Forest management planning in Congo Basin rainforests

A critical analysis of the state of art and design of a new planning system as a contribution to sustainable forest management

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I still remember my mother - Megni Donfack Julienne

Summary

Tropical forests are part of the world's ecosystems and a significant reservoir of biodiversity. The Central African (or Congo Basin) region contains the second largest and still uninterrupted tracts of contiguous dense tropical rainforest area in the world, second in size only to the Amazon rainforest. However, their progressive disappearance constitutes one of the major environmental problems (deforestation and forest degradation) nowadays. Efforts around the world are focused on achieving sustainable forest management since the United Nations summit in Rio de Janeiro (1992), an approach that balances social, economic and environmental objectives. Within this framework, the aim of this thesis was to critically analyse the forest management planning situation in Cameroon, as well as to propose a new planning system.

The methodology applied consisted first of all of literature analyses to gain an overview and identify factors limiting the sustainable use of rainforests (with emphasis on forest planning) in the Congo Basin resulting from an inadequate institutional frame and ineffective forest management planning systems and practices. These secondary data analyses also demonstrated that forest management planning is currently in transition in most parts of the world. The need for the development of a new approach in planning arose due to the fact that the rainforests are common pool resources. Additionally, based on this analysis, a new definition of forest management planning was proposed and a new planning system called combined planning system (CPS) was then designed after its improvement through discussions with experts, mostly academics.

In a next step the theoretical CPS model served as a basis for deducing criteria for an empirical and explorative study aimed at critically analysing of the forest management planning situation in Cameroon. The result of the analysis confirmed the theoretical setting of the CPS model concerning the forest management planning actor groups that need to be involved in forest management planning processes. Six actor groups were adopted as CPS working groups (CPSWG) to be equally integrated as "institutions" jointly performing each step of the planning and implementation process. The forest management plan is referred to as a "social contract" between actors in this thesis which clearly diverges from the classical top down and bottom up approach. In individual interviews group members provided valuable information. The contributions made by respondents when grouped together are as follows:

the government group contributed 22% of the information, the forest enterprise group 19%, the local actor group 19%, the forest planners group the 10%, the conservationists group 15%, and the forest donors group 8%. The explorative study results show that the majority (60%) of the respondents define forest management planning by focusing on the technical or tactical aspects which is labelled as tactical planning subsystem in this study. This finding underlines the need for integrating aspects related to values and strategies, as well as institutional governance into the CPS model. Additionally, this explorative study provides a comprehensive understanding of the specific forest management planning problems in Cameroon and explains how the CPS model can address these problems. Results show that 39% of the forest management planning problems are related to institutional and governance subsystem problems. Then, problems associated with the value and strategic subsystem follows with 38%. In contrast, only 16% of the problems of forest management planning result from the technical or tactical planning subsystem. Nonetheless it is mostly the latter which is mostly addressed in forest management planning research.

Lastly, the combined planning system as a contribution to address shortcomings in forest management planning is described. The CPS model is divided into the already mentioned subsystems, namely the value and strategic subsystem, the institutional governance subsystem, and the tactical planning subsystem. This model identifies important social, economic and environmental factors which could improve the effectiveness of the planning outcome implementation, simplify the planning process, and facilitate active participation of relevant actors, as well as conflict management in a dynamic process. The CPS model is an innovative conceptual and methodological approach in forest management planning for the Congo Basin region which contributes to achieving sustainable use of the rainforests resources. However, there are also limits to the CPS model, which remain to be challenged. Therefore recommendations in form of guidelines for the CPS implementation are made making it possible to fine-tune the model to the demands of forest planners and other forest management planning actors. At the same time, there are recommendations for further research, to continue developing the CPS model designed and presented in this thesis and to test the application of the CPS model in the real world.

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List of abbreviations and acronyms

AAC	Annual Allowable Cut
AC	Allowable Cut
AF	Arbeitsgemeinschaft Forsteinrichtung
APN	Amelioration des Peuplements Naturelles
ATIBT	Association Technique Internationale des Bois Tropicaux
ATO	African Timber Organisation
AZPAF	Arbeitskreis Zustanderfassung und Planung in der Arbeitsgemeinschaft Forsteinrichtung
BDH	Diameter at Breast Height
BFT	Bois et Forêts des Tropiques
CANA	Climate Action Network Australia
CAR	Central African Republic
CBD	Convention on Biological Diversity
CBFP	Congo Basin Forest Partnership
CBP	Community based planning
CFC	Concession Forestiére Camerounaise
CG	Conservationists Group
C&I	Criteria and Indicators
CIFOR	Center for International Forestry Research
CIRAD	Centre International de Recherche Agronomique et de Développement
COMIFAC	Commission for the Forests of Central Africa Commission
CPR	Common Pool Resource
CPS	Combined Planning System
CPS1	Combined Planning System first draft
CPSWG	Combined Planning System Working Group
CSP	Control Sampling Plot
CSS	Cellos Silvicultural System
DMA	Minimum Administrative Cutting Diameters Eligible
DME	Minimum FMP Cutting Diameters Eligible
DRC	Democratic Republic of Congo
FAO	Food and Agriculture Organization of the United Nations
FDG	Forest Donors Group

FEG	Forest Enterprise Group
FM	Forest Monitor
fmp	Forest Management Plan
FMP	Forest Management Planning
FMU	Forest Management Unit
FPG	Forest Planner Group
FPP	Forest Peoples Programme
FQS	Forum qualitative Sozialforschung
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
GFW	Global Forest Watch
GG	Government Group
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GPS	Global Positioning System
Gt	Gigatonnes
GTZ	Gesellschaft für Technische Zusammenarbeit
Ha	Hectare
IAD	Institutional Analysis and Development
IASCP	International Association for the Study of Common Property
IFF	Intergovernmental Forum on Forests
IFMPI	Integrated Forest Management Planning Information
IGS	Institutional Governance System
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPF	Intergovernmental Panel on Forests
ITTO	International Tropical Timber Organisation
IUFRO	International Union of Forest Research Organizations
IWR	Institute for Water Resources
LAG	Local Actor Group
LULUCF	Land Use, Land-Use Change and Forestry
MARPP	Active Method of Participatory Research and Planning
MCD	Minimum Cutting Diameters
MINEF	Ministère de l'Environnement et des Forêts

MINFOF	Ministry of Forest and Fauna
Mt	Megatonne
MUS	Malayan uniform system
NGOs	Non-Governmental organizations
NIE	New Institutional Economics
NOAA	National Oceanic and Atmospheric Administration NOAA
NPFE	Non Permanent Forest Estate
NRM	Natural Ressource Management
NTFPs	Non Timber Forests Products
OTPIC	Online Training Program on Intractable Conflict
PCI	Principles Criteria and Indicators
PFE	Permanent Forest Estate
PRC	Présidence de la République du Cameroun
PSFE	Programme Sectorielle Forêt et Environnement
REDD	Reducing Emissions from Deforestation in Developing countries
REM	Resource Extraction Monitoring
RIL	Reduced Impact Logging
SCOPE	Sustainability indicators a scientific assessment
SFM	Sustainable Forest Management
SIPP	System intelligent participation process
SMS	Selective Management System
SNCFF	Stratégie Nationale de Contrôle Forestier et Faunique
SPU	Serial Planning Unit
TCP	Tropenbos Cameroon Programm
TPS	Tactical Planning System
TSS	Tropical Shelterwood System
UNCED	United Nations Conference on Environment and Development
UNECE	United Nation Economic Commission for Europe
UNEP	United Nation Environmental Programme
UNFCCC	United Nation Framework for Climate Change
US	United States
US$	United States Dollars
VCS	Voluntary Carbon Standard
VLUP	Village Land Use Plan

VSS	Value and Strategic System
WB	World Bank
WRI	World Resources Institute
WWF	World Wide Fund for Nature

1 Introduction

Rainforests are among the most diverse and widespread ecosystems on earth. They provide mankind with a wide range of economic, social and environmental benefits. However, these forests are increasingly being threatened among other causes by unsustainable logging practices. The rapid rate of degradation and loss of tropical rain forests is one of the world's most prominent environmental concerns. Efforts around the world are focused on achieving sustainable forest management since the 1992 United Nations (UN) declaration (Rio de Janeiro), an approach that balances social, economic and environmental objectives. A result of these efforts is the fact that the legal and policy environment is improving in many countries in Central Africa, as evidenced by political commitment at the highest level, by the development of national forest programmes throughout the sub regions, and by progressive new legislation in many countries. Regional partnerships provide also a solid framework for appropriate action. However, the investment in forestry remains far below what is required; the capacity to enforce laws and to implement programmes effectively remains weak in many countries. Consequently, in most tropical countries, forest management planning has been implemented insufficiently; only 1-5% of the tropical forests are mentioned to be sustainably managed. This situation is more critical in Central Africa, where the extraction volumes exceed production of about 174 %. Until now there have been crucial limitations in the design of forest management plans and their implementation. The reasons for this are related both to the insufficient planning techniques and the surrounding environment such as enormous diversity of the resource, socio-economic conditions and the inadequate institutional and legal framework. In this context, there is a need for developing a simple and practical forest management planning system that could be easily implemented and represents a useful sustainable forest management tool. The main objective of the thesis is to build a dynamically organised and consistent planning system, which will be applicable in medium-sized planning areas of permanent forest estates, e.g. a forest management unit. The first chapter will provide the contextual overview of the thesis dealing with the importance of the rainforests and identifying forest management planning and/or forestry problems. It highlights the research objectives and questions pursued by the thesis, as well as the research process and the methods applied. At the end of this chapter linkages between research objectives, questions, the research process and methods will be summarised and illustrated.

1.1 Background

Geographically, the tropics lie between the tropic of Cancer (23°5 N) and the tropic of Capricorn (23°5 S).[1] In phyto-geographic and ecological terms, it is useful to define the tropics according to climate and vegetation, often by the 20°C annual isotherm, approximately 30°N and 26°S.[2] Under this definition, tropical forests cover 1.680 million hectares (ha); 635 million ha can be found in Africa, of which 237 million ha alone are in Central Africa, the "Congo Basin" (see Figure 9-1 in Appendix A).[3] Depicted as a uniform mass of green, the rainforests of the Congo Basin constitute the second largest, vast and still uninterrupted tracts of contiguous dense tropical rainforests area in the world from the Gulf of Guinea to the Albertine Rift. They follow the Amazonian rainforests. Cameroon, with 21,436 million ha of rainforests, has the second largest forest reserve in Africa after the Democratic Republic of Congo (DRC).[4] Approximately 30 million people[5] (see Figure 9-2 and 9-3 in Appendix B), from over 150 ethnic groups living in or near those forests (Congo Basin) are affected by extreme poverty due to lack of investments in basic social services.[6] The contribution of the timber sector to the gross domestic product (GDP)[7] is difficult to assess and differs substantially from country to country. However, the Congo Basin Forest Partnership (CBFP)[8] estimates it to be 6-13%[9] of the GDP.

[1] See Jordan & Montagnini 2005.
[2] Lamprecht 1989 quoted by Vanclay 1996; Amsallem et al. 1999.
[3] Congo Basin includes here Cameroon, Central African Republic (CAR), Congo, Democratic Republic of Congo (DRC), Equatorial Guinea, Democratic Republic of Sao Tome and Principe and Gabon. It is an important forested region with approximately 57% of its area covered with natural forests (Food and Agriculture Organisation of the United Nations (FAO) 2001). Containing a quarter of the world's remaining tropical forest (Mokombo 2003), currently more than 600.000 km^2 (30%) of forest are under logging concessions, whereas 12% are protected (Adam & Miller 1992; Amsallem et al. 1999; Grosch et al. 2007; Congo Basin Forest Partnership (CBFP) 2007; FAO, 2001, 2007; see also Figure 9-1 in Appendix A).
[4] FAO 2005a,b; CBFP 2007; Gesellschaft für Technische Zusammenarbeit (GTZ) 2007; Billand et al. 2006, 2008; Desclée al. 2008; Djeumo & Fomete 2001; Letouzey 1985 quoted in Oyono, 2004a,b; Cerutti et al. 2006.
[5] Whose livelihoods depend on these resources (CBFP 2007; Djomo et al. 2000; Goetz et al. 1998; Mokombo, 2003; GTZ 2007).
[6] According to Gérard & Langbour (2007) report, the total population of the five countries: Cameroon, Congo, Gabon, CAR and DRC may increase from 83 million inhabitants in 2005 to 123 million in 2020, an increase of 40 million in 15 years. According to CBFP the increase of the population in 2050 will be of about 111 million.
[7] This contribution can be illustrated by the taxation system for logging; Forest harvesting is taxed in various ways. There is a general company tax and a value-added tax, in addition to three specific forestry taxes: an annual, area-based forest fee (in 2005 this US$1 per hectare); a felling tax of 7% of the taxable value of the felled volume of timber; and a replanting tax paid at the rate of 11% of the taxable value, which is determined by the finance law in relation to the free-on-board (FOB) value at the seaport of Douala, Cameroon. There is also an export tax of 10,5% on round wood and 4,05% on sawn wood. In late 2004, an environmental tax was introduced for those companies that do not start the preparation of forest management plans (GTZ 2007; CBFP 2007).
[8] CBFP 2007.
[9] Cameroon 6% (Resource Extraction Monitoring (REM) 2008), Republic of Congo 2%, Gabon 3-4%, Equatorial Guinea 6%, CAR 10% to 13%, DRC 0,7%. Indeed, Cameroon ranks among the world's top five

Concerning the total forest production export, it is estimated to be 60-85%.[10] The forestry sector accounts for approximately 20% of jobs in Cameroon,[11] second after the public sector and mining and/or oil extraction.[12] The Congo Basin rainforests together with the Amazon rainforest support the greatest diversity of living organisms on earth.[13] It also represents one of the last regions in the world where vast interconnected expanses of tropical rainforest permit biological processes to continue undisturbed.[14] In other words it is one of the world's precious reservoirs of biodiversity.

Those forests are of great importance for the water cycle, erosion protection and ecosystem equilibrium. They play a vital role in maintaining the balance of the planet's ecosystems and of the global climate. Therefore these forests play a significant role with regard to nitrogen deposition, biotic exchange or carbon concentration, and consequently on global warming and climate change. The major contribution of Land Use, Land-Use Change and Forestry (LULUCF) activities in the mitigation[15] of climate change is widely recognised by the scientific community.[16] In fact, worldwide forests store about 638 Gigatonnes (Gt) of carbon, 50% more carbon than in the atmosphere.[17] Dominated by deforestation and degradation in the tropics, the LULUCF activities generate about 30% of global greenhouse gases (GHG) emissions,[18] deforestation alone is responsible for about 20% of global GHG emissions[19] and

tropical log exporters. Industrial round wood production has increased by 35% since 1980 (World Resources Institute (WRI) 2000).

[10] On average 35% of production is exported as logs (CBFP 2007; GTZ 2007).

[11] Logging generates around 45.000 jobs in Cameroon (CBFP 2007; GTZ 2007).

[12] These facts put forward that the growth of income generated by forestry activity will make a large contribution to the economic growth through: a) increased material contributions to the developing country's needs, increased export earnings providing more foreign exchange, c) diversification of the economy and hence increased stability, d) increased rewards to labour and capital, generating increased demands for other goods and services, e) social overhead capital in the form of houses, roads, schools, etc. being more fully used (from the forest model experiences see Diaw et al. 2007).

[13] The main centres of species richness and endemism are in western Cameroon and in central Kivu (CBFP 2007; Desclée al. 2008).

[14] Biodiversity value: over 400 mammal species, almost 1.300 species of birds and 20.000 known species of plants, of which around 8.000 are endemic, more than 900 species of butterflies. (Dogmo 2005; CBFP 2007; Desclée al. 2008).

[15] Mitigation achieved through activities in the LULUCF sector, either by increasing the removals of GHGs from the atmosphere or by reducing emissions by sources, can be relatively cost-effective (United Nation Framework for Climate Change (UNFCCC) 2008). Reducing deforestation is crucial to achieving substantial emissions reductions in the post-2012 period (Climate Action Network Australia (CANA) 2008).

[16] Voluntary Carbon Standard (VCS) 2007; UNFCCC 2008. See also the initiative, known as Reducing Emissions from Deforestation in Developing countries (REDD) which is high on the environmental policy agenda.

[17] Cameroon Carbon storage: above-ground biomass: 2,679 Mega tonne (Mt), Below-ground biomass: 1,125 Mt (Butler 2009).

[18] In fact, human activities through LULUCF activities, affect changes in carbon stocks between the carbon pools of the terrestrial ecosystem and between the terrestrial ecosystem and the atmosphere (UNFCCC 2008).

logging accounts for approximately one fifth of global GHG emissions.[20] It (particularly tropical deforestation and degradation) is also the major cause of species extinctions and a significant source of water pollution, air pollution, soil erosion and the dispossession and impoverishment of indigenous people.[21] Especially the latter fact must be questioned: why do local people near or inside the rainforests live in extreme poverty, although they are in the midst of richness with regard to natural resources?

In political arenas, numerous conventions have been established to regulate the management of the environment and natural resources at an international level. The majority of states in the Congo Basin region have signed and/or ratified most of these conventions.[22] Since the early 1990s, Congo Basin countries have undergone a general overhaul of their institutional and political structure and process, specifically in forestry, with the aim to achieve sustainable forest management (SFM).[23] This effort in the way of sustainability started with the Brazzaville process, namely the Conference of the Central African Moist Forest Ecosystems (CEFDHAC), the Yaoundé process in 1999, the Conference of Ministers in Charge of Forests in Central Africa (COMIFAC) in 2000 with the process of harmonising forestry policies in Central Africa already adopted called "Plan de Convergence Sous-Regional", the Congo Basin Forest partnership (CBFP) in 2002 as well as the "Réseau des Aires Protégées d'Afrique Centrale" (RAPAC).[24] This political will is also represented in the forestry law introduced in 1990.[25] Through this law, the "top-down", centralised system, which was dominated by the state and excluded local populations, is now giving way to more "decentralised", "negotiated" management approaches, e.g. forest communities, forest royalties etc.[26] However, taking into account the specificities of each country, progress is being made at different rates.[27] Progress has also been made in the legal guidelines for producing forest management plans in the

[19] Deforestation in the tropics and forest re-growth in temperate and boreal zones are major factors in contributing to emissions and removals of greenhouse gases (GHG) respectively (Streck 2008; Bellassen et al. 2008, Greenpeace 2008; United Nation Environmental Programme (UNEP) 2008).
[20] Deforestation is responsible for 70% of land-use emissions: 4,9 GtCO2 today, and 3,5 GtCO2 in 2050 would cost about US$5-10 billion annually to eliminate in Cameroon, DRC, Ghana, Bolivia, Brazil, PNG, Indonesia, Malaysia (Streck 2008; Greenpeace 2008).
[21] VCS 2007; Bellassen et al. 2008, Dogmo 2008a,b,c; UNEP 2008.
[22] Dogmo 2004.
[23] E.g. The 1994 forestry reforms introduced new procedures for sustainable forest management in Cameroon, see Foahom et al. 1996; Foahom & Jonkers 2004; Bigombé 2003; Oyono 2004a; ITTO 2005; GFW 2005; PRC 1994, 1995.
[24] See also Dogmo 2004; Nasi et al. 2006.
[25] Most forestry laws in the region were redesigned during this period and all state the need to implement management plans for their production forests (CAR in 1990, Cameroon in 1994, Congo in 2000, Gabon in 2001, DRC in 2002 (Billand et al. 2006). In fact, the Cameroonian political structure has, over the past decade, progressively opened itself to an emergent democracy.
[26] Nasi et al. 2006; Amsallem et al. 2004.
[27] Gérard & Langbour 2007.

region. A full report of these guidelines is available in Appendix C, section 9.3.1 and 9.3.2 providing a synthesis of the forest management option and also the manual of forest management planning (FMP).

1.2 Problem statement

The progressive disappearance and/or degradation[28] of Congo Basin tropical rainforests constitute one of the major environmental problems today. Despite the growing public concern and increasing political rhetoric, most actions have been relatively ineffective in dealing with this problem. In the case of Africa, the forests are being degraded in critical ecosystems by loss of about 5.262.000 ha annually which correspond to a loss of 0,8 % of the total land (of which 852.000 ha are lost in Central Africa corresponding to -0,4%).[29] Additionally, FAO (2007) reported that during the years from 1995 to 2005, Africa lost more than 9% of its forest area. This situation is more critical in Central Africa than in West Africa, where the extraction volumes exceed production of about 174% see Table 9-2 in appendix D.[30] Like other countries in the Congo Basin region, Cameroon's government reacted to this situation by introducing a new forest law in 1994, which focuses on the principle of SFM.[31] In spite of the efforts made by the Cameroonian authorities, deforestation and degradation continues and has even increased in Cameroon. It has the highest deforestation rate in Central Africa (1% per year) while other countries have rates lower than 0,2% per year (see Figure 9-5 in appendix D). It is feared that if nothing is done to check this problem, the forests will soon disappear. An examination of this environmental problem (the destruction of the tropical forest) illustrates what has often been cited as the absence of sustainable use of forest resources, which causes each year more GHG emissions than the emissions from the transport sector throughout the world.

[28] Degradation is here understood as the impoverishment of the forest in terms of numbers of species or their relative quantities per unit area; it also indicates a reduction in the capacity of the forest to provide the goods and services that it was formerly capable of providing (Prospect 2008). See for discussion about the Cameroon rainforest destruction Dogmo 2005.
[29] Global Forest Watch (GFW) 2001, 2005; FAO 2001a.
[30] ITTO 2005; FAO 2005a; GFW 2005.
[31] This law (PRC 1994, 1995) was built on prior forest field work conducted in Cameroon as a basis for the policy process, like the Dimako project, Sikop , SO' Lala, Lokondjé- Nyong, Tropenbos site etc. (see Centre International de Recherche Agronomique et de Développement (CIRAD)-Forêt 1997; Durrieu de Madron & Forni 1997;Yene 2002; Amsallem et al. 2002 ; FAO 2002a-d).

A profound analysis of this absence results mostly according to some authors[32] in land use change in favour of agriculture, specifically industry-driven agriculture. This type of agriculture, the so-called production of cash crops (the main reason for planting is to make money) is the main conducing factor of deforestation and is responsible for half of the tropical forest destruction. It includes: bio-energy production, intensive production of palm oil, cellulose, soy beans and monoculture of trees or fast growing wood (e.g. Eucalyptus, Teak etc.).[33] Other authors, mostly conservationists point out the population growth (overpopulation) or demographic pressures also known as Malthusians theories, to be exclusively and ineluctably the main factors, such as slash burning or "shifted cultivators" in the search of new soil. Cultivator in this context is the term used for people who have moved into rainforest areas and established small-scale farming operations. Besides the problems of urbanisation, abusive use of tropical mines, hydroelectric dams, tourism, pollutions, and forest burnings, other authors[34] emphasise what they call the genuine engines which include: poverty and debt burden in the tropical areas, the interests industry (industrial logging (legal or illegal) and development and overconsumption of rich countries. Concerning the logging operations (here over-logging), they argue that this kind of logging procedure is generally unsustainable and may be an important driving force of forest destruction, specifically in the Congo Basin. According to this point of view, WRI (2000)[35] also proved through satellite images that the high deforestation and degradation rate in the Congo Basin occurs where logging intensity is high with very low population density. Another reason (why logging is considered to be the main driving force for degradation and deforestation) is the quasi absence of current agro-industrial clearings as is the case in Latin America.[36] This paper will focus on the assumption that logging is one of the main conducing factors of deforestation and degradations in the Congo Basin.

The need to properly manage[37] these forests has only been recognised in the last few years, following recent international awareness of the threats to forest resources from ranching and

[32] FAO 2007; Duterme 2008.
[33] This clearance of natural forest for agriculture is accelerated sometimes by access provided by logging roads.
[34] Dogmo 2005; WRI 2000; GFW 2005; REM 2008; Duterme 2008.
[35] See also Dogmo 2005.
[36] Butler 2008.
[37] Furthermore, there are two strong arguments in support of management for the production of wood in natural tropical forests. The first is that no ecologically satisfactory alternative land uses to natural forests are to be found for many tropical sites because they are too infertile for agriculture. Secondly, wood having the qualities found in many types of tropical forests cannot be produced as cheaply, in large dimensions or in the quantities required to meet present and future industrial requirements from intensively managed plantations on the same infertile sites. Maintaining the land under a permanent forest cover, and adopting a planned basis of sustained

agricultural activities, population pressure, and illegal logging which cannot guarantee sustainable use.[38] Apart from that, there is also much concern about the need of conserving those forests. In order to be renewable their use must be sustainably planned for the benefit of all users. In the context of this paper sustainability refers to the new broad dimensions: environmental, economic, social and cultural. Consequently, the application of a scientific and technical management planning system for these forest resources is critical to achieve sustainability. Without this objective irreparable degradation through poorly executed operations can occur. Thus, the FMP should integrate this new view in elaboration and conception. A closer analysis of this situation of deforestation and degradation or the absence of sustainable use of Cameroon's forests particularly and the Congo Basin's forests in general can be classified into two main groups:

a) Insufficient knowledge about scientific and technological planning in the field of forest management. Knowledge about the management of the complex heterogeneous forest resources is rudimentary or often lacking.
b) An inadequate institutional framework that needs to be developed further in order to maximise the contribution of forestry and of forest industries to development while maintaining the productive capacity of the resource and its contribution to environmental and social stability.

These limitations will be discussed in the following sub sections.

1.2.1 Insufficient knowledge about scientific and technological planning

1.2.1.1 Poor quality of the existing forest management plan

Out of a total of 72 forest management units (FMU), 32 had approved management plans (by the forest administration). The management plans of 17 had been rejected by the Ministry of Forest and Fauna (MINFOF), the status of 14 was unknown and 19 were in process.[39] The International Tropical Timber Organisation (ITTO) also reported that on the 8,84 million hectares of natural rainforests production which is an element of the Cameroon' permanent

yield management within an overall, sustainable forest management plan, is usually the most appropriate long-term development strategy (FAO 1998).
[38] FAO 1998; Angoué et al. 2004; Jordan & Montagnini 2005.
[39] International Tropical Timber Organisation (ITTO) 2005.

forest estates (PFE),[40] also known as "classified forest" ("forêts classés" in French), only 500.000 hectares are sustainably managed and less than 2 million hectares have a management plan. In this respect, an analysis of fmp documentation in Cameroon, based not only on legal prescriptions but also on non-legal references (like certification standards) conducted by Doucet & Vandenhaute from "Nature+" as instructed by the GTZ, examined 20 fmps and highlighted that the weaknesses in forest management practices are partly due to the insufficient quality of the fmps (80% of FMPs approved were of poor quality).[41] Until today the practice of bad selective logging or timber based or unique function planning persists.[42] Also in the existing forest management design, there is little integrated economic, social and ecological evaluation of the yield from the overall planning at enterprise level and its implementation at the ecosystem unit level, which is the smallest geo-referenced planning area entity.

1.2.1.2 Ineffective forest management planning and certification

Fines et al. (2001), Nguiffo et al. (2002), Lescuyer (2002), FAO (2002), FAO (2005) and Poissonnet (2005) stated that Cameroon is showing the will to manage its natural forests in a sustainable way. An important indicator of this orientation is the obligation[43] to prepare and implement FMP for all production forests (e.g. FMUs) and council forests of the PFE which are the focus of this thesis (for a report about the manual and procedure for FMP in Cameroon see Appendix C, section 9.3.2).[44] Nevertheless, in only a few cases FMP have been implemented fully and effectively.[45] In fact, the formats of the fmps in use today originate in

[40] Cameroon has an estimated 12,8 million hectares of natural-forest PFE, comprising 8.84 million hectares of production forest (including council forests, the objectives of which may vary between councils) and 3.90 million hectares of protection forest. The law (94 in PRC 1994) specified that at least 30% of the national territory should be classed as the PFE which can only be used for forestry or as wildlife habitats (see for more the Cameroon Zoning Plan and Table 9-1, Figure 9-4 in Appendix C).

[41] ITTO 2005, Doucet & Vandenhaute 2006.

[42] In this respect, large areas of rainforest are destroyed in order to remove only a few logs. The heavy machinery used to penetrate the forests and build roads causes extensive damage. Trees are felled and soil is compacted by heavy machinery, decreasing the forest's chance for regeneration.

[43] FMP is a mandatory process as set by the Forest legislation, forest law 94 (PRC 1994) as well as well as the "Arrêté" n° 222 of Ministère de l'Environnement et des Forêts (MINEF) (2001). FMP has to be performed by the forest concessions or forest council's holders and must be approved by the government before implementation. It is also a prerequisite for forest certification.

[44] The options at FMU level are presented in four technical documents which contain standards for forest inventory with the purpose of FMP, standards for the stratification of forest lands for their mapping on a scale of 1:500.000, standards for the verification and evaluation of forest inventories and guidelines for the elaboration of forest management plans for production forests (see PRC 1994; MINEF 1998; ITTO 2005; FAO 2005a; Atyi 2000; Nguiffo & Djeukam (2002); Foahom & Jonkers 2004).

[45] Besong 1992; Fines et al. 2001a; Foahom et al. 1996; Karsenty et al. 1998; World Bank (WB) 2002; International Technical Tropical Timber Association (ATIBT) 2005a,b.

earlier concepts of "forest working plans" from 'scientific forestry', as developed in Europe in the 18th century where timber production was the main FMP objective. Such plans need relatively high levels of technical and financial inputs by forest managers to prepare and implement them.[46] These conditions can justify the failure of implementing the fmp in Congo Basin countries. Furthermore an analysis of some FMP project results shows an emphasis on the plan rather than the process. Conventional FMP formulation does not normally recognise the importance of process (i.e. a sequence of steps to consider)[47] particularly participatory processes, the aim being solely to produce a plan (as a document), which directs the way in which the forest is managed. Furthermore, conventional fmps are often treated as rigid blueprints prescribing everything, which can be undertaken in a forest area with little scope for flexibility. In practice, forest managers may find this approach unrealistically demanding, in which case they may look for loopholes to circumvent problems. Unfortunately, even now some forest companies continue to see forest management as a constraint or as unproductive and financially too expensive (lack of value and strategic thinking). In some cases there is also insufficiency or simply a lack of fmp implementation. This constitutes the greatest threat to the sustainable use of forests in the Congo Basin. The lack of implementation could also be explained by the fact that governments do not have the capacity to monitor[48] forest companies' operations[49] nor to enforce legislation. The main agency responsible for forests and forest control has always faced administrative instability. Many delegations and services responsible for forests and fauna are understaffed[50] and suffer from poor morale. This leaves

[46] FAO 2004; Forest Peoples Programme (FPP) 2006.

[47] The FMP itself, because the planning process is an opportunity: to empower local forest users; to identify and involve local stakeholders; to agree on management objectives and strategies; to negotiate and agree on benefit sharing, responsibilities and costs; to combine local knowledge with technical information

[48] Recent WB and International Monetary Fund (IMF) programmes have required reductions in the number of public employees and their salaries as a consequence of structural adjustment (see FM 2001; Sarre 2004; Jordan & Montagnini 2005). In one of its reports/ratios trimestriels, the Observer Independent deferred that "the provincial services of control as well as the other decentralised services continue to face a serious lack of average logistics and essential materials for their work. As examples, the Departmental Delegation of Haut-Nyong with Abong Mbang, having in its spring of responsibility 17 concessions (FMU) extended on a surface across approximately 36.040km2, does not have vehicles at its disposal. The Chief of Station of Ma' year does not even have a motor bike, although there are more than 5 FMUs sometimes separated by several hundred kilometres under its jurisdiction. For lack of means of transport for forest concession monitoring, certain chiefs of forest station, certified logs through "hammer" at home. Instead of that, they hammer wood already charged on trucks along the main roads or in their residences. In the same way, the majority of the chiefs of station do not have a budget for hiring of vehicle in order to transport wood possibly seized (REM 2008). Also in 2000, the GFW for showed that because of inadequate transportation, most MINEF agents are unable to reach logging concessions to be inspected by their own means. In the late 1980s, MINEF was forced to sell most of its vehicles as a result of the economic crisis.

[49] Twenty five logging companies and individuals hold three quarters of Cameroon's forest concessions. Three parent groups, partially or wholly financed by French interests, retain almost a third of Cameroon's logging concessions (WRI 2000).

[50] MINEF stopped hiring new staff in 1992, and one MINEF field agent was responsible for an average of almost 21,000 hectares of concession in 1998-99 (WRI 2000).

these departments extremely weak. In this context Billand et al. (2006) showed that forestry administrations faced the impossible situation of not being able to carry out their regular control duties because of inadequate funding and staffing while being asked to develop sophisticated fmps (see Figure 9-6 EU-based forest companies with logging operations in Central Africa in Appendix E). Forest Monitor (FM) (2001) showed that the Congo Basin region in general is still subject to a system of neo-colonialism, perpetuated by the former colonial powers, foreign capital and a few powerful elites at national level. This situation can also be explained by enormous debt burdens, a lack of democratic space for meaningful civil society involvement, corruption and unfavourable technical, financial, political and institutional conditions which inhibit the emergence and implementation of policies that would facilitate ecological, economic and social sustainability.[51] Furthermore, a general lack of personnel, disparities in the distribution of personnel, and lacks of personnel training programmes have all affected forest control in the Congo Basin forests region. In addition, there is a drastic lack of sustainability of governmental institutions. A fundamental characteristic for successful long-term administration is the ability to sustain tasks over short-ranges in the administrative system. The main agency responsible for forest and forest control has always faced administrative instability.

In the area of forest certification, there are until today only two "critical" certified forests in Cameroon, the WIJMA (for WIJMA see Table 9-3 in Appendix F) and SEFAC.[52] Although principles, criteria and indicators as developed by the Forest Stewardship Council (FSC), the ITTO, the Centre for International Forestry Research (CIFOR) and the African Timber Organisation (ATO) exist, there is quite some variation in the standards listed by these most influential organisations. However, a few of the standards are similar. Many authors emphasise that the most difficult task in forest management is the social and governance dimension and the question is how to put it into practice and thus reach an agreement with all the interest groups. These facts show that there is a crucial need to take a particular interest in the Congo Basin FMP situation by addressing institutional governance, its value and strategy, as well as the collaborative tactical aspect of FMP in a unique planning process. Globally in PFE, FMP has been described mostly from the technical or classical view. And the forest itself as a common pool resource (CPR) has been ignored or put aside[53]. These features depict

[51] Forest monitor (FM) 2001; REM 2008.
[52] Certification in process in Congo Basin ISO 14001 (5.330.405 ha), Pan African Forest Certification (874.656 ha) Forest Stewardship Council (2.639.068 ha), others (Keurhout…) 1.727.788 ha (Billand et al. 2008).
[53] Dogmo 2008a,b,c.

important institutional governance, value and strategic system weaknesses within the FMP framework according to the findings of the empirical case studies in Cameroon based on twenty four interviews performed from November 2007 until January 2008 and in November 2008.[54] Now, more than ever, there is a need to address the complex social situation associated with the difficult ecological condition of the Cameroonian forests as well as to stress the limited technical level of the FMP situation in the tropical region, as well as worldwide.

1.2.1.3 Limitation regarding recent studies in forest management planning

To address this issue, many organisations and consulting companies conducted projects on FMP in the Congo Basin region contributing to the development of methods and strategies for SFM of the southern Cameroon rainforests through a multidisciplinary approach, e.g. FAO projects from the Forest Resources Development Service; Forest resources management (FRM) project with "Projet d'Appui à la Réalisation des Plans d'Aménagements" (PARFAF); the Tropenbos Cameroon Programm (TCP), the International Technical Tropical Timber Association (ATIBT) project in the Congo Basin, etc. This section emphasises only the two programmes mentioned last (TCP and ATIBT). However as can be observed in the final outcome, there has been insufficient integration of the social, moral and institutional governance as well as the ecological dimension of sustainability in the results of the medium-sized planning process, which is more technically oriented.[55] ATIBT also addresses the issue of forest destruction in four important public documents about FMP focusing separately on social, wildlife and production aspects (ATIBT 2005a,b and 2007 developed from the 2001 version).[56]

Although these changes have just been introduced into the FMP framework and should be evaluated, an analysis of these documents shows that there is a lack of integration between the social, economic and ecological aspects, which are concepts within a unique FMP process. This may constitute a limiting factor and thus reduce the effectiveness and quality of such a

[54] Interviews performed by Njantang (2008) and the author. The result of this fieldwork is presented in chapter 3 of this thesis.
[55] Although, in TCP, there was a project about the social dimension of sustainability called social sciences project (S1) with the objective "(...) to study the role of local population in the exploitation of the forest, their perceptions and knowledge of the forest environment and the possibilities of involving these local populations in more sustainable forms of forest management" (see Fines et al. 2001a,b).
[56] ATIBT 2005a,b, ATIBT 2007; ATIBT 2001.

planning model, which is mostly based on external expertise.[57] This fact suggests that the implementation of FMP may be counterproductive and the future of the forest enterprise is possibly compromised due to the gap in the flow of information between the social, wildlife and production aspects and particularly due to conflicts, which could arise between the three. This ATIBT concept neither takes into account the complexity of the governance or the institutional aspect of planning which is currently one of the important problems in forest planning implementation. In this respect, the author's argument is based on the difficulty with the ATIBT model to reconcile the actors' or stakeholders' interests in practice and legitimise the planning outcome in the framework of collective action problems which could not be solved in a separated FMP process (isolation of social, economic and ecological aspect).[58] It is also based on the need of transparency and social justice in the FMP framework.

1.2.1.4 The lack of an understanding regarding the importance of forest management planning

The lack of an understanding regarding the importance of FMP is one of the main factors for inadequate and/or ineffective FMP outcome in Congo Basin PFE. This is based on the fact, that FMP is not only a critical element of the management function, but also known as a leading guidance instrument in forestry. In this context Prospect (2008) argued that ultimately, the prevention of these processes (degradation and deforestation) can only be achieved by determined and effective management which includes FMP as a management function. However, there are two fundamental reasons explaining why an unsuitable ("ungeeignetes" in German) planning design may directly lead to unsustainable use of the forest resources.[59]

The first reason is found in the history of forestry. It shows that, to a large extent, FMP runs parallel to that of forestry.[60] Both developed in a time of threatening wood shortage and also from the realisation that the use of the forest in all its forms, in particular the yield of timber is not inexhaustible, and that forests can be saved only through regulated, sustainable yields.[61] Although the history of Central European FMP reaches far back to the 13th century, the current situation in the Congo Basin is not much different even though FMP is a recent

[57] Expert based forest planning model.
[58] See for more about specific collective action problems Anderson & Ostrom 2006.
[59] Propect (2008) shows also that forest degradation usually results from poor management, i.e. poor forest planning as part of the management function.
[60] Baader 1942; Bachmann 1992; Schlaepfer et al. 1987; Kurth 1994; Richter 1963.
[61] Schlaepfer et al. 1987; Bachmann 1992; Hanewinkel 2001; Oesten 2003.

development starting in the 1990s. One should be aware of the fact, that the Congo Basin forest resources were property of the colonial power which later transferred it to the 'independent' state. The latter continued with policies concerning timber harvesting or economic profitability. As a result the resources were overused (uncontrolled creaming)[62] leading to today's situation.

The second reason is that FMP is a framework adequate for binding all the actors or stakeholders involved. FMP requires (for its implementation as a social contract) a decision for sustainable use not only from governments, forest companies and experts but also from the population, non governmental organisations (NGOs) and forest donors as a whole. It is essential that these FMP outcomes and practices provide for the needs of all actors and stakeholders involved. This art of planning may be a collaboratively useful way to address the destructive processes and established monitoring and controlling through the planning outcome or contract. It is crucial that these forest management practices provide for the needs of the people by securing both forest and agricultural products. Failures in realising the full implications of actors and stakeholders in the planning process nearly always result, not only in forest loss, but also in social degradation and overall contribute to global warming. In fact, it is assumed that FMP outcomes may mitigate global warming through reducing degradation and deforestation of tropical rainforests[63] and improve the living conditions of local poor people (fmp as social contract)[64] as well as the economic efficiency (economic and financial evaluation or analysis of the overall planning).[65] In general, the author assumes that FMP is an appropriate vehicle to challenge the existing deforestation and degradation problem in PFE. In the next paragraphs, the need to specifically address FMP problems in the Congo Basin and in Cameroon is stressed.

[62] Creaming of forest is an insidious, wasteful and destructive process (Prospect 2008).
[63] In fact, various FMP activities (like planning variables or parameters) can be changed that could increase not only the carbon stocks and/or reduce GHG emissions and thus make a measurable difference to the long-term increase in GHG benefits.
[64] FMP may contribute to alleviate poverty in local communities near or in the forestland. According to UNEP (2008), as the forests are important for the subsistence of hundreds of million poor peasants, any change at management level is likely to still deteriorate the situation of the world's most vulnerable communities. Conversely, by modifying the way in which the forest resources are managed one can reinforce the rights, improve the wellbeing of these communities and guarantee that the public goods are managed in the interest of the public and not of individuals.
[65] Economic efficiency is a term typically used in microeconomics when discussing production. Production of a unit of good is considered to be economically efficient when that unit of good is produced at the lowest possible cost.

1.2.2 Inadequate institutional framework

1.2.2.1 Failure of the institutional change system: property rights and decentralisation

Another limiting factor in FMP design is the fact that tragically, many of the forest policy reforms[66] have not achieved their intended purpose and may even have generated counterproductive results.[67] Some authors support the fact that decentralisation can reduce corruption and improve the governance system in Congo Basin countries. Nevertheless, there is theoretical and empirical evidence showing, that decentralisation fails systematically to encourage good governance in developing countries in general.[68] This situation is mostly illustrated through the taxation systems (forest royalties and sales of standing volume logging permits)[69] and political issues, such as using forests as a source of political patronage.[70] In this respect, in the case of Cameroon, the decentralisation process and property right reforms implemented in Cameroon are authoritarian.[71] Imposed from above and ignoring the real needs and expectations of the local communities it retains many of the powers of the central state directly and through the rural councils and forestry fees management committees.[72] But the government is not setting up the basic institutional infrastructure upon which to base the positive outcomes promised by decentralisation. Instead, local democracies are created but

[66] Political reforms (in property rights system: privatisations, strong centralisation, forest community and in decentralisation system: taxation like forest royalties, municipalities, forest communities organisation like for Cameroon "Comité Paysan Forêt", etc…) (see Dogmo 2008b). In Cameroon, "Comite Paysan Forêts" means structures made up entirely of local people, including minority Baka pygmies and women, elected by the villagers. Created by the administration, members serve as a link between the local communities, the administration and logging companies.

[67] See also Castadot et al. 2007; Ango et al. 2007 who show through their case studies in Cameroon that there is a big gap between (theoretical waiting of) the Cameroonian forestry community and the practical problems local communities are confronted with.

[68] Nupia 2006; Dogmo 2008a,b,c; Diaw et al. 2007.

[69] The taxation system is in place to provide benefits to communities from logging. This income could theoretically be used to fund a community forest application. Law 94/01 stipulates public participation in the design and implementation of forest management policies, enlisting all partners, including governmental agencies, the private sector, communities and people living in and around the PFE. The stakeholders in forest management in Cameroon have divergent interests with respect to forests of different legal status, particularly when they are opened up for logging. Arrangements are made between concession-holders and local people on a case-by-case basis according to rules established in the forest law. To put it simply, the larger the permanent forest estate, the greater the profit for the councils and the state. For example, for a production forest, the Annual Forestry Fees are at least FCFA 1,500/ ha/year, and are distributed as follows: 50% to the state, 40% to the council, and 10% to neighbouring villages. In other words, local people should receive 10% of the forest fees and taxes from commercial forest concessions. From such fees collected, 40% are to be invested into local and district development. Forest concessions situated within the jurisdiction of a community also need to be accessible for non timber forests products (NTFPs) harvesting by local populations. An annual royalty for the forest area (RFA) is applied in concessions; the so-called "FCFA 1.000 tax" is only applied in much smaller areas (see Dogmo 2005, 2008b)

[70] Through which political elites distributed privileges, mobilised and rewarded political support, and enriched themselves at the expense of the country (WB 2006).

[71] Governed until the beginning of the 1990s according to an "authoritarian principle" (Mbembé 1995 quoted by Oyono 2004a).

[72] Mvondo 2005; Bigombé 2003; Carret 1998; Oyono 2004a,b,2005; ITTO 2005.

given no powers, or powers are devolved to non-representative or upwardly accountable local authorities.[73] It represents predatory and neo-paternalistic alliances between the central state, the decentralised bodies and the forestry fees management committees, and between the authorities of the central state, the local administration and local political figures.[74] Since decentralisations that democratise and transfer powers threaten the interest of many actors, few have been fully implemented.[75] It has been demonstrated that the forest management decentralisation has not yet contributed to reducing social conflicts and establishing democracy in the management of forest resources.[76] Oyono (2004a) in his study concluded that in Cameroon's forestry domain, the institutional arrangements necessary for local management of CPRs are either nonexistent or insufficient, hence the notion of "deficit." Under such circumstances, the higher objectives of local management and forest governance or improvements in the standard of living, in equity and in ecological sustainability, which the reforms are intended to produce, are largely bastardised, delayed and compromised by a profusion of interests that determine the heterogeneous strategies of manipulation and appropriation of forestry income in Cameroon.[77] The present problem illustrates the poor governance situation in the region such as the confusing property right system, a low level of law compliance, lack of transparency and accountability, corruption and illegal logging which damage the forestry sector causing severe ecological, social and economic problems. Especially illegal logging destroys forest ecosystems, robs national governments and local communities of needed revenues, undercuts prices of legally harvested forest products on the world market, finances regional conflict and acts as a disincentive to SFM.[78] The estimated portion of illegal timber in Cameroon is 50%[79], in Gabon 70%.[80] Although, in Cameroon, an institution has been created for forest and fauna control called "Stratégie Nationale de Contrôle Forestier et Faunique (SNCFF)"; it shows little commitment to the governance principle.[81]

[73] Ribot 2002a,b.
[74] Mvondo 2005; Bigombé 2003; Carret 1998; Oyono, 2004a,b,2005; ITTO 2005.
[75] Ribot 2002a.
[76] Bigombé 2002; ITTO 2005.
[77] Oyono 2004a,b; FAO 2004; ITTO 2005.
[78] Karsenty 1999b; Amsallem et al. 2002.
[79] In 2000, WRI shows that Fifty-six percent of licenses were operating irregularly in 1997-98.
[80] De Clerck &Ton 2004.
[81] See more about the reason for the SNCFF infectivity cited by REM 2008.

1.2.2.2 Inadequate benefits sharing mechanism

Globally, over the past couple of decades, the pressure on governments to demonstrate that forests are being managed in a more sustainable manner and delivering more social benefits has been steadily growing. In addition to previous limiting factors with regard to FMP, inadequate forest use and benefit-sharing regulations resulted in a situation forcing local people to utilise forest resource illegally and that they do not feel responsible for the forest condition. At the same time state forest authorities neither had the resources and know-how, nor the support of the local people to enter into sustainable management of natural forests. Consequently, natural forests are considered as no-man's land and are exposed to uncontrolled over-utilisation and encroachment. In fact, for the entire colonial period up to the mid-1990s, the forests of Cameroon were managed through a centrally directed structure and process, which expropriated resources and control over resources from local communities, and excluded such communities from accessing forest resources as well as economic benefits accruing from them.[82] In order to address these shortcomings, the participation of various stakeholders in the sustainable management of tropical forests is recognised by the international community and, for some years now, has been required under the Congo Basin countries' laws. Stakeholder participation is discussed widely in the literature on natural resource management.[83] This new vision of sustainability also endorsed by Cameroon states that participation of stakeholders especially the local people has to be addressed as part of a SFM process at the relevant level. However, to date information indicate that significant progress has been made since 1988 towards sustainable management of natural tropical forests, but the extent of such progress remains far from satisfying, it is clear that the security of the tropical forest estate is still in jeopardy. Processes that allow the greater participation of local communities and other legitimate stakeholders in the management and sharing of benefits from forests are often still insufficiently developed.[84] ATIBT (2005a,b) showed that rushed participatory processes are inappropriate and create misunderstandings and disillusions among the populations compromising good relationships between actors. In fact promising initiatives of a participatory processes carried out by forestry companies to implicate and make the existing beneficiaries feel responsible, remain very partial, with numerous shortfalls. Also for economic reasons and to control "social peace", a company agent often deals with the social dialogue internally. Based on the work of

[82] Clement 1997; Diaw et al. 2007.
[83] Emerit et al. 2001; Vabi 1998; Nguinguiri 1999a,b; Hobley 1996; Brown & Schreckenberg 2001; ATIBT 2005a,b.
[84] ITTO 2005; FAO 2005; Brown & Schreckenberg 2001.

the Lokoundjé-nyong projects and many others projects on FMP[85] the FAO (2002, 2004) showed that there is, at present, no appropriate operational partnership between stakeholders within the framework of the Lokoundjé-nyong fmp. This reveals a lack of ways to stimulate the involvement of stakeholders and in particular the local population, who have been marginalised in forest management since colonial times.

Furthermore, there are conflicting interests in the resource, but this is particularly true in Cameroon where the main stakeholders have quite disparate levels of purchasing power and political influence. On the one hand there are dispersed, disorganised and powerless forest dwellers who are heavily dependent on the forest and the resources it provides, but whose security of tenure and national voice are often minimal. On the other hand there are timber companies which have invested heavily in logging and timber transformation, have close links to the national political establishment and have much to lose from the exercise of public control (and even more to gain from the lack of it). In addition there is an increasingly vocal and strident international environmental lobby to whom, in the main, the values of Cameroon's forests lie more in their long-term environmental values than in their direct uses, and for whom neither of the major national constituencies represents an overriding interest group. Reconciling these competing interests is not proving easy, and its feasibility cannot be assumed.[86] The crucial point lies not so much in the actual sum of available knowledge, but in the degree of awareness shown by the actors involved. Communication between actors is poor and the educational level is very low (especially among the local peoples). Therefore, there is a need to rise to the challenge to develop an institutional and/or participatory approach within the planning framework which can create self-encouraged co-operation and positive trust among stakeholders and taking into account the multiple roles, conflicting objectives and vested interests involved in forestry. More practically, forestland is considered as a source of social conflict because of inadequate benefit sharing systems between actors and/or stakeholders.[87] As can be seen in the forest sector, conflicts are partly a result of the fact that indigenous peoples remain in extreme poverty and do not recognise their interests in the planning outcome designed according to an expert based approach (classical model). Furthermore, like the "joint management" in India, forest management and planning mostly links the forest Company and local user groups "Comité Paysan et forêt" for sharing rights and duties over forestlands. Menawhile the other actors have been totally or partially ignored

[85] See the following FAO forestry reports: FAO 2002a-d, 2004; Yene 2002.
[86] Brown & Schreckenberg 2001.
[87] The conflict is mostly between local communities and logging companies and it is not without risk for the local population to engage in a conflict with a logging company (De Clerck & Ton 2004).

in the planning process. The "Comité Paysan Forêt" introduced by the government as social institutions have been proved to be unuseful as they have neither contributed to the elaboration and implementation of FMP nor to the four aspects of sustainable human development like ecological output, income generation, village infrastructure development, and community empowerment (this fact can be easily verified in the east and south province of Cameroon). The reason for this is that the main actors or stakeholders have not been considered equally when jointly planning and managing the forests as CPRs. Additionally, FMP may use the means and measures to include all the stakeholders and to find a compromise. In this respect, to maintain a position where the capacity of forests to provide all benefits to all stakeholder groups will be continuously enhanced while the forests are being used. This is the challenge of FMP. In addition, according to ATIBT (2005a,b) at the moment no forestry company fully meets the social objectives of the management plan due to numerous constraints. Equally, there is no state, research or conservation project, or no "professional development "operator that can claim to have implemented an effective, autonomous and viable local development in the forest zone of Central Africa applying a convincing "recipe"… The problem is thus to try and develop methods that can be used for FMP. This approach developed should be one that can be easily refined as much as possible.

1.2.2.3 The need to address current forest management planning

Addressing the insufficiencies in FMP has become an urgent matter in the Congo Basin since the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. Artur (2005) showed that even though the classical[88] or traditional, centralised management planning arrangements (expert based) have been in use much theoretical and empirical evidence shows that it has failed to deliver sustainably managed forests and does not meet the needs of those who depend upon the resources. However, over the last decade, emerging social, governance and environmental concerns with regard to the global ecosystem as a whole and the management of the world's forests in particular, led to significant changes in perceptions of FMP.[89] This shift in emphasis from the production of a single commodity (classical), notably timber, to a comprehensive ecosystem management for multiple uses and

[88] In a classical model of planning, the value and strategic planning, as well as institutional governance are used to complement the production model which is considered to be most important. In Cameroon for example for the PFE, forests shall be managed in order to sustain their production capacity. It is in this respect that the concept of forest management planning is represented in the law (Foahom & Jonkers 2004; Atyi 2000); only the production capacity is mentioned.

[89] Clément 1997; Association Technique Internationale des Bois Tropicaux (ATIBT) 2001; Kovac 2002; Bois et Forêts des Tropiques (BFT) 2004; Nasi et al. 2006; Dogmo 2005.

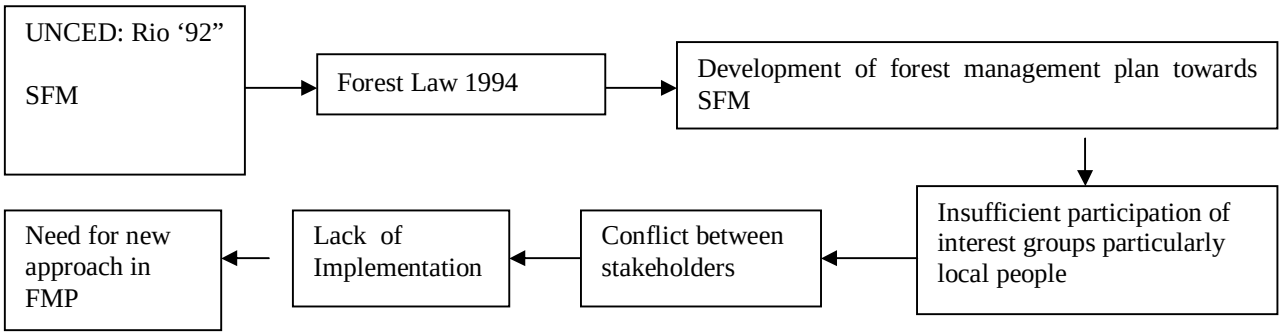
benefits requires considerable changes in the way forestry activities are planned, implemented and controlled.[90] In this respect, Oesten & Roeder (2002) argued that in times of more rapidly and deeply seizing transformation of the social surroundings, forestry[91] can only survive and further develop, if it makes constant contributions to solving social problems. They argue that FMP can, therefore, not orient itself exclusively inwardly, and that to maintain its autonomy, management requires on the one hand the social support, agreement of actors, i.e. legitimacy, and on the other hand it must secure its long term existence.

Figure 1-1, p. 20 displays the need for a new approach to FMP. After the UNCED efforts must be made to incorporate normative (values) such as ideologies, beliefs, ethics, morals and strategic thinking as well as the technical aspects into forest planning. These values can act as powerful driving forces to provide the incentives or restrictions needed to achieve the goals and long-term success of forest management.[92] However necessary "efficient and effective" normative and strategic planning may be, it is neither sufficient for resolving conflicts nor for assuring active participation of stakeholders in the planning process. Effective planning must be supplemented by an institutional governance system, which is derived from an institutional and development framework and an agreement procedure. Finally, the medium term planning process has also to be integrated for social, ecological and economic yield determination.

[90] Kovac 2002; BFT 2004; Nasi et al. 2006.

[91] Forestry, i.e. forest management, has to be understood as the art, science, and practice of studying and managing forests and plantations, and related natural resources according to Wikipedia, the free encyclopaedia (13.09.2007). According to CAB International (CABI) 2004 and the International Union of Forest Research Organizations IUFRO 2005 it is also known as a formal or informal process of planning and implementing practices aimed at fulfilling relevant environmental, economic, social and/or cultural functions of the forest and meeting defined objectives. Note - Further detailed definitions, such as those of timeframe, intensity, impacts, management level and resource requirements can be applied, depending on the purposes, such as reporting, forest resources assessment, policy formulation or resource allocation. The aforementioned definition has been elaborated in the process of harmonising forest-related definitions for use by various stakeholders, an initiative of the Food and Agriculture Organization (FAO) together with the Center for International Forestry Research (CIFOR), the Intergovernmental Panel on Climate Change (IPCC), the International Union of Forest Research Organizations (IUFRO), the International Tropical Timber Organization (ITTO) and the United Nations Environment Programme (UNEP).

[92] Adapted from Sabatier & Weible (2006 and Sabatier & Jenkins-Smith 1999 and Sewell 1985 quoted by Clement 2007).



SFM: sustainable forest management

United Nations Conference on Environment and Development (UNCED)

Figure 1-1 Process showing the need for new approach in forest management planning

1.3 Objectives, open questions, methods, process and restriction

1.3.1 General objective

It must be borne in mind that the term FMP, as used in forestry was strongly associated with the idea of sustained yield management,[93] and thus stands in contrast to the conventional forest logging[94] which dominates some parts of the Congo Basin. In the logic of conventional logging, the FMP objective is to determine by forest survey the annual allowable cut, commonly referred to as the AAC, that is the quantity of commercial timber or fibre that may be cut or logged annually (e.g. within a FMU or forest council) during the rotation time (30 years in Cameroon),[95] and to stick to it as closely as possible by following an established cutting budget. In this traditional view,[96] which looks at forestry and FMP primarily through an economic lens, there was little room for including ecological as well as social components. Consequently, the traditional AAC calculation paid little to no attention to socio-ecological objectives. These considerations can be identified as constraints for the planning outcome implementation.

In this context, the overall objective of the thesis is not only to critically analyse the Cameroon FMP situation, but also to design a dynamically organised, consistent and

[93] Bartoo et al. 1961; Speidel 1972; Mantel 1959; Baader 1942, 1945.
[94] In conventional logging, harvesting is not planned but uses a "hit or miss" approach. Timber fellers have little regard for the residual stand, and their search for logs is inefficient (see Barreto et al. 1998).
[95] ATIBT 2007; Cerutti et al. 2006.
[96] Traditional vision of forestry, unique function orientation from 12th-13th centuries in central European region (see chapter 2 for more detail).

acceptable[97] planning system. This would have to be applicable in medium-sized planning areas (FMU) or council forests of the PFE and forests of non permanent forest estates (NPFE)[98] for the management of natural forests to sustainably use the goods and services of the forests in the Congo Basin region in general and in Cameroon in particular.[99] This system as an interactive or dynamic and integrative process leading to more equitable management and use of forests within local societies attempting to bring together the key actors within one forest area, in order to reach a consensus[100] on the use of resources. At the same time the planning system has to be ecologically[101] sound and economically[102] feasible or affordable. The challenge of this planning system is to sustain desired forest conditions, uses, and values in the context of global markets and environments and with sensitivity to local equity in meeting ecological, economic and social (human) needs. Therefore, this planning system is a contribution to designing as a social contract[103] between the main actors involved.

1.3.2 Specific Objectives

The specific objectives are as follows (see also Table 1-1, p. 26):

1. To theoretically characterise the Cameroon forestry and planning situation;
2. to review fundamentals, notions and principles of FMP;
3. to propose a theoretical model of forest planning as a method or model for SFM as well as a way to derive criteria for the analysis of the Cameroon FMP situation;[104]

[97] Consistent (not contradictory), acceptable (consensus oriented between the key users)
[98] The NPFE is forested land which can be converted to non-forest uses. These NPFE are neither classified nor subject to specific management plans or designated as conversion forest for other uses, provided that they are kept under forest until required, and harvested according to some guidelines (see for more in Table 9-1 and Figure 9-4 in Appendix C).
[99] Cameroon has been chosen as the focus of this thesis because it is considered to be the laboratory of forestry for the whole Congo Basin region (see Cerutti et al. 2006; Dogmo 2004).
[100] Social subsystems or participatory planning procedures have to be accepted or desirable and consequently results in more effective outcomes, increased trust, reduced conflict, mutual learning, and new institutions for sharing information and undertaking collective action.
[101] Natural subsystem or natural sustainable yield (element of a planning system).
[102] Economic subsystem (element of a planning system).
[103] A contract is an agreement, a declaration of will to exchange rights and duties in a planning frame (adapted from FAO 2001b).
[104] This specific objective can be broken down into the following: firstly to develop a proposal for normative planning and search for a way to integrate or combine it with the strategic planning. Secondly to provide a proposal for active participation and conflict management as an institutional framework which aims to be closely tied to developing relationships, improving communication and problem solving, increased productive dialogue among diverse stakeholders, evolving trust relationships, sustained local participation and increased mutual learning and understanding about resource management needs and improvements. Finally to develop a tactical/ medium-term FMP process with a working procedure.

4. to propose a critical analysis for the Cameroonian FMP situation and identify and explore issues that affect their implementation. Through this analysis the planning model will be tested and refined;
5. to suggest a model for FMP and recommendations for the follow up.

1.3.3 Research Questions

To achieve the objectives of this study, the following main research questions were investigated:

Is it possible to design a planning system or method which is easy to implement or a system for generating forest management plans in order to contribute to the achievements of the principle of SFM in the Congo Basin rainforest in general and in Cameroon in particular taking into account the complexity of the external environment?

This main question can be broken down into the following sub-questions:

1. Which "problems" can be deduced from the existing FMP practices in Cameroon?
2. What are the fundamentals of forest management and planning?
3. How should the theoretical planning system of the forest management be designed? Which guidelines can be derived for FMP conception and implementation in Cameroon? Or which suitable basic requirements or important elements should be taken into account when designing the planning system for SFM in the Congo Basin in general and in Cameroon in particular?
4. How to empirically analyse the existing FMP situation in Cameroon? Specifically: What are the main users or participants of FMP? What is the users' understanding of FMP? What are the constraints to the active implementation of FMP outcomes in Cameroon? How to analyse the Cameroonian FMP situation and compare it to the proposed FMP model developed in this study?
5. What kind of planning system can contribute to achieving SFM in Cameroon? Specifically:
   - Which normative or ethical principle should be pursued for the planning model designed? Which sets of guidelines should be developed to safeguard the long-term of

the forest enterprise and how should the normative - strategic planning outcome be integrated in one subsystem?

- How should the institutional or collaborative process be organised and/or what would be a conflict reducing FMP procedure under the current institutional framework?
- What kind of tactical planning process is needed to lead to SFM? In other words how can the medium term rainforest production and utilisation system be formed and organised?

6. What can be recommended to improve the forest management situation in Cameroon based on the insights obtained from the system designed?

1.3.4 Research process and methods

The research aims to improve the FMP situation in the tropical Congo Basin region in general and in Cameroon in particular. The idea is to design a model system, which would be seen as a method for the conception and elaboration of contemporary FMP. To achieve this, the research methods must address the research questions and objectives systematically to constitute a coherent approach. This thesis can be subdivided into four working steps (see Table 1-1, p. 26 and Figure 1-2, p. 27). The following highlights the methods and process used in each step of the thesis. However, the methods will be more near and dipper described in the course of the thesis.

1.3.4.1 First step: Problem frame and theoretical conceptual model (model building)

The first step of this thesis is subdivided in two chapters. This first chapter already addressed the research aims, questions and identified the problems of FMP in the Congo Basin. It characterised the Cameroonian forestry situation and shows the complexity of the circumstances. The second chapter addresses the second and third research questions. A literature review served as a basis for answering the second research question on the fundamentals of forest management and planning as was the case for the previous chapter. The latest knowledge, current and emerging approaches, as well as information concerning the major focal areas of the economic, social, policy and management research related to FMP were reviewed. Through this survey, the general concepts and history of FMP for central European and tropical regions, the general concepts of sustainability and the challenge facing FMP were also described.

In order to facilitate the answer of the third question on how the theoretical planning system of the FMP should be designed (model building), the information gathered to answer the first two questions provided the basis. In order to design a theoretical system of FMP essentially based on literature analysis, the approach taken included the reformulation of the information from previous sections. This system was therefore conceptually and deductively designed by a deductive constructivist method, grounded in the system thinking approach and observations of the authors' experiences on forestry in Cameroon. The resulting theoretical FMP system is the so-called combined planning system (CPS) (see section 2.5.1 on the method used in designing the CPS, chapter 2). After the first draft of the CPS design the author concentrated on finding ways to improve it. The first draft was therefore discussed with experts to gain dipped insight into the system. Lastly, the result of this first step was used to devise criteria for the analysis of the Cameroonian FMP situation, specifically for building categories and subcategories.

1.3.4.2 Second step: Empirical and explorative study of FMP in Cameroon

This step was an empirical and explorative study of the Cameroonian FMP situation and addresses the fourth research question on how to analyse the existing FMP concept in Cameroon. It consisted of inductively gaining information through qualitative research by interviewing practitioners or FMP participants in Cameroon (see section 3.1 of the chapter 3: Working method). This information was then used to refine the CPS further (section 3.2 of the chapter 3).

1.3.4.3 Third step: The model CPS description

This step addresses the research question five on what kind of planning system can contribute to achieve the forest management principle in Cameroon efficiently. For this the results of the previous steps (A and B) served as a basis. This procedure makes it possible to describe an alternative system to the current FMP in the Congo Basin and Cameroon. In this respect, each subsystem of the model system of FMP is presented in detail in chapter 4, chapter 5 and chapter 6 of this thesis.

1.3.4.4 Fourth step: Discussion and recommendations

The last step is organised in two parts and addresses the last research question on what can be recommended to improve the forest management situation in Cameroon based on the insights obtained. This step discusses the critical issues and coalesces the findings of previous phases

with regard to the potential ramifications to management for FMP. It focuses on the conclusions that can be drawn from this study and the implications the results of this thesis may have for the improvement of the FMP conception and implementation in Cameroon. In this respect, recommendations for further research and practice were generated. Clear directives or requirements for the implementation of the FMP model designed in this thesis were also examined.

1.3.5 Research orientation and research restriction

The present thesis aims to address the research problems which seem to be tied to the fact that the few efforts made in the Congo Basin focused mostly on wood production with insufficiently incorporating the value and strategic aspect of planning from institutional governance, as well as a tactical planning perspective. In fact, this integration may enable at least the acceptance of the FMP outcome as a "social contract" by the forest users and facilitate its implementation as CPRs. In this respect, this thesis tries to narrow the gap in this area. It was based on a theoretical design that analysed of the planning situation in Cameroon, leading to recommendations for the model's improvement and implementation. The planning system developed in this study is restricted to an implementation in medium-sized areas, e.g. FMU, forest council in PFE and national estates in NPFE. If the planning level takes into account the time frame it will be described as medium term planning. This new planning approach was described as CPS, which is legally required for FMU and Council Forests in the Congo Basin region. Additionally, the planning concept has been designed as collaborative and should assist in building common beliefs and values, managing conflicts before they escalate. Although this way of planning is perhaps more time consuming than planning without participation, it is considered to be vital. The legitimisation of participation within the planning framework was established by the UNCED in 1992.[105] The model was not tested in the real world, but assessed through discussion with "experts" as well as through an empirical and explorative study with planning practitioners and users. The tools developed in the CPS model are of conceptual nature and need to be tested in the field. However, it does not address the small-scale and/or temporary concessions: allotments, family allowances and community forest, where no management plan is required before obtaining harvesting permission. Moreover, the planning system is suitable for different forest ownerships; this means that the system is flexible and easy to adjust to some specific characteristics of a

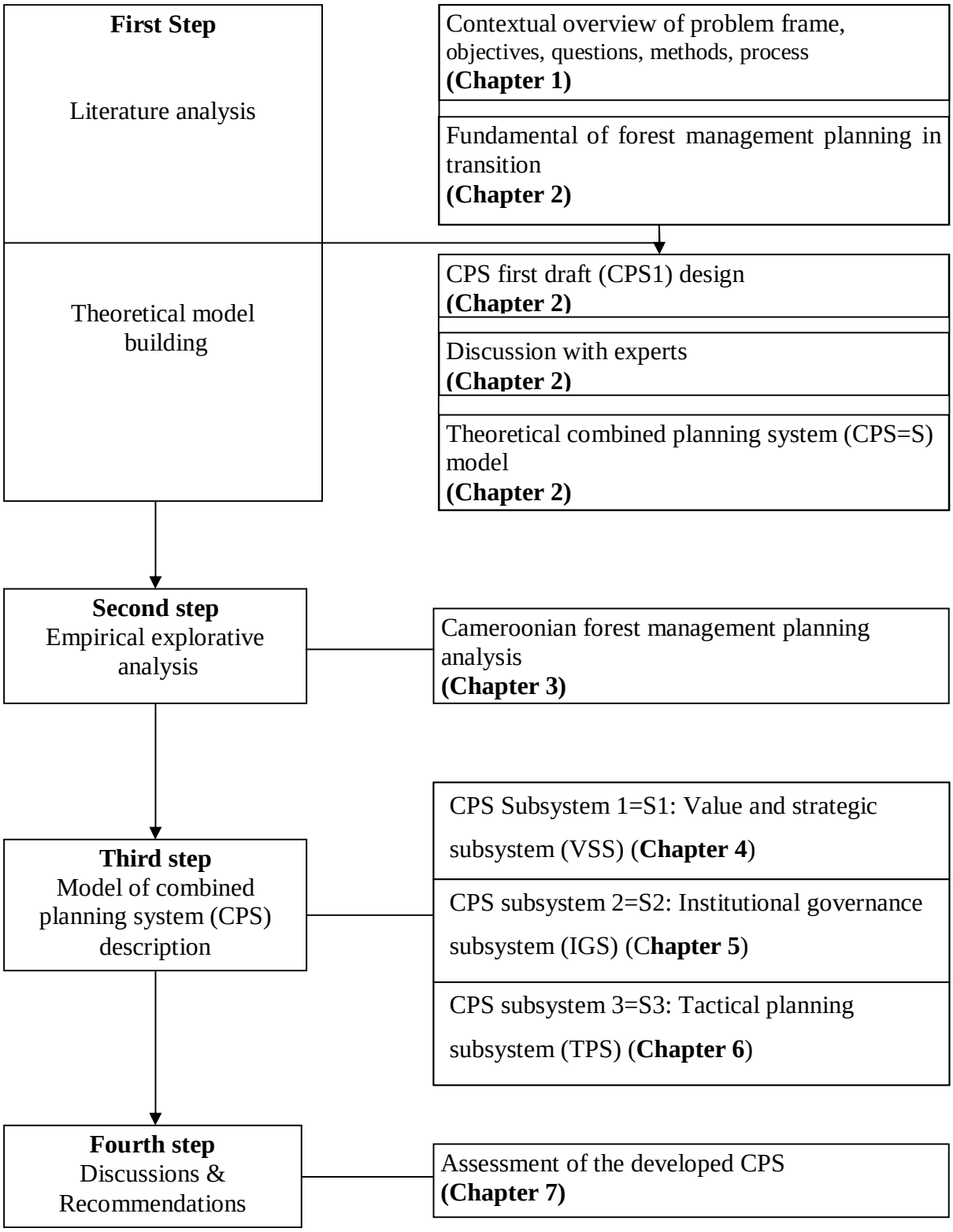
[105] Earth Summit 2002.

specific type of forest ownership and its results could be extrapolated to other regions of the humid tropics around the world that have similarly been transformed by the powerful and relentless processes of national and global integration.

Summary of linkages between research objectives, questions, research methods and process

Specific research objectives	Research questions	Research process	Research methods
		First step	
To theoretically characterise Cameroonian forestry and the planning situation	What problems of FMP can be deduced?	Chapter 1: Background, problem identification, objectives, questions, methods, process	Literature survey
To review fundamentals, notions and principles of FMP	What are the fundamentals of forest management and planning? How should the theoretical planning system for forest management be designed?	Chapter 2: Fundamentals of forest management and planning and the theoretical CPS design	A constructivist method Discussion with experts
		Second step	
To propose a critical analysis for the FMP situation in Cameroon	How to analyse the existing Cameroonian forest management planning?	Chapter 3: Analysis of the Cameroonian forest planning situation	Qualitative research: data collection, content analysis
		Third step	
To propose a model of forest management planning as a method for SFM	What kind of planning system can contribute to achieving SFM in Congo Basin?	Chapter 4: Value and strategic system (VSS); Chapter 5: Institutional governance system (IGS) Chapter 6: Tactical planning system (TPS)	Synthesis of the results: model outcomes presentation
		Fourth step	
To suggest recommendations for the follow up.	What can be recommended to improve the forest management situation in Cameroon based on the insights obtained from the system designed?	Chapter 7: Discussions and recommendations	Selection of recommendations

Table 1-1 Summary of linkages between research objectives, questions and methods



CPS: Combined planning system

Figure 1-2 Schematic representation of the structure of the thesis

2 Fundamentals of forest management planning in transition: A proposal for a combined planning system (CPS)

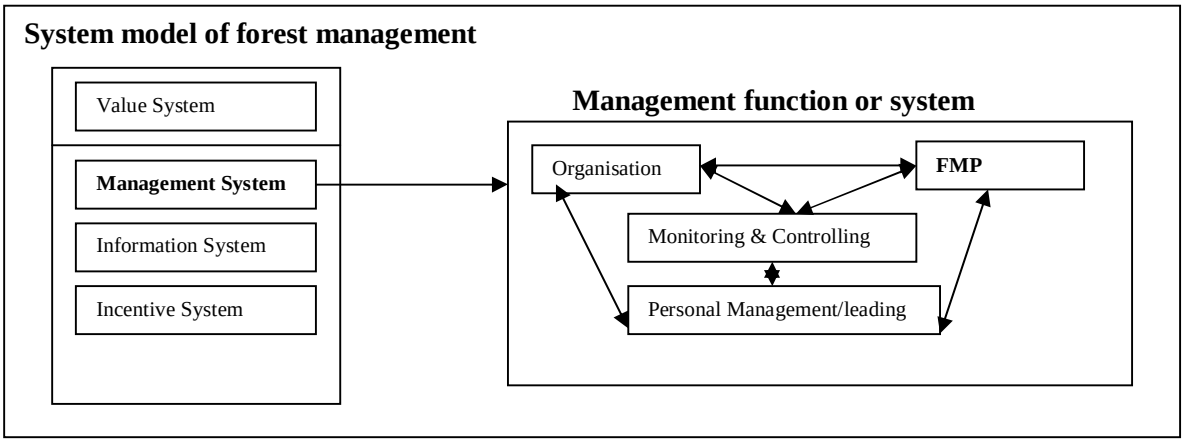
The history of forest management planning (FMP) has followed a very similar pattern practically all over the world, to a certain level. It runs parallel to a large extent with that of forestry.[106] *Both developed in a time of threatening wood shortage and from fear that a timber famine would result from over-cutting, land clearing, and grazing, biodiversity reduction, poverty and more recently climate change*[107] *and also from the realisation that the use of the forest in all its functions, in particular the timber yield, is not inexhaustible, and that only a regulated forest production and utilisation can prevent shortage with their consequences.*[108] *FMP and forestry are therefore "product" of forest degradation, deforestation and wood emergencies.*[109] *How this regulation for the different forest demands was made, is temporal and locally very different as it is linked to numerous external factors and developments. In this respect, the use of a FMP system to deal with various forestry and/or planning problems dates back to the early 13th century in Central Europe, to the mid 19th century in Burma* (now Myanmar) *and only since the 1990s in the Congo Basin region.*[110] *Since then large conceptual planning methods or systems have been developed and continue to be developed. In this framework, the present chapter addresses the research question two (2) and three (3) respectively about, what are the fundamentals of FMP? How should the theoretical system of the FMP be designed? It is organised into four (4) sections. The first one describes the* FMP concept *within the system of forestry in general and the management function in particular, it reviews the central European FMP systems. The second one discusses the evolution of the various methods and views that have been applied in tropical region. The concept of sustainability is presented in the third section. In the fourth one, challenges faced by FMP, specifically the reasons for their failure are discussed. It also highlights the need for a new approach to address FMP problems. The last section proposes a definition of FMP as adopted in this thesis and explains the design of the new model of planning, the so-calls CPS. This model system is based on a value and strategic system, an institutional governance system, and a tactical planning system* as key elements or subsystems

[106] Richter 1963; Speidel 1972; Schlaepfer et al. 1987; Bachmann 1992; Kurth 1994.
[107] Adapted from Bartoo et al. 1961.
[108] Schlaepfer et al. 1987; Bachmann 1992; Clément 1997; Atyi & Mbolo 2006.
[109] Adapted from Speidel 1972, Kurth 1994.
[110] ATIBT 2007.

2.1 Central European forest management planning

2.1.1 Forest management planning in forest management

To deal with problems through a decision making process within the social framework is the central purpose of a management system.[111] This problem may be perceived due to its degree of significance, its deviation from desired conditions, and undefined and uncertain paths, linking existent and desired states. Such a situation is also defined as a difference between the states "is" and "is to be".[112] However, with the increasing conflicting interests of various participants in relation to forest resources and the complexity of forestry and the rising dynamics surrounding it, such as social responsibility, ecosystem functionality, etc., increase the necessity for a management system leading to purposeful measures. This management system is derived from the system model of forestry.[113] Beside the management system, this system model includes amongst other things a value system, an information system and an incentive system. As can be seen in Figure 2-1 below, the management system itself embraces an array of functions: FMP, organising, monitoring & controlling, and personnel management. Of these elements, the FMP (as "Führungsinstrument"[114] in German) in stewarding forestry activities towards desired conditions - is considered to be the logical and essential starting point and consists in turn of several activities.



(FMP: Forest management planning)

Figure 2-1 Integration of management function in the system model of forest management and integration of the planning in the management function adapted from Oesten & Roeder 2002 and Kovac 2002.

[111] Adapted from Oesten & Roeder 2002; Kovac 2002.
[112] Kovac 2002.
[113] Oesten & Roeder 2002.
[114] Sekot (1991).

In the framework of FMP, several scientific methods have been proposed and continuously developed to address forestry problems. With regard to its history,[115] these methodological systems of planning have largely been the same all over the world. Thus, an analysis of planning scholars' findings allows deriving three lines of thinking. The first one is the unique function of FMP methods.[116] The second one is the multi-functions approach[117] and the last line of thinking is the participatory planning approach from social sciences scholars. These systems of planning have been labelled participative-, collaborative-, joint-, and co-management and/or planning. They (systems) are oriented towards a new vision of sustainability[118] providing normative guidelines for the planning process. It was primarily developed in the tropical region, whereas the former two lines of thinking were mostly developed in Europe. In this respect, the next section of this review presents the most important FMP techniques or methods used in the past and are still in use in central Europe.

2.1.2 Central European forest management planning techniques

In the central European region a deductive method is characterised as a "Bottom to top" approach: : from the forest stand to the enterprise, e.g. Even-Aged Method, "Classical Combined Method" ("Klassisches Kombiniertes Verfahren" in German). Others are inductive methods based on expected diameter distributions in each stand ("Control Method" - "Kontrollmethode" in German). More recent methods include the "Serial Planning Unit" (SPU) ("Serielle Planungseinheit" in German) developed by the forest service in Rheinland-Pfalz (Germany) and the Control Sampling Plot (CSP) from the Switzerland. There are five parameters that are useful to classify the FMP system developed in central Europe: area, economy, volume, stock and increment in regulated forests, as well as stock and increment in unregulated forest. Based on these parameters, the planning systems can be classified into five groups as can be seen in Figure 9-7 in Appendix G.[119]

[115] This part on the Central European FMP history emphasises mostly the German, French and Swiss planning history. They were the first in this field and developed the foundations of FMP.
[116] The first and older group based their understanding on just one function of the forest, the economic value. This falls into the period of the beginnings of FMP during the 12-13th century, e.g. Judeich 1871; Hartig 1795; Wagner 1923; Baader 1942; see also section 2.3.
[117] The second group based their understanding of forest management planning on the multiple functions of the forest. This type of FMP integrates all the functions of the forest into the planning outcomes. This group of scholars includes, for example: Speidel 1972; Bachmann 1990; Bos 1994; Kurth 1994 etc., see section 2.3.
[118] The move from unique function, multiple functions to socio, economic and ecological management from changing social, ecological and economic circumstances of recent decades.
[119] For further reading on the history of FMP in Europe as well as on the fundamental of FMP in general see the work ("Großhausarbeit" in German) of Njantang under the scientific support of the author (Njantang 2007).

2.1.2.1 First development phase of central European FMP: 13th to 16th century

The first development phase is from the beginning of forest utilisation: Of irregular–to regular yield planning in Europe (13th to 16th century). In this early period, excessive use and partial devastation of the existing forests was caused by growing industrial needs for wood as part of the development of the free-market economy, in particular by the iron and glassworks industries during the Middle Ages and at the beginning of modern times.[120] To address these problems regulations aimed at controlling grazing until young stands had outgrown the reach of livestock, while cutting was concentrated on other areas. In this framework the control by area of forest was developed.[121] It only regulates the final yield, that is to say the cutting of trees in the designated areas, and does not take into account production from thinning and other operations in the younger stands, though separate arrangements can be made for this to be fairly uniform each year.[122] Control by area is the simplest of all methods and has been used also in tropical forests in an early phase of management. Generally, if some estimate of the rotation or felling cycle is made the forest can be divided into an equivalent number of equal-sized blocks and one block can be exploited each year.[123]

2.1.2.2 Second development phase of central European FMP: 17th-18th century

The second development phase is from curbing the forest exploitation development to the end of the devastation period (17th-18th century). In the course of history, Central European forests declined and disappeared because of the over use, this happened in the 17th-18th century.[124] Forest science arose in the aftermath of this environmental catastrophe. After this period of crisis, early forestry began again with focus on reforestation. It started as forest restoration on a technical-biological basis.[125] In the same manner, the instruction for the examination of the forests with growing stock estimation in 1650 occurred in the German southernmost office of the Konstanz administration. Estimation of the ripeness for cutting yield was made according to plots and determination of the prescribed yield was developed as

[120] This time was dominated by Bartoo et al. 1961, Speidel 1972; Kurth 1994; Schlaepfer et al. 1987 and Bachmann 1994 as irregular and coincidental wood uses and forest devastations, just as it was in North America and Australia at a much later date.
[121] Bartoo et al. 1961.
[122] Brasnett 1953.
[123] Adler & Wright 1999; Vanclay 1996; Atyi 2000.
[124] The thirty Years' War: 1618-1648, with its disruption of order and authority, resulted in over-cutting and neglect of the forests of central Europe (Bartoo et al. 1961; Mantel 1959; Kurth 1994).
[125] Kurth 1994; Duchiron 2000; Kovac 2002; Gadow 2003.

primitive control by volume in 1653, 1680 and 1696. That was the beginning of control by volume with regulations similar to FMP: forest surveys and a first sample plot system.[126]

2.1.2.3 Third development phase of central European FMP: 18th-19th century

The third development phase is from the beginning of scientific FMP from the 18th to the 19th century. It is the first transition in FMP. This phase is characterised by a sharp break particularly in France, Switzerland and the countries surrounding the Habsburg lands as a result of the French revolution[127]. In this period various methods were developed simultaneously. The first FMP methodology and modern forestry dates back to the 18th century. The origins of the scientifically based theoretical concept lie in Germany[128] and new procedures of improved forest inventories were developed in the spirit of sustainability to secure present and future timber harvesting.[129] The European economic movement (neo-classical economic theories) is characteristic of this development phase. The nineteenth century saw new advances culminating in the periodic method by Hartig (1795) and Cotta (1804),[130] the so-called method of 1883, the combined periodic method,[131] and the transition for the normal growing stock method:[132] the volume- and increment method established by König (1813)[133] and further developed by Paulsen.

2.1.2.4 Fourth development phase of central European FMP: 19th-20th century

The fourth development phase is from the 19th to the 20th century. This phase includes firstly, the age class method (even-aged method). It determines the sustainable annual cutting for the next planning period ("Wirtschaftszeitraum") from the same felling area. The goal of this method was the production of a normal age class distribution, in order to ensure sustained final yields. During the 19th and 20th centuries Europe's attention also shifted from purely planning the state of resources, towards planning the continuing availability of goods and

[126] Bartoo et al. 1961.
[127] In France, interruption of the forestal tradition was caused by revolution.
[128] Bartoo et al. 1961; Speidel 1972; Kurt 1994; Duchiron 2000.
[129] Speidel, 1972.
[130] Which made the list possible. Both a surface as well as a volume felling plan developed as logical advancement as soon as enough knowledge and time for volume inventory existed (Cotta 1804 Quoted by Kurth 1994).
[131] The area is divided according to felling periods with consideration of both factors - the volume and the area measure - with compensation in the sense of reaching sustainability.
[132] Normal growing stock method or rational method: It determines the annual utilisation from increment and growing stock.
[133] Quoted by Mantel 1959.

services.[134] The even-aged method served as a basis for the development of the combined method ("bottom to top" approach). According to this combined method, theoretically a forest always produces an even flow of timber and is called a "fully regulated forest" in such a case.[135] The next planning method of that time was the control method (an inductive method) which emerged as an alternative method to the combined method (see Table 2-1 below). The control method is the only proven FMP system regarding the forest as an ecosystem in which all its components closely interact with the site, soil and climate. It is also a unique FMP system which continuously maintains a dynamic all-aged stand structure, volume and area control.[136]

Characteristic	Combined method or even aged Method	Control method
Unit	Stand	Division or compartment
Growing stock inventory	Representative survey, estimation	Complete enumeration
OVI determination	Yield tables (YT)	V2-V1+N-E
aTI100	YT	-
Silvicultural yield	Sum of felling plan	Sum of division
Sustainable control	Indicator YT	N, stock, increment.

V2: Stock at end of the period; V1: Stock at start of the period; N. Felling; E: Ingrowths during the period; aTI100: Average total increment 100: Production class, OVI: Ongoing volume increment.

Table 2-1 Fundamental differences between the important features which are decisive to characterise the combined method and the control method (adapted from Oesten 2003).

2.1.2.5 Fifth development phase of central European FMP: 20th-21th century

The fifth development phase is from the 20th to 21th century. It is the second transition in FMP methodology. After the development of the combined method and the control method, FMPs in Europe have essentially been based on the principles of these methods. Their main feature is a strong focus on sustainable timber production as well as on economic viability of the forest enterprise. In this context, the CSP from Switzerland and SPU from the forest

[134] According to Speidel 1972; Bachmann 1992; Schütz 1997; Duchiron 2000.
[135] The essential requirements of a fully regulated forest are that age and size classes be represented in such proportions and be consistently growing at such rates that an approximately equal annual or periodic yield of products of desired sizes and quality may be obtained in perpetuity (Kurth 1994; Atyi 2000)
[136] The Control Method relies heavily upon local natural regeneration, intensive 100% inventories to monitor stand growth in all size (age) classes every 6-10 years, and harvesting trees only upon complete inventories to control its stand variables. This method is reviewed by Baader 1942, 1945; Mantel 1959; Richter 1963; Speidel 1972; Bachmann 1992; Vanclay 1996; Alder 1992; Duchiron 2000; Schütz 2001; Atyi 2000.

service in Rheinland-Pfalz (Germany) were developed.[137] The former, CSP, is mainly based on the control method but is extensively used in age-class forests. It is "purely" an inventory method, not a management method, and planning in this case, has to be done separately. This method was basically developed by Krutzsch & Loetsch (1938).[138] The latter, SPU, is one of the recently developed methods for FMP in response to the previously described forestry-related problems in Europe.[139] The Table 2-2 below displays the fundamentals differences between the SPU and the CSP.

Characteristic	Serial planning unit	Control sampling method
Unit	"Forest place" (Waldort in German)	Sample
Growing stock inventory	Representative survey, estimation	Representative survey
OVI determination	Yield tables (YT)	Δ BDH
aTI100	YT	-
Silvicultural yield	Serial planning unit in development phases	Sum TT
Sustainable control	Indicator YT	Per increment

aTI100: Average total increment 100: Production class, OVI: Ongoing volume increment; TT: Treatment type. BDH: Diameter at breast height

Table 2-2 Fundamental differences between the Serial Planning Unit (SPU) and the Control Sampling Plot (CSP).[140]

Another method in this group is the FMP as a strategic management instrument which has also been developed recently. The design is oriented towards the operation research method. In fact, contrary to classical planning systems,[141] which are concerned with tactical and operational planning tasks usually dealing with medium and short-term problems with low complexity degrees, In contrast, strategic planning systems deal with long-term, frequently little differentiated and badly structured problem fields, which are characterised by a high

[137] Arbeitskreis Zustanderfassung und Planung in der Arbeitsgemeinschaft Forsteinrichtung (AZPAF) (1997); Arbeitsgemeinschaft Forsteinrichtung (AF) (2003)

[138] Krutzsch & Loetsch (1938 quoted by Bachmann 1992). Its basic principle is on the one hand a permanent sample (sample circles) distributed evenly through the entire forest area (marked invisibly) and on the other hand an "objective" inventory method. No estimated parameters, same sampling probability for all stands and the calculation of error possibilities' at management level. Finally the individual area appraisal is only possible to a limited extent (Oesten 2003).

[139] Derived from traditional forestry so the forest companies are required to make use of all chances and possibilities to secure its future by adaptation, i.e. changing general conditions. Moreover: Lowering the cost, the use of modern technology and adaptive organisational structures[139], are at the same time associated with limited personnel resources in forest management planning, as well as the necessity of new priority settlements in the direction of meaningful strategic forest planning (Cf. AZPAF 1997; AF 2003; Hanewinkel 2001; Oesten 2003).

[140] Adapted from Oesten 2003; AZPAF 1997; AF 2003.

[141] Medium term planning (Speidel 1972).

complexity degree.[142] Strategic planning is a process, with which, on the basis of the goal formation, enterprise strategies are developed and implemented after a strategic analysis with the use of simulation, optimisation and linear programming.[143] The central task of strategic planning is the conservation and creation of success potentials in forest enterprises with the goal of ensuring long-term success. Typical strategic tasks are, e.g. the planning of long-term forest transformations or conversion projects or the development of risk management systems, while planning decisions on single stand level belong mainly to the range of operational planning.

2.2 Tropical forest management planning

Jordan & Montagnini (2005) highlighted that tropical deforestation and degradation was a concern to colonial powers in the 19th century because of their reliance on the forests of their colonies to supply timber for building naval vessels.[144] Following World War II logging increased in intensity and scale, and population pressures in tropical countries resulted in the clearing and degradation of tropical forests. By the 1960s, scientists began to recognise that the disappearance of tropical forests represented an important loss of global resources, and in the 1970s and 1980s began to determine the area of tropical forests worldwide and the rate at which they were disappearing. Since that time, concern was also raised over environmental quality, public health, social justice, common welfare and active participation, specifically of local communities that are rightly considered to be an essential feature of the FMP and conservation of tropical forests worldwide.[145] For decades, it has been known that the success of FMP in terms of sustained forest production depends to a considerable degree on its compatibility with the interests of local populations and other stakeholders. In this framework, different methods have been developed, although the number of available methods for tropical forests is still rather small compared to the existing approaches of methods applied in temperate zones.[146] Furthermore, there is very little written work on the tropical FMP either in textbooks or in research publications. In this section, the history of tropical FMP is discussed based on some well-known techniques, methods and theories.

[142] Bea & Haas 1995 quoted by Hanewinkel 2001.
[143] Kreikebaum 1997; Pfohl & Stoelzle 1997; Hanewinkel 2001; Oesten & Roeder 2002.
[144] For example, British Colonial Foresters became concerned with the lack of regeneration of teak forests in Burma (now Myanmar) and initiated a reforestation programme in the mid 1800s.
[145] This statement resulted from a historical perspective on the exclusion of the local communities in resources management. In tropical regions, most forestland was and still is under the statutory ownership of the respective sovereign state (Cf. FAO 2005a). This framework of state ownership has been inherited from colonial times.
[146] Vanclay 1996; Bossel et al. 1997; Adler & Wright 1999.

The following four FMP methods and frameworks are highlighted: the first one is the rationalist or expert-based planning or top-down approach. This rational approach will be addressed in the following section and includes yield regulation, e.g. control by area, which has sometimes been defined as a harvesting system, e.g. reduced impact logging (RIL). At the same time it is known as a silvicultural system, e.g. tropical shelterwood system (TSS). The second approach represents community based planning (CBP) or self-organising or Bottom-up or local knowledge-based planning as a permanent construction of the content of the plan by the users.[147] Consequently the planning process begins with the users planning for the users, and ends with the users implementing the plan. CBP places a strong emphasis on community-level institutions for managing the forests in contrast to the top-down approach. Decisions in planning are a set of actions taken by a network of users and the representative structures.[148] Additional important characteristics of the CBP view of planning can be found in Dogmo (2008c, p. 15-16)[149]

The third planning method is the institutional framework of FMP (property rights and decentralisation). It is discussed based on the understanding that forests are a CPR. Various authors agree that the main reasons for FMP problems lie in inadequate institutional frameworks[150] and the fact that institutional frameworks have been ignored in FMP processes. The references in this study principally include the theories of new institutional economics (NIE) [151] with emphasis on property rights regimes because of their importance in relation to tropical Cameroonian forests. The full review on the property rights system, as well as their impact on FMP is discussed in Dogmo (2008b, p. 13-50; 2008c, 16-23).[152] The references also include studies on institutional governance,[153] which looks at governance[154] regimes at

[147] Adapted from Buttoud 1999a.
[148] Henderson 2005; Beket et al. 2005.
[149] See also the following authors: McCay & Hanna 1998; Shannon 1991; Applegate et al. 2002; Graham et al. 1992; Henderson 2005; Beket et al. 2005; Brody 1998; Kessler 2004; FAO 1998b; Folke et al. 2002; Artur 2005; Wenner 2000; NOAA 2000.
[150] Understanding the institutional situation is an essential prerequisite for improving forest management planning performance.
[151] NIE expands neo-classical economic theories in order to explain economic behaviour by incorporating a property rights analysis, an economic analysis of law, public choice theory, constitutional economics, the theory of collective action, transaction costs of economic performance, hierarchy and organisation, the principal-agent approach, the theory of relational contracts, and comparative economic systems.
[152] See also Bhagirath & Engel 2006; North 1992; Arlinghaus et al. 2007; Antinori 2000; Kundhlande & Luckert 1998; Ribot 2002a; Larson 2004; Ango et al. 2007; Castadot et al. 2007; Djomo et al. 2000; Runge 1981; Ostrom et al. 1999a,b; Feeny et al. 1990; Berkes 1989; Berkes 2006.
[153] North 1992; Bhagirath & Engel 2006.
[154] The concept of "governance" was used in the 1990s by the "new public administration," the National Performance Review, and the reinventing government movement in the United States to reflect the idea of

an institutional level. In this study governance regimes cover important aspects of decentralisation. In this respect, according to the property rights and institutional theories, it could be concluded that rainforests as CPRs need to be managed and planned as a common property in order to avoid the cost of exclusion or the "tragedy of the anticommon" and the negative effects of decentralisation, such as corruption, injustice, etc.[155]

Finally, the fourth FMP "method" presented relates to co-management, mostly developed in Asia and South America which involves government and/or forest companies and the population mostly during the management process. It is the result of the need to design FMP institutions combining the bottom-up principles with the principles of top-down planning with attention paid to the interactions between the two. It is also known by a variety of other terms, the more common being adaptive, collaborative, and cooperative, joint, participatory management.[156] In general, it should be noted that this concept is mostly applied in conservation or protected areas and often in relation to other natural resource management systems like fisheries.[157] However, the co-management is rarely applied in forest production as can be seen in many cases of forest concessions in the Congo Basin rainforest region, when compared with top down approaches.[158] The full review of this concept is presented in Dogmo (2008c, p.24-30).[159]

implementing public policies not just through governmental bureaucracies but also through a variety of public-private partnerships, outsourcing, and privatisation. A parallel influence in the 1990s was the growing importance of networking (including electronic networking) in policy development and coordination: governance was associated with networking, whereas government was associated with traditional bureaucratic hierarchies in public administration (Hajer & Wagenaar 2003).

[155] For full review on the property rights system and institutional governance, see Feeny et al. 1990; Hajer & Wagenaar 2003; Overdevest & Rickenbach 2006; Hobley 1996; Edmunds & Wollenberg 2003; Ahmed & Mbwambo 2004; Ostrom 1988a,b; Gray 1991; Ribot 2002a,b; Agrawal & Ostrom 2003; Pacheco 2002,2004; Ostrom 2007; Larson 2004; Ribot 2004; Beneria-Surkin 2003; Anderson et al. 2004; Kassibo 2002; Oyono 2004a,b; Contreras 2003; United Nation (UN) 2004; Agrawal & Ribot 2000; Agrawal et al. 1999; Agrawal 2000; Oyono 2004a, 2005.

[156] Pomeroy & Rivera-Guieb (2005) described the fundamental differences between community based management (CBM) and co-management. These differences focus on the level and timing of government participation in the process. CBM is people-centred and community-focused, whereas co-management focuses on these same issues and a partnership arrangement between government and the local community of resource users. The process of resource management is also organised differently. Co-management has a broader scope and scale than CBM, with a focus on both internal and external community issues. The government may play a minor role in CBM; co-management, on the other hand, by definition includes a major and active government role.

[157] With the surrounding local communities (Berkes 2002).

[158] Pomeroy & Rivera-Guieb 2005.

[159] Agrawal et al. 1999; Agrawal 2000; Edmunds & Wollenberg 2003; Berkes 2006; Burger & Mayer 2003; Adger et al. 2003; Brown 1999; Biesbrouck 2002; Abega et al. 1999; Nguinguiri 1998 ; Pinkerton 2003; Jentoft & Trond 1989; Berkes 2002; Hideyuki & Xin 2008, Pomeroy 1995 ; Folke at al. 2002; Hislop 2008.

2.2.1 Forest management planning understanding as "yield regulation"

Tropical forest management and planning literature shows that early yield regulation methods used in tropical forests tended to follow the classic techniques developed and employed in Europe during the 13th, 14th and nineteenth century for both even-aged and uneven-aged forests. Recknagle (1917)[160] for example, described eighteen distinct methods (see some of them in Figure 9-8 in Appendix H). Methods of calculating the yield depend on a number of factors, variables or criteria. They include: control by area,[161] control by volume,[162] control by volume & increment[163] and control by the number of trees,[164] regulation by size class[165] and common growth model types, like the gap models with their three contents, the cohort models, the carbon balance models and the FORMIX3 for relating to other models.[166] In tropical central Africa exists an approach for FMP based on yield regulation techniques developed by the CIRAD in the east region of Cameroon, the "Dimako project", in 1992.[167] Also within this framework, the FAO proposed some tools for FMP on the basis of their research on FMP (FAO 2002a-d).

2.2.2 Forest management planning as "silvicultural systems"

FMP has been understood by some authors[168] as a silvicultural prescription. From history, **s**ilviculture in tropical Africa dates back to the early 1900s.[169] Some of these systems are still practiced, while other systems have been discontinued or modified. In the following, some systems already developed in the tropics are reviewed: first of all, the natural regeneration

[160] Recknagle 1917 quoted by Vanclay 1996.
[161] Adding to the description on control by area from the section 2.1.2.1, p. 31, specifically for the Congo Basin, the number of trees felled each year is controlled by felling rules that may be based on minimum size limits for utilisation, favoured species, silvicultural considerations and an assessment of potential logging damage (Alder 1992; Dupuy 1998; FAO 1998; Atyi & MBolo 2006; ATIBT 2007).
[162] Control by volume has its origins in the Austrian government decree of 1788. The timber industry generally prefers a guarantee of yearly volume to one of yearly area (FAO 1998).
[163] As Dwight (1965) points out the science of forest regulation is based here on a very simple principle: if there is excess of old timber, the allowable cut should exceed the mean annual increment (MAI) of the forest; if, on the other hand, young age classes preponderate, the cut should be less than the increment (Dwight 1965 quoted by FAO 1998).
[164] The control by the number of trees requires information on three attributes of the forest: the number of trees in each diameter class, the time of passage that is the time taken by trees to grow through the various diameter classes to exploitable size, and the mortality percent of each diameter class (FAO 1998; Adler & Wright 1999).
[165] This method was devised for uneven aged and semi-uniform forests, and is based on the substitution of sized classes for age-classes for the purpose of yield regulation.
[166] The FORMIX3 model can be classified under the carbon balance modelling approach since the calculation of the individual tree growth is based on the carbon balance (FAO 1998).
[167] Durrieu de Madron & Forni 1997.
[168] Silva 1989; Jordan & Montagnini 2005.
[169] Basically two schools have evolved: Making use of natural regeneration which was advocated by foresters of English origin, and artificial regeneration, defended by French foresters, although amongst the Belgian foresters in particular, there were supporters of both schools (Catinot 1965 cited by Silva 1989).

system which depends on the number of individuals of desirable species left after harvest.[170] Then, the modified version of the Malayan uniform system (MUS) is one of the older and most widely known management systems in Southeast Asia. Its rotation period is about 50-60 years and the determination of regeneration status is through diagnostic sampling (3-5 years after harvest). Afterwards, the polycyclic methods contain many management systems including: the selective management system (SMS)[171] and the cellos silvicultural system (CSS).[172] Most management systems for natural tropical forest today are modifications of the SMS or the CSS geared to suit the local ecological characteristics of the forest as well as the economic conditions of the region. Another method is the Tebang Pilig Indonesia and the Tebang Pilig Tanam Indonesia. In tropical Africa, the management practices were applied in Ghana since the 1950s and modified more recently.[173]. There have also been trials conducted by the "Société de Développement des Plantations Forestiéres" (SODEFOR) in Côte d'Ivoire[174] about the improvement of natural stand systemy or "l'amélioration des peuplements naturels" (APN). Furthermore, the other system was the TSS, a partial clearing system,[175] introduced in Nigeria in 1944 as a monocyclic system based on the European uniform or shelterwood system. The other silvicultural system with natural regeneration attempted for a brief period in Ghana was the post exploitation system. However, a number of approaches and solutions to the problems of silviculture in natural forest have been abandoned.[176]

2.2.3 "Harvest systems" in the tropical region also referred to as forest management planning

Harvesting and extraction operations are activities that generally cause the most significant impacts on the forest. Felling and removing trees are the activities that are included in this system. Some research efforts have also been devoted to the improvement of logging

[170] With the following characteristics: Abundant, wide diameter distribution, and good quality timber.
[171] SMS was applied in rich forests. It counts only on the commercial species of average diameter (30 to 50 cm), left on feet by a practised cut every 25 or 30 years. It is an inexpensive system (Dawkins & Philip 1998; Hon Tat Tang 1987 quoted by Silva 1989; FAO 2005a).
[172] The CSS has been proposed as a technically feasible balance of economic and ecological aspects of timber production in the seasonal evergreen forest of Surinam (De Graaf & Poels 1990; Dekker & de Graaf 2003; Catinot 1965 cited by Silva 1989; De Graaf et al. 1995; FAO 2005a; Jordan & Montagnini 2005.
[173] Asabere 1987 quoted by Atyi 2000; Jordan & Montagnini 2005.
[174] De Graaf et al. 1995; Maître1986 cited by Atyi 2000; FAO 2005a; Jordan & Montagnini 2005.
[175] In opposition to MUS, the forest under management did not have a high regeneration capacity (Dawkins & Philip 1998). This system was gradually abandoned in Ghana and Nigeria in the late 1970s and polycyclic methods were adopted.
[176] Dawkins & Philip 1998; Jordan & Montagnini 2005.

techniques following the damaging and destructive conventional logging[177]. One of the most known techniques is the RIL.[178] It is identified as one of the key elements of SFM. In this framework, there is a significant difference between RIL and FMP. RIL refers to the process of timber harvesting including pre-harvest planning, technical supervision and post-harvest assessments that reflect concern about non-timber resource values and about the future state of the forest,[179] whereas FMP deals with the basic questions: what management objectives and activities have to be undertaken, where, when and by whom. According to Speidel's (1972) and Bachmann's (1992) definitions of FMP, RIL may be an important element of the FMP rather than a FMP of itself. Therefore, forest planners, who are called on to develop a forest management plan can use the RIL as a tool, which assists them in managing forestlands in such a manner and rate, that they are capable of providing long-term contributions and functions to society and future generations.

2.3 Sustainability in forest management planning

The searching for equilibrium between social-, economic- and environmental aspects of sustainability[180] has been one of the top debating subjects within the scientific community and among practitioners.[181] This development was triggered off by the publication of the final report of the commission for the environment and development.[182] This section refers to the necessity for sustainable development for the benefit of current and following generations. This concept is not by any means new. It was already represented in the early stage of forestry

[177] Conventionally practiced is characterised by depleted timber stocks and causes severe ecological damage to residual forests.
[178] RIL systems use an array of best harvesting techniques that reduce damage to residual forests, create fewer roads and skid trails, reduce soil disturbance and erosion, protect water quality, mitigate fire risk and potentially help maintain regeneration and protect biological diversity. These techniques are now widely recognised and numerous studies in the three major tropical forest biomes (Latin America, Central Africa, and South East Asia) have demonstrated that, under moderate logging intensity, these techniques can reduce the damage on residual stands and soil by 50%. However, RIL operations are still based, as all other selective logging systems operated in the tropics, on a very simple rule: the minimum diameter limit applied to all commercial species (Durrieu de Madron et al. 1998; Boltz et al 2003; Barreto et al. 1998; Jordan & Montagnini 2005).
[179] Durrieu de Madron et al. 1998; Applegate et al. 2002; Jordan & Montagnini 2005.
[180] The adjective "sustainable" (Zürcher 1965 quoted by Speidel 1972; Kurth 1994). Its meaning stands for continual, durably, persistently, steadily, for a long time working, regular, returns, constantly, continuously, potentially infinitely.
[181] Thus, FAO (2007) showed that a Google search for "sustainable forest management" produces 25 million results (see also Burger & Mayer 2003; FAO 2007; Earth Summit 2002; ITTO 2005).
[182] Better known as "Brundtland report". It was created in the autumn 1983 of the United Nations at their 38th Conference.

as can be seen in the FMP methods review in section 2.1.[183] Also this concept was present in the first report of the "Club of Rome".[184] This development received further attention in the course of the UN earth summit on the environment and development in the year 1992 in Rio de Janeiro, Brazil. One of the most important outcomes adopted during the conference was a set of guiding principles, such as forestry principles and Agenda 21, Chapter 11.[185] In this respect, SFM can be considered as one of the most important contributions, which the forestry sector can make to the sustainable development objectives of any nation, particularly those richly endowed with forest. SFM has several broad dimensions dealing with administrative, economic, legal, social, technical, environmental, cultural and spiritual aspects related to natural and planted forests for ensuring that the values derived from the forest meet present-day needs while at the same time ensuring their continued availability and contribution to long-term development needs.[186] Without the equilibrium between the dimensions of SFM, it would be difficult to implement FMP and it would have to be justified partly, why FMP nowadays has regressed or failed. In the light of the two preceding sections 2.1 and 2.2 which reviewed the FMP techniques used in Europe and in the tropics, the present section highlights that in the course of history, different concepts of sustainability related to FMP have also been applied, depending upon economic and/or social and/or ecological ambitions (see Figure 9-9 in Appendix J). The first one is the oldest version focusing on the unique function of FMP. The second one is oriented towards multiple uses. The third is people-centred SFM that includes participation.

2.3.1 Oldest version of sustainability in forestry - Unique function oriented FMP

A review of the relevant literature shows that unique-function use in FMP constitutes, in this paper, the first variety of how scholars understand sustainability. This unique function or dimension in FMP is associated with the well-known principle of sustained yields, which is the oldest concept in forest planning and was born at the beginning of forestry in the 12-13th

[183] In this respect, Speidel (1972) spokes of static sustainability for the continuation of conditions (surfaces -, growing stock -, value sustainability, forest-biological sustainability) and dynamic sustainability for the continuation of achievements (growth, increment, wood yields, funds-slow-acting (Gelderträge), infrastructure achievements). It demands the synthesis between equilibrium and growth for the sustainability and sees therein the linkage of static and dynamic sustainability (See Figure 9-9 in Appendix J).

[184] In fact, Radke (1997 quoted after Joest 1998) pointed out that the initial prognosis of the Club of Rome report, did not prove to be true that the economic system would collapse in foreseeable future, if nothing changes (see also Meadows et al. 1972 quotes by Joest 1998).

[185] Joest 1998; Klauer 1999; Steurer 2001; Vornholz 1997; Earth Summit 2002.

[186] These needs are the improved production of goods and services such as wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products (FAO 2007; Burger & Mayer 2003).

century in Central Europe. This concept of sustainable yield is the sustainability of the wood yield in the classical formulation of Hartig (1795). Apart from few exceptions, a unique function used as the main dimension of sustainability in that time was clearly oriented towards the economic value of the forest. The overall goal of FMP was to optimise economic efficiency of the forest enterprise and was focused on timber production. In this respect, Hartig (1795) argued clearly that the goal of FMP consisted of the "Determination of present and future supplies of timber from the forests".[187] To achieve this, several methods of planning were used in that period and enable a thorough understanding and characterisation of the unique-function use (see section 2.1 for a review of these methods). The designation of this unique function imposed itself constantly since Judeich's book titled *"Die Forsteinrichtung"* for the field of activity in the German-speaking countries.[188] The economic basis was present in the definitions of numerous specialists who had the tasks formulating FMP prescriptions at that time. Concerning these definitions, a historical development or sequence of some of these is presented in Table 9-5 in Appendix K.

In the light of this unique function in FMP various forms of sustainability have been proposed, as shown in Figure 9-9a in Appendix J. For example, the term sustainability is understood only as continuity of the wood yields.[189] Here, apart from exaggerations it is the strictly sustained yield management.[190] This form of sustainability still forms the basis of the Central European forestry. This practice has led to high wood yields, in addition, to sustainable forest structures.[191] Sustainability can also be understood as wood production established on capitalistic economic theories which is justified by the sustainability of income.[192] Since annual wood utilisation cannot be constant according to volumes and value because of unforeseeable events and because of the price fluctuations, compensation is aspired by the planning of a "capital reserve fund" or cash reserve fund.[193] In the technical

[187] Richter 1963; Schlaepfer et al. 1987.
[188] Judeich (1871) argued that: "The object of forest management is to organize the overall economic activities in a forest with regard to both time and space so as to best facilitate the purpose of said activities."
[189] This concept which was under the influence of the neoclassical economic theory concerned about the equilibrium of the normal forest theory (Zivnuska 1966 quoted after Speidel 1972).
[190] The most descriptive representation of this principle was given by Baader (1942, 1945), who defined: "sustainability of wood yields is a pursuit for duration (continuity), the steadiness and the equal measure of the highest wood yields." The demand for the constant level of the wood utilization can theoretically be achieved only with a "normalisation" of the age group distribution in planning periods of up to 200 years.
[191] For further comments see Kasthofer 1846 quoted by Kurth 1994; Richter 1963; Mantel 1959; Speidel 1972.
[192] Ostwald 1931 quoted by Speidel 1972.
[193] Corresponding amounts are being added to the capital reserve fund in case of overuses and in case of minimum use taken again in addition to the pension. According to the sustainability of the funds-slow-acting (Geldreservefonds), material property in form of wood stand is exchangeable in principle, with the financial assets of the reserve fund. While the demand liquidity is strongly pointed out, harvesting, reforestation and production security are neglected Ostwald 1931 quoted by Speidel 1972; Kurth 1994. In this context the

literature but not in forest practice, the sustainability of wood as formulated by Heyers (1841)[194] and supported by Judeich (1871) as "suspending sustained-yield management" was of major significance. In this sense, a forest is sustainably managed, if one provides for the regeneration of all mature areas.[195] However, Saari (1950)[196] rightfully rejected the concept of sustainability of wood production as a basis for a realistic FMP, particularly since the demand of certain wood yields and appropriate liquidity was not raised. Sustainability has also been understood as the sustainability of growing stock, in which the growing stock is kept constant. This form of sustainability means equilibrium of felling operations ("Holzeinschlag" in German) and increment in order to increase the felling possibility.

2.3.2 Sustainability in multiple uses

This is an expansion of the sustainability thought on all functions of the forest. It focused on sustainability of the forest's use and protection functions.[197] The multiple- uses- sustainability is supported by Leibundgut (1949)[198] and is found in most directives for the FMP.[199] However, sustainability of multiple uses (see Figure 9-9b in Appendix J) in FMP has already been for more than 150 years. Due to the uncertainly in that time, which contains the social needs after immaterial achievements of the forest and how they have to be quantified, the principle of sustained yield persists.[200] Kasthofer (1846) pointed out early the advertence of the specific functions, which individual forests have to fulfil. In this context, with the claim of advertising sustainability of all forest functions the special position of the multiple uses sustainability has been emphasised by several authors.[201] Richter (1963) spokes of "props after optimal fulfilment of the tasks of the forest for the people and local culture" or sustainability is striving for duration, steadiness and maximum of all-round task fulfilment of the forest for the human society.[202] This formulation of sustainability into broader senses should then also include a complex of economic production and reproduction in order to express the effort of combining the natural and economic reproduction process.[203] Other authors see multi-purpose forestry as the maximisation of the overall effect of all resources of

sustainability of return on investment of Hayek (1936 & Hicks (1942 quoted by Speidel, 1972)) is also represented.
[194] Cf. Speidel 1972.
[195] The definition of sustainability was the logical consequence of the theory of net soil gain.
[196] Saari 1950 quoted by Speidel 1972.
[197] Kurth 1994.
[198] Leibundgut 1949 quoted by Richter 1963.
[199] Speidel 1972
[200] Baader 1942, 1945; Kurth 1994.
[201] Quoted by Speidel 1972.
[202] Richter 1963.
[203] Richter 1963.

the forest. Richter defines this kind of sustainability as a social request. Although Knuchel (1950) pointed out that only a biologically recovered forest carries out a higher yield and realises protection tasks. Peter & Wiebecke (1983)[204] showed that for sustainability, the ability of the forest enterprise is to be designated, safeguarding continuous and optimal use of wood, infrastructure achievements and other goods for use by the present and future generations. Bachmann (1990) also stated that FMP is the medium and long-term management of forests, which has to take into account economic, ecological, and "social aspects". An example of these methods has been reviewed in section 2.1, like the combined method *(klassisches kombiniertes Verfahren in German)* including planning by sector, *(in German "Bereichsplanung")* or other uses in the planning outcomes, for example for recreation, nature conservation, hunting, etc… in the FMP process.[205] Other methods are the control method and SPU which are especially based on the multiple use function of forest. Furthermore, multiple use FMP is defined as the decisions and activities required to reproduce the anticipated objective(s) of stakeholders with regard to the use and conservation of forests in the area.[206] As in the case of unique-function use of FMP, there are also several definitions of FMP based on the multiple uses. These definitions are displayed in Table 9-6 in Appendix L. Concerning the social function, a part of the forest is reserved for human activities (the use of NTFPs, recreation, fresh air, hunting, walking, jogging, etc); there is little integration of the concept of participation in the planning process. In fact, the definition of FMP oriented on multiple use is limited insofar as some problems, e.g. the incompatibility of certain forest uses, causes conflicts[207]. These conflicts are often the result of a lack of fairness and transparency between the stakeholders involved in the process.[208] In fact, collaboration or cooperation between stakeholders, which is a very important element to avoid such conflicts, is often absent.

2.3.3 New understanding of sustainability

After the Rio Summit, a new concept of sustainability was defined. It is clearly recognised that as the health of the forest deteriorates all of its functions and services are threatened. The concept equally integrates the social, economic and ecological dimension (see Figure 1-9d in Appendix J)**.** This new concept of SFM incorporates human preferences for timber and non-timber products, preferences for marketed as well as non-marketed products and services, the

[204] Peter & Wiebecke 1983 cited by Kurth 1994.
[205] Schlaeper et al. 1987; Bachmann 1992; Mantel 1959.
[206] Fines et al. 2001a,b.
[207] Clawson 1976.
[208] Pukkala 2002

preferences of industrial as well as non-industrial agents, including local people and other stakeholder groups, and the preferences of present as well as future generations. Dynamic systems are determined and purposeful, whereby the aims (prescribed values) are conditions of the equilibrium (ideal sustainability structures, target forest). By incorporating the fulfilment of social demands placed upon the forest SFM does not conserve a certain state at a time but leaves room for changes in relation to human requirements of the forest.[209] In this new version of sustainability, the concept of sustainable yield includes the sustainable social yield, sustainable economic yield and sustainable ecological yield derived from the silvicultural yield. This fact is justified by the definition of forestry put forward by Oesten & Roeder (2002) as quasi-social institution. This precept clarifies again the normative or ethical conviction, which has been underlined since the beginning; sustainability (social ethical obligation facing future mankind) is needed in order to ensure the supply of raw materials, ecological functions, and social services of the forests for future generations. In this context SFM represents a behaviour pattern for the interactions between humans and the forest ecosystem ensuring the long-term efficiency of this ecosystem and of the environment for satisfying the various needs of today and of the future.[210] This new vision of sustainability oriented towards the need to reach equilibrium between social, economic and ecological sustainability is a main feature showing that FMP is in transition.

Consequently, the following definitions, among others, serve as a basis for discussion. The ITTO definition of SFM is, 'the process of managing a forest to achieve one or more clearly specified objective(s) of management with regard to the production of a continuous flow of desired forest products and services, without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment'.[211] Another example is the definition of the Ministerial Conference of Helsinki, which highlighted that good management and utilisation of forest and forested areas in such a way and at such intensity that their biological diversity, productivity and regenerative capacity, their vitality, and their capacity to fulfil, now and for the future, their pertinent ecological, economic and social functions at the local, national and global levels, be maintained, without thereby doing harm to other ecosystems.[212] The term SFM stands for the management of forests according to the principles of sustainable development. It is also the current culmination in a progression of basic forest management concepts preceded by

[209] Henne 1968 quoted by Kurth 1994.
[210] Gärtner 1991 quoted by Kurth 1994.
[211] See CIFOR 1998.
[212] WCFSD 1999.

sustainable forestry, and sustainable yield forestry before that. Sustainable forest management is the term currently used to describe approaches to forest management that set very broad social, economic and environmental goals. A number of sets of criteria and indicators have since been developed to evaluate the achievement of SFM at both the country and management unit level.[213] There is a multitude of initiatives to define the major components of sustainable forest management, but the majority have the following elements as a common denominator: a legal policy framework, a sustained and optimal production of forest products, an environmental management system, social issues, and some considerations related to plantations. As far as further development and implementation of the above principles within the framework defined by the Intergovernmental Panel on Forests (IPF)[214] and the Intergovernmental Forum on Forests (IFF)[215] and the newly created UN Forum on Forests (UNFF) are concerned, the aim initially was to implement those decisions that had been arrived at in the course of the UNCED conference. These included the development of criteria and indicators (C&I) for SFM. This was formulated by the codification of current practices and guidelines for forest management. According to Elliot & Schlaepfer (2002), these C&I can clearly be viewed as an indispensable SFM tool and it was through these indicators that the operational quality of the approach was targeted. This is the reason why sustainable forest management should be applied while designing a normative framework for the combined planning system. In Cameroon various C&I systems have been developed or tested in the forests, including the ITTO's C&I, the C&I toolkit of the CIFOR (1998)[216] and more recently the ATO/ITTO Principles, Criteria and Indicators (PCI). A national working group developed the basis for national C&I that are compatible with FSC standards. However, none of these processes has so far been implemented beyond experimental field-testing and capacity building.[217] Cameroon participated in the development of the convergence plan for forest management in the Congo Basin, which was endorsed by a conference of African heads of state in March 1999. This plan aimed to increase coordination and cooperation among countries of the Congo Basin in all activities relating to forests.[218]

[213] Brundtland 1987; Earth Summit 2002; Burger & Mayer 2003.
[214] IPF 1995-1997(see Dogmo 2004).
[215] Intergovernmental Forum on Forests (IFF) 1997-2000 (see Dogmo 2004).
[216] See also Boyle et al. 1997.
[217] CIFOR (1998); ATO/ITTO 2003.
[218] Dogmo 2005.

2.4 Challenges forest management planning faces

2.4.1 Limits to the current forest management planning method

Planning poses problems in forestry, and especially in large forest enterprises owed to the long life span of trees; the geographical extend of forest estates and the uncertainties of nature and markets. Adding to the problem frame underlying this thesis (see chapter 1, section 1.2), the limit of current FMP in the Congo Basin is of a more general nature. In light of the new task of achieving sustainability, the use of conventional instruments of planning in forestry (the working plan)[219] could harm forestry initiatives, e.g. due to conflicting interests between stakeholders. However, if the traditional form of planning is applied today, it is apparent that many of the traditional methods and beliefs will not stand up to critical examination partly, because the absolute and relative scales of values are constantly changing and partly because the full implications of accepted practices have not always been fully appreciated since the Rio vision of sustainability. After the review of all the methods used in the preceding section of this chapter, the requirements of contemporary sustainability, i.e. achieving equilibrium between social, ecological and economic aspects, remain unfulfilled. There are three shortcomings suited to illustrate the importance of forest planning. Firstly, there is no clear statement of the normative as well as strategic aspect of planning, by which to judge the relative success of different courses of action and then secure the forest enterprise in the long term. Secondly, there is an inadequate or inexistent institutional governance framework which could guarantee successful interaction between actors and then secure their direct and active participation and collaboration during the planning process Thirdly, the traditional plan leaves no room for flexibility which is not only based on the uncertainties or the focus on risks associated with environmental changes and man-made impacts, but also on human behaviour or different interests of each stakeholder group.

In this context, the analysis of the FMP techniques shows an imbalance between economy, social aspects and ecology. On the one hand, some planning techniques remain focused on only two aspects of sustainability, for example the serial planning unit (SPU) and the control method. Others are containing just one of the three aspects of sustainability, for example the even aged method, the strategic aspect of the FMP, as well as the control sampling method, which does not directly consider social aspects and superficially addresses the ecological or

[219] These working plan was originally divided into two parts, part one consisting of a description of the forest and part two of prescriptions for a fixed period of years ahead (Bradeley et al. 1967)

environmental aspects. In fact, Rio with its new concept of sustainability remains vaguely used in FMP nowadays.[220] This concept review in the last part shows the urgent need to re-orient the FMP approach towards equilibrium. On the other hand, certain approaches focused on the social aspect of SFM only, e.g. the community based approach of planning, commonly known as bottom-up approach has been proved also to be ineffective in some parts of the worlds, specifically for FMU.[221]

Other limit are owed to the fact that: most of the FMP methods used in tropical regions, specifically for production forests, tended to follow classic techniques developed and employed in Europe during the nineteenth century for both even-aged and uneven-aged forests[222] as can be seen in Figure 9-8 in Appendix H. However, natural forests in the humid tropics differ from temperate and boreal forests in several ways.[223] This fact has many implications for FMP and means that most of the planning techniques devised for Europe cannot be used without modification.[224] Therefore, it appears also that the wider issues of social and environmental functions of the forest are also superficially addressed in these FMP designs.

Another limit is lack of confidence and commitment to the FMP outcome by stakeholders because, for example in the top-down approach or expert-based approach, the specialists form the plans independently and only inform the stakeholders at the beginning and/or end of the

[220] See also the comment of the author about the ATIBT and TCP planning system model in the first chapter of this study.

[221] The CBP approach advocated by scholars of the commons argue that multiple forest values are closer to the concept of "social states" than market price or monetary value, and the decisions related to SFM are decisions of "social choice" and not decisions to be guided by conventional benefit-cost analysis, based on the monetisation of all costs and benefits. These authors suggest also a non-market oriented stated preference technique to identify all possible forest values and to elicit peoples' preferences for different forest values (for review see Berkes 2002, 2006; Ostrom 1998a,2007, Shannon 1991, 2002; Agrawal 2002; Ango et al. 2007, Castadot et al. 2007).

[222] Recknagle 1917 quoted by Vanclay 1996.

[223] The main problems can be summarised as follow (Dawkins & Philip 1998): The forests were extensive and less accessible than in Europe. First, tropical forests are characterised by high species diversity, many tree species and many of these may occur infrequently. There may be complex vertical and horizontal structures, usually stocking on a wide range of different site conditions. Second, there is a lack of long-term field data, usually derived from observations of permanent sample plots (PSPs). Third, the lifetime of many species is very long, typically some hundred years, and tree age is usually unknown and in some rainforests of the humid tropics, the growth rates may be relatively low, contrary to the expectation (Jordan & Montagnini 2005).

[224] Similarly, despite the lush appearance of many tropical forests, the net primary production is less than many expect: Commercial timber production in natural forests is usually less compared with tropical plantations, and many temperate forests. Additionally, the phytomass in the humid tropics may be high, but only a small proportion of the total volume may be of commercial interest because of practical limitations such as size and species characteristics. Since the commercial trees may be widely dispersed, the area of forest disturbed for a given volume may be much larger than in temperate and plantation forests, despite the large volumes of some individual trees. Buttresses, large branches and decay may mean that only part of each tree bole is merchantable, therefore, FMP is characterised to be a very complex process, while the use of these forests plays an important role for the rural poor.

planning process. Thus the yield estimation does not integrate the needs or interests of these stakeholders. As a bottom-up approach the focus of CBP is on local knowledge, which is adequate for forest communities and councils. The co-management approach is oriented towards protected areas and reserves. The exclusion of stakeholders in each step of the planning process which, if applied, can innovatively reduce negative impacts and enhance the positive effects of the planning process is a clear shortcoming in top-down approaches.

Forest, a renewable natural resource, can be deemed to be a so-called CPR, and is characterised by great rivalry over the ability to utilise the resource and problems caused by the exclusion of other (unauthorised) users (tragedy of the commons). The difficulties faced by CPR managers trying to cope with the problem of unauthorised users represent a particular dilemma as many of the approaches tried to date have failed,[225] and have at the same time also failed to eradicate economic inefficiencies, social conflicts, or the destruction of natural resources. [226] Other limits are for instance that conventional, top down, formal management regimes ("command and control") have not been successful, either for the tropical forests or for the local people, because they have not dealt adequately with the complexity of these forests and rapid change. Nor have they effectively responded to local and district level needs and demands. They have especially failed to recognise local peoples' forest knowledge and existing traditional management systems, their organisational capabilities, and their creativity in managing the forest to improve both human well-being and the long-term forest condition (see section 2.2.2). However, simply turning over control to local people or authorities is not

[225] In fact, forest practices in tropical regions have generally failed in trials to improve the conditions in forest environment because of lack of just participation of all stakeholders. As evoked in the introduction of this chapter, most of the research previously done on the development of management options in tropical forestry has used on the one hand growth and yield information and silvicultural systems with little reference to socio-economic and institutional considerations, and on other hand, focused just on local people or on one isolated interest group.

[226] Biesbrouck & Van den Berg (2000) also outlined some reasons why a reform of conventional forest planning and management is necessary. They showed that in conventional forest planning, professional foresters and/or planners control the entire management process. Brown (1999 cited by Biesbrouck & Van den Berg 2000) highlighted the fact that such professionals are endowed with the means to actually fulfil these duties and to implement official forestry policy in some southern countries. In many other cases, however, this is not the case. As local populations, due to their physical proximity, are usually the actual managers of forest areas, the idea of collaboration between forest planners and local people imposes itself. Biesbrouck & Van den Berg (2000) argued that the exploitation of forest resources is crucial for the economic and cultural survival of local populations, and will continue to be so for the foreseeable future. This exploitation influences the availability of forest resources. Some authors describe the effect of exploitation on biodiversity in negative terms. Others, however, have shown that the current high levels of biodiversity in tropical moist forests are largely a result of human activity (Ichikawa (1999 & Bailey et al. (1992) & Fairhead & Leach (1996 cited by Biesbrouck & Van den Berg 2000)). Local involvement in the formulation of forest management arrangements will help to make these known, to become accepted, and respected. Among development experts, participation is even considered to be an aim in itself for it provides people with a better grip on their own futures. Especially in west Africa, a region with a longer history of social forestry, international donor agencies consider it to be part of the process of the decentralisation of power, one of the means to reduce the (costs of) state bureaucracy (Biesbrouck & Van den Berg 2000).

an answer either. Davies & Richards (1999) showed that these groups are often inexperienced in management and the risks of corruption and favouritisms are still present.

2.4.2 Need for a new approach

Forest experts commonly define sustainability in terms of wood-production, as it has been conceived for more than two centuries.[227] Nevertheless, a new concept was becoming more and more popular in that time, which expresses sustainability not only in terms of timber production, but also considering other forest values like biodiversity and the main ecological functions. In this frame, since FMP stakeholders have been entrusted with the new task of achieving sustainability (the move from unique function, multi-functions to ecosystem (all functions) management changing social and economic circumstances of recent decades), forest planners and managers aim for building a concept or method to support their day-to day operations and actions to be implemented also benefiting the community. Since this new situation has significantly widened the domain of forest practice and science, much effort has been made addressing the following questions: How should forest planning be understood? What can be and should be sustained (one use other multiple uses/functions)? What kind of planning and management system makes it possible to achieve SFM? How should the planning process be organised to achieve this principle (through collaborative planning)? As a result of these developments in the world, planning in forestry, as in most other enterprises, has become an increasingly important and demanding activity. In the case of Cameroon, FMP is a mandatory process as set by the forest legislation framework (forest law 94, art. 222).[228] It has to be met by the forest concessions or forest council holders and must be approved by the government before implementation. In addition, the forest management plan is necessary for forest certification.

In this frame, this review suggests[229] the need for a new approach which equally integrates the social, economic and ecological dimension of sustainability within the FMP framework. This alternative planning system or method proposed below underlines that it is important to

[227] Silva 1989.
[228] PRC 1994; MINEF 2001.
[229] After a closer look at the forest management planning situation in the European context as well as in the tropical region, bearing the theoretical references in mind, it became clear that there are two different points to consider, neither a bottom-up approach, nor a top-down approach to conservation and development can promote sustainability. This is because key stakeholders are either left out wholly, or become marginal players at crucial points in the process, through both top-down and bottom-up planning. For sustainability to be achieved, multi-stakeholder coalitions must become the quid pro quo in framing the actions necessary to enable optimal decisions to be taken, and effective actions pursued.

consider normative values, such as ideologies, beliefs, ethics, morals and strategic thinking, as well as the technical aspects. These values can act as powerful driving forces to provide the incentives or restrictions needed to achieve the goals and long term success of forest management.[230] However necessary the "efficient and effective" normative and strategic planning is, it is not sufficient for resolving conflicts or for assuring active participation of stakeholders in the planning process. Effective planning must be supplemented by an institutional governance system which is derived from an institutional and development framework and an agreement procedure. Finally, the medium term planning process must also be integrated for determining social, ecological and economic yields. This result in three main headings within the context of the new approach: Value and Strategic Subsystem (VSS), Institutional Governance Subsystem (IGS) and Collaborative Tactical Subsystem (CTS). In this respect, according to the author, the planning system designed in this study is referred to with the acronym CPS: Combined Planning System. It is required and suitable for improving the design of the FMP process.

2.5 Proposing a combined planning system (CPS)

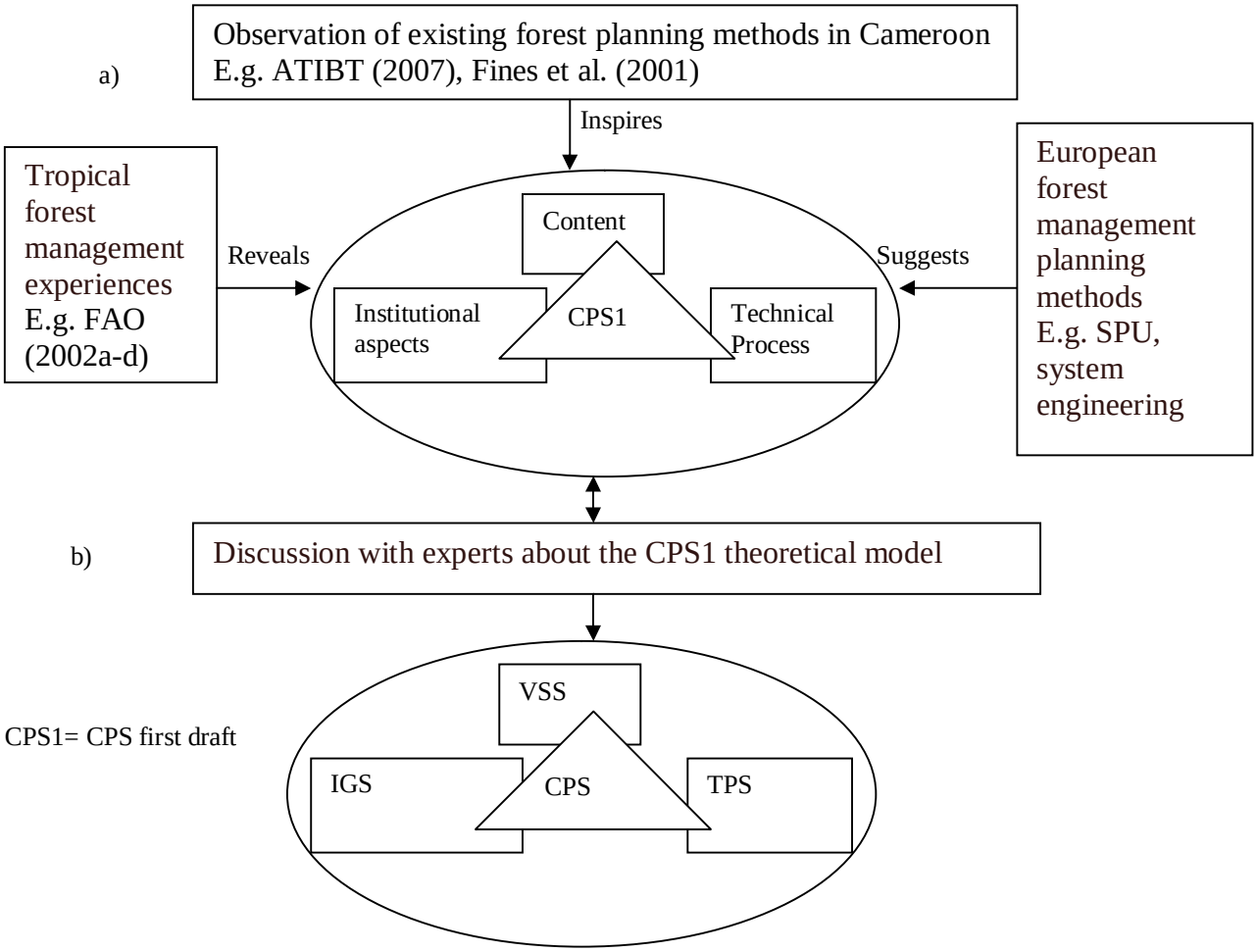
The central idea presented here is to design a methodological tool which can support the planning conception and implementation for tropical SFM in the Congo Basin. It means that the final decision corresponds to a consensual decision of the concerned stakeholders. In the Congo Basin region, there is a general setting for forest management at the regional and national (e.g. Cameroon) level. This general setting includes a forestry law and a zoning plan which defines the regional and/or national approach for FMP[231] including the distinction between different types according to their ownership and their leading management objectives. The planning system designed here focuses on the production forests, specifically the FMU and council forests, although it addresses also other forest types which, according to the law, also need fmps.

This section of the thesis addresses the question of how the theoretical system of the forest planning should be designed. Specifically, it discusses the methods (tools and techniques) available to design a CPS. In each field it combines appropriate theories and/or methods with

[230] Adapted from Sabatier & Jenkins-Smith 1999 & Sewell 1985 quoted by Clement 2007.
[231] see Appendix C; PRC 1994; MINEF 2001.

each technically distinct part of the CPS in order to achieve the result required to be most efficient (for review about these theories see Figure 9-12 in Appendix N). This section highlights also the architecture adopted for the CPS.

2.5.1 The theoretical approaches of the combined planning system (CPS)



Subsystem 1: value and strategic system (VSS), subsystem 2: institutional governance system (IGS) and tactical planning system (TPS).

Figure 2-2 Theoretical approach of the CPS design and conception

The working approach adopted for the CPS designed is based on the findings and theoretical references presented in Figure 9-12, Appendix N and in section 2.1, 2.2, 2.3 as well as in Dogmo (2008a,b,c). The Figure 2-2 above shows that the CPS was designed from two integrated approaches including first of all a constructivist approach and the discussion with experts.

2.5.1.1 Constructivist method of system design (deductive method)

The CPS1 as a first draft of CPS is conceptually and deductively designed based on models of planning known in the literature, as shown in Figure 2-2, p. 52. This constructivist's approach is based on a classical deductive scientific method which is the process of reaching a conclusion that is guaranteed to follow, if the evidence provided is true and the reasoning used to reach the conclusion is correct. This deductive reasoning works from the "general" to the "specific". It works as follows: Think of a theory about a topic and then narrow it down to a specific hypothesis. The use of deductive reasoning from general principles to specific cases or reasoning in the descending line from generals to particulars is also called a priori method. It is in this context built upon a constructivism method. The theoretical reference shows that the emphasis is not on a specific theory, but on the problems and ongoing discussions in the forestry sector at the time. This applied theoretical reference framework incorporates planning, policy (with institutional analysis and development, new institutional economics, property right), social aspects (participation and/or collaboration) and economic theory (Figure 9-12 in Appendix N). In this respect, the first challenge of designing CPS is the combination of more than one theory and other schemes from European forest planning models as these provide a basis for the CPS1 model design because of the far reaching experiences in FMP (see section 2.1) and system engineering. Here, the emphasis is on the latter because the CPS1 was to a great extent grounded in the systems of thinking approach as an element of system engineering theories within a constructivism method for system design. According to Daenzer & Huber (1997), Kurth (1994), and Bachmann (1992), a system can be understood as an entity with elements that are interconnected. In the graph-theoretical representation, the elements are displayed as circles (knots) and relations appear as connecting lines (edges) (see an example in Figure 9-10 and Figure 9-11 in Appendix M). This system thinking approach involves three main ideas:

a) The top-down principle ("Vom Groben zum Detail" in German) is the essence of planning consistency.[232] However, the works of Oesten & Roeder (2002) mainly form the basis of the CPS1 design.

[232] by Daenzer & Huber 1997; Bachmann 1992; Kurth 1994; Kreikebaum 1981 assisting in tracing a pathway leading from the goal of the study toward the implementation of the system. Irrespective of the occasion (e.g. defining a problem, goal establishing etc.), this principle assists in defining and sharpening perceptions of problems and in tracing directions leading towards the next steps. In this context finding a solution between several alternatives means resolving a problem in such a way that a chosen alternative at the higher level comes

b) The Bottom-up principle is the second main idea, assisting in merging all the aspects of planning subsystems (such as natural, ecological and economic subsystems) into one entity.
c) The last main idea is the solution-finding which will be performed by means of a problem-solving cycle or process. The problem solving cycle is the main tool of the planning process.[233]

Another front in the constructivist's method for designing the CPS1 is the experiences in tropical forest planning. These reveal ways for improving existing FMP models, e.g. yield regulations methods,[234] the joint-management method and co-management,[235] CBP[236] and the institutional aspect[237] through institutional analysis and development (IAD).[238] Additionally, the interaction between some participatory approaches was also incorporated: The active method of participatory research and Planning (MARPP),[239] Rapid Appraisals of various kinds including participatory rural appraisal (PRA), and the integrated natural resource assessment (INRA). However, of significant support in building this theoretical concept is literature dealing with enterprise management, system engineering, information system, conflict management and participation. Furthermore literature focusing on new technologies will be added. Literature dealing with criteria and indicators for sustainable forest management and certification, as well as[240] information systems [241] serves as a normative basis in building this theoretical concept. Among the critical requirements in the design of the CPS1, the observation of the existing FMP system in the Congo Basin, especially in Cameroon (known as the "laboratory" of forestry management for the Congo Basin)[242] will be useful to design the CPS1 model as it is important input data from the research area where the

into effect at the lower level and there again affects the selection of the next alternative. Such a systematic approach is essential in implementing strategies at the lower planning levels

[233] In general it consists of analysing situations, establishing goals, synthesising and analysing possible alternatives, evaluating, decision-making, implementing (detailed study; system building; system implementation) (Daenzer & Huber 1997; Bachmann 1992; Kurth 1994).

[234] FAO (2002a-d)

[235] Berkes 2002,2006; Hideyuki. & Xin 2008; Jentoft & Trond 1989; Pinkerton 2003; Pomeroy & Rivera-Guieb 2005; Folke at al. 2002.

[236] Graham et al. 1992; Brody 1998; Henderson 2005; Beket et al. 2005; Artur 2005; Shannon 1981,1991; Beket et al. 2005; Dogmo 2008b,c.

[237] Feeny et al. 1990; Overdevest & Rickenbach 2006; Hajer & Wagenaar 2003; Ahmed & Mbwambo 2004; Hobley 1996; Edmunds & Wollenberg 2003; Larson 2004; Ribot 2002a,b.

[238] Dogmo 2008c.

[239] See Stiles 1995; Manga et al. 1999; Assolo et al. 1999.

[240] Bossel 1997; Adler 1992; Adler 1993; Adler et al. 1995; Earl 1992; Bos 1994; Stiles 1995; Boyle 1996; Vanclay 1996; Byron et al. 1997; Adler & Wright 1999; Davis et al. 1999; Dudley et al. 1999; Elliot et al. 2002; Nguinguiri 1999,2001; Kovac 2002; Alder 2002; Applegate et al 2002; ITTO Tropical forest update 2004; Forestry Tasmania 2004 ; FAO 2005a.

[241] Curran et al. 2000; Eden 1986; Freycom et al. 1998 ; Dogmo 2005.

[242] Cerutti et al. 2006.

CPS will be implemented.[243] Thus, this combination of various sources accumulates knowledge for more efficiency in FMP and for the design of feasible tools recommendations.

In general, here, the design first summarises key features, and then considers the degree to which the application can address the needs of SFM in the Congo Basin. Working with European and tropical FMP approaches, as well as observations in the field makes it possible to systematically evaluate different elements from the FMP planning method review and try to combine these in different ways into one planning system (CPS1), which is organised as an integration process (see Figure 2-2, P. 52). The basic principle adopted for this study is that "economic, ecological and social dimension are inseparable dimensions of the FMP.[244] In this context the following criteria will be taken into account: the justification, relevance, the applicability, the cost; the acceptability by stakeholders (social choice theory), ethical preferences, complexity choice theory; counter preferential choices and subjective preferences, risk and constraints theory. The selection of these elements is based on the findings from the problems frame described in chapter one of this thesis.

2.5.1.2 Discussion with experts

For decades, social scientists have sought to improve the quality of their research by perfecting scientific procedures. Kreuger & Casey (2000) showed that they found the experimental design strategies used in physical and biological sciences to be instructive and helpful. During this time, the strategies of randomisation, control groups, and experimental designs became popular and accepted. However, scientists were soon disappointed, for although they learned a great deal, they found that, this positivist approach to scientific research actually limited their thinking and overlooked valuable data. Consequently, other scientific procedures emerged that also proved to be applicable to system design. Various scientific procedures were developed, all belonging to a category called discussion with

[243] For examples: ATIBT 2001,2005a,b,2007; the TCP project outcomes (Fines et al. 2001a,b; Biesbrouck & Van den Berg 2000; Biesbrouck 2002; Atyi 2000; Foahom et al. 1996; Foahom 2001; Foahom & Jonkers 2004); Dimako Project outcome from the CIRAD (Durrieu de Madron et al. 1997,1998; Karsenty et al. 1998; Karsenty 1999a,b) and the outcomes from the FAO project in 2002 (FAO 2002a-d) which provide with their report some details on how the forest concession may be planed). The following literatures was also useful in this framework: Dupuy 1998; Lescuyer 2002; MINEF 1998,2002; Gérard & Langbour 2007; Nasi et al. 2006; BFT 2004; FAO 1998.

[244] The idea of this proposed planning system is to combine ecological constraints with economic analyses and social demands in order to obtain practicable forest management planning approach which is based on the notion of "joint-management" or "co-management" associated with institutional analysis (as a combination of the bottom-up and top-down approaches). An attempt will be made to take into consideration these three broad aspects, but within each aspect the levels of detail which will be examined, will depend on available information and practicability.

experts, because of the objective of this study, the discussion with experts as a second pillar in designing the CPS from the CPS1 was adopted in order to improve the theoretical CPS design (CPS1). In this respect, the theoretically designed CPS1 has been discussed with experts. The "expert panel" (the panel was virtual) preceded the analysis of the Cameroon FMP situation in the next section. The experts were recruited to participate in an open discussion on the CPS1 mode. Thus, each of the experts selected received the possibility to discuss all elements of the CPS and the feedback resulting from the expert discussion was used to refine the root model CPS1 (see Figure 2-2, p. 52).

To appoint the panel, the following core criteria were: professional experience[245], availability to discuss the CPS model[246], author of one or several tools used in the design or the development of the CPS: for example the IAD, the elements structure of the CPS1 etc. Moreover, an important criterion for the choice of the experts was based on the fact that various fields of research are covered. In the end these included social sciences, policy, environment, ecology, and economy. This was deemed necessary due to the complexity of the FMP subject, which Baader (1942, 1945) described as an assembly of several fields of science. An evaluation of FMP model thus requires a combination of knowledge from all these fields of sciences.

The procedures for the recruitment of experts for refining the CPS1 model design required a time-consuming selection process because only few experts exist in this area of research and they are dispersed around the world, specifically in Africa, Europe, Asia and America. Based on the previously described criteria and the pre-selection of a larger number of potential experts, the availability of experts was investigated. From the fairly long list of potential experts, a limited number of key experts were chosen. The group comprised eleven experts coming from France, Germany and the United States.[247] The latter do not represent an exhaustive list of experts on the matter for an objective evaluation of the CPS but are essential references for sustainable forest management of tropical forest resources. The direct actors were not included in the discussions with the experts until the next step (chapter 3) of the research process. Once the selection process was over and the experts' recruited appointments

[245]He/She should have specialised knowledge/experience in the field addressed by the Combined Planning System, and be recognised and respected by his/her peers. The credibility of his/her conclusions is highly dependent on these elements.
[246] The availability to discuss the CPS model, listen to the model CPS and be open-minded is an essential criterion which was necessary for the pre-test of the CPS.
[247] The final list of these experts is available in Appendix T in Dogmo 2009.

with the selected experts were made through e - mails and telephone. The importance of this appointment was paramount. After having the feedback of the experts, the model CPS1 was refined, and thus improved. The resulting model CPS reflects the analysis of the FMP situation in Cameroon as presented in the next chapters. The use of the "expert panel" to assist in the creation of a survey instrument to provide a highly efficient tool for gathering germane data will be discussed.

The process of conducting the design of CPS by using more than one approach (constructivist method and the discussion with experts) increases the potential of creating and adding new knowledge in the area of FMP.

2.5.2 The architecture of the CPS model

The CPS focuses on management of natural forests where many trees of different species, size and age coexist in a medium or large tract of land and where the local people live in and around theses forests. It aims to achieve an equilibrium between the social, economic and ecological aspect of sustainability. In this context sustainable yield means the intersection between sustainable social yield, sustainable ecological yield and sustainable commercial yield as a guiding principle for management planning as proposed by the CPS model. In this context, sustainable yield means a quantity of forest goods and services harvested and/or conserved at the end of each cutting cycle, which is equal to the net growth of the forest stand and can be continued in perpetuity, taking into consideration the social, ecological and economic aspect of the management. The model design as understood in this section consists of the exhibition of the different components of a planning system and the linkages that exist between these components. This model design was developed based on the finding of the previous sections and chapter and specifically on the following understanding of FMP and sustainable yield:

In order to facilitate the understanding of the CPS design and its better description, the following definition has been used in this study for forest[248] management planning as an element of the management function[249]. FMP is an institutional contract (formal or informal) as a consensus or agreement between interested parties resulting from a dynamic and active

[248] Forests as CPRs.
[249] Oesten & Roeder 2002.

participatory process[250] or system of practice for organising forest resources[251] with regard to both time and space aimed at fulfilling relevant ecological (including biodiversity, and carbon sequestration), economic and social functions of the forest in a sustainable manner. This means that the planning outcome or the social contract has to be geared towards the sustainable use[252] of goods and services and therefore should be ecologically sound (natural sustainable yield), socially acceptable (social yield) and economically viable (economic yield). This definition of FMP incorporates the theory of normative, strategic and medium-term forest management according to the sustainability principle. It leads to a new orientation of tropical forest management with one of the objectives being that a satisfying combination of forest resources' uses within the framework of FMP is defined. This FMP should remain flexible enough to adapt to changing social and political circumstances.

In this respect, the architecture of the CPS consists of three main subsystems or orientations which should be taken into account to achieve sustainable forest management. These aspects are: the planning content, the institutional aspect of the planning, the planning process itself. These three subsystems have been converted and promoted based on the broad system derived from the combination of VSS in combination with IGS and TPS. Figure 2-3, p. 60 displays the design of the CPS. The CPS model is codified as S (CPS = S = System). The components or elements are described as follows:

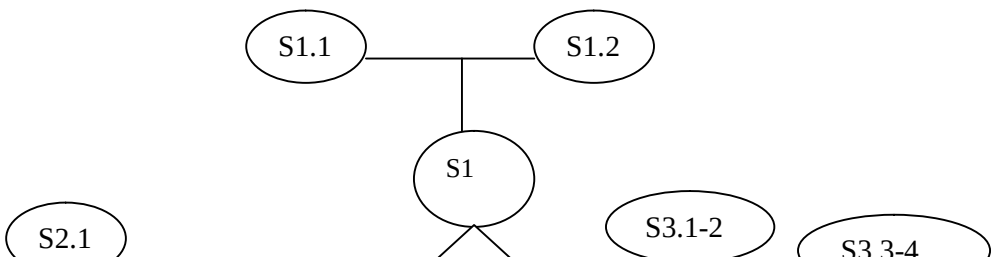
a) The first component of the CPS (S) represents the sum of normative and strategic planning defined in the CPS as value and strategic subsystem 1 (S1) or reliable planning content. It consists of normative forest planning (S1.1) which has to be integrated into strategic forest planning (S.1.2). In other words, S1 is the sum of S1.1 and S1.2. S1 consists of the planning vision, mission, the guidelines images and norms & principles of behaviour and strategic intention on the one hand and the strategic planning including the strategic analysis, strategy formulation (synthesis and analysis) and strategy implementation on the other hand. Subsystem 1 (S1) has been developed to assist forest planners as well as all other stakeholders in sustaining forestland over time, and thus secure the future of the forest enterprise, ensuring the sustainable forest development of the forestland and protecting public interest in these

[250] The planning process is conducted by the interested Parties who participate actively in each main phase or Step without restriction. The following elements testify as elementary principle: transparency, generally accessible, fair, comprehensibility of the activities, commitment, volunteer, reflecting, consistent, and flexible.
[251] Products and services, multiple functions.
[252] Sustainability is here understood in the same view like the Brundtland 1987.

lands. This level of planning is future oriented planning, essentially dealing with the long-term survival of the CPS (S)

b) The second component of the CPS (S) represents the adequate institutional aspect of forest planning as the institutional governance subsystem (IGS). The IGS is defined as subsystem 2 (S2). In fact, CPS is not isolated but is part of the overall institutional framework (see chapter 2). Therefore, the CPS takes into consideration the current institutional framework and develops an adequate framework within which stakeholders can be actively involved in the FMP process and consequently reduce conflicts between stakeholders or actors involved in the process. Subsystem 2 (S2) has been designed as the sum of th institutional analysis and development framework (S.2.1) as well as participation and conflict management (S.2.2). S2 should assist in building agreement, managing conflicts before they escalate, and in materialising plans. Although this way of planning is perhaps more time consuming than traditional planning, it is considered vital.

c) The third component of the CPS is a flexible and efficient planning procedure. This component is the tactical planning subsystem (TPS) which is defined in CPS as subsystem 3 (S3). The formulation procedure consists of a continuous sequence of elements which describe the forest planning process itself as a combined approach of expertise and collaboration with people involved. Subsystem 3 serves as the framework for the implementation of the previous two subsystems. It secures the forest enterprise in the medium term. It represents joint planning of actors in a panel, and is labelled Combined Planning System Working Group (CPSWG), which is a decision making arena about each step of the tactical planning process. The elements of S3 as a simultaneous or a combined approach between tactical planning and tactical dialogue are: acquiring information (S3.1), knowledge (S3.2), goal setting (S3.3), planning area establishment (S3.4), ecosystem unit description (S3.5), planned silvicultural yield (S3.6), overall planning (S3.7), ecosystem unit: detail planning (S3.8) and four tactical dialogue (S3.9). The CPS intends to support FMP design in tropical natural forests and may be combined with the three forest planning modules a to c into a complex system, in order to gain a clear agreement and improve the chance for a better and more sustainable use of resources.



S = S1 + S2 + S3 + S4 =Combined Planning System

S1 = S1.1 + S1.2 = Value and strategic subsystem (S1.1-2 = normative planning and S1.2 = strategic planning)

S2 = S2.1 + S2.2 = Institutional governance subsystem of the CPS (S2.1 = Institutional analysis and development and S2.2 = participation and conflict management)

S3 = S3.1 + S3.2+…. + S3.9 = Tactical planning subsystem (S3.1-2 = acquiring information + knowledge accumulation, S3.3-4 = goal setting + planning area establishment, S3.5-6 = ecosystem unit description + planned silvicultural yield, S3.7-8 = overall planning + ecosystem unit: detail planning and S3.9=four tactical dialogue).

Figure 2-3 Architecture of the combined planning system (CPS)

2.6 Conclusion

In conclusion of this chapter it can be summarised that FMPs have developed further since the beginning of forestry. The idea of regulating the flow of timber from a land use was the unifying concept of forestry.[253] Using stand characteristics separately from the socio-economic environment may lead to missing interactions that exist between socio economic and ecological aspects of FMP. A closer look towards FMP in the central European context as well as in the tropical region and the current challenges facing the FMP with regard to the problems frame described in the first chapter and the limit of current FMP described in this chapter indicate that solving FMP problems does necessarily require an integrated approach in FMP for production forests. For modern forestry the objective is no longer solely timber economics and FMP but also calls for sustainable use. The answer to this is the CPS.

The CPS model was designed by combining elements from different planning system and/or theories with references to policies, new institutional economics, system engineering, impact assessment and social sciences, planning, common etc.[254] The reason for choosing this mixture of theories is based on the complexity of tropical forest management and on the need to design a combined planning system that uses a combination of these approaches. The main task of the CPS is to address the ever-changing needs of society with regard to forestry and thus to identify important factors in the social, economic and environmental dimension which should positively simplify the planning and facilitate the process helping to reach an agreement/contract which may then be "easily" implemented. Thus, the CPS aims to bring together participants of FMP in a specific area (FMU or forest council) to jointly plan the forest and share benefits. It is a multi actors participatory approach in which those involved can innovatively discuss the planning, thus reducing negative impacts and enhancing the positive effects of the planning process. This chapter also serves as a basis for the analysis of the FMP in Cameroon. It provides criteria for the analysis through the subsystems of the CPS model leading to the improvement of the FMP situation in Cameroon.

[253] This was consisting to determine inventory, growth, yield, harvest levels and silvicultural system with little reference to socio-economic considerations.
[254] See Figure 9-12 in Appendix N.

3 Empirical and explorative analysis of the forest management planning situation in Cameroon

This chapter analyses Cameroon's FMP situation and relates it to the theoretically designed CPS described above. In order to "evaluate" the CPS model, it needs to be tested in the real world.[255] *Unfortunately, taking into account certain limiting factors due to the specificity of the FMP and of forestry in general it is also clear, however, that this model could not be tested or implemented in Cameroon during the duration of the PhD research. Limiting factors include, firstly, the time needed for the FMP design or drafting in general. It has been estimated to be three years (conception and elaboration for FMU).*[256] *Secondly, the implementation timeframe for an FMP outcome is almost 30 years corresponding to one cutting or rotation cycle.*[257] *Thirdly, the FMP design has been estimated to be expensive. It was evaluated by ATIBT (2007) to be three and sometimes four Euros per ha. This means for a FMU with 75.000 ha that the price will be between 225.000 und 300.000 Euros. As a result it was decided to assess the CPS model through an empirical and explorative study (field work). In its broadest sense, this fieldwork attempts to provide a new understanding of the FMP situation as well as showing that CPS may be a contribution to address this situation in Cameroon. The study questions examined in this chapter correspond with the fourth thesis question on how to empirically analyse the existing FMP situation in Cameroon, specifically: Who are the main users or participants of FMP? What is their understanding of FMP? And what are the specifics enforcing that there is still insufficient forest under an effective management plan in Cameroon as well as in the whole Congo Basin region? In order to address these questions, this chapter covers five topics and is organised as follows: the first one deals with a general overview of the scientific research method, followed by a description of the working method selected for this study. This working method covers a number of sections that relate to qualitative research, i.e. data collection and data content analysis. Results of the data evaluation have been presented as well as the restriction of this study as last topic. These results have been structured in order to address each study question.*

[255] The real world as already asserted in this thesis is the permanent forest estate, like production forests (FMU) and to some extent the protection forests in the Congo Basin and Cameroon in particular.
[256] PRC 1994; ATIBT 2007.
[257] See PRC 1994; ATIBT 2007.

3.1 Working method

The Figure 3-1 below displays the working method used to analyse the FMP in Cameroon. This method was adapted from Berg (2004), Mayring (2000) and Djontu (2009) as can be seen in Figure 3-1 below. It consisted, first of all, of deriving guiding questions for the analysis (as can be found in the chapter 1, p. 22-23). Then, after an overview of the framework of research methods, the data collection (semi-structured interviews) and transcription was performed (see section 3.1). The qualitative analysis (data content analysis) came afterwards and was organised into three parts. The qualitative analysis included the structuring of the interview material (first part) and a subdivision of the interview partners into six different FMP participant groups (see Figure 9-13 in Appendix O). The analytical categories and sub-categories were determined as part of the second step of the data content analysis procedure for gathering the data: VSS, IGS and TPS. The determination was deduced from the results presented in chapter 2, section 2.5.2, p. 52-60. In a third step, the data was sorted into the various categories and criteria of selection and grounded sub-categories (inductive) were established. Finally, a description or frequency analysis was performed. It consisted of counting the number of entries in each category and/or sub-category for descriptive statistics making it possible to quantify the results.

Research question (chapter 1, p. 22-23)
E.g. what are the main problems of the forest management planning in Cameroon?

Data collection – transcription (see 3.1.2, p. 66)
E.g. semi-structural interview, digital voice recorder, transcription (238 pages)

Determination of analysis' unit or data structure (see 3.1.3.1, p. 71)
E.g. interview materials were arranged in group of actors (six groups)

Determination of analytic categories and sub-categories (deductive construct) (see 3.1.3.2, p. 72)

Read through data; sorting the data into the various categories (deductive); establish criteria of selection and grounded sub-categories (inductive) (see 3.1.3.3, p. 73)
E.g. quoted by at least 2% of interviewees, VSS 2: Corruption/Bad governance; VSS-2: Non implication

Description or frequency analysis (see 3.1.3.4, p. 74)
E.g. VSS problems 38% and IGS problems 39%, TPS 16%...

Figure 3-1 Working method for the analysis of the Cameroon forest management planning situation adapted from Berg (2004); Mayring (2000) and Djontu (2009).

3.1.1 Overview of research methods

In deciding how to analyse the FMP situation in Cameroon, the author was confronted with a large number of possible research methods. In fact, the approaches used in social research can be classified in various ways;[258] however, one of the most common distinctions is made between qualitative and quantitative research methods which are rooted in philosophical traditions with three distinct but related dimensions: emotional, purposive or relational, and epistemic/ontological assumptions.[259] The quantitative research methods which are fairly inflexible were originally developed in the natural sciences to study the physical and natural world and phenomena. These were not appropriate when the object of study were human dimensions.[260] Quantitative methods attempts to quantify social phenomena and patterns of human interaction. They focus on a limited number of cases for statistical significance. The advantage of this inflexibility is that it allows for meaningful comparison of responses across participants and study sites. It is confirmatory in nature, based on a positivist model of characterising natural sciences.[261]

Conversely, qualitative approaches are gaining in popularity and have emerged over the last 20 years the traditional social sciences because they provide valuable insights into local perspectives and serve as a means to enhance the quality of a traditional quantitative project.[262] Qualitative research methods are a form of social inquiry and are used to dig up information that cannot be obtained with quantitative methods.[263] They were developed in social sciences to enable researchers to gather an in-depth understanding of human behaviour, perspectives, and experiences of the people in study and explain social phenomena.[264] According to Guest et al. (2005) qualitative research has the ability to provide complex textual descriptions of how people experience a given research issue. They are typically more

[258] Mayring 2000; Berg 2004; Djontu 2009.
[259] Epistemology can be defined as the theory of knowledge and the assumptions and beliefs that we have about the nature of knowledge. The fundamental question is based on how do we know the world? What is the relationship between the inquirer and the known? Indeed, ontology is concerned the philosophy of existence and the assumptions and beliefs that we hold about the nature of being and existence. Paradigms: models or frameworks that are derived from a worldview or belief system about the nature of knowledge and existence. Paradigms are shared by a scientific community and guide how a community of researchers act with regard to inquiry (See Cohen & Crabtree 2006; Carter et al. 2008).
[260] Cohen & Crabtree 2006.
[261] Examples of quantitative methods now well accepted in the social sciences include survey methods, laboratory experiments, formal methods (e.g. econometrics) and numerical methods such as mathematical modelling (Mann 2001; Friese et al. 2002 ; Guest et al. 2005).
[262] Guest et al. 2005; Cohen & Crabtree 2006; Carter et al. 2008; Wilson 2008.
[263] Cohen & Crabtree 2006; Stevens 2009.
[264] Marshall & Rossman (2006) view those social phenomena holistically.

flexible,[265] iterative and reflexive, i.e they allow greater spontaneity, openness to serendipitous invention and adaptation of the interaction between the researcher and the study participant[266] as well as their great contribution to producing culturally specific and contextually rich data it produces.[267] Preissle (1999)[268] showed that "qualitative research is a loosely defined category of research designs or models, all of which elicit verbal, visual, tactile, olfactory, and gustatory data in the form of descriptive narratives like field notes, recordings, or other transcriptions from audio- and videotapes and other written records and pictures or films."[269] Comparing quantitative and qualitative research, the basic differences are, firstly, the analytical objectives, secondly, the types of questions they pose, thirdly, the types of data collection instruments they use, fourthly, the forms of data they produce, and fifthly, the degree of flexibility built into the study design.[270] At the same time, Myers (1997); Friese et al. (2002); Patton (2002); Berg (2004); Cohen & Crabtree (2006); Marying (2000, 2007); Bochner et al. (2008) and Stevens (2009) found that the key difference is the flexibility of qualitative methods. In addition qualitative research has other specific advantages, such as contextual understanding, point of view of participants, being process oriented and containing rich and deep data.[271]

In this thesis, the motivation for taking a qualitative approach derives from the observation that, if there is one thing which distinguishes humans from the natural world, it is the ability to talk.[272] In this respect, qualitative research methods are useful in analysing the FMP situation in Cameroon. This kind of qualitative research includes multiple methods that are interactive and humanistic, qualitative data sources, as well as qualitative analysis techniques

[265] Participants have the opportunity to respond more elaborately and in greater detail than is typically the case with quantitative methods.
[266] Marying 2000; Silbey 2003; Guest et al. 2005.
[267] About the social reality of individuals groups and cultures. Data produces about values, opinions, behaviours, and social contexts of particular populations, social settings, and relationship with other people, personal experiences, the identification and interpretation of interaction patterns (Cohen & Crabtree 2006).
[268] Preissle 1999 quoted in Ratcliffs 2002; see also Preissle 2002 quoted by Titus 2004.
[269] For discussion on the definition of the qualitative research see: Myers 1997; Friese et al. 2002; Patton 2002; Berg 2004; Cohen & Crabtree 2006; Marying 2000, 2007; Stevens 2009.
[270] Other scholars like Guest et al. (2005), differentiate qualitative research from the quantitative one as follows: First, sampling is typically not random but is purposive. That is, cases are chosen based on the way that they typify or do not typify certain characteristics or participate in a certain class. Secondly, the role of the researcher is the key. Researchers must reflect on their role in the research process and make this clear in the analysis. Thirdly, data analysis differs considerably. Researchers must carefully code data and discern themes in a consistent and reliable way. Another way of differentiating qualitative research from quantitative research is that largely qualitative research is exploratory (i.e. hypothesis-generating), while quantitative research is more focused and aims to test hypotheses (See Guest et al. 2005).
[271] Dereshiwsky 1999; Ratcliffs 2005; Bryman 2004.
[272] Guest et al. 2005; Cohen & Crabtree 2006.

which are therefore deductive, inductive and interactive.[273] Qualitative approaches are, for example: case studies, action research, and ethnography. These qualitative methods have been briefly reviewed by Myers (1997); Patton (2002); Berg (2004); Cohen & Crabtree (2006); Stevens (2009) etc.[274] The qualitative data sources used in this study, will be discussed in the next section. Overall the qualitative approach of this study was combined with quantitative methods, specifically for the already mentioned frequency analysis. Due to this the data collected helps to better interpret the results and understand the complex reality of the FMP situation in Cameroon. Moreover, it offers the opportunity for fully addressing the research questions.

3.1.2 Qualitative data sources and data collection techniques

Qualitative research involves the use and study of a variety of empirical materials or qualitative data sources. Five data gathering techniques are particularly cited in the relevant literature: interviews, focus groups, narratives (personal experience, introspective, life story, historical and interaction), observation, analysis of documents and materials (visual texts or collection of artefacts and texts).[275] From this empirical material or data, three data gathering techniques are most common: participant's observation, in-depth interviews and the analysis of documents and materials.[276] The focus in this study was on interviews because theses were

[273] Myers 1997; Stevens 2009.

[274] The term "case study" has multiple meanings. Like other research strategies, it is a way of investigating an empirical topic (it is an empirical inquiry) by following a set of pre-specified procedures and can be used to describe a unit of analysis. Its distinctive need arises out of the desire to understand complex social phenomena (see Myers 1997; Cohen & Crabtree 2006; Stevens 2009). Action research is a form of collective self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social or educational practices, as well as their understanding of those practices and the situations in which the practices are carried out (Myers 1997; Stevens 2009) and Ethnography: Ethnographic research comes from the discipline of social and cultural anthropology where an ethnographer is required to spend a significant amount of time in the field. Ethnographers immerse themselves in the lives of the people they study (Lewis 1985 quoted by Meyers 1999) and seek to place the phenomena studied in their social and cultural context. For a fuller discussion about the action research, and ethnography as qualitative research methods (see Myers 1997; Patton 2002; Berg 2004; Stevens 2009).

[275] Researchers may also learn about a bounded system by collecting and studying artefacts (e.g. written protocols, charts, flow sheets, educational handouts) - materials used by members of the system or case being studied (Myers 1997; Patton 2002; Stevens 2009).

[276] *Observation* is appropriate for collecting data on naturally occurring situations or behaviour in their usual contexts. Researchers use all of their senses to examine people in natural settings. This technique is used by researchers who become members of a culture, group, or setting, and adopt roles to conform to that setting. By doing this, researchers gain a closer insight into the culture's motivations and emotions. Observing without participating may inhibit the researchers' ability to understand the experiences of the culture. Participant observation is a strategy of reflexive learning, not a single method of observing (Meyers 1997; (Family Health International (FHI) 2005). Observation is a systematic data collection approach. Researchers use all of their senses to examine people in natural settings or naturally occurring situations.

In-depth interviews are optimal for collecting data on individuals' personal histories, perspectives, and experiences, particularly when sensitive topics are being explored. In general, interviewing involves asking questions and getting answers from participants in a study. Interviewing has a variety of forms including: individual, face-to-face interviews and face-to-face group interviewing. The asking and answering of questions

particularly suited due to the Cameroonian context framework and also because of the sensitivity of the topic. The interviews were held in compliance with ideas about good or well-designed interviews.[277] In this respect, it is assumed that Cameroon FMP participants will provide illuminating data. The author was also inspired by the benefits of qualitative interviews listed by Hutchinson et al. (1994).[278] These benefits have motivated him to perform the interview. Furthermore, Corbin & Morse (2003) and Silverman (2001)[279] show that there are several types of interviews: unstructured interactive interviews, semi-structured interviews, structured interviews, informal interviews and focus groups. The main difference between them is found in the degree to which participants have controls over the process and the content of the interview. For a full discussion about each type of interview see Cohen & Crabtree (2006); Corbin & Morse (2003); Stevens (2009).

3.1.2.1 Semi-structured interview

This chapter deals with semi-structured interviews which allow interviewees the freedom to express their views in their own terms[280] and includes elements of an informal interview.[281] The semi-structured interview aims at learning everything the participant can share about the research topic. Also, it is an effective qualitative method for getting people to talk about their personal feelings, opinions, and experiences. Through this form of interview an insight into

can be mediated by the telephone or other electronic devices (e.g. computers) (Cohen & Crabtree 2006; Corbin & Morse 2003; Stevens 2009). *Focus groups* are effective in eliciting data on the cultural norms of a group and in generating broad overviews of issues of concern to the cultural groups or subgroups represented (Guest et al. 2005). *Analysis of document and materials:* When studying a culture, social setting or phenomenon collecting and analyzing the texts and artifacts produced and used by members can foster understanding. There are many different types of documents researchers may be interested in collecting: Documents in the public sphere (e.g. pictures, articles, documentaries, educational material, books) that may have been produced by or used by members of a culture or social setting: files, statistical records, meeting minutes, emails, documents used in daily work (e.g. internal manuals, written procedures, wall posters and other public postings in a work place, chart flow sheets), Memos (Meyers 1997; Cohen & Crabtree 2006; Stevens 2009).

[277] The following important aspects of good interviews were used according to Stevens (2009): to sample the correct population; to ask questions that give you the specific data you need; to ask questions which the respondents understand as having the same meaning as you (the researcher) understand in these questions; to have well-trained and appropriate interviewers; and to conduct the interviews at a time and place where both the interviewer and the respondent can concentrate.

[278] Hutchinson et al. (1994) quoted by Corbin & Morse (2003) listed seven possible benefits of qualitative interviews. They stated that interviews (a) serve as a catharsis, (b) provide self acknowledgement and validation, (c) contribute to a sense of purpose, (d) increase self-awareness, (e) grant a sense of empowerment, (f) promote healing, and (g) give voice to the voiceless and disenfranchised.

[279] Silverman 2001 quoted by Kalekin-Fishman (2001). Sometimes referred to as open-ended or narrative interviews, participants are given considerable control over the course of the interview.

[280] Characteristics of semi-structured interviews: a) The interviewer and respondents engage in a formal interview; b) The interviewer develops and uses an "interview guide." This is a list of questions and topics that need to be covered during the conversation, usually in a particular order; c) The interviewer follows the guide, but is able to follow topical trajectories in the conversation that may stray from the guide when he or she feels this is appropriate.

[281] This means, the interviewer talks with people in the field informally, without use of a structured interview guide of any kind.

how certain people interpret FMP could be gained. This kind of interview is a technique designed to elicit a vivid picture of the participant's perspective on the research topic. The interviewer engages with participants by asking questions in a neutral manner, listening attentively to the participants' responses, and asking follow-up questions and probes based on those responses. These in-depth interviews are usually conducted face-to-face and involve one interviewer and one participant. However, for this investigation, sometimes there were two interviewers and more than one participant, especially in the case of the local actor group. The face-to-face interviews were all conducted in the respondents' offices or in private locations, in the village for example. Accordingly interviewers who move among communities must find suitable locations on an ad hoc basis. Inviting participants to suggest a location where they would feel comfortable may also be a viable option.

3.1.2.2 Questionnaires

When conducting (the author & Njantang 2008) the semi-structured interview, mostly open-ended questions were asked in the opposite of a closed-ended question. i.e. according to FHI (2005), questions that encourage a detailed response rather than "yes," "no," or one-word answers to elicit unstructured talk from participants about their experiences and opinions for insights into the person's attitudes, beliefs, and perceptions. Appendix P contains the interview manual as well as the guideline questions of the semi-standardised interview. Some questions presented in the list in Appendix P are not integrated into the analyses in this chapter as they are not relevant in the context examined. Nonetheless answers to those questions provided information to be used as a framework for the analysis and evaluation of the FMP situation in Cameroon.

3.1.2.3 Fieldwork

The fieldwork conducted in Cameroon and Europe was subdivided into three periods. The first period was spent in Cameron from the end of November 2007 to the beginning of January 2008 , the second period encompasses three days spent in Paris at the beginning of December 2007 and the last period of field work was ten days long and was again spent in Cameroon in the middle of November 2008 The sampling method used was purposive sampling[282] which is one of the three most common sampling methods used in qualitative

[282] In this sampling method, group's participants respond according to pre-selected criteria relevant to the research question. Sample sizes, which may or may not be fixed prior to data collection, depend on the resources and time available, as well as the study's objectives. Purposive sample sizes are often determined on the basis of

research (purposive sampling, quota sampling, and snowball sampling). The sampling strategy includes six participant groups or interview partners which were identified based on the function, the personal engagement, and opinions about the topic and their capacity to represent the interests of those unable to participate of their cluster. On average these groups contained four respondents per group. After several postponed appointments and negotiations, a Master's student[283] and the author were carrying out a series of semi-structured interviews with FMP participants, 24 of a total of 33 actors selected were interviewed. This equals a rate of 73%. These groups with 24 participants from 20 organisations and institutions proved to be highly interested, even enthusiastic in providing their input to the study endeavour. Additionally, a good part of the 24 respondent answers exceeded expectations with regard to the amount of information provided. The names, positions as well as the organisation of the interviewee can be seen in Dogmo (2009). Affiliations included: a government group (GG)[284] with four participants, a forest planner group (FPG)[285] with five participants, four participants representing a local actor group (LAG)[286], three representing the conservationists' group (CG)[287], another three representing the forest donors (FDG)[288], and five participants affiliated to the forest enterprise group (FEG)[289] (see Figure 9-13 in Appendix P).

These interviews took place, either where the interviewees work or in another location. The length of the interviews varies, the longest lasting nearly two hours and the shortest slightly under an hour. Recruiting participants was often a challenge and considerable problems were faced during the interviews. These include: the often delicate nature of working with a diversity of interest groups, possible stigmatisation of participants, the high mobility of some

theoretical saturation (the point in data collection when new data no longer bring additional insights to the research questions). Purposive sampling is therefore most successful when data review and analysis are done in conjunction with data collection.

[283] See Njantang 2008.

[284] Example: Ministère des Forêts et de la Faune (MINFOF), Agence National d'Appui au Développement Forestier (ANAFOR), Ministère de l'Administration Territoriale (MINAT), Commission des Ministres en charge des Forêts d'Afrique Centrale (COMIFAC), Forest delegation of Eseka and Mbam.

[285] Forest Planning consulting firm for conception and elaboration of forest management plan like Bureau veritas, Forest Resource and Management (FRM), Nature+; Centre for International Forestry (CIFOR) private planner etc.

[286] Example: Organisation pour l'Environnement et le Développement Durable (OPED), Population Ntui 1 et 2 ; population d'Eséka.

[287] Centre pour l'Environnement et le Développement (CED), Centre Internationale d'Etudes Forestières et Environnementales (CIEFE).

[288] Example of actors: Forestry Governance Facilities (FGF), Central Africa Regional Program for the Environment (CARPE), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Organisation néerlandaise de développement (SNV) and World Bank.

[289] Example: Entreprise Forestière Tagne Djedom (EFTD), Pallisco, Société d'Explotation du Bois au Cameroun (SEBC), Société d'Exploitation Forestières et Agricoles du Cameroun (SEFAC), Société Forestière et Industrielle de la Doumé (SFID), Société Forestière Wanda (SFW), Timber Transformation of South Cameroon (TTS), WIJMA, Cameroon United Forest (CUF), Association Technique Internationale des Bois Tropicaux (ATIBT) and Nature+.

of them, their concern about confidentiality, and misinformation, fear, or rumours about the investigation. Certain FMP participants were afraid to give pertinent answers to the questions, which resulted in certain questions being answered in either a superficial or disinterested manner. It is to be noted that, because of lack of time, certain interviewees were also unable to answer the questions in more detail. Furthermore, during certain interviews there were abrupt external interventions on the part of the interviewee being called upon either to assume part of his administrative duties or by unforeseen visits. All those factors can affect the results of this research. In this respect, of about 33 interviewees, 9 refused the interview because of confidentiality and time availability. It was generally difficult to establish contact with interviewees and meeting geographically dispersed respondents turned out to be time consuming. There was also a continual lack of respect for interview appointments and, due to the time limits of this study; it was not possible to wait for a long time as time available for field work was limited. One interviewee refused to be recorded. Once back in Germany, interviews were analysed and in the process interviewees were contacted by telephone to fill remaining information gaps.

3.1.2.4 Recording and transcription

With the permission of the interviewee, the interviews were recorded with a Digital Voice Recorder, Olympus VN- 2100 PC. 23 interviews were recorded; only one participant refused and the answers were recorded by writing in order not to intimidate the interview partners on the sensitive issue. The process for the complex task of systematically managing the data consisted first of all of converting raw data into computer files. After recording the interview materials, they were transferred to a computer. The interviews were transcribed resulting in 238 pages.[290] The interview documents were entered into a database in a rigorous, standardised way which was essential to ensuring validity of the study results. This was also done for reasons of consistency which was important and especially crucial for material archiving as well as a materials management checklist.

[290] See Dogmo 2009.

3.1.3 Qualitative data analysis

In literatures, there are various analysis techniques particularly suited to social research, e.g. content analysis[291], narrative summary analyses or "threading", observer impression, and triangulation.[292] Based on the present study goal, the author orients itself at the qualitative data content analysis adapted from Mayring (2000) and Berg (2004) and Djontu (2009). These authors integrate in their qualitative analysis framework a descriptive part which was useful in this study mainly to illustrate the result of the investigation.[293] It is a methodology for an in-depth studying of the content of recorded transcripts of interviews, using quantitative or qualitative techniques. Content analysis is a systematic description of who, what, where, and how within a set of formulated systematic rules to limit the effects of the analyst's bias. It is the preferred technique for analysing semi-structured interviews and cognitive testing interviews.[294] Stevens (2009) shows also that content analysis is comfortably self-taught and analyses progress quickly. It was an important tool in the evaluation of the Cameroonian FMP situation.[295]

3.1.3.1 Data structure

Initially the material was structured according to the FMP participant or actor groups as previously defined in Appendix O. This means that the data provided by all the interviewees or respondents were grouped in each actor group file for data organisation. An example can be seen in Table 3-1, p. 72. The interview materials of the following respondents: Ministry of Forests and Fauna (MINFOF), Delegate of the MINFOF Mbam (DMINFOF-M), Delegate of the MINFOF Centre (DMINFOF-C), Delegate of the MINFOF Eséka (DMINFOF-E) were grouped in one group called government group (GG) and stored on computer in one file. Then all the forest enterprises interview materials were also bundled together in one group called forest enterprise group (FEG) file. The same structure was applied to all others groups (forest donor group (FDG), conservationists group (CG), Local actor group (LAG); forest planner group (FPG)).

[291] Quantitative content analysis starts with word frequencies, space measurements (column centimetres and inches in the case of newspapers), time counts (for radio and television time) and keyword frequencies (Meyers 1997; Stevens 2009).
[292] Good discussions on narrative summary analyses or "threading", observer impression, and triangulation can be found in Meyers (1997) and Stevens (2009).
[293] Collections of codes of similar content that allows the data to be grouped.
[294] Stevens 2009.
[295] Adapted from Wilson 2008: chapter 11.

Group	Element of the group
Government group (GG)	MINFOF
	DMINFOF-M
	DMINFOF-C
	DMINFOF-E

Ministry of Forests and Fauna (MINFOF), Delegate of the MINFOF Mbam (DMINFOF-M), Delegate of the MINFOF Centre (DMINFOF-C), Delegate of the MINFOF Eséka (DMINFOF-E).

Table 3-1 Example of data structure

3.1.3.2 Determine analytical categories and sub-categories

Coding is the process whereby raw data are systematically transformed and aggregated into units which permit a precise description of relevant content characteristics. The rules by which this transformation is accomplished serve as the operational link between the investigator's data and underlying theories and hypotheses.[296] In this respect, first, decisions about methods of coding were guided by the establishment of the analytical categories and sub-categories.[297] This determination was essentially deductive based on the theoretical CPS model framework (see previous chapter 2, section 2.5). Table 3-2 below displays the categories deductively derived as main codes and sub-codes for the FMP situation analysis in Cameroon.[298] The VSS, IGS and TPS with their sub-elements (sub-code) have been identified in this thesis to be elements which must be integrated into the same FMP framework. A full description of these elements and sub-elements can be found in chapter 2, section 2.5.2.

Main Category	C1: Value and strategic system (VSS)	C2: Institutional governance system (IGS)	C3: Tactical planning system (TPS)	Others (open)
Sub categories	Mission, vision, guiding images**,** principles of behaviours, strategic intention, strategic analysis, synthesis and strategic formulation	Participants, action situation, contextual factors, pattern of interaction (Institutional Analysis and Development (IAD)), active participation and conflict resolution mechanism	Acquiring information, goal, planning area establishment, unit description, overall planning, implementation, controlling and monitoring	Others

C: Category

Table 3-2 Details of main code and sub-codes

[296] Guest et al. 2005; Holsti 1969 quoted by Mayring (2000).
[297] Adapted from Holsti 1969 quoted by Mayring (2000).
[298] See also Chapter 2, section 2.5; Dogmo 2008a,b,c.

In the present codified system (Table 3-2, p. 72), "Others" were introduced to complement the other categories taking into account the views of FMP participants, which could not be clearly categorised.

3.1.3.3 Sorting the data into various categories

In a next step data were structured and the categories and sub-categories established. Based on these sub-elements of the VSS, IGS and TPS (see Table 3-2, p.72) were derived and all important or relevant elements from each interview corresponding to the respective categories were extracted. These contents were similar in meaning and therefore were considered to be focus points. This means that the text or paragraphs were gradually added or transferred to the corresponding categories (see Figure 3-2 below) for the process of sorting the data into categories and sub-categories). This abstraction was helpful for interpreting the results.[299] Specifically in relation to the third research question about the FMPs problems in Cameroon 13 grounded sub-categories were established (inductively)[300] with a selection criterion of 2%. This means a sub-category must be mentioned by at least 2% of the interviewees. Therefore, in the frame of the analysis both deductive and inductive sub-categorisation (specifically for question 3) was used as key words for transferring the information from interview material to the main code and from the main category to analyse the interview material.

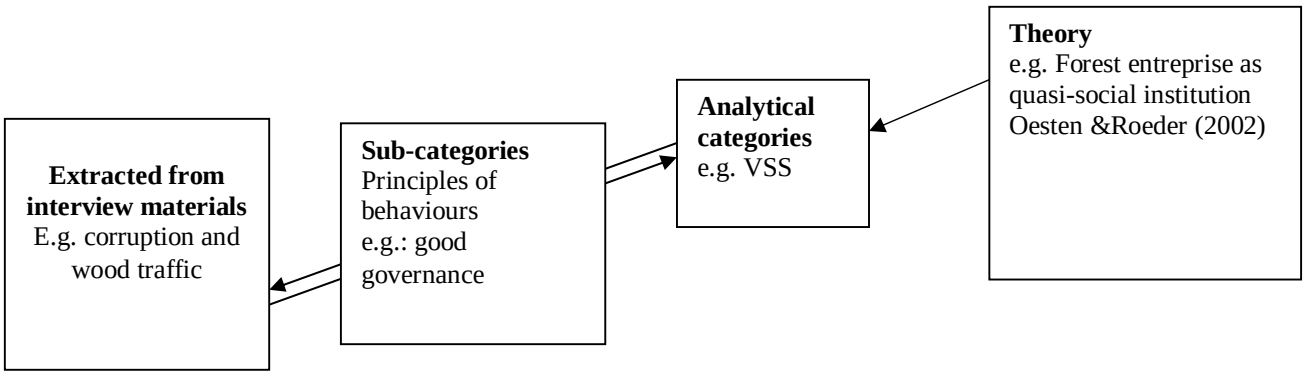


Figure 3-2 Simplified process of codification: Interviews material[301] organisation according to the category with inductive and deductive sub-code.

[299] For examples see Dogmo 2009.

[300] These sub-codes are as following: a) Value and strategic system problem 1 (VSS-1): Corruption/Bad governance; VSS-2: Non implication of all aspects of sustainable forest management; VSS-3: Lack of will in the side of forest enterprise and forest services; forest management planning has been still seen as constraint because of short term visibility; VSS-4: Lack of financial means (FMP is expensive); b) IGS: Institutional governance system problem 1 (IGS-1): Inactive participation of planning participants; IGS-2: Difficulties to reconcile the conflicting interests; IGS-3: Lack of formation or Capacity building or insufficient competency. IGS-4: Lack of contract between participants: Consensus building process is weak; c) Tactical planning system problem 1 (TPS-1): Insufficient acquiring information's system. TPS-2: Regeneration or enrichment problems; TPS-3: Yield regulations problems/Lack of ecological, social, economic and financial evaluation; TPS-4: Lack of controlling and monitoring system.

[301] Concerning the following example below, the question was: "What are the problems of FMP in Cameroon?"

In the following, after extracting or sorting each interview material for each respondent, the author groups these materials again for each FMP participant group in order to build only one data file or view for each of the six groups of participants. An example of this grouping procedure is the data gathering from each interview material analysis of the MINFOF for example; the DMINFOF-M, the DMINFOF-C, and the DMINFOF-E (see Table 3-1, p. 72). These were brought together and combined to build the opinions or views of the government group (GG). However, for the present study, it was not easy to identify grounded sub-categories (inductive) because of the divergence of the stakeholders' views. It was also difficult to classify those interview elements within the main categories. In this study, the focus was put on each group of FMP participants and not exclusively on individual participants.

3.1.3.4 Frequency or quantitative analysis

Alongside the previously described data content analysis, the descriptive statistical analysis of the data was also used to demonstrate the magnitude and frequency analysis. It consists of counting the number of entries in each category and/or sub-category. In this frame both deductive and inductive methods were applied. The main categories remain the same used in the CPS (VSS, IGS, TPS and others) whereas the sub-categories were converted into different digits depending on the interview question. For the first question of this chapter, the parameters or variables were the FMP participant groups themselves, who should ideally be involved in the planning process in Cameroon; the sub-categories were converted into the following:

a) 1 means that the participant has been cited by the interviewed person.
b) 0 means that the participant has not been cited by the interviewed person.

Concerning the second question of this chapter on what the personal understanding of FMP is the sub-categories with their parameters or variables (VSS, IGS, TPS and others) are as follows:

a) 2 means that the parameters or variables played a great role in the definition of FMP by the questioned person;
b) 1 means that the parameters or variables played some or a superficial role;
c) 0 means that the parameters or variables played no role.

Answers to the third question, on what the problems of FMP in Cameroon are, were converted into different digits for each subcategory (VSS1, VSS4; IGS1,…, IGS4; TPS1,…,TPS4). The entries in each sub-category were:

a) 1 means that the subcategory has been cited by the questioned person.
b) 0 means the subcategory has not been cited by the questioned person.

In this descriptive analysis framework, the author counts the number of entries in each category and for each sub-category for statistical analyses and to allow for the demonstration of magnitude. The score in each category and subcategory results from the sum of the entries. The study involved 24 interviewees divided into six groups; the total score for each category as well as the total score for each sub-category was calculated using Microsoft Office Excel. For example, the total score on the VSS category for the second question mentioned above was derived from the following formula: VSS1+VSS2+...VSS24 = (0 - 48), the minimum score may be zero (0) and the maximum score may be 48. For the first question of this chapter, the range lies between 0 and 24. IN case of the third question, which included entries for each subcategory, the total score for each category was the sum of the entries for their subcategories. For example: VSS= sum of VSS1+ sum of VSS2+ sum of VSS3+ sum of VSS4= (0 - 96). In general, for the third research question, the overall formula was: Problem of FMP= (IGS1+ IGS2+…. +IGS4) + (VSS1+…+VSS4) + (TPS1+…+ TPS4).

This procedure (qualitative analysis with frequency analysis) made it possible to gain a better material overview and form starting points for the analysis of the Cameroonian FMP situation. However, there are some restrictions to this kind of data evaluation. The data evaluation of each stakeholder group results from the synthesis of all opinions of each individual belonging to the group. The results present the opinions of each stakeholder group, and therefore one has the impression that all the groups have the same opinions, but in reality there is sometimes divergence of the declarations within the same group. It must also be noted that it was not taken into consideration that some interviewees belonged to several groups. For example, certain agents of forest administration (government) have their own NGO and therefore, they answer the questions sometimes either as a government official, as someone from an NGO, or both. There are conservationists who are at the same time forest donors (like IUCN representatives). In the same way, certain interviewed forest planners work in forest

enterprises. This situation could affect the results and may be reflected in the results presented below.

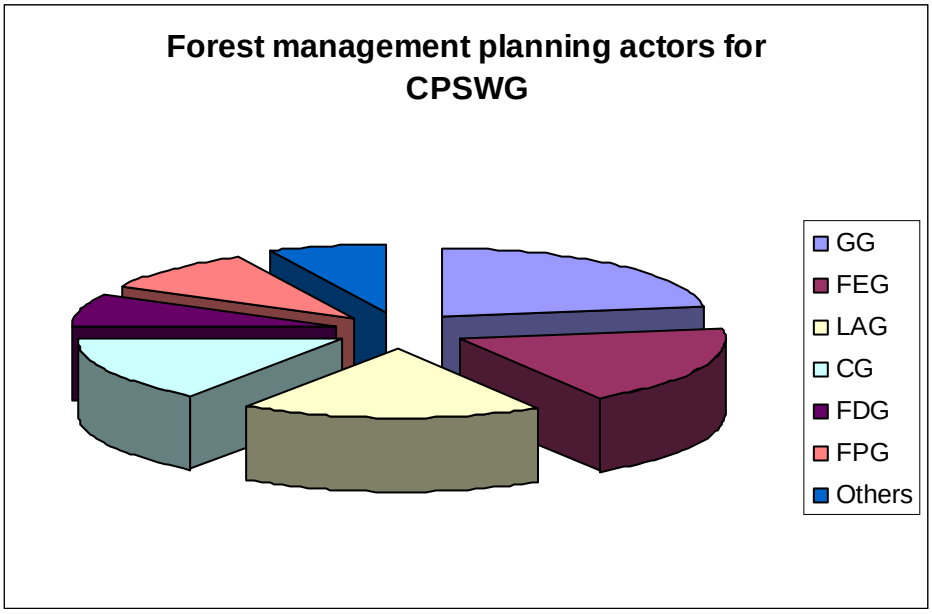
3.2 Results

The objective of this chapter is to analyse Cameroon's FMP situation based essentially on the FMP participants' or actors' answers. The presented results are based on the data analysis procedure developed in the previous section. The representation of the results and its headlines follows the chronology of the questions addressed in this chapter. In order to grant a better overview, see questionnaire one, two and four in Appendix P. For instance, section 3.2.1 deals with the first analysis question corresponding to who the main participants/actors in the FMP process in Cameroon are. Due to the abundance of interview material only a few key citations will be presented in this chapter. As already mentioned in the methodology, the questioned participants were divided into specific groups and should speak for those. The results are sometimes very general opinions such as „the forest administration represents the opinions…" It must be borne in mind, however, that these statements have only been expressed by one or two selected representatives of the forest administration. The estimates therein should be seen as individual perspectives. At the same time, the interpretation of results represents the points of view of various actors who remain anonymous in the results section.

3.2.1 Forest management planning actor groups

This section deals with the verification of the theoretical foundation concerning the participants or actors in FMP (section 3.1.2.3, p. 68). Before starting the field work, Cameroonian FMP actors had to be identified and selected for interview. This was based on the theoretical CPS1 and Dogmo (2008b), which proposed six actor groups relevant for the FMP process and forming the CPS working group (CPSWG) (see chapter 5). These groups include the GG, FEG, LAG, FDG, CG, FPG, which were already identified, see Figure 9-13 in Appendix O and Dogmo (2008b) for a full review. In this framework, the purpose of this part is thus to confirm this theoretical setting. During each interview respondents were asked about their view on the main actor at each step of the FMP process in Cameroon. The results presented in this section are the sum of all opinions expressed representing the quotations of

all respondents within each actor group to gain the quotation for the group and thus for all the groups taken together. The following Figure 3-3, below illustrates the results of this analysis.

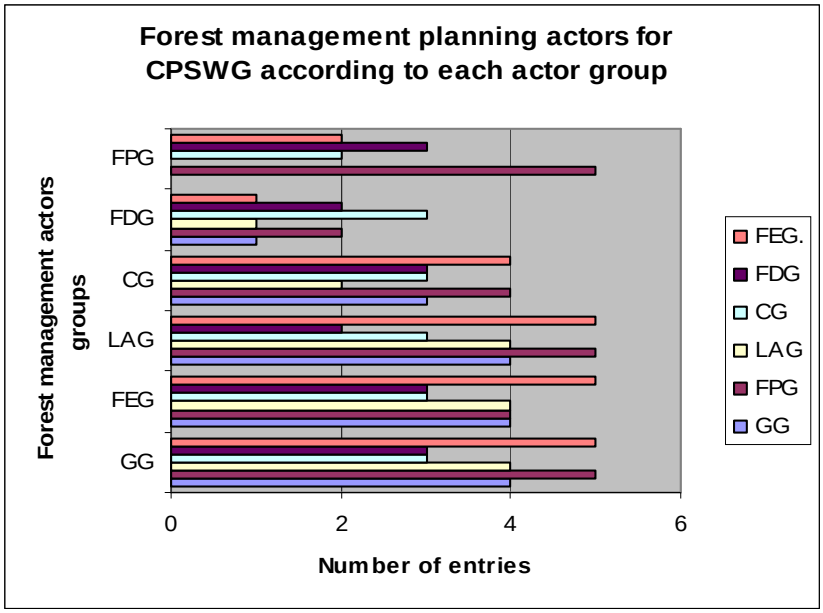


Government group (GG, value: 28 (22%)), forest enterprise group (FEG, (value: 23 (19%)), local actor group (LAG, (value: 23 (19%)), conservationists group (CG, (value: 19 (15%)), forest donors group (FDG, (value: 10 (8%)), forest planners group (FPG, (value: 12 (10%)), 'others' (value: 9 (7%)).

Figure 3-3 Forest management planning actors for CPSWG according to the number of quotation by each respondents

The figure above shows that of one hundred quotations by respondents, 22 quotations are for the GG who are considered essential participants of the FMP process, followed by the LAG and the FEG with 19% each. These are followed by the CG with 15%, the FPG with 10% and the FDG with 8%. These six groups are those which obtained a value higher than 8% and represent those actor groups that must be integrated into each step of the planning process. The category "others" with 7% includes all other groups which were cited or quoted only once by an interviewee. Accordingly, such groups were not considered to be among the most important FMP actor groups. A surprising outcome was the comparatively low ranking of the FPG with only 10%. This may be explained by the fact that the forest planners have been partly merged with the FEG. In fact, the FPG mostly represent consulting firms sub-contracted by the FEG, which ultimately has the responsibility of the planning design and implementation in most of the Congo Basin countries. Despite the financial capacity the FDG has it was ranked low, too. This is mostly due to the fact that, the FDG respondents quoted themselves very little as an actor group. This can also be explained by the little knowledge in FMP. This shows in Figure 3-4, P. 78 comparing the number of answers given by each group.

Figure 3-4 below points out clearly that the quotation of actors who are called to participate in the FMP process differs according to the actor groups. Concerning the GG and the FEG, the main actors which should be included in FMP are mostly FEG, GG, LAG, and FPG. Groups CG and FDG were named less often. Especially little attention is given to the conservationists and the FPG even exclude them from their actor list. This may reflect the difficult relationship between these groups as nature conservation NGOs have issued numerous critical reports on illegal logging, the destruction of biodiversity, deforestation, etc. In this context, one representative of the CG group made a statement against the FEG: "in the FMP outcome, the forest company removed the commercial species because it is the foundation on which they base their economy. It is an infraction with ecological and social consequences."[302] The LAG is of very little importance as an actor group to the CG and FDG. This is justified by pointing out the limited local knowledge on FMP processes. The little regard of the LAG is illustrated by the following statement made by a FPG representative: "asks a local actor, if they have the FMP of the forest enterprise logging in or around their forest? They will have nothing…" These findings highlight, as already recommended by many authors, the need for active participation of these participants in the FMP process.[303]



Forest enterprise group (FEG), forest donors group (FDG), forest planner group (FPG), conservationists group (CG), local actor group (LAG), government group (GG).

Figure 3-4 Quotation by each actor group about the actors of forest management planning in Cameroon

[302] See Dogmo 2009, interview materials.
[303] See ATIBT 2005a,b, 2007.

It appears evident in the light of Figure 3-3, p. 77 and 3-4, p. 78 that the FMP process must involve a partnership in which the GG, FEG and LAG work together with FDP, CG and FPG to jointly plan the rainforests. This means that responsibility and decision-making is shared by each of them. They constitute what has been called in the CPS1 framework the CPSWG. This CPSWG enables the FMP outcomes to be flexible enough (negotiation and periodic adaptation of management plans) to respond to changes in socio-economic and political issues[304] as suggested by Amsallem et al. (1999). It may use indigenous traditional knowledge together with scientific approaches, increase the opportunities for interpretation of indigenous culture, facilitate the social development and economic opportunities, and finally raise the recognition of rights and interests of each of the actors involved. Rainforests are a CPR and FMP is a multi-actor process in which each actor actively participates on the drafting and negotiations of key elements of the FMP outcome. Karl (1995) showed that successful policy or decision making requires 'buying-in' people and equitable solutions that address the concerns of all major stakeholders in forests. This has been confirmed in this study which identified six groups that should be actively participating in the FMP process. The insufficient integration of these actor groups in each step of the FMP process could explain in some ways why FMP implementation is still difficult to achieve in the field. As already asserted, the planning outcome should be a contract between all the actor groups involved.

A restriction on this analysis on participant identification is that there was a great divergence of answers in certain groups of actors. For example from the government side, an actor like MINFOF cited a group different to those of the MINFOF provincial delegation. This is not reflected in the results which represent a synthesis of declarations of all individual actors belonging to the same group.

3.2.2 Concept definition of forest management planning

The definition of FMP by each respondent, respectively each actor, as well as from FMP literature showed that many definitions have been proposed, and that there is no standard definition of FMP, like already assumed by Kovac (2002) and Bos (1994), Bachmann (1994), and Kurth (1994) (see the Chapter 2, section 2.1-4). However, looking profoundly through the data based on the frequency and magnitude analysis (see the Figure 3.5, p. 81) it can be

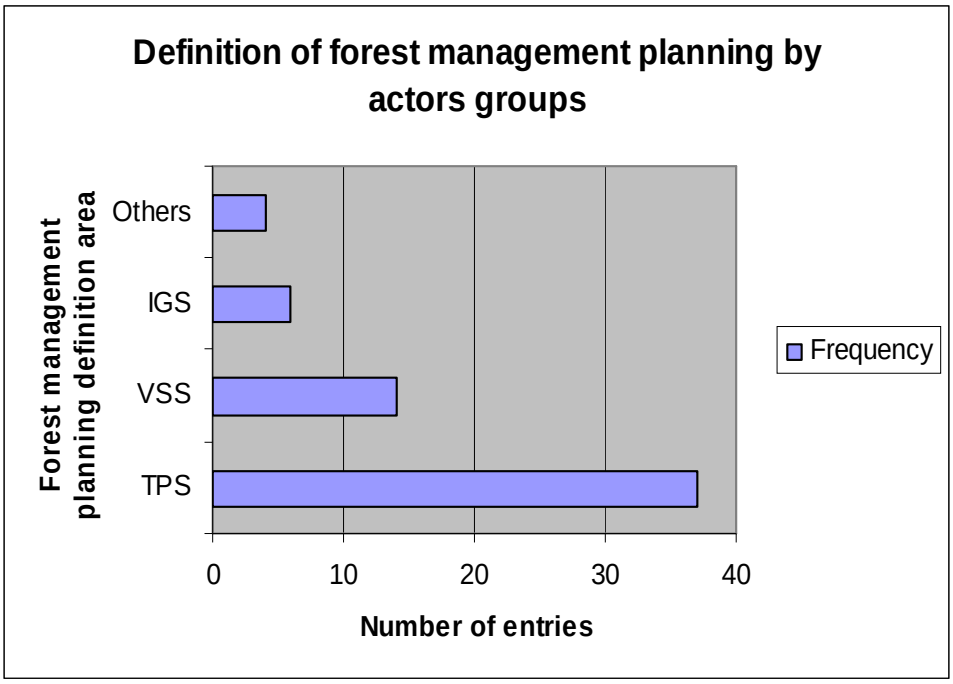
[304] Neither stability nor long-term forecasts can be guaranteed in many Congo Basin countries because there are numerous factors that can generate unpredictable conditions that are incompatible with sustainable forest management Amsallem et al. (1999).

generalised that the majority of respondents focuses on the technical aspects when defining FMP, which is referred to as tactical planning system in this study. In fact, 60% (with a value of 37 of a total score of 48 entries) of the interviewees from all groups put emphasis solely on the TPS. For example, "FMP is the organisation of the logging activities with regards to both time and spaces" (see Figure 3-5, p. 81).[305] In the light of this result, it is assumed that the understanding of FMP resembles the classical or traditional FMP approach which started in Europe in the 12-13th century. This kind of definition has been dominated by tree-specific or wood management regimes as presented by Karl (1995). The focus is mostly on the unique function of wood production and utilisation (for sustainably-produced timber). In this frame, FAO (1999) shows that for a long time, SFM projects really only examined silvicultural techniques[306] aimed at managing forests for sustainable wood production. Thereafter as shown in Figure 3-5, only 23% (with a value of 14 entries) expressed a definition that would incorporate VSS as a variable. In fact, some introduced the concept of sustainable yield. However, a profound analysis of this concept definition pointed out by the interviewees and the following answers in relation to the FMP definition show that this concept of sustainable yield was specifically based on wood production and utilisation which was already present in the traditional or classical forestry and FMP in 17th-18th century (see Chapter 2, section 2.1)[307], which differs from the modern concept of SFM referred to as the Rio vision in this thesis.[308]

Furthermore, only 10% (with a value of six entries) of the interviewees integrate the IGS variable into their definition, e.g. the fact that FMP must integrate active participation of all relevant actors, specifically the local communities on the one hand and conflict management mechanisms on the other. This shows that the IGS variable is hardly taken into consideration or even neglected. In fact, although the forest law of 1994 in Cameroon imposed the involvement of the actors specifically the local populations in the FMP framework, in practice this is rarely the case. This explains why several actor groups, specifically the GG, FEG, and FPG, remain very superficial in their declarations concerning the implication level (or active participation) of the actors in the FMP process. Several authors raised this issue and recommended the improvement of the process to avoid just consulting the local population at

[305] See Dogmo 2009.
[306] the "Malaysian Uniform System" (MUS) in Southeast Asia;
the improvement of natural stands system or "L'Amélioration des Peuplements Naturels" (APN) in Africa; and
The "Celos Management System" (CELOS system), tested in Surinam.
[307] Wagner 1923; Baader 1942, Speidel 1972.
[308] After the United Nation Conference on environment and development in Rio de Janeiro 1992 (Eco-summit 1992, Burger & Mayer 2003).

the end of the planning process and instead involve them actively in each step of the process.[309] Lastly, 7% of the interviewees' answers were classified as "others" corresponding to no variable, e.g. FMP is an obligation for the forest concession holders and constitutes a consideration of all aspects put in place to achieve sustainable forest management at national or international level (legal framework, harmonisation of laws).[310]



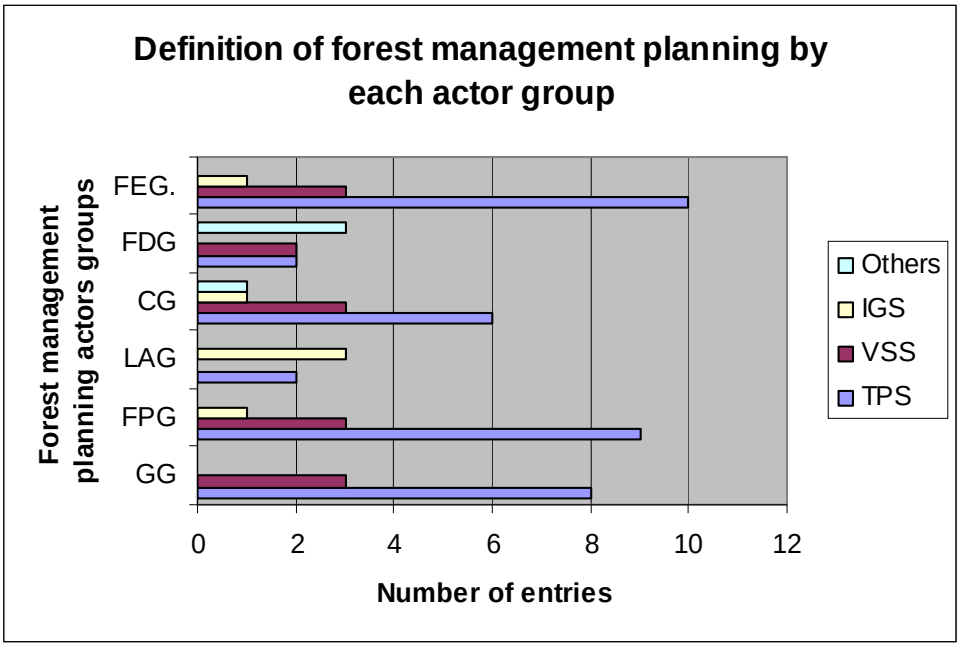
Forest management planning (FMP); Tactical planning subsystem (TPS) or the technical aspect of planning, value and strategic subsystem or normative and strategic aspect of planning, institutional governance subsystem (IGS) or interaction analysis with active participation and the conflict management aspect of planning. Mains focus in the definition (with frequency) of FMP by responders in frequency: Definition oriented on "TPS" (Value: 37 (60%)), "VSS"(Value: 14 (23%)), "IGS" (Value: 6 (10%)), "Others"(Value: 4 (7%)).

Figure 3-5 Definition of forest management planning by actors

Looking at each participant group, Figure 3-6, p. 82 displayed below shows that mostly the GG, FEG, and FPG emphasise their view in defining the FMP mainly based on the TPS variable with an average score or value of nine while the other three groups (LAG, CG and

[309] Adapted from Doucet & Vandenhaute 2006; Berg 2004; Biesbrouck & van den Berg 2000; Biesbrouck 2002; Dogmo 2008a,b,c; Berkes et al. 2003; Cartier & Ruitenbeek 2001; Henderson 2005; Colfer et al. 2005; Ostrom 1998a,b; 1999a,b; 2005, 2007; Priscoli 1997; Ayres et al. 1998.
[310] Dogmo 2009.

FDG) have an average of three (3.33). This feature can be explained by the interest of the three first groups in the production function of the forest. This means the economic value is more important to these respondents than the other values that are oriented towards the VSS and IGS. In fact, the FEG representatives as concession and/or forest holders and their "associated" FPG[311] specifically are emphasising the economic interest because of their major financial investments (sometimes hundreds of millions of dollars).[312] They expect that the rate and magnitude of these investments will produce significant economic returns. In this respect, the question during the interview was if ecological, social, and economic investments really can co-exist.[313] The GG as rainforest owners and the contracting partners of the FEG are interested in the taxes paid. It is therefore clear why these three groups orient their definition mostly on economic or unique functions of the forest. The emphasis of focal actors (LAG) and the conservationists (CG) remains focused on the social and ecological function of the forest when defining FMP.



Forest management planning actors: Forest enterprise group (FEG), forest donors group (FDG), conservationists group (CG), local actor group (LAG), forest planner group (FPG), government group (GG).

Figure 3-6 Definition of forest management planning by each participant group

[311] Mostly they are consulting firms for the FEG.
[312] Therefore, they are also related to the profit maximisation.
[313] This question has been addressed by the CPS model showing through the integration of the VSS, IGS and TPS it is possible to improve the FMP situation and contribute to reconcile ecological, social and economic interests of the tropical rainforests.

In the light of the experience gained during the interview and the analysis of this second question on what the FMP is, the concept of FMP in Cameroon remains unclear in the eyes of the LAG, CG and FDG. Sometimes, the questioned respondents showed little knowledge about the FMP, specifically the LAG living in and around the rainforests. For example in a village, the population living near the forest concession said in defining FMP that "when the company comes, they give people to eat and drink before entering the forest for logging". It was also surprising to find that these villages (represented through the LAG) do not have a copy of the FMP of the concession operation in their area. This fact was also confirmed during the commentary from the FDG and CG.[314] This little knowledge showed by the LAG, CG and FDG is evidence of insufficient participation of these actor groups in the FMP process. It can also explain partly the ongoing problems in the affectivity of the FMP outcomes (problems of implementation). It shows also an insufficient formation and need for training or capacity building for these groups, above all the local actors.[315] According to the theoretical references (see chapter 2, section 2-1 to 2-5) of this thesis showing that FMP is in transition and highlighting the need for a new model that can meet modern challenges and integrates VSS, IGS and TPS, which have not been sufficiently addressed in the FMP framework in Cameroon.

The following definition derived form the CPS model has been proposed for forest[316] management planning as an element of the management function[317]. FMP is an institutional contract (formal or informal) as a consensus or agreement between interested parties resulting from a dynamic and active participatory process[318] or system of practice for planning forest resources[319] with regard to both time and space aimed at fulfilling relevant ecological (including biodiversity, and carbon sequestration), economic and social functions (poverty alleviation)[320] of the forest in a sustainable manner. This means that the planning outcome or the social contract has to be directed at the sustainable use of goods and services and therefore should be ecologically sound (natural sustainable yield), socially acceptable (social yield) and

[314] Dogmo 2009.
[315] Approaching the solution of the ongoing FMP in Cameroon, the respondents proposed the capacity building for LAG groups to enable them to participate in the planning process and thus increase their commitment to the planning outcome (see Dogmo 2009).
[316] Forest here as CPRs and neither as private goods, nor as open access.
[317] Oesten & Roeder 2002.
[318] The planning process is conducted by the interested parties who participate actively in each main phase or step without restriction. The following elements testify as elementary principle: transparency, generally accessible, fair, comprehensibility of the activities, commitment, volunteer, reflexibility, consistent, flexible.
[319] Products and services, multiple functions.
[320] It is in the millennium goal started in the Johannesburg Conference on environment and development in 2002 (UN 2002).

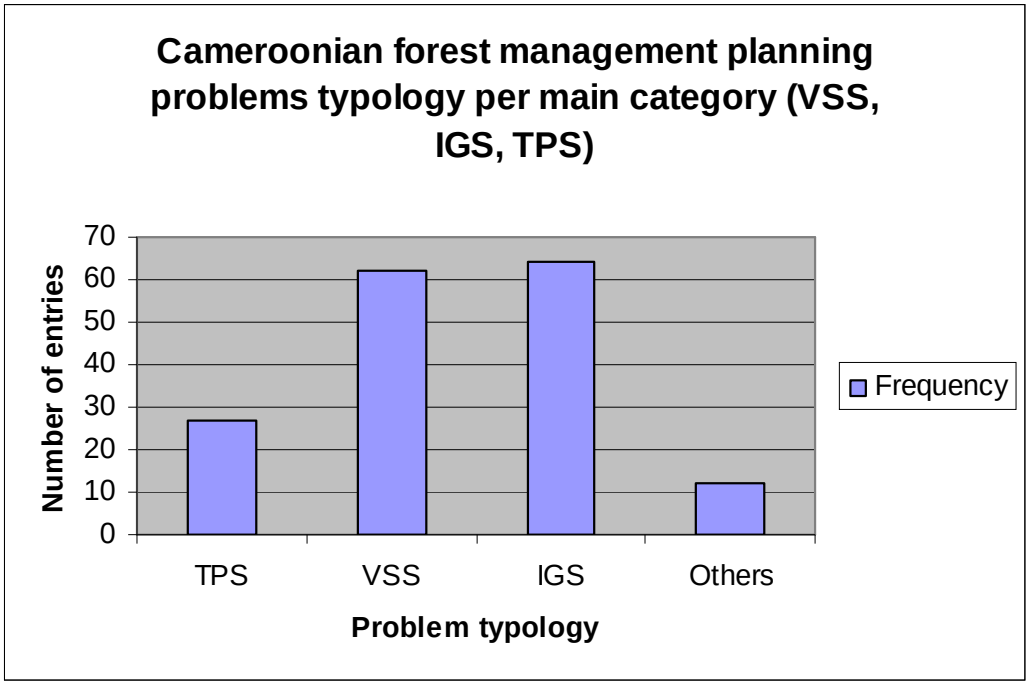
economically viable (economic yield). In this respect, the CPS model promoted here is based on the broad system derived from the combination of the value and strategic subsystem (VSS) the institutional governance subsystem (IGS) and the tactical planning subsystem (TPS).

The results gathered from this section show that today's FMP definition or conception still does not vary from the classical or traditional one, which emphasises the technical and unique function of forests. It only integrates one variable (TPS) instead of the three (with VSS and IGS) as proposed by the CPS model. The VSS and IGS are still insufficiently applied. Thus the number of variables or parameters included in the interviewees' definitions was a useful tool to analyse their understanding of FMP.

3.2.3 Problems of forest management planning

The purpose of this section is to highlight the main problems of FMP in Cameroon. In order to do that, two approaches were used. Firstly, the problems were described according to their variables or parameters (VSS, IGS and TPS).[321] Secondly, each variable as well as each sub category was analysed in order to describe the main problems to FMP at this level, too. Figure 3-7, p. 85 displays the variables or issues and their frequencies.

[321] The qualitative description of the problems can be found for further reading in Dogmo (2009) as well as in Njantang (2008).



Tactical planning subsystem (TPS) or technical aspect of planning, value and strategic subsystem (VSS) or normative and strategic aspect of planning, institutional governance subsystem (IGS) or interaction analysis with active participation and conflict management aspect of planning.

Figure 3-7 Typology of forest management planning problems in Cameroon

Figure 3-7 above illustrates that all three categories of the FMP have been addressed by the interviewees. However, comparing them, there appears an important difference. The frequency analysis shows that the main problems of FMP in Cameroon stem mostly from the IGS and VSS factors. In fact, 39% of the FMP' problems are IGS problems with a value of 64 of a total possible score of 96. The VSS follows with 38% (value of 62). However, only 16% of the problems of the FMP are associated with the category of the TPS. Furthermore, another important remark is that more than half of the people interviewed agree with these results, specifically the FEG, the GG as well as the FPG. The category "others" with a value of 12 entries (of a total of 98) represent 7% of the FMP problems in Cameroon. The category "others", as can been seen in the data evaluation materials in Dogmo (2009), mostly included topics not directly related to the question and included for example certification, policy harmonisation in the Congo Basin etc. Furthermore, this category was not considered in the analysis because these problems were only perceived by individuals. In this respect, due to various IGS and VSS factors of FMP problems (see Figure 3-7 above), FMP outcomes are therefore proven to be ineffective according to the majority of respondents. The FPG or FEG have abandoned or poorly implemented the FMP outcomes due to inadequate VSS and IGS factors Examples for this are the failure of the GG to monitor the plan or the short term vision

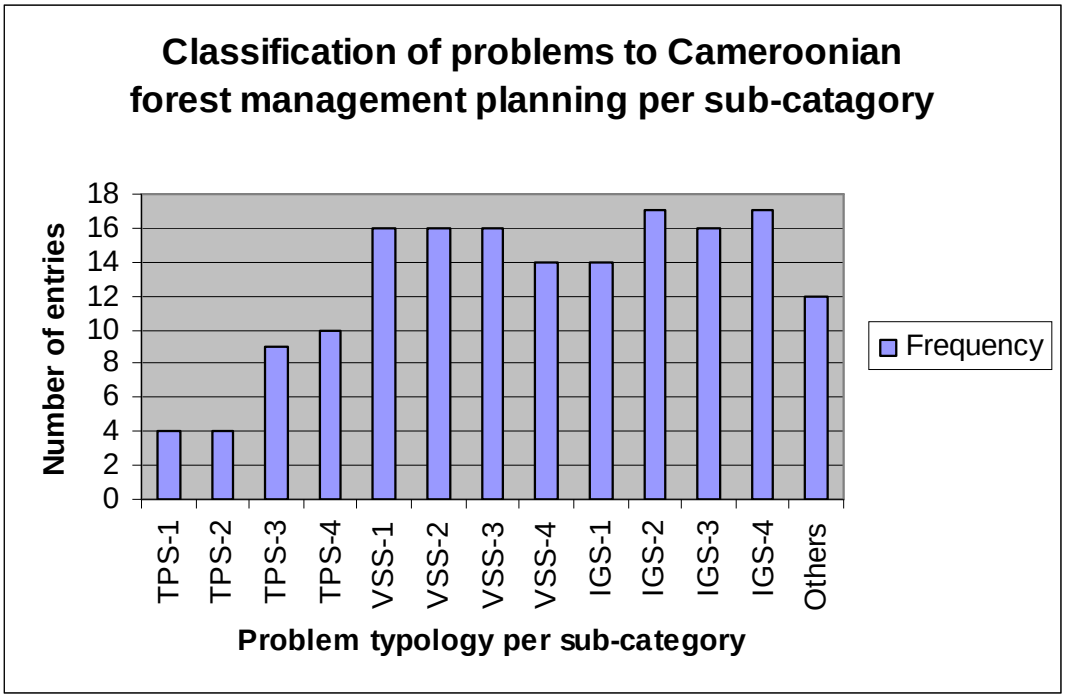
of the FEG. In fact, taking into account the large scale of the FMU and concessions, as already highlighted in chapter 1, the government does not have the possibility to monitor and control the forest operations which are mostly far away from the administration with little logistics. This problem is mostly correlated to the VSS and IGS factors because a FMP as a social contract (i.e. including IGS and VSS) engages the other participants in the implementation. In this respect, the IGS and VSS explain the FMP in Cameroon better than the TPS. This can be easily found in their frequency in Figure 3-7, p. 85. Consequently, addressing the IGS and VSS factors is therefore an alternative approach which may be more successful in contributing to solving the tropical FMP problems in Cameroon than only focusing on the TPS like traditional or classical FMP. This confirms statements about FMP being in transition, from a technically (TPS) oriented approach to a more integrated or combined approach (the three variables taken together).

In this respect, the planning profession must not solely focus on traditional or classical parameters anymore but open up to the IGS and VSS variables. A detailed analysis of these main problems (IGS, VSS, as well as TPS) may be explained by a number of often-coincidental factors (or pitfalls), which are the sub-variable or parameters displayed in Figure 3-8, p. 87.[322] These sub-categories were inductively devised, being inspired by the interview materials. This must be quoted by at least 2 % of the interviewees. An examination of Figure 3-8 shows that the FMP problems can be classified into three groups. The first one is constituted by the sub-variable which was quoted by more than 9% of the respondents with a value between 16 and 18 of a total score of 24. This group contains six sub-variables and is therefore the biggest one. It includes: the IGS 2, 3 and 4 as well as the VSS 1, 2 and 3. Furthermore, VSS and IGS account for 62% of all FMP problems analysed in this study and thus provide key issues for the Cameroonian FMP situation. As can be seen in Figure 3-8, there are also TPS sub-variables. The second group of sub-variables represents 7% and nine 9% (7%<X>9%) of the quotations by respondents with a value between 12 and 14.[323] In this block, there are two sub-variables: VSS 4 and IGS 1. The two represent 16% of the Cameroonian FMP problems. The last group is a sub-variable which includes less than 7% of the quotations with a value between four and ten: the TPS 1, 2, 3 and 4 as well as the other

[322] Based on the material examination the problems are grouped into three categories (VSS, IGS, TPS) and then each category is subdivided into four sub-categories, for example: IGS1, IGS2, IGS3, IGS4.

[323] X is the sub-variable.

categories. The main focus of the following sections will provide an overview of the elements of the three sets of problems.



Value and strategic subsystem (VSS) or normative and strategic aspect of planning: Value and strategic system problem 1 (VSS-1): Corruption/bad governance (value 16=11%); VSS-2: Non implication of all aspects of sustainable forest management (value 16=11%); VSS-3: Lack of will on the side of forest enterprise and forest services; forest management planning has been still seen as constraint because of short term visibility (value 16=10%)**;** VSS-4: Lack of financial means (FMP is expensive) (value 14=8%). **Institutional governance subsystem (IGS) or interaction analysis with active participation and conflict management aspect of planning:** Institutional governance system problem 1 (IGS-1): Inactive participation of planning participants (value 14=8%). IGS-2: Difficulties to reconcile the conflicting interests (value 17=10%); IGS-3: Lack of formation / capacity building or insufficient competency (value 16=10%); IGS-4: Lack of contract between participants: Consensus building process is weak (value 17=10%); others: (value 12=7%). **Tactical planning subsystem (CTPS) or technical aspect of planning:** Tactical planning system problem 1 (TPS-1): information acquiring information's system (value 4=2%); TPS-2: Regeneration / enrichment problems (value 4=2%); TPS-3: Yield regulation problems/lack of ecological, social, economic and financial evaluation (value 9=5%)**;** TPS-4: Lack of controlling and monitoring system (value 10=6%).

Figure 3-8 Classification of problems to Cameroonian forest management planning per sub-category

3.2.4 First set of forest management planning problems

3.2.4.1 Difficulties to reconcile the conflicting interests (IGS2)

Based on the assessment of the results, particularly for FMUs, it was found that there was an intricate social conflict which is one of the main problems in Cameroon. These disputes are of substantial magnitude involving a significant number of interests. They are very complex and multi-faceted components of the Cameroonian FMP framework. Sometimes, they are very violent causing serious damage in some FMU areas as described by some interviewees.[324] LAG and CG have also expressed concerns regarding these conflicts, showing that these had been neglected for too long by the FEG and FPG, as well as the GG within the FMP framework. LAG and CG argued that these problems exist because the FEG, FPG and GG ignored forest-dependent communities during the decision-making in the planning process. They have been excluded although the local people can contribute to the design and implementation of the FMP outcomes. At worst, they said, this situation has impoverished communities, created tensions between them and the FEG and GG particularly, and at times it has even undermined state authority. This description is similar to the FAO (2003)[325] report on the importance of community-based forest resource management. It also shows the need for a consensus building process as proposed in the CPS1 (see chapter 2, section 2-5). In the light of the data evaluation, these conflicts have diverse forms and some of them are reviewed in the following.

1. Conflicts about ideology and value: The FEG, as well as the FPG claim that the conservationists are only oriented towards the protection of the environment or biodiversity. According to FEG and FPG this view is restrictive as it does not integrate the other goods and services of the rainforest. In their (FEG and FPG) eyes conservationists think that logging must be forbidden and the forest should be left untouched. In response CG and LAG accuse the FEG of only being profit-oriented and do not care about the future generation. Concerning the GG, they also said that the GG is only interested in tax incomes. Furthermore, the LAG as well as the CG said that the FEG, FPG and GG are not interested in social issues, poverty alleviation or the people's well being. These conflicting

[324] These statements are derived from the answer of the interviewees of the question 5 (see questionnaires in the Appendix P and Dogmo 2009 for many examples on that).
[325] Document about tropical secondary forest management in Africa: Reality and Perspectives who encourage the introduction of the Community-based forest resource management.

views have a strong influence on the FMP process and thus highlight the need for reconciliation.

2. Conflicts about boundaries on forest management units or concession areas and conflicts about property rights: These conflicts arise, according to the LAG, most often because of disrespect of the logging limits by the forest holders. They showed that sometimes the forest holders use their agricultural land, as well as their cultural or spiritual sites. Forest enterprises destroy farms of the local populations during their activities and these damages are sometimes not or insufficiently compensated for. In fact, the government classified the forest without really taking into account the local poor people. Their traditional rights are not considered when concessions are allocated, despite the recommendations law 94 makes. The FEG said in response that they have a contract with the government and thus do not have the possibility to react to traditional rights. They also show that most of the time they have substituted the state on their concession area because the government does not take responsibility of the area. Many of these conflicts relate to property rights which are inadequate as shown in chapter 2. These conflicts are mainly due to the misunderstanding and undefined property rights system between forest users involved in the planning process, particularly the FEG, LAG and GG. In fact, every party claims that the forest belongs to them (traditional property rights system versus legal property rights system).

3. Social conflicts and conflicts within the villages (clans or families): According to the local actors, sometimes there are problems when the employers of forest concessions "take" the villagers' wives but when particular services are asked for by the community these are refused (taking villagers from forest concessions to the village by car during funeral ceremonies, and helping to buy coffins). Conflicts within the LAG or villages around the FMU area partly arise from the fact that the external actors like the GG represents a local institution which does not match the traditional system, for example the GIC "Groupe d'initiative commune", the Comité Paysan Forêt, as well as the "comité de development". In this context, the lack of integrating the traditional knowledge and organisational system into the FMP system can explain some conflicts between members of the GG and the LAG. Furthermore, these conflicts are partly aggravated because the local governmental institution does not integrate all the compartment of the villages, for example, there is a

weak representation of women and the young and sometimes there the process is hijacked by certain elites.

4. Conflicts about certain commercial species: Conflicts are also generated around certain tree species, specifically commercial species which are of economic, social and ecological interests/importance depending on each actor group involved. For example, according to the local actors, species like the "Moabi" (Baillonella toxisperma) produce vegetable oils useful for the local populations, but are currently a precious species for wood production and are of high demand in the international market associated with high profit.[326]

These areas of conflict in Cameroonian forestry highlight the need to create a new approach to address this conflictual situation in order to improve the interaction between the actors and increase their incentive to work towards SFM. In this respect, a reconciliation mechanism was set up through the introduction of the "Comité paysan forêt" (CPF) as a mediating institution, as well as the decentralisation of the forest royalties [327] which have been proven to be limited. The former is mostly designed as a consulting institution at local level or the interface between forest enterprises, the forest service and the population. They are not part of the planning process. Also the GG themselves recognise that, regarding the limitations of public institutions to take responsibilities in conflict management, they have tended to shift their governmental role to regulation (therefore decentralisation reform). Nonetheless, most of the respondents, especially the LAG, CG and FDG make clear that there is an increasing demand for more social and environmental benefits from forestry. In fact, this situation shows that the consultation of the actors after drafting the forest management plan is a limited view of participation. There is an urgent need for active participation of all actors in each step of the planning process, for example participants or actors have to agree on the sustainable yield which has to integrate social, economic and ecological interests. Consequently, there is a need to integrate conflict management into FMP framework. In this respect, the IGS as subsystem 2 of the CPS highlights the guidelines which have been developed in order to identify ways and means to address conflicts and ensure greater participation of the main actors and stakeholders by establishing a CPSWG, active participation, and a conflict mechanism process (see chapter 5). Addressing this issue in FMP is crucial to reducing the conflict potential.

[326] See Doucet & Kouadio 2007 for full discussion.
[327] See Dogmo 2008 b.

3.2.4.2 Lack of contract between participants: Weak consensus building process (IGS4)

The weakness of the consensus building process is directly dependent or due to the insufficient participation of all the parties which have to be involved. This results in criticisms raised by the LAG, CG and FDG on the execution of the "cahier de charges" by the forestry companies. These "Cahier de charges" are contracts signed between the company and the bordering communities for the execution of social projects, like the construction of bridges, schools, dispensaries etc.[328] Unfortunately they are seldomly carried out or only partially carried out according to the LAG and CG. They show that they generally fulfil what is interesting to them in the "cahier de charges" in question. Therefore, the LAG blocks logging roads, for instance, and the CG are mostly active in writing negative publications about forest logging practices. The FEG as well as the GG say in response that the CG and local populations have exaggerated demands which can never be entirely satisfied. Particularly the FEG and FPG show that the LAG generally confuses their roles with the state in the forest zones. The forestry companies cannot substitute the state in its role of a provider for its population. They only give their contribution to the local development, for example, through paying taxes like the forest royalties and other taxes. A thorough analysis of this situation makes it possible to show that many partnerships failed in the past due to lack of comprehension, transparency, accountability, as well as the lack of confidence between actors involved in the process of setting up the agreement, and lack of equitable sharing of benefits. All this illustrates the weaknesses of the negotiation process between the actors. In fact, the actors can only adopt the planning outcome, if the process was equal and equitable in each key stage of the FMP outcome. Moreover, the six groups raise the problem of property rights which remain vague in the area of the Congo Basin.

In the light of this assessment, there is a necessity for negotiation and dialogue between all the six groups in question at each step of the planning process and thus the establishment of a social contract between the parties involved. This contract constitutes a sum of the rights and responsibilities between them. Therefore, the key to sustaining partnerships in the long term is ensuring mutually beneficial partnerships for both parties (see Anyonge et al. 2003).[329] In this

[328] See also Djomo et al. 2000; Djeumo& Fomete 2001.

[329] The study highlighted key factors for successful mutually beneficial partnership or out grower schemes: a) Appropriate arrangements (e.g. partners should have a reasonable likelihood of deriving benefits, contribute to the strengthening of the socio-cultural and economic context of local communities); b) Security in arrangements (e.g. land tenure, business viability) and partnerships; c) Equitable sharing of production and market risks and benefits are accurately calculated; d) Genuine negotiation arrangements with partners with the social and

respect, this issue has also been addressed in the CPS framework through the IGS, subsystem 2 (see chapter 5), with specific focus on the forest as a CPR for several actors.

3.2.4.3 Lack of formation, insufficient competency in forest management planning (IGS3) and bad governance (VSS1)

The FPG as well as the FDG argue that there are very few professionals involved in the FMP process in Cameroon. They explain this by pointing out the fact that the majority of FMPs are based on European models, which are not appropriate in the Cameroonian context. They also show that the FPM outcome has mostly been performed by foreign consulting firms rather than local ones. They argue that this lack of formation is characterised by a high number of rejected FMPs by the government. The CG, GG and FDG highlight the lack of training of certain actors, this is shown by the fact that forest companies, for example, near or around LAG villages do not recruit villagers to perform tasks in the FMP process. Another factor such as costs can explain this lack of competence according to the FEG. In fact, some forest enterprises have already established a management planning team ("cellules d'amenagement" in French). However, most of them are just established for the validation of FMPs. After the validation, the management team is dissolved due to the lack of financial means. Furthermore, specifically as can be seen in section 4.1, the LAG as well as the CG shows very little knowledge of the planning process due to being almost entirely excluded from the process. Also here, the CPSWG serves as a framework for collaborative learning processes between all actors involved that enable them to better plan and monitor and implement FMP.

One of the major problems mentioned by most of the stakeholder groups is bad governance. It is observed in the field of forestry in general. There is a low level of law compliancy and implementation, low level of monitoring and control, little transparency, and little accountability. Thus, the most important area in which bad governance is seen is in the management of the forest royalties or "redevance forestière" in French.[330] In fact, the LAG, FEG and FDG argued that the populations do not always receive their share of 10% of the forest royalties, although forest enterprises pay these taxes to the government. This problem is raised especially by the local populations, who often react by blocking the roads to the forest enterprise activities because they want to receive their forest royalties. The problem of bad

technical expertise; e) Realistic prospects and opportunities (e.g. flexibility of options) known by partners; f) Principles and practices of sustainable forest management form the basis of arrangements; and
g) Contribute to wider community well-being.

[330] See full on forest royalties in Dogmo 2008b.

governance is also characterised by the numerous cases of corruption in the field.[331] This corruption manifests itself in non-compliance or disrespect of the logging rules by the forest enterprises (illegal logging). Bad governance also results from administrative slowness in the sense that the government takes a lot of time to examine the forest management plans proposed by the forest enterprises before accepting or rejecting them. Another aspect of bad governance is observed during the FMP drafting, during which forest enterprises ask forest planners to manipulate results and parameters of the FMP as stated by the FPG.

3.2.4.4 Non-implication of all aspects of sustainable forest management (VSS2) and lack of will of certain stakeholders (VSS3)

Concerning the non-implication of all aspects of SFM, the LAG and the CG denounce this problem and argue that there exists a certain disequilibrium between the social, economic and environmental aspects. This disequilibrium is explained by the fact that the forest enterprises act upon short term goals (for example to achieve quick financial profitability). Therefore, they sometimes take only the economic aspect into consideration and neglect the rest. An analysis of 20 approved FMPs by the forest administration showed this imbalance.[332] The LAG mentions another element leading to disrespect of the three aspects of sustainability. In fact, they complain that apart from certification, there exist several initiatives, like the origin of the wood legality (OLB) or the wood traceability (*origine de la légalité du bois in French)*. This initiative is only based on the legal aspect (for example, logging certificates, "notebooks" from of logging sites, wood marked before its entry to the firm, etc.) and does not take into account social and environmental aspects. The majority of forest enterprises prefer this initiative because it is less expensive than certification.

Concerning the lack of will: FMP is still seen as a constraint. In this context, the GG claims that many actors do not see the importance of FMP, including the FEG. They have neither long term strategies nor future visions. This lack of commitment to long term investments is partly the reason for illegal logging, corruption and other related problems. With regard to certification it can be observed that many forest enterprises only engage in this to secure their markets or because of obligations imposed by the state rather than for the sake of acting in line with SFM principles. For example, during the title attribution of concessionaires, there is a provisional convention defined by the state. In fact, the GG argues that the forest enterprise has a provisional title for three years, during that time the concessionaire has to design the

[331] Dogmo 2009.
[332] Doucet & Vandenhaute 2006.

inventory and the socio-economic studies and produce an FMP. Non-compliance with the rules of this provisional convention by the forest enterprise has the logical consequence of a refusal of the definitive title attribution.

3.2.5 Second set of problems in forest management planning

3.2.5.1 Insufficient participation of all actors or stakeholders (IGS1)

The problem of theoretical or insufficient participation has been addressed by almost all the FMP participants groups. In fact, all actors agree that the populations who live around or in the forest are not actively involved or implied in the FMP process. The LAG and CG group show that sometimes they are informed or consulted only after the decision-making process within the planning framework (forest management plan drafting). Against this view, the FPG, FEG and the GG argued that the population doesn't actively participate in the decision making process also because of their insufficient knowledge concerning the technical aspects of planning as well as the law. Furthermore, they highlighted that the LAG are mostly illiterate. This insufficient participation or the lack of a platform for negotiation between actors during each step of the planning process could be one of the main reasons for conflicts in Cameroon.

3.2.5.2 Lack of financial means or capacity building (VSS4)

Lack of financial means is the most important problem raised by the FEG because of their own interest. For this purpose, they argue that FMP is expensive. That is the main reason why they don't manage forests. They also showed that forestry is submitted to many taxes. Also in this framework, there is a lack of financial and economic evaluation before investment by the forest enterprise, said the GG. The GG effectively also denounces an administrative problem which is based on the size of the concessions in Cameroon. Indeed, they argued that many FMPs have a negative financial evaluation due to the lack of feasibility studies by the forest enterprises. These feasibility studies are based on elements such as the production capacity of the forest, the profitability and the investments projection. This explains the higher number of abounded concessions today. In the same way, the GG and LAG also argued that certain forest enterprises do not abound their concession but compensate their financial deficit by the disrespect of Minimum Logging Diameter (MLD). For example, if the MDE are insufficient to pay their employers, or when they realise no profit, they are sometimes obliged to practice illegal logging. This situation is frequently observed at the great extend by forest enterprises,

of which the reduction of cutting area by the government has caused much waste to the timber forest company (they were usually accustomed to the great surface).

3.2.6 Third set of problems in forest management planning

3.2.6.1 Follow-up, monitoring and yield regulation problems (TPS3 and 4)

All actions which derive from the FMP need regular monitoring and controlling in order to ameliorate certain social, economic and environmental performances of the FMP outcome during the implementation. In this context, the LAG, CG and FDG argued that the forest administration does not always ensure the monitoring and follow up in their enterprise area, for example, logging area inspections. They also argued that the forest administration does not give sufficient time and means to the forest agents to verify and control the situation in the field. In certain circumstances the forest enterprises support the forest agents to do this monitoring, providing car, logistics etc. The question is how it is possible for a forestry agent to do the job in an unbiased fashion when the equipment is provided by the forest enterprise. Therefore, this situation sometimes leads to corruption, if a forest enterprise does not respect the law. Concerning the yield regulation problems, they are mostly related to the difficulty for the enterprise to gain equilibrium in their investment. The FEG showed that there are a lot of constraints to yield regulations, such as the minimum logging diameter (MLD), the reconstitution and other planning parameters which reduce the yield and therefore the income. This yield regulation problem is also characterised by the lack of ecological, social, economic and financial evaluation (see also section 3.5.2).

3.2.6.2 Afforestation or regeneration and insufficient acquiring information system problems (TPS1 and 2)

According to the LAG and the GG, the forest enterprises are oriented towards making profit and therefore they do not pay attention to regeneration or to their information system, even though the law recommends it. For example, the law allows the forest enterprises to take some essences to enable the regeneration of other helophyte species, but in reality they do not do that because of a lack of a market, said the GG. The forest enterprises sometimes argue that afforestation costs are higher. Also, according to the LAG, the forest enterprises consider the regeneration process as a loss of time and profit. In response to these claims, the CG, LAG

and GG try to convince the forest enterprise to regenerate the forest and acquire adequate information, which is necessary for the future generation.

3.3 Restrictions to the results and conclusion

There are some limiting factors to the quality of these results. Firstly, the time that was available was an important factor for the selection of interview partners.[333] Secondly, during the analysis of interview materials, there was greater divergence of points of views among the members of the same group. There were sometimes opposed answers within one group. This impeded the description of the opinions of the group and thus skewed the results. Thirdly, the mood or temperament of interviewed people could also affect the results, as there were some questions which profoundly touched some participants. Lastly, by answering the questions, the majority of FMP participants took into consideration only their own interest and neglected the interests of other groups. The results have produced a large quantity of information, which is to some extent complex. In fact, a closer look at the results shows a divergence pronounced between the opinions of different FMP participant groups, which can be explained by the disparity of interests of each FMP participant group. Moreover, other observations testify the low level of knowledge of the majority of FMP participant groups about the concept definition of FMP. Thus, the theoretical predefined/preset codes and sub-codes were helpful in this framework for the analysis of the interview material and especially contributed to address the problems of lack of formulation of the answer by some FMP participant groups.

In conclusion of this chapter, one of the lessons learnt from this study is that until today the FMP definition or conception still does not vary much from the classical or traditional one, which is more technical and unique in its function. It integrates therefore only one variable (TPS) and not three as proposed by the CPS model. The VSS and IGS are only applied insufficiently. In this respect, the number of variables or parameters integrated in their definition by respondents was a useful tool in this study to analyse their conception about the FMP. The other lesson learnt is based on the fact that this analysis has confirmed the theoretical setting concerning the FMP participant groups to be involved in an FMP process. FMP in Cameroon should involve the following six actor groups: the GG, the LAG, FEG, CG, FDG and FPG. They have to be integrated in an equitable way for each step of the

[333] Taking into account the time assigned within this investigation in the framework of the all PhD thesis framework, it was difficult to do more interviews.

planning process, the implementation of the outcome, and specifically the sharing of benefits gained from the resources. Additionally, the forest concession has to be defined as a CPR rather than state property with its contractual holders (FEG) in order to address the conflicts in the field.

Lastly, this chapter has enabled a comprehensible understanding of the FMP problem situation in Cameroon and has provided insight into the possibilities of CPS to address these problems, which have been subdivided into three groups. The first one includes the IGS 2, 3 and 4[334], as well as the VSS 1, 2 and 3.[335] The second group contains two sub-variables and includes the VSS 4 and IGS 1[336] and the third one includes TPS 1,2,3,4.[337] This classification shows that, in contrast to the generally known setting in FMP, the problems are to be found mostly in IGS and VSS. This confirms what the author assumed. However, this study, which has been carried out in order to understand the FMP situation in Cameroon, has produced results which would need to be confirmed further. Nonetheless, the theoretical CPS model design (chapter 2, section 2-5) may be an appropriate model to contribute to address the problems identified for Cameroon.

[334] IGS-2: Difficulties to reconcile the conflicting interests; IGS-3: Lack of formation / Capacity building or insufficient competency; IGS-4: Lack of contract between participants: Consensus building process is weak.
[335] VSS-1: Corruption/Bad governance; VSS-2: Non implication of all aspects of sustainable forest management; VSS-3: Lack of will in the side of forest enterprise and forest services; forest management planning has been still seen as constraint because of short term visibility.
[336] VSS-4: Lack of financial means (FMP is expensive); IGS-1: Inactive participation of planning participants
[337] TPS-1: Insufficient acquiring information's system; TPS-2: Regeneration / enrichment problems; TPS-3: Yield regulations problems/Lack of ecological, social, economic and financial evaluation; TPS-4: Lack of controlling and monitoring system.

4 Value and strategic subsystem (VSS)

This chapter deals with the VSS as subsystem 1 (S1). The following questions were of important concerned in its design: Which normative and strategic approaches should be pursued in the FMP framework? Which sets of guidelines should be developed to safeguard the long-term or future of forestry and how should the normative and strategic planning be integrated into one subsystem? To answer these questions, the VSS was built to allow information flow and inter action from the normative planning to the strategic one through the strategic intent. In the opinion of the author the VSS should provide FMP participants with the motivation to act sustainably and to produce products for common welfare and social justice. In this respect, this section involves first of all an account of the necessity for integrating in the classical (medium term)[338] planning process, the normative and strategic planning and the needs to merge them into one subsystem. This because of ideology, beliefs, ethics, morals and strategic thinking (future orientation) which can act powerfully as driving forces in providing incentives to pursue the planning process or the implementation of its outcome.[339] Then, after describing the approach or the way used in the design of the VSS,[340] the structure of the VSS model and the clarification of the meaning of the normative, strategic intention as well as the strategic planning are highlighted. This structure shows inter-connexion between elements of the VSS. It contains eight identifiable stages devised from the combination of the following three sets (refer to Figure 4-2, p. 103): The first one (first set) highlights the normative aspect of planning, which consists of vision, mission, guiding images,[341] and norms or principles of behaviour. The second set shows the strategic intent, which in the context of this working paper is the link between normative and strategic planning. The third set concerns the strategic planning, which is further elaborated, by focusing on the strategic analysis, strategy formulation, and the strategic implementation as tactical planning. Finally, this chapter draws the conclusion on the general lessons learnt.

[338] Classical FMP can be designated as the theory of medium-term economic planning in the forest enterprise. The medium-term economic planning is an established term in economic sciences and in the handling language (Speidel 1972).

[339] Adapted from Sabatier & Weible (2006 quoted by Clement 2007; Sabatier & Jenkins-Smith 1999; Sewell 1985 quoted by Clement 2007).

[340] The sources used in the collection of information for the design of the VSS model are highlighted. It constitutes an interdisciplinary framework based on one hand normative source like the institutional frame, namely international and regional forest policy, with an emphasis on cases from Cameroon (specifically the national constitution, forest law and the forest legislative mandate, governance) and the management concepts, such as ecosystem management, the ecosystem approach, sustainable forest management and certification. On other hand the strategic planning sources which is essentially the secondary data on strategic planning. These two sources of inspiration (normative and strategic planning sources) represent the framework for the VSS model design.

[341] Or ‘Leitbild’ in German

4.1 The necessity for integrated normative and strategic forest planning

The arguments made in this chapter to suggest the integration of the normative and strategic aspect of planning into one subsystem are then due to the gap in the flow of information between the two planning aspects and specifically because of the conflict which can arise between the two aspects of planning. In fact, classical or medium term FMP combined solely with the strategic or normative planning is not sufficient to ensure the sustainability of resources.[342] There is a need for a strategic intent, which is built upon a strategic planning process and not derived exclusively from the normative planning.[343] However, it has become clear that the normative and the strategic aspects of planning are often ignored in classical FMP. Sometime, they are always presented separately in the literature, without any link made between them.[344] Failure to recognise the gravity of this problem has been part of the reason for the unsuccessful implementation of the FMP outcome in temperate and tropical forest regions in the last decades.[345] This means the implementation of FMP become in this framework counterproductive and the future of forestry possibly compromised. Specifically in the Congo Basin this failure is part of the forest destruction, there are some examples from the last chapter: corruption/bad governance, non implication of all aspects of SFM, lack of will in the side of forest enterprise and forest services as well as the fact that FMP has been seen as constraint because of short term vision.

There are two other foundations which sustains the need to merged the two planning aspect and promote their co-existence within the same framework. The first one (foundation) of the VSS is the fact that the FMP affects the social outcomes, especially those for the participants or actors.[346] Oesten & Roeder (2002) showed that where dependency exists, any FMP failing to integrate "values" such as common welfare and partnership cannot be realised or implemented.[347] The second foundation of a VSS orientation is based on moral principles[348]

[342] Oesten & Roeder 2002.
[343] Smith 1982; Hanewinkel 2001; Kreikebaum 2001; Oesten & Roeder 2002.
[344] For details on normative planning refer to Smith (1982) and for strategic planning refer to Kreikebaum 2001; Pfohl & Stölzle 1997; Hanewinkel 2001; Oesten & Roeder 2002.
[345] In other words, this fact suggests that without the integration of normative and strategic planning in the system of FMP, it may be difficult to implement and monitor planned operations in the field. Hanewinke 2001; Oesten & Roeder 2002.
[346] The concept of the stakeholder which is more applicable in the context of this thesis is the utilitarian version (adapted from Freeman 1984), whereby stakeholders are viewed as having an instrumental value that helps a forest enterprise achieve its objective (Burton & Dunn 1996). In other words, it is based on the deontological version and relies on Kantian ideas to lend stakeholders an intrinsic value (Burton & Dunn 1996; Donaldson & Preston 1995). Stakeholder interests are thought to form the foundation of forest management planning itself.
[347] Oesten & Roeder 2002.

that oppose the argument that making a strategic commitment to morality is not only conceptually flawed but is also ineffective. To strategically apply ethical principles means that a forest enterprise only acts according to moral principles when this is to its advantage. However, this is by definition a failure to adhere to ethical principles. Quinn & Jones (1995)[349] considered that if the purpose of acting ethically is to acquire a good reputation that will in turn provide economic benefits, why not pursue the good reputation directly without the intellectual excursion into moral philosophy? From a practical perspective, the instrumental benefits of normative planning paradoxically only result from a genuine commitment to ethical principles. Additionally, values give meaning to the norms and behavioural standards in forestry. Values are strong motivators to act in the best interests of the FMP participants.

In this respect, this chapter proposes the VSS as an integrated subsystem for CPS based on normative and strategic aspect of planning with the strategy intent as intersection of the model. In contrast to the price oriented value, the VSS integrates also the non-price values. The task of the VSS is to look at forestry policy for promptly communication and potential image protection in relation to all reference groups of the forestry (participants). This task should be considered as securing the signalling and the learning mechanism of the forestry (economic demands and interests). FMP has to address the VSS within the designing framework and thus ensure the legitimacy of the forestry in the long-term. Oesten & Roeder (2002)[350] pointed out the need for a strategic intent, which in this context may be described as the link between the two planning approaches (normative and strategic). It is the opinion of the author that the merged system may allow information to flow from the normative planning, in the form of emerging value as ethic, morals, guidelines, to the strategic planning one, inwardly focused on securing the long-term planning process, thereby enhancing the overall effectiveness of FMP activities. The legitimacy in the eyes of the stakeholders and the public, and their confidence in fmp draft is to an extent the fundamental argument behind the VSS. In fact, the VSS decisions and instruments within the FMP process has to be converted

[348] A Kantian posture (Berman et al. 1999; Freeman 1983) a feminist perspective (Eric & Studler 2002; Freeman 2004) and a fair contracts approach (Freeman 2004) are all examples of moral principles that can form the normative foundation of FMP. Without adding values, the situation of forestry will continually become more difficult, particularly given controversial public debate over ‘conservation’ vs. ‘logging’, poverty alleviation, active participation, etc.

[349] Quinn & Jones 1995 quoted by Berman et al. (1999).

[350] They presented the element of normative planning but not link it to strategic planning. The strategic intent, in their view the last step in the normative planning process, has been adopted as the link in this report, because inherent in the strategic intent is a strategy concept.

in the form of targets for tactical and operational planning which will not be addressed in this section.

It may be concluded that FMP that integrate and sustain, the VSS (see Figure 4-2, p.103) may have a competitive advantage over other forest enterprises that do not act in this way.[351] Substantial advantages from the forestry perspective mean that the VSS would basically be public relations e.g. communication as well as the central basic categories of reliability and cooperation.[352] The goal is thereby primarily confidence advertisement, or image grooming. However, the effects of this image grooming will be short-lived where the confidence and reliability problems of the forestry exist because they have more profound causes. A confidence crisis between the enterprise and stakeholders is frequently misinterpreted as simply an information deficit on the part of the stakeholder.[353] The VSS model tasks are to look for a policy, for communication and potential image protection in relation to all reference actors groups within the FMP process. The VSS should be considered as securing the signalling and the learning mechanism of the multi-participant or actors of FMP (economic demands and interests). VSS aims to ensure the legitimacy of the FMP outcome in the long-term.

4.2 Overview of the value and strategic subsystem (VSS)

4.2.1 Working approach in designing the Value and strategic system

The VSS is considered as code of good conduct for FMP. It is a set of guidelines developed from a variety of data from a range of sources to safeguard the future or success of the FMP process and outcome. It is to be followed when carrying out the tactical FMP. The method used in the design of the VSS was based on secondary data or documentations from various sources dealing with legislation (constitution, forest law), economic, political, institutional literature (both national and international) and from literature or documents focusing on SFM, governance and certification. The Figure 4-1, p. 102 shows that the VSS design is based on the following fundamental considerations or sources: the national constitution of Cameroon, Forest law of Cameroon, good governance, ecosystem management, sustainable forest management and the ecosystem approach, certification, international and regional forest

[351] Adapted from Oesten &Roeder 2002.
[352] Adapted from Oesten & Roeder (2002).
[353] Adapted from Oesten & Roeder 2002.

policies and strategic planning theories and methods,[354] for further review on each of those concepts see Dogmo (2008a, p. 8-23).[355]

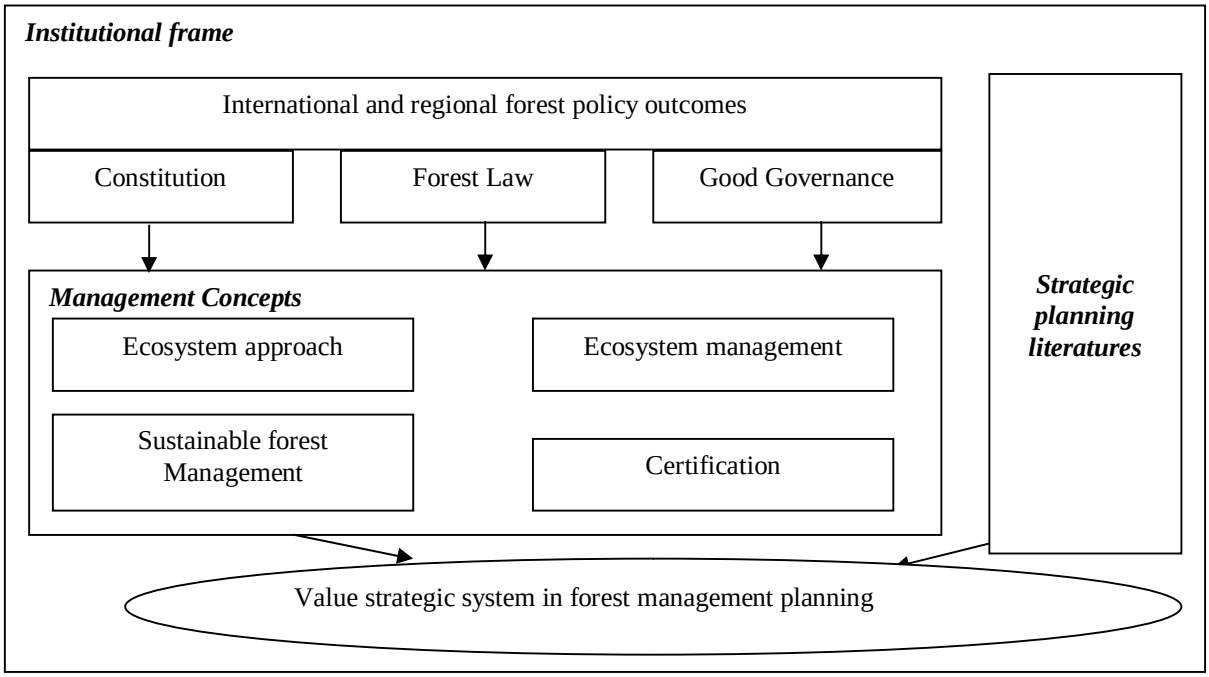


Figure 4-1 Conceptional framework for value and strategic system (VSS)

4.2.2 Structure of the VSS

Although every forest planning system is designed uniquely, to fit the specific needs of a particular forest ownership, Figure 4-2, p. 103 provides a graphic representation of the elements of the VSS, which is quite explicitly placed in the framework of FMP process. This "model" assumes that normative forest planning on the one hand and strategic planning on other hand are interdependent and constitute a necessary function of FMP with the aim of improving planning and implementation in tropical forestry, or simply to improve forest management performance. As can be seen in Figure 4-2, p. 103 the VSS consists of eight identifiable stages; the first set (a) is the normative level FMP which begins by identifying a vision and 'Leitbild'. Once these are clearly defined, the mission and a series of norms and principles of behaviour are defined. With these different levels of orientation, a

[354] These literatures are as followed: Bos 1994; Pfohl & Stölzle 1997; Boston Consulting Group 1988,2004; Bea & Haas 2001; Kreikebaum 2001; Hanewinkel 2001; Oesten & Roeder 2002; Kovac 2002. Although, there is a lack of literature on normatice and strategic planning because most of the study in forest management planning has been based essentially on tactical planning or medium term forest planning (See for reviewed Kurth 1994; Speidel 1972.

[355] see also PRC 1994,1995; African Forest Law Enforcement and Governance (AFLEG) 2003 quoted by Sustainable Development 2003; WRI 2000; MINEF 2000; Cerutti et al. 2006; PRC 1996; Fargeot et al. 2004; Naciri 2008; Elliot et al. 2002; ATO/ITTO 2003; ATIBT 2007; Convention on Biological Diversity (CBD) 2007; Flitner et al. 2006; Bass 2002; Bass et al. 2002; Shannon 2002; Burger & Mayer 2003; Earth Summit 2002; UNCED 1992a-e; Speidel 1972; Atyi 2000; Mantel 1959.

comprehensive picture of the future development of the forest enterprise, and the reliability and legitimacy of the enterprise or management will be marked. The fundamental feature of the design of this normative view of planning is based on the question to know, why do one do something? Therein are the principles, standards and rules defined, and those that are suitable highlight the strategy intent. As can be seen in Figure 4-2 below second set (b), the integration between the normative and strategic planning is possible through the intercession point of the two concepts, which is in this case the strategy intent, which should be found in the two aspects of functional planning. The third part (c) of the Figure 4-2 below concerns securing the future ability of the forest enterprise. It shows the strategic planning process as a product of strategic analysis, synthesis and analysis (strategic formulation as intention), as well as of strategic implementation. The question arising from this strategic view of the system value is about are we doing the correct things. The purpose of this VSS model is to encourage forest organisations using this approach to learn to think normatively and strategically in order to secure the future of their activities. Immediately below is displayed the proposed VSS model combining normative and strategic planning in one system. The model is placed explicitly within the framework of FMP.

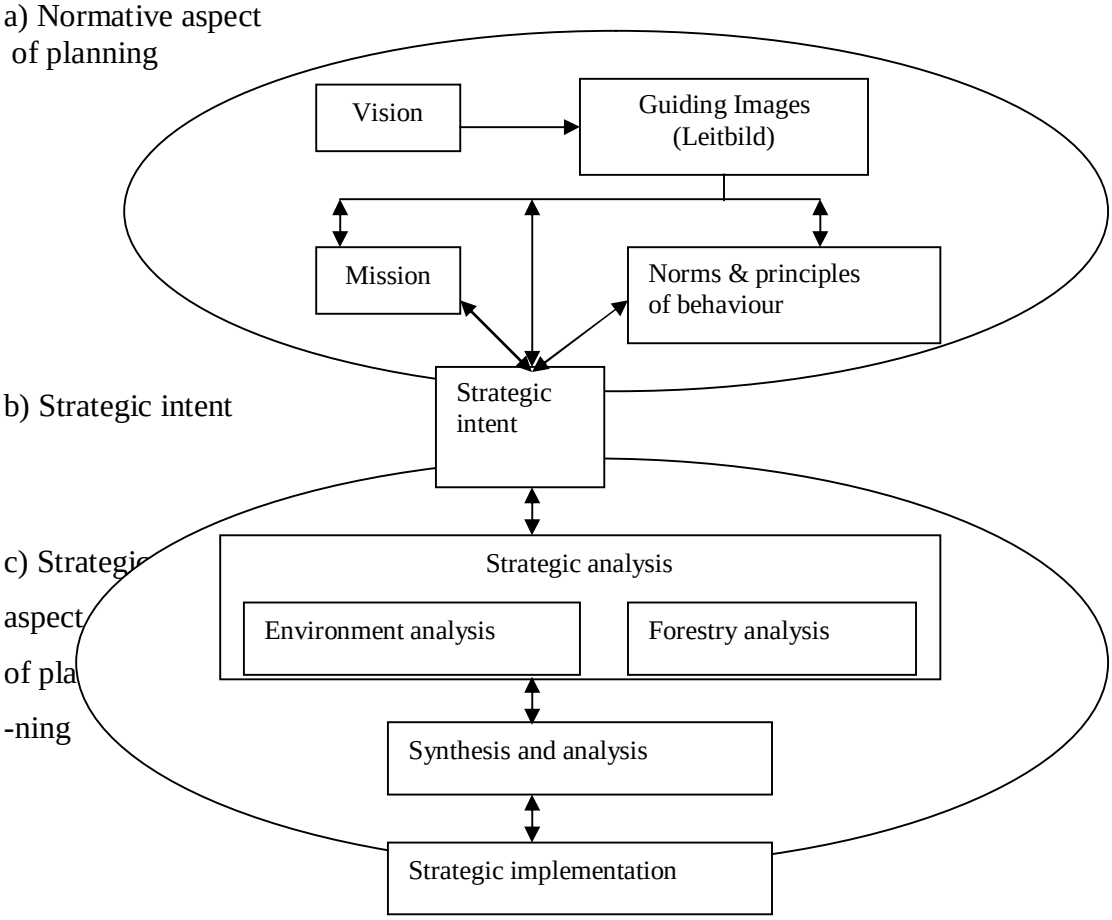


Figure 4-2 Value and strategic system (VSS) as a normative and strategic based forest planning model

4.3 Normative planning within the forest management planning framework

4.3.1 Generality

Normative planning is also known as a reconsideration of the value[356] (non-price value) premises underlying decisions, the definition of the desired ends and ideals, and also the decisions that determine what ought to be done.[357] For example, values include people having equal access to services irrespective of their origin and living standard; respecting the worth and dignity of each person and service users having choices in relation to the available services. The values of individuals and organisations (e.g. forest enterprises) would affect their approaches to the drafting of FMP, service delivery. In the context of this thesis, normative approaches to FMP hold that FMP ought to pay attention to key fundamental moral principles (ethical and moral commitments), rather than to a desire to use the resources solely to maximise profits, as advocated by the scholars of privatisation, such as Demsetz (1967) and other new classical economists. Based on stakeholders' theory,[358] normative approach includes the identification of moral or philosophical guidelines for the FMP process (tactic and operation). The moral theory (utilitarianism and deontology) based on the definition of the moral point of view,[359] the normative planning process should contains six characteristics which are necessary for a standard or rule to be a moral one: generality, universality, priority, disinterestedness, publicity, and substantive impartiality. The planning approach deals with decisions on the value associated with FMP. Furthermore, FMP can also additionally, be located within the general theoretical discourse of democratic theory.[360]

Consequently, the author proposes that the FMP process started by defining a normative model with reference to how forest planners might ideally plan in order to promote common welfare and justice through SFM and good governance principles. Based on various data sources (see Figure 4-1, p. 102), a series of values to be included in order to better manage the tropical forest of the Congo Basin has been formulated. The normative planning model is a

[356] Values are desirable qualities often linked with beliefs and commitments, and what are considered to be the rights of service users. (adapted from Smith 1937,1982).
[357] Smith 1982.
[358] Principle of who or what really counts, Freeman 1983; Donaldson & Preston 1995.
[359] Refer to Taylor 1978.
[360] Relevant to the VSS model are several key concepts central to democratic theories: popular sovereignty such as coming to stakeholders of the FMP judgement specifically public accountability, transparency of decision making, and representation which is based on political equality. Taken together, these concepts create a picture of a self-governing society (Bellah et al. 1991; Thompson 1999; Shannon 2002).

combination of objectives, principles, norms and strategic intent that collectively form a vision for FMP and the guiding image.[361] They constitute a single point of reference, and an overarching coherent set of guidelines to direct and steer FMP tactics and operations, in all spheres of government and other public and private agencies involved in FMP so that the outcomes are consistent with the national objectives. The objectives, principles, norms and strategic intent are the VSS framework to promote normative FMP. The objective of these variables is to influence directly the substantive outcomes of planning decisions or the fmp.

4.3.2 Definitions and elements of the normative aspect of a forest enterprise

The normative system covers the whole, and the ranking of goals, principles, standards and rules to which forestry feels obligated, as well as the relationships between them. The normative aspect represents the reference points and evaluation yardsticks for all decisions and measures in the remaining planning process.[362] According to this framework, and referred to by Oesten & Roeder (2002), the normative planning aspect contains the following four elements which should be closely linked, resonating with and reinforcing each other to create strong normative planning: vision and mission, guiding images, norms and principles of behaviour and strategic intent:[363]

1. Vision statement: It is an abstract drawn from a wealth of details. A statement of FMP's vision sets out the reasons for the organisation's existence and the future 'ideal' that the organisation aims to achieve or is working towards. It refers also to an indicative, motivating and sense-giving framework for strategic, tactical and operational actions. For the case of this thesis, the vision of common welfare and justice is proposed;[364]

2. Mission statement: the fundamental reason for the existence of the organisation and a concrete expression of the vision statement, explaining how it is to be achieved; the representation of the basic purposes of the enterprise activity.[365] The basic questions according to Campbell (1992) are about who are we, what is our business and what role do we play for the stakeholders.[366]

[361] Adapted from Oesten & Roeder (2002).
[362] Adapted from Oesten & Roeder (2002).
[363] The complete description of each of these elements can be seen in Dogmo 2008a, 31-51.
[364] Adapted from Ruppert 2004.
[365] Adapted from Campbell 1992 who showed the way to create or analyse a mission statement, see also Campbell & Yeung 1991; Barua et al. 2006.
[366] See also Andrew 1992.

3. Guiding image: the written form of the vision, instrument of control. It is the basis for strategic planning, the goal education process on all levels, co-personal guidance, public relations, etc.[367]

4. Norms and principles of behaviour: fundamental principles for acting in the frame of different internal and external stakeholders or the organization members (shareholders). The basic question is about why and how we should act.[368] According to the description developed by Oesten & Roeder (2002), Burger & Mayer (2003), Cornet & Muslim (2004), ATO/ITTO (2003) and CIFOR (1998) these norms and principles are based on ethical or moral principles and can be summarised as the FMP ethics-codex.

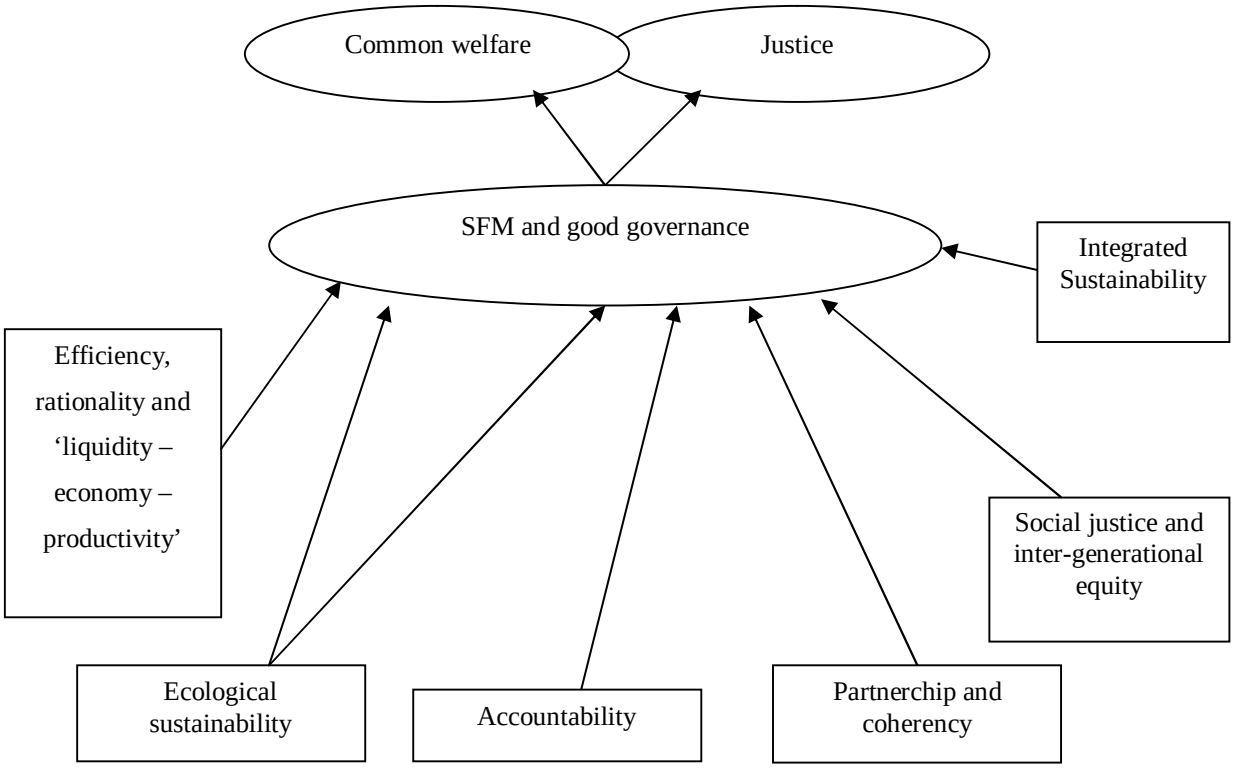


Figure 4-3 Norms and principles of behaviour for forest management planning

Figure 4-3 above displays three different levels of norms and principles of behaviour as adopted in this thesis. Firstly, at the top of the figure is the highest level or the overall

[367] Generally formulated, the guiding image brings graphically in a written form complex normative conception (vision) over worthwhile in social, economic, political, technological and ecological future questions to the expression. All decisions and actions are to be adjusted to the guiding image, even if the guiding principles of the guiding image are yet to be implemented through the tactical and subsequent operational planning. The guiding image expresses the forest enterprise's/ management's vision which is sometimes future-oriented and oriented towards internal and external stakeholders and opened in the ideal case the identity of the forest enterprise/management.

[368] Therefore, norms and principles of behaviour outline the view within the forest planning design framework. They are designed to orient both the planning of the forest resource, and human social interaction in the widest sense. These guidelines or principles are the structural element, the basic rules of a vision. This basic orientation provides more concrete and objectively verifiable standards of SFM, namely principles, criteria, indicators and verifiers.

goal/principle of normative FMP, which includes justice and common welfare. In the centre is the middle level of normative FMP, including SFM and good governance. Finally, the lower level of the Figure 4-2, p. 103 describes the principles of behaviour, which include the standards and principles of behaviour, partnership and coherency, efficiency and rationality, ecological sustainability and accountability, forest resource management for inter-generational (equity) and integrated sustainability.[369]

5. The strategic intent: provocative and motivating goals for the entire enterprise. It must also be seen as the output of the strategic planning process. The basic question is: On which general fundament or goals should the forest enterprise be developed?

These values or normative aspect bundles the fundamental normative conceptions of worthwhile conditions in social, economic, political, technological and ecological future questions of the enterprise, gives the tactical and operational measures a direction and provides a justification for the tactics and operations. These values communicate the vision, and form the foundation of FMP as a whole. The strategic intent, the link between the normative and the strategic aspect of planning, is the basic institutional and tactical planning aspect within the FMP process that must be achieved for the implementation of the central vision.

4.4 Strategic intention as link for value/normative and strategic/Goal planning

Gerstein (2009) stated that in the field of management and organisational development, strategic intent is defined as a compelling statement about where an organisation is going that succinctly conveys a sense of what that organisation wants to achieve in the long term. He argued that strategic intent answers the question about what exactly are we trying to accomplish. In the sense of company management, Alagse (2009) showed that a strategic intent is the immediate point of view of a long term future that company would like to create. It is the intent of the strategies that company may evolve i.e. it creates spotlight for directing the strategy in a company. When carefully worded, provides a strategic theme filled with emotion for the whole organisation. In this thesis, the strategic intent is understood as the link by means of which two planning approaches may be merged, namely normative and strategic. It is the intersection and/or outcome between these two aspects (normative and strategic).

[369] The complete description of each of these elements can be seen in Dogmo 2008a.

However, these concepts are used almost interchangeably in the literature: strategies, norms and intention. As Norms, the strategic intention, clarifies the vision and tells everyone (stakeholders and shareholders, personals) about how it is going to realise its vision. In this respect, adapted from Ostrom (2005), strategic intent can be understood as plans of action that individuals and/or organisations adopt primarily for prudential reasons, to achieve preferred outcomes in light of expectations concerning the likely strategies of others. She argued that one of the reasons why formal game theory has been so useful is that it enables the theorist to assume that all participants are fully rational and that all will assume that all of the other participants use the same model of the game, that other players analyse the game as rationally, and that all will choose a best response to what they predict will be the best strategy chosen by others. These best strategies form within the VSS, a result of a normative as well as a strategic planning process. This result can be notified as norms or strategies that represent preferences related to predictions about actions or outcomes that are not focused primarily on short-term payoffs.[370]

More specifically, for the Congo Basin, the traditional norms and strategies for managing the forest has also to be integrated for strategies and/or norms design. In fact, many rules have been crafted by communities over time. In this respect, medium-term or tactical planning and short-term or operational planning are no longer sufficient to guarantee the safeguarding and future success of the forest enterprise. The context within which forest enterprises plan has changed significantly in recent years and continues to evolve at a rapid pace. Forest enterprises responsible for the use, management and protection of forest resources are experiencing major changes in their external operating environments. These changes have significant implications for how they articulate their strategic intention. Some of the more noticeable factors influencing planning, in this respect can be found in Ostrom (2005) as well as in Dogmo (2008a).

If the strategic and normative aspect of forest planning is left to the tactical and operational planning phase, it is likely to be too late for the re-establishment of operational success because of the changes to the surrounding environment.[371] Therefore, another important aspect of the strategic intention is besides the normative planning, the strategic which constitutes a built of the strategic intent. Strategic planning can be understood as the process of developing and maintaining a viable fit between the organisation's objectives and

[370] Ostrom (2005).
[371] Oesten & Roeder 2002; Hanewinkel 2001.

resources, and its changing market opportunities. The aim of strategic forest planning is to shape and restore the forest enterprise's business and products so that they combine to produce satisfactory profits and growth. There are a variety of definitions and models for strategic planning. Some commonly accepted attributes of a strategic plan are that it deals with fundamental questions such as forest conversion and transformation, and it provides a framework for detailed day to day planning. Hanewinkel (2001) argued that without this integration of the strategic aspect of planning, decisions made as part of a classical FMP approach will not be implemented because of the ineffectiveness of the FMP, which has been developed at great cost. Therefore, the FMP decision would be ignored by the foresters and should be taken again only during the next forest planning process (after 10 years). One of the major limitations of the traditional forest planning model is that information about the strategic decision made on the basis of the changing internal and external environment is usually not taken into account systematically or comprehensively. When this omission occurs because of the assumption that external changes cannot be predicted, classical forest planning condemns itself to failure because it is only based on information known from direct experience garnered in the past and the immediate present. According to Oesten & Roeder (2002), not only is a reactionary processing of the changed conditions needed for survival, but also the development of an active, conscious and problem-anticipating[372] attitude. The goal is an early and systematic structure, from strategic success potential to future tactical and operational success. Whereas operational planning is geared towards the present, strategic planning is future-oriented. In other words, tactical or operational planning is concerned with 'doing things correctly', and strategic planning focuses on 'doing the correct things'. Tactical and operational planning ensures efficiency, whereas strategic planning is concerned with effectiveness.

In the context of this thesis, the strategy intent, as the rationale behind FMP or forestry constitutes the link between normative and strategic planning in FMP. The author proposed according to Hamel & Prahalad (1994) three (3) main main tenets of strategic intent planning which includes: direction, discovery and destiny.[373] In the same view, Alagse (2009)[374] showed that the strategic intent is about clarity, focus and inspiration.[375] Strategy intent is an integral part of normative and of strategic planning, and consequently of the VSS. Although the specific functions of the strategy intent are different in the two processes, they serve the

[372] "Problem antizipierende" in German, translated by the author.
[373] See Dogmo 2008a.
[374] Adapted from the book of Hamel & Prahlad 2003.
[375] See Dogmo 2008a.

same purpose in the VSS. In many planning model designs, strategic intent constitutes one of the central steps. It is in this step that the real intention of the forestry is identified and/or selected. These intentions are then prepared for the strategy formulation, or syntheses and analysis in the strategy analysis. The forest enterprise and/or management determines its strategic intent based on (and consistent with) its vision, mission, norms and principles of behaviour, and within the framework of strategy analysis (environmental, enterprise and other analyses). The strategic intent is the fundamental intention that the forest enterprise has to address in order to achieve its mission and to move toward its desired future.

4.5 Strategic planning process

Strategic planning in forest management is concerned with the long-term, and frequently little differentiated and structured complex problem fields characterised by a high degree of complexity.[376] In other words, it incorporates decisions that have the potential to cause greater changes than others and thus securing the future of the forest enterprise.[377] Strategic planning within FMP is a process based on goal setting in accordance with the findings of enterprise and environment analyses for the selection and design of means to attain the desired goals to be developed and implemented.[378] Zuurbier et al. (1994)[379] defined the objective of strategic planning as: mission, goals, strategies, capacities and conditions. Bos (1994) limited its description to objectives, activities and methods. He stated that strategic planning deals with three types of decision, namely the decision on the land use objectives for the forest land, the decision on the desired forest in the future, and the decision on the management activities. Oesten & Roeder (2002) stated that the primary task of strategic planning is to understand the environment, define and identify options and organisational goals, make and implement decisions, and evaluate performance. Therefore, strategic planning aims to exploit the new and different opportunities of tomorrow and tries also to optimise for tomorrow the trends of today. Its central task is the preservation and creation of the potential for success of forest management concerned with long-term, future success or safety device.[380] Based on the Oesten & Roeder (2002) definition described previously, as a process emphasizes goal setting on the basis of enterprise and environment analyses of the selection of alternative actions, and

[376] Bea & Haas (1995); Smith (1982); see also Wikipedia, the free encyclopaedia (13.06.2007).
[377] Spencer 1984 quoted by Bos (1994).
[378] Cf. Kreikebaum (2001); Pfohl & Stölzle (1997); Smith (1982); Bostom Consulting Group (BCG) (1988).
[379] Zuurbier et al. (1994) quoted by Bos (1994).
[380] Smith 1982; Kreikebaum 2001; Oesten & Roeder 2002.

designing ways to attain the goals to be developed and implemented.[381] The author recommends for further readings on strategic planning refer to Sekot (1991); Bos (1994), Oesten & Roeder (2002), Kreikebaum (2001), Pfohl & Stölzle (1997). The strategic planning process can be divided into the three ideal-typical phases, namely strategic analysis, synthesis and analysis, and strategy implementation and control.[382] The last two elements (implementation and control) of strategic planning will not be addressed in this report. It deals with the tactical level or the medium-term planning.

4.5.1 Strategic analysis

The strategic analysis begins with the identification of the strengths and weaknesses,[383] and the opportunities and threats of forestry.[384] Diagnosis of the strategic problem is the goal of the strategic analysis. Identification, analysis and representation of the basic strategic problems of the enterprise are to be determined by means of the enterprise and the environmental analysis, in particular by confronting the risks and chances, and the strengths and weaknesses. Information obtained from the external and internal environment adds important components to classical forest planning.[385] First, it identifies new and potentially crucial subjects that should be added to those identified during the analysis. Secondly, it identifies possible developments of the forest with the help of new technologies such as simulation, visualisation, etc. These must be used to adjust, for example, the choice of trees species, silvicultural system, to regulate yield, biodiversity and social needs and so on. According to Daenzer & Huber (1997), Kreikebaum (2001), Oesten & Roeder (2002), there are a number of techniques, e.g. SWOT (strengths and weaknesses, opportunities and threats) analysis and risk analysis.[386] Strategic analysis facilitates understanding of the current circumstances. As environmental changes are largely unforeseeable and possibly imply strategic decisions of great consequence, the analyses will possess a qualitative character. In this respect, forestry can often successfully build on their strengths and develop strategies to

[381] Comparison with Smith 1982; Pfohl & Stölzle 1997; Kreikebaum 2001.
[382] Adapted from Oesten & Roeder 2002.
[383] examining the strengths and weaknesses of the enterprise's position, an attempt to analyse performance
[384] Oesten & Roeder 2002.
[385] For example, understanding pressures for change; others (e.g., clients) may be pressing for changes to the way things are done. Alternatively, the environment may be changing and it may be necessary to anticipate or respond to this. Pressures may arise from changes to the economy, new legislation, competition, changes to people's attitudes, new technologies, or changes in government.
[386] helps identify project risks, weaknesses in the organisation or operation. This allows for planning to neutralise certain risks

minimise the negative effects of their weaknesses, for example strategic stakeholder analysis.[387]

4.5.2 Strategy formulation: synthesis and analysis

The strategy formulation aims to describe how the forest enterprise intends to structure or to formulate its programmes to respond to the vision and the information contained in the assessment or strategic analysis. The development of a strategy represents an iterative process, which is usually based on three logical elements:[388] concretising the value or normative guideline (see section 4.2), the development of strategy options based on strategic analysis (synthesis) and the strategies definitions or identifying strategic choices. The purpose of this stage of the strategic process is to generate as many different ways of achieving the objective as possible, through the synthesis or accumulation of all of the information collected during the strategy analysis, in order to identify key issues and develop strategy options. It consists of generating as many different ways to achieve the value or normative aim as possible. This means searching for a better solution than that which is the most obvious, or possibly improving the most obvious solution by incorporating aspects of other solutions.[389] This planning phase features two types of decision according to Bos (1994): Decisions on the desired future forest[390] and decision on management activities.[391] Strategic planning instruments has been proposed for the achievement of this strategic planning process was developed by Hanewinkel (2001) presented in its brilliant study on "Neuausrichtung der Forsteinrichtung als strategisches Managementinstrument." It includes:

1. Coordination of the forest used: GIS model, 3D visualisation, and landscape planning model, multi-criterion decision-making aids;
2. Simulation: forest growth simulators with an economic component and silvicultural options such as Silva, etc.

[387] These are some guiding questions fro stakeholders' analysis: Who are the stakeholders? What are their needs, wants and expectations? Key stakeholders may include funding bodies, clients, staff, management committee members and volunteers. These people have a variety of views and needs that will have an influence on the plans developed, see Freeman 2004; Oesten & Roeder 2002.
[388] Adapted from Bos 1994; Oesten & Roeder 2002.
[389] Speidel 1972; Bos 1994; Oesten & Roeder 2002.
[390] This is a description of the future forest in terms of tree species distribution, regeneration, forest transformation or conversion, etc. It is a strategic approach based on the normative value decided on previously. Decisions on the desired future forest are needed so that a choice can be made between alternative management activities. (Bos 1994).
[391] If the characteristics of the desired future forest do not match the characteristics of the current forest, then the current forest has to be transformed into the desired future forest. This calls for transition management. Strategic planning deals with decisions on which parts of the forest have to be transformed from the current forest type into the desired future forest within a certain planning period..

There are two other useful tools for selecting the best option, namely grid analysis and decision trees.[392] If the results of the analysis of the options show that the plan will fail to produce sufficient benefits, it is necessary to either return to an earlier stage in the planning cycle or to abandon the process altogether.

4.5.3 Evaluation of strategy

Once the course of action has been selected (strategic formulation) and it has been ascertained that it is viable and applicable, it is necessary to examine the strategic planning and draw from it whatever lessons one can.[393] These are then fed back into future planning. It consists to decide whether it is worth implementing. Evaluating the plan gives the FMP participants the opportunity to either investigate other options that might be more successful, decide to implement the plan or accept that no plan is needed. Periodic evaluations of strategies are essential to assess the success of the strategic planning process. It is important to measure performance often, to evaluate the long-term effects of specific actions, and their influence on the organisation's vision and mission.[394] The forest enterprise should measure current performance against previously set expectations, and consider any changes or events that may have impacted upon the desired course of action. Depending on the circumstances, the following techniques can be helpful in evaluating a strategic plan:[395] PMI (plus/minus/interesting),[396] cost/benefit analysis,[397] force field analysis,[398] cash flow forecasts;[399] thinking hats.[400] Any analysis of the strategic plan must be tempered by common sense, and specifically by the normative result from the section 4.3.

[392] Grid analysis is helpful when it is necessary to decide between different options requiring consideration of a number of different factors. Decision trees by contrast allow one to think through the likely outcomes of following different courses of action (Oesten & Roeder 2002).
[393] Oesten & Roeder 2002.
[394] Dolence et al. 1997.
[395] Adapted from Dolence et al. 1997.
[396] This is a simple technique for weighing up the pros and cons of a decision. It involves listing the plus points of the plan in one column, the minus points in a second column, and the implications of the plan in a third column.
[397] This is useful for confirming that the plan makes financial sense. It involves adding up all the costs involved with the plan, and comparing them with the expected benefits.
[398] Similar to PMI, the force field analysis helps provide a good overall view of all the forces for and against the plan. This facilitates the identification of areas where adjustments can be made to render the plan more likely to succeed.
[399] Where a decision mainly has financial implications, such as in business and marketing, the preparation of a cash flow forecast can be extremely useful. It allows one to assess the effect of time on costs and revenue.
[400] Thinking hats is a technique to use to obtain a rounded view of the plan and its implications.

4.6 Conclusion

Lessons drawing in this chapter seek to show that that the normative and the strategic aspects of planning are often ignored in classical[401] FMP. They are generally missing from the FMP process, although their urgent need has been demonstrated, in the last chapter (see chapter 3). Failure to recognise the gravity of this problem has been part of the reason for the unsuccessful implementation of the forest management plan in tropical Congo Basin rainforest regions in the last decades. Without value and strategic thinking Cameroon or Congo Basin rainforests may continue to be subjected to destruction as said by respondents during the field work in Cameroon (Dogmo 2009). In this chapter, the need to address this "symptom" was highlighted, along with more fundamental change to the environments and lifestyles that affect the effectiveness of the plan. This chapter argues also that FMP process requires the linking or merging of the normative or value aspect and the strategic one in the same framework, creating thus a value and strategic system (VSS) (non-price only) as a framework to avoid crisis and to address conflict within FMP drafting and implementation. The common welfare and the (social) justice objectives of the FMP framework cannot be achieved without clear basic principles or normative values as well as it cannot be achieved in the absence of a strategic view of planning. It also highlighted that the input of the normative value in the strategic planning process as strategic system for securing the long term existence of the forest enterprise has to be done through the strategic intent as link between these two aspects of planning. FMP must incorporate values identified so as to create trust, confidence and consequently save on costs. In this respect, the unequivocal statement of the FMP's VSS is the starting point for the derivation of an appropriate planning system designed to secure the long-term future of the forest enterprise. This new approach (VSS) as a signalling and learning mechanism has been developed in the FMP framework and may provide forest planners and others participants in FMP with the motivation to act sustainably. The VSS is a tool for long-term existence of the forestry as well as for the legitimacy and confidence of the stakeholders and/or FMP participants in the planning process. However, the present legal framework influencing FMP in Cameroon requires some reform for the VSS approach to be implemented.

[401] medium-term or tactical forest management planning

5 Institutional and governance subsystem (IGS)

The quest for sustainable, efficient and equitable ways to manage the tropical common pool resources (CPRs) of Central Africa, such as the rainforests, has been a long and difficult one. Moves towards decentralisation and property rights reforms have created a new FMP framework that requires a new governance principle or structure.[402] *Emphasises on Cameroon, Cameroon's forestry council and FMU are confronted by the problem of scarce natural resources such as land, water and trees. These resources are owned and/or exploited by the better off, and are frequently the cause of disputes and conflicts (see chapter 1). Organisational structures and decision-making mechanisms are generally dominated by the local elite, forest industries and forest department.*[403] *Cameroon's PFE are therefore a source of conflict in which economic, ecological, social and cultural values are at stake.*[404] *This gave rise to the following questions: Can the conflicting interests within the FMP framework be reconciled? Can active participation and conflict management lead to the consensus necessary for the implementation of fmps? Is it possible to design a model that integrates the actors in each step of the FMP process? These questions constitute the issues addressed in this chapter. The main objective of this chapter was to develop a proposal for managing the co-existence of actors in the FMP framework. It aimed also to outline how to achieve a reconciled agreement amongst actors incorporating diverse objectives, different perceptions of the forests and thus improves their confidence in the planning outcome. The approach used here for active participation and conflict resolution is an institutional one in the sense of collaborative planning procedure. The structure of this section is as follows: In the first part after the introduction, the need for an institutional approach in FMP is addressed (section 5.1). The second part emphasises on the design of the institutional governance system (IGS), built primarily on the basis of the 'institutional analysis and development (IAD) framework' developed by Ostrom and colleagues (section 5.2).*[405] *It incorporates interactive and active participatory FMP and conflict management based on the establishment of a working group called the* combined *planning system working group (CPSWG), and also communication/consultation, negotiation and consensus building (section 5.3). The third part of this chapter highlights the conclusions (section 5.4).*

[402] For more detail refers to Dogmo 2008b.
[403] Oyono 2002a,b, 2004a,b; Steimann 2004; Dogmo 2008b.
[404] Oyono 2004a,b; Bigombé 2003; Dogmo 2008c.
[405] Ostrom 2005.

5.1 The need for IGS design

5.1.1 The necessity for the IGS

Forest, a renewable natural resource, can be deemed to be a so-called CPRs, and is characterised by great rivalry over the ability to utilise the resource and problems in the exclusion of other (unauthorised) users (tragedy of the commons).[406] The difficulties faced by CPR managers trying to cope with the problem of "unauthorised" users represent a particular dilemma as many of the approaches tried to date have failed,[407] and have at the same time also failed to eradicate economic inefficiencies, social conflicts, or the destruction of natural resources.[408] In this respect, new, innovative participatory FMP and conflict management approaches such as the IGS need to be developed, tested and integrated. There must be a process of learning and adaptation. Actors will need to work together to decide upon the best combination of approaches applicable. The key to achieving this goal lies with the institutional governance structure, as the entity that decides how a certain resource management plan is carried out.[409] Although there is no blueprint for the management of CPRs, the novel approach proposed here is built upon the theoretical references described in chapter 2 of this thesis based on two views of planning expanded upon earlier, the rationalist on one hand and on the other hand theories and methods derived from social movement: community-based management, "CPR management", co-management, collaborative management, adaptive learning, participatory and conflict management etc.[410] In other words, The IGS model for planning derives from new institutional economics (NIE), as a political and social method for partnerships that takes into account the dynamic of the system, or the institutional change (such as taxation, decentralisation and property rights reforms).[411] This is critical to achieving consensus between FMP actors. This new approach is designed in the framework of goals as developed by Priscoli (1997, 1998),[412] Ayres et al. (1998) and McCay & Hanna (1998) as well as the insights of Dietz et al. (2003),[413] Wenner (2000), Forêt d'Afrique (FORAFRI) (1998), Berkes & Folke (1998), Berkes et al. (1998), Kovac (2002),

[406] For further details on the tragedy of the commons refer to Dogmo 2008b; Burger et al. 1999.
[407] Adapted according to Biesbrouck & Van den Berg 2000; Ostrom 2005, 2007.
[408] See Dogmo 2008c.
[409] Adapted from Arlinghaus et al. 2007.
[410] For more referred also on Dogmo 2008c, working paper 54; chapter 2 of the thesis.
[411] See also Dogmo 2008b, Working Report 53.
[412] See also Priscoli 1997; Ayres et al. 1998.
[413] Dietz et al. 2003.

Gibson et al. (2000), Fisheries Management Science Programme (FMSP) (2008), Gordon (1954), Williamson (2000); Carter & Gronow (2005), Kesley et al. (1995).[414]

5.1.2 Overview of the IGS

The main objective of this chapter was to seek to improve conflict[415] resolution within a FMP framework. To date the importance of the social and ecological sustainability of CPRs has not been fully recognised, specifically in relation to forest concessions, FMU and forest councils. This thesis addresses this shortcoming, specifically the crisis of legitimacy of current FMP in Cameroon, and in many other tropical countries. Through the development of stronger working relationships with other actors in society, meaningful social change can be achieved through IGS in forestry. In this context, it has been assumed by the author[416] that a relationship between the forestry department, forest industries, local populations, and other actors is possible.[417] The design IGS as a collaborative planning approach constitutes an iterative learning process for all parties. This approach to active participation may complement legal requirements in Cameroon,[418] may be fair and transparent and based on participants acting in good faith, and does not guarantee, or predetermine, what the outcome will be.[419] This proposed IGS model has been designed specifically for medium-sized forest units (FMUs) which represent examples of sites on which the local people rely greatly for their likelihood, and are one of the areas in Cameroon where attempts have been made to achieve conservation through collaborative management.[420] However, it can be adapted to other ownership situations and other regions of the world, including the temperate forests. The IGS is a model linking an adapted IAD framework with active participation and conflict management. This is new to FMP, where decision-making has traditionally been left to forest owners or holders and/or forest administrative bodies and/or experts, sometimes without any negotiations with the actors, specifically the local users. Most of the time, the actors were only consulted, or informed, at the end of the planning process.[421] This fact is critical for consensus achievement. Through an analysis of interaction, a consultative and multi-actors consensus-building process involving various interest groups of FMP actors results in a clear

[414] See also Berkes 2002, 2006. These goals and conflict management review are described in Dogmo 2008c, Working paper (WP) 54, p. 33-43..
[415] Conflict typology see Gordon (1954); Marusic (1996 cited by Kovac 2002) and Dogmo 2008c, p.33-42.
[416] Dogmo 2008b,c.
[417] See also Chorfi 2004; Yunusova 2005; Dogmo 2008c.
[418] But cannot conflict with legal provisions, or property and user rights, see also the Cameroon forestry Law 1994.
[419] Joint FAO/UN Economic Commission for Europe/ILO (Wenner 2000).
[420] Adapted from Biesbrouck & Van den Berg 2000.
[421] Doucet &Vandenhaute 2006; Biesbrouck & Van den Berg 2000; Dogmo 2009.

understanding of roles, responsibilities, authority and accountability at various levels. This new model is like Shannon (1981) said: "participatory democracy", which means that any person that may be affected should be involved in each step of the process when plans are made, put into action and evaluated.[422] This may be accomplished over the course of gradual, sequential phases, in a mutually agreed and equitable manner at all levels. It can also be seen as a tool that can help to fill the "forest governance gap" between assessing and accelerating field level progress in SFM.[423]

The IGS model, displayed in Figure 5-1, p. 119 can be summarised in two parts: The first part displays the adapted institutional analysis and development (IAD) framework developed by Ostrom and her colleagues.[424] It is based on an institutional analysis focusing on the role of the rules or planning process/outcomes in influencing human behaviour in different spheres; traditional rules or customs, market systems, or social arrangements. The IAD was selected because the recent changes to the forest area in Cameroon have impacted significantly upon the set of actors and the rules governing access to land and land use. The IAD could be used to analyse the interactions between FMP actors. Furthermore, the IAD framework would constitute a way to address the limits of participation as described by the Joint FAO/UN Economic Commission for Europe/ILO[425] Committee on Forest Technology, Management and Training, which originate from within and beyond the participatory process. The second part of the Figure 5-1 displays the active participation and conflict management mechanism. It aim is to provide framework to reach a consensus between the actors through negotiation, which would be an important incentive for FMP' implementation. Previous studies on Central Africa have shown that the active participation and conflict management in FMP processes is a necessary condition for making the plan implementation possible.[426] Wenner (2000) argued that the active participation and conflict management as being socially legitimate, increased the active collaborative learning, mutual recognition and constructive co-operation between forest-related actors, and at the same time maximise the total benefits offered by forests.[427]

[422] Shannon 1981; Yunusova 2005.
[423] Bass 2002.
[424] Ostrom, 1990, 2000, 2005; see also Williamson (2000).
[425] These limits can be found in Wenner 2000, Dogmo 2008c, p. 40.
[426] FAO 1998; FAO 2002a-d; Karsenty 1999a,b; Fines et al. 2001; Carret 1998; Emerit & Lescuyer 2003; Amsallem et al. 2002; Aligica 2005a, b; Merrill 2004, 2005; ASFE 2007; Nguinguiri 1999; Oyono 2004a,b.
[427] Active participation and conflict management are in turn facilitated by a shared understanding between the actors of the interconnectedness of the social, economic and ecological systems (Hahn 2003; Nash 1950, 1951).

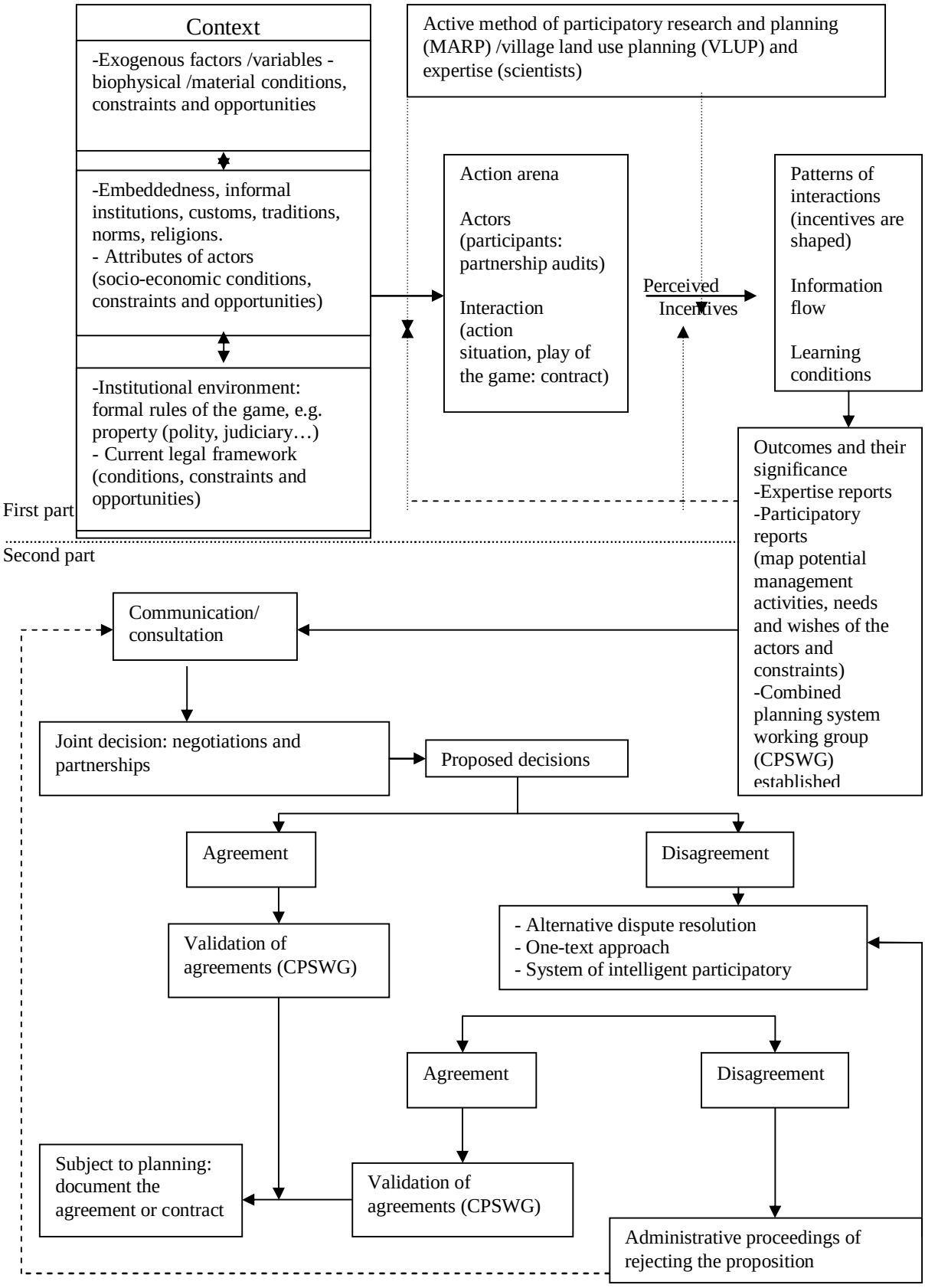


Figure 5-1 An institution governance system for forest management planning in the Congo Basin as a result of an adapted IAD framework and a democratic manner of dealing with problems

5.2 First step in the IGS design: the adapted institutional analysis and development framework

Over the last decades, the devolution of resource management and access rights from the state to local communities and user groups has become an important policy tool in developing countries.[428] An increasing awareness of environmental issues and the growing desire of all actors to be involved in the decision-making concerning the management of natural resources have brought about major changes. To address this issue, the IAD framework,[429] as illustrated Figure 5-1, p. 119 first part, is an important approach to identifying the main variables that influence actors' involvement in FMP processes. The most important aspect of the IAD framework is that it introduces an arena as well as a context within which actors or participants interact to develop, implement and monitor a FMP shaping their collective decisions and individual actions. An IAD framework focuses on identifying actors or participants of FMP, their connections and inter actions, their histories and their interests (in specific places, situations and events) and to reconstruct the structures of power and the nodes in the network. This fact assumes that, if the FMP process is carried out with the active participation of actors, this procedure is essential for the generation of legitimacy and agreeing on a contract, the second part described in Figure 5-1. In summary, the IAD approach is built upon a three elements mapping procedure in a predefined framework (see Figure 5-1, first part):

1. identifying and mapping the action arena (action situation and actors),
2. identification of factors determining the action arena (the rules, the attributes of a physical world, and the nature of the community),
3. elaboration or projection of how "1" and "2" combined generate patterns of interaction and specific outcomes over multiple action arenas.

The main objective of this IAD framework as proposal may be to identify or to study the institutional conditions conducive to effective FMP, and how these relate to its implementation taking into account the current policy reforms. This first part in the IGS

[428] Agrawal & Ribot 1999; Ribot 2002a,b; Behera & Engel 2006.

[429] The roots of and inspiration for the IAD framework developed within the new-institutionalism movement, lie in experiences gleaned from the study of common pool resources by a group of scholars associated with the Indiana University Workshop for Political Theory and Policy Analysis (by Ostrom and her colleagues since the early 1980s), and also the "the theory of the commons" (Gardner et al. 1994; Anderson 2000; Pedersen 2001; Anderson et al. 2005; Anderson & Ostrom 2006). This framework is also a result of North's urging of social scientists to move beyond static analysis, enabling us to show why some situations produce an equilibrium that leads to substantial net benefits while others produce suboptimal equilibria. There is a need to develop a cluster of tools for the analysis of dynamic systems, and it is helpful, to begin with, to attempt to understand change in one specific type of setting (Agrawal & Ribot 1999; Ostrom 2005; North 2005, see also chapter 2 of this thesis).

design is also an attempt to contribute as a social method; to anchor it in the relevant literature. However, it is necessary to examine the way it operates and the incentives for the actors involved. This must be done before efficiency, equity and accountability can be evaluated.

5.2.1 Action arena or "social action field" as a focal point

The determination of the action arena (or conceptual unit, see Figure 5-1, p. 119, first part)[430] is the first step within the IAD framework.[431] Putting emphasis on PFE, the FMP elaboration and the resulting institutional arrangements for common property management is often done by planning experts and controlled by a government-based management planning system (classical planning model). Such a system often fails to recognise traditional community resource management regimes, as well as the interests of the other actors, such as conservationists, local communities, the general public, etc. In this respect, the action arena is the focus of examination, mapping and prediction and has two components: an action situation component and an actors or participants component. In other words, an action arena is composed of an action situation involving actors who have preferences, information-processing capabilities, selection criteria, and resources and who must decide among diverse actions in light of the information they possess about how actions are linked to potential outcomes and the costs and benefits assigned to actions and outcomes.

5.2.1.1 Action situation in forest planning system

Action situation refers to the social space within which the different actors or participants interact, exchange goods and services, engage in appropriation and the provision of activities, solve problems, or fighting, or produce collective goods and services that make up the fmp. It is determined by a set of factors, the rules organising the relationships between individuals, the attributes of a physical world, and the nature of the CPSWG within which the arena is located.[432] The action situation refers to a specific type of interaction that actors engage in to arrive at such a decision. Anderson & Ostrom (2006)[433] gave one example of an action situation entailing possible conflicts that may arise between different forest user groups with unclear boundaries or property rights which has been the case in many forests concession in

[430] Or to establish boundaries of the analysis.
[431] This framework offers a mapping method not only for actors and institutional structures but also for the processes involved.
[432] Gardner et al. 1994; Andersson & Ostrom 2006; Aligica 2004, 2005.
[433] Anderson & Ostrom 2006.

Congo Basin. The behaviour of each actor group in this action situation can be explained in terms of contextual factors in the IAD framework.[434] In another example Ostrom (2005) highlighted that one can think of human interactions as situations composed of actors choosing among actions at particular stages of a decision-making process.[435] She shows also that before predicting likely actions of actors and resulting outcomes, a theorist must make assumptions about the individual participants the information they have, their preferences, and how they make decisions.[436] Within the framework of this thesis, the action situation is referring to each step of the FMP process. Each of these steps constitutes an action situation, for example, a goal setting step, a planning areas establishment, a yield estimation etc. Consequently, each actor group's incentive in implementing the planning outcome depends on each action situation outcome.

5.2.1.2 Actors or participants analysis of configurations of actors and institutions

Once the general arena is defined, it is necessary to identify the main actors or participants groups in relation to FMP. In this context, forests have to be understood as CPRs. Freeman (1983)[437] highlighted the role of actor's analysis[438] which reflects an increasing recognition of how the characteristics of actors influence decision-making processes.[439] Any social change initiative, any FMP project must be based on normative, strategic and tactical analyses to be able to include all beneficiaries[440] of the FMP outcome by an exhaustive actor's survey.[441] An actor analysis is a basic tool for highlighting the relevant institutions' roles and the inter-institutional linkages.[442] In this respect, actors in an action situation are decision-making entities or represent institutional governance for the FMP process. Within this context, the author suggests the establishment of the combined planning system working group (CPSWG)[443] as institutional governance for forest planning. In this framework, the

[434] Four key elements are mapped out: a) actor's preferences regarding certain actions and outcomes; b) the way actors acquire, process, and use information; c) the decision criteria actors use regarding a particular course of action; and the resources that an actor brings to a situation (Gardner et al. 1994; Aligica 2004, 2005).
[435] In light of their control over a choice node, the information they have, the outcomes that are likely and the benefits and costs they perceive for these outcomes. When analysed formally, these are the working parts of a game.
[436] Maximise own net benefits, or use heuristics, or engage in conditional cooperation.
[437] Adapted from Freeman 1983; see also Freeman 2004.
[438] See Dogmo 2008c for the process of actor analysis proposed by Freeman 1983.
[439] Studd 2002; Aligica 2005b.
[440] Beneficiairies are affected positively or negatively by forest management planning outcomes (Freeman 1983).
[441] See Studd 2002.
[442] Aligica 2005a; Andersson & Ostrom 2006.
[443] The CPS represents a FMP model developed by the author during his PhD and by incorporating all key actors the CPS working grouped integrates aspects of the collaborative planning framework. This concept (CPSWG) is following one of the four general options for improving the institutional framework for ecosystem management and biodiversity conservation (Hahn 2003) consisting of establishing functional linkages between key institutional actors after

CPSWG is assigned to a position of conducting the FMP process and not a forest planner alone as know in the traditional planning. It (CPSWG) is capable of selecting actions from a set of alternatives made available, at nodes in a planning process. Theoretically, in an action situation the CPSWG participants can be corporate actors or moral entities.[444] The CPSWG is a framework for actor's interactions. The aim is to enhance commitment, transparency, accountability and confidence of key actors involved to the FMP outcomes.[445] The aim is the "institutionalisation" of a CPSWG as a permanent advisory board or forum for democratic or share governance.[446] This board has to be a learning forum as defined by Cortner & Shannon (1993) tackling the challenges posed by ecosystem management through recognising resource planning as a forum for 'public' deliberation.

Adapted from Studd (2002), Berkes et al. (2003), ATIBT (2005a,b), Biesbrouck & Van den Berg (2000), there are criterion for selecting the CPSWG members to guide the FMP process. These criterions have been identified as essential conditions for successful active participation and adapted for CPSWG and presented in Dogmo (2008c, p. 46-59). This condition for success for CPSWG could improve the quality of FMP outcomes and anticipate what people's reaction will be during the implementation phase. In fact, the quality and credibility of planning decisions will be improved and the actors' confidence in the process and the ultimate decision will be increased only through comprehensive actors' involvement.[447] The CPSWG is a framework in which actors including forest planners jointly plan and carry out the FMP. However, one of the hardest parts of collaborative planning processes with the CPSWG is to get the actors to agree to participate through facilitation and mediation. The factors for getting them to actively participate in the FMP process have been described in Dogmo (2008c, p. 46-59).[448] Figure 5-2, p. 124 illustrates[449] a cluster of six broad key actor groups (as CPSWG board) in FMP who have been identified by various authors and confirmed by the author in chapter 3 of this thesis.[450] These six member groups of the CPSWG were seen as the major players in the FMP in the Congo Basin rainforest region and particularly Cameroon for each

decentralising the resource management decision-making and engaging and reorienting government institutions and establishing new national and international institutions. CPSWG builds a network of key individuals representing actors and institutions at the local level (FMU level).

[444] Adapted from Ostrom 2005.

[445] Adapted from Buttoud 1999a.

[446] Adapted from Chorfi 2004.

[447] McCay & Hanna 1998.

[448] See also Priscoli 1997, 1998; Ayres et al. 1998; Oakerson 1990; Dourojeanni & Sève 2007; Synapse consulting (SC) 2000; McCay & Hanna 1998.

[449] A full description can be found in Dogmo 2008c), see also the Appendix O.

[450] FAO 1999; Wenner 2000; FAO 2002a-d; Karsenty 1999a,b; Fines et al. 2001; Carret 1998; Emerit & Lescuyer 2003; Amsallem et al. 2002; Aligica 2005a,b; Merrill 2004, 2005; ASFE 2007; Nguinguiri 1999; Oyono 2005.

FMU and/or concession and/or forest council. The CPSWG includes conservationists or environmentalists group, the forest enterprise group (FEG), the local actor group, the forest planner group, the forest donors group and the government group. All these CPSWG members have been identified and should be the institution which has the responsibility to design and implement FMP outcomes.[451]

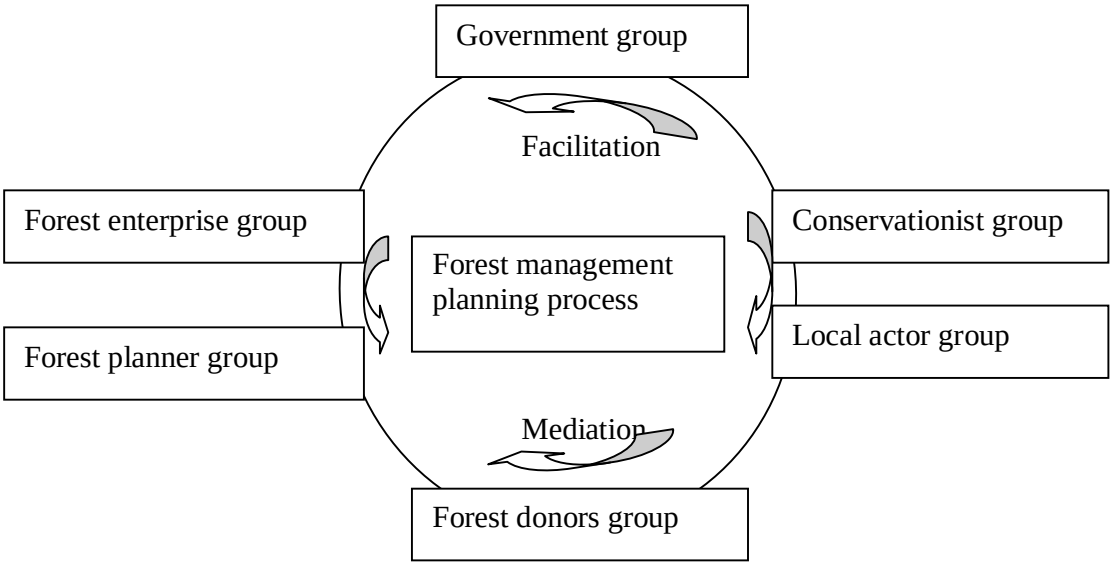


Figure 5-2 Six major actors groups within the CPSWG.

These six groups which constitute the CPSWG cannot always be clearly distinguished and are expected to interact in certain ways, as Figure 5-2 above shows. As long as the planning process is not tightened between actors groups and well structured in terms of CPSWG, any initiative, no matter how analytically and pragmatically grounded, may be likely to be dissipated, eroded and emasculated in the implementation process[452]. The CPSWG has to be institutionalised formally or informally in order to improve the legitimacy of the planning outcome. Among the arguments against a CPSWG may be the fact that it is hard enough to get the actors to work together in an equitable and transparent process. The knowledge as well as the power distribution among the CPSWG members is unequal and their interests are conflicting most of the time. Further description and the functioning principle of the CPSWG as well as the facilitation and mediation of the dialogue for conflict resolution and reaching an agreement can be found in the Dogmo (2008c,WP 54). However, the author argues that the forest planners who are members of the CPSWG should also be able to play the role of the

[451] These actors group characterisations has are based on Chorfi 2004; FAO 1998; Nasi et al. 2006; Aligica 2005a,b; Merrill 2004, 2005; ASFE 2007; Nguinguiri 1999; Oyono 2005. For characterisation of each of these actors group see Appendix O of this thesis.
[452] Aligica 2005a, b.

facilitation and/or mediation as third party (neutral entity) and not in the service of any of the CPSWG members. The author suggests the implementation of the CPSWG as institutional governance for forest planning in the Congo Basin, taking into consideration the design of the planning areas unit in the tactical planning. Each planning level should have a specific CPSWG which integrates relevant actors at each level. For example, in the case of FMUs or forest councils, the CPSWG should start as early as the tactical planning phase. Thus, each step of the planning process has to be commonly validated first of all in the smallest planning unit, then at the compartment level and afterwards at the enterprise level (corresponding to the FMU level). In this respect, the smallest planning unit, there should be broad active participation of the actors, specifically the local peoples near or inside the small planning unit. This would imply working with different communities at various moments of the planning process, mostly Bagyeli or Bakas people and Bantu farmers as said Biesbrouck & Van den Berg (2000) that the CPSWG deserves particular attention in relation to the issue of integrating local people.

5.2.2 Context analysis

This stage of the IAD procedure identifies how rules are linked to the physical and cultural environment to influence the way the elements of an action situation generate particular types of situations and processes. Thus, the institutional analysis procedure looks at these factors while simultaneously identifying "some of the typical action situations that result from particular combinations of these factors".[453] In fact, the action arena depends on political, cultural, ethical and historical frameworks. A change in any of these elements produces a different action situation and may lead to very different outcomes. Whenever one is interested in understanding processes of structural change of a particular situation itself, however, one has to open up and overtly include one or more of the underlying 'exogenous' sets of variables. Their basic characteristic is to create the system dependence of people and groups and thus they appear as subjects in the political system, as clients in the public service ruling system and as consumers in the economic system.[454] Figure 5-1, p. 119 first part, underlies three broad variables: firstly, the biophysical conditions or natural exogenous factors, secondly, the broader community of the actors themselves, and thirdly the rules-in-use or legal framework. All of these variables are composed of multiple subparts.

[453] Gardner et al. 1994; Aligica 2005a,b; Ostrom 2005.
[454] Ljubiša 1999.

5.2.2.1 Attributes of biophysical conditions

Across the globe the SFM principle requires a wide variety of planning approaches for its conception and/or implementation. Unfortunately, planning actor groups like the CPSWG that design and implement such approaches depend on the information on physical conditions available to them.[455] One of the most important aims with the biophysical condition is to provide sufficient contextual background to allow for the development of a precise and locally acceptable survey tool for acquiring information on the physical conditions for the FMP process. The attributes of the relevant physical conditions may yield different types of action situations, patterns of interaction and outcomes depending upon the configuration of the physical environment.[456] This issue is to define the nature of the good or physical condition that is involved in the action situation of an action arena. This comprises the description of the CPRs. The author proposes integrated FMP information (IFMPI)[457] which may be used to support the FMP activities. It includes the data collection and construction of the IFMPI as a strategy for gaining information about the behaviour of the players within the action arena framework. The components are linked and include: forest service report ("Vorbericht"); inventory and map work ("Inventar- und Kartenwerk"), geographic information system (GIS), and an image processing system, control of execution within the previous FMP timeframe ("Kontrolle des Vollzuges im abgelaufenen FE-Zeiraum").[458]

5.2.2.2 Socio economics attributes

The social environment is a composite of numerous interrelated factors. Although these items may be identified from checklists, interviews, etc., the inter-relationships are generally poorly understood and have largely been ignored in the planning process. In part, this problem is caused by a failure to recognise that social processes have impacts on planning.[459] Socio-economic studies are described as a key element of the FMP process. On the one hand it estimates socio-economic effects such as changes in employment, transportation or recreation,

[455] Furthermore, the art and science of ecosystem management is constantly becoming more complex as new studies continue to provide insights into the dynamic interdependencies between various combinations of species and their environment(s) that cross social, ecological, and economic dimensions.
[456] The interaction between actors are shaped or influenced by the outcomes of biophysical analysis
[457] The IFMI also has the ability to maintain current forest inventories and generate maps; specifically of spatially-oriented data (e.g. attributes of entities depicted on a map, such as group of species, villages etc., whose location can be fixed on a map).
[458] Dogmo 2008c.
[459] SCOPE 1979.

or changes in the aesthetic value of a landscape, changes in rules and social conditions etc.,[460] and on the other hand, it estimates the impacts on society of these socio-economic changes caused by the proposed management action.[461] This step requires specialised knowledge of the social sciences,[462] rural management,[463] and also knowledge of social communication in sometimes delicate contexts. [464] At the outset, however, it should be emphasised that the socio-economic environment is difficult to quantify.[465] Socio economic data collection has to be participatory and interactive based on listening, exchange, and mutual comprehension. Socio-economic data also identify the neighbouring villages and camps in the FMU or concession and characterise the demographic trends, especially through an evaluation of people's needs for agricultural land (agro forestry series). This requires knowledge of the villages' limits of their territories, at least approximately; the origin of the population and the reasons for migratory movements, and about all the rightful beneficiaries of the FMP by an exhaustive population survey. There is also the need for characterising and analysing the different uses of the natural resources in the forest concession area to assess if the human activities are ecologically sustainable and to identify the social criteria and indicators to follow the development of theses activities.[466]

5.2.2.3 Legal framework: What are the current rules?

The IAD approach has important policy implications.[467] The legal framework refers to the institutional environment that human beings create through formal rules (e.g., constitutions, laws, property rights, etc.). This refers to rules and norms that are actually used by actors participating in FMP. Special attention is given to these rules as they are usually the most obvious and likely target of policies aiming at institutional change. Rules are seen as

[460] It summarises what exists and what is needed in order to adapt each measure (health, schooling, mapping of habitats, human activities, etc.) and identify the resources people and companies will rely on;
[461] It also tries to include the theoretical aspect of what is very much understood by forestry, its role, its importance, its socio-economic value and finally, its contribution to the welfare of the people and the national economy. Indeed, forest resources apparently ignored in the ranking of the national economy could play a huge role contributing to the development of the country. Timber seems to be the only product within the forest management planning framework which is largely recognised when it comes to value the importance of the forest, with more emphasis on wood, and in most of the cases forgetting its role and other various services.
[462] Rural sociology and economics, socio-anthropology.
[463] Agronomy, agroforestry, organisation of the trade networks etc.
[464] Large scale poaching, ethnic differences etc. (ATIBT 2005a,b).
[465] Here, the recommendation is made that the assessor should at least try to derive a short list of social impact indicators, and to estimate, using whatever means are available, their relative magnitudes in terms of the major special interest groups that will be affected. Impact indicators might include, for example, employment rates, rural depopulation rates, etc. (ATIBT 2005a,b).
[466] For example: ATIBT 2005a,b; Fines et al. 2001a,b; Biesbrouck & Van den Berg 2000; Tripathl & Psychas 1992; SCOPE 1979; Zola 1999; Butry & Pattanayak 2002, 2005.
[467] Aligica 2005a,b.

'prescriptions that define what actions (or outcomes) are required, prohibited, or permitted'.[468] These are important independent variables because these rules influence the incentives that each actor faces and ultimately help determine behaviour. For example, one of the central questions is whether the current rules are likely to solve the previously identified FMP problems (conflicts between actors). In fact, the manner in which people use environmental resources depends on the property rights governing these resources.[469] In particular, property rights significantly affect the incentives individuals' face, which ultimately determine the final outcome of CPRs management; this is a social dilemma related to FMP.

5.2.2.4 Participatory rural assessment and expertises

The IAD framework, as well as the whole planning process involves participatory or collaborative techniques and awareness raising activities from social sciences. The active method of participatory research and planning (MARPP), as well as the tools of the rapid rural assessment (RRA) and participatory rural assessment (PRA) as community, are all social science methods aiming to address in the IAD framework the alarming scale of miss implementation of FMP mechanisms and is all the more urgent. The MARPP uses tools developed by the people involved, for example to analyse the pattern of interaction at the village level. The use of these tools promotes the development of the local populations' know-how and can be used effectively as instruments to obtain an understanding of local realities, to enhance the empowerment of local people and define FMP interventions.[470]

However, despite successes of this participatory method (MARPP) in community forestry, expertise is needed to identify specific tasks in FMP for medium sized planning areas or in forest concessions where a fmp is needed for economic efficiency. In fact, farmers, who lack education or formal training, can on average outperform highly educated engineers in the design and operation of FMP operations. Nonetheless the villagers also need the technician's "know how".[471] Therefore Yunusova recommended that a technical expert analysis should complement the communicative processes. In this respect Chorfi (2004) proposed the used of a village land use plan (VLUP). The objective of a VLUP may be in the IAD framework for interaction analyses in order to assist the actor involved in the development of a fmp In this

[468] Aligica 2005a; Behera & Engel 2006.
[469] Behera & Engel 2006.
[470] For further reading on MARP see Dogmo 2008,WP 54; see also Stiles 1995; Manga et al. 1999; Assolo et al. 1999; Nguinguiri 1998; Forêt d'Afrique (FORAFRI) (1998); Abega et al. 1999.
[471] Berkes 2002, 2006.

respect, the methodology proposed in this section for acquiring information in socio-economic area should be in contrast of the conventional research technique, a combination of experts, MARPP, VLUP as tools in the FMP framework, specifically the IAD framework.

5.2.3 Pattern of Interaction between actors

This dimension of the IAD framework deals with how the game is played or the "governance of contractual relations". Multiple interactions in the different action situations create patterns of interaction that, over time, result in predictable outcomes as already showed by Anderson & Ostrom (2006). By studying these patterns, one can identify institutional incentives of the different actors in a given action situation. Because of the framework's design, these incentives can be traced back to specific contextual factors that seem to generate the observed incentives.[472] So the motivational problems faced by actors that may prevent them from trying to alter the rules at the collective choice level has to be addressed through in the IAD framework as well as the search for a way to create accountability mechanisms to address motivational problems. Within the interaction patterns, actors face varying opportunities to learn from the experience of individuals, depending to a great extent on the social connectivity.[473] The IAD framework guided analysis explicitly relates the information available to different groups of actors and asks the facilitator to characterise the information flow in the action arena. Anderson & Ostrom (2006) highlighted that there are three main dimensions of information flow that seem crucial for organisational learning and good local governance are: downward flow, upward flow and horizontal flow. All these interaction patterns entail a very important assumption about how things work in reality and about the connections between actors, conditions and consequences, in other words about social causality.[474] This stage in the IAD framework consists of an analysis of relationships between actors involved in the planning process assisting in gaining an understanding of the way relationships are organised around the forest planning process.

[472] Anderson 2000; Anderson & Ostrom 2006.
[473] Cf. Ostrom 2005; Anderson & Ostrom 2006.
[474] Andersson 2000; Anderson & Ostrom 2006.

5.2.4 Outcome

Since it is the aim of the IAD process, the desirable outcome of the main action arena is defined as well as what needs to happen in each action situation in order to produce this outcome.[475] In the case of the IAD framework, the ultimate or possible outcome from the analysis should be firstly, the characterisation of a planning decision problem which may have a strong impact on actors' preferences.[476] Secondly, there will be the establishment of the CPSWG as an institution for designing and implementing the FMP outcome as well as providing the expertise and participatory reports. Thirdly, it is the description of the interaction patterns between the main actor groups in each action situation within an action arena, which is the FMP process in this case. The overall aim of the IAD framework, as the first part of the IGS model presented in this section suggests is to identify the sources of conflicts in FMP processes and their implementation. Section 5.3 of this chapter will therefore design a possible approach to active participation and conflict resolution mechanisms, which represent the second part of the IGS model (see Figure 5-1, p. 119). There may be an increase or improvement of trust between the main actor groups through the analysis of the interaction patterns on the one hand and the legitimacy of the 'social contract' or the forest management plan resulting from negotiations on the other hand.[477] The overall outcome of this paper aims to develop a partnership between the local communities, forest companies, forest departments, conservationists, planning 'experts' and forest donors for the sustainable management of forest areas on the basis of trust and mutually defined rights and responsibilities of all the parties involved.

5.3 Second part of the IGS: active participation and conflict resolution mechanisms

This section presented the second part of the IGS which is evolving as an approach or method for collaborative planning of CPRs, known here as active participation and conflict management.[478] It follows the outcomes from the IAD framework discussed in the last section. It involves the sharing of management responsibility and/or authority of a resource

[475] Gardner et al. 1994; Ostrom 2005; Andersson 2000, 2006.
[476] Likewise defined as open for the evolvement of new viewpoints and frames, see Kahneman & Tversky 1985 quoted by Hämäläinen & Slote 2003.
[477] Hämäläinen & Siitonen 2004; see also Hämäläinen & Slotte 2003.
[478] It is believed that collaborative planning will effectively address some of the problems of forest overexploitation; dissipation and redistribution of resource rents; limited community participation and conflicts among the different groups of resource users.

between actors (as users of the resource).[479] This approach is expected to lead to improve the planning processes as well as its implementation and it appropriation by the actors' groups. This approach also aims to improve the FMP outcomes in terms of economic efficiency, equity and biological sustainability.[480] The new approach here in planning therefore represents the varying degrees of involvement and interaction of actors. It can serve as a mechanism for both FMP and community and economic development by promoting participation of planning actors and the public in actively solving problems and addressing their needs. The idea promoted here is that actors should have better control of forest land uses and the process may lead to more agreement between actors.[481] To further clarify the range of tools covered by active participation and conflict management in FMP, a "typology" of this second part of the IGS approach is outlined below:[482]

1. communication and/or consultation;
2. consensus building process

The approach depicted in Figure 5-1, p. 119 second part illustrates a possible change in the relationship between forest companies and other actors, particularly local communities, moving from information campaigns to empowerment.[483]

5.3.1 Communication and consultation

Communication and consultation are considered to be the basis for active participation and conflict management for SFM (see Figure 5-1, p. 119 second part). They involve the CPSWG from the IAD framework on the one side and the public as a whole on the other side.[484] Communication and consultation gives the opportunity to build up confidence between the actors involved in the FMP process. It provides objective information, input and feedback through fact sheets, newsletter, letters, news releases, workshops, websites and surveys, open houses, public meetings, etc.[485] In this frame, FMP requires to take into account the actors

[479] Commitment to participatory approaches may demand significant changes in the way we think about both the theory and practice of sustainable forest management. Participation implies that actors will work together to set criteria for sustainable management, identify priority constraints, evaluate possible solutions, recommend technologies and policies, and monitor and evaluate impacts (Berkes 2002, 2006).
[480] Based on Abdullah et al. 1998.
[481] Buttoud 1999a.
[482] The approach is an adapted version based on the work of some other scholars: Kovac 2002; Studd 2002; Chorfi 2004; FAO 1998; ATIBT 2005a,b, 2007.
[483] Adapted from Biesbrouck & Van den Berg 2000; ATIBT 2005a.
[484] Although in this study, the CPSWG represent the public.
[485] Pricoli 1997.

perceptions, attitudes, behaviours and tactics, analyse in the IAD framework.[486] Whenever actors or CPSWG members work together in designing the forest management plan, they have to communicate at two levels at least:

1. Content: CPSWG members communicate about the subject matter, the facts of the case, the information;[487]
2. Relationship: actors also communicate how much they accept each other, care about each other's needs and problems, and how concerned they are about preserving the relationship. Actors' participation involves disseminating information to the actors, and getting their ideas, issues, and concerns.

Priscoli (1997) highlighted that many conflicts are communication and consultation problems and it may be therefore necessary to employ several different communication strategies to approach these sequentially. In this context, the starting point of any dialogue intervention should not be one given method, but depend on the needs and challenges involved. This dialogue allows actors to see systemic complexity as well as how attitudes and positions can affect the whole group.[488] The emphasis is on establishing relationships between members within the CPSWG framework which can help lessen many of the problems related to conflict escalation, and can be a forerunner to official negotiations and conflict resolution. By establishing the members' relationships in the CPSWG, stereotypes are broken down, and people come to see the "enemy" as a real, living, breathing, feeling, caring person, not just an abstract, hostile, evil enemy.[489] Once this change of attitude takes place, mutual understanding and trust can slowly be developed between adversaries. Although the parties may still have divergent interests or unmet needs, they can reach a point of mutual understanding, making it clear that problems must be solved by cooperating, not competing or trying to destroy the other. This communication and consultation action is 'oriented to achieving, sustaining and reviewing consensus and indeed a consensus that rests on the inter-subjective recognition of criticisable validity claims'.[490]

The rules of communication and consultation, the skills and the virtues practiced provide aid to participants in overcoming personal, systemic and cultural hindrances to meaningful communication and avoiding undesired but frequent outcomes of joint investigation such as

[486] ITTO 1992; Marjuni 1992; Marjuni 1990.
[487] Public information or education, actors are informed about decisions already made, one way communication (open house, public meetings, public hearings).
[488] Hämäläinen & Siitonen 2004.
[489] Adapted from Priscoli 1997.
[490] Habermas 1981.

groupthink, as well as defensive and limiting interpersonal reasoning.[491] The methods for communication used should be transparent and participative, enabling rather than controlling. It is important to emphasise the high cultural value of communication, specifically in the case of the Congo Basin region as stated by the OTPIC (2007): "effective communication with people of different cultures is especially challenging. Cultures provide people with ways of thinking-ways of seeing, hearing, and interpreting the world. Thus the same words can mean different things to people from different cultures, even when they talk the 'same' language. When the languages are different, translation has to be used to communicate, the potential for misunderstandings increases". [492] Additionally, Priscoli (1997) highlighted the role of the facilitation or "procedural assistance" in the process of communication and consultation in natural resource management. For example he showed that the facilitator's role is to remove process issues, such as how meetings are run, as a source of dispute by delegating those to a third party impartial to the substantive outcome and acting on behalf of all participants.[493] The overall outcomes of the consultation and communication in this framework should be a trusting relationship and information exchange between actors forming the basis for the consensus building process.

5.3.2 Consensus building process

The consensus building is increasingly carried out through deliberative procedures instead of more traditional remote processes of surveys and sending out written consultation documents. It[494] is an approach which incorporates a range of participatory techniques to help participants identify common grounds and mutually beneficial solutions. While consensus building is probably most often used in environmental disputes, it is applicable to many other kinds of public policy disputes at community, state, and international levels.[495] It represents a general or widespread agreement and usually leads to an outcome that 'every actor involved can live

[491] Hämäläinen & Siitonen 2004.
[492] For further reading on ways in which culture interferes on communication and consultation see Dogmo 2008c; see also Ting-Toomey 1985; Yunusova 2005; OTPIC 2007.
[493] A facilitator does not have the authority to make substantive decisions for the group, but will make some decisions about how the meeting is run, and will consult with the group about major decisions in relation to the procedure, e.g. a significant change in agenda or meeting procedures. In those cases the facilitator consults with the group and it is his or her job to identify why a decision is needed, identify options for participants to consider, and, if appropriate, make a recommendation. But the ultimate decision-making authority lies with the participants. It is just more efficient to leave all but the major procedural decisions in the hands of the facilitator. In this paper facilitation is understood to be an information exchange generating options for problem-solving with the assistance of a third party skilled in meeting leadership in low to medium level conflict situations (a further discussion on characteristics of facilitations is to be read in Dogmo 2008c, WP 54).
[494] Also known as "a collaborative problem solving or actors dialogue to making a decision in which the interested parties identify common ground and work voluntarily towards finding a mutually acceptable solution to a contentious problem" (Studd 2002).
[495] Studd 2002.

with', as well as unequivocal agreement as a win-win solution.[496] This is a set of processes in which rules are negotiated by which planning decisions are made. The processes adopt a flat or non-hierarchical planning decision structure, involving all actors in defining the problem, devising the methods and creating the solutions.[497]

In regulated rule-making, representatives of actors' groups, such as CPSWG members have to work within the legal and policy framework, come together to negotiate and reach agreement on the rules within which a regulation is devised. The emphasis is on basing dialogue on the needs of different interests rather than the positions they adopt, and working towards a win-win solution or the 'mutual gains method' so that co-operation among actors is the only way to reach a compromise, and not only gains (or benefits) are additive. The best solution for the CPSWG will be when the sum of the individual gains is the most important. Sometimes the "4R" method is also used defining each actor's "4R"[498] in the decision-making process.[499] In this case, Buttoud (1999b) argued that the mediator's first task is to evaluate the level of coherence between the "4R", and deal with all the points showing incoherence.[500] Goals of the consensus building process are to reach consensus (consensual) widely supported and well reasoned for, or specify a task which could then support further decision-making (instrumental).[501]

Consensus building is usually carried out by a mediator or a facilitator (see Figure 5-2, p.124) who takes a more active role in brokering negotiations between parties, through a process of joint and independent meetings of the CPSWG. As mentioned above in the case of the CPS the mediator or the facilitator may be a forest planner or an independent party within the FMP frame. Often a team of intermediaries is involved. A consensus building effort moves through a series of steps which will be discussed in the following. These include adapted from Studd (2002) and Fisher & Ury (1981):

1. Negotiations: identification and evaluation of alternative solutions;
2. decision-making or agreement or contract (finalisation and approval of the settlement or the result is subject to planning (Figure 5-1, p.119 second part);
3. democratic dealing with problems.

[496] Studd 2002.
[497] Adapted from Studd 2002.
[498] Rights, responsibilities, revenues and relations.
[499] Cf. Buttoud 1999a.
[500] Buttoud 1999b.
[501] Yunusova 2005.

5.3.2.1 Negotiation

Negotiation is the first step of the consensus building process. The process begins with a pre-negotiation which refers to the discussions that precede formal negotiations. The topics usually include procedural questions: where and when the negotiations will take place, how they will be structured, and what the agenda will be, and so on. Often these decisions are made before the parties actually sit down together. It includes also the result of the analysis of the situation or problem, the parties' interests and perceptions, and of the existing options performed in the IAD framework.[502] Priscoli (1997) highlighted that facilitators or mediators will discuss the questions with each side individually, will make a proposal, and then will use shuttle diplomacy to reach agreements on process and structure before the parties sit down together (see Figure 5-3, p. 137) for the real negotiation on planning decision. The next stage in negotiation is the formal negotiation which consists to plan ways of responding to the situation or problems. In fact, at the outset the mediator tries to synthesize the results from the previous stages specifically by defining, and often re-defining or 'reframing' the conflict. Facilitators or mediators usually try to get the disputants to reframe the issues in terms of interests, which are usually negotiable, rather than positions, values, or needs, which usually are not. He (Priscoli (1997)) argued that the mediator also usually proposes a process and an agenda, but gets the participants involved in a cooperating enterprise right away as they negotiate the details of the process and agenda. Thus, this gives the participants a sense of control of the process.

After the parties generate a list of alternatives, these alternatives are carefully examined to determine the costs and benefits of each (from each party's point of view), and the barriers to implementation. Eventually, the choice is narrowed down to one approach which is fine-tuned, often through a single negotiating text, until all the parties at the table agree. Thus consensus building differs from majority rule decision-making in that everyone involved must agree with the final decision- there is no vote. The negotiators then take the agreement back to their constituencies for approval. This is one of the most difficult steps, as the constituencies have not been involved in the ongoing process, and often have not developed the level of understanding or trust necessary to understand why this is the best possible agreement they can get. Negotiators need to be able to explain exactly why the settlement was drafted as it was, and why it is to the constituencies' benefit to agree to it. The negotiation step is also illustrated in Figure 5-1, p. 119 within the IGS framework.

[502] Cf. Priscoli 1997,1998; Dogmo 2008c, WP 54.

5.3.2.2 Agreement or Contract

This stage is one of the most important. The CPSWG members discuss the problem trying to find a solution on which they can agree. If all the CPSWG members sign the agreement, the last stage is to submit the fmp for implementation. This stage is difficult, too, as unforeseen problems inevitably develop.[503] But successful consensus building processes are usually able to surmount such problems because the process improves the opponents' relationship so much that they are able to work together effectively in the future to overcome implementation problems. In this respect, Fisher & Ury (1981) named four principles for effectively reaching agreement.[504] They also describe three common obstacles to reaching an agreement and discuss ways to overcome these. Fisher & Ury (1981) explained that a good agreement is wise and efficient and improves the parties' relationship. Wise agreements satisfy the parties' interests and are fair and lasting.[505]
Priscoli (1997) also highlighted the way to achieve sustainable and durable agreements and settlements (see Figure 5-3 adopted from Priscoli 1997). These are:

1. substantive interests: content needs, money, time, goods, or resources;
2. procedural interests: the need for specific types of behaviour or the "way that something is done."
3. relationship or psychological interests: needs referring to how one feels, how one is treated, or conditions for ongoing relationships. These interests can be seen in Figure 5-3, p. 137 often called the "satisfaction triangle."

The above interests are represented by the three sides of the triangle. Ideally, any public involvement and conflict management process would be designed to seek point A. This point represents optimal satisfaction with the procedural, psychological, and substantive interests of each of the parties. Frequently, technical professionals, in designing conflict management and

[503] Adapted from Fisher & Ury (1981); Studd (2002).
[504] Principled negotiation provides a better way of reaching good agreements. Fisher & Ury's (1981) four principles are: a)separate the people from the problem; b)focus on interests rather than positions; c)generate a variety of options before settling on an agreement; and d)insist that the agreement will be based on objective criteria. These principles should be observed at each stage of the negotiation process. Priscoli (1997) also showed that there are certain general principles that underlie the use of conflict management and dispute management tools. These include the following elements: firstly, define the problem, rather than propose solutions or take positions; secondly, view the situation as an opportunity for collaboration, not competition; thirdly, negotiate over interests, not positions; finally, employ effective communication skills.
[505] For further reading refers to Fisher & Ury (1981); Dogmo 2008c, WP 54.

public involvement processes, implicitly or subconsciously behave as if they are reaching for point B (see Figure 5-3 below adopted from Priscoli 1997).

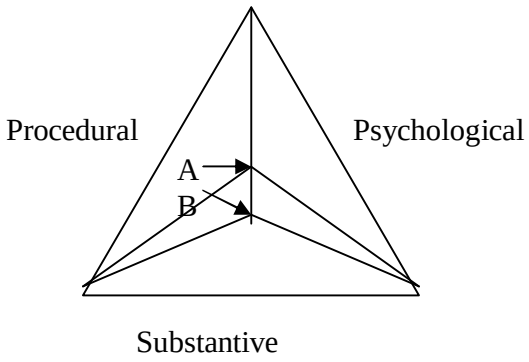


Figure 5-3 Achieving agreements: the satisfaction triangle[506]

After an agreement has been reached, it is necessary to document the agreement as FMP outcome to reduce the risk of subsequent misunderstanding. Verbal agreements run the risk of misinterpretation and there can be honest differences in how an agreement is remembered.[507]

5.3.2.3 Democratic dealing with problems or disagreements

If any one of the groups represented in the consensus building process disagrees at the final stage of the planning decision making processes, they are likely to refuse to sign the agreement and the agreement may well fall apart and the next step of democratically dealing with a problem has to be activated. Fisher & Ury (1981)[508] showed that when the other party remains stuck in positional bargaining there are three elements to be considered:

1. Assisted dispute resolution (third party or arbitration)

According to Priscoli (1997)[509] ADR is an alternative to adversarial processes such as litigation or administrative processes that result in "win–lose" outcomes. It is based in mutual gains between parties or "win-win" model. It is an effort to arrive at mutually acceptable decisions. He showed that the ADR techniques need third-party assistance (see Figure 5-4, p. 138).[510] The major third-party assistance techniques are described below, beginning with

[506] Adopted from Pricoli (1997).
[507] Priscoli 1997.
[508] Fisher & Ury 1981.
[509] See also Priscoli 1998; Ayres et al. 1998.
[510] The major third-party assistance techniques are described by Priscoli 1997; see also Dogmo 2008c, WP 54 for further discussion on ADR.

those that concentrate on the process, then moving to those with increasing involvement of the third party in the substance of the decision.

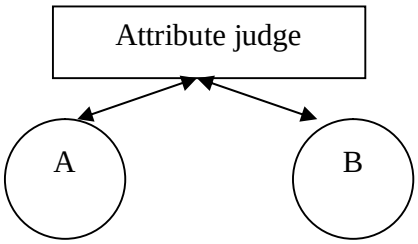


Figure 5-4 Third party decision-maker (A&B are actors in dispute), this outlook is understandable, but not very reasonable and it is useful, if a technique like mediation is unsuccessful.

2. One-text approach

In this approach as described by Priscoli (1997, 1998) a third party should interview each side separately to determine what their underlying interests are. The third party then assembles a list of interests and asks each side for their comments and criticisms of the list. He argued that the third party then takes those comments and draws up a proposal. The proposal is given to the parties for comments, redrafted, and returned again for more comments. This process continues until the third party feels that no further improvements can be made. At that point, the parties must decide whether to accept the refined proposal or to abandon negotiations.

3. System intelligent participation process (SIPP)

It is a new system proposed in Hämäläinen & Siitonen (2004) which may also be adapted for forest planning, which shifts the focus from conflicts into defining a common goal and innovative ways to reach it. The process aims to create self encouraged co-operation and trust among the participants by recognising and avoiding the systemic responses originating from reactive and conflict driven thinking and interactions. It is an essential tool to steer the process away from conflicts towards a positive and collaborative generation of creative solutions to a problem[511]. The idea is to create a shared vision of the desired future to embed different values and interests in the alternative strategies to reach it. The system's intelligent FMP process is seen as a step towards a culture of innovative collaboration, which can produce

[511] Watkins & Mohr (2001 cited by Hämäläinen & Siitonen 2004).

sustainable decisions.[512] The starting point of SIPP is the acknowledgement of the fact that every decision-making process is systemic which is related to systems thinking, which emphasises seeing and understanding a system as a whole with al its interactions and feedbacks.[513] By means of various one-text approached and SIPP techniques for dispute resolution, there are two possible ways which must be considered: a) the process may result in an agreement and the proposed decision will be integrated into planning, and b) the process failed to produce an agreement administrative proceeding or lawsuits may be recommended.

4. constructive confrontation

This method consists of listing and treating all the various disputable issues expressed by the participants to the process separately as described Buttoud 1999a,b. He showed that the hypothesis is that for determining the solutions the divergences are more important in negotiation then common positions. The discussions are based on the analysis and positions expressed by the participants on the concrete present situation. The actors first present their views, then discuss them in common meetings with the others participants, and finally negotiate a compromise on each of them. Every item expressed by participants is classified into a typology distinguishing the positions which are commonly considered as always compatible, from those which are supposed to be compatible under certain conditions and the incompatible ones. This method has been proved to have some advantages compared to the other methods.[514]

[512] Hämäläinen & Siitonen 2004.
[513] Hämäläinen & Saarinen (2004); Saarinen 2004.
[514] For further reading see Dogmo 2008c.

5.4 Conclusion

This Chapter 5 has presented a novel approach called IGS to enhance legitimacy and the confidence of FMP actors, as well as the generality and the modularity of planning systems. The IGS consists of two parts. The first part is the IAD framework, mostly focusing on the actor analysis and interaction as well as the structuring of incentives. The second part emphasises the active participation and conflict management mechanisms as collaborative planning processes. The IGS approach to planning allows actor groups to come together in a CPSWG to jointly and simultaneously develop each step of a fmp. The CPSWG is in this thesis proposed as shared-governance which is based upon an atmosphere of collegiality and mutual respect and is guided by the principles of disclosure, responsiveness, and accountability. Such a system is typically “time” consuming and outcomes are unpredictable, i.e. there are no guarantees for a “successful” outcome or any outcome at all. However, it reduces conflict, increases mutual learning and the actors’ trust in the outcome and creates incentives for the implementation. Additionally, it complements the intuitive planning skills of planning experts (top-down effect) with the book-keeping capabilities of automated planning systems. These systems differ in terms of who has authority which, in this case, is the CPSWG and not the forest planner alone. The approach presented emphasised a holistic or illusionist (as opposed to exclusionist which focuses on economics only) approach to FMP. The IGS is an interdisciplinary approach. This IGS also address an institutional improvement of the fmp design, specifically, the establishment of the CPSWG, the IAD etc. The IGS provides a proposal for securing this collection action between actor on FMU level or forest council level.

6 Tactical planning subsystem (TPS)

6.1 Overview of the TPS

The current international "debate" on SFM (not the traditional sustainable yield)[515] aims at finding a scientific and technical way for good forest management practices that contribute to poverty alleviation, ensure the conservation of tropical rainforests[516] whilst sustainably extracting its timber resources and NTFPs.[517] In the same view, FAO (1998) reported that SFM should ensure that the values derived from the forest meet present social, economic, ecological, cultural and spiritual human needs while, at the same time, ensuring their continued availability and contribution to long-term development needs.[518] One of the results of this "debate" is a growing awareness on the role of FMP, contributing to reconcile the needs and wishes of the multiple users with the preservation of the forest's numerous products and services. In this respect, the tactical or medium term[519] planning process proposed by the CPS framework for carrying out forestry activities may be an important tool to address this issue (SFM).[520] The tactical planning system represents the third subsystem (S3) and may also be used to contribute to forest certification.

Addressing the TPS within the context of sustainability requires as framework which is provided by the VSS and IGS described in the previous chapters 4 and 5. Accordingly the TPS can be understood not only as a connecting element between the past, present and future of forestry, but also as the implementing framework for VSS and IGS developed in detail in Dogmo (2008a,b,c) The TPS translates the VSS as well as the IGS into a thoughtfully prepared and well co-ordinated tactical planning for the rainforests as CPRs and for regulating

[515] Multiple functions: due attention given to the productive, protective, social and environmental aspects in an integrated manner, whilst the unique function FMP is oriented towards timber harvesting.
[516] Appropriate measures should be taken to protect forests against loss of biodiversity, carbon sink and harmful effects of pollution, including air-borne pollution, fires, pests and diseases in order to maintain their full multiple values (Earth summit 2002; Burger & Mayer 2003; FAO 1998; UNCED 1992a-d; Marjuni 1992).
[517] ATIBT 2005a,b; Fargeot et al. 2004; Cerutti et al. 2006.
[518] These needs are for forest products and services, such as wood and NTFPs like water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products.
[519] See for more about medium term planning which is a 10 year period in the Central European region (Bachmann 1992; Speidel 1972; Baader 1942,1945). However, in Cameroon, the medium term planning horizon corresponds to one cutting cycle which some authors assume to be sufficient for determining sustainability. This time is estimated to be 30 years (Fines et al. 2001a; ATIBT 2001,2007; Durrieu de Madron et al. 1997; see also the Appendix O).
[520] This principle was highlighted at the World Summit after the summit of Rio (1992), where the emphasis was on social (improving the well-being of local populations) and economic development in the concerned forest country, as well as ensuring the conservation of the forests and their biodiversity (UNCED 1992a-e; Earth Summit 2002).

forestry activities within a set time period. It refers to medium term CPRs planning through the application of prescriptions that specify the goals and a schedule of activities for the forest resources management (action and control arrangements).[521] For example, in the IGS framework, there was a proposal for the establishment of the CPSWG as an "institution" for a consensus building process through the integration of all actors within the FMP process. This may find implementation in the TPS process as tactical dialogue (see section 6.5) and may target multiple objectives and functions.

The TPS is designed to be used in the conception and elaboration of the FMP outcome for the PFE and is to be implemented in daily forestry practice. It is an iterative learning process (in which each step feeds into the next or each step of the planning process is used as an input for the subsequent steps) for all parties or actors involved. The TPS should be an indispensable part of a FMP process and should regulate forest functions (provide forestry guidance),[522] social, economic and ecologic yield determinations, production, harvesting,[523] silviculture, monitoring and other forest tactics and operations. It should also provide a framework for a consensus building process between CPSWG members.[524] The content of the TPS process, however, may be conveniently divided into three major items or steps (see Figure 6-1, p. 144): the first one is the pre-planning which provides basic forestry guidelines useful for the selection of alternatives in the next step. The pre-planning step includes five elements followed by the first tactical dialogue for consensus building as an interactive approach: acquiring information, goal setting, selection of species, mapping and remote sensing, establishment of planning areas, as well as verbal and numeric ecosystem unit description.[525] It (pre-planning) should contribute to the accurate transmission of information as input in the overall planning, avoid the pedantry of erudition, serve as a record for later reference, and provide fora for keeping CPS WG members informed. The second step in the TPS framework is the overall planning. It is the overall decision making at the FMU or forest council level of the PFE specifically concerning the decision on the management procedures and yields including production, conservation, social or community aspects testing the efficiency of the allowable cut (AC). This step is also negotiated within the CPSWG framework in the second

[521] Adapted from FAO (1998); ATIBT 2007; Bartoo et al. 1961; FAO 2002a-d.
[522] Dividing the forest resources into sections allows the CPSWG to treat them separately, for example, divisions in the woods may be the separation of large or mature timber areas from areas having only pole size timber or an old field just restocking with pine or hardwood sapling or poles. It may be also the separation of forest with high conservation value and forests with high social value etc.
[523] specify where and under what conditions and constraints the yield may be harvested.
[524] See IGS model in section 4.2; Dogmo 2008c, Working paper 54.
[525] Adapted from Bartoo et al. 1961.

tactical dialogue. The last step is based on the selection of alternatives performed in the planning step. This provides a basis for ecosystem unit detail planning (verbal and numeric), monitoring and controlling the performance of forest activities and safeguarding continuity in managerial operations over time. Furthermore it formalises planning arrangements for tactical implementation of the TPS outcome: operational planning at ecosystem unit level, species groups and BHD-structure level. These three steps correspond respectively to the three tactical dialogues proposed as learning mechanisms between CPSWG members.

The present chapter explains the instruments and tools that may be used to support FMP processes within the framework of FMUs or forest councils of PFE. It proposes a model for tactical FMP and discusses its potential approaches to collaborative planning that may take advantage of the classical FMP methods. It integrates technical, socio-economic and political views. Figure 6-1, p. 144 displays below the TPS tools which will be discussed in this chapter. Each group of elements or tools of the TPS represents a section. The TPS design involves on the one hand: acquiring information, setting of management objectives, planning area establishment, species selection, and ecosystem unit and forest description. On the other hand it shows the overall planning, as well as the ecosystem unit detail planning, monitoring and controlling and the tactical dialogue as a CPSWG.

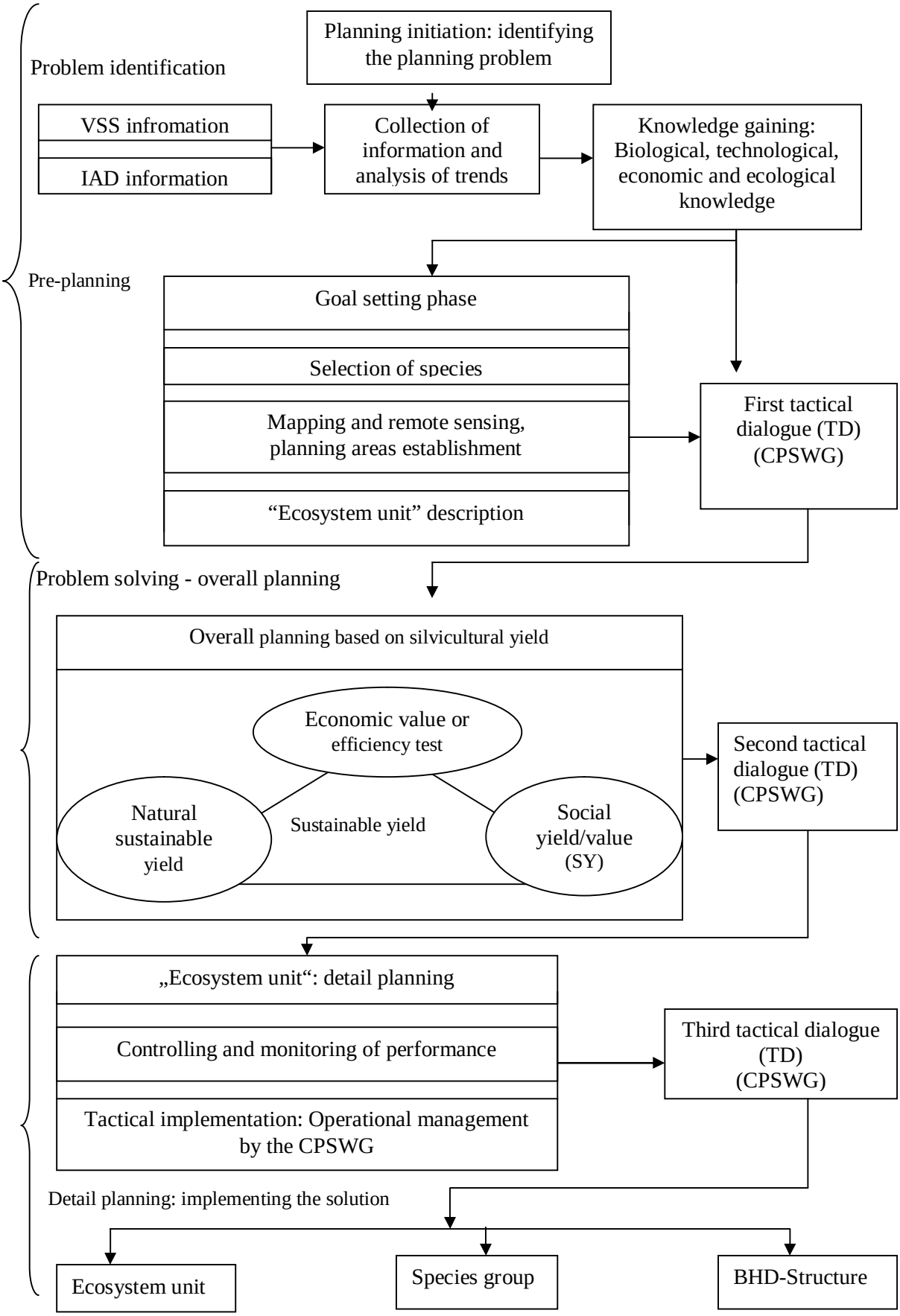


Figure 6-1 Tactical planning subsystem (TPS)-Process model cycle

6.2 Pre-planning within the tactical planning system

6.2.1 Collection of information

Collecting information is a core element of pre-planning and serves as the basis for the TPS. This step includes all pertinent information regarding the past, present and future condition of the forest resources, as well as all supplementary information which may assist in formulating the plans for the management.[526] The range of information covers scientific, technical, economic, social and political knowledge related to the specific planning problem (representing the phase of problem identification). This is necessary in order to seize the present situation of goods and services in such a way that causes for planning problems and possible future developments (diagnosis and prognosis) can be identified.[527] In addition, the present condition of the forest enterprise and its "environment".[528] To be time and cost efficient the purpose for which the information is needed must be clearly defined before collecting information.[529]

In this respect, forestry planners must have knowledge of how to proceed to gain the knowledge needed[530] including organisational, as well as computational skills to be able to apply and analyse remote sensing, global positioning system (GPS), GIS, MARPP etc. This is important because empirical investigations in industry showed that the effectiveness of management plans is positively influenced by the extent and the quality of the information gathered.[531] This justifies why, in the last decades, there have been increasing efforts to improve the integration of information theory into the FMP design.[532] Within the TPS framework, the information gathered should be greatly condensed from the IAD and VSS outcomes,[533] general pre-inventory and cartography, photo-interpretation and stratification of the massif are considered to be vital. [534] In this frame, the preparatory work of the TPS process should consist of all the previously described information sources and must be

[526] Adopted from Bradley 1967; Bartoo et al. 1961. Bachmann 1994; FAO 1998,2002a-d.
[527] Cf. Bachmann 1992; Kurth 1994.
[528] Bradley 1967; Bartoo et al. 1961. Bachmann 1992.
[529] Cf. ATIBT 2007.
[530] Adapted from Baader 1942,1945.
[531] Kurth 1994;Bachmann 1992; ATIBT 2007.
[532] information theory in the original sense includes all methods for the procurement, storage and processing about data, perceptions, experiences and reports (Bachmann 1992; Kurth 1994; Kovac 2002; Bos 1994).
[533] See chapter 4 and 5; Dogmo 2008a,b,c, working paper 52, 53,54.
[534] for more details refer to Bachmann 1992; Fines et al. 2001a; Chorfi 2007; Speidel 1972, Bartoo et al. 1961; Kovac 2002; Bradley et al. 1967. A list of information sources is also provided in Tab. 8.1 in Annex 1 about Acquiring information process for tactical planning

processed or organised to form a basis for the plan. The information must be validated within the first tactical dialogue. In the following the two information sources (the VSS and IAD) of the TPS will be described.

6.2.1.1 Value and strategic subsystem information (VSS)

VSS as a non price value has to be integrated in form of a higher level goal (guiding non price prescription) into the TPS. It consists of the synthesis all information or data on normative planning (vision, mission, guiding image, principle of behaviour), strategic intention and strategic data (forestry analysis, strategic formulation and strategic implementation) which are useful as guidelines and a framework for the tactical planning design (TPS) (see section 4.1).

6.2.1.2 Institutional Analysis and Development framework (IAD) information

The IAD appear in TPS as source of information useful for it designs. It has been described in detail in Dogmo (2008c, WP 54) and in the chapter 5 of this thesis. Of significant interest, there are three fundamentals information' sources for the TPS designed from the IAD framework. The first one is the context analysis outcome which included the identification of factors determining the action arena (the legal framework, the attributes of a biophysical world,[535] and the attribute of the community).[536] The result of this context analysis from the IAD framework will be used to draw attention to the characteristics, living conditions and activities of local populations, the sources of any possible conflicts and obstacles, and the features of the relevant use rights within the FMP framework.[537] The second one is the outcomes information from the IAD framework as input information in the TPS, including the establishment of the CPSWG, the pattern of interaction or incentive analysis between participants. The last one is forest service report or in German "Vorbericht" (preliminary

[535] The results from the analysis of the natural exogenous factors /Variables described during the IAD. It consisted on the one hand on forest service report or in German "Vorbericht" (preliminary report: past experience and proposal) an on the other hand on the biotic and abiotics factors, like lie of the land (relief and hydrography), climate, nature of the ground (geology and pedology), landform, floristic aspects, faunistics aspect. It included also possible impacts of forest management on the natural environment, biodiversity and biological risk; conditions of the environment (perception, systematic observation).

[536] It consisted on description of the surrounding villages; infrastructure: Roads, electrification, telecommunications, water supply, recreation, health, education, shops and markets; human pressure on forest: pressure on Forest Management Unit; Estimate of degradation in the FMU through "abbatages", clearings, Pasture, fire, pollution, description of the population; population activities: shifting cultivation, agricultural plantations; Animal husbandry; Sacred places; Industrial activities: timber production; forest exploitation, non-timber forest products exploitation: hunting, fishing, gathering; research, etc.). It consisted also forest management social constraints, work times or time study results, material consumption, costs, socio-economic situation etc

[537] Adapted from ATIBT 2007, Dogmo 2008b,c, working report 53-54.

report: past experience, proposals) and the result of the national inventory data or static inventory.

The outcome of this acquiring information process is the gain of knowledge which is of significant importance for the following step of the TPS process. That knowledge are biological, technological, economical, social and ecological one derived essentially from IAD and VSS of the CPS (see Figure 6-1, p. 144).

6.2.2 Setting of management objectives

Forests provide a wide range of benefits at local and national level.[538] Establishing the specific objectives of the TPS should always be stated early in the planning process once the information gathering step is completed. Within this framework, these are formulated as tactical medium-term goals[539] which are controlled by VSS outcomes (overall policy framework) and should reflect the CPSWG members' interests.[540] These management objectives should be set rationally and allow the CPSWG to respond flexibly to present and future variations in physical, biological and socio- economic circumstances, keeping in mind the overall objectives of sustainability. FMP therefore has to balance flexibility and continuity.[541] In this context, main objectives should not be changed until a new situation is judged to be stable but once a new situation has been recognised, the revised objectives should be stated clearly and unequivocally. Additionally, according to ATIBT (2007), one of the purposes of forest management is to ensure sustainability of the forest and all its different functions equally.[542] This step of the TPS aims at deriving the tactical planning goals from the stakeholders' objectives in relation to the forest goods and services they wish to obtain.[543] In this respect, Bachmann (1992) and Speidel (1972) pointed out that goals can either be independent, complementary, or conflicting. These different relation types are to be determined. Conflicts over goals must be settled. Furthermore, the goal establishing process

[538] FAO 1998.
[539] In German „mittelfristige Ziele" (Bachmann 1992; Speidel 1972)
[540] Adapted from Kovac 2002; Bachmann 1992.
[541] Bradley et al. 1967.
[542] This fact is against the FAO 1998 and ATIBT 2007 statement that log production is usually the main objective
[543] See the stakeholder analysis proposed in the IAD framework and the forestry and environmental analysis in the VSS.

needs a sound procedure which consists of addressing uncertainty,[544] risks[545] and constraints[546], as well as clear requirements for the goal setting process.[547] These factors within the goal setting phase are recommended by various authors[548] as it minimises risks and manages mistakes.[549] Furthermore, a list of goals provided in the following subsection is derived from earlier considerations with respect to requirements of the national and international legislation and realistic proposals.[550] It includes all goals which develop and enhance the value of the forests. In this respect, the multiple-use forestry of Cameroon characterised the frame within which the list has been designed as a way to combine environmental protection (maintenance of forest cover and biological diversity) with both economic efficiency (industrial timber harvesting) and social justice (forest utilisation by local people). In contrast to traditional forestry (timber production), this type of forestry offers a wide range of possible objectives (such as biodiversity conservation, fauna management,

[544] As depicted, uncertainty is an extremely influential factor and affects the TPS design process and the other planning system (VSS and IGS). Irrespective of a horizon, any concrete, temporally and spatially defined goal turns into an abstract goal after some time. Additionally, trees and forests change slowly. Forestry therefore is a long term activity. Decisions made today will influence the forest for decades ahead and it is "unwise" to respond to what may be a temporary change in circumstances without considering what the long term effect of the response may be. Objectives can change over time. The longer the time period, the more likely it is that objectives will change (see the stakeholder analysis proposed in the IAD framework and the forestry and environmental analysis in the VSS).[544] Taking into account the uncertainty, goals should be understood as dynamic elements that must be examined and refined constantly (adapted from Bachmann 1992; Speidel 1972).

[545] Evaluating the impact of achieving a set goal (forest function) is a necessary task within the TPS goal establishing step. To obtain information about the suitability of desired goals in the environment, potential risks should be explored in a broader spatial context. A simple, although rather basic procedure for the evaluation, is shown by Daenzer & Huber (1997) and Bachmann (1992). The procedure adopts different variables to assess the environmental impacts.

[546] It is vital that the goal setting step of the TPS takes into account all the constraints (restrictions, prohibitions, plus any geographic, socio-economic and legal constraints, etc.) that may affect the forest area. These constraints also include financial factors, in which case the ability to purchase anything, whether materials, land or labour, will be effectively limited, or it may be confined to a single factor of production, such as the size of the land, number of skilled supervisors, number of manual workers or machines, amount of fertiliser or fuel. Two most common constraints in forestry are limited funds and land (Bachmann 1992).

[547] Based on these factors (uncertainty, risk and constraints), there is a need to fulfil some requirements in order to avoid likely disputes (a desired goal usually affects present and future generations) and to control the effectiveness of planning and the goals. Consequently, according to Bradeley et al. (1967); Bos (1994); Kovac (2002); Bachmann (1992), the goal setting process should be: a) specific, clear and understandable in relation to the subject matter; b) measurable/verifiable, whereby the measurability can refer to values or quantities; c) attainable or realistic; an attainable goal is a goal for which you see a realistic path to achievement, and reasonable odds that you get there; d) time efficient: goals should be tangible and have a schedule for completion; e) rewarding; a goal is rewarding when you have clear reasons why you want to reach that goal; f) an energizer. In addition to the general requirements explained above, the goal establishing process requires careful considerations with regard to the following questions: Which tasks and actions are imposed by forest and environmental legislation? Which task and actions are imposed by international commitments? Which environmental issues are to be addressed at large-sales? How particular can goals at large-scales be?

[548] E.g. Kocac 2002; Bos 1994; Bachmann 1992; Daenzer & Huber 1997.

[549] E.g tracing a hiking path in a hardly accessible area, increasing mean growing stock volume in sites with low productivity.

[550] See Kovac 2002; Fines et al. 2001a,b; Bartoo et al. 1960; BFT 2004, Nasi et al. 2006; Atyi 2000.

research, the collection of forest produce by local people…).[551] Thus, from this list, goals can be grouped into three types, namely, environmental, social and production oriented. This corresponds to the three components of sustainability. Such a grouping fully matches the management over all forestlands. Sometimes the precise objective is unclear though, for instance if a sustainably managed forest is to offer outdoor recreation, the question is what kind of forest we judge to be suitable for outdoor recreation. If this question can be answered the sustainability objectives can be formulated in such a way that the achievement of these objectives can be measured. Panayatou & Ashton (1992)[552] showed that considering the value of NTFPs could make the difference between a socially acceptable and sustainable timber industry and a logging enclave resented by local population. They argued that goals have to deal with problems associated with multiple uses. One way to formulate sustainability objectives is by specifying the following dimensions: object, scale and time.[553] Taken together, the three components of sustainability goals aim to enhance the protection of forestlands, in sustaining their multiple roles, in protecting utilisation and finally in developing forest planning and building stewardship capacity.

6.2.2.1 Economic goals

Economic goals cover the whole range of demands stakeholders place on forest enterprises. It is to ensure a sustainable timber supply in order to secure the company's long-term revenues for both the company and the state. In the medium and long term, the economic goals serve the satisfaction of human needs, since it explains the supply from special goods, immaterial values and money to the obligatory intention of enterprises.[554] One commonly stated objective within the economic framework is to maximise, for example, income or timber production, the return on capital in the sense of financial yield or the internal rate of return, or the net financial return on investments through timber yields. [555]

[551] Being an ecosystem, a forest almost inevitably produces a variety of products and services (Gregory 1972 quoted by Bos 1994; Fines et al. 2001a). A forest not only shapes the landscape with its vertical structure, it also has other effects (Bos 1994). Thus in forestry, multiple use refers to the use of the forest ecosystem for the fulfilment of different needs simultaneously. Multiple use management of forest creates an opportunity for efficient land use and, when land is scarce, multiple use of forests is often very desirable. Hence in Cameroon multiple use is the objective of forest management in most forests. Furthermore, in multiple use situations the forest is managed to produce more than one kind of goods and services. This is called multiple productions. Multiple production can be established in a joint production process or in several single production processes (see Bos 1994; Atyi 2000; Law 1994 (quoted by PRC1994); also the zoning plan of Cameroon)

[552] Panayatou & Ashton (1992 quoted by Fines et al. 2001a) ; see also Lescuyer 2002.

[553] See Bos (1994) who further developed the three important scales of sustainability.

[554] Speidel 1972; Bachmann 1992.

[555] Or they might also wish to develop the forest primarily as a wildlife habitat, to a maximum rate of growth of income, to a maximum net income over a given period, a maximum average net income in perpetuity, a

In this respect, the revenue earned from log production is the major driving force in tropical forest harvesting. Revenue earned from log harvesting will usually be the main funding source for long-term sustainable tropical forest management. However, no single objective is appropriate to all enterprises.[556] Elements of the economic goals which the forest management plan should fulfil can be arranged into four groups:[557] Product goals,[558] monetary goals,[559] safety goals,[560] sustaining and improving the production role.[561] The forest management plan must ensure the sustainable production of timber in both quantity and quality. The volumes removed during the logging operation must ensure the operation's economic sustainability and profitability in the medium and long term. RIL[562] must not irreversibly compromise either the diversity and productivity of forest stands, or the regeneration potential of the various species. Logging operations, based on a permanent forest area, must be programmed and planned, in terms of both space and time. Concerning the industrial objectives the management plan must guarantee the medium to long-term supply of the forestry industry, tailored to fit both forest potential and market requirements. A company's industrial objectives target the development of modern plants equipped to handle primary, secondary and tertiary timber processing activities. This industrial development is anchored in comprehensive knowledge of the resource that ensures regular plant supply in the long-term and the development of a range of new high-performance, custom-made timber processing tools. Developing these industries

maximum return to land, o labour, initial investment, or other specific factor of production such as imported machinery.

[556] A private person will probably, unless very altruistic, wish to make the biggest possible profit, but a firm or state agency will probably take a longer view and be less concerned about delayed or intermittent returns (ATIBT 2007; Speidel 2002; Kovac 2002).

[557] Bachmann 1992; Speidel 2002; Kovac 2002; ATIBT 2007.

[558] Product goals like real (special) goods and services goals (wood, sorts, quality, others uses, hunt use, etc.), infrastructure (recreation, water-, erosion protection, and reserve area), or other services that fall within this category, such as machines and transport, consultations, formation etc.

[559] Monetary goals and their effects are measured in monetary units. The shareholders must decide between: Net profit (forest net profit), soil net profit (gain) capital, profitability (related to own capital funds or working enterprise capital), “Kostendeckung in German” loss acceptance, productivity, contribution for creation of value (productivity).

[560] Safety goals. Unforeseeable economic developments of the enterprise and forestry, e.g. conjectural crises, changes in the structure and the concern before operational setbacks and disasters (wind, insect’s calamity etc.) cause the shareholders to take into consideration these risks in the goal setting process. The extent of security aimed for depends on the individuals involved.. Risk avoidance or minimisation is expressed through: reserve formation, liquidity, wood choice, spatial order, structure of forest, min the capacity, insurance.

[561] Sustaining and improving the production role, is essential for long term sustainable forest development, for example achieving the ideal mean growing stock of reasonable quantity (timber –wood areas should be opened in time to prevent them from over maturity, achieving the ideal distribution of volume proportions in the enlarged diametre classes, achieving an ideal mean growing stock of xm3/ha within the next years.

[562] Barreto et al. 1998.

provides for increasing harvests of secondary species and diversifying the range of species harvested.[563]

6.2.2.2 Conservation or environmental goal

Establishing a network of forestlands taken out of production and sustaining its ecological condition is essential for SFM for several reason: for sustaining the integrity of FMU or the forest council and their normal functioning, for preserving their naturalness, for their equilibrium, for preserving cultural patterns along with the settlements and finally, for improving the quality of life in the populated areas.[564] It also encompasses the preservation of the ecological functions and the biodiversity of the forest area.[565] Furthermore, for environmental objectives, forest management must preserve biological diversity and its associated values, water resources, and soils, as well as fragile ecosystems, so as to protect the ecological functions that guarantee the forest's integrity. Areas containing ecosystems with high conservation value existing within the UFA will be set aside, and no logging operation will be carried out there during the whole term of the management plan.[566] The impacts of logging activities on forest structure, biodiversity (fauna and flora) and the surrounding environment will be alleviated by a raft of specific measures to be implemented in the field. Agricultural clearing areas shall be clearly outlined and their expansion controlled.[567] This goal includes for example: promoting close to nature management, sustaining the gene pool, understanding natural processes and disseminating knowledge about them, preserving forest cover (considerably well preserved, almost unfragmented cover, uniqueness from the ecological point of view, the realm of flora and fauna), maintaining forest health by direct (combating diseases, insects) and indirect measures, maintaining and improving (where possible) the regeneration capacity, preserving sites, hosting the protected floral species, sustaining floral diversity in general, sustaining diversity in well preserved forest areas, improving the distribution of snags and woody debris in all forest management classes, sustaining and improving conditions in forests providing site and water protection, setting a ban on mineral oils, needed by technological equipment, within the next 30 years (a planning period), preserving resting and nesting spots of protected species in compliance with the nature protection law, sustaining and improving habitat conditions for birds in general,

[563] Adapted from ATIBT (2001,2007).
[564] Fines et al. 2001a; Schlaepfer (1997 quoted by Kovac 2002).
[565] ATIBT 2007.
[566] Prescription for certification, e.g. FSC in (www.fsc.org/).
[567] ATIBT 2007; FAO 1998.

enriching the tree species compositions with a suitable number of seed and fruit trees and bushes, wildlife habitat enhancement or maintaining animal diversity in general.

6.2.2.3 Social goal

Ethical and social motives represent social goals. Socio-economic objectives are highlighted as a contribution to local development and poverty alleviation in the local area. Meeting the needs of local communities and other actors involved in the FMU or forest council area in terms of the use of the forest and its products, and an improvement in the living (for local communities) and working conditions of company staff.[568] It is a result of the new legal obligations concerning management of forest concessions, forest councils[569], as well as the new international market demands, the demands on the internal economic performance of the company, and the social, economic and cultural realities of the local populations (all lead to a social component of the management plan).[570] Law No 94-01 of 20 January[571] on forestry, wildlife and fisheries states that; "logging or customary right means the right which is recognised as being that of the local population to harvest all forest, wildlife and fisheries products freely for their personal use, except the protected species". In fact, many communities depend heavily upon non-wood forest products for subsistence and as a basis for local trade, for example, canes, medicinal and food plants, gums, resins, and wildlife. Cameroonian tropical forests are an essential source of energy for many communities, directly through burning of wood for cooking and heating and indirectly to protect watersheds as a source of water for hydroelectricity generation. Tropical forests are dwelling places for many millions of people and are increasingly of value for recreation and tourism, notably "eco-tourism". They are important havens for wildlife and are the habitats of many endangered species of plants and animals. It is essential in tropical FMP to achieve a balance between the long-term wood production, the social, and the environmental management objectives. Based on literatures, the social component must meet the following major goals:[572]

1. Ensuring adequate sanitary and social conditions on the base camps by implicating the rightful beneficiaries of the forestry company in the elaboration and implementation of

[568] ATIBT 2007.
[569] Law 94 in PRC 1994.
[570] ATIBT 2005a.
[571] Law No 94-01 of 20 January in PRC 1994; Nasi et al. 2006; Atyi 2000; ATIBT 2005a,b.; MINEF 2001.
[572] These social goals have been developed by ATIBT (2005a,b) ,FAO (1998); ATIBT (2007) ,and Fines et al. (2001a); MINEF (2001); MINEF (1998).

suitable measures. Forest management must play a role in preserving and improving the long-term social and economic well-being of company staff and local communities;

2. the rights and duties of all parties involved must be clearly defined and acknowledged;
3. ensuring a suitable coexistence of the different uses of the natural resources and areas in the forest concessions and council through a participatory process involving all actors.
4. contributing to the reinforcement of the local development process for the benefit of the neighbouring populations through the new fiscal tools which have been put into place.
5. the use of forest resources must contribute to reducing poverty (directly by improving local living conditions, and indirectly through the payment of taxes that alleviate the state budget and creating jobs (in particular via industrial development). In other words, the forest management plan must be designed and implemented with the aim of meeting the needs of local communities in terms of a range of diverse forest products and farming land.

In addition to the above findings, the social goals also include: opportunities for outdoor recreation, maintenance of the aesthetic quality of the landscape,[573] managing and keeping conflicts between human society and large predators at a low rate; managing conflicts between local communities and tourism,[574] developing a suitable strategy for mitigating conflicts within the planning period, furnishing infrastructure, sustaining the well being of citizens and improving their environmental conditions, sustaining and improving current ecological conditions of forestlands so that they will be capable of providing desired forest roles to locals and visitors, and to serve as an adequate habitat for the numerous plant and animal species.

In conclusion, it can be summarised that the goal establishing action is indispensable for raising confidence in the planning process, for materialising already existing and future plans, for crossing the boundaries of different stakeholder interests, and finally for building an integrated landscape planning and management system. Thus, all the decisions set out in the FMP must be focused on achieving these objectives.[575] To define a set of management objectives fitted to the context of the area to be managed, the objective setting phase has to be negotiated and include all the CPSWG members. This has to be performed during the first tactical dialogue within the TPS framework. In this respect, an applied research programme

[573] Excluding the network of suitable areas for recreation & tourism.
[574] Sustainable development of the region and developing the well being of local societies
[575] Adapted from ATIBT 2007.

must be set up jointly with national and international research institutes, for example, focusing on how to accommodate the social-ecological and economic goals within the FMU.

6.2.3 Selection of species or choice of the tree species to be managed

Tree species selection is one of the main significant FMP decisions. It is a pivotal step in the TPS. It affects profoundly the forest structure with all consequences, also for the ground vegetation, as well as the fauna of the forest ecological system. When selecting the tree species not only technological, cost and production aspects must be taken into consideration, but also the resulting future forest. Also the expected yields in volumes and value depend largely on the tree species choice.[576] The forests' stability, biodiversity, and the character of the landscape are affected by the decision made. For the species selected the regeneration indexes, as well as the yield must be calculated as part of the management planning process.[577]

The choice of the tree species is closely linked to the goal establishing step involving the forest owner, the logging operator, as well as the other actors of the FMP process. Therefore decision must be a joint effort by the actors involved (during the second tactical dialogue), in compliance with the relevant legal framework, e.g. the forest protection and recovery functions, nature protection and landscape conservation.[578] This selection may also include ecological parameters for individual species and a market survey, correlated with the company's industrial investment strategy, as well as interests of the local communities. Generally, there are about 20 to 30 target species with a stronger focus on four to five main species according to ATIBT (2007). It is nevertheless important to select a wide range of species, due to occasionally surprising changes in the marketing options for some species that had been disregarded previously.[579] Atyi (2000) suggested that species should be grouped according to similar characteristics, such as growth rate, economic value and size at maturity. This will help the "planner" to calculate several possibilities according to these groups rather than for individual species, or as is the case using the Tiama software,[580] for the whole stand. Fines et al. (2001a)[581] showed that for determining which species to include, it is important to

[576] See for more detail see Oesten 2003; Burschel & Huss 1997; ATIBT 2001,2007.
[577] ATIBT 2007
[578] Burschel & Huss 1997; ATIBT 2007
[579] Recommended by the ATIBT 2007.
[580] The software programe Tiama, a tool for processing inventory data.
[581] Fines et al. 2001a.

consider other uses of the species concerned. In this respect, two types of uses should be considered: a) timber and b) trees used by or important for local populations.

6.2.4 Mapping and remote sensing

Mapping is one of the key forest management tools and the resulting maps fulfil a wide range of functions in FMP depending on the type, the amount of detail of features represented, and their scale.[582] Mapping is considered to be the foundation of the FMP process. It provides reliable knowledge not only on the managed forest, but also field operations as a whole during the preliminary phase of the management plan and later during its implementation.[583] Map interpretation is the art of extracting from a map all of the information it contains for FMP purposes so that a "picture" can be drawn in the CPSWG's mind of the shapes and slopes of the ground, the pattern of streams and rivers, the vegetation cover, and the location and nature of man-made features.[584] There are two stages in the review of maps for FMP.[585] The first stage is to identify and acquire published base maps of a forest area to be managed showing physical features, including settlements, villages, roads and other infrastructure, rivers and coastlines, contours, geology, soils, land uses, forests and agricultural vegetation type boundaries. Reports or notes which might accompany the maps should also be acquired. The second stage is a review of the maps that have been collected. Mapping is not fixed, and the resulting cartographic database should be regularly updated. In the previously described framework, three sources for mapping must be distinguished:[586]

1. Aerial photographs which are helpful for identification of geographic features and for orientation in the field. They are a practical tool for mapping rivers, ridges, coastlines, swamps and other geographic features.
2. Remote Sensing: where photographic coverage is limited, or is difficult to obtain because of persistent cloud cover, satellite imagery is more useful than aerial photography for mapping. Good quality, up-to-date imagery and computer mapping systems can strengthen mapping quality and coverage. A mosaic mapping approach is often followed, where cloud-free sections of a series of satellite images are digitised to form a map base.
3. GPS, is a system of satellites orbiting the earth which transmit precise time and geographic position information. Positions are updated continuously thus enabling speed

[582] Bachmann 1992; ATIBT 2007; Kurth 1994.
[583] FAO 1998; ATIBT 2007.
[584] Adapted from ATIBT 2007.
[585] Bachmann 1992; FAO 1998; ATIBT 2007.
[586] Cf. Bachmann 1992; Kurth 1994; ATIBT 2007; FAO 1998; Dogmo 2005 for more.

and bearings to be computed with considerable accuracy, usually less than 30 meters in both latitude and longitude.

4. GIS, which is applied to the computerised storage, processing and retrieval of geographically referenced spatial data, such as various types of maps, and the corresponding statistical and other attribute information. The capability of combining different maps, known as "overlaying", is one of the most important GIS functions.
5. Primary map types like topographic map, land use planning map, forest zoning map, cadastral maps, geology maps; soils maps; contour maps etc.

These mapping procedures and sources (interpretation of mapping sources, aerial photos and/or satellite images) should be integrated into building a tactical planning information system and stored in a database. Preliminary mappings are useful where vegetation patterns are distinct. Thus, aerial photographs are valuable for recognising and interpreting forest types for zoning and stratification at an early stage in inventory planning. These forest planning information systems are also relevant for mapping in order to build a forest stratification[587] map of the forest area which involved the identification of various types of vegetal formation and strata covering the concession in order to define a sampling device suited to each stratum.[588] It is also useful for locating permanent sample plot positions, for silviculture, forest protection, community settlement planning, and for ecological research. However, the information collected in the field will be used to check and validate the photo-interpretation or the interpretation of satellite images after the forest description steps.

6.2.5 Forest planning area establishment

Based on the previously described mapping process, establishing planning areas[589] refers to tracts of land that are oriented towards a specific land use type with a leading objective. However, a main objective of a forest area may also support other secondary objectives. The establishment of forest zones provides a practical basis for SFM of tropical forests where wood production and other goods and services exist.[590] In such cases of multiple uses the

[587] Stratification consists of identifying, marking out and grouping the forest stands with similar features: strata (see for more ATIBT 2007; FAO 1998).
[588] The description of the strata is based on a set of simple criteria used to identify and mark out the main types of terrain and forest stands . These are: The environment: distinguishing features of formations on firm ground, formations on ground liable to flooding or on swampy ground, and formations on steep slopes; the nature and density of vegetation cover; zones of fairly or exceptionally uneven terrain, on which forest operations would require the use of specific measures, and would even be impossible in certain extreme cases (see ATIBT 2007; FAO 1998 for more)
[589] Or land allocation or establishing user rights according to Fines et al. (2001a).
[590] Concept of multiple uses.

dominant management objective for specific forest areas needs to be identified.[591] FMP literature confirms that this is one of the important decisions within the FMP framework because: it simplifies the planning process, its reduces high costs, and it provides a framework for multi- purpose use, as well as a hierarchically designed monitoring system which is a most rational choice system associated with the TPS.[592] Thus, the planning area establishment is a critically important step in defining and locating the "net productive area" for wood production in a FMU or forest council.

In this respect, the FMU or council should be subdivided into series or districts based on the allocations assigned by the CPSWG to the identified territories.[593] This subdivision into different districts is guided by the management objectives. Thus, each district has its own distinct set of management objectives (production, protection, rural development, etc.) which has been provided by the forest planner and validated by the CPSWG (for each standardised unit of the forest area to be managed) during the first tactical dialogue. These districts must be demarcated on the basis of a forestry licence of which the limitations have been validated or redefined to take into account certain features that government limitations often fail to embrace, such as the existence of large urban centres, proximity to protected areas or the inconsistency of certain limitations.[594] The following guidelines for determining a district function are shown by BFT (2004):[595]

1. The richness in timber or wood or suitability for timber production and exploitation (where significant environmental or social constraints are not identified);[596]
2. biodiversity or suitability for flora and fauna conservation, important habitat for endangered plants or animals or the presence of rare species or sites;
3. the presence of villages or areas used by the populations, or suitability for NTFPs;
4. boundaries should be geographically recognisable, such as rivers, streams, ridges and gullies. Permanent roads and trails may also be used. Boundaries should be recorded on all FMP maps;
5. districts should comprise uniform forest types and be physically recognisable on the ground as much as possible. To the extent that it is practicable, forest areas that are to be

[591] Kovac 2002 ; FAO 1998; Fines et al. 2001a.
[592] Adapted form the district planning method description (see chapter 2; AZPAF 1997; AF 2003).
[593] ATIBT 2007; FAO 1998.
[594] Their boundaries should be as clearly defined as external ones (roads, cut lines, pillars, painted standing trees and poles should be used to define theses boundaries (Cf. ATIBT 2007).
[595] See also Borie & Pasquier 2001 quoted by BFT 2004.
[596] An area of forest can be zoned for wood production (the accessibility or practicability),

managed for different purposes or that have clearly different functions or values, should be placed in separately defined districts.

In addition to these guidelines, the FAO (1998) reported that important questions should be asked when establishing the planning areas. These are: What are the primary values, or characteristics, of each specific area of forest? Can the values identified be clearly described and can they form the basis of a zone? Can value judgements on possible zones be supported by good quality inventory and other technical data? What new data is necessary and how can it best be acquired? According to the multi purpose context of Cameroonian forestry and based on the guidelines previously described, the following districts must be taking into account:[597]

1. District of production where wood production is not bound by other forest values. Zoning is a critically important step in defining and locating the "net productive area" for wood production for a forest management unit;
2. district of protection and conservation where forest is ecologically important because it contains rare and possibly endangered plants and/or animals, where forest forms an important habitat for specific animals, where soil conservation and watershed values are dominant; [598]
3. districts of social importance (e.g. agroforestry and NTFPs) where forest areas are predominantly of value to the physical and spiritual well-being of local communities dependent on the forest. It can include burial grounds; areas where forest has certain landscape values in contrast to highways, railways or towns, where forest is used for public recreation for instance.

Consequently, the whole area covered by a FMU or a forest council ultimately has to form one coherent block, the management of which will be entrusted to the CPSWG members, who will therefore be responsible[599] for managing the timber producing districts and any other district. Once these have been identified with the approval of CPSWG members, the districts

[597] Adapted from FAO 1998; Fines et al. 2001a; BFT 2004; ATIBT 2007; Yene 2002.
[598] In this conservation and protection district forest might be used for specific forest research studies. It may be linked to wildlife, biological diversity and watershed conservation zones. It may include steep slopes where serious soil erosion may occur if a part of a forest is made accessible by roads and timber extracted, it could be placed in a watershed protection zone. Again, forest serving as an important habitat for endangered plants or animals may be described as a biological reserve zone. Where significant environmental or social constraints are not identified an area of forest can be zoned for wood production.
[599] Not only the company is responsible for managing the planning districts as developed by ATIBT (2007) but all stakeholders of the CPSWG.

will be used to determine taxes based on the surface area of the production district (surface area tax).[600] Because of the goals of this thesis and the time available the focus will be on districts of production. This wood production zone forms the basis for the determination of the annual allowable cut (AAC).

In order to sustain the yield during the planning period the district of production must be subdivided into the smallest possible geo-referenced (using GIS) planning areas, which are called compartment or harvesting units, sometimes referred to as forest production units (UFP, as in the Congo). This is in accordance with recommendation from the ATIBT (2007), AZPAF (1997) and AF (2003).[601] Hereafter, this subdivision is referred to as ecosystem unit which is also called "assiétte de coupe" in French (cutting area). Each ecosystem unit constitute the smallest planning area established according to the planning goals and the following criteria:[602]

1. The selection of the ecosystem unit boundaries: natural geographic features should be selected to define the boundaries of an ecosystem unit. These include rivers, streams, shorelines, ridges and spurs. Permanent and clearly defined roads, railways and tracks may also be used.[603]
2. Numbering should be sequential, usually commencing at a forest headquarter. Ecosystem unit numbers should not be changed.
3. The ecosystem unit should not be so large that a sub-division into numerous sub-ecosystem units) is required in order to achieve effective implementation of forest operations.[604]
4. For ecosystem units, the volume and area distribution are determined (combination between volume and area as parameter for the overall planning). This operation is based on the forest inventory results, as well as the maps available for the task. It also

[600] Adapted from ATIBT 2007.
[601] Fines et al. 2001a; FAO 1998; ATIBT 2007.
[602] FAO 1998; ATIBT 2007; AZPAF (1997); AF (2003).
[603] This is adapted from the district planning unit model. Not having clearly recognisable natural features that serve as boundaries on flat land can be delineated by using straight lines that have a north-south, east-west orientation to enable them to be shown as true or magnetic coordinates on maps. In this framework FAO (1998) and ATIBT (2007) proposed that boundaries should be defined and marked using beacons which may be durable wooden poles, stones, or concrete pillars painted using two contrasting colours, such as bright red and white bands. The tops of poles should be pointed, partly to shed water and also to assist with recognition. Poles should be between one point five (1.5) metres and two (2) metres tall. Although not all pillars need to be labelled, permanent labels should be firmly attached to those that indicate major changes in boundary direction or are triangulation points for surveys, or are "tie-in" points for internal surveys.
[604] Sub-compartmentalisation should be minimised. Flexibility is required in determining compartment size; a practical size range.

integrates the yield regulation methods, such as [605] "forest in equilibrium" and "the continual growth".

The ecosystem unit is thus a permanent, geographically recognisable unit of forest land forming the basis for planning, prescription, implementation, monitoring and recording of forest operations. As the smallest geo-referenced planning area it is the basis for the forest description including the species group and BHD structure and the smallest unit for the FMP implementation.[606] Records may both be constructed and maintained manually in a register, or on a personal computer using database software.[607] Furthermore, the design should be modified to meet the requirements of local situations. One form should be prepared for each sub-compartment. The example shows how operations may be recorded. Each record should be accompanied by an ecosystem unit map; the scale can vary depending upon local conditions[608].

6.2.6 Forest description

The main elements of a forest description depend very much upon the specific objectives of FMP. Objectives must be quite clear irrespective of whether an inventory is proposed for an existing FMU or forest council or for a new concession.[609] The objectives defined during the first step of the TPS should consider the physical effort that will be required to conduct an FMP inventory,[610] the organisation, estimated costs and time, the existing knowledge of resources, and the availability of specific aspects of inventory technologies and institutional capability. Finally the fact that not all inventory objectives are of the same degree of importance must be taken into consideration.[611] In this respect, ATIBT (2007) proposed two objectives of the FMP inventory which covers the whole surface area within the concession initially considered as harvestable: firstly, the location and evaluation of the harvestable timber potential in the short, medium and long-term, based on the knowledge of the structure

[605] See for more BFT 2004; FAO 2002a-d.
[606] FAO 1998.
[607] Each record should have six main components (see ATIBT 2007; FAO 1998: a) a summary of site conditions (soils, slopes, rainfall); b) species and species group present and their development phases (species, regeneration, tree numbers and volumes expressed by stem diametre classes); c) wood product goals d) production time frame (silvicultural activities); e) dates and details of harvesting and silvicultural operations (selective harvesting, shelter wood cutting, thinning, climber cutting, enrichment planting, release weeding); f) post-harvest inventory data (poles, saplings, seedlings, nucleus trees).
[608] FAO 1998
[609] ATIBT 2007.
[610] Planning inventory is to be distinguished with the national inventory data from the IAD framework.
[611] FAO 1998

and composition of the stands to be managed; secondly, the performance of a preliminary ecological analysis of forest ecosystems and their use, based on the collection of environmental data (ground, vegetal strata, etc.), information on wildlife, non-timber forest products (NTFP), biodiversity and signs of human activity. An outline of the forest description process to be carried out for the management inventory can then be separated into three main categories adapted from the ATIBT (2007), FAO (1998) and Fines et al. (2001a) as follows: forest sampling, data entry, calculation and processing.

6.2.6.1 Forest sampling

FMP inventories performed in Congo Basin production forests involve systematic samplings made along parallel and equidistant forest paths. Adapted from MINEF (1998); ATIBT (2007), the sampling unit is the compartment: the compartments are adjoining and centred on the forest path (compartments with a surface area of 0.5 ha for central Africa with a mean diameter (dhp) superior other equal to 40cm). The sampling rate represents the ratio between the surface area actually sampled and the total surface area of the area to be inventoried. Most management standards for the sub-region require a minimum accuracy level of 10%, with a probability threshold of 95% for the concession to be managed.[612] Adopted from ATIBT (2007), tracing "forest paths" consists of physically representing the previously mapped sampling plan on the terrain, through openings in the vegetation cover and by chaining the distance travelled in order to mark out the tallying compartments. The data recorded during the tracing of forest paths, mainly concern: slopes, types of vegetal formations encountered; topography and hydrography, roads, tracks, and traces of previous harvesting operations.[613] Other designations may also be selected; the important thing is to have consistent records for the whole inventory.

6.2.6.2 Ecosystem unit description

The ecosystem unit records or description may either be constructed or maintained manually in a register, or on a personal computer using database software or should be stored using GPS. This record has to be a 100% inventory of all species of commercially harvestable trees

[612] See MINEF 1998; ATIBT 2007.
[613] Cf. ATIBT 2007; Bachmann 1992.

in a mixed species tropical forest[614] that may be used in calculating the AAC and that are planned to be harvested.[615] The two modes of records proposed by Speidel (1972), ATIBT (2007), and Fines et al. (2001a) are the numerical description of the ecosystem unit and the verbal one:[616]

1. Numerical description

This mainly focuses on the botanical identification of trees (based on the common name, which is then translated into its scientific name) and their measurement. It also includes the NTFPs. In this respect, several categories of trees are characterised according to their diameter:[617]

- Trees (generally with a diameter greater than 10 or 20 cm);
- acquired regeneration (generally with a diameter of between 5-10 cm and 10-20 cm);
- regeneration (of forest tree seedlings; h = 50 cm and up to 5-10 cm in diameter).[618]

This numerical description can be used for describing the species composition, volume, DBH distribution, increment etc. An example of this numerical description is: tree species area, tree species supply via growing space factor, production class or DBH distribution, estimation of the production class, volume of tree species, the major kinds of trees and the size-class of the trees and key yield parameters of each ecosystem unit (N: Number of tree species, DBH: diameter at breast height, M: mortality in %, D: damage in %, R.: % of reconstitution).[619]

[614] Full enumeration with good accuracy for reducing the error due to the non homogenous or multi-storeyed structure.
[615] Adapted from ATIBT 2007.
[616] Based on the combined method described in chapter two, see also Speidel 1972, Kurth 1994; Bachmann 1992.
[617] Adapted from ATIBT 2007; FAO 1998.
[618] numerical records include: tree tallies which are performed over the whole inventory ecosystem unit; taking a tally of acquired regeneration: The term acquired regeneration generally designates stems with a diameter of between 5 and 10 cm and the tally diameter of 'large trees' (20 to 30 cm); regeneration inventory: here, regeneration means all seedling stems up to a diameter of between 5 cm and 10 cm according to the case. Knowledge of the regeneration potential of the main species is pivotal to the sustainable forest management approach; the management inventory also provides an occasion to record other information on the whole concession, such as roads, tracks, traces of previous harvesting operations, etc; Additional tallies, sometimes referred to as the 'biodiversity inventory' are also performed. They include in particular wildlife and NTFP surveys (see ATIBT 2007). Human activities (hunting, fishing, farming, gathering, etc.) are also listed.
[619] ATIBT 2007; FAO 1998.

2. Verbal description

The verbal description includes: major kinds of tree species, indicating tree species (Moabi tree wood); canopy, mixture, density, mortality and quality of the species and for those trees of or near mature size, information on available markets, prices, and product specifications should be compiled, and plans for sales and contracts developed, e.g. direction (dense middle-aged timber, sparse in the middle, with younger poplars in SW or tree by tree to group wise mixture etc..); special characteristics (e.g. 50% of Moabi…) or anything deviating from the average (e.g. badly form Ayous); extra elements like the condition (thinning residues over…% of area), quality (e.g. high grade timber Moabi), damage (Azobe red rot in 20% of trees), mortality; ecosystem unit history, regeneration stock (natural regeneration over … % of area, Moabi under planting over 1.0 ha with under storey shrubs over 70 % of the area) and additional ecological surveys. These surveys target signs of human activity (hunting, fishing), wildlife, the environment and NTFPs; checking: tallies of the ecosystem units should be performed on a random basis, in order to confirm the quality of the work, estimating the amount of merchantable volume by tree kinds and sizes and what forestry practices are needed. Biodiversity surveys, recreation surveys, and social surveys.

6.2.6.3 Data entry, calculation and processing

The entry and processing of data in the drafting of the ecosystem unit description report is an important task of the information processing procedure. In accordance with ATIBT (2007) this consists of:

1. Entering data: FMP inventory data are preferably entered using software designed specifically for this purpose. These data have to be recorded numerically, as well as verbally.[620]
2. Data analysis: detailed instructions on data processing from both remote sensing imagery interpretation and from field sampling as follows: mathematical formulae that should be applied for computing means and sampling errors and the relationships that should be used for converting imagery or forest measurements into desired expressions of quantity, for example, individual tree volume tables. In this respect, forest description data are analysed either using GIS or other software designed specifically for this purpose combined with GIS, Each record should be processed using GIS, remote sensing and GPS

[620] See forest resources and management (FRM) for a data processing software, < b>Forest Decision Program©, which can be easily adapted to the multiform expectations (BFT 2004; FAO 2002a-d; www.frm-france.com)

to resolve the problem of non-availability of the latest maps or spatial information.[621] This integrated approach merges data sets from multiple sources into a single set of meaningful information. The availability of digital data sets is significantly growing and thus available for processing and combining by data fusions methods.[622]

3. Parameters[623] for the calculation of the productivity include three main elements:
   - Increment: Knowledge of forest growth provides a confident basis for the measurement of increment which can be used to derive wood yields for a production forest. It is usually expressed as the diameter growth of the stems and is given in centimetre/year (cm/year). Increment figures form a determining element in the calculation of the annual allowable cut;
   - The mortality rate of trees is assessed to be constant and to apploed to all diameter classes. The mortality rate recommended by MINEF (1998) and Fines et al. (2001a) and used by TIAMA is 1% per annum in all the diameter classes and for all species. Data on mortality are even scarcer and less reliable and some authors use a rate of 2% per annum;[624]
   - Ingrowths (or recruitment), the growth of new trees into measurable size classes from regeneration.
   - Logging damage: Well conducted forest exploitation with low yield does not necessary lead to major perturbation of the ecosystem or the forest structure. Generally, 90% to 95% of the canopy remains intact and enough trees remain to secure natural regeneration of commercial and other species. The API Dimako Project (1994)[625] reported a logging damage rate of 6.5% of the area after harvesting 0.77% tree /ha, while the result of TCP[626] assumes that about 20% of these 5.1% damage can be avoided, if RIL is applied.
4. Calculation of volumes, densities and basal-areas which are calculated both for the whole area to be managed, and also for the different ecosystem unit or strata. In this respect, calculation and data compilation methods that should be used are: descriptions of

[621] ATIBT 2007.
[622] Dogmo 2005.
[623] The forest parameters in general include s: tree species, tree age, stand structure, timber volume etc., soil maps, pedagogical features such as: soil moisture, soil type, nutrient supply, soil depth; topographic maps; topological features such as: trees, lakes building a.s.o; terrain model; terrain features such as slope aspect illumination; height zones in raster format; height zones, colline, submontane montane, subalpine, etc.; satellite classification in raster format crown- forest damage; aerial photo interpretation in vector format; forest parameters crown closure, needle loss, vertical stand structure. There are many things which may be made a part of an inventory naturally few inventories will contain all of them.
[624] Fines et al. 2001a; Atyi 2000.
[625] Durrieu de Madron & Forni 1997.
[626] Jonkers (2000 quoted by Fines et al. 2001a).

procedures to be followed, for example, specific computer software and programmes, detailed descriptions of all phases of data processing, including data transcription from field forms (or from field computers), verification, data computation, preparation of summaries and database management.

5. Resource distribution maps: these maps are used to directly illustrate inventory results;
6. Diametric structures: the interpretation of the management inventory provides a picture of the diametric structure of the inventoried species;
7. Regeneration indexes: the best way of ensuring the sustainability of a forest stand is to take steps to guarantee its regeneration following any forestry operations.

Based on this previously described element of this data entry, analysis and processing, the forest description should be summarised in an inventory report as a decision-making support tool for the CPSWG. All the analyses are summarised in an inventory report. This document provides a recap of management inventory methods (selected standards, implementation, etc.), presents analysis results and provides an interpretation of the results to be used as a decision-making support tool by forest managers.

6.3 Overall planning

The proposed management plan as overall planning is the second step of the TPS after the pre-planning phase as shown in Figure 6-1, p. 144. It is based on the preliminary situation analysis performed in the previous step. The forest description report in this framework is in this sense a key support tool in the overall planning process. This key step (forest description) requires careful thinking on the part of the CPSWG members involved in negotiation processes. In fact, the opinions of the various actors have to be taken into account to ensure that the final FMP document strikes the right balance between the economic, social and environmental requirements of SFM.[627] It is absolutely crucial that the economic viability of a forest management plan be achieved in this step which may be a fundamental condition of its effective implementation and success. The overall planning process within the TPS framework includes the following two elements (see Figure 6-1, p.144):

a) Planning of the management districts which include the overall planning of the production districts, the protection or conservation districts, and the agricultural districts;
b) the efficiency or economic test and a sustainable yield (Figure 6-2, p. 180).

[627] Adapted from ATIBT 2007; FAO 1998; Fines et al. 2001a,b.

6.3.1 Production district planning

The emphasis in this section is about the planning of the production districts or series. There are three approaches to be considered including: planning parameters, forest production planning and forest utilisation planning.

6.3.1.1 Forest management planning parameters

According to ATIBT (2007); Fines et al. (2001a) and Yene (2002) FMP parameters involve regeneration indexes (or reconstitution), minimum FMP cutting diameters eligible (generally in French called DME and the administrative one DMA) and the rotation periods. They are all closely interlinked and interdependent in the iterative yield determination procedure. They are key elements that may determine whether forest production and utilisation is sustainable or not.

1. Regeneration indexes

The best way of ensuring the sustainability of an ecosystem unit is to take steps to guarantee its regeneration following any forestry operations according to ATIBT (2007). The parameters evaluated to define forest productivity,[628] as well as the diametric species structure (like the number of species, distributions, time, BHD structure, mortality, damages, etc.) may also be used to calculate the regeneration index of each species during a rotation period. ATIBT (2007) reported also that the regeneration index estimate must guarantee a minimum harvest volume during the following harvesting operation period.[629] An ecosystem unit (stand) that is harvested and managed under optimum sustainability conditions will preserve all its forest functions, maintain the integrity of the biological process and will be capable of regenerating within reasonable times; this regeneration will not however resemble the species make-up or diameters of the original forest or the volumes.[630]

[628] Forest productivity comprises three main elements influencing the productivity or allowable cut area: the increment, mortality and exploitation damage, see Fines et al. 2001a; Vanclay 1997 and the last section of forest description.
[629] This calculation (of the regeneration index) is performed for each species managed, for which a diametric growth figure in mm/year has to be selected as well as a mortality rate and a percentage of loss due to logging damage. The calculations are made by taking the first class below the MCD, then the two first classes, followed by the three first classes. Each time the regeneration percentage for the number of initially harvestable stems is determined (see ATIBT 2007).
[630] Adapted from ATIBT 2007.

2. Selecting minimum FMP cutting diameters eligible for harvesting (DME)

The minimum FMP cutting diameters eligible for harvesting (DME)[631] are defined for each species.[632] The DME may not only differ from the national or administrative[633] minimum cutting diameters (MCD) (generally known in French as DMA), but also on the minimum fruiting diameter.[634] A MCD is the minimum diameter below which loggers may not harvest a specific tree species.[635] This means, according to the ATIBT (2007), that the operators have to seek to optimise the rotation period by pairing the determination of the DME relating to the diametric distribution structure of each species with the calculation of the rotation period. Rotation periods decrease according to a corresponding increase in DME. Changes in MCD (generally of 10 by 10 cm) often have a greater impact on regeneration rates than do variations in rotation (generally of 5 in 5 years).[636]

3. Selecting the rotation period (cutting cycle)

The cutting cycle or rotation is a very important element of SFM. It is common knowledge amongst foresters that a fairly long period between two timber harvests is necessary to allow the forest to recover the wood volume extracted.[637] Based on Speidel (1972) and Oesten (2003) there are two factors in the estimation of a rotation period including time (the rotation time is the average time between species formation and the middle of reproduction period)[638] and maturity (the rotation maturity is the identification of species whose structure corresponds to the species target or has reached maximum alignment with the latter).[639] However, for the

[631] Adapted from Atyi 2000.
[632] Atyi 2000.
[633] MINEF prescribed a MCD for each species. These MCDs are considered too low from an economic as well as an ecological point of view (Atyi 2000)
[634] When drafting FMPs it is very useful to have data on fruiting diameters as they are key criteria in selecting minimum cutting diameters (ATIBT 2007).
[635] Fines et al. 2001a,b.
[636] This is recommended by ATIBT (2007).
[637] Fines et al. 2001a; FAO 1998; ATIBT 2007; Speidel 1972; Kurth 1994; Bachmann 1992.
[638] it is determined at the level of each species. However, the following factors developed by Speidel (1972) have to be considered as criteria for determining the rotation time: impact on average overall volume increment (aTIr); assortment structure, strength-quality grades (timber crop) and impact on the timber industry; production risks and volume of work, mechanisation; prices, costs, total turnover, liquidity, net gain, profitability; ecological and social impact. In the framework of rotation time, Speidel (1972) considered also two factors technical-biological rotation times (until the wood reaches optimum maturity, diminishing volume increment and optimum regeneration time, required target diameter, target assortment structure achieved) and socio-economic rotation times (rotation time of the highest forest rent and the highest soil rent, derived from the forest profitability value) (see also Oesten 2003).
[639] The determination of the maturity contents includes three stages according to Speidel (1972) and Oesten (2003): the technical determination of maturity which is the same as the biological and technical rotation time (see above); monetary determination of the maturity based on the marginal analysis which is a comparison of the actual ongoing value increment of stands with a standard curve (as a general rule, average value increment of one stand or ecosystem unit type in one location). It is also the case, if the actual value increment exceeds the

tropical Congo Basin region ATIBT (2007) showed that selecting a new rotation period also means selecting a new DME. Thus, by increasing the rotation period, one can decrease DMEs and vice-versa. This balance will be determined by analysing different scenarios based on regeneration index studies. ATIBT (2007) argued that it does not fall below a certain threshold which varies from one country to another and is usually around 20 to 30 years. The guidelines for the elaboration of management plans for production forests set the minimum cutting cycle at 25 years for Cameroon.

4. Yield prediction models

A yield prediction model uses the quantitative relationships between measured growth variables to predict yields of forest types. It is a tool that helps to schedule and regulate harvests sustainably. Two basic methods are available for their construction, diameter class (or stand table) projection and cohort modelling.[640] Both depend upon the use of comprehensive growth data to construct and fit a yield prediction equation. Detailed development and application of both methods require specialised assistance that is beyond the scope of these guidelines, but descriptions of each are included to illustrate the basic steps involved in their construction.[641]

6.3.1.2 Forest utilisation planning (felling plan)

Forest utilisation planning is understood to be the calculation of the annual allowable cuts (AAC) (yield determination). The AAC determination is another crucial aspect of the TPS process. It is the quantity or volume of timber and NTFPs for a defined planning period that can be extracted annually from a given forest.[642] It is also defined as the determination of the quantity of harvestable timber per hectare during a given logging operation.[643] The result of this determination is an AAC set with consideration of all endogenous and exogenous parameters. It is expressed in cubic metre/ha.[644] In this framework, there are several determination procedures of the AAC. In practice, the choice and use of each method depends

standard curve (test statistics) the stand or ecosystem unit is not mature or if it is below the standard curve it is mature from a monetary point of view and the non monetary analysis (benefit analysis) (see also Bachmann 1992; Kurth 1994).

[640] Alder & Wright 1999; See chapter 2 of this thesis.

[641] FAO 1998; Alder & Wright 1999; Vanclay 1996.

[642] FAO 1998.

[643] Alder & Wright 1999; Vanclay 1996; ATIBT 2007.

[644] Expression of the AAC based on area and/or volume (Bachmann 1992; Fines et al. 2001a; FAO 1998; ATIBT 2007).

on the silvicultural system(s).[645] Each of these methods provides only a general guideline for deriving an AAC. Indeed, new computer-based methods of yield determination are currently being developed and have the potential for achieving much greater precision than older methods. Their use depends upon having good quality information of tree diameter class distributions, tree volumes, growth, recruitment and tree mortality. One of this computer based method is the TIAMA which is subject to the condition that at least 20 species representing 75% of the exploitable volume have to be used.[646] It depends also upon the diametric structure at species and ecosystem unit levels. In addition it is based on the parameters of the FMP described in section 6.3.1.1. This yield determination provides a basis for deriving a log harvest. However, it should also be in balance with increment for controlling the output in order to ensure that the cut is neither exceeded nor undercut, i.e. equal to the net volume increment in one cutting cycle.[647] If the volume cut is too large, the forest will deteriorate and ultimately loose its value as a timber resource. On other sites with many restrictions, forestry will not be economically feasible and may lead to clearing of the forest in favour of other land uses.

In this respect, the silvicultural system(s) applied, the diametric structure, the FMP parameters (the regeneration index of the species to be managed (target species), rotation period, the DME/DMA), as well as factoring forest dynamics should be included in the calculation of the overall AAC.[648] In this respect, the AAC has to be calculated globally for the whole concession and for each district or compartment, each ecosystem unit, as well as every species to be managed, in order to optimise the planning of cutting cycles and smooth out the figures for annual production capacity.[649] Furthermore, there are also some factors in relation to maturity which have to be taken into account for the determination of the AAC: firstly, the urgency of final felling as ecosystem units require felling (e.g. over mature ecosystem unit: rotten, denuded, too old-post optimum, bad quality ecosystem units: target not achieved); secondly, the ecosystem unit mature for felling that have reached maximum alignment with the FMP target (maximum average increment achieved or value increment reached its peak); thirdly, the ecosystem units which could be felled (available ecosystem units reserve

[645] The methods are: a combination of area and the felling cycle; a combination of area, volume and the felling cycle; a combination of volume and forest increment; a consideration of volume only (FAO 1998 and chapter 2 of this thesis).
[646] Adapted from Fines et al. 2001a; FAO 1998.
[647] Principle of sustainable yield.
[648] Adapted from ATIBT 2007; FAO 1998; Fines et al. 2001a; Speidel 1972; Bachmann 1992; Kurth 1994; Oesten 2003.
[649] Adapted from ATIBT 2007; FAO 1998; Fines et al. 2001a.

ecosystem units): closed to maturity, but not yet mature, in the event of particular management requirement for example liquidity problems, investments, no major economic disadvantages as a result of felling, prerequisite conditions like no risk as a result of felling, availability or reclamation, stability, health, MCD or minimum volume. Speidel (1972) and Bachmann (1992)[650] also highlighted a final felling planning process which include the urgency of final felling (see determination of the maturity), determination of the felling sequence (see section 6.3.1.1) (based on the regeneration period and the thinning planning) and the determination of the final felling volume which corresponds to the AAC. The time frame of a cutting cycle (30 years) makes it possible to estimate the AAC for at least 20 species[651] making up a minimum of 75% of the standing harvestable volume in Cameroon.[652]

6.3.1.3 Forest production planning

The systematic application of appropriate production planning is a basic principle in planned sustainable management of tropical forests according to FAO (1998). Forest production has to be understood as a silvicultural production system. Silvicultural system is a set of techniques that are being applied either polycyclic or monocyclic, in a specific forest area to help attain specified FMP objectives. In most instances in a wood production forest, the aim of silviculture is to enhance the growth and quality of potential crop trees.[653] Consequently timber resources are managed in such a way that initially available resources will recover to the extent that in subsequent cutting cycles exploitable timber of at least the same quality will be available in at least the same quantity. However, repeated selective logging tends to modify the composition of the stand, as good-quality trees of commercial species are progressively extracted while non-commercial species and defective and poorly shaped stems of valuable species remain. To counterbalance undesirable changes in the forest, the forest planner should take measures that will assure sustainable production and an increase in quantity and quality.

The primary characteristics of silvicultural systems[654] which have been applied at various times in tropical forests in Latin America, Asia and Africa are summarised in chapter 2 of this

[650] Speidel 1972; Bachmann 1992; Kurth 1994; Oesten 2004); see also (BFT 2004; http://www.frm-france.com/index.php?tg=method&idx=meth&num=2 (accessed 18.06.2009)
[651] Tree species are regrouped into three groups based on the frequency of their demand in the timber product markets (Atyi 2000).
[652] Besong 1992; Atyi 2000; Fines et al. 2001a; Lescuyer 2002; Foahom & Jonkers 2004.
[653] Cf. FAO 1998.
[654] The choice of a silvicultural system is determined, firstly, by the ecological characteristics of a forest for which sustainable management is being planned and, secondly, by the management goal and objectives for a

thesis and are also described in Schmidt (1987), FAO (1998) and Jordan & Montagnini (2005).[655] The polycyclic, selective cutting system is the most widely applied system in hill forests. It offers a flexible, practical, technically and commercially realistic basis for harvesting and at the same time it influences the forest composition and structure in favour of the next crop. It was also identified to be a cost-effective way[656] In contrast, clear cutting in narrow strips and group selection cutting patterns are applied in some localities but have the disadvantage of causing damage to remaining trees. This form of clear cutting has been forbidden in the Central European region.[657] However many authors argue that the results obtained from many research projects about silvicultural system in tropical forestry are not convincing and often the treatments failed due to improperly applied methods.[658] They show also that the cost of the silvicultural treatment is higher than the value generated. Nonethelsess, other studies have shown that opening up the forest by eliminating trees will stimulate diameter increment.[659] In Africa, according to Schmidt (1987) silviculturists in Nigeria and Côte d'Ivoire experimented with natural regeneration and line planting during most of the first half of the twentieth century. Many other African forestry departments tried to take up the challenge of silviculture in moist forests beginning in the 1950s. Some of the methods relied on natural regeneration,[660] others utilised techniques for improving the

specific forest management unit. Sustainable management of tropical forests is at the core of a forest development strategy and implies silvicultural manipulation, or intervention, in order to achieve objectives written in a forest management plan.

[655] See also Atyi 2000.

[656] For example based on the result of De Graafs' thesis (1986) for Suriname, a polycyclic system is proposed and discussed for the economically accessible mesophytic forests. In the system, a restricted amount (approx. 20 m³/ha) of quality timber is felled in 20-yr cycles in a well controlled selection operation. During the cycle, arboricides are used to release commercial species and to provide an economic increment. This system is designed for areas that are large enough to provide the supply of an economically viable timber processing unit (see Jordan & Montagnini (2005).

[657] See FAO 1998 for more detail on silvicultural systems; see also Burschel & Huss 1997.

[658] Panayatou and Ashton 1992 quoted by Fines et al. 2001a. Concerning the natural regeneration system, Schmidt (1987) argued that it is difficult to measure accurately the productivity gains obtained by natural regeneration and stand improvement techniques. Uncertainty concerning the efficiency of the methods used has undoubtedly contributed to their progressive abandonment by most African countries.

[659] Atyi 2000; Jordan & Montagnini (2005).

[660] The three main methods based on natural regeneration were the TSS in Nigeria: Its objective was to enhance the natural regeneration of valuable species before exploitation by, gradually opening up the canopy (poisoning undesirable trees, cutting climbers) to obtain at least 100 of 1-m high seedlings per ha over five years. The forest thus worked was logged in the sixth year and cleaning and thinning operations were then carried out over 15 years.). However, the main problems encountered were the exuberant spreading of climbers once the canopy had been opened up and the failure of the seedlings of valuable species to grow adequately. Moreover, some poisoned eliminated trees later turned out to be commercially valuable, e.g. Pycnanthus angolensis. The APN, or improving natural populations, in Côte d'Ivoire is an example of the second method: it is technically linked to TSS. The aim is to favour the growth of average stems and also to ensure regeneration through natural seeding of the valuable species by removing climbers and opening up the canopy based on economic motives. The selection system used in Ghana represents the third method which focuses on regeneration of forests well stocked with valuable species. Harvesting occurs about every 15 years, after the forestry department has marked the stand to retain some well-distributed seed trees, followed by thinning operations. However, the method has been found to

dynamics of the stands,[661] SODEFOR silvicultural system[662] and others used artificial regeneration. Schmidt concluded that natural regeneration techniques are thus not practiced on a commercial scale in the francophone countries, nor in Nigeria. However, Ghana and Uganda have in principle continued both moist forest planting and management. In central Africa, the silvicultural system is assimilated with the FMP itself and sometimes involves harvesting regulations that fix the terms and areas for concessions, a rotation period and a MCD for economic species. Stumpage rates paid in harvesting contracts are theoretically earmarked in order to finance management and regeneration costs, but in practice the funds revert to the general state budget.[663] Consequently, few silvicultural measures are currently practiced within forest concessions in Central Africa. Logging or harvesting is the first, and often the only "silvicultural" action. Logging opens up ground and canopy areas, thereby creating favourable conditions for rapid growth of young residual stems. Logging is conducted solely by the concession holder.[664]

In this framework, the production planning as understood in this section is the result of the silvicultural treatment applied to each commercial species, ecosystem unit, disctrict or compartment and to all forest areas. Planning should be integrated into the financial estimation of the cost and benefits of the FMP process also considering the impact on the AAC. This production planning is in the comprehension of the author an essence of the planning process which should guarantee the future of the forest operations and must be taken into account in the Congo basin FMP process.

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cause considerable felling damage because of the relatively short rotation. Regeneration has been poor, and less valuable shade-tolerant species dominate because of insufficient opening up of the canopy (see Schmidt 1987).

[661] This technique was utilised in the 1950s in Gabon's Aucoumea klaineana forest to accelerate the growth of all-sized stems of valuable species in naturally well-stocked stands, without specifically promoting regeneration through natural seeding. The species grew in patches or clumps, presumably as a result of natural seeding of forest trees in the clearings or gaps. The objective was to let these stands attain commercial diameters as quickly as possible through thinning operations, but the production gain was never measured. After treating about 1 Mio ha in this way, the forestry department abandoned this technique in 1962 to switch to Aucoumea klaineana plantations (see Schmidt 1987).

[662] Based on the description of Schmidt (1987), the silvicultural practices used represented the traditional exploitation of economic species and thinning by poison girdling. Two thinning regimes were tested (30 and 45 percent of the total basal area) by beginning systematically with the tallest trees in the residual forest until the desired percentage of basal area was reached. The objective of the thinning was to favour valuable trees larger than 10 cm. No particular operation has been planned for regeneration through natural seeding. The result showed that after four years of observation, volume increment was 3-3.5 m3/ha/yr against 2 m3/ha/yr in the control stands, i.e. a gain in growth of 50-75 percent in stems of 73 main species larger than 10 cm DBH. Measurements taken every year showed that the volume increment increases with time and that the impact of the thinning operations will probably be felt for at least ten years. He also argued that a management system based on this practice would seem justified since the ratio of commercial volume to cost is greater than that of forest plantations set up in the same area.

[663] See Schmidt 1987.

[664] ATIBT 2007.

6.3.2 Conservation and/or protection district planning

Protection and/or conservation districts must be defined within the FMU or forest council to be managed. In fact, SFM can not be achieved in the absence of action for effective conservation and protection. Management measures for conservation and/or protection must be defined in the TPS outcome. Policies and legislation (e.g. law 94 in Cameroon)[665] establishing a PFE in Cameroon provide a framework towards achieving effective forest protection.[666] In addition, the conservation districts should be the responsibility of all actors (CPSWG members) involved in the TPS. The conservation and/or protection district is has various purposes.[667] The first purpose is watershed conservation. Forests have a fundamentally important role in forested tropical regions, both physically and socially, for the conservation of water and soil resources through the protection of hill and mountain slopes from erosion by rainfall and the flooding of rivers. Protection of sloping land and soils is the single most important physical and biological function of forests. The second one is the conservation of biological diversity. Conservation of genetic forest resources and the maintenance of biological diversity are essential for sustaining the productive and protective values of all tropical forest lands. This guarantees the long-term survival of forest species and maintains, restores and enhances every element of forest biodiversity. The third purpose is wildlife conservation. There is a growing interest in conserving wildlife in tropical forests through the creation of reserved land where habitats and species can be protected. Forest planners and managers can contribute towards effective wildlife conservation by promoting practical action along the following lines: Reserves or refuges, corridors connecting refuges, major animal feeding grounds, hunting by forest concession company employees, wildlife populations. The last purpose is the buffer zone surrounding the ecological reserve.

According to law 94 in Cameroon, it is forbidden to conduct logging activities in a conservation district. Each of these conservation districts may recommend strict protective measures such as: involvement of all the CPSWG members in planning forest track networks (construct tracks as far as possible from the series, avoid crossing protected areas, etc.) and logging activities in the immediate vicinity of these districts; setting up a rigorous hunting control system (with, for example, a ban on organised hunts within and around protected or

[665] PRC 1994.
[666] Providing security to forest tenure, permanent definition and maintenance of forest boundaries, an operational capability to protect forests from fire, and seek cooperation with forest communities for example (see PRC 1994 and FAO 1998).
[667] See Fines et al. 2001a; ATIBT 2007; FAO 1998; PRC 1994, 1995.

conservation areas); setting up a buffer zone governed by a set of specific management rules; etc. Where protection or conservation districts are delineated by artificial boundaries, these boundaries should be established prior to the passage of cruise and logging teams in the nearby area. In this respect, the environmental plan for an FMU or forest council should be designed. The following procedure should be performed for identifying, evaluating and minimising adverse environmental impacts during the formulation of a forest management plan[668]: screening of a proposed forest management programme, preliminary assessment of environmental impact, management programme revision, environmental monitoring. Some concrete example of the environmental programme at the forest management unit level are:[669] a limitation on land clearing, a limitation on timber removal, limitation of damages to forest stands, limitation of timber losses, a protection of sensitive areas and waterways, planning and building roads, and taking anti-pollution measures.

Within the framework of forest certification, the conservation district is originally classified as forest of high conservation value (forest) (HCV). HCV are defined to be natural habitats where these conservation values (the presence of rare or endemic species, sacred sites, or resources harvested by local residents…) are considered to be of outstanding significance due to their high environmental, socioeconomic, biodiversity or landscape values. Others define HCV areas as critical areas forming part of the landscape, which needs to be appropriately managed in order to maintain or enhance HCV.[670] The HCV process comprises three key steps: firstly, identify which High Conservation Values are present: the presence or absence of each HCV is determined, by using existing data and collecting additional information as necessary. Then, identify the HCV area and how it must be managed: the HCV area is the area of habitat which must be appropriately managed in order to maintain or enhance the identified HCVs. Lastly, establish an appropriate monitoring regime: to ensure that the management practices are effective in maintaining or enhancing the HCVs.[671] There are six main types of HCV areas based on the definition originally developed by the Forest Stewardship Council (FSC) for certification of forest ecosystems. These types are listed in

[668] FAO 1998

[669] Some of these measures were also proposed by Barreto et al. (1998) about financial costs and benefits of reduced-impact logging relative to conventional logging in the eastern Amazon.

[670] HCV Resource Network 2005; World Wide Fund for Nature (WWF) 2002.

[671] However, WWF (2002) identify two principles which are paramount for a HCV: a) HCVs are managed to maintain the attributes that are of high conservation value, and b) management employs the precautionary principle, which requires that where the effects of extraction and other management measures are unknown, values are insured through a cautious approach (HCV Resource Network 2005; WWF 2002).

Appendix Q, Figure 9-14.[672] In general the costs and benefits associated with conservation and protection districts should be integrated into the cost efficiency control of a sustainable yield (see Figure 6-2, p. 180).

6.3.3 Management of the communities or social districts

Most forest concession areas in Central Africa also include locations of villages and work camps.[673] A large number of the people who live in or near forests and are at least partly dependent on forest resources live in tropical forest localities. Each distinct ethnic group has its own cultural inheritance and its own social and economic relationships with forests that cover religion, ceremonial activities, arts, food supply, medicine and economic use. Therefore there are potentials for conflicts due to clashing interests which need to be addressed in order to pave the way for joint decisions and cooperation's. Sustainable tropical forest management is not only concerned with technical management but also with the integration of agriculture with forests for food production, the production of wood for community use and for the supply of non-wood forest products. It should lead to the social and economic development of local communities, including the provision of basic needs, and to income generation and employment.[674] Such a social district is a good opportunity to apply balanced forest management which can contribute to achieve these objectives. In chapter 5, toolbox to address the social aspects of forest planning and the social district in particular will be proposed.

Based on the preliminary FMP studies[675] the socio-economic analysis carried out using participatory research methods the boundaries of the allocated concession as well as of the social districts may be redrawn, for example, to demarcate community forests or agricultural, hunting lands to be excluded from production. This is the standard procedure in Cameroon, where the demarcation of FMUs is reviewed prior to drafting the forest management document. However, whether the boundaries are redrawn or not, several villages and work camps generally still remain within the concession area.[676] Village communities mainly support themselves through slash-and-burn agriculture, and need to have a land reserve in order to extend their crop farming activities. Furthermore, forestry operations carried out close to fields can damage crops locally, sometimes significantly.[677] Furthermore based on the

[672] HCV Ressource Network 2005; Aksenova et al. 2006.
[673] ATIBT 2007
[674] FAO 1998
[675] ATIBT 2007 ; Fines et al. 2001a,b;Yene (2002)
[676] ATIBT 2007; Djomo et al. 2000.
[677] Djomo et al. 2000; ATIBT 2007.

legal prescription (law 94)[678] as well as on the previous paragraph FMPs specify user rights within a FMU or forest council and describe the restrictions, regulations and prohibitions related to each activity or land use to be undertaken (e.g. hunting land). This is why FMPs include a "community or social series" which is demarcated on the village outskirts.[679] The limits of this district must be defined jointly with the local communities, using tools such as GPS to mark out crop-farming and fallow areas, participatory mapping to outline areas of village influence, and satellite imaging to identify the expansion of crop areas.[680]

In this respect, forest companies subject to SFM procedures must agree not to cut any tree within the social district, unless this has been approved by the local communities. Logging companies may enter into agreements through the CPSWG with local villages in order to harvest the resource according to clearly defined income sharing rules and silvicultural procedures (i.e. protection of a given species, record the MCD of a given species, etc.).[681] This is therefore a sensitive process that requires long periods of collaborative work, and that has to be performed whenever logging operations come within the vicinity of villages.[682] The communities living within agricultural districts could organise the setting up of community projects. In general, for all concessions or forest councils, the traditional rights of the local communities must be recognised by the CPSWG, for example, harvesting of household timber,[683] hunting, fishery and gathering.[684] In general all social measures must be listed and a rough schedule of their implementation needs to be provided. This generally involves a detailed medium-term schedule and long-term goals based on the socio-economic analysis performed when preparing the FMP (see also the IAD, communities' attributes section). In general the cost and benefits associated with the communities and social districts should be integrated into the cost efficiency control of a sustainable yield (see Figure 6-2, p. 180).

[678] Law 94 on forestry, wildlife and fisheries states that: " logging or customary right means the right which is recognised as being that of the local population to harvest all forest, wildlife and fisheries products freely for their personal use, except the protected species" as well as " the Ministers in charge of the forestry, wildlife and fisheries may, by reason of public interest, and in consultation with the populations concerned, temporarily or permanently suspend the exercise of logging rights, when necessary. Such suspension shall be done in consonance with the general regulations on expropriation by reason of public interest". With regard to the hunting law states that " traditional hunting is authorised throughout the national territory except in State forests protected for wildlife conservation or in the property of third parties" and that " any hunting method, whether traditional, which endangers the conservation of certain animals may be forbidden or regulated by the service in charge of wildlife".
[679] ATIBT 2007.
[680] See Fines et al. 2001a; ATIBT 2007; FAO 1998.
[681] Adapted from ATIBT 2007.
[682] ATIBT 2007
[683] e.g. local population are allowed to harvest trees for their personal use except protected species.
[684] people in the area collect many forest products for a wide range of purposes.

6.3.4 Cost efficiency control

Although cost efficiency control is one of the basic principles of FMP[685] there is no universal method clearly put forward in the existing FMP on how to develop the cost efficiency control or economic and financial test for a sustainable yield.[686] This section highlights the fact that all planed activities in the planning series or district need to be financially supportable from revenues earned through selling forest products and services, primarily from log harvesting, NTFP, hunting, eco-tourism, etc. In this respect, this step is the tactical efficiency control of a FMU and forest council which is the driving force for the generation of revenue from which all forest conservation and/or protection and social development as well as research activities[687] should be funded. In order to guarantee or enable a FMU or council to be commercially, as well as ecologically sustainable and socially acceptable, the control efficiency should be positive before the FMP is implemented (see Figure 6-2, p. 180).[688] Based on the FAO (1998), to have lower expectations with regard to immediate profits on part of the private sector is an important pre-requisite to achieve sustainable management of tropical forests.

Based on the previous paragraph, a cost efficiency control should include the following elements according to Oesten (2003):[689] Work load control (medium term work scheduling), financial control (receipt- expenditure accounting), and income control (income statement) which will not be developed in this thesis because of the time available.

6.3.4.1 Work load control (medium term work scheduling)

Work study is a generic term for those techniques, particularly method study and work measurement, which are used in the examination of human work in all its contexts, and which systematically investigate all factors that affect the efficiency and economy of the situation being reviewed, in order to effect improvements. This should reduce inefficient practices in tropical forest management leading to lower costs and increased economic performance.[690] In

[685] See for more detail, Speidel 1972; Baader 1942; FAO 1998.
[686] Fines et al. 2001a,b.
[687] All funding for protection, post-harvest silviculture, inventory, research, and environmental management and community development should, if possible, be derived from revenue generated from harvesting (see FAO 1998).
[688] Adapted from FAO recommendation on commercial control of the tropical forest logging 1998
[689] Oesten 2003.
[690] FAO 1998.

this respect, work load control also promotes optimised working procedures benefiting employees who can be reluctant to adapt to the changes proposed.[691]

The process for medium term work scheduling suggested in the following is based on Oesten (2003) integrating the concept of intra-operational labour capacity versus planned man-hours. In order to study these two concepts, the planned labour quantity and a forecast of labour productivity will be examined, i.e. the total number of planned man-hours and the labour capacity. However, it is possible also through forecast arrival of manpower and forecast leave of manpower to highlight the total number of planned man-hours and the labour capacity. The results of this process of medium term work scheduling should be expressed in man-hours required or time required/year and hectare versus labour capacity or man-hours available/year and hectare and the surplus which is the difference between the two concepts expressed also in year und hectare.

Furthermore, quality control should be integrated into this step to ensure that forest operations are carried out in accordance with prescriptions and contract schedules set by the CPSWG. Quality control is determined by making measurements of variables related to a FMP prescription, using temporary sample plots placed at random within manages forest areas. Data measured on quality control plots indicates the standards of work achieved and provides objective standards that cannot be determined through visual assessments.[692]

6.3.4.2 Financial control (receipt- expenditure accounting)

This step of the TPS should attempt to make a financial statement according to the information and data available. This statement includes the receipt- expenditure accounting. These two concepts are also adopted from Oesten (2003).

1. Receipt accounting

There are two sources in income generation which include timber harvesting and other forest products and services. First, harvesting is the main income from timber harvesting based essentially on the AAC, corresponding to the gross volume that will be available during the cutting cycle. This net volume has to be calculated on the volume that is effectively extracted from the forest and sold. This net volume is usually estimated using a commercialisation

[691] FAO 1998; Dogmo 2009.
[692] FAO 1998

coefficient.[693] Other products and services represent the second receipt sources. It includes the income resulting mainly from the conservation and social districts, as well as from the production district with the exception of timber or wood products. To achieve an optimal mix of different land uses in a single forest requires that the cost and benefits of each land use are considered.[694] Multiple use management might signify that the revenues of the exploitation of some products or services will be less than under single use management, but the overall revenues will exceed those under single use management.[695] In this study the multiple use includes: Timber, NTFPs, eco-tourism and recreation, carbon sequestration, watershed protection, subsidies from forest donors or states and other rents and leases, hunting leases, minor products which may provide revenues that can be gained from visits to forest concession or forest council areas.[696]

2. Expenditures

Expenditures are estimated from the production, utilisation, the conservation and social districts, as well as others FMP activities. The production and utilisation include for example the cost for silvicultural prescription, the timber harvest, forestry fees, felling and round tree export taxes, plantations (pre-plantation, culture, regeneration), forest conservation (fencing and other), tending of young stands (cleaning and pruning), thinning, road maintenance, transport, social function costs including the CPSWG capacity building, administrative expenditures (forest management and local administration), research, training, RIL practices etc. Examples for social costs are: the construction of schools, hospitals, roads etc. Conservation costs may include management costs, materials etc. In general, the costs for developing the FMP have already been estimated by the ATIBT (2007)[697] which needs to be adapted to each local situation. The total receipts adding up to the total expenditure highlights the surplus which must have absolute positive value for the AAC to be a sustainable yield. But if the value is negative, this mean the yields must be reviewed within the FMP districts and solutions must be discussed within the tactical dialogue framework (CPSWG).

[693] These are used to convert gross numbers of standing trees or volumes into the number of standing trees or volumes that can actually be harvested and/or marketed (ATIBT 2007). This coefficient from MINEF is about 55% and the sum of the allowable cut/species should be multiplied by 55% and also multiplied by the FOB values which will the provide the total income of the forest.
[694] Bos 1994; FAO 1998; Fines et al. 2001a.
[695] Panayatou and Ashton 1992 quoted by Fines et al. 2001a.
[696] Fines et al. 2001a; ATIBT 2007.
[697] ATIBT 2007 proposed relating costs to the elaboration of a forest management plan which includes, a) Forest management unit: equipment, supervisory staff (forest management plan officer, design office, etc.) and operational staff (technicians, mapping department, secretariat, etc.), operation (vehicles, stationery, etc.), b) Acquisition of cartographic data, satellite images, setting up of a GIS, c) Studies (wildlife, socio-economic, biodiversity, etc.) and training courses (RIL, forest management training, etc.), d) Forest management plan inventory 2 000 à 3 500 Fcfa / ha – 3,0 à 5,3 € / ha

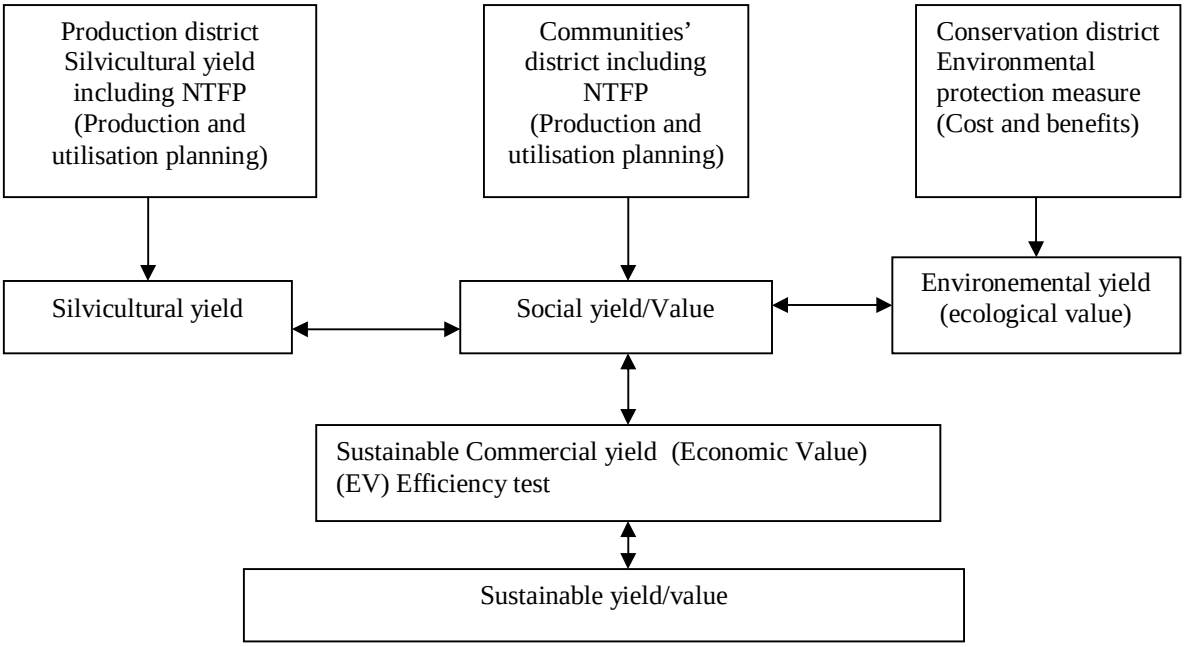

Figure 6-2 Overall planning process

6.4 Detailed ecosystem unit planning, controlling and monitoring

6.4.1 Detailed ecosystem unit planning

Establishing the planning area based on the forest description highlights the ecosystem unit as the smallest geo-referenced planning area. In this step of the TPS proposal process it must be decided how to plan activities in order to achieve the set goals of sustainable yield. This paper suggests to group together all ecosystem units and ecosystem unit types designated as production districts to form units with similarities (with comparable silvicultural system or diameter structure etc.) in which the main implementation and control of the yield will be performed. This unit is called sustainable yield regulation class equal group of ecosystem units. Additionally, in each group of ecosystem units and respectively in each ecosystem unit contained within the activities have to be planned numerically. The yield felling plan and the production plan need to be determined.[698] In this respect, firstly the AAC calculated for the whole forest, is attributed to each group of ecosystem units. There are several methods for subdividing the sustainable yield into compartments as was already explained in chapter 2. Of these methods, the combined use of the management by volume and increment as parameters

[698] Adapted from SPU model AZPAF, 1997; AF 2003.

are proposed in this context, although, these parameters have not been tested in the field of Congo basin research area. In Cameroon mostly management by capacity[699] or management by volume[700] are used. Secondly, the silvicultural system for production planning adopted in the overall planning will be implemented through verbal and numerical planning for each compartment. The result of this production and felling plan inside each goup of ecosystem units will be the basis for the operation planning.

6.4.2 Monitoring

Management of tropical forest resources needs to be responsive and adaptable to changing knowledge and needs. Even the most carefully planned arrangements should be modified as new information becomes available and good management requires early recognition of the need for modification. FAO (1998) reported that monitoring the implementation of activities set out in an approved TPS outcome is fundamental to sustainable forest management and forms the basis for transparent accountability of tactical and operational activities. Monitoring[701] of the plan has several functions.[702] According to FAO (1998) the main one refers to the comparison of actual performance against the planning objectives. There are two main approaches to monitoring tactical and/or operational performance: firstly, periodic monitoring which involves making comparisons between physical achievements and programme targets and between financial expenditures and budgets at the end of specified time periods, for example, every three or five years or longer intervals. Secondly, the continuous monitoring which is frequently applied to specified key indicators providing information on plan implementation, like the yearly intervals. Continuous monitoring provides all stakeholder groups with the means of applying close control over forest

[699] Divide the total harvestable surface area by the rotation period. This gives annual compartments of an equal size, but with highly variable harvestable volumes due to the diversity of forest composition. This option facilitates the forest administration's control over the management process. Capacity-based management method is no longer used in Central Africa (ATIBT 2007).

[700] to divide the total marketable volume by the rotation period, and then to define compartments with the same volume, otherwise referred to as fixed-volume forest management (ATIBT 2007).

[701] In the absence of formal and systematic monitoring a problem may not be recognised until it is too late to make meaningful changes (FAO 1998)

[702] FAO 1998 highlighted the following: to allow for the control of current management activities, for the evaluation of the operating performance of a forest management unit or forest councils and for the evaluation of tactical management programmes. One approach to monitoring involves making comparisons between physical achievements and programme targets and between financial expenditure and budgets at the end of specified time periods, for example, at three- or six-monthly intervals. Another approach is to monitor specified key indicators continuously, which enables information on the progress of plan implementation to be collected more frequently, such as at weekly intervals.

operations enabling frequent comparisons to be made between planned programmes and inputs of resources with actual achievements and inputs.

As proposed by the CPS model developed in this thesis the CPSWG will be responsible for monitoring as an institutional framework for monitoring and also as a participative institution binding with a contract or agreement from the FMP process. ATIBT (2007) described following activities which may be performed during the monitoring process: concession or forest reserve boundary;[703] forest description data; felling; silvicultural operations; forest security and protection and environmental management; forest road construction; rural communities' development.

6.4.3 Controlling or assessment

A tactical plan is an agreement between actor groups specifying what should be done and how to manage a FMU or forest council on a sustainable basis. Any action implemented under the CPS system must be subject to regular assessment in order to assess the effects of the measures taken, and to ensure the continuous improvement of environmental performance. ATIBT proposed a set of assessment methods which include first of all the internal assessments: specialised teams of company officers perform internal assessments on a regular, on-going basis, which underpin the inspections carried out on each activity sector (worksite inspections, workshop cleanliness inspections, etc.). Then, the internal audits: these are performed on an ad-hoc basis, and cover the whole forest management system; they are carried out by a company manager designated by general management, possibly accompanied by specialist consultants. Finally, the external audits: these are required by certification procedures, and involve inspections subcontracted to the relevant organisations. These regular assessments provide for:

a) Checking the effective implementation of the work programme;
b) checking the relevance of the measures taken and their effectiveness;
c) initiating corrective measures should a major impact (pollution) be identified or in the event of deviation from the logging operator's specified standard.

[703] Boundary definition adjacent to neighbouring concessions or forest reserves involves physical marking of boundaries on the ground and formal land surveying); concession or forest reserve boundary maintenance (physical, "on-the-ground" examinations of boundaries is the most effective mechanism for reliably monitoring the maintenance of boundaries) (see ATIBT 2007).

Requirements governing assessment activities under the forest management plan have been developed through various certification systems, principles, criteria and indicators for sustainable forest management from ATO/ITTO process or CIFOR.

6.5 Tactical dialogue as democratic dealing with problems

One of the main problems in FMP is the choice of decision and its implementation as described by Chorfi (2004), Yunosova (2005), Kovac (2002). A possible approach for the CPS was proposed in section 4.2, (the IGS as subsystem 2 for addressing this problem). In this respect, the initiative for the formulation of a TPS outcome should be taken together by all interest groups or actors, such as forest owners or the government, concession holders on behalf of the owner, local communities having historical rights or privileges in a forest, conservationists, forest planners and forest donors. They are the most important planning actors as explained in chapter 3. Within the IGS framework these actors are joined in the CPSWG. The CPSWG may considerably enhance the actors' participation and their confidence in the outcome,[704] and thus contribute to enable actors to share benefits from forest utilisation and production.[705]

The three tactical dialogues described above serve as a basis for decision-making within the TPS (see Figure 6-1, p. 144). So far, in the majority of cases without an agreement between all interested groups, the decision-making process was ineffective.[706] Therefore these tactical dialogues were developed to address conflicts and establish confidence in the planning process between actors. In this framework, each actor can exchange information, express opinions and, interests, act sincerely, and share advantages and responsibilities.[707]

[704] Justas opposed to passive participation like information and consultation.
[705] For example according to FAO (1998) accommodation of the respective interests of forest management companies and local community groups can be eased with the recognition that companies and indigenous communities are, in most cases, interested in different things - industrial logs by forest management companies on the one hand and small dimension wood and non-wood products by local communities on the other. A positive approach towards adapting the interests of both groups is to include rural communities as partners in forest management and to share the benefits of wood production with them.
[706] Chorfi 2004; Yunosova 2005.
[707] The programme of each tactical dialogue is described by Chorfi (2004) l.

6.5.1.1 First tactical dialogue

The first tactical dialogue of the TPS is a sequence of steps from the IAD, active participation and conflict management. In this step, the CPSWG as an arena should be a framework for the discussion of the results yielded from the three planning process steps below (point a, b and c) The TPS steps of the first tactical dialogue include:

1. Acquiring information and analysing trends (underpin planning) generating and analysing planning. The information gathered should result from the IAD as well as from the system value (see section 8.2);
2. goal setting phase: create goals and objectives of the forest management plan;
3. species selection, planning area establishment and forest description.

The conclusion of the TPS process should be an agreement after negotiation between all interested parties involved in the CPSWG. The agreements should be about gaining information, objectives and functions, as well as species selection, the planning area establishment and the forest description. This means that the resources will be managed and used according to these decisions. If there is no agreement, the proposed solution should be renegotiated according to the democratic dealing process within the IGS framework (see section 4.2).

6.5.1.2 Second tactical dialogue

At this stage the CPSWG deals with the overall planning. It encompasses firstly the determination of the allowable cut from the planned silvicultural yield (derived from the production and utilisation plan of the production district). Secondly, it consists of the conservation and protection district plan and, finally, of the social district plan. This allows defining and discussing the activities which need to be performed during the planning period and agree on the sustainable yield which shows the benefits and obligations of each of the interested parties. It is also a framework for defining the ways for achieving the management objectives.

6.5.1.3 Third tactical dialogue

During this final session, the CPSWG define and discuss all activities which must be carried out within the ecosystem unit, including the detailed planning as well as its implementation, control and monitoring. The agreement has to be achieving about the responsibility, therefore the CPSWG has to consider the interactions between activities to undertake and check their feasibility. All the actors involved in the CPSWG should be actively involved. In order to achieve a real agreement, the content of the plan must be discussed in a wider perspective (presentation of the result in the concerned communities, villages, administration…). This allows to exchange views and to make sure that the concerned people agree with the proposals, and if necessary, make amendments to the action plan. The reporting commission established within the CPSWG has to deliver the final document (management plan). The procedure for the active participation and conflict management is proposed in the IGS framework.

6.6 Conclusion

In conclusion, the TPS as subsystem three is a connecting element between the CPS model system including the VSS (subsystem 1) and IGS (subsystem 2). For the preparation of the TPS therefore the current situation and the intended objective as well as the future activities in the forest area must be determined. It requires technical skill, good judgement, common sense associated with VSS and IGS outcomes. TPS is a model for technical elaboration of the FMP and for carrying out forestry activities in the medium term and may also be used for SFM. This TPS study targets multiple objectives and functions of forestry. It requires a consensus building process which is provided by the tactical dialogue. Three dialogues were proposed here for the TPS process within the CPSWG framework that specifies information, targets, action (including ecological and social issues), controlling and monitoring arrangements. It provides a basis for monitoring forest activities and provides continuity in managerial operations over time, to formalise FMP arrangements. TPS is an iterative process, providing a new approach to evaluating forest resources yields by taking into account the social (improvement of the local communities living condition as well as forest worker), ecological (reduction of the biodiversity and improvement of the carbon sequestration and other ecological services), and economic (cost and benefits must be efficient for investment)

dimension of sustainable forestry. The two innovative elements developed in this study are the incorporation of tactical dialogues into the planning framework and the management of FMP parameters or variables for sustainable yields.

The outcome of the TPS is the FMP which is a mandatory step, a legal requirement of all countries in the Congo Basin. It is the cornerstone of the SFM approach.[708] It enables the CPSWG and specifically companies to work towards the certification of their production. The preparation of a FMP, however, is just one of the necessary steps in the certification process, and is not sufficient in itself. Above all, it has to be deployed in the field and its requirements and directives have to be enforced. This commitment to sustainable management can be monitored and evaluated using sustainable management principles, criteria and indicators. These are used to evaluate a company's level of sustainable management in relation to one or several certification guidelines of its own choice. It is therefore entirely up to the company to decide whether or not it wishes to commit to certification, in other words, certification is in no way a legal requirement. While there can be sustainable FMP without certification, there can never be certification without sustainable forest management. The decision of the forest industry to commit to sustainable management is not entirely selfless. The process involves major and numerous benefits and constraints, the main ones being.

[708] Adopted from ATIBT 2007; Dogmo 2009.

7 Discussion and recommendations

The overall objective of this thesis was to design an innovative approach to rainforest management planning in line with SFM in the Congo Basin countries specifically Cameroon. This was done by addressing specific research questions and taking into consideration the theoretical references, the conceptional framework, as well as the methodology presented in above. The methodology applied included:

1. *A literature survey for problem identification and for an overview of the fundamental of FMP;*
2. *model building through literature analysis and discussions with experts (field work trip in Europe see Dogmo 2009 to design a planning system contributing to SFM in the Congo Basin. This deductively theoretical planning system design was chosen because of the need to derive criteria or categories and subcategories from the CPS1 for the critical analysis of the Cameroon FMP situation and at the same time for refining the CPS1;*
3. *an empirical and explorative analysis of the FMP situation by means of interviews in Cameroon and Paris to discuss the FMP situation with actors. This allows further analysis of the CPS by integrating the finding from the field work in Cameroon.*

Moreover, the resulting CPS model design was developed further by the alternative definition of the FMP (see Chapter 2) to address the problem frame of this thesis. However, this planning model conception has to be distinguished with the planning system usually used in operational research based on computational activities, e.g. linear programming, simulation, optimisation.[709] *In this respect, this discussion chapter is subdivided into three parts. The methodology, as well as the significance or usefulness of the CPS is discussed in the first part, followed by a discussion of the limits and restrictions of the CPS model. In the third part the CPS model is compared to existing planning systems specifically the rational model and the CBP.*

[709] See Hanewinkel 2001; Bos 1994; Atyi 2000.

7.1 The usefulness of the CPS

7.1.1 Discussion on the methodology

The methodology presented in this chapter made it possible to critically analyse the FMP situation in Cameroon and to design a planning system for the Congo Basin, especially for Cameroon. Specifically with regard to the CPS model design the methodology has proven to be useful. The method highlighted that the CPS is a theoretical model based on the literature analysis conducted leading to the so-called first draft called CPS 1. The next step of the methodology in designing the CPS was based on the field trip to Cameroon and Paris. Comparing this step to the next, which involved semi-structured interviews with FMP actors, the latter turned out to be more substantial for the CPS design and its evaluation. This can be explained by the fact that the theoretically designed model was reflected upon empirically taking into consideration the reality of the ongoing FMP situation in Cameroon (empirical evaluation). In fact, during the semi-structured interviews the FMP actors freely discussed the topic.[710] This form of evaluation of the CPS model can be qualified as indirect evaluation because the questionnaires did not include question on the CPS model (see Appendix P). This indirect evaluation of the model was useful for a solid foundation for learning.[711] In the opinion of the author, a direct evaluation by specifically questioning the interviewees on the CPS model may be sources of bias and may be also a sign of lack of flexibility and transparency. Without the indirect evaluation of the CPS, the interviewees would have no confidence in their input for the improvement of the FMP situation in Cameroon. However, due to the time available for this study and specifically for the field work in Cameroon, the focus group as a form of qualitative research was not integrated in this study. Such a focus group could bring together the interview partners in order to improve the quality of the data through their interactions.[712]

The decision to opt for a methodology subdivided into three parts was motivated by the need to rise from one level to the next to identify the needed variables or categories (VSS, IGS and TPS) and subcategories for the analysis performed during the last step of the methodology. These variables were therefore the basis for the critical analysis of the Cameroonian FMP situation. At the same time, the results of the analysis were used to evaluate the CPS model.

[710] This can be taken from the answers to the interview questionnaires (Dogmo 2009).
[711] The questionnaires did not contain questions about the CPS model.
[712] Adapted from Mayring 2000.

Another reason for choosing this methodology is the limits of FMP research due to the specificity of forestry sciences, which will be discussed in section 7.2. These constraints or limits restricted the research method to the proposed one. This is not due to the conceptual framework and design but because of the lack of CPS model implementation in the real world, in a FMU or forest council for example through a case study. However, bearing in mind the complexity of the Cameroonian forestry situation the chosen methodology was appropriate whereas other methods may have been insufficient in dealing with this degree of complexity.[713] The present methodology is surely not the only one suitable for designing a planning system, but proved to be practicable in addressing the research questions (see chapter 1).

7.1.2 CPS contribution to the ongoing FMP situation in Congo Basin

In general, the forest management plan elaboration and implementation is a mandatory exigency, a legal requirement and obligation of all countries in the Congo Basin. It is the cornerstone of the SFM approach.[714] Based on this legal exigency, the CPS model proposed in this study may contribute in providing a conceptual framework for drafting and to some extent implementing FMP outcomes in the Congo Basin. The CPS model with it toolkits (needed by practitioners, decision makers, and forests users) provides an important means to address the shortcomings of the current FMP outcomes described in chapter 1, as well as the findings presented in chapter 3. It can be seen as a contribution to improve the insufficiencies of the existing FMP system (see chapter 2 and the next section for a comparison of the CPS and some existing systems).[715] It is an innovative technical, socio-economic and ecological

[713] See Chapter 1, the problem frame section.
[714] Cf. PRC 1994; Appendix O; MINEF 1998,2001.
[715] Under the existing FMP, four groups have to be considered. The first is the classical planning model with a top down or expert based approach, e.g. SPU or control by trees method. This also includes the conventional logging or selective logging, RIL model and sometimes some silvicultural system like MUS, CSS, SMS, TSS, clearing systems because these silvicultural systems Calare also considered to be forest management models. This first classical approach has its history in timber resource use based on economic goals, with limited understanding or consideration of long-term sustainability, ecological and social processes. In these groups, the planning specialists (generally consulting firms) design the plans independently for the forest enterprise as holders and for the forest owner (the state) and sometimes only informing the actors or stakeholders at the beginning and/or end of the planning process (chapter 2). The second one is the bottom-up approach like community based planning. This group mostly focuses on local knowledge with little understanding of the rational processes, like the CBP. The third group is the mixed models (combining top down and bottom top tools) of the two approaches in planning like the joint-, adaptive-, collaborative- and co-management are included (see chapter 2). The fourth group is the new generation of model forest management planning proposed by the ATIBT in their three modules for the Congo Basin (see ATIBT 2005 a, b and ATIBT 2007 developed from the ATIBT 2001 version). This is partly based on results from the Dimako project in the East region of Cameroon, law 1994, and the "Manuel de guide pour l'aménagement forestier au Cameroun" or guideline on

instrument to respond to changes in forestry in general and for "modern" FMP, in such a way that the planning outcome may represent a social contract[716] between the main actors involved. This contract should be socially, ecologically, and economically viable to facilitate its implementation. This is in accordance with the understanding of forestry defined by Oesten & Roeder (2002)[717] who showed that forestry can only survive and further develop, if it makes constant contributions to solving social problems.

In this respect, the CPS is promoted here based on a broad system derived from an approach which yielded a combination that enables an integrated view of three elements within the same FMP framework. This combination of elements is required for successful SFM in Cameroon's fmps which has been confirmed by the Cameroonian field work results. This enables the FMP to address at the same time the social, ecological and economic functions of the rainforests. In this view, the CPS integrates a combination of a VSS, for normative and strategic planning, complemented by IGS used for the participants' interaction analysis and consensus building processes, and a TPS process for economic, social and ecological yield evaluation. In other words, the CPS model approach involves breaking down the decision making in FMP into three components: VSS, IGS and TPS. Each of these subsystems represents a level of the FMP process within the CPS frame. As already showed in chapter 3 of this study, these three subsystems are important variables of significant interest in addressing the FMP problems in the Congo Basin. This combining system enables the flow of information from one subsystem to another. As a flexible and dynamic model tool system, CPS should support the FMP design in Cameroon. An overview of the model "tools" is provided in the section on the design of the model (see Chapter 4, 5, 6). Each subsystem or tool summary includes a brief illustration of how the tool contributes to the FMP design. From an empirical perspective this approach in FMP is an appeal for the integration of the VSS and IGS into the planning process. This was hardly addressed during the analysis conducted by Natur+ for GTZ in 2006 by Doucet & Vendanhate who analysed the Cameroon FMP that was approved by the forest administration mostly highlighting technical problems like the determination of the regeneration index. The CPS model provides guidance and requirements necessary for SFM through the introduction of the VSS and IGS supporting the

developing management plans for production forests in the permanent forest domain of the Republic of Cameroon (January 1998) (MINEF 1998). The conceptual model of FMP developed by the Tropenbos Cameroon programme is also included in this group (see chapter one) as well as the FAO project outcome in FMP (FAO 2002a-d).

[716] A contract is an agreement, a declaration of will to exchange rights and duties in a planning frame.

[717] Oesten & Roeder 2002.

TPS. The tools proposed in the CPS model may be useful for other kinds of forest ownership, but the primary focus here is on PFE,[718] specifically the FMU, forest councils and to some extent protected areas (see Annex O).[719]

Each of the CPS subsystems is divided into various sub elements, for example the IGS is subdivided into the IAD framework and active participatory and conflict management mechanisms. The CPS model identifies important factors in the social, economic and environmental domain which should simplify the planning process helping to reach an agreement or contract which may then be "easily" implemented. Thus, the CPS proposes tools that bring together FMP actors in a specific area to jointly plan the forest and share the benefits from their activities. All three subsystems of the CPS have to support and relate to this multi-actor planning system. CPS is therefore characterised as a multi actors or shared governance planning approach in which those involved can innovatively discuss the planning problems, thus reducing negative impacts from mistrust and enhancing the positive effects of forestry processes. In this respect the most important planning outcome is the aforementioned social contract.

7.2 CPS comparison with the existing planning system

In the light of the CPS contribution for SFM in the Congo Basin described above and the theoretical references of this study (which highlight the need for a new model of planning)[720] the main thematic differences between the existing FMP system[721] and the CPS model are identified in this section. The main question guiding this comparison is: What exactly is the CPS model's contribution to SFM? The relevant thematic differences seem to be subdivided into four areas: design, regulatory guidelines, yield determination, and outcome of the FMP process. The Table 7-1, p. 195 displays these differences and highlights that the CPS has provided the foundation for a new system of FMP better addressing the patterns and problems

[718] In fact, the 1994 Cameroonian forestry law divides the Cameroonian rainforest area into two parts: the permanent forest estate (PFE) and the non-permanent forest estate. According to this law, the PFE constitutes the forestlands, assigned to the forest production and/or to the wildlife habitats. It includes the state forests *(forêts domaniales in French)* and the communal forests. The state forest includes the protected areas and forest reserves like production forests or FMU) (PRC 1994, 1995).
[719] For example the CPSWG seem also to be applicable in the planning processes in the forest reserve planning and land use planning which may be supported by these model tools
[720] See chapter 2.
[721] See chapter 2 and WP 54.

in the currently managed Congo Basin forests as discussed in this thesis. Furthermore this is in accordance with the problems frame discussed in chapters 1 and 5 of this study.

7.2.1 Architecture of FMP system

As mentioned before the CPS model is a combination of three subsystems (see Table 7-1, p. 195) which may contribute to addressing the lack of adequate mechanisms for incorporating broader ecological, social and economic goals directly into the same forest planning framework. This also enables the forestry sector to readily adapt to environmental change. Consequently the main differences between the design the CPS and existing systems are:

1. CPS integrates the VSS (S1) within the FMP framework through the introduction of the normative and strategic planning linked to the strategic intention. This enhanced the goal building process in the TPS (medium term planning) and secures the vision of the long term or future existence of forestry in contrast to short term outlooks;
2. CPS introduces the analysis of the pattern of interactions between participants in the IAD framework. This is characterised by motivations and incentives mapping. CPS provides a framework for active participatory fora with the establishment of the CPSWG. This CPSWG should be an "institution" which constitutes the basic actors assessment for the FMP outcome implementation. The results of these assessments are then fed into the synthesis which is useful for consensus building processes between CPSWG members in order to be able to draft the FMP contract. These new features in planning may improve the CPRs management, through equitable and public control.[722] It also improves local democratic structures since economic rationality is replaced by social rationality.[723]
3. CPS integrates the TPS into its framework with an emphasis on the ecosystem unit description determining and evaluating the social, economic and ecological yield. This is also an innovation in the medium term planning as know in the existing system.

7.2.2 Yield determination and evaluation

In the CPS framework, specifically in the TPS, the yield determination is a combination of the social, economic and ecological yield and not solely the economic yield or social yield or a combination of just these two as is the case in the existing planning system. These three aspects of yield constitute to achieving a sustainable yield (see Table 7-1, p. 195). This

[722] The public here represented by the CPSWG members.
[723] Shannon 1991; Buttoud 1999a.

integration may make an objective evaluation possible prior to the detail planning of the cost and benefits associated with the investments in forestry. Benefits include, for example the medium and long-term total or partial timber supply for a company, securing the user rights of villagers and safeguarding their access to land simultaneously providing a means for local development, protecting biodiversity and other ecological functions, evaluating costs, etc. In this respect, CPS aims to improve security and ensure long term forestry. It also allows for addressing the various conflicts frequently occurring in FMU areas because of inadequate benefit sharing mechanisms. The CPS is an approach for full participation in benefit sharing process.

7.2.3 Planning procedures and regulatory guidelines for FMP

CPS focuses on active participation more than is usually the case in traditional FMP as can be seen in the IGS (S2) proposal. For example: the establishment of the CPSWG is proposed which may involve many actors as a multi-actor FMP. The FMP is performed by the CPSWG which has the technical, social, economic (also financial) and ecological responsibilities to draft the FMP. This means that the distribution of responsibilities is between actors who have become partners (chapter 5). This proposal contrasts with the existing rational model in which typically only the forest planner performs the task of planning for the forest holders and owners: the FMP process is started by the planning expert and ended by handing over the management plan to the users (top down) (see Table 7-1, p. 195).[724] It is also in contrast to CBP in which the responsibility falls upon the community concerned. The users begin the process and complete it.[725] The CPSWG approach is used to ensure that linkages among all forest functions or resources as CPRs are considered at each step in the planning process. For implementing active participation, three tactical dialogues for the consensus building process among the CPSWG are proposed. The CPSWG acts as a filter in the selection of alternative planning processes. Thus, it may contribute to the understanding of the complex social, ecological and economic relationships within the framework of FMP, and to avoiding a priori decisions due to lack of knowledge of these interactions.

With regard to knowledge management CPS provides a platform for learning between partners or participants as can be seen in the second part of the IGS dealing with the

[724] Figure 2-2, WP 54 in Dogmo 2008c.
[725] See Figure 2-3, WP 54 in Dogmo 2008c.

consensus building process (chapter 5). In this respect, the CPS may be considered to be a collaborative learning process in which there is a knowledge transfer between participants. It is a mixture of knowledge as described by Chorfi (2004) and Yunusova (2005) including: expert (planner) based input-, local based input -, donor-based, and conservationist based-knowledge. This may improve the collective experience and address the lack of formation (see chapter 3). Furthermore, CPS asks for much more flexible and dynamic FMP processes. This may equip the planning process with adaptability to change and specifically to risk and uncertainty which characterise forestry in general. CPS may thus give rise to the opportunity to move from rational thinking as is the case the operational research towards institutionalising the CPSWG for permanent adaptation. Additionally, CPS may offer better opportunities for transparency and address the problem of governance described in chapter 3 of this study.

7.2.4 Outcome

The outcome of the CPS model is a social contract between actors involved representing the public. This contract may facilitate the implementation of the FMP outcome because each participant feels to be part of the outcome with duties and rights (see Table 7-1, p. 195). However, in conclusion to this section, the CPS which introduces new parameters and variables (subsystems) is not complete and remains in its conceptional form and theoretical stage. This means that the CPS as a proposal is not perfect regarding its comprehensibility, relevance, justification or reason and applicability. Therefore, the next section of this chapter discusses the limiting factors and shows that the CPS model is open to new findings and should be discussed further for its improvement. The CPS model presented in this thesis is a work in progress that will continue to be refined through repeated feedback from various actors involved and through its real world implementation at FMU and forest council level.

Parameters \ Forest planning system		Combined Planning System (CPS)	Traditional, classical planning model	Community based planning (CBP)
Architecture		Value and strategic subsystem (VSS)		
		Institutional governance subsystem (IGS)		community construction (Bottom to top approach)
		Tactical planning subsystem (TPS)	Technical planning (Top to down model)	
Yield determination and evaluation		Social yield + Economic yield + Ecologic yield = Sustainable yield	Economic yield = Sustainable yield	Social yield = Sustainable yield
Planning procedures and regulatory guidelines	Participation form	Active (multi-actors)	Passive	Active (the communities)
	Who conduct the planning process?	CPSWG- a multi-actors team	Forest planner	Communities
	Nature of the process	Dynamic and flexible	Robust and non flexible	Dynamic and flexible
	Knowledge	Mixed from all actors	Expert based	Communities based
	Transparency	Yes	No	Yes
Property rights		Multi-actors	Private or state	Community
Forests		As a common pools resource (CPRs)	As a private or state good	As a community good
Form of the outcome		Multi-actors contract	“Command”	communities contract

CPSWG: Combined planning system working group (CPSWG)

Table 7-1 Comparison of the CPS model with the existing planning system model (rational model and CBP)

7.3 Constraints and limitations of the CPS Model

As already briefly described in the previous section and in the introduction of this chapter, the established CPS model is deductively derived from the theoretical references (chapter 2). It is also based on problems identified in former studies on FMP. Furthermore it builds upon the results of explorative and empirical studies carried out in Cameroon, as well as on own observations made during field work. In this context this section examines the constraints or limits to validating or testing the CPS. In fact, the testing or empirical evaluation of the CPS could not be effectively performed, as described in chapter 3, although it should be applied in PFE. The implementation of the CPS in the real world would be the most appropriate way to confirm or refine their different sub-systems (VSS, IGS and TPS).[726] The constraints to testing the CPS in the field are discussed in the following. The two questions addressed are:[727] Are these constraints caused by specific restrictions or inadequacies in the technological or methodological design of the CPS? Or are these constraints of a more fundamental kind?[728] Possible limits associated with the former question can be overcome through improvement and further development as was already mentioned in section 7.1.1. Further recommendations to overcome such limits will be proposed in section 7.4. It is proposed that the methodology applied for explorative and empirical analysis of the Cameroonian FMP situation could be improved and further developed by for example introducing focus groups in addition to the semi-structured interviews. More fundamental constraints which are addressed by the second question cannot be influenced. It focuses on constraints each FMP research must deal with.[729] This refers to the characteristics of forestry itself and the resulting effects on FMPs which may hamper the implementation of the theoretically designed CPS model.

These constraints are fundamental in nature and show how difficult it is to aim for further development of the CPS and its validation during the short time of this thesis. Even in operational research the model could only have been tested partially. According to Speidel (1972), Bachmann (1992), Kurth (1994), Densborn (1999), ATIBT (2001,2007) and FAO(1998) these fundamental constraints are caused by the following forestry characteristics:

[726] These subsystems are toolboxes for planners
[727] These questions are based on those developed by Densborn 1999.
[728] Adapted from Densborn 1999.
[729] Adapted from Densborn 1999; Speidel 1972.

1. Long-term forestry production: The time of production is often very long for the natural species of the tropics and varies between 60 and 100 years for certain species in the Congo Basin.[730] This exceeds the time of production of other economic sectors. It therefre requires a long time to evaluate a FMP model.
2. The time of rotation is about 30 years (in Cameroon, see forest law 94 and ATIBT 2007, Nasi et al. 2006) which correspond to one cutting cycle. The periodical revision is every five years. It varies from one country to another in the Congo Basin and is usually around 20 to 30 years. This is also sufficiently long to judge quality of the model during its implementation.
3. Planning area expansion: Compared with other economic sectors forestry is carried out on large or very large areas. This area sometimes can reach about 200.000 ha according to Cameroonian law 1994.[731] The area covered can reach 1.000.000 ha in the Congo and 4.000.000 ha in the DRC.[732] These large concessions allocated over long time periods, are generally renewable once or several times.
4. Dependence on natural, social and economic conditions: These include soil conditions, geomorphology, and climate in relation to natural dependencies; extreme poverty of local communities, etc. in relation to social dependencies, and insufficient consumption, financial crisis, etc in relation to economic dependencies.
5. Equality of products and means (factors) of production. This result in the problem of an accurate yields regulation in forestry since the use of a product and the means or factors of production are harvested at the same time. This may influence the evaluation of yield determination by the CPS which also includes the social and ecological yield.
6. Risk and uncertainty: The complexity of decision making is particularly pronounced in forestry, e.g. due to conflicting objectives which play an important role in the CPS model. This is mostly because of the imperfect information situation in comparison to other economic sectors.
7. Social environment and interests groups: the social environment lacks clear relations unlike other sectors, for instance product market relations. This underlines the complexity of forestry which influences FMP decisions in a dynamic manner.[733] It would therefore be difficult to have a “perfect“evaluation of a model CPS.

[730] Adapted from ATIBT 2007
[731] Appendix O; PRC 1994,1995; Nasi et al. 2006.
[732] FM 2001, see Figure 9-6, Appendix E.
[733] Adapted from Densborn 1999; Kovac 2002.

These characteristics make it very clear why it is impossible to fully test and evaluate the CPS in practice within a very short period as set by the thesis time frame. In this context the long term of the production,[734] the rotation period and the expansion of the area, as well as the complexity of their functions for planning decisions (conflicting interests) may be the most important factors which affect the evaluation of the CPS model, especially in the Congo basin region where roughly 30 million people live within or near forest concessions.[735] Furthermore, there is a reversal effect for the achievement of the planning decision; this means that after planning decision faults, there is a need for decades to correct these faults/errors contrary to other economic sectors. Decisions on the rotation period and the MCD and DME/UFA, or decisions on the regeneration rates or simply the enrichment of an ecosystem unit clearly have long-term effects.[736]

Beyond this concern about the parameters dependent on the methodological design of the CPS and the characteristics of forestry, there is another factor that hampered the evaluation of the CPS in the field during the research of this thesis. This is the financial costs of the time consuming process of establishing the CPS in the Congo Basin. These costs involves major investments, for example, as presented in chapter 3, a forest company found the FMP drafting to be a constraint because it is too difficult to finance given the delay in returns after the investment period.[737] In fact, the FMP process represents an investment that is non-productive in the short-term. ATIBT (2007) showed for the implementation of their model that the cost may be estimated to be about €3 sometimes €5.3 per hectare.[738] However, this does not include the full cost of the VSS and the IGS establishment which could not be addressed in this thesis. Based on these fundamental constraints it was thought to be appropriate to improve the CPS model indirectly through the analysis of the FMP situation conducting fieldwork in Cameroon.

[734] As well as the dependence on natural factors of production.
[735] CBFP 2007.
[736] Adapted from Hanewinkel 2001.
[737] Dogmo 2009.
[738] This cost distribution is between the various steps according to ATBIT (2007): a) Forest management unit: equipment, supervisory staff (forest management plan officer; b) Design office, etc.) and operational staff (technicians, mapping department, secretariat, etc.), operation (vehicles, stationery, etc.); c) Acquisition of cartographic data, satellite images, setting up of a GIS; d) Studies (wildlife, socio-economic, biodiversity, etc.) and training courses (RIL, forest management training, etc.); e) Forest management plan inventory. However the cost distribution also varies greatly depending on the analysis carried out, i.e. whether or not the supervisory aspect is factored into the cost of the inventory, whether or not administrative costs are accounted for, whether supervisory work is taken into account for internal studies, etc.

Beyond the aforementioned limits of the CPS model, this chapter will highlight the importance of the IGS and VSS in the planning process (see Chapter 3). These two subsystems of the CPS may be helpful in addressing some limitations and may bring equilibrium to the planning outcome, specifically through the establishment of the CPSWG. Accordingly, the next section focuses on further development and recommendations in relation to solutions for the CPS implementation, as well as further research.

7.4 Recommendations

In the light of the limits of the CPS model discussed in the last section, it is worth thinking about how big and complex this model can be and what challenges must be met to overcome these constraints in the future. The recommendations will be grouped into two categories: practice (practical forestry) and science.

7.4.1 Recommendations for practice

The CPS model with its three subsystems VSS, IGS and TPS has been theoretically designed rather than empirically. Therefore, the question of its implementation in the real world has to be addressed, specifically the link between them. However these relationships were not explicitly included, because each subsystem must be clearly and explicitly designed before any relationships can be identified. The relationships are used to enable the implementation of the model by the CPSWG through a facilitating procedure. This relationship is useful for further development of the current CPS model. In fact, at the moment, the guidelines to be used by the CPSWG or users of the model are not fully developed yet. Before any attempts are made to implement the CPS model, it must firstly be clarified how the model will be used. A procedure of setting priorities for the CPS model in order to be able to enable fine-tune the model to the demands of the forest planners and other FMP actors are proposed in the following:

1. First of all, the practitioners or CPSWG may design the VSS (S1) which opens the door to the FMP process as the first element or subsystem of the CPS. This subsystem VSS is the starting point or the “opening key” within the CPS. In fact, it highlights the normative aspect of FMP. For example, a vision could be: securing or protecting the image of forestry through common welfare. This subsystem must be applied first to safeguard

forestry in the long run as a signalising mechanism. The measures developed then have to be implemented as part of the subsystem TPS;

2. Secondly, the practitioners may design the IGS (S2) as a second subsystem of the CPS. Following the pattern of interactions analysis (motivation and incentive of the actors involved in the planning process) the institutionalisation and establishment of the CPSWG should be established. This step may be helpful in the implementation of the CPS in the field. Furthermore, it is proposed to implement the tactical dialogue within the TPS for the consensus building process.
3. Lastly, the TPS represents medium term planning. It is a process for acquiring information through the overall planning to arrive at the economic, social and ecological yield determination. This process has to be performed by the CPSWG in a transparent manner to avoid conflict when implementing the plan in the real world.

This procedure for CPS implementation may facilitate its use by practitioners as it provides a basis for better comprehension of the tools proposed in this framework. This procedure offers a general approach to assembling and building a toolkit that can address specific problems of FMP in the Congo Basin. The effectiveness of such a toolkit in guiding the FMP conception and elaboration is dependent on the degree to which their application and integration promotes information exchange between the key participants (actor groups) in the planning process.[739] Therefore, in order to enhance the functionality and range of opportunities offered by the CPS model, an alliance is required for rainforest planners to expand their knowledge because planning is no longer focusing on unique function forests but on multiple purposes (socio, economic, ecological aspects) with a special focus on the VSS and IGS according to the findings presented in chapters 3 to 5. Convenient and easily understandable ways of manipulating and interacting with CPS will be essential for an effective CPS model implementation. However, this procedure developed for the CPS implementation is still in its theoretical stage and needs to be investigated further. In order to do so case studies could be carried out to identify the applicability of the CPS model in planning processes other than the FMUs and forest councils. Despiet all the efforts already undertaken, planning design for SFM remains a challenging problem (see chapter 1).

[739] Adapted from Kovac 2002; Bos 1994.

7.4.2 Recommendations for research

Although, the CPS model seems a promising approach for FMP in the Congo Basin, further work needs to be done in order to develop this basic idea into an operational model. This follow up work should aim at the improvement and refinement of the subsystems. Additionally, at the present stage further research is needed to assess the pertinence of the CPS tools, as well as the relationship between the subsystems. The results could then be used to refine or reformulate the CPS model. This is important because of the complexity of forestry and its environment (multi-functionality of the rainforests). The recommendations for further work can be grouped into three categories: first of all work concerning the improvement of the existing findings presented in chapter 4 and specifically of the current CPS; then, work concerning the implementation and application of the CPS model in the real world.

7.4.2.1 Work concerning the improvement of the existing findings of the Chapter 3 and specifically of the current CPS

There is a need to improve the findings obtained during the field work performed as part of this thesis for refining the CPS. Notably, because one of the difficulties in developing a system likes CPS is based on the fact that the actors of FMP were interviewed separately. When the empirical study described in chapter 3 was being done the interaction between interviewees was not taken into consideration. Therefore, further work is needed and a joint seminar for establishing a focus group may be a useful follow up activity for CPS model improvement. Specifically, for gaining further information generated through interactions.[740]

Such a focus group for the improvement of the CPS model is expected to contribute significantly to improve the outcome of the findings of chapter 3 and thus the CPS model itself paving the way for developing further into the direction of SFM practices. A focus group may produce data and insights that would be less accessible without interaction found in a group setting. Lindlof & Taylor (2002) showed that listening to others' verbalised experiences stimulate memories, ideas, and experiences in participants. This kind of qualitative research method is seen as an important tool for acquiring feedback and restitution regarding the previous fieldwork. It is also an important arena for dynamic critique and local knowledge. Additionally, the CPS may be directly diffused amongst the focus group

[740] Cf. Myers 1997; Stevens 2009

participants and evaluated by them. In this respect, the CPS as a proposal is not finalised regarding its comprehensibility, relevance, justification or reason and applicability. It is open to discussion to improve these aspects. The focus group should be established on the basis of a theoretical conception and the group may be further subdivided into four working groups each dealing with one of the four aspects mentioned.[741]

7.4.2.2 Work concerning the implementation or application of the CPS model in the real world

Another main recommendation for the future is to actually pursue research during which the CPS is implemented and evaluated. This is mandatory for its refinement to actually be practicable in PFEs at FMU or forest council level. Only then will the consequences of implementing the CPS in the Congo Basin become apparent. However, it is recommended to implement the CPS model subsystems as explained in section 7.3.1. Nonetheless, further research is needed to assess the effects of applying these subsystems and the model as a whole to reveal the effectiveness of the procedure proposed. The implementation of the CPS may also be useful for the confirmation of the comparison performed in section 7.2 with existing models. In fact, the CPS model is only one among several models proposed within the last decades for FMP drafting in the Congo Basin. The application of the CPS model may however constitute a promising alternative, contributing to SFM.

[741] These four aspects include: comprehensibility, relevance, justification or reason and applicability

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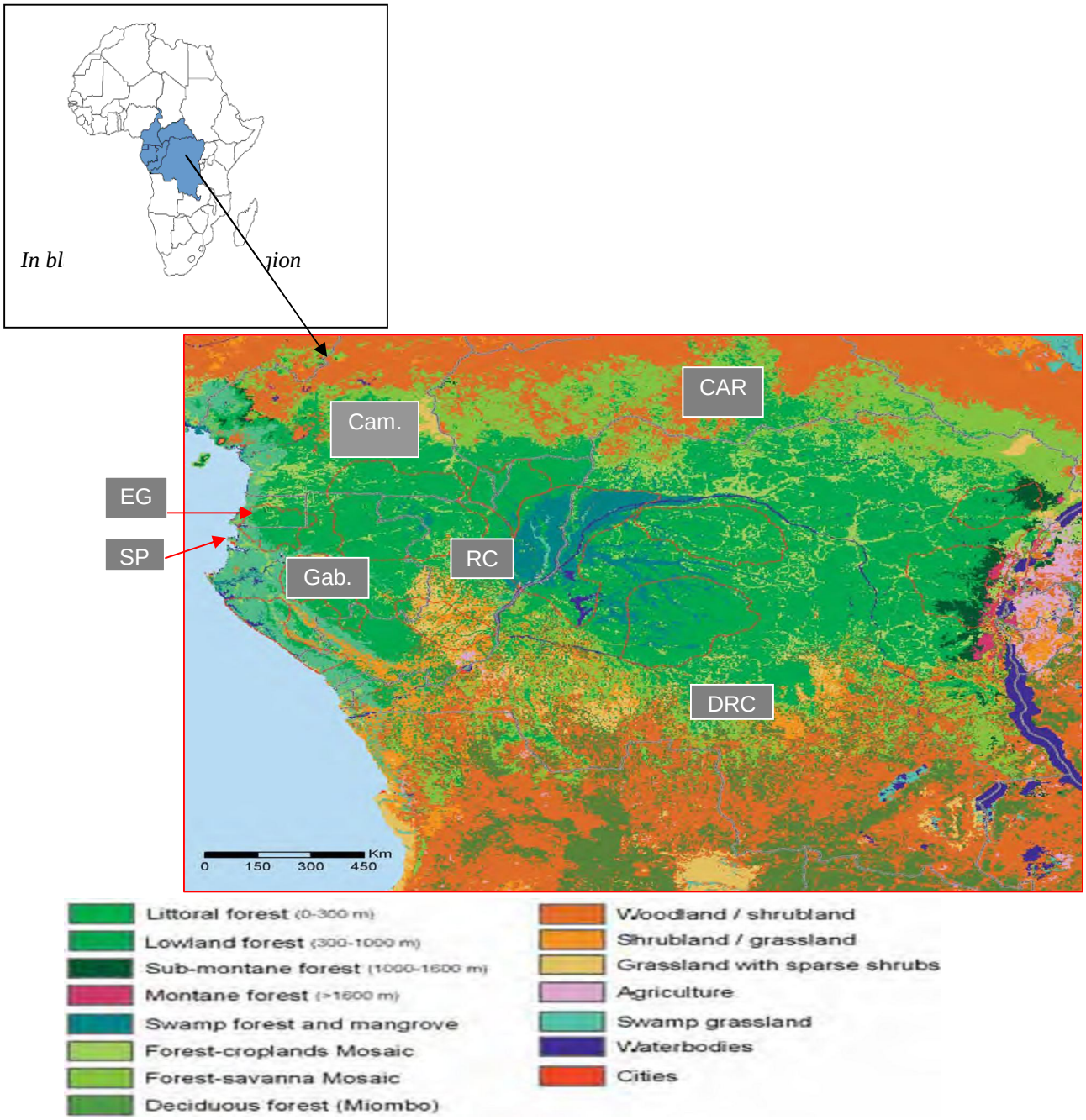
9 APPENDIXES

9.1 APPENDIX A: Congo Basin rainforests region



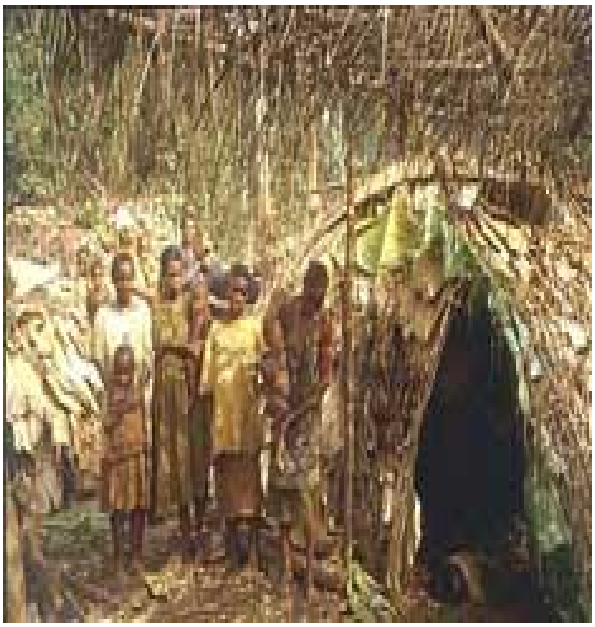
CAR: Cameroon, CAR: Central African Republic, RC: Republic of Congo, Gab.: Gabon, SP: Sao Tome and Principes, EG: Equatorial Guinea, and DRC: Democratic Republic of Congo

Source: Adapted by JRC quoted by quoted by CBFP 2007.

Figure 9-1 Congo Basin Rainforests region

9.2 APPENDIX B: A typical village in the rainforests

Figure 9-2 A typical village in the rainforests (CBFP 2007)



a. Bakas

b. Bantous

Source a.: Forest Monitor 2001

source b.: Djomo et al. 2000

Figure 9-3 Extreme poverty and lack of investment in basic social services.

9.3 APPENDIX C: Synthesis on Cameroon forest management planning guidelines

In Cameroon, existing forest management planning options adopted by the state can be classified in three options which are independent on forest ownership (see Figure 9-4 and Table 9-1 of this appendix C):[742]

a) Option on the national level which is called strategic planning (mainly of forest policy statements and choices that are designed to govern the management of all national forests: Zoning plan).[743]
b) Option on the collective level or tactical planning: Identification of forest management zones and of specific objectives per zone.[744]
c) Option on the Forest Management Unit (FMU) level.

9.3.1 Forest management option on national level

Management option on the national level consisted mainly of forest policy statements and choices that are designed to govern the management of all national forests. The option for forest management in Cameroon on the national level is described in three main policy documents: The national forestry policy statement written in 1993[745] and its decree of implementation.[746] The above three policy documents are supported technically by the Zoning plan which was approved by the State in 1995.[747]

a) Forest policy statement.

A new forest policy prepared by a coalition involving the ministry in charge of forests, Non-governmental organisation (NGOs) and the World Bank was adopted in 1995 after a five-year process.[748] According to the Atyi 2000, the main underlying principle is that of ensuring the sustainability and development of the economic, ecological and social functions of the nation's forests through integrated management that leads to the sustained and lasting conservation and utilisation of resources and forest ecosystems. In this respect, the forest policy centres the achievement of five objectives associated each with a set of action strategies as can be found in the Law 1994 (PRC 1994, 1995). These objectives are:[749]

a) To ensure the protection of Cameroon's forest heritage and to contribute to the safeguarding of the global environment and to the preservation of biodiversity.
b) to improve the integration of forest resources in overall rural development and to increase the participation of rural populations in forest conservation and management in order to raise their living standards;
c) To sustainably develop forest resources with a view to enhance the forest resources in order to improve their contribution to the GDP of Cameroon while preserving their productivity.
d) To ensure the regeneration of forest resources by plantations in order to perpetuate their potentials

[742] Adapted from Atyi 2000; Foahom 2001.
[743] Karsenty et al. 1998; Fines et al. 2001a,b; Lescuyer 2002; Foahom & Jonkers 2004.
[744] Fines et al. 2001a,b; Lescuyer 2002.
[745] PRC 1994, 1995; Atyi 2000.
[746] PRC 1994, 1995;Atyi 2000.
[747] Atyi 2000; Nguiffo & Djeukam 2002; Foahom & Jonkers 2004.
[748] Atyi 2000 ; Djontu 2009; Foahom 2001.
[749] See Atyi 2000 ; Djontu 2009; Foahom 2001.

e) to set up an efficient institutional system involving all concerned parties in the management of the sector. [750]

b) Forestry and Environmental law

Since the beginning of the 1990s, there has been particular emphasis on environmental protection in Cameroon and, even more, on the sustainable management of forest resources. A new law on forests, wildlife and fisheries (Law 94/01 of 24 January) was approved in 1994 and supporting decrees on wildlife (95/466) and forests (95/531) issued in 1995.[751] In addition, a new environmental law was approved in August 1996 (Law 96/12) concerning the management of the environment. Cameroon opted for the politically high-risk strategy of radically overhauling its legislative framework as a means both of increasing the efficiency of the industry and promoting community participation in forest management.[752] These are supplemented by specific regulatory texts for production forests and community forests. All these documents deal, more or less directly, with the involvement of local populations in decisions concerning forestry management.[753] Furthermore, the Law 94/01 provides a good basis for introducing SFM; in particular, it stresses good forest management practices through the following provisions: the replacement of the former forest licence system by a forest concession system; the compulsory preparation and implementation of long-term forest management plans in concessions and simple forest management plans (plan de gestion) in forests attributed to communes and communities.

From historical point of view, according to Foahom & Jonkers (2004), Cameroon's first forest law dates from 1974. They showed that this law was revised in 1981 (Law N°81-13 of 21 November 1981) and completed by the 1983 application decree (Decree N° 83-169 of 12 April 1983). Foahom (2001) argued that this law from 1994 sets conditions to be followed by physical or moral persons in order to enter the logging profession. Procedures for granting and renewal of licences, the control of exploitation by girth and species, and the various taxes were documented in a procedural guide entitled "*Cahier des procedures pour l'exploitant forestie*r" published by the Forestry Department in 1988.[754] Furthermore, forest exploitation licences were granted to private companies for a period of five years and were renewable. The concession areas were divided into working coupes of 2.500 ha called *‚Assiette de coup*e.[755] After a coupe was closed, re-entry to harvest more timber was not permitted. The licensee nominated the coupes in advance for the coming year. The company had to present, among others, maps showing the positions of harvestable trees and proposed forest roads, and the results of an inventory of commercial species. Some other types of logging permits existed and consisted of *‚gré-à-gr*é and *‚vente de coup*e and conditions to obtain them are defined in the law.[756]

Foahom 2001 highlighted also that there were 45 species listed as obligatory for inventory purposes, and trees smaller than a diameter specified in the *‚Cahie*r could not be felled. The minimum diameter varies from 50 cm to 100 cm, depending on the species. He argued that the average volume extracted per hectare was estimated at 5

[750] PRC 1994 1995; Atyi 2000 ; Foahom & Jonkers 2004; Nguiffo & Djeukam; ITTO 2005.
[751] Atyi 2000; Brown & Schreckenberg 2001; Foahom 2001.
[752] Brown & Schreckenberg 2001; ITTO 2005.
[753] Emerit et al. 2001; ITTO 2005.
[754] See also Van Dorp1995; Foahom & Jonkers 2004; Nguiffo & Djeukam 2002.
[755] Atyi 2000.
[756] Van Dorp 1995.

m^3 out of a commercial volume of about 35 m^3.[757] From historical perspective, he (Foahom 2001) showed that The writing of a Forest Management Plan was not a prerequisite to forest exploitation. Management plans were developed for some forests such as Deng Deng forest (in the semi-deciduous forest) and Melap forest (plantation forest in the savannah zone) but were never applied due mostly to institutional obstacles. Gazetted permanent production forest was almost non-existent, and timber production was in short-term concession of one to five years. Foahom (2001) showed furthermore that regulations concerning forest management (exploitation) were based on the 1981 law until the promulgation in 1994 of the current Legal Regulations on Forestry and Wildlife. The drawing of this recent law took into consideration the Cameroon government goal of achieving sustainable management of its. This last decade, Cameroon's forest sector has gone through profound institutional and legislative reforms, all of which complies also with many bilateral and multilateral conventions of which Cameroon is a party.[758] This has resulted in a number of actions that have significantly modified regulations governing the entire sector. A Ministry of Environment and Forest was created in 1992 (Decree N° 92/069 of 9 April 1992). As compared to the former Institute of Agronomic Research, the newly created Institute of Agricultural Research for Development (Decree N° 96/050 of 12 March 1996) put more emphasis on Forestry and Environment research. Apart from these institutional reforms, other reforms apply to legal regulation on forestry and wildlife, to designing a National Zoning Plan and guidelines for the preparation of forest management plans.[759] Foahom & Jonkers (2004) revealed that it is the legal framework contributing to the implementation of the National Forestry Action Programme, as an integral part of the government strategy to ensure sustainable use and conservation of its forestry, wildlife and fisheries resources, and of the various ecosystems. It lays down regulations with a view to attaining the general objectives of Cameroon New Forest Policy. Its implementing instruments are made of two specific regulatory (Decrees N° 95-531-PM and 95-678-PM) and three common (Decrees N° 86-230, 96-237-PM and 96-238-PM) instruments.[760] They (Foahom & Jonkers 2004) additionally showed that the Law on the management of the environment (Article 9), recognises the principle of participation, according to which (roughly translated) "decisions on the environment shall be taken after consultation with the sectors of activity or groups concerned, or after public debate, when they are of a general nature." The MINEF, too, agrees that local populations should "participate in every phase of consultation and follow-up throughout the process, from the preparatory phase to the implementation of the management plan".[761] There is, therefore, a legal obligation to involve local communities in the decision-making process whenever a forest is to be the subject of a management plan.[762]

c) The Zoning Plan

The National Zoning Plan (NZP) is an indicative framework for land use in the southern forested area. It acts as tool for the planning, orientation and exploitation of natural resources within the area. The process of forest management in Cameroon involves several stages, which may be summarised for purposes of clarity.[763] According to the provision of the Legal Regulations (Law N° 94-01), permanent and non-permanent forests are distinguished, as illustrated in *Figure 9-4 and Table 9-1*. In fact, sustainable forest management implies legal

[757] Evans, 1990 quoted by Foahom & Jonkers 2004.
[758] Foahom & Jonkers 2004.
[759] Legal Regulations on Forestry and Wildlife (Law N° 94-01 of 20 January 1994 in PRC 1994.
[760] Van Dorp 1995; Foahom & Jonkers 2004; Nguiffo & Djeukam 2002)
[761] MINEF 1998.
[762] Emerit et al. 2001; Brown & Schreckenberg 2001.
[763] Emerit et al. 2001; Brown & Schreckenberg 2001.

protection of managed forest and therefore a categorisation of the forests, the Cameroonian forests are divided into:[764]

- Permanent Forests Estate (PFE) (forêts permanents in french) also known as 'classified forest' (forêts classées), which can only be used for forestry or as wildlife habitats. It constitutes the land, assigned to the forest and/or to the wildlife habitats. It includes the state forests *(forêts domaniales in French)* (protected areas and forest reserves) and the communal forests (see Figure 9-4). Cameroon has an estimated 12.8 million hectares of natural-forest PFE, comprising 8.84 million hectares of production forest (including council forests, the objectives of which may vary between councils) and 3.90 million hectares of protection forest (see Table 9-1). The law (Article 22) specifies that at least 30% of the national territory should be classed as the PFE. It consisting on one hand of forests set aside for the preservation of animal and plant species and where logging is not allowed and on second hand on production forest, designated for sustainable production of timber and other forest products and on council forest which is classified or planted forest to the benefit of the local council, which results to the grant of property rights within the PFE. This forest is subject to a management plan, supervised by the technical authority. Its logging should contribute to increase communal funds. This in turn should contribute to provide social services to local population of the concerned council. These forests are managed in a decentralised manner by elected local councils on the basis of management plans approved by MINEF.
- Non-permanent forest Estate (NPFE) (forêts non permanentes), consisting of forested land designated as conversion forest (which can be converted to non-forest uses). This includes: Community Forests ("forêt communautaires" in french) and forests belonging to private individuals ("forêts privées"), Communal forests ("forêts du domaine nationale") a residual class (see Figure 9-4). These NPFE are neither classified nor subject to specific management plans, designated as conversion forest for other uses, provided that they are kept under forest until required, and harvested according to some guidelines as PFE except the CF which need a simple forest management plan. The community forest is an area located in the NPFE (≤ 5000ha); subject to an agreement between the village community and forest service. Logging on the basis of simple management plan (SPM) (see Table 9-1). CF seen as a way of securing access to the resource, and secondarily as a means of collecting forestry revenue. A pre-emption right decree from 2001 grants to village-community the ability to decide for the type of status they want their forest to stand (CF vs SSV).[765]

The forest management procedure, which establishes the boundaries between these two forest estates, and provides for their management, is thus a crucial stage. It is conducted in two phases.[766] The first is to establish the boundaries between the two estates and to define the uses to which the permanent forest is put (that is, its priority use, which defines the type of management implemented). This is usually based on the Cameroon national zoning plan, which proposes the demarcation and allocation of the permanent forest, and is carried out with the participation of all the stakeholders. An Outline Plan is often drafted at this stage, to answer two

[764] Brown & Schreckenberg 2001; Emerit et al. 2001; ITTO 2005; Atyi 2000 ; Foahom & Jonkers 2004; Oyono 2004a ; Nguiffo & Djeukam; Djeumo & Fomete 2001; Auzel et al. 2001.
[765] Côté, 1993 quoted by Foahom & Jonkers 2004.
[766] Fines et al. 2001b.

essential questions: a) Who is going to manage the forest (identifying the stakeholders and institutions concerned with resource management)? 2.What is going to be managed (defining the boundaries of the permanent forest and the uses to which it is put)? This document is a starting point for the classification procedure. The second stage is then to draft a management plan for the classified forest, clearly describing the terms of use of the land concerned.[767]

9.3.2 Forest management option on Forest Management Unit (FMU)

Guidelines for drawing up a Forest Management Plan for a Production Forest

Permanent forests shall be managed in order to sustain their production capacity. It is in this respect that the concept of Forest management plan is presented in the law. According to its section 29, Foahom & Jonkers 2004 showed that a management plan shall be drawn up for State forests defining, in accordance with the conditions laid down by decree, the management objectives and the rules for each forest, the means needed to achieve the said objectives, as well as the conditions under which the local population may exercise forests.[768] In this respect, according to Atyi (2000); Nguiffo & Djeukam (2002) and Foahom et al. (2004), the option on the FMU level are presented in four technical documents which contain standards for forest inventory with the purpose of management planning, standards for the stratification of forest lands for their mapping at the scale of 1:50.0000, standards for the verification and evaluation of forest inventories and guidelines for the elaboration of forest management plans for production forests.[769] Additionally, they highlight, that these documents provide only indications for sampling designs during different types of forest inventories. For example, the sampling intensity of forest inventories for management planning purposes should be at least 0, 5% of the total FMU area. They also regroup tree species in three groups based on the frequency of their demand in the timber product markets. The minimum Diameters Eligible for Harvesting (DME) is also set by species. The guidelines for the elaboration of management plans for production forests set the minimum cutting cycle at 25 years and make it mandatory to estimate the annual allowable cut on the bias of at least 20 species making up a minimum of 75% of the standing harvestable volume.[770] Additionally, in managing the national forest resources, the participation or, at least, the consultation of concerned stakeholders is a duty, pointed out by the Cameroonian legislation. The environmental law 1996 (article 9 quoted by Foahom & Jonkers 2004) refers to a participation principle that implies, that "every citizen must have access to information related to the environment (...); decisions on the environment must be taken after consulting the concerned sectors or groups, or after public discussion when they have a general scope".[771] The preparation of the management and business plans and arrangements for implementation is the responsibility of the concession-holder under state supervision; to assist this, in 1998, ONADEF produced a guide to the preparation of forest management plans in production forests.[772] Bids can be submitted by national or foreign investors to MINFOF, which awards the FMU on the advice of a technical committee. After paying a security deposit within 45 days of notification, the winning party receives a three-year

[767] Emerit et al. 2001.
[768] MINEF 1998; MINEF 2001; Foahom & Jonkers 2004.
[769] See also Fines et al. 2001; Lescuyer 2002.
[770] Besong 1992; Atyi 2000; Fines et al. 2001; Lescuyer 2002; Foahom & Jonkers 2004.
[771] Nguiffo & Djeukam; Lescuyer 2002; Foahom & Jonkers 2004.
[772] MINEF 1998.

provisional concession licence. During this period the concessionaire must prepare a fully-fledged forest management plan and make arrangements with all stakeholders involved, in particular any local forest users.[773]

Forest estate	Category	Number	Area (ha)
Permanent (PFE)	***Forest reserves***		
	Attributed FMU	96	6.063.119
	FMU of conservation	9	867.009
	Other production forests (Non FMU)	30	632.400
	Other forest reserves(1)	57	920.000
	Protected area for the fauna(2)		
	National parks	17	2.0910.382
	Fauna reserves	6	738.995
	Sanctuaries of fauna	4	246.368
	Zoological gardens	3	6,7
	Hunting area	57	(3)
	Others (4)		
	Communal forests	13	325.500
	Total PFE(5)		12.703.779
Non Permanent (NPFE)	National forest estate (VC)(6)	29	62.500
	Community forests(7)	107	387347
	Private forests	(8)	

(1) Protection forest, integral ecology reserves, recreation forests, research forests and perimeter of afforestation

(2) Source: Direction of fauna and of Protected areas

(3) Non mentioned area, then certain zones which are the cynegetic interest superimpose itself with other spatial unit

(4) Ranches of State and buffer Zones

(5) The area of the permanent forest estate presented here is a combination of data derived from the Forestry Atlas and the data of MINFOF, and therefore have to be considered as a simple estimation based on the best available data

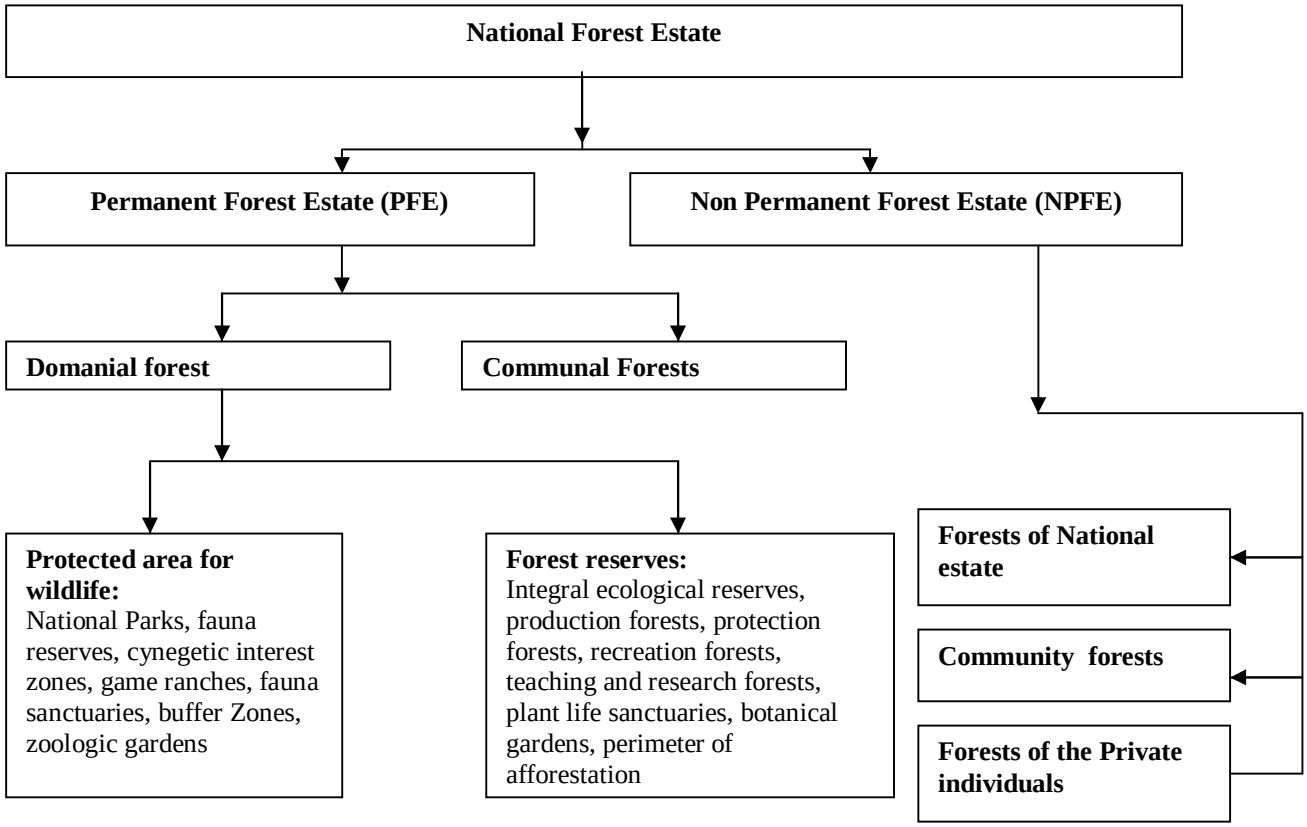
(6) VC: "Vente de coupe valide en 2005 »

(7) Source : « Sous Direction des Forêts Communautaires » (SDFC)

(8) Non available data.

Table 9-1 Zoning of Cameroonian`s forests adopted from ITTO 2005; Nasi et al. 2006; PRC 1994; MINEF 1998; Djontu 2009

[773] ITTO 2005.



Source: Cerutti et al. 2006; PRC 1994, 1995

Figure 9-4 Organisation of national permanent forest estate.

Forest management situation in protected area, Extent of protected areas

An estimated 3,90 million hectares of forests are in some form of protected area, comprising national parks (2,91 million hectares), wildlife reserves (739.000 hectares), wildlife sanctuaries (24.600 hectares) and zoological gardens (6.700 hectares); a further 867.000 hectares of FMUs have been set aside for conservation purposes.[774] 2,65 million hectares of forest are in protected areas conforming to IUCN protected-area categories I–IV, of which 2,26 million hectares are lowland evergreen broadleaved rainforest. The first six national parks in Cameroon were set up primarily to attract tourists to Sudanian savanna and woodland vegetation types in the north of the country.[775] The major forest zone in the southern part of the country was, until recently, less well represented in the protected-area system. The Korup area was upgraded from faunal reserve to national park by presidential decree in 1986 and the forest reserves of Dja and Pangar Djerem are also being proposed as national parks.[776]

[774] GFW 2005.
[775] United Nation Environmenetal Programme (UNEP) 2002.
[776] ITTO 2005

9.4 APPENDIX D: Rainforests destruction in Cameroon

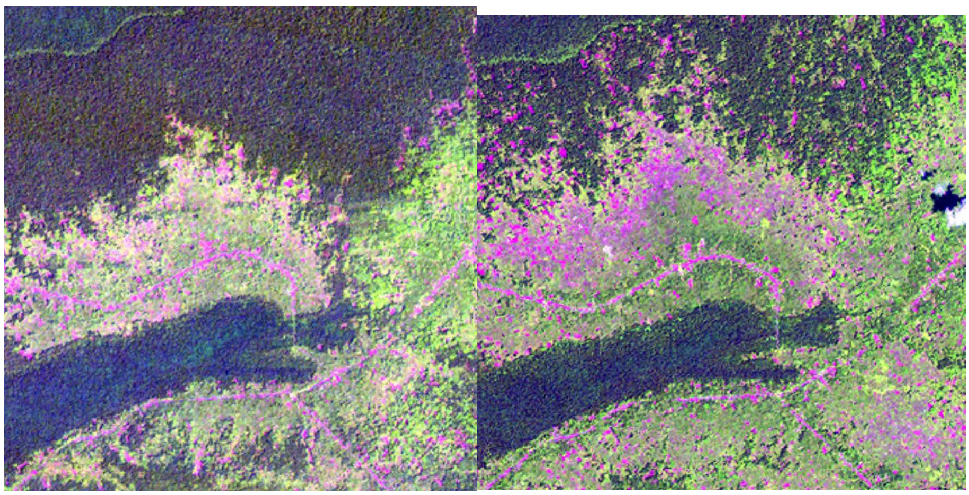


Figure 9-5 Cameroon rainforests destruction

	Undisturbed forests (in million ha)	Disturbed forests (in million ha)	Average production 1990-95 (in million m^3)	Production as a percentage of sustainable yield
Africa	59.6	112.9	17.1	174%
Asia and the Pacific	53.0	91.9	97.6	59%
South America and the Caribbean	42.1	122.5	33.8	141%
TOTAL	154.7	327.3	148.5	91%

Source: FAO (1997) in FAO, 2005

Table 9-2 Production forest areas in 1990 and current levels of roundwood production compared with sustainable yield

9.5 APPENDIX E: EU-based forest companies with logging operations in Central Africa

EU Parent Company	Central African Country/ies of Operation	Logging Subsidiaries in Country of Operation	Concessions (ha)
Alpi *Italy*	Cameroon	Alpicam	128,449
		Grumcan	85,812
Basso *Italy*	Gabon	BTIG	450,000
Bolloré *France*	Cameroon	Forestière de Campo (HFC)	162,790
		SIBAF	134,765
Bruynzeel *The Netherlands*	Congo (Brazzaville)	Boplac (43.5%)	500,000
Danzer *Germany* $	Democratic Republic of Congo	Siforco	2,900,000
	Congo (Brazzaville)	UFA Est/SCBO	1,300,000
DLH Nordisk *Denmark* $	Congo (Brazzaville)	Boplac (43.5%)	500,000
Feldmeyer *Germany* $	Congo (Brazzaville)	CIB	1,150,000
Interwood *France*	Cameroon	Coron	136,760
		Interwood Cameroun	not known
	Gabon	SHM	300,000 (estimate)
Pasquet *France*	Cameroon	R. Pallisco	-
Rougier *France* $	Cameroon	Cambois	145,176
		SFID	68,292
	Congo (Brazzaville)	Mokabi	370,000
	Gabon	Rougier Gabon	700,000
SAFI *Spain*	Equatorial Guinea		30,000
Sonae *Portugal*	Gabon	Leroy Gabon	654,000
Thanry *France*	Cameroon	CFC	215,000
		J Prenant	54,457
		Propalm	125,490
		SAB	60,838
		SEBC	223,130
	Central African Republic	Thanry Centrafrique	228,000
		Sofokad	131,200
	Gabon	CEB	505,000
		EFG	100,000
Vasto Legno *Italy*	Cameroon	SEBAC	88,796
		SEFAC	62,597
Wijma *The Netherlands*	Cameroon	Wijma (Douala)	-
		SARL	
Wonnemann *Germany*	Congo (Brazzaville)	SOCOBOIS	Not known
TOTAL			**11,010,552**

Key Logging (including as subcontractor) Processing Transport $ Trade in timber

source: FM (2001)

Figure 9-6 EU-based forest companies with logging operations in Central Africa

9.6 APPENDIX F: Management of the production Permanent Forest Estate (PFE) for Cameroon

Natural				Planted		
Total sustainably under licence	Allocated to concessions/management plans	with	certified managed	Total	With management plans	Certified
8,840 500d	4,950*	1,760**	1	17 0	no data	

* Source: GFW 2005 adapted from FAO (2005)
** Includes concession areas that already have a management plan or have completed forest inventories for the preparation of a forest management plan

Table 9-3 Management of the production Permanent Forest Estate (PFE) ('000 hectares)

9.7 APPENDIX G: Central European forest management planning techniques

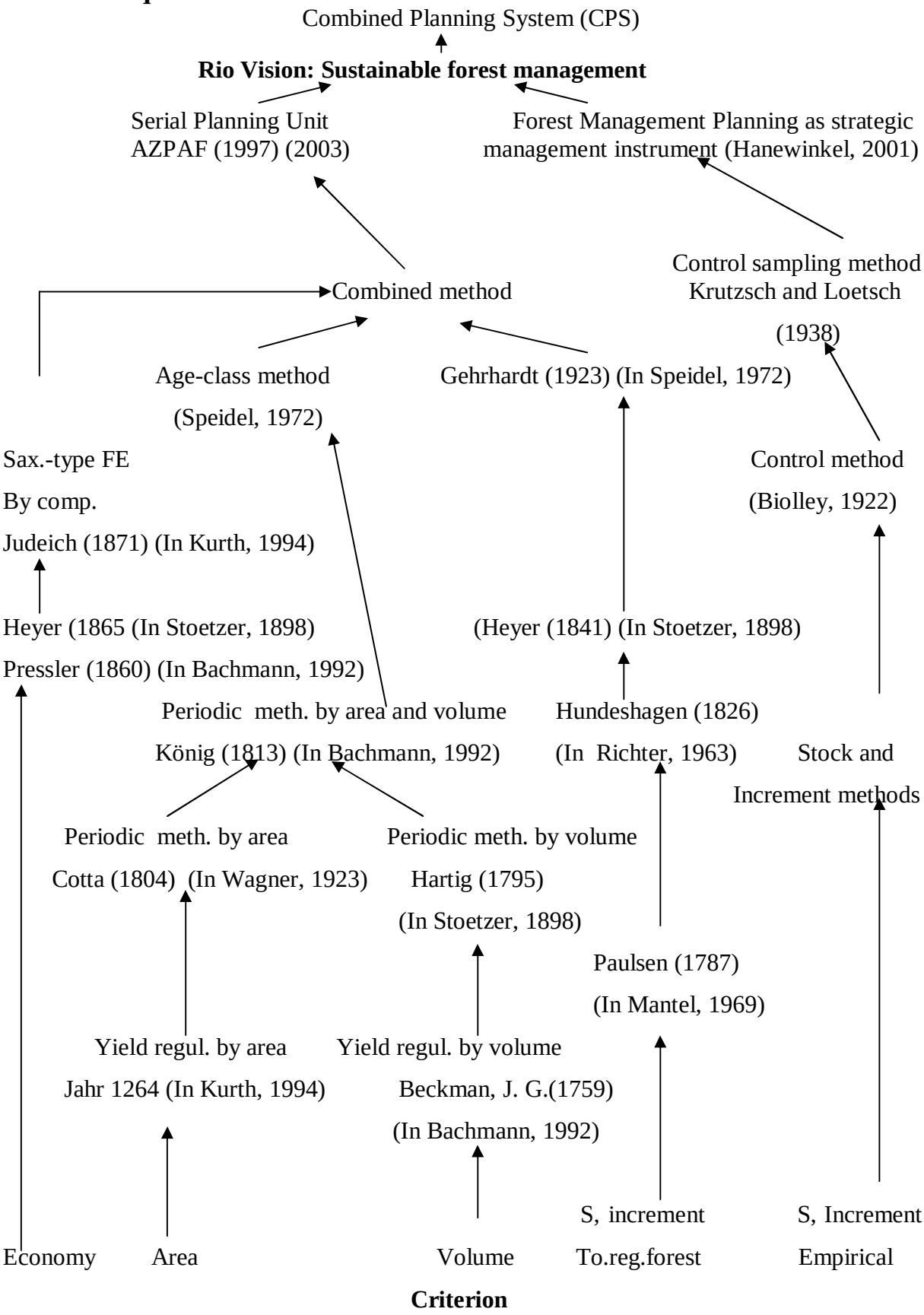


Figure 9-7 History of the forest management planning in central Europe (adapted from Speidel 1972)

9.8 APPENDIX H: Rationalist approach in tropical forest management planning

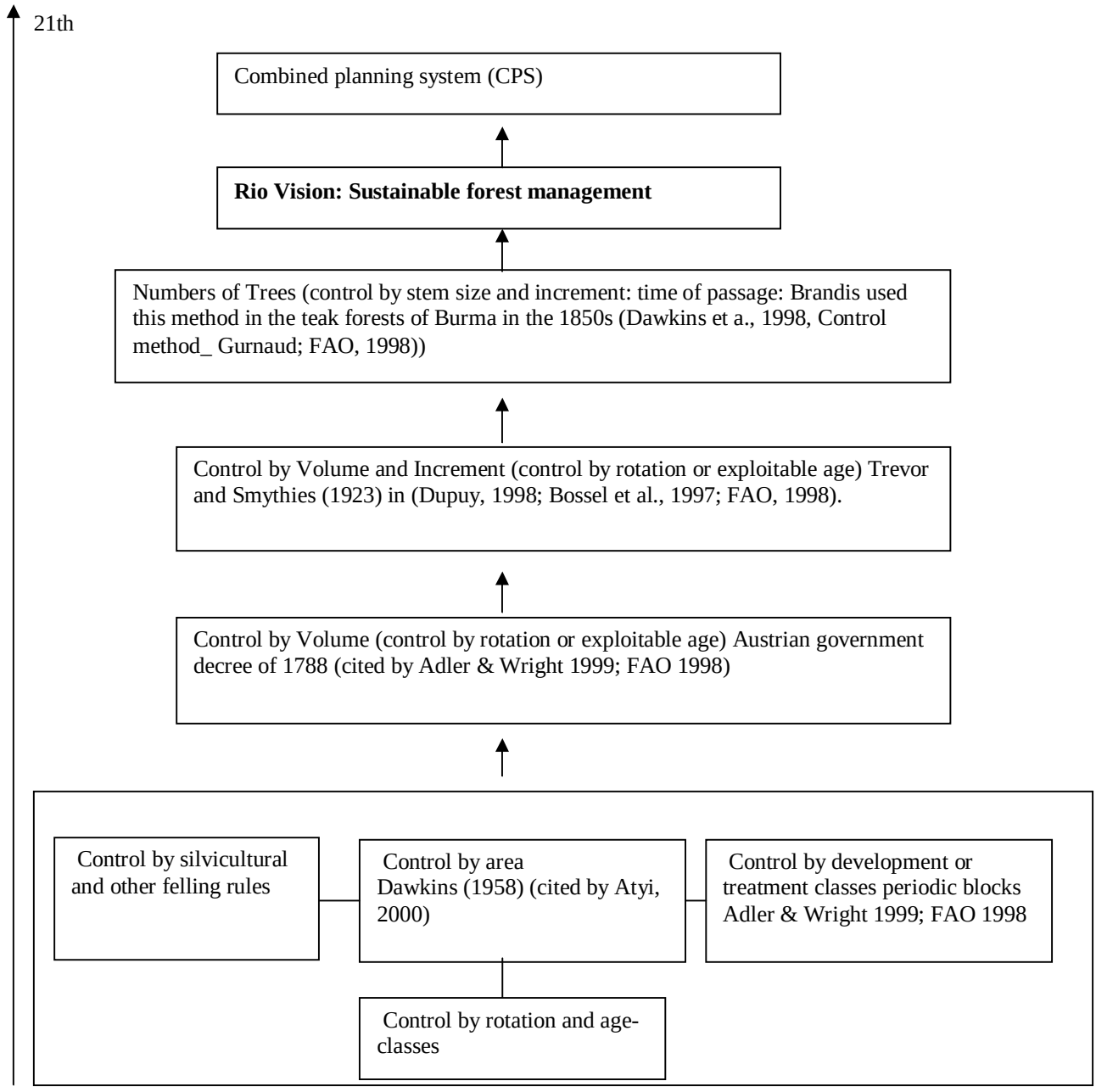


Figure 9-8 Illustration of rationalist's forest management planning understanding as yield regulation: a history

9.9 APPENDIX I: Participatory decision making continuum

Management Agency Controlled		Stakeholder Controlled	
Level 1	Level 2	Level 3	Level 4
Management Agency has authority, makes the decision, and then informs stakeholders (telling, directing, management agency is accountable and responsible,management agency is in control, stakeholders are told about, but not involved in decision making)	Management agency gathers input from the stakeholders before deciding (selling, coaching, stakeholder input is gathered as part of the process, stakeholders are consulted and may have input into the decision)	Stakeholders decide and recommend actions for the agency to implement (participating, facilitating, accountability is shared, stakeholders provides decision to management agency, who then develops an action plan and implements the decision	Stakeholders decide and act to implement (delegating, liaisoning, stakeholders are accountable and responsible, stakeholders can set direction and take action without approval, stakeholders implement decision

Table 9-4 Participatory decision making continuum designed by NOAA Coastal Service Center (2000) modified from Bens (2000).

9.10 APPENDIX J: Forms of sustainability

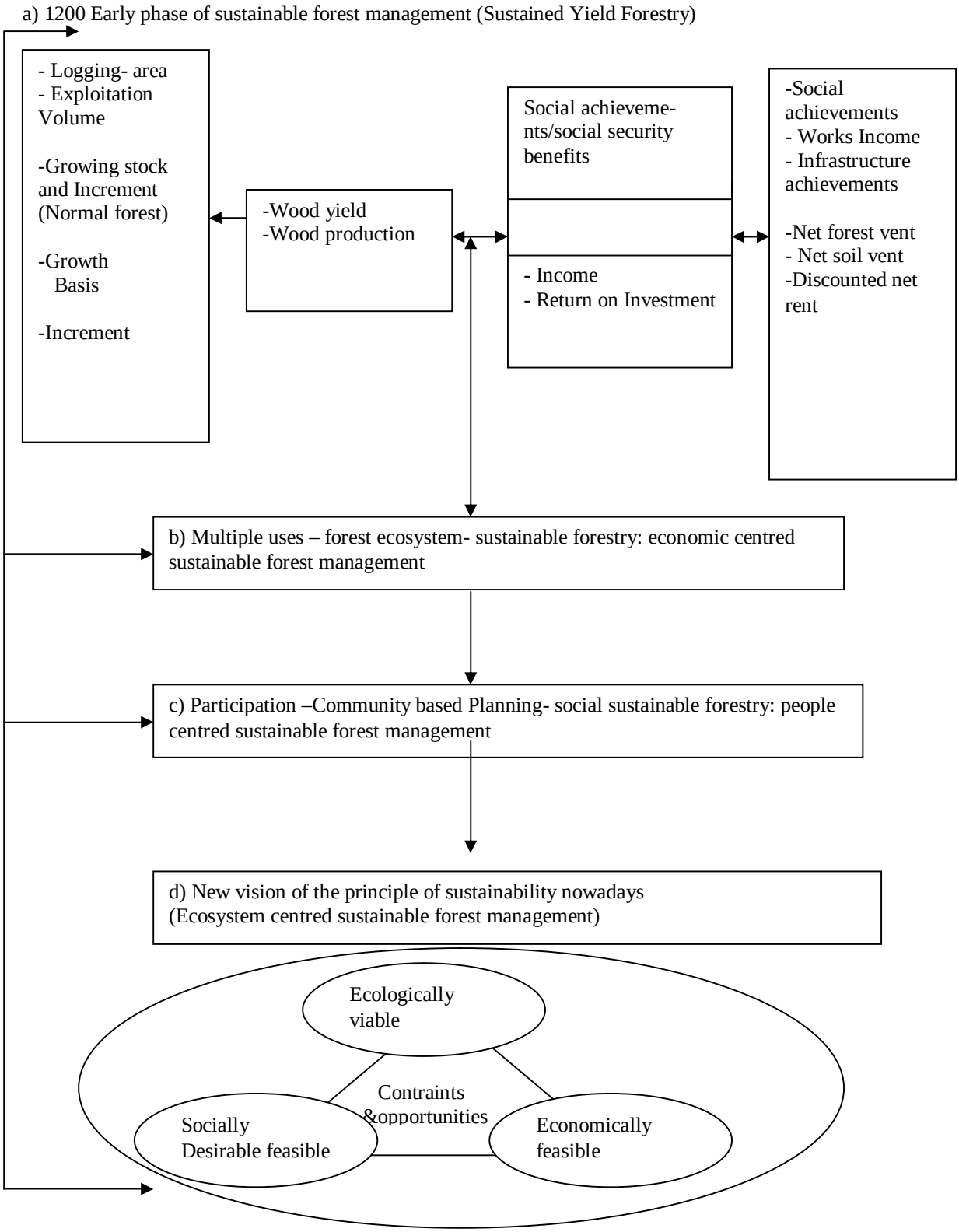


Figure 9-9 Evolution of the Concept of sustainability

9.11 APPENDIX K: Forest management planning definition oriented to unique function

Authors	Year	Definitions
Moser	1757	„Forst-Einteilung“ als Einteilung in jährliche Schläge (Kurth, 1994)
Johann Gottlieb Beckmann; Lichtenstein,	1759	Management of improvement and stand forest economy. “Einrichtung einer pfleglichen und beständigen Forstwirtschaft in German“ (Kurth, 1994)
Christoph Oettelt und Heyda	1768	„ Die Absicht der neuen Forsteinrichtung ist teils die pflegliche Verwaltung und Nutzung der gegenwärtigen Holzung eines Landes, teils die Vermehrung derselbe. Die pflegliche Verwaltung der gegenwärtigen Waldungen besteht darinnen, dass ich mit der Waldung und vorrätigen Holzern so umgehe, dass ich weder zuviel noch zu wenig Holz, sondern eine der ganzen Holzung proportionierliche Anzahl jährliche schlage.“ (Kurth, 1994).
HENNERT	1791	"Unter einer Forstabschätzung versteht man die Bestimmung des gegenwärtigen und zukünftigen Holzbestandes, (...), so daß dadurch ein nachhaltiger Ertrag derselben richtig und unzweifelhaft ausgemittelt werden kann.“ (Richter, 1963; Schlaepfer und Schuler, 1987).
Hartig	1795	"Determination of present and future supplies of timber from the forests" (Speidel, 1972; Schlaepfer und Schuler, 1987).
Cotta	1804	"Bestimmung des Ertrages eines Waldes". Cotta argues or write further: „ jede gründliche Taxation nicht bloß angeben muss, wie viel man jährlich in einem Walde hauen dürfe, sondern auch wie jede Hauungen zu verrichten sei, wenn der entworfene Etat und die Verfassung des Waldes bestehen sollen“, so ist damit ebenfalls der Zusammenhang von Produktion und Ertrag unterstrichen (Speidel, 1972; Richter, 1963; Kurth, 1994).
Hundeshagen	1828	„ Unter Forsteinrichtung versteht man, alle, den Betrieb einer Wirtschaft betreffenden Anordnungen, nach Maßgabe ihrer Individualität, d. h. nach allen besonderen Anforderungen ihres Besitzer, der Örtlichkeit und der Zeit.“ (Wagner, 1923; Kurth, 1994; Speidel, 1972; Richter, 1963)
Graner	1889	„Lehre von der räumlichen und zeitlichen Ordnung des wirtschaftlichen Betriebs für eine als ein zusammengehöriges Ganzes gedacht Mehrheit von Waldbeständen, mit dem

		praktischen Endziele der Regelung der nachhaltigen Nutzung.“ (Richter, 1963; Kurth, 1994). Forest enterprise management is accepted by Von Graner as designation, while Grebe (1867) chose the term forest management regulation and yield regulation to qualify it.
Stoetzer	1898	„Die Forsteinrichtung beschäftigt sich mit der Ordnung des wirtschaftlichen Betriebes von Wäldern, trifft insbesondere Bestimmungen über die zweckmäßigste Art und Zeit der Abnutzung der Bestände und deren Verjüngung und stellt die Höhe der nachhaltig jährlich zu beziehenden Holznutzung, des so genannten Hiebssatzes oder Etats, fest. Die Forsteinrichtung bezweckt die Anbahnung von Waldzuständen, durch welche die absichten des Waldbesitzers möglichst vollständig erreicht werden können. In der Regel wird derselbe bestrebt sein, aus dem einzurichtenden Walde einen nachhaltig möglichst hohen Ertrag in möglichst kurzer Zeit zu beziehen und zwar entweder ein Maximum von Ertrag an sich (Waldreinertrag) oder eine möglich hohe Bodenrente“.
Biolley	1920	„ L’aménagement rationnel sera la systématisation des expériences faites ou à faire par le traitement ; son but est de préparer et de développer la base expérimentale du traitement, afin que celui ci devienne á son tour, expérimental ».
Wagner	1923	Die ganze Forsteinrichtung ist aus dem Bedürfnis einer nachhaltigen Regelung des Waldertrags- also der zeitlich Ordnungs- heraus gewachsen. Da nun aber diese Aufgabe durch entsprechende räumliche Anordnungen im Wald sehr erleichtert wird, ja fast bedingt ist, so lag es nahe, die Regelung der räumlichen Ordnung mit der Ertragsregelung zu verbinden, ein weg, der zumeist beschritten worden ist. Die Große Mehrzahl der Methoden der Ertragsregelung stellt sich nämlich die doppelte Aufgabe: - Den Hiebs- Satz zu bestimmen, den Ertrag zeitlich zu ordnen, - Den Hiebs- ort festzulegen und dadurch unmittelbar entscheidend auf die räumlich Ordnung einzuwirken. In 1928 Wagner describes the forest management planning as "Gegenstand der Forsteinrichtung ist "die planmäßige Organisation" der Forstwirtschaft. Es ist Ordnung zu schaffen im Nebeneinander der wirtschaftlichen Dinge, d.h. räumlich, auf der Betriebsfläche - räumliche Ordnung - und es ist Ordnung zu schaffen im Nacheinander der wirtschaftlichen Dinge, d.h.

		zeitlich, innerhalb der Produktionszeit - zeitliche Ordnung."." (Richter, 1963; Speidel, 1972; Kurth, 1994).
Carl Heyersche	1841	Designates, for example the task of forest sustained yield regulation: „Das nachhaltige Einkommen der Wälder auf eine den zwecken der betreffenden Waldbesitzer möglichst entsprechende, genaue und sichere Weise zeitlich und räumlich zu ordnen und seinem Betrage nach zu bemessen." Carl Heyersche (in Baader, 1942) views the yield regulation to the forest management regulation and the exploitation of the production separately (Baader, 1942)
Baader	1945	„ Die Forsteinrichtung wird… als nachhaltige Betriebsführung und Betriebsplanung bezeichnet…" dabei werden unter „Betriebsplanung" zwei Gebiete zusammengefasst: „nachhaltige Produktionsregelung" und „nachhaltige Ertragsregelung" (Richter, 1963; Baader, 1942; Baader, 1945). Two definitions under stress of the planning (organization) of the forest enterprise given by Mantel and Speidel, supported by wagner (1928).
Mantel	1948 1959	„ Die Forsteinrichtung (auch Forstbetriebsregelung usw. genannt) ist der Inbegriffs der periodischen forstwirtschaftlichen Planung für einen betrieb (Mantel, 1959; Speidel, 1972)
Speidel	1972	the theory of medium-term economic planning in the forest enterprise. The meduim-term economic planning is an established term in economic sciences and in the handling language. The expressions „forest management planning"can be also replaced by „medium-term economic planning in forest enterprise

Table 9-5 Forest management planning definition oriented to unique function (in original terms)

9.12 APPENDIX L: Definition of forest management planning oriented to multiple use function

Author	Year	Definitions
Von Hagen	1867	"Total well-being of the inhabitants of the state".
Stoetzer	1898	Forest yield regulation is the term that Carl Heyer gave to our disciplin. under management of forest enterprises, he understook the management and order of the whole enterprise: organization of the forest into suitable districts, order of the service personnel, distribution of the business, regulation of forest yield, statement of the lucrative wood types, systems of management, rotation length, regeneration methods, cutting consequences *(Hiebsfolgen in German)* and cultural principles).
Knuchel	1950	„Mit diesen Plänen wird die Wirtschaft in Jeder Hinsicht geordnet, und zwar so, dass die gestreckten Ziele mit dem geringsten Aufwand und in kürzesten Zeit erreicht werden können.“ Die natur ist zu studieren und unseren Bedürfnissen dienstbar zu machen. Nur biologisch gesunde Wälder leisten dauernd höchste Erträge und erfüllen die Schutzaufgaben, die so wichtig sein können wie die Lieferung von Holz.
Richter	1963	„ Die Forsteinrichtung als Prüfungsinstanz des wirtschaftlichen Erfolges, also auch in Betriebsökonomischer Hinsicht, verbesserte Einbeziehung der Forsteinrichtung in die volkswirtschaftliche Gesamtplanung, Einbeziehung von Problemen der Technisierung, Mechanisierung sowie des Meliorationswesens in die Forsteinrichtung, Beteiligung der Forsteinrichtung an den Arbeiten der Landeskultur und Raumplanung, Planmäßige Durchführung einer wirtschaftlichen Standorterkundung durch die Forsteinrichtung als Ergänzung der biologisch-ökologischen Standortserkennung.“
Speidel	1972	"... Forsteinrichtung ... Lehre von der mittelfristigen wirtschaftlichen Planung im Forstbetrieb...".
Schlaepfer	1984	„L’aménagement des forêts est un ensemble d’activités de la gestion forestière qui comprend : -la fixation des objectifs généraux de l’entreprise forestière -la recherche d’information concernant les différentes fonctions de la forêt (inventaire forestier)

		-la planification des exploitations -la planification forestière intégrée. »

Table 9-6 Definition of forest management planning oriented to multiple use function

9.13 APPENDIX M: Formel system representation and subsystem.

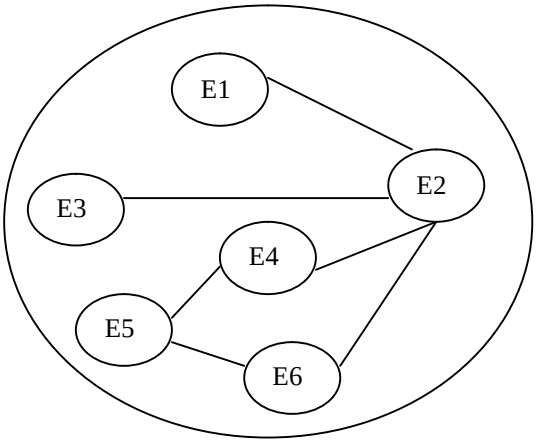


Figure 9-10 Formel system

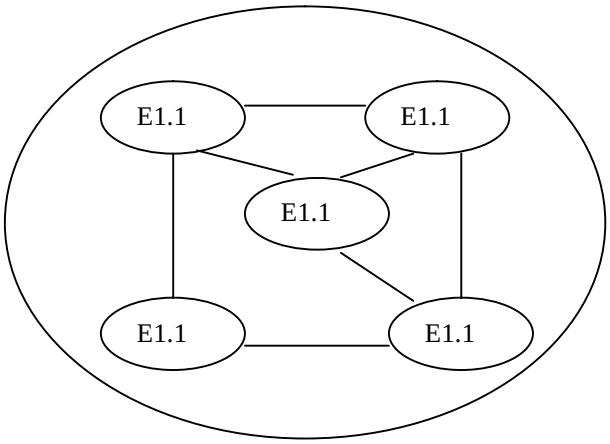


Figure 9-11 Formel subsystem

9.14 APPENDIX N: Theoretical references for the CPS design

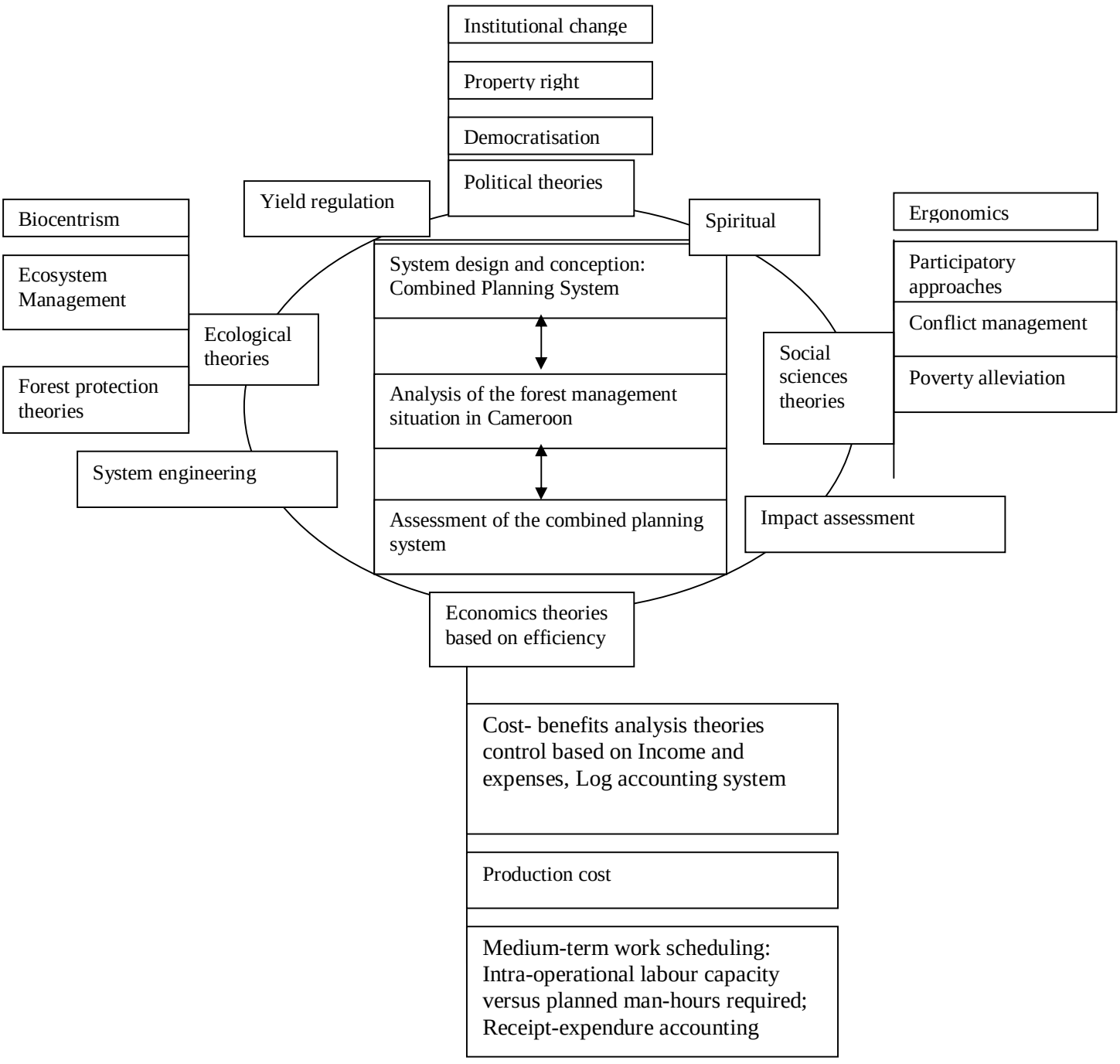


Figure 9-12 Theoretical references for the CPS design

9.15 APPENDIX O: Forest management planning participants groups description

Government group

The government group (GG) as policy makers: in the Congo Basin and Cameroon in particular it is represented by the ministries responsible for forests and fauna and the regional and departmental delegations as acting as forest owners and defining the rules and norms of forest management planning and/or approving technical protocols suggested by forest enterprises prior to management measures. The ministry must also validate the planning outcome and monitor and control its implementation.[777] In the case of Cameroon, the responsible authority is the agency national d'appui au développement forestier (ANAFOR). Other actors which may be taken into account in this group are representatives at different levels: village chiefs, canton chiefs, mayors, sub prefects, territorial unit staff on one side and the local governments of the municipality,[778] to which the FMUs or forest councils are allocated, on the other side. According to working paper 53[779] the local government is integrated into this GG, which shows the failure of the decentralisation process and why the local government is incorporated into this group. Example: Ministère des Forêts et de la Faune (MINFOF), Agence National d'Appui au Développement Forestier (ANAFOR), Ministère de l'Administration Territoriale (MINAT), Commission des Ministres en charge des Forêts d'Afrique Centrale (COMIFAC), Forest delegation of Eseka and Mbam.

Private forestry firms group

Private forestry firms are the second system or actors, specifically the industrial operator, titleholder of the concession, forest logger (for example SEBC, PALLISCO…). Sometimes, the concession is under tenant farming, which means the title holder of the concession and the forester are both represented and implicated in the participatory process. It must respect the legal and tax frameworks relative to sustainable management of the national forests and carry out the technical studies preliminary to the drafting of the plans. It must take part in the discussions on the forest management planning decisions, discussions of which it is frequently an initiator and one of the principal strengthens of proposition. Other duties or obligations are to implement all measurements of the forest management plan for which it is responsible like the preparation for the documents of management, measurements of management of the various series, without forgetting social and environmental measurements.

[777] The government defines the national norms of work and/or validates the technical protocols suggested by the forest enterprises for the technical studies preliminary to the management. It also verifies and validates the field work by leading its own operations but distinct from those of the forest companies.
[778] A fundamental element is information of all stakeholders on the situation of payments from the company's tax share which is destined for financing of local development by the state. This information enables the clarification of everyone's level of respect for the rights and obligations of each stakeholder.
[779] Dogmo (2008b, working report 53-2008).

Example: Entreprise Forestière Tagne Djedom (EFTD), Pallisco, Société d'Explotation du Bois au Cameroun (SEBC), Société d'Exploitation Forestières et Agricoles du Cameroun (SEFAC), Société Forestière et Industrielle de la Doumé (SFID), Société Forestière Wanda (SFW), Timber Transformation of South Cameroon (TTS), WIJMA, Cameroon United Forest (CUF), Association Technique Internationale des Bois Tropicaux (ATIBT) and Nature+.

Forest planners group

Forest planners form the third group, their responsibility is to conduct the FMP according to the Law with a neutral position as third party. They play an important role in the forest management planning process, because they draw up and examine the forest management plans as technical experts. They play also a consultant role for the forest industries concerning forestry. They also play an advisory role for the CPSWG concerning SFM. Group members are forest planning consulting firms for the conception and elaboration of forest management plans, such as: Forest Resources and Management in Montpellier (FRM), Nature+ in Gembloux; Bureau Veritas, Centre for International Forestry (CIFOR), Bureau veritas, private planners etc.

Forest donors group

External actors or forest donors (for services: assistance and support) are the fourth actors group within the CPSWG. They contribute to important financial support and the FMP process. They intervene with the government in support of the definition of forest policies. They also provide funding for forest logging company capacity building in planning and for their certification. Members of this group represent, for example, forestry governance facilities (FGF), the Central Africa Regional Program for the Environment (CARPE), the "Deutsche Gesellschaft für Technische Zusammenarbeit" (GTZ), the "Organisation Néerlandaise de Développement" (SNV) and the World Bank (WB); the International Monetary Fund (IMF); the French Cooperation (FC), European Union (EU) etc.

Public = Local actors group Conservationists group

The public is the fifth group representing civic society. Within this cluster two specific groups of stakeholders must be integrated: local actors and conservationists or environmentalists. The former represent the fourth CPSWG member which mostly encompasses local communities living near or inside the FMU or forest council including associative groups and local NGOs, local management committees, councils of village elders, Village Development Committees, etc. All general forestry concerns are linked to historical rights or privileges and are important to stakeholders, who must be involved in the planning at different levels in accordance with the planning area. In the Congo Basin, according to Biesbrouck & van den Berg (2000), special attention must be paid to Bagyeli or Bakas

people and Bantu farmers[780] who represent politically marginal groups in forest management,[781] whereas those responsible for industrial logging dominate any decision-making within the forestry sector. The local people should be the primary beneficiaries of the FMU or forest council's activities. Therefore, the CPSWG specifically the forest planners group should work with local communities and develop effective mechanisms that will facilitate effective and enduring two-way communication, as well as permanent negotiation and consensus building between CPSWG members, specifically between forest planners and local communities.[782] Examples for possible local actor groupr are: Centre pour l'Environnement et le Développement (CED), Centre Internationale d'Etudes Forestières et Environnementales (CIEFE), Organisation pour l'Environnement et le Développement Durable (OPED), village development committees, comité paysans forêts, etc. The second group within this cluster involved in the CPSWG are conservationists or environmentalists: These play a very important role in the conservation of biodiversity and ecological sustainability. Examples are: International Union for Conservation of Nature (IUCN), GFW, and World Wide Fund for Nature (WWF), World Conservation Service (WCS).

[780] The Bagyeli, Bakas and Bantu depend on timber and non timber forest products (NTFPs) for their survival and for their economic development.

[781] Anther reason is that there is no single type of local leadership or organisation at village level which can represent the interests of Bantu groups, let alone of both Bantu and Bagyeli or Bakas in any decision-making. Local representation implies the right to speak on behalf of the local populations. Such a right can only have value when it is based upon shared agreement among those people who delegate their voice. There is no institutionalised type of local leadership, which satisfies this precondition (Biesbrouck & van den Berg (2000))

[782] In this respect, three features should be recognised in encouraging rural community participation in sustainable forest management: first of all a clear recognition and respect for the rights of indigenous peoples who live in or have a traditional dependence on tropical forests, then promoting collaboration amongst people and institutions who are involved in the various aspects of forest management, including wood production, integrating professional skills and training with traditional knowledge and resources of local populations in order to support the needs of rural communities more effectively and minimise or avoid conflicts in forest management, and finally enhance the well-being of forest workers and local communities.

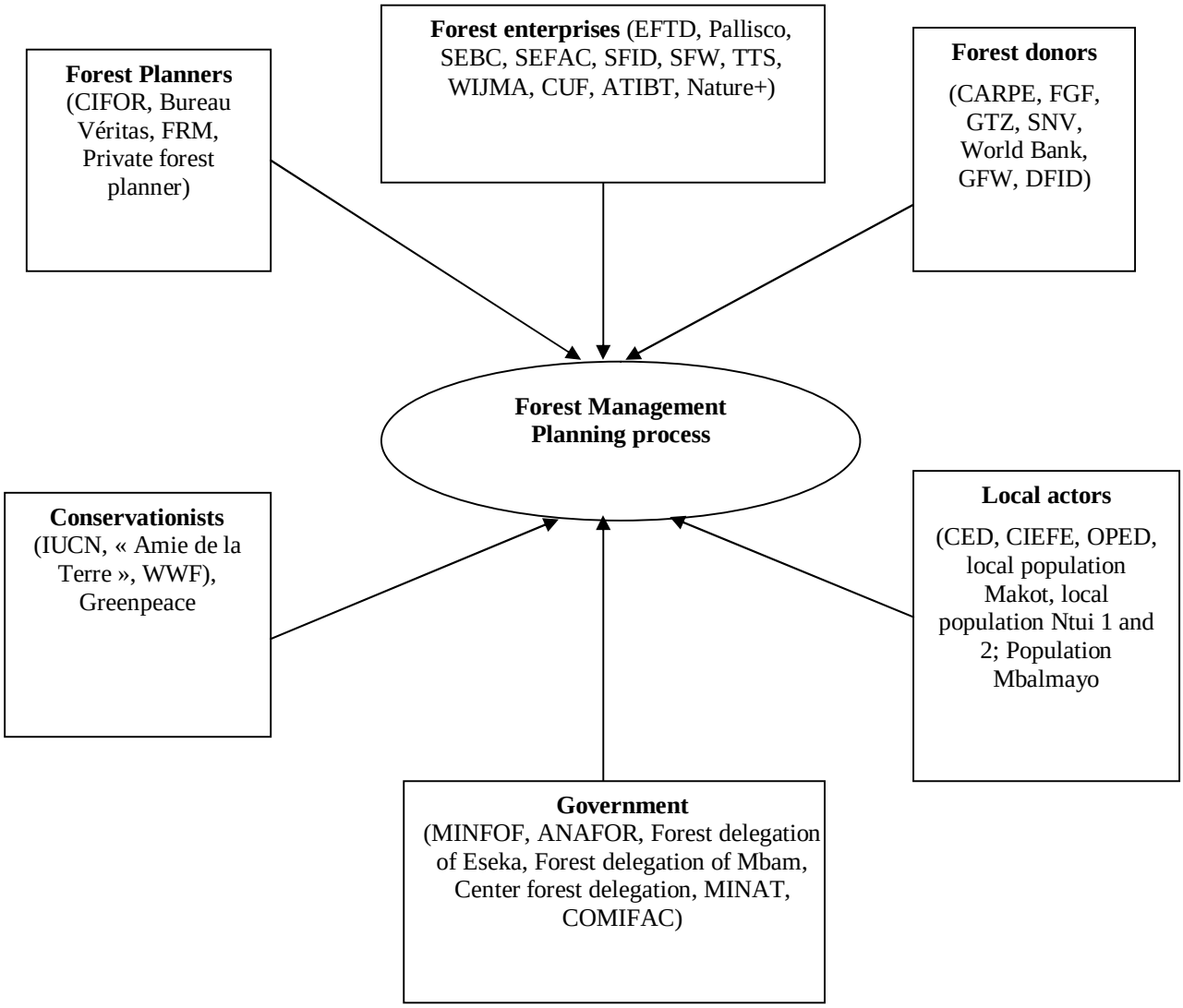


Figure 9-13 FMP participants or actors group identification

9.16 APPENDIX P: Interview manual

Study area:	Cameroon
Analysis topic:	Cameroon forest management planning situation analysis
Interviewed person:	
Funktion (Stakeholder group):	
Interviewer:	
Interview situation (Location):	
Date:	
Period:	

1. Greetings
2. Introduction/overview about Project
3. Interview questions

Questionnaire

1. Who are the main participants/actors implied in the forest management planning in Cameroon and who should be ideally involved?
2. What is forest management planning for you?
3. What are the positive aspects of forest management planning in Cameroon?
4. What are the problems of forest management planning in Cameroon?
5. Why there are conflicts in FMU areas?
6. Which solutions do you think to solve these problems?
7. How do you think the Cameroonian forests will evolve in the future if its problems are not solved?
8. Any other thoughts/your last word to conclude this interview.

9.17 APPENDIX Q: The six types of High Conservation Value areas

HCV1. Areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia).
HCV2. Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.
HCV3. Areas that are in or contain rare, threatened or endangered ecosystems.
HCV4. Areas that provide basic ecosystem services in critical situations (e.g. watershed protection, erosion control).
HCV5. Areas fundamental to meeting basic needs of local communities (e.g. subsistence, health).
HCV6. Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Figure 9-14 six types of High Conservation Value areas adapted from High Conservation Value (HCV) Resource Network (2005); Aksenova et al. 2006.

Zusammenfassung

Tropische Regenwälder sind ein in vielerlei Hinsicht bedeutsamer Teil der auf der ganzen Welt zu findenden Waldökosysteme und ein bedeutendes Reservoir an biologischer Vielfalt (Biodiversität). Im zentralafrikanischen Kongobecken befindet sich der nach dem Amazonas zweitgrößte zusammenhängende tropische Regenwald der Welt. Sein durch Abholzung bedingtes Verschwinden stellt eines der größten aktuellen und weltweit wirkenden Umweltprobleme dar. Seit der UN Konferenz von Rio de Janeiro (1992) gibt es zahlreiche Initiativen und Bemühungen, die Wälder des Kongobeckens gemäß dem Leitbild der Nachhaltigkeit zu nutzen. Gemäß diesem Ansatz hat sich auch die vorliegende Arbeit zum Ziel gesetzt, mit Blick auf die Waldbewirtschaftung eine Balance zwischen den sozialen, wirtschaftlichen und umweltbezogenen Interessen herzustellen. Ihr Ziel ist es, die aktuelle Forstplanungssituation in Kamerun kritisch zu analysieren sowie ein völlig neues Planungskonzept vorzustellen.

Die in dieser Arbeit angewandte Vorgehensweise basiert auf einer gründlichen Analyse der relevanten Literatur und veranschaulicht einige Grenzen einer nachhaltigen Nutzung des Regenwaldes im Kongobecken mit Schwerpunkt auf Forstplanung als Folge von unzulänglichen institutionellen Rahmenbedingungen und ineffektiver Forstplanungssysteme einerseits, einer unzureichenden Waldbewirtschaftungspraxis andererseits. Sekundäre Datenanalysen zeigen hier, dass sich die Forstplanung in den meisten Ländern der Welt im Wandel befindet. Aufgrund der Tatsache, dass die Regenwälder „gemeinschaftlich“ nutzbare Ressourcen („Common-pool resources“ in Englisch) sind, wird die Notwendigkeit deutlich, ein neues Konzept für die Forstplanung zu entwickeln. Zusätzlich zu dieser Literaturanalyse wurde versucht, die Forstplanung neu zu definieren. Darüber hinaus wurde als Ergebnis eines Diskussionsprozesses mit Experten (größtenteils Akademiker) ein neues und verbessertes Forstplanungssystem entwickelt und als „kombiniertes Planungssystem“ (KPS) vorgestellt.

Bezogen auf das bislang noch theoretische KPS-Modell erfolgt die Ableitung von Kriterien für die Analyse der Forstplanungssituation in Kamerun. Das Resultat dieser Analyse bestätigt das theoretische KPS-Modell hinsichtlich der im Forstplanungs-Prozess zu beteiligenden Akteure. Sechs Arbeitsgruppen, so genannte KPS-Arbeitsgruppen (KP-AG), die auf eine angemessene Art und Weise in den Forstplanungsprozess zu integrieren sind, fungieren als „Institutionen“, die als Zusammenschluss von Akteuren jeden Schritt des Planungsprozesses

sowie die Umsetzung der erörterten Ergebnisse durchführen. Das Ergebnis der Planung wird im Rahmen dieser Arbeit als: „Gesellschaftsvertrag“ bezeichnet, der sich von traditionellen „Top-down“-Planungen deutlich unterscheidet. Die Gruppen gliedern sich in die Regierungsgruppe, die Forstunternehmergrupper, die lokale arbeitende Grupper, die Forstplaunungsgruppe, die Gruppe, die sich für die Erhaltung einsetzt und die Forst-Geldgeber Gruppe. Von 100 Nennungen entfallen 22 Nennungen auf die Regierungsgruppe (entspricht 22%), 19% auf die Forstunternehmergruppe, ebenfalls 19% auf die lokale Gruppe, 10% auf die Forstplanungsgruppe, 15% auf die Gruppe, die sich für die Erhaltung einsetzt sowie 8 % auf die „Forst- Geldgeber Gruppe“. Die Ergebnisse der Untersuchungsstudie zeigen bezüglich der Definition von Forstplanung, dass ein Großteil der Befragten auf das technische Planungssystem ausgerichtet ist, das in der Studie als taktisches Planungssubsystem bezeichnet wird. Mit Blick auf diese Ergebnisse wird deutlich, warum Wertesystem und Strategien sowie die institutionellen Governancesaspekte fest im KPS Modell verankert sind. Darüber hinaus ermöglicht die vorliegende Studie, die Probleme der Forstplanung in Kamerun zu verstehen und gibt Einsicht, inwiefern man ihnen mit dem KPS Modell begegnen kann. In der Tat sind 39% der Forstplanungsprobleme als institutionelle (governance)-bedingte Probleme anzusehen und machen 64 Punkte von insgesamt 96 Punkten aus. Darauf folgen mit 38% die wertbedingten und strategischen Probleme. Anhand der Ergebnisse wird auch deutlich, dass lediglich 16% der Forstplanungsprobleme im Bereich des technischen und taktischen Planungssystems auftreten. Hier wird deutlich, dass die Probleme größtenteils in den Bereichen des wertbedingten und strategischen Subsystems und des institutionellen Governancessubsystems auftreten - mit einem Gesamtanteil von 77%. Im Gegensatz dazu steht der technische Aspekt der Planung, dargestellt durch das Teilsystem der taktischen Planung, auf das näher im Bereich der Forstplanungsforschung eingegangen wird.

Zuletzt wird das kombinierte Planungssystem thematisiert, um die Schwachpunkte in der Forstplanung herauszuarbeiten. Das KPS-Modell ist in folgende Unterthemen unterteilt: Werte- und strategisches Subsystem, das Subsystem des institutionellen Governance sowie das Subsystem der taktischen Planung. Das Modell identifiziert wichtige Faktoren im sozialen, ökonomischen und Umweltbereich und verbessert die Implementierung und die Effektivität der Forstplanungsergebnisse, es vereinfacht den Planungsprozess, erleichtert die aktive Teilnahme der Akteure und ermöglicht das Management von Konflikten in einem dynamischen Prozess. Das KPS-Modell erweist sich in der vorliegenden Arbeit als ein innovatives Konzept und eine methodologische Weiterentwicklung der Forstplanung für die

Region des Kongobeckens. Es trägt dazu bei, das Leitbild der nachhaltigen Waldbewirtschaftung praxisnah umzusetzen. Trotzdem wird angesichts der angesprochenen Grenzen des KPS-Modells deutlich, wie groß und komplex dieses Modell ist und wie die Herausforderungen, die in diesen Begrenzungen liegen, zukünftig angegangen werden müssen. Abschließend werden Empfehlungen gegeben, so dass durch Verfahrensregeln oder Richtlinien für die KPS- Implementierung die Modelle den Bedürfnissen der Forstplaner und anderer Forstplanungsakteure angepasst werden können. Darüber hinaus wird der weitere Forschungsbedarf abgesteckt, der sich in den folgenden zwei Kategorien gliedert: einerseits die Verbesserung der vorhandenen Ergebnisse, insbesondere zum gegenwärtigen KPS, andererseits Verbesserungen hinsichtlich der Implementierung und Anwendung des KPS in der realen planerischen Praxis.

Résumé

Les forêts tropicales sont une partie de l'écosystème forestier mondial et un réservoir biologique (biodiversité) significatif et unique. L'Afrique Centrale (ou Bassin du Congo) contient le second plus large, vaste bloc quasiment ininterrompu et continu couvert ou massif forestier dense humide tropical. Il vient en second plan après la forêt dense humide Amazonienne en dimension. Cependant, leur progressive disparition constitue un des problèmes (enjeux) environnementaux (déforestation et dégradation) majeurs de notre temps. Les efforts dans le monde sont focalisés dans l'implémentation de la gestion durable des forêts depuis la conférence des Nations Unies sur l'Environnement et le Développement à Rio de Janeiro (Brésil) en 1992, en tant qu' approche voulant un équilibre entre les objectifs sociaux, économiques et écologiques. C'est dans cette logique (dans ce cadre) que la présente thèse a pour objectif de faire une analyse critique de la situation de l'aménagement forestier au Cameroun aussi bien que de proposer un nouveau model d'aménagement.

La méthodologie appliquée consistait premièrement á une analyse de littérature qui a illustré certaines contraintes de l'utilisation durable de la forêt dense humide (avec focus sur l'aménagement) dans le Basin du Congo comme résultant de l'inadéquation du cadre institutionnel et l'ineffectivité des concepts (théoriques comme pratiques) d'aménagement (implémentation). Ensuite, cette analyse des données secondaires a laissé démontrer également que l'aménagement forestier est actuellement en transition dans plusieurs continents. Elle a soulevé le besoin de développement d'une nouvelle approche étant donné que les forêts tropicales sont des ressources communautaires « common pools resources ». En plus de cette analyse, une nouvelle définition de l'aménagement forestier a été proposée et un nouveau model développé, après l'avoir discuté avec des experts, principalement du milieu académique et appelé system d'aménagement combiné (SAC).

Après, le développement du modèle théorique de SAC a permis de déduire les critères utiles pour une étude empirique et exploratrice, pour une analyse critique de la situation de l'aménagement forestier au Cameroun. Les résultats de cette analyse ont confirmé la conception théorique du modèle SAC au sujet des participants ou groupes d'acteurs à impliquer dans le processus d'aménagement. Ainsi, six groupes d'acteurs ont été adoptés en tant que groupes de travail (GT) du SAC à intégrer d'une manière équitable dans l'aménagement forestier. Ce groupe de travail en tant que «institutions» a la responsabilité de

conduire conjointement chaque étape du processus d'aménagement aussi bien que l'implémentation du plan d'aménagement résultant. Lequel plan est appelé dans cette thèse: «contrat social» en opposition au plan, aux ordres ou commandes issues des models d'aménagements rationnels « s'appuyant sur des experts ». Ces groupes de travail incluent sur cent citations ou cotation par des répondants, 22 cotation étant du groupe du gouvernement (22%), le groupe des compagnies forestières (19%), du groupe d'acteurs locaux (19%), du groupe des aménagistes (10%), du groupe des conservateurs de la nature (15%) et du groupe des bailleur de fonds (8%). En outre, les résultats des analyses prouvent également que la majorité (60%) de répondants en définissant l'aménagement forestier, l'on définit suivant l'aménagement technique ou tactique, ce qui est caractérisé dans cette étude comme système d'aménagement tactique. Cette trouvaille justifie pourquoi dans le model SAC, les aspectes normatifs et stratégiques aussi bien que l'aspect institutionnel de gouvernance y sont fortement intégrés, á côté de l'aspect tactique ou technique. En plus, cette étude exploratrice a rendue compréhensible les problèmes d'aménagement forestier au Cameroun tout en montrant la possibilité du SAC á contribuer á aborder ces problèmes. En fait, 39% des problèmes d'aménagement proviennent des aspects institutionnels avec un score de 64 sur 96 possibles. Ensuite les aspects normatifs et stratégiques de l'aménagement viennent avec 38%. Cependant, seulement 16% des problèmes d'aménagement résultent des aspects tactiques ou techniques. À cet égard, les problèmes d'aménagement sont pour la plupart (77%) situés dans les aspects normatifs et stratégique, d'une part et dans les aspects institutionnels contrairement à l'aspect technique de la planification qui est la plupart du temps adressé dans les projets de recherche sur l'aménagement.

Pour finir, le système d'aménagement combiné (SAC) comme contribution pour adresser des points faibles d'aménagement a été décrit. Le modèle (SAC) est subdivisé sur des diversités ou sous-systèmes, y compris le sous system des valeurs et stratégies; sous-système institutionnel de gouvernance et sous-système d'aménagement tactique ou technique. Ce modèle identifie des facteurs importants dans le secteur social, économique et environnemental qui améliorent l'effectivité de l'exécution ou l'implémentation du plan d'aménagement, simplifient le processus de planification, et facilitent la participation active et la gestion des conflits suivant un processus dynamique. Le modèle SAC présenté dans cette thèse est une approche conceptuelle et méthodologique innovatrice dans l'aménagement des forêts pour la région du bassin du Congo qui contribue á garantir l'utilisation soutenable des ressources. Cependant, à la lumière des limites du modèle SAC discuté dans cette thèse, il a

été réalisé combien grand et complexe ce modèle était et combien ses limites doivent être relevées ou devraient être adressées à l'avenir. Par conséquent, des recommandations ont été proposées d'une part par un procédé ou directives pour l'exécution du SAC (dans la pratique), qui peut permettre aux modèles de répondre aux demandes des aménagistes et d'autres acteurs de l'aménagement. En outre, les recommandations ont été proposées aussi pour davantage de recherche sur le plan scientifique qui peuvent être groupées en deux catégories comme suit : premièrement pour l'amélioration des résultats existants, et deuxièmement pour la recherche concernant l'implémentation et l'application du modèle SAC dans le monde réel.