistence depend to a large extent on a co-operation with social and economic policies. With regard to the second category one could imagine, at least at a first glance, that there are less important linkages to other political programmes.

However, it is obvious that economic and finance policies, for instance, influence many other

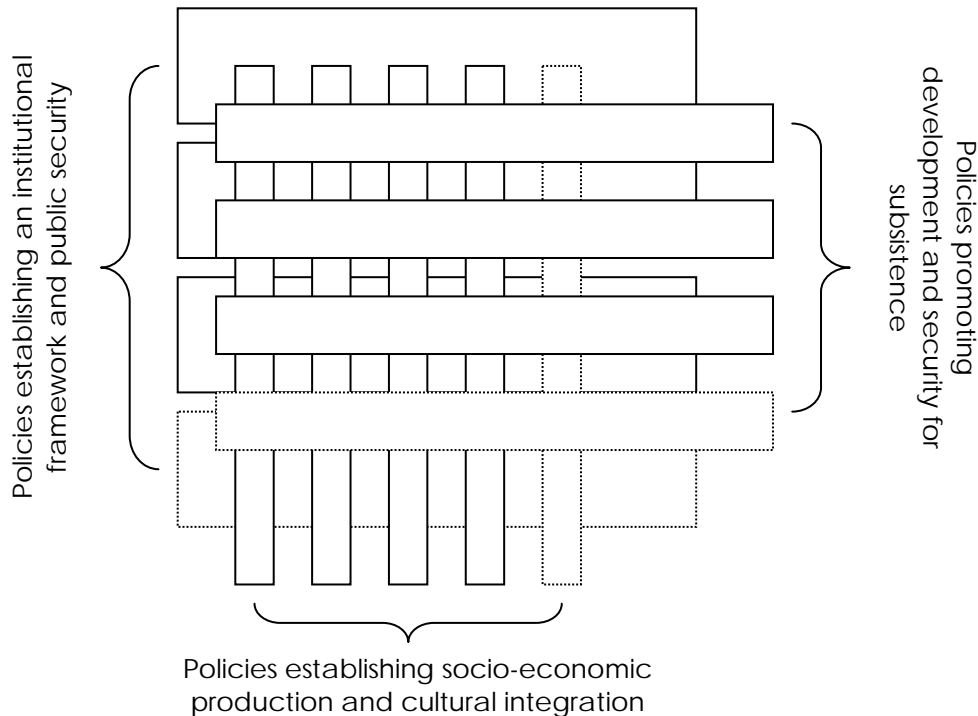
policy areas, and that their functioning depends on the other hand to a large extent on technological or environmental factors.

Figure 3 illustrates the dependencies between the three categories. Policies guaranteeing the rule of law are the basis for policy development in other areas. Policies for promoting development depend closely on policies for socio-economic integration. The figure does not indicate all possible combinations, and in particular the many linkages that exist between policies of the same category.

The fact that public policies overlap and have a great number of linkages among each other has far-reaching consequences for the way in which states and governments are able to steer political decision and implementation processes that allow to solve societal problems. Many issues can in fact not be tackled by one single law, policy programme or administrative unit alone. Effective solutions have to be found through different agencies and actors as well as through co-ordinated provisions in different policy areas. The metaphor most often used for such complex situations where many actors work together without being submitted to a clearly determined hierarchy is “networks”. Other terms relevant in this context are “co-ordination between different governmental agencies” and “inter-administrative co-ordination”.

Networks refer to the structure of the relations between actors and stakeholders that are concerned by and/or have influence on a determined public policy domain. This includes, for instance, governmental agencies, private firms, private and public associations, non-governmental organisations, or key persons and personal leadership. It is the relationship between the various actors involved that is of particular interest. With the words of Hanf and Scharpf (1978: 12) “the term “network” merely denotes (...) that policy making includes a large number of public and private actors from different levels and functional areas of government and society”. Typically political and policy networks in a democratic societies show pluralist and neo-corporate structures. Pluralist structures mean that many interest groups compete for influence in public decision making. Neo-corporate structures refer to a situation with few influential interest groups which negotiate compromises with public authorities and administrative agencies.

Figure 3: Relationships Between Different Categories of Public Policies



Source: Categories after von Prittwitz et al. 1994: 54

In policy analysis, it is widely discussed how networks can be managed and what networks mean for the steering capacity of the state. The role of states and governments is not only to be seen in direct interventions in society, but increasingly as a mediator between different societal actors (Mayntz 1992). Network management thus refers to any purposeful attempt to guide political interventions and to co-ordinate decision-making processes among a large number of private and public actors with often controversial interests in different policy areas and at various levels of government. Managing policy networks is a difficult and complex task which often requires mediation and alternative conflict resolution techniques.

With regard to inter-administrative co-ordination the example of the restructuring process of the Swiss Federal Agency of Environment, Forestry and Landscape during the 1990ies offers some interesting experiences (Knoepfel 1995, Knoepfel et al. 1991). The advisors developed

various options on how to integrate more closely environmental and economic resource policies.

One option currently used is to leave things more or less as they are and to provide a loose co-operation of agencies with a co-ordinating section between them. The sector responsibilities remain with each competent government unit but administrative procedures and regular meetings are institutionalised to inform, negotiate and decide on cross-sector issues.

Preferably, an independent unit is charged to organise, moderate and mediate the meetings.

Another way to bridge the gaps between different administrations is to implant cells in other relevant departments. A forestry cell, for instance, in a land use office will be in a position to explain and advocate the rationale of and the requirements for sustainable forestry development within other governmental agencies. In a longer perspective this may lead to the gradual release of competencies and a transfer of responsibilities to other agencies. If the newly implanted forestry cell will become accepted and important in the new administrative environment, it might no longer be necessary to maintain a specialised forest policy section.

One can also imagine that the de-specialisation is handled in a less downright manner, for example through filling vacancies in the administration with staff from other professional backgrounds. This is a rather informal but sometimes effective way to increase the knowledge and understanding for the potential and requirements of sector policies. However, there may be reasons to choose an alternative option and to strengthen the resources and competencies within the responsible sector agency. Boundaries between different sectors may be high because the power is unequally distributed and some offices can strongly interfere with other units.

Whatever the solutions are one has to be aware of the limits of inter-administrative co-ordination, especially if important and largely controversial interests have shaped the content of different public policies. A similar situation exists for managing policy networks if the external policies and cross-sector linkages have largely impeding or contradictory effects on the implementation of forest policy objectives. Co-ordination will always be an additional part to the existing hierarchical structures and cannot replace the formal distribution of competencies and resources among governmental agencies. Co-ordination usually functions well if it generates additional benefits for at least one of the involved partners. It is effective and smoothly operating if the majority of the partners, be it within the administrations or in combination with external interest groups, can rely on complementary policy objectives and

linkages with positive effects. It has limited potential and becomes easily inoperable if competencies and resources are unequally distributed or if the redistribution of responsibilities and resources is at stake. In such a situation political and/or hierarchical decisions within government and public administrations are usually required. Decisions from outside will be more effective and enable the actors involved to develop a more rational and efficient way to co-ordinate various policy goals and policy instruments (Scharpf 1993 20-22, 76, 89-91).

In order to seize potentials and boundaries of co-ordination, it is helpful to use Scharpf 's distinction between *positive and negative co-ordination*. In positive co-ordination actors try to optimise the utility of all activities to be envisaged. They evaluate the options and likely commitments of all actors and parties involved and choose what they consider the optimal solution to them. A prerequisite for positive co-ordination is that the participating actors share a clear understanding of the advantages and disadvantages which may accrue to each party. Actors that are bound to have to accept disadvantages should be compensated in order to keep them as partners in a longer term co-operation. Multilateral co-ordination needs to be institutionalised and has to provide a guarantee that the focus is on issues of common interest that are to be negotiated. To maintain and develop the already existing co-ordination and co-operation patterns is of considerable interest since the creation of new policy networks is usually quite costly. Negative co-ordination on the other hand implies the reduction of the degree of inferences from one agencies with the competencies of other units. A comparatively frequent case is negative co-ordination on a bilateral level with only two agencies or actors. It requires the precision of the responsibilities and the terms of activities of the interfering actor by limiting his sphere of intervention to his constitutional and/or administrative mandate. Negative co-ordination is unlikely to promote new solutions but helps to clarify the competencies of government and administration as consistent with the objectives and instruments of the prevailing public policies.

Linkages and combinations of linkages which result from external policies and policy networks may be characterised by several *typological elements*. The following six elements are proposed in order to provide for a significant and comprehensive description and/or classification: the regional or local context; the types of policy domains or policy areas addressed; the levels of decision making; the type of instruments used; the direction in which the linkages operate; and valence or impact of the prevailing linkages. *Table 4* summarises the proposed typological elements of cross-sector linkages that result from public policies related

to forests and forestry. The indicated elements can serve as a checklist in order to examine the characteristics of linkages that emanate from a given external policy domain respectively the effects from a forest policy programme on other fields. The list facilitates comparative analysis in various domains and/or of policy networks operating under different social, economic and political conditions, and in different ecosystems.

The previously described socio-economic criteria and broad ecosystem zones used by de Montalembert provide a good basis for defining *the regional or local context*. The six regional patterns allow a first assessment of the relevance of typical policy linkages and the dimension of their impacts. There are obviously considerable differences in the way certain external policies operate if one considers the conditions of temperate and boreal forest as compared to those of tropical lowland forests; the conditions of densely populated countries as compared to countries with a low population density; the conditions of the large mountain forest areas in the Alps, the Andes or the Himalayan area as compared to those of the dry forests in the semi-arid zone. What is true on a broad regional view is also of relevance on a more reduced scale. Differences in ecosystems, population density, income opportunities or with regard to local government may provide quite a different context for the implementation of public policies within countries. A typical example for different kinds of linkages are those that result from agricultural and rural development policies in highly productive agricultural areas as compared to those with marginal agricultural lands. If in the first case there may result considerable pressure on the forest area, there may be a rapid increase in forests in the latter case.

The *type of public policy domain* is another important criteria for qualifying the linkages with and the impacts on forest policy programmes. Following the classification of von Prittwitz the domains or policy areas identified by different authors as of importance can be, for instance, aggregated in the following manner:

- Public policies establishing a general institutional framework provide the basis for more problem and issue oriented domains. They define the constitutional rules of state organisation and of the public and private sector; the degree of intervention of government and the public administration; the procedural pattern for political processes involving people and interest groups; and the rules for a settlement of societal conflicts. They include macro-economic policies; policies of privatisation or more generally speaking defining the role of the state; and land tenure, rural and urban development, and social policies.

- Public policies that can be related to a determined economic sector or specific uses of land and natural resources. Quite often the objectives of such policies may be contradictory and the cross-sector linkages need to be balanced in a broader context of sustainable development. Forest policy linkages can be placed in this category as well as those from agriculture, mining, energy, transport, construction or tourism policies.
- Public policies promoting development and precaution for subsistence refer, for instance, to environmental, nature protection, technology and educational issues. These policies concern future development options of society and overlap quite often the more specific domains such as sector and land use policies.

Policy programmes and linkages to forestry originate from legislation and political decisions that are made on different levels of government and the international community. Linkages to forest policy are increasingly the result of *multilevel policy networks* (Schmithüsen 2000: 19). It is necessary to distinguish and analyse the levels of decision making from which the linkages result: the international and regional level; the national and sub-national level; and the level of local government and communities. This analysis is of particular importance in view of the growing trend to transfer or delegate national decision and implementation processes in forest resources management to the competencies of sub-national and local governments and institutions. On the other hand there is a growing impact which emanates from international legal instruments and conventions on national decision making. The principle of subsidiarity which plays an increasing role at national level in many countries as well as the principle of international commitment and responsibility which has gained weight as a result of the Rio Process generate, in fact, new and more complex policy networks and cross-sector linkages.

The effects of cross sector linkages are determined to a large extent by *the type of instruments* that are provided for in each policy domain. Regulatory, incentive and informational instruments as well as state offer and persuasion lead to different kinds of linkages. Of particular relevance are instruments which produce overlapping regulations respectively those which facilitate the management of policy networks such as internal and external hearings, public mediation processes, and cross sector financial arrangements. In addition to directly operating policy instruments which address actors outside of the administration it is important to analyse procedural and organisational instruments which operate in an indirect manner (Zimmermann 1994: 242).

The *direction in which policy linkages operate* within a given policy network can be unilateral, reciprocal or neutral. Most of the available studies focus so far on the influences of external policies on forests and forestry. How forest policy objectives and instruments influence other policy domains has until present rarely been examined. A noteworthy exception is a recent doctoral thesis on Bhutan's biodiversity policy which shows that major policy inputs and achievements result from a series of developments and amendments of forest policy in this country (Tsering 2000). A meaningful examination of policy linkages related to forestry demands a broader perspective based on a holistic and inter-sector approach which analyses impacts and linkages in both directions as well as reciprocal effects that may result.

The last criteria which has been selected as an important typological element to examine forestry related cross-sector linkages is their *valence or impact*. Policy linkages may produce positive, negative or neutral effects and impacts, and again they may operate in different directions. One kind of interference is the one in which the valence of the linkages produces positive effects for one policy domain and negative ones for other. Policy changes and co-operative arrangements are in such circumstances quite difficult to be obtained. Linkages which show positive effects for both policy domains usually provide opportunities for co-operation and alliances. A comparable situation exists if linkages result in negative effects on both sides. A positive valence on one side combined with a neutral effect on the other will not necessarily lead to action. Negative effects from policy linkages in one domain combined with neutral effects in the other offer good prospects for immediate changes.

There are of course many possible combinations; two typical examples are briefly mentioned. In countries with lowland forests and high population densities in the tropics negative linkages in both directions usually exist between agricultural and forest policy domains. Agriculture policy fails to promote sufficiently enough sustainable production and an increase of outputs with the result that farmers seek new lands in forested areas. Forest policy on the other hand is barely in a position to provide additional income for the rural population and to protect effectively production and protection forests. In industrialised countries there is now a strong movement towards increased nature protection measures in forests. Nature protection policy is promoted at the international level and works mainly with financial incentives, informational instruments and persuasion.

Table 4: Typological Elements for Specifying Linkages

<i>Context</i>	<i>Public policy domain</i>	<i>Levels of decision-making</i>	
<ul style="list-style-type: none"> - Temperate and boreal forest in industrialised countries with market economies - Temperate and boreal forest in countries in transition to market economy - Lowland forests in the humid tropics with high population densities - Lowland forests in the humid tropics with low population densities - Highland and mountain forests in tropical and temperate regions - Forest and tree vegetation on arid and semi-arid lands 	<p>Public policies establishing the institutional framework:</p> <ul style="list-style-type: none"> - Macro-economic - Privatisation /role of the state - Land tenure - Rural development - Social policy - ... <p>Public policies related to special economic sectors:</p> <ul style="list-style-type: none"> - Agriculture - Mining - Energy - Transport - Tourism - ... <p>Public policies promoting development:</p> <ul style="list-style-type: none"> - Environmental - Nature protection - Technology - Education - ... 	<ul style="list-style-type: none"> - International - Continental / inter-continental - National - Subnational 	
<i>Instruments</i>	<i>Direction</i>	<i>Valence</i>	
<ul style="list-style-type: none"> - Regulations - Financial incentives - State offers - Persuasion - Procedures - Organisation 	<ul style="list-style-type: none"> - Forest policy is interfering - Forest policy is interfered - Reciprocal link 	<p>For other domain:</p> <ul style="list-style-type: none"> - Positive - Neutral - Negative 	<p>For forest policy:</p> <ul style="list-style-type: none"> - Positive - Neutral - Negative

1.4 Conclusions

- The knowledge that forest conservation and development are influenced by many external factors and that there are strong influences from a range of public policies is not new in itself. However there is a growing awareness among policy makers, the public, forestry specialists and researchers that cross sector linkages need more attention and that one has to know more precisely how external policies impede or foster national and international objectives of sustainable forest production and the preservation of reserves and protected areas. Until present negative effects from policy linkages have found more attention and are better documented than positive ones.
- Substantial contributions in the discussion on relevant forest related policies and cross-sector linkages have been made by the work of FAO, CIFOR, the World Bank, international research institutes, and environmental NGO. The follow-up processes to the UNCED in 1992, and in particular the work of IPF, IFF and now the UNFF, have risen the attention on the subject of the international community and the media.
- Numerous country studies are already available that provide material on legislation and public policies that are of importance to forest conservation and forestry development. However, research studies based on policy analysis that examine in detail the nature of cross-sector linkages are still scarce even if more investigations have been undertaken during recent years.
- The available policy analysis focuses on few issues: deforestation processes in the tropics and subtropics, and increased nature protection in forest areas of industrialised countries. Usually negative effects from external policies have found the attention of the researchers. The examples cited cover a range of countries in Latin America, Central Africa, and in South and Southeast Asia. They refer to interference from public domains such as fiscal, trade, transportation, land tenure, agriculture and water irrigation policies.
- Together with studies that focus on cross-sector linkages between different bodies of legislation the available material provides a good basis in order to assess which public policy domains are the most likely to have cross-sector linkages to forestry. In addition to the domains mentioned above land use, industry, mining, energy, environmental and nature protection policies are of importance.

- The nature and importance of cross-sector linkages depends on the regional and socio-economic context. It is not the same in a developing country with tropical forests, in countries in the arid or semi-arid zone, or in countries with temperate and boreal forests. It is important to differentiate in policy analysis according to meaningful typological elements that characterise cross sector linkages.
- There is an increasing understanding among policy makers and forest specialists that forest policy objectives and instruments are in many cases not sufficient to reach sustainable management of forest resources. Complementary measures which concern other public policies are necessary

On the other hand, there are several considerations that are not sufficiently elaborated and discussed in the reviewed information. Further reflection and research is necessary:

- Only few empirical studies focus explicitly on cross-sector linkages and are based on original field work. Existing studies are limited to a few single countries or a particular region. The majority relies on secondary analysis of case studies and a few expert interviews only. A study concentrating on linkages and comparing systematically findings from countries of different regions is still missing and a challenge to researchers.
- In policy analysis and forest research it has been common to investigate rather the negative interference from external policies. Positive impacts of public policies have so far rarely been examined. The same holds true for the impacts of forest policies on other public policies.
- Most of the available information is limited to a narrow focus on one single sector and the particular needs and problems attached to it. Changing the perspective and taking a broader view on positive as well as negative impacts as related to sustainable land uses, economic and social development, and environmental protection based on an analysis of the existing policy network as a whole is the real challenge of future research.
- As a consequence, the perception of cross-sector linkages would change from seeing forest policy at the core and other domains as interfering factors. One would have to understand and interpret the institutional framework, the role of the forest administrations, and contribution and potential of the forest sector as one out of many knots in a wider system of many actors and alternative options to reach sustainable management of renewable natural resources.

2. Considerations on Further Research

2.1 Research Context

Further research needs to be situated within the context of emerging trends in international politics and national forest policy developments (Humphreys 1996, FAO 1999, Michaelsen 2000, Schmithüsen 2000, United Nations Forum on Forests 2001). During the last 10 years the conditions for policy-making have changed fundamentally as reflected in trends towards globalisation, multilevel policy-networks, privatisation, and increased democratic participation. New international treaties and regulations add new dimensions to the existing patterns of governance at national, regional and local levels. The distinction between private enterprise and public administration becomes increasingly permeable and sometimes blurred. The private sector has to deal with the incorporation of external effects in management and public authorities start to work with models from business administration.

The civil society's expectations are high and extend to new issues and in particular to environment protection and sustainable development. People want politics to be transparent and responsive to their needs and they also want the right to participate in policy decisions if they want to do so. The civil society expects that measures taken by policy-makers and public administrations are effective and efficient and, moreover, that the number of regulations and overall public expenditure will be reduced. In such an environment individual policy-actors have less power and influence to alter the existing situation by their own. Policy-makers and civil servants need to take into account the wider context both in the international as well as the local dimensions. They have to be able to interact flexibly with a variety of actors, such as citizen's action groups, international organisations, private companies or public administrations from other domains.

In the forest sector society's demands for goods and services are changing and growing. Forests are expected to provide timber, to protect watersheds and soils, and to provide shelter from natural disasters. They are expected to host a wide range of rare species and offer a scenic backdrop for sportsmen and city dwellers seeking tranquillity and recreation. Newly created demands, such as the use of forests as carbon sinks, illustrate that the social meaning of forests is a dynamic one. It can be subject to rapid and unpredicted expansions. Forests are only one option among several land-use alternatives which means that there is competition

between maintaining the forest cover and land clearing, and between the forest sector and other sectors of the economy. In fact in countries with a rapidly growing population the conversion of forests to other land uses is often a necessity and may, if properly managed, contribute to the sustainable development of a society. However, the growing pressure on forest lands may also lead to conflicts among the users, to the disadvantage of the poorer part of the population, and to the degradation of the state of forests.

In such a context, aims, strategies and instruments are sought to overcome complex problems and to find effective and efficient solutions. Taking cross-sector linkages into account and approaching problems in a more integrative manner are key concepts for improving the result of public policies, governmental action and administrative decisions and activities. The call for these concepts can be traced in many international and national debates in search for more adequate policy development and implementation.

At the national level cross-sector linkages as an issue emanate from at least two broader discussions. First, the tasks of governments and administrations were and still are expanding. In industrialised countries political interventions have expanded from traditional fields to new areas such as trade, economic and social affairs, environmental protection and sustainable development. It also holds for developing countries and countries in transition to market economies where the state has diminished the tasks in some fields but faces new challenges and engagements in others. Public interventions are, however, not always well co-ordinated and may lead to contradictory policies. Decisions made in one public domain have usually positive and negative effects and often unforeseen repercussions in other areas. Most public policies show strong effects from decisions taken outside of their own field of competencies. The success or failure of any public policy depends to a considerable extent on the effects from external policies and from cross-sector linkages.

The types of policy instruments used are about to change, putting more emphasis on financial incentives, persuasion and procedures than on regulation. Labelling, for example, aims to influence the behaviour of timber customers by making the external costs of products more transparent. Another trend is to seek the voluntary agreements of forest owners for the establishment of nature protection zones by compensating them for income losses on a contractual basis. As measures can be more effectively if implemented by many stakeholders which understand and agree on them, procedural and persuasive instruments are more widely

used. Regional planning, the Local Agenda 21, and other participatory and co-ordination mechanisms are important policy steering instruments in this context.

National forest programmes (NFP), which are actually promoted as planning instruments at the national and sub-national level in order to reach the goals of sustainable forest development use a holistic approach which is much different from previous sector planning procedures. Within NFP, inter-sector approaches are seen as a necessary core element (CSD 1997: § 10). This reflects lessons learned from formerly developed policy and planning instruments, and in particular from the Tropical Forestry Action Plan (TFAP). Experiences with the preparation and implementation of the TFAP at country level have shown that many actions failed to halt deforestation because the objectives and instruments concentrated too narrowly on the forestry sector (Humphreys 1996: 44).

So far, knowledge and experiences on how to deal with interference and cross-sector linkages from external policies is limited, also under the frame of National Forest Programmes. Some concrete recommendations have been made by FAO. They stipulate that such programmes need a multidisciplinary effort to become successful, that professionals in different fields and with different land use experiences should be associated in their preparation, and that cross-sector linkages have to be taken thoroughly into account (FAO 1996: 18, 34). FAO proposes some examples for national co-ordination mechanisms such as a high-level inter-ministerial co-ordinating bodies (FAO 1996: 31-2). For co-ordination, the importance of smooth administrative procedures, the elaboration of a well structured, transparent and accessible information and data base, and procedural arrangements for a continuing dialogue among stakeholders are stressed (FAO 1996: 47).

Ideas that linkages between public policies are important and need to be considered for improving the state of forests and for developing a sustainable forestry sector have been widely diffused and accepted in the 1990ies within the system of the United Nations and other international organisations. The UNCED sees inter-sector approaches to be a necessary prerequisite to achieve sustainable development. Enhancing policy and programme co-ordination and fostering cross-sector co-operation has become a core elements of the mandate for the newly established United Nations Forum on Forests (ECOSOC 2000, United Nations Forum on Forests 2001). The World Bank is currently reformulating its forest policy and stresses the need to contribute in the dialogue with governments to a more effective co-ordination of public policies and projects. A new and more comprehensive cross-sector

approach is considered as of particular importance (World Bank's Forests Team 2000). The European Union provides an example for the diffusion of these concepts on a continental scale. A Council Resolution of December 15, 1998 on a Forest Strategy for the European Union identifies, *inter alia*, as a substantial strategic element “the need to improve co-ordination, communication and co-operation in all policy areas with relevance to the forest sector within the Commission, between the Commission and the Member States, as well as between the Member States”.

Probably the most important trigger for policy makers to focus on cross-sector linkages was the UNCED Conference 1992 in Rio de Janeiro. In Agenda 21 cross-sector approaches are seen as a prerequisite for the sustainable development of society in general and for the sustainable use of forests in particular. The prevailing separation of different land management issues and of public policies which refer to them is considered as a reason for the lack of a development which balances economic advancement, sustainable ecosystem management and environmental protection. A more comprehensive approach is advocated which integrates economic, social and environmental requirements. National governments and the international community are advised to pay more attention to cross-sector linkages and to develop more consistent public policy frameworks for sustainable development. Section 8.4 of the Agenda 21 calls specifically for a progressive integration of economic, social and environmental issues in policy formulation and implementation. The need for more co-ordination between sectors relevant to forestry development and forest resources conservation is underlined, for instance, in Chapter 11, Sec. 31(e) of Agenda 21 on combating deforestation. It is also advocated in Section 9 of the Non-Binding Instrument on Forests as adopted during the Rio Conference 1992.

In the following-on process of the International Panel on Forests (IPF) and later the International Forum on Forests (IFF), the need for considering linkages was further stressed. Discussing steering elements for promoting sustainable forest management at a country level, inter-sector approaches and co-ordination mechanisms with any program and project affecting forests in one way or another were seen as necessary. This also reflected past experiences with Tropical Forest Action Plans, an instrument to promote the sustainable use of forests but that often failed due to lacking harmonization with other projects and policies (Liss 1999: 34). Particularly issues affecting land use, poverty, food security, energy needs and environmental protection are seen as important (Commission on Sustainable Development 1996,

Intergovernmental Forum on Forests 1999). Taking the continuity of the discussion into account, it is not surprising that fostering inter-sector approaches has become a core element of the mandate of the UNFF.

The World Bank is another international actor trying to integrate forest related goals with external projects and programmes. For its new forest policy, the World Bank wants to centre on poverty alleviation, economic development, and protection of environmental values. Therein, it proposes to focus on action where the Bank can apply a comparative advantage, for example on analysing and co-ordinating policies and projects to ensure a cross-sector approach to sustainable forest management or on assisting governments to ensure that indirect and cross-sector impacts of policy and investments on high conservation and protection areas are minimised (World Bank's Forests Team 2000: 61). The need for such measures is found in the observation that the Bank Group invests far more in external sectors frequently inferring in forests than it does in direct forest projects; and that “credits schemes favouring grazing, agricultural research and technology focuses on capital intensification in frontier areas, directed agricultural settlement, and the perpetuation of uneven land distribution (...) often have damaging effects on forests.” (World Bank's Forests Team 2000: 42). Addressing forest use within a multisector context has already been an issue for the actual forest policy of the World Bank. Already in its 1991 policy paper, the World Bank stressed the need for adjusting to embrace goals of the forest policy in projects such as reforms of concession policies, forest revenue systems, fiscal, tax, and agricultural policies, infrastructure and land use planning procedures, and land tenure systems (World Bank 1991: 62).

Under the title “Improving decision-making processes” the Agenda 21 states:

8.4 The primary need is to integrate environmental and developmental decision-making processes. To do this, Governments should conduct a national review and, where appropriate, improve the processes of decision-making so as to achieve the progressive integration of economic, social and environmental issues in the pursuit of development that is economically efficient, socially equitable and responsible and environmentally sound. Countries will develop their own priorities in accordance with their national plans, policies and programmes for the following activities:

- (a) Ensuring the integration of economic, social and environmental considerations in decision-making at all levels and in all ministries;
 - (b) Adopting a domestically formulated policy framework that reflects a long-term perspective and cross-sectoral approach as the basis for decisions, taking account of the linkages between and within the various political, economic, social and environmental issues involved in the development process;
 - (c) Establishing domestically determined ways and means to ensure the coherence of sectoral, economic, social and environmental policies, plans and policy instruments, including fiscal measures and the budget; these mechanisms should apply at various levels and bring together those interested in the development process;
- (Agenda 21, Chapter 8 (Integrating Environment And Development In Decision-Making), emphasis through the authors).

Principal Functions of the United Nations Forum on Forests

2. [The Economic and Social Council] *decides also* that to achieve the objective, [the UNFF] will perform the following principal functions:

- (a) Facilitate and promote the implementation of the Intergovernmental Panel on Forests/Intergovernmental Forum on Forests proposals for action as well as other actions which may be agreed upon, including through national forest programs and other integrated programmes relevant to forests; catalyze, mobilize and generate financial resources; and mobilize and channel technical and scientific resources to this end, including by taking steps towards the broadening and development of mechanisms and/or further initiatives to enhance international cooperation;
 - (b) Provide a forum for continued policy development and dialogue among Governments, which would involve international organizations and other interested parties, including major groups, as identified in Agenda 21, to foster a common understanding on sustainable forest management and to address forest issues and emerging areas of priority concern in a holistic, comprehensive and integrated manner;
 - (c) Enhance cooperation as well as policy and programme coordination on forest-related issues among relevant international and regional organizations, institutions and instruments, as well as contribute to synergies among them, including coordination among donors;
 - (d) Foster international cooperation, including North-South and public-private partnerships, as well as cross-sectoral cooperation at the national, regional and global levels;
 - (e) Monitor and assess progress at the national, regional and global levels through reporting by Governments, as well as by regional and international organizations, institutions and instruments, and on this basis consider future actions needed; and
 - (f) Strengthen political commitment to the management, conservation and sustainable development of all types of forests through: ministerial engagement; developing ways to liaise with the governing bodies of international and regional organizations, institutions and instruments; and the promotion of action-oriented dialogue and policy formulation related to forests;
- ECOSOC 2000: 2, emphasis through the authors

2.2 Possible Research Designs

Empirical social research displays a wide array of alternative designs in survey methods and analysis techniques. The aim is to find a custom-tailored solution that serves to answer the research questions as precisely as possible, that shows a good cost-benefit ratio, and that can be conducted with the available resources and accessible data. There is some guidance available with regard to appropriate design and methods that can be chosen for a certain kind of question. Research designs are, for example, different whether the issues to be investigated are descriptive ones or focus on a causal relationships. They are different, too, if the findings relate to single cases only or are to be generalised (GAO 1991: 68-9). In this context it is important to ask how many variables have to be looked at. Holistic approaches start from the assumption that many issues and factors are connected in some way and should be studied in a comprehensive design. Reductionism on the other hand argues that problems and issues can be divided in different parts and analysed separately. What matters is that these approaches usually work with different numbers of variables. They lead to different choices on qualitative and quantitative research approaches, Studies with a holistic approach tend to be qualitative ones (but not always) whereas reductionism in research usually leads to quantitative research methods. In the following, some possible designs are discussed and compared. They refer mainly to a holistic approach in research and examine as well to what extent quantitative methods are feasible.

Natural resource accounts (NRA) and environmental resource accounts use quantitative and qualitative information on natural resources primarily in physical terms. In the beginning of the 1990ies, the OECD gained experiences with forest accounts in some countries (OECD 1994). In input-output tables the production, transformation and utilisation of forest resources throughout the economy was traced in quantitative physical terms. These NRA did not incorporate quality aspects of natural resources utilisation and could not analyse complicated causal relationships. With regard to cross-sector linkages NRA show to which sectors flow which quantities of wood and processed forest products (and sometimes also part of the forest cover). So far, specific national forest accounts do not put much emphasis on a more detailed analysis of flows and linkages between the forest and other sectors. They are mainly concerned with the linkages between forestry production and wood processing. This restrains the usefulness of NRA, at least at present, for policy analysis on cross-sector linkages. Meaningful national forest accounts require quantitative information not only on wood

production but on the full range of forestry services. This needs a fairly detailed and highly institutionalised data base. In many countries it may be quite difficult to provide sufficient and verifiable information if one considers that already reliable data for forest related activities of farm households are hardly surveyed.

Some studies model cause-and-effect relationships in *complex econometric analysis*. This approach has been used, for example, in order to assess the impact of trade liberalisation agreements on environmental policy (OECD 2000). Relevant models are, for instance, the computable general equilibrium (CGE) and the comprehensive model for policy assessment (COMPASS). Without having own experiences we value such models as a useful approach for research on multi-sector policy networks and see the main application of econometric models for studying linkages with macro-economic policy. The collection of adequate data will remain difficult and a limiting point to such research.

Another feasible research design are *indicator frameworks*. Following clearly specified criteria, a set of indicators can be defined which are used as a reference base in order to monitor important linkages and trends. This approach has been developed, for example, in order to assess the degree of integration of environmental concerns into transport policy (OECD 1999). In the case of forestry linkages one could construct a set of indicators in order to assess the main factors of deforestation e.g. those due to agriculture, mining, forest fires etc. One could also evaluate positive effects from cross-sector linkages with indicators that assess the main factors of success in sustainable forest management, increase of biodiversity in improved forestry practices, or in protecting reserved areas and national parks. An advantage in using such a research design is that it can be custom-tailored to the research questions of a particular empirical study. The quality of the data base that is available or that can be assembled decides on the quality and the usefulness of the research findings. If these are satisfactory the qualitative and quantitative information collected for such an investigation from different sources has considerable potential for uses in other contexts.

The outcome of external policy domains as affecting the forestry sector can be evaluated by using *impact study designs*. Relevant research questions are, for instance, the following ones: To what extent does an agricultural policy programme encourage respectively reduce the effects of deforestation? Do wildlife management programmes significantly impede or promote forest regeneration? What are the effects of policies on the privatisation of forest

lands and forest management with regard to sustainable forest uses and forestry practices. Possible alternatives of this kind are quasi-experimental, cross sectional or longitudinal section designs (Rossi et al. 1988). If data availability is sufficient quantitative studies can be carried out. The start for impact studies is usually based on a hypothesis on what the important linkages of a policy network are. It has to be confirmed or falsified during the investigation.

Case studies are defined as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context (1); when the boundaries between phenomenon and context are not clearly evident (2); and in which multiple sources of evidence are used (3)” (Yin 1989: 23). Case study designs have been chosen in most of the research that has been undertaken so far. They will remain of importance in further studies considering the complexity involved in analysing interference among different public policies as well as the difficulties to assemble reliable data that allow meaningful findings with new information. Case studies could be undertaken in order to document and interpret policy processes that relate, for instance, to changes of forest area, changes in outputs from forestry goods and services, changes of the production potential in relation to defined use systems, changes in protective functions, variations in biodiversity in different forest management systems, and changes in nature protection and park management. It is important in future case studies not only to consider the negative effects, as has been done largely in the past, but to identify and analyse systematically the positive effects of cross-sector policy linkages that contribute to a more efficient and sustainable use of land and forest resources.

Whatever the concrete research question is, the use of case studies provides a first step to provide more empirical knowledge on the actually prevailing conditions by using multiple sources of evidence such as documents, legislative texts, available quantitative information as well as the opinions and judgements of the stakeholders involved. The use of a range of information sources will contribute to a better understanding of structures and issues that result from complex policy linkages. However, a major aspect one has to be aware of in using such a research design is the problem of how to compare and put into a common frame of interpretation the findings from different information sources. The difficulty of developing weight factors for the various observations and findings is probably the limiting point in using the results from case studies. This is particularly true if one wants to compare and evaluate different studies in order to draw more general conclusions in a more comprehensive context.

Expert panels offer an opportunity to policy makers, professionals and stakeholders to present their views and use their experiences on what they consider as relevant policy linkages and the likely effects which they may generate. Such panels can be organised in face to face sessions with various participants or indirectly through written communication or e-mail exchanges. Usually several rounds of exchange of opinions and statements are needed to have sufficient time for summarising and comparing the different views and for letting the participants find a consensus on what they think to be the important issues and possible conclusions (e.g. Hopple and Kuhlmann 1981, Linstone and Turoff 1975). Quite a comprehensive study based on expert opinion has been conducted recently in order to assess the sustainability of Swiss forest policy (Limacher et al. 1999).

An argument in favour of this kind of research is, that the danger of subjectively biased results is reduced through communicative validation within the panel. Forthcoming results have a chance to be more widely accepted in view of a number of different opinions from various groups of stakeholders as compared to studies elaborated by one single researcher. This is an important aspect in circumstances where very different and controversial problem, perceptions and concrete interests prevail. Expert panels as a research design require comparatively small inputs which is an advantage if only limited resources and data are available. The critical point, on the other hand, is to provide a meaningful composition of a panel and to find competent staff for organising the sessions and interpreting the findings.

In comparing the usefulness of various research designs one can refer to criteria such as the necessary requirements to carry out a study, the significance and informative value of the findings, and the resources respectively the costs of the undertaking (Table 5). For the *requirements of different research designs* one can state that quantitative studies need previous knowledge of the type of relevant policy linkages and their likely effects as well as sufficient and confirmed data. Findings are restricted to quantifiable policy linkages. Qualitative research designs do not necessarily require an intensive previous knowledge on the nature and structure of the policy context. Quantifiable information and the data are one element of the research. Expert panels require less detailed knowledge of the empirical background of the investigation since a considerable part of it comes forth during the research process itself. This is different with case studies which need to be conducted by researchers that are familiar or can familiarise themselves with the subject or field of investigation.

With regard to the *significance and informative value* case studies, expert panels and econometric modelling are the explicit ones. They may provide valuable information on direct and indirect policy linkages, a fairly detailed picture of all of different factors at work, and of the various actors involved. Indicator frameworks and quantitative impact assessment are useful in order to illustrate the influence of certain variables in the policy network and to monitor their performance. Due to a widely spread faith in the significance of numbers studies that quantify linkages are likely to have more attention from the public and within the circles of policy-makers and analysts than qualitative research. However, one has to keep in mind that quantitative investigations may risk to fail in presenting the overall context and the empirical complexity of the whole web that usually results from cross-sector linkages. Considering the significance of National Resource Accounts it appears that they are at least until present of less informative value since their information tend to be limited to wood flows in the forest and wood processing sectors.

Considering the required resources respectively the cost of various research designs one may state that all of them need different kinds of expertise and that the costs will depend on many factors and vary considerably. As a general rule the costs of national resources accounts, econometric modelling, and indicator frameworks will be rather on the high side whereas impact and case studies or expert panels will be in the medium or lower range.

Comparing the different strengths and weaknesses of alternative designs one should try to combine some of their relative advantages and informative value. Further research could start with case studies and lead to quantitative impact analysis or to econometric modelling at a later stage. Qualitative studies can provide recommendations for the quantitative monitoring over longer periods of critical effects that result from particularly relevant policy linkages.

Table 5: Comparison of Research Designs on Cross-Sector Linkages

	<i>Requirements</i>	<i>Significance</i>	<i>Costs</i>
National Ressource Accounts	<ul style="list-style-type: none"> - Main linkages must be known - Main linkages with institutionalised and documented sectors - Main linkages are quantifiable flows of resources, i.e. high data quality needed - Expertise in systems of national accounts 	<ul style="list-style-type: none"> - Stronger for intra-sectoral linkages, less differentiated for cross-sectoral linkages - Impact of variables can be estimated 	High
Econometric modelling	<ul style="list-style-type: none"> - Main linkages must be known - Main linkages with institutionalised and documented sectors - Main linkages are quantifiable flows of resources, i.e. high data quality needed - Econometric expertise 	<ul style="list-style-type: none"> - Complex linkages can be studied - Impact of variables can be estimated 	High
Indicator framework	<ul style="list-style-type: none"> - Main linkages must be known - Main linkages are quantifiable in single indicators, i.e. medium data quality - Expertise in measurement and statistics 	<ul style="list-style-type: none"> - Strong for monitoring a few linkages over time - Estimation of the impact of single variables less precise then below 	High
Impact study	<ul style="list-style-type: none"> - Main linkages must be known - Both quantitative or qualitative approaches are feasible, i.e. flexible on data quality - Expertise in quantitative data analysis and policy evaluation 	<ul style="list-style-type: none"> - Strong for illustrating linkages - Estimation of the impact of single variables less precise then above 	Medium
Case study	<ul style="list-style-type: none"> - Main linkages must not be known - Linkages can but don't have to be quantifiable, i.e. flexible on data quality - Expertise in qualitative social research - Field experience recommended 	<ul style="list-style-type: none"> - Strong for illustrating complex and indirect cause-and-effect relationships - Estimation of the impact of single variables only roughly 	Medium
Expert panel	<ul style="list-style-type: none"> - Only experts as source of information needed - Expertise for selecting experts and staff for administration of panel needed 	<ul style="list-style-type: none"> - Less subjectivity through communicative validation - Estimation of the impact of single variables only roughly 	Low

2.3 Proposals for Country Specific Case Studies

It is proposed to continue further research on the importance of cross-sector linkages and public policy networks mainly through qualitative case studies. This allows to draw a more comprehensive and empirically based picture that includes the most relevant factors and the direct and indirect cause-and-effect relationships. The aim is to provide an actual, insightful and thorough understanding of the problems but also of the opportunities for a limited number of countries in their specific regional context.

The six typological criteria discussed in section 1.3 can be used in order to formulate relevant research questions. The starting point will be in any rate the identification of the most relevant public policy domains and the type of linkages which interact with forest policy programmes. This allows to obtain a more solid knowledge of the forest sector's institutional framework which results from macro-economic, privatisation and land tenure policies. Public policies related to economic sectors as agriculture, mining, energy and transport, as well as those addressing rural and urban development, and environmental and nature protection will have to be considered. In order to obtain an accurate assessment of the important cross-sector links the analysis of chosen cases should not be restricted to a single regional context, direction and valence. Research issues should not be limited to negative effects from external policies. They should be based on a more comprehensive view on the actual and potential positive impacts on forestry programmes that can be associated with external public policy domains. Different levels of decision-making and different types of instruments will have to be examined.

A case study design that fits the best these objectives at country level can be based on already available qualitative information and data from quantitative studies, and be supplemented through more intensive document analysis and expert interviews. Researchers with field experiences in a certain region can be mandated to examine previously documents and findings and to undertake supplementary research within a defined set of policies and linkages to be analysed subsequently. It is important is to show the actors and stakeholder involved, and the mechanisms through which influences are exerted. Causal relationships between forest and other policy domains and the links and effects acting in both directions need to be explained.

The proposed case studies provide findings that are of use for concerned stakeholder groups, policy and decision makers, government officials in their respective sphere of competencies and the public. They will increase the understanding of cross-sector linkages as a decisive factor in forest conservation and forestry development and demonstrate the need to look beyond sector limits and boundaries of administrative bodies acting as if they could move in an interdependent policy environment. They will also be suited to provide new findings on complex cause-and-effect relationships. A phased approach in carrying out the case studies allows in a first stage to select policies and types of linkages that are particularly important in the empirical research context and to focus subsequently on those that merit further analysis. Based on the findings monitoring systems of policy development and interference can then be established which are of great importance for the implementation of more co-ordinated public measures related to sustainable land and forest uses.

The proposed research framework is illustrated in Figure 4. Focussing on an actor-centred approach the behaviour of forest owners and forest users is considered as the key determinant for evaluating the impact of public policies on the state, use and management of forests. As the particular qualities and characteristics of the prevailing ecosystems determine to a large extent the scope of action of forest owners and users, the relationship between forests and forestry actors is reciprocal. In addition, the state of the forest is largely influenced by natural processes and hazards. The socio-economic factors that influence the actions of forest owners and users have been identified on the left side of the figure. They are largely determined by social and cultural values, forest and other relevant public policies, and the national and local economies. All of these factors are interwoven with each other.

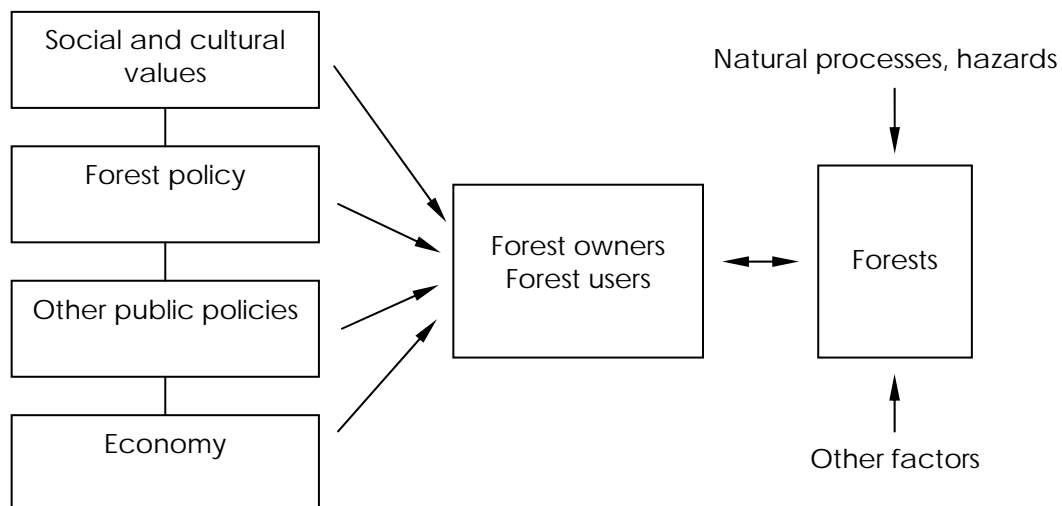
The central content of what is important in studying forest related public policies is thus embedded within the general framework. Cross-sector linkages refer to the effects of all relevant public policies on forest owners and forest users and through their actions and decisions on the extension and state of forests. The principal research question is what public policies mean exactly in a given context and to what extent they exercise positive and negative influences on forest owners, forest users, and on forests. The following considerations are relevant in this context:

- The *impact of a policy on the behaviour of forest owners and users* forms the primary cause-effect relation (Knoepfel et al. 1997: 103). Policy impact means of course not only an influence on identifiable actions, it may also imply lack of influence in orienting or

changing behaviours of the target addressees. In this context, some behaviours will be particularly important to observe like forest clearing, timber harvesting, uses of non-wood products, utility of forest services, management practices, and measures of biodiversity conservation and nature protection.

- The outcome of a policy on the state and development of forests is in fact to be considered as the ultimate policy goal and a kind of derived effect. How are the forests influenced through the behaviour of forest owners and users which are addressed by the objectives and instruments of the prevailing forest policy as well as by those which result from cross-sector linkages? The answer to this question characterises in fact the *actual net effects* of a policy network related to forests and forestry (Rossi and Freeman 1993: 214). Interesting effects that can be observed are, for instance, the size and distribution of forest land, the stand volumes maintained, the richness of different species, and the sustainability of forestry practices.

Figure 4: Framework Explaining Behaviour of Forest Owners and Users



The focus of the case studies is on public policy networks since sectors are always components of a more comprehensive economic, social and political pattern. A sector view only would not allow to analyse and understand all of its relevant effects and impacts.

Arguments in favour of such an approach are the following ones:

- The users of the findings from the country studies will probably be mainly policy makers and government officials from ministries and administrations concerned with forestry development and conservation as well as from other ministries and public authorities engaged in the promotion of productive land uses and environmental protection. The empirical findings on the combined impacts of various policies will contribute to and increase the understanding for more coherent implementation activities, decisions and plans of the public administration as a whole.
- Public policies are the domain where the state and the competent ministries have the possibility to influence the actual behaviour of forest owners and users.
- It is also necessary to reduce the complexity of a model to a level where meaningful new insights can be gained with a reasonable amount of resources for the research to be undertaken. Focussing on public policies appears to offer a reasonable balance and a feasible research framework. The major components are the analysis of the policy goals and instrument, of the policy impact on target groups, and of the net effects of cross-sector linkages on forests and forestry.

Studying *policy goals and instruments* is the initial steps of a policy programme analysis. It is based on an examination of the content of relevant legislation, official administrative documents, and budgets analysis (Knoepfel and Bussmann 1997, Knoepfel et al. 1997, Tsering 2000). The analysis should first show what the official public policy aims are with regard to forests and to the behaviour of forest owners and users. Second, it should made clear with which instruments the public policy plans to achieve these goals. However, concrete goals for the state of the forests or the behaviour of forest owners and users may not always exist. Their introduction would evoke protest from interest groups having other goals for the forests, or from forest owners and users trying to optimise their own scope of action. Knowing the goals of forest policy will be necessary to assess if an effect of external policies is positive or negative. If the forest policy has no clear goals, the cross-sector linkages are difficult to be specified. Comparing goals and instruments of external policies with those of forest policy can reveal incoherence and inconsistency. The limitation to this approach is, that one can not evaluate the importance of instruments for changing a behaviour or for solving a problems. In order to validate the findings, interviews with representatives of public administrations, land owners and land users as well as with other stake holders will be useful. This will decrease the danger of interpreting statements on goals as relevant that are in reality only of a declamatory nature.

The *impacts* of forest and external policies *on the behaviour of forest owners and users* have to be studied next. Behaviour of and influences on the actors depend on specific attributes. They cannot be studied in the same manner, for instance, for a large scale forest company, for farmers or for rural dwellers. Interviewing representatives of different actor groups reflect the perceptions and opinions of these actors on what they consider important policy influences that affect their behaviour and land use strategies. This allows to rate which policies are considered to have the most significant impacts. However, it does not provide the full picture in as much as factors which do not find attention among the actors may have a decisive influence as well. Another approach is based on case studies (e.g. Yin 1989) which use different sources of information. In the setting of rural and developing communities, ethnologic studies working with participatory observations may be appropriate (Jorgensen 1989).

Studying the *net effects of policies on forests and forestry* will be rather complex and costly. The choice of an appropriate research approach on net policy effects will depend on many factors and some of them may not yet be known. This refers, for instance, to the type of relevant policies, to the actors involved, and to the social and economic contexts in which these policies operate. It also applies to data availability and to the available resources to conduct the studies. It is difficult to measure net effects, i.e. those outcomes of a policy “that can be reasonably attributed to the intervention, free and clear of the effects of any other causes that may be at work” (Rossi and Freeman 1993: 221). Possible research designs are randomised experiments, quasi-experiments, simple before-and-after studies, cross-sectional studies, panel studies, and time-series analysis (Rossi and Freeman 1993). As these designs are time-consuming and expensive, one could opt for a judgmental approach and rely on an appraisal through experts who know the issues from field visits and personal experience. However, such an approach has to be rated “among the shakiest of all impact assessment techniques” (Rossi and Freeman 1993: 252).

Illustrating different kind of co-ordination mechanisms or network management: The ways of managing public intervention over the boundaries of different public policy domains need to be examined. Typical questions to be asked are, for instance: How do different agencies actually work together ? What agencies have which resources ? Are there contradictory and/or overlapping competencies at the policy setting and the implementation levels ?

Co-ordination mechanisms or network management include a wide array of possible strategies. In order to inspire readers for strategies, case studies should illustrate several approaches with different policy outputs and outcomes. Preferably, successful or rather successful strategies and cases should be compared with less successful ones.¹ We propose to concentrate on case studies with the following institutional aspects:

- Co-ordinated planning and consultation procedures
- Inter-ministerial co-ordination mechanisms;
- Establishment of fora for creating informal contacts (such as the Forest Forum for Decision-Makers in Finland);
- Integrating issues of external domains into the activities of forest administrations (e.g. “greening” of forest administration);
- Allocation of resources to forestry departments in relation to their tasks and as compared with those of other departments with important cross-sector linkages;

Research designs will vary for studying network management or inter-administrative co-ordination, the later being less standardised.

Studying policy network management can be done through a formal quantitative network analysis or through a qualitative analysis of the structures in place. The number and categories of actors and stakeholders involved in a determined policy domain can be assessed through a literature review and/or through selective interviews with experts. A formal network analysis uses a standardised interview of actors on their relation with other actors. This data is then analysed quantitatively and as a result networks can be graphically plotted (Knoke and Kuklinski 1982, Knoke and Kuklinski 1991). A qualitative analysis does not use a standardised interview methodology and relies only on selective qualitative interviews. The researcher will have to draw the network boundaries and the relations between different actors according to his judgement and interpretation of the qualitative interview statements. . Both approaches can be combined in studying the formal ways actors meet and share information.

¹ A source for finding cases is the ongoing project “A general analysis of forest laws and aspects of implementation in selected countries south of Africa” of the FAO Community Forestry Section. This study is – among others – surveying “cross-sector / advisory bodies and commissions” for many African countries (personal communication from Dominique Reeb).

For research on *inter-administrative co-ordination*, no single and commonly used methodology exists. Case studies using multiple sources of evidence (literature review, analysis of law and documents, expert interviews) are probably most appropriate. The actual mechanism to co-ordinate different agencies have to be studied, as well as the ways in which information is shared and consultation organised. Financial and human resources of different agencies have to be compared and their adequacy to be assessed in relation to the objectives of public policies for which they have governmental competencies. In order to make a judgement on the openness of public administrations for operating in more concerted policy networks, the educational background of the members, their perceptions and attitudes towards sustainable land management and conservation, as well their actual behaviour can be studied.

Policy and decision makers could benefit from empirical country studies of this kind at least in the following two respects:

- Ways and means to effectively co-ordinate different policies are illustrated and will be better understood. Policy-makers can be sensitised with regard to the strategic points that need more attention in developing positive linkages among different policy domains and to reach better co-ordination among public administrations in charge of implementing the goals and objectives from such policies. .
- The future role and potential of forest policy and forestry administrations in sustainable land and natural resources management, and their contributions in a multi-sector policy network will be reflected more clearly. In some cases the actual findings may show that the forest administrations are not yet in a position to make effective contributions to sustainable the development of renewable resources, especially if one compares their possibilities with those of administrations in other forest related public policy domains. This again will call for an institutional strengthening of the forest sector, to more co-ordinated public policy networks in sustainable land management as well as to more specialised and pro-active public forest services operating in a a constantly evolving network of public policies with important cross-sector linkages.

2.4 Conclusions

Important trends such as globalisation of the economy and of trade , internationalisation of environmental and nature protection, privatisation and a changing understanding of the role of the state, increased democratic participation of stakeholders concerned, a growing influence of non-governmental organisations in public decision making processes, as well as an increase and diversification of society's demand for forest goods and services form the context for further research on forest related public policies and cross-sector linkages in the domain of forestry. Such research has not only to be concerned with sector linkages relating to wood production and sustainable forestry practices at national level. Its perspectives extend to a growing range of public and private actors interested in many other forestry goods and services as well as in maintaining ecosystems biodiversity and in protecting cultural values associated with trees and forests. Policy processes and linkages at sub-national and local levels as well as those at a regional and world-wide scale need to be considered.

Agenda 21 and the follow-up processes of Rio set the international framework for an emerging international regime on forest conservation and forestry development. They establish a reasonable balance of economic , social and ecological factors as the primary aim of forestry development. Many public policies and cross-sector linkages have to be considered in order to improve the frame conditions for sustainable forest resources management as part of changing and evolving land use patterns. If the effects of external policies on the forestry sector have mainly found attention so far, it is now time to investigate to what extent public forest policy is of importance to and has effects on other policy domains within the global context of sustainable development of societies.

Investigations on cross-sector linkages in forestry have already been undertaken and need to be continued with more elaborated research designs such as natural resource accounts, econometric analysis, indicator frameworks, and impact studies. As important as improving appropriate research methods is the necessity to launch specific case studies at national, sub-national and local levels which provide more empirical information on success as well as on draw-backs in a given social, economic and political context. Quantitative data based research is needed as much as qualitative analysis in order to provide more information on the nature, structure and functioning of different policies and cross-sector linkages.

If relevant effects from external policy linkages on the forest sector have been examined with an increasing interest, the same cannot be said with regard to the management of such linkages and of complex policy networks. There is a considerable interest to engage this kind of research more consistently and to investigate how co-ordinating mechanisms such as network management and inter-administrative co-ordination can be improved and contribute to reach national forest policy goals. This implies to reconsider the current role of forest administrations and their ability to operate with success in a given policy and administrative setting.

Cross-sector linkages and co-ordinating mechanisms are complex and their environment is dynamic and forces at work can probably not be controlled in one single study. The complexity and instability of the situation bears consequences for a feasible research approach. By now it is difficult to imagine anything else than a qualitative and open approach, concentrating on a series of case studies. It is important to organise the research work in such a manner that forthcoming empirical findings will be comparable among each other.

Further research should identify in a first stage the most significant policy domains, the kind of linkages that are most important and the scale of positive and negative effects which are likely to result from them. The criteria for selecting the major factors to be researched subsequently in more detail should be the usefulness of new knowledge gained to the main addressees of these studies, and in particular to the representatives of national public administrations and policy makers. It is advisable to start with cases studies on a national level that analyse on the linkages between forest policy options and one or two external public policies.

Researchers with country or regional experiences will be needed in order to make a meaningful selection of relevant cross-sector linkages, to carry out consistent document analysis, to organise expert interviews, and to resume and interpret their results. The focus of the research should be on the actors and stakeholders involved, the instruments and procedures that influences their behaviour, and on the causal relationship between forest and other policy domains in both directions. New approaches in co-ordination mechanisms as well as the likely limitations of co-ordination need to be examined.

Bibliography

- Abeywickrema, N. (1987). "Forestry Sector Policies and their Impact on Implementation of Irrigation Power Generation Programmes". FAO, Rome.
- Abramovitz; J.N.; Mattoon, A.T. (2000). "Paper Cuts - Recovering the paper Landscape". Worldwatch Paper 149
- Amelung, T. and Diehl, M. (1992). "Deforestation of Tropical Rain Forests. Economic Causes and Impact on Development", Vol. 241. Mohr, Tübingen.
- Angelsen, A. and Kaimowitz, D. (1999), "Rethinking the Causes of Deforestation: Lessons from Economic Models", World Bank Research Observer, 14, 73-98.
- Aylard, B. (forthcoming). "Economic Analysis of Land-use Change in a Watershed Context".
- Barr, Ch. (2000). "Profits on paper - The Political Economy of Fiber, Finance, and Debt in Indonesia's Pulp and Paper Industries". In: Barr, Ch.: Banking on Sustainability - A Critical Assessment of Structural Adjustment in Indonesia's Forest and Estate Crop Industries. CIFOR and WWF, Macroeconomics Program Office.
- Barr, Ch. (forthcoming). "Will HPH Reform Lead to Sustainable Forest Management? - Questioning the Assumptions of the "Sustainable Logging" Paradigm in Indonesia". In Colfer, C.J.; Pradnja Resosudarmo, I.A., eds, (forthcoming): Which Way Forward? - Forests, Policy and People in Indonesia. Resources for the Future, Washinton, D.C.
- Bradburn N. M. and Sudman, S. (1988). "Polls and Surveys: understanding what they tell us" Jossey-Bass, San Francisco.
- Brunner, A.G.; Gullison, R.E.; Rice, R.E.; da Fonseca, A.B. (2001) "Effectiveness of Parks in Protecting Tropical Biodiversity". Science 291: 125-128-
- Buttoud, G. (1998). "Les politiques forestières", Vol. 3335. Presses Universitaires de France, Paris.
- CIFOR. Center for International Forestry Research: Poley Listserve - D. Kaimowitz
- Cirelli, M. T. (1999). "Trends in Forestry Legislation: Central and Eastern Europe". FAO Legal papers Online Nr.2; Rome: <http://www.fao.org/Legal/default.htm> .
- Cirelli, M.-T.; Schmithüsen, F. (2000). "Trends in Forestry Legislation: Western Europe" FAO Legislative Study, Rome, Online Nr. 10: <http://faolex.fao.org/faolex/eng/index.html>
- Commission on Sustainable Development (1996). "Forests in the Global Political Debate. The Intergovernmental Panel on Forests: its mandate and how it works". United Nations, New York <http://www.un.org/esa/sustdev/ecn17ipf1996-ifp.htm> .
- Commission on Sustainable Development (1996). "Implementation of Forest-Related Decisions of the United Nations Conference on Environment and Development at the National and International Levels, including an Examination of Sectoral and Cross-Sectoral Linkages. Progress in National Forest and Land-Use Plans.". United Nations, New York <http://www.un.org/documents/ecosoc/cn17/ipf/1996/ecn17ipf1996-8.htm> .
- Commission on Sustainable Development (1997). "Report of the Ad Hoc Intergovernmental Panel on Forests on its fourth session (New York, 11-21 February 1997). E/CN.17/1997/12" United Nations Commission on Sustainable Development, New York.

- Communities, European (1999), "Council Regulation (EC) No 1257 of 17 May 1999 on Support for Rural Development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain Regulations", Official Journal of the European Communities, 80-102.
- Contreras, A. (2000). "Selected Forest Institutional Issues in Africa. Draft for Comments" FAO/World Bank, Rome/Washington D.C.
- Contreras, A. (2000). "The Underlying Causes of Forest Decline" CIFOR, Bogor.
- Csóka, P. (1998). "Forest Policy Activities in the Countries in Transition in their Preparation for the EU" In: Glück, P., Kupka, I. and Tikkanen, I. (eds.) Forest Policy in the Countries in Transition - Ready for the European Union?, Vol. 21. European Forest Institute, Joensuu, pp. 9-20.
- Cubbage, F. W. and Siegel, W. C. (1997). "The Impact of Federal Environmental Law on Forest Resource Management in the United States" IUFRO World Series Volume 7: 93-108; IUFRO Secretariat, Vienna. .
- Cubbage, F., O'Laughlin, J. and Bullock, C. Forest Resource Policy", 1993 ed. John Wiley & Sons, New York/Chichester .
- de Montalembert, M.-R. and Schmithüsen, F. (1993), "Policy and Legal Aspects of Sustainable Forest Management", *Unasylva*, 44: 3-9.
- de Montalembert, M. R. and Schmithüsen, F. (1994). "Policy, Legal and Institutional Aspects of Sustainable Forest Management". FAO Forestry Paper, Vol.122: 153-171, FAO, Rome.
- de Montalembert, M.-R. (1994). "Cross-sectoral Linkages and the Influence of External Policies on Forest Development" Second Meeting of the Malaysia-Canada co-sponsored Intergovernmental Working Group on Global Forests, Ottawa, pp. 23.
- de Montalembert, M.-R. (1995), "Cross-sectoral Linkages and the Influence of External Policies on Forest Development", *Unasylva*, 46, 25-37.
- ECOSOC (2000). "Draft Resolution. Report of the fourth session of the Intergovernmental Forum on Forests", Vol. E/2000/L.32*. United Nations Economic and Social Council, New York.
- FAO (1993). "Forestry Policies of Selected Countries in Asia and the Pacific", FAO Forestry Paper Nr. 115, Rome.
- FAO (1994). "The State of Food and Agriculture 1994". FAO, Rome.
- FAO (1996). "Forestry Policies of Selected Countries in Africa": FAO Forestry Paper Nr. 132, Rome.
- FAO (1996). "Formulation, Execution and Revision of National Forestry Programmes. Basic Principles and Operational Guidelines" Food and Agriculture Organization of the United Nations, Rome.
- FAO (1998). "Forestry Policies in the Caribbean and Latin America". FAO Forestry Paper Nr. 137/1 and 137/2, Rome.
- FAO (1998). "Trends in Forestry Law in America and Asia". FAO Legislative Study Nr. 66, Rome. (French and Spanish Version published in 1999)
- FAO (1999). "State of the World's Forests". Food and Agriculture Organization of the United Nations, Rome <http://www.fao.org/forestry/FO/SOFO/SOFO99/sofo99-e.stm> .

- FAO (1999). "Trends in Forestry Law in Africa and Europe. FAO Legislative Study Nr. ... , Rome.
- FAO (2000). "Pulp and paper capacities. Survey 1999-2004" United Nations Food and Agriculture Organisation, Rome.
- FAO/ECE/ILO (2000). "Public Participation in Forestry in Europe and North America". Joint Committee Team of Specialists on Participation in Forestry, Working Paper 163; Sectoral Activities Department, International Labour Office, Geneva.
- Flick, W.A. (1997). "Ecosystem Management as American Law". IUFRO World Series Volume 7: 193-203; IUFRO Secretariat, Vienna.
- Gaddis, D.A.; Cabbage, F.W. (1997). "A century of Wetland Protection and Legislation in the United States - Dredging Navigational Rivers to Preserving Flatwoods Functions and Values", IUFRO World Series Volume 7: 144-161; IUFRO Secretariat, Vienna.
- GAO (1990). "Case Study Evaluations" United States General Accounting Office. Program Evaluation and Methodology Division, Washington D.C.
- GAO (1991). "Designing Evaluations. GAO/PEMD-10.1.4" United States General Accounting Office-Program Evaluation and Methodology Division, Washington D.C.
- Glück, P., Kupka, I. and Tikkanen, I. (1998). "Forest Policy in the Countries with Economies in Transition - Ready for the European Union?" EFI Proceedings, Vol. 21. European Forest Institute, Joensuu , pp. 171.
- Hanf, K. and Scharpf, F. W. (1978). "Interorganizational Policy Making: Limits to Coordination and Central Control" Sage, London.
- Hickman, C.A. (1997). "Federal Protection of Threatened and Endangered Species - Implications for Forest Resource Management in the United States". IUFRO World series Volume 7: 116-132, IUFRO Secretariat, Vienna.
- Hickman, C.A.; Hickman; M.R. (1997). "Legal Limitations on Governmental Regulation of Private Forestry in the United States". IUFRO World Series Volume 7: 291-304; IUFRO Secretariat, Vienna.
- Hodges, D.G. (1997). "A Review of Federal and State Law Affecting the Use of Prescribed Fire for Silvicultural Operations in the Southern United States", IUFRO World Series Volume 7: 162-169; IUFRO Secretariat, Vienna.
- Hopple, G. W. and Kuhlmann, J. A. (1981). "Expert-Generated Data. Applications in International Affairs". Westview Press, Boulder .
- Humphreys, D. (1996). "Forest Politics. The Evolution of International Co-operation" Earthscan, London.
- Intergovernmental Forum on Forests (1999). "Report of the Intergovernmental Forum on Forests on its third session". United Nations, Geneva
<http://www.un.org/esa/sustdev/iff3.pdf>.
- IPCC (2001). "Climate Change Impacts, Assessment, and Vulnerability - A Summary for Policymakers". International Panel for Climate Change.
- IUFRO Research Group 6.1300: Forest Law and Environmental Legislation – Current Bibliography Online: <http://iufro://boku.ac.at/iufro/d6/hp61300.htm>
- Jagger, P.; Pender J. (2000). "The Role of Trees for Sustainable Management of Less-Favored Lands - The Case of Eucalyptus in Ethiopia". EPTD Discussion Paper Nr. 65; International Food Policy Research Institute, Washington D.C.

- Jorgensen, D. L. (1989). "Participant Observation: a Methodology for Human Studies", Vol. 15. SAGE, Newbury Park.
- Kaimowitz, D. (1996). "Livestock and Deforestation. Central America in the 1980s and 1990s: A Policy Perspective" CIFOR, Jakarta.
- Kaimowitz, D., Byron, N. and Sunderlin, W. (1998). "Public Policies to Reduce Inappropriate Tropical Deforestation" In: Lutz, E., Binswanger, H., Hazell, P. and McCalla, A. (eds.) Agriculture and the Environment. Perspectives on Sustainable Rural Development. World Bank, Washington D.C. , pp. 302-22.
- Kaimowitz, D. and Angelsen, A. (1999). "The World Bank and Non-Forest Sector Policies that Affect Forests".
- Kaiser, F.H.; Royer, J.P. (1997). "The Appropriate Role of U.S. Government Programs in Fostering U.S. Forest Investment". IUFRO World Series 7: 329-335; IUFRO Secretariat, Vienna.
- Knoepfel, P. (1995). "New Institutional Arrangements for a New Generation of Environmental Policy Instruments: Intra- and Interpolicy Co-operation" In: Dente, B. (ed.) Environmental Policy in Search of New Instruments. Kluwer Academic Publishers, Dordrecht , pp. 197-233.
- Knoepfel, P. and Bussmann, W. (1997). "Die öffentliche Politik als Evaluationsobjekt" In: Bussmann, W., Klöti, U. and Knoepfel, P. (eds.) Einführung in die Politikevaluation. Helbing & Lichtenhahn, Basel und Frankfurt am Main , pp. 58-77.
- Knoepfel, P., Varone, F., Bussmann, W. and Mader, L. (1997). "Evaluationsgegenstände und Evaluationskriterien" In: Bussmann, W., Klöti, U. and Knoepfel, P. (eds.) Einführung in die Politikevaluation. Helbing & Lichtenhahn, Basel, Frankfurt am Main , pp. 78-118.
- Knoke, D. and Kuklinski, J. H. (1982). "Network Analysis" Sage, Beverly Hills.
- Knoke, D. and Kuklinski, J. H. (1991). "Network Analysis: Basic Concepts" In: Thompson, G., Frances, J. and Levacic, R. (eds.) Markets, Hierarchies and Networks: The Coordination of Social Life. Sage, London , pp. 173-182.
- Le Master, D.C.; O'Leary, J. T. Sample, V.A. (1997). "Forest Service Response to Changing Public Values, Policies and Legislation During the Twentieth Century in the United States", IUFRO World Series Volume 7: 43-76; IUFRO Secretariat, Vienna.
- Limacher, S., Kübler, D., Kissling-Näf, I. and Zimmermann, W. (1999). "Sustainability Assessment of Swiss Forest Policy. Background Report" Chair of Forest Policy and Forest Economics, Zürich.
- Linstone, H. A. and Turoff, M. (1975). "The Delphi Method. Techniques and Applications". Addison-Wesley, Reading .
- Liss, B.-M. (1999). "The Role of the Tropical Forests Action Programme and National Forest Programmes in Sustainable Forest Development" In: Glück, P., Oesten, G., Schanz, H. and Volz, K.-R. (eds.) Formulation and Implementation of National Forest Programmes. Volume I: Theoretical Aspects, Vol. 30. European Forest Institute, Joensuu , pp. 26-38.
- Luckert, M.K.; Haley, D. (1997). "Problems Governments Face when Designing Forest Tenure Systems – An Overview of Canadian Tenures". IUFRO World Series Volume 7: 217-228; IUFRO Secretariat, Vienna.

- Mandondo, A. (2000). "Forging (un)democratic Resource Governance Systems from the Relic of Zimbabwe's Colonial Past. Institute of Environmental Studies/University of Zimbabwe and CIFOR.
- Mayntz, R. (1992), "Modernisierung und die Logik von interorganisatorischen Netzwerken", *Journal für Sozialforschung*, 32, 19-32.
- Mayring, P. (1990). "Qualitative Inhaltsanalyse: Grundlagen und Techniken" Deutscher Studien Verlag, Weinheim.
- Michaelsen, T. (2000). "National Forest Programmes in the IPF/IFF Process" In: Europe, M. C. o. t. P. o. F. i. (ed.) *The Role of National Forest Programmes in the Pan-European Context. Presentations and outcomes of the NFP workshop organised by the MCPFE in Tulln/Austria, 13-14 September 1999.* MCPFE. Liaison Unit, Vienna , pp. 11-14.
- Nohlen, D., Schultze, R.-O. and Schüttemeyer, S. S. (1998). "Lexikon der Politik. Band 7. Politische Begriffe". C.H.Beck, München , pp. 744.
- OECD (1994). "Natural Resource Accounts: Taking Stock in OECD Countries", Vol. 84. OECD, Paris.
- OECD (1999). "Indicators for the Integration of Environmental Concerns into Transport Policies" Working Group on the State of the Environment, Paris.
- OECD (2000). "Assessing the Environmental Effects of Trade Liberalisation Agreements: Methodologies" OECD, Paris.
- Parsons, W. (1997). "Public Policy. An Introduction to the Theory and Practice of Policy Analysis", paperback ed. Edgar Elgar, Cheltenham.
- Peck, T. J.; Descargues, J. (1997). "The Policy Context for the Development of the Forest and Forest Industries Sector in Europe" United Nations Economic Commission for Europe, New York and Geneva.
- Peck, T.; Descargues, J. (1997). "Le context politique pour le développement du secteur de la forêt et des industries forestières en Europe", *Forstwissenschaftliche Beiträge* Nr. 18; Professur Forstpolitik und Forstökonomie, ETH, Zurich.
- Repetto, R. and Gillis, M. (1988). "Public Policies and the Misuse of Forest Resources". Cambridge University Press, Cambridge and New York , pp. 432.
- Rossi, P. H. and Freeman, H. E. (1993). "Evaluation. A Systematic Approach", fifth ed. SAGE, Newbury Park.
- Rossi, P. H., Freeman, H. E. and Hofmann, G. (1988). "Programm-Evaluation. Einführung in die Methoden der angewandten Sozialforschung" Enke, Stuttgart.
- Rubin, H. J. and Rubin, I. S. (1995). "Qualitative Interviewing: the Art of Hearing Data" Sage, Thousand Oaks.
- Rudel, T. K., Flesher, K., Bates, D., Baptista, S. and Holmgren, P. (2000), "Tropical Deforestation Literature: Geographical and Historical Patterns", *Unasylva*, 51, 1-12.
- Sabatier, P. A. (1988), "An Advocacy Coalition Framework of Policy Change and the Role of Policy Oriented Learning therein", *Policy Sciences*, 21, 129-168.
- Scharpf, F. W. (1993). "Co-ordination in Hierarchies and networks" In: Scharpf, F. W. H. (ed.) *Games in Hierarchies and Networks.* Campus/Westview, Frankfurt u.a. , pp. 125-165.

- Scharpf, F. W. (1993). "Positive und negative Koordination in Verhandlungssystemen" In: Héritier, A. (ed.) *Policy-Analyse. Kritik und Neuorientierung*, Vol. 24. Westdeutscher Verlag, Opladen, pp. 57-83.
- Schmithüsen, F.; de Montalembert, M.-R. (1991). "Current Trends in Forest Policies". Position Paper 10th World Forestry Congress; *Revue forestière Française*, Hors Série Volume 7: 9-18, Paris.
- Schmithüsen, F. (1995). "Evolution of Conservation Policies and their Impact on Forest Policy Development – The Example of Switzerland". *The Commonwealth Forestry Review: Special Issue on Forestry and Nature Conservation*; Volume 74 (1): 45-50.
- Kaimowitz, D., Byron, N. and Sunderlin, W. (1998). "Public Policies to Reduce Inappropriate Tropical Deforestation" In: Lutz, E., Binswanger, H., Hazell, P. and McCalla, A. (eds.) *Agriculture and the Environment. Perspectives on Sustainable Rural Development*. World Bank, Washington D.C., pp. 302-22.
- Schmithüsen, F., ed. (1996), "Experiences with Public Ownership and Joint Management Systems" *Forest Research Contributions Vol. 17, Forest Policy and Forest Economics*, ETH, Zurich
- Schmithüsen, F. and Siegel, W. C. (1997). "Developments in Forest and Environmental Law Influencing Natural Resource Management and Forestry Practices in the United States of America and Canada. Selected Contributions submitted to the IUFRO Research Group 6.13.00 Forest Law and Environmental Legislation". IUFRO Secretariat and Chair of Forest Policy and Forest Economics, Vienna and Zurich, pp. 375.
- Schmithüsen, F., Herbst, P. and Le Master, D. (1999). "Experiences with New Forest and Environmental Laws in European Countries with Economies in Transition. Proceedings of the International Symposium Ossiach, June 1998" *Forstwissenschaftliche Beiträge der Professur Forstpolitik und Forstökonomie*, Vol. 21. ETH, Zürich, pp. 142.
- Schmithüsen, F. (2000). "The Expanding Framework of Law and Public Policies. Governing Sustainable Uses and Management in European Forests". In: Schmithüsen, F., Herbst, P. and Le Master, Dennis C. (ed.): *Forging a New Framework for Sustainable Forestry: Recent Developments in European Forest Law*. IUFRO World Series Volume 10. IUFRO, Vienna, pp. 1-27.
- Schmithüsen, F.; Herbst, P.; Le Master, D.C., Eds, 2000: *Forging a New Framework for Sustainable Forestry – Recent Developments in European Forest Law*. IUFRO World Series Volume 10; IUFRO Secretariat, Vienna.
- Schmithüsen, F., Iselin, G. and Herbst, P. (2000). "Challenges in Implementing Forest and Environmental Legislation in European Countries with Economies in Transition. Proceedings of the Second International Symposium Ossiach, September 1999" *Forstwissenschaftliche Beiträge der Professur Forstpolitik und Forstökonomie*, Vol. 23. ETH, Zürich, pp. 111.
- Schmithüsen, F. and Zimmermann, W. (2000). "The New Federal Swiss Forest Legislation: Constitutional Competencies, Objectives, Instruments and Policy Actors", Vol. 6. Swiss Federal Institute of Technology, Zurich. Schmithüsen, F.; de Montalembert, M.-R. (1991). "Current Trends in Forest Policies", Position Paper 10th World Forestry Congress; *Revue Forestière Française* (1991), Hors Série Vol. 7: 9-18, Paris.
- Schubert, K. (1991). "Politikfeldanalyse" Leske & Buderich, Opladen.

- Siegel, W.C. (1997). "The Interaction of State and Federal Water Quality Legislation in the 133-143; IUFRO Secretariat, Vienna.
- Siegel, W.C.; Martus, C.E. (1997). "Local Government Forest Ordinances in the United States". IUFRO World Series Volume 7; IUFRO Secretariat, Vienna.
- Tarasofsky, R.G., (1995): The International Forest Regime – Legal and Policy Issues. IUCN/WWF, 1995
- Tsering, Decheng (2000). "Biodiversity Policy in Bhutan". Doctoral Thesis at the chair of Forest Policy and Economics. Swiss Federal Institute of Technology, Zürich.
- UNECE and FAO (1996). "European Timber Trends and Prospects: Into the 21st Century", Vol. 11. United Nations, Geneva.
- United Nations Conference on Environment and Development (1992). "Agenda 21" UNCED, Rio.
- United Nations Forum on Forests (2001). "Suggestion for a Multi-Year Programme of Work of the United Nations Forum on Forests", Vol. 1. United Nations Forum on Forests, New York.
- von Prittwitz, V., Wegrich, K., Bratzel, S. and Oberthür, S. (1994). "Politikanalyse" Leske und Budrich, Opladen
- Wallace, J.-L. (1997). "Evolution of Timber Revenue Policies on Crown Land in the Province of Ontario/Canada". IUFRO World Series Volume 7: 273-290; IUFRO Secretariat, Vienna.
- Wear, D.N.; Steward, F.J. (1997). "Determining Timber Harvest Levels and Selling Public Timber in the United States". IUFRO World Series Volume 7: 170-192; IUFRO Secretariat, Vienna.
- World Bank (1991). "The Forest Sector". World Bank, Washington D.C.
- World Bank (1993). "Argentina - Forestry Sector Review". World Bank, Washington D.C. .
- World Bank (1998). "Forest Policy Implementation Review and Strategy. Initiating Memorandum" World Bank, Washington D.C.
- World Bank's Forests Team (2000). "Toward a Revised Forest Strategy for the World Bank Group, Draft Discussion Paper, December 24, 2000, with an Introductory Note from the World Bank's Forests Team" World Bank, Washington D.C.
- Wunder, S. (2000). "Oil Wealth and the Fate of the Forest: Gabon (Draft)". CIFOR, Bogor.
- Wyss, S. and Zimmermann, W. (1997). "Kohärenz durch Kooperation und Koordination. Ansätze und Fragmente der politikwissenschaftlichen Theorie und empirische Beispiele aus der Regional- und Umweltpolitik", Vol. 168. IDHEAP, Chavannes-près-Renens
- Yin, R. K. (1989). "Case Study Research. Design and Methods", revised edition ed., Vol. 5. Sage, Newbury Park, London, New Delhi
- Zimmermann, W. (1994), "Neue Instrumente braucht das Land?", Umweltrecht in der Praxis, 8, 237-63.