

Progress in Implementation of C & I for Assessing Progress Towards
Sustainable Forest Management within the Dry-zone Africa Process

By

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SUMMARY

The central role of forests in development and the need for their sustainable management has gained indisputable recognition. At the same time, concerns about the rapid rate of decline of tropical forests that surfaced in the 1970s and its subsequent escalation in the 1990s, has attracted a strong global commitment to sustainable forest management. This was endorsed further in the forest management principles and agenda 21 which were adopted at the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in June 1992. It is noted that responsible UN agencies and member countries concerned with the promotion of sustainable forest management have agreed on the use of criteria and indicators (C&I) as tools for monitoring, assessment and reporting (MAR) on the state of forests at all levels. The paper discusses the development of C & I under the dry-zone Africa process and progress in the implementation of C&I by member countries for assessing progress towards sustainable forest management. It examines data generated through regular monitoring of the state of Kenyan forests, to assess the relevance of the criteria and indicators and guidelines for their implementation for monitoring, assessing and reporting the state of forests in the region. It notes that global reporting on the state of forests will rely heavily on the accuracy of national data, and the MAR process must therefore emphasize quality over quantity.

The Kenyan experience further shows that though data are available for most indicators, these are scattered in different returns held by different concerned government agencies and non-governmental organization partners. Recognizing that sustainable management of forests has introduced new concepts, terminology and definitions applicable to assessment and reporting, it proposes a need for exhaustive discussions, at all levels, to provide a common understanding and interpretation of parameters and results generated. Sustainable forest management calls for accurate up-to-date data on the state of all forests. Consequently, collection is likely to be expensive for non-direct forest operations but looks at the availability context and expectations facing forests, particularly in developing countries are complex and challenging.

Constraints identified include lack of trained manpower, equipment and operating funds. The paper proposes establishment of an interactive database at a liaison office in the region, which should be replicated in member countries at the national level. It recommends provision of an initial support to the dry-zone Africa process to facilitate liaison and mobilization of resources for capacity building of responsible staff, and acquisition of additional equipment for grounding the MAR process in the region. Member countries are urged to start with a core set of criteria and indicators that they have data or are able to measure and to expand the ground gradually with acquisition of additional capability.

BACKGROUND

The rapid rate of decline of tropical forests continue to be a subject of concern to the entire world community. The United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in June 1992, provided much impetus and commitment of national and international institutions and agencies to sustainable management of forests. Responsible UN agencies have continued to facilitate work towards realizing this monumental task.

The context and expectations facing forests, particularly in developing countries are complex and challenging. Sustainable forest management calls for accurate and up-to-date information on the state of forests at all levels. In this regard, criteria and indicators (C & I) as tools for promoting sustainable forest management have been developed under different processes, of which the dryzone Africa process is one.

The Dry-zone Africa process that embraces forest poor countries of Africa, namely the countries of Eastern Africa, Southern Africa and West Africa, have developed 7 criteria and 47 indicators. Member country representatives have endorsed the set of C & I developed for the zone, as an acceptable general framework for action. Subsequent consultations under the process have reaffirmed their relevance for assessing the sustainability of forest management when measured and interpreted over adequate time series. The SADC countries have introduced an additional indicator under criterion 5, "change in water yield and quality", while the CILSS countries introduced six additional indicators. In general, all member countries have shown interest in the process and recognized that it is a necessary step towards achieving sustainable forest management in the region. The countries have further confirmed availability of data for most indicators.

As we enter the new millennium, it is fitting for member countries to settle on a range of indicators that meet their social, economic, environmental and ecological conditions best. The need for incorporating the role of C & I in national forest policy framework, capturing participation of all stakeholders and underpinning this with a clear political commitment must also be stressed as crucial for gaining effective implementation. But more importantly, implementation should not be delayed. Countries should be encouraged to start with the most relevant set of C & I, for which they have data or can measure with minimal additional inputs.

This paper attempts to scoop data and relevant information from different sources to provide baseline measurements on the state of Kenya's forests as a model, within the framework of guidelines developed in 2000 under the UNEP and FAO initiative.

SADC - Southern African Development Community.

CILSS - Permanent Interstate Committee for drought Control in the Sahel

CRITERION 1

1.1 Total forest area

Year	2000		2001
Parameter	Area (Ha)	%	Area (Ha) % Area
Indigenous forest outside forest reserves	180,000	10	
Indigenous forest forest reserves	1,060,000	62	
Plantations within forest reserves	160,000	9	
Total Area of gazetted forest reserves	1,640,000		

Entry made in 2000 provide baseline, against which trends in changes emerge from measurements made in subsequent years.

1.2 Biomass

Year	1999						2000
Forest Zone	Area	Total Volume	Timber Volume	Polewood (5-10cm)	stocking (10-20cm)	Fuelwood Yield	
Coastal forest	Ha	m3/ha	m3/ha	No/ha	No/ha	m3/ha	
Closed-canopy forest	66,700	100	4	320	250	0.6	
Other forest associations	15,000	56	3	180	100	0.3	
Dry forests							
Closed-canopy forest	163,800	200	47	400	230	0.8	
Other forest associations	47,000	110	24	330	140	0.3	
Montane forest							
Closed-canopy forest	387,000	250	61	260	100	1.3	
Other forest associations	361,300	130	31	150	100	0.7	
Western rain forest							
Closed-canopy forest	43,000	230	78	212	145	1.1	
Other forest associations	5,000	120	42	107	73	0.4	

The 1999 data entry establish baselines for assessing direction of change in subsequent years.

CRITERION 2

2.1 Area by Vegetation Types

Forest Region/Forest type	2000 Area (ha)	2001 Area (ha)	2002 Area (ha)
Coastal forests	82590	-	-
Dry forests	210830	-	-
Montane forests	748420	-	-
Other forest associations	48780	-	-
Plantations	160,000	-	-

A baseline exists, data for 2001 could not be accessed at short notice. Future assessment would provide trend and direction of change.

2.2 Extent of Protected Area

Category of holding	Land Tenure	1998 Area (ha)	2002 Area (ha)
Forest Reserve (terrestrial)	State land	1 200 000	
Forest Reserve (mangrove)	State land	54 000	
Nature Reserve	State land	27 000	
National Park	Trust land	63 000	
Nature Reserve (Terrestrial)	State land	14 000	
Sanctuary	State,trust private	<100	
Marine Reserve (mangrove)	land		
National Monument	Trust land		
Trust land	Private land	100 000	
Private forest	Private ownership	-	

This provides a useful base for assessment

2.3 Clearing Affecting Endemics

Logging and hunting directly remove part of the populations of some species alter a forest's structure and hence micro environment, or by the removal of animals that eat or disperse forest plants, or are themselves the prey of other animals. Effects have not been measured, though limited information available on impacts from human exploitation.

Excisions and pressure for human settlement are on the increase.

Excisions effected in the forest reserve between 1969 and 2001

1963 - 1969	90,715 ha
1970 - 1979	12,271 ha
1980 - 1989	44,066 ha
1990 - 1995	6659 ha
1995 - 1999	5242 ha
2000 - 2001	207,000 ha/ (proposed)

Such excisions will not only effect endemics but is likely to harm the drive to SFM as the base of forest shrinks.

CRITERION 3: MAINTENANCE OF FOREST ECOSYSTEM HEALTH

3.1 Area and Percentage of Forest Modified

This can be determined using satellite imageries, available from the regional mapping center at subsidized rates. Records show that about 2500 ha of plantations are destroyed by forest fire, 5000 ha of forest land are converted to agriculture annually through pressure on forests from communities living along forest margin. 10% of natural forests have been converted to plantations from the dawn of forest management.

So far no clear base line position was established.

3.2 Trends in Yield: can be assessed from data accumulated from permanent sample plots

	1995	2000	2001	
Area of indigenous forests (ha)	1295	1270		
Wood biomass (million m ³)	227.9	223.5		
Annual wood yields ('000 m ³)	1942.5	1905.0		

Differences in measurement taken between the five years shows a decline in area and yield in volume.

3.6 Percentage of population involved in crop and livestock farming:

Communities living along forest margin that rely of forest, benefit through grazing, collection of woodfuel, wild food products, cultivation, wood harvesting and processing.
Cases of wood poaching and forest destruction are high.

About 2.9 million people, representing around 530,000 households, live within 5 km of forest areas as follows:

Year		1999			2000
Average forest size 9ha).	Area of 5Km catchment (ha). forests	Households/km ² of forest			
		Dry & Coastal Forest	Montane Forest	Western Rainforest	
15	85	1139	16512	29607	
77	94	244	3544	6354	
188	103	109	1586	2845	
479	117	49	710	1274	
1108	138	25	360	645	
3520	184	10	151	271	
37524	422	2	33	59	

This shows that western rainforest has the highest level of attendant pressure on forests. Changes in this indicator in a time series, examined against other indicators such as the state of forest health would provide useful highlights on factors affecting forest sustainability.

CRITERION 4: MAINTENANCE AND ENHANCEMENT OF PRODUCTIVE FUNCTIONS

4.1 Extent and Percentage of Forest Managed According to Plan.

Year	1992	1995	2000
Indigenous forests (ha)	1,310,000	1,295,000	1,270,000
FD forest plantations (ha)	164,000	148,000	134,000
Percentage	3%	2.9%	2.8%

The area under forest management is also declining. The actual situation on the ground may well be worse than this.

FD - Forest Department

4.2 Growing stock

Wood biomass inventory (million m ³)					
Year	Indigenous forest	Woodland/ bushland	Farmlands/ settlements	FD Forest plantation	Total
1992	230.6	571.4	75.4	57.4	934.7
1995	227.9	594.7	88.5	51.4	962.5
1996	227.0	593.8	93.4	50.2	964.4
1997	226.2	592.9	97.9	48.9	965.9
1998	225.3	592.1	102.5	47.5	967.3
1999	224.4	591.2	107.0	46.1	968.7
2000	223.5	590.3	111.6	44.5	969.9

The volume of woody biomass in the forest is declining while that in the settlements is rising.

4.3 Balance Between Growth and Removal

Year	Sustainable wood Supply			Wood demand			Wood balances		
	Timber	Pole	Fuelwood	Timber	Pole	Fuelwood	Total Supply	Total Demand	Surplus/ Deficit
1992	2,991.9	1,232.2	16,923.4	968.7	1,109.9	18,106.5	23,234.7	20,185.1	3,049.6
1995	3,184.0	1,305.6	18,250.2	1,057.6	1,219.4	20,106.7	25,034.1	22,383.7	2,650.4
1996	3,285.6	1,327.9	18,578.7	1,086.2	1,259.7	20,821.9	25,584.0	23,167.9	2,416.2
1997	3,385.8	1,349.2	18,885.2	1,115.7	1,301.3	21,562.6	26,112.2	23,979.6	2,132.6
1998	3,488.5	1,370.8	19,193.0	1,145.9	1,344.3	22,329.7	26,647.1	24,819.9	1,827.2
1999	3,593.8	1,392.7	19,502.0	1,176.9	1,388.7	23,124.1	27,188.9	25,689.1	1,499.2

The pattern shows a decline in level of wood surplus.

4.4 Annual Consumption of Biomass Energy (tonnes per capita)

1989			1995			2000		
Urban	Rural	Firewood	Urban	Rural	Firewood	Urban	Rural	Firewood
Charcoal	Charcoal	Wood	Charcoal	Charcoal	Wood	Charcoal	Charcoal	Wood
0.091	0.013	0.372	0.086	0.013	0.364	0.082	0.013	0.355

The pattern in annual per capita consumption shows a slight drop from 1989 to 2000, for urban charcoal and rural firewood, while that for rural charcoal remains stable.

CRITERION 5: MAINTENANCE AND IMPROVEMENT OF PROTECTIVE FUNCTIONS

5.1 Land Managed for Protection and Support to Agriculture and Environmental Functions

Forest	Area (ha)	
	1990	2000
Mt. Kenya	213,000	
Aberdares	148,000	
Mt Elgon	70,089	
Nandi	30,913	
Cherangani	8291	
Loita Hills	41,480	
Mau	320,000	
Total	834,773	

The 1990 provide baseline entry to be used in the future for trend analysis.

CRITERION 6: MAINTENANCE AND ENHANCEMENT OF SOCIO-ECONOMIC BENEFITS

6.1 Value of Wood Products

Year	1999		2001	
Item	Vol m ³	Royalty Kshs/m ³	Vol m ³	Royalty shs/m ³
Timber	384900	334		
Fuel wood	966299	32		
Pole wood	289700	32		

Baseline established.

6.2 Value of NWFPs

Collection not controlled through licensing system, often localized and traded in the informal sector.

Year Item	2000		2001	
	Value (Kshs)	%	Value (Kshs)	%
Fibres	149,720,000	17.6		
Grazing	322,289,000	37.7		
Honey	139,231,000	16.3		
Hunting	172,207,000	20.2		
Others	68,879,000	8.1		

Baseline established.

6.3 Ecotourism

In 1992, approximately 120,000 visitors entered National Parks where indigenous forest forms a major part of the overall environment and provides a habitat for many animals which are viewed elsewhere. An economic value of US\$ 67 per day equal to Kshs 5000 per day gives a figure of Kshs 480 million as the value of tourism in indigenous forests.

6.4 Share of Forest Sector in GNP

Year	1996	1997	1998	1999	2000
Value of Forestry in Kshs (million)	6145	6817	7161	7470	7796
Percentage of forestry to total GNP(%)	1.19	1.12	1.05	1.02	1.00

The value of forestry's contribution shows a gradual decline. One would have expected a bigger drop due to problems facing the industry.

6.7 Forest Sector Trade Balance

	1999		2000		2001
Item	Quantity Tonne	Value Shs (m)	Quantity Tonne	Value Shs (m)	
Export					
Wood	1814	384	2110	388	
Paper	14,074	618	13824	713	
Import					
Wood	-	-	-	-	
Paper	49,794	2304	89212	2613	

The source of increase in export of wood is unclear probably due to wood from neighboring country that is re-exported. The drop in export of paper and a rise in import of the same is noticeable.

6b.9 Employment generations

	1995 (Nos)	2000 (Nos)
Forest users	150,000	150,000
Pastoralists	383,000	425,200
Farmers	98,700	128,500
Forest enterprises	0	12,500
Forest industries	24,000	29,600
Institutions	21,424	12,454

The no. of pastoralists and farmers involved in farm forestry has increased, while that of employees has gone down due to retrenchment

CRITERION 7

7.1 Policy Framework

The current forest policy (revised 1968), is due to be replaced by a new forest policy (under parliament and scrutiny) that is addressing sustainable management for production, environmental functions, biodiversity conservation, and compliance with international obligations. Other related policies: National Environmental plan, Kenya Wildlife Service Policy, Sessional papers 1 of 1986 and Economic Management for Renewed Growth.

Legislation

- Forest Act, Cap.385 of 1962 (revised 1982 and 1992)
- Timber Act, Cap. 386 of 1972.
- Wildlife (Conservation and Management) Act, Cap.376 of 1976, and 1989 Amendment.
- Antiquities and Monuments Act, Cap.215 of 1984.
- Fisheries Act, Cap.378 of 1989.
- Agriculture Act, Cap.318 of 1980 (revised 1986)
- Registered Land Act, Cap.300 of 1985 (revised 1989)
- Trust Land Act, Cap.288 of 1962 (revised 1970): Land Adjudication Act, Cap.284 of 1968 (revised 1977); Land (Group Representatives) Act, Cap.287 of 1968 (revised 1970).
- Chiefs' Authority Act, Cap.128 of 1970 (revised 1988).
- Environmental management and co-ordination Act (EMCA), 1999.

Inter-Institutional Collaboration - This is achieved through memoranda of understanding (MOU) signed between institutions with related or overlapping mandates as follows:

The Forest Department	A Government department responsible for forest management, conservation and production, within and outside gazetted forests. Licensing, regulatory functions, law enforcement: has professional and technical staff.	Policy and legislation on forestry.
The Kenya Wildlife	Parastatal, responsible for sustainable management of wildlife resources for development Collaborates and networks with FD through an MOU signed in December, 1995	Policy and legislation on of wildlife resources.
National Museums of Kenya	Parastatal, management of forests within gazetted national monuments, Collaborators, and network with FD, KWS and KEFRI, through an MOU.	Policy and legislation on biodiversity.

7.4 Research and Development Capacity.

The two main national institutions that undertake research in forestry are KEFRI which is a fully fledged research institute. Other research institutions mandated to undertake forestry research are the National Museums of Kenya which concentrates mainly on biodiversity research and Universities with forestry and forest related departments and some international organizations particularly ICRAF, also undertake research in forestry.

7.5 Existence of incentives for investment in forestry sector. Existing ban on harvesting of logs from state forests and cancellation of long term licenses (except for three large companies) (this is an incentive) has discouraged investment in forestry. However for planting stock has encouraged the development of private nurseries.

7.6 Due to the ban, there has been an increase in supply of wood from farmlands. To address the problem of converting logs to timber, circular saws mounted on tractors and chain saw for sawing logs in farmlands has increased.

7.7 Participation by communities, NGOs, and private sector: This is provided for by the Environmental Management and Coordination Act (EMCA) of 2000 and therefore adds emphasis of production on wood on farms.

REPORTING SCHEDULES

Most agencies involved in the management of forest resources and related biodiversity make annual returns on the state of these resources. The forest service is already participating in FAO's state of the world's forests assessment and national forestry action programme updates, all of which provide useful starting bases that can be adopted for reporting results of assessment of C & I.

Because data collection has a cost and may be prohibitive for some countries the following set of frequencies is proposed for measuring different indicators.

Indicators to be measured annually

Criterion III	Indicators 3.4
Criterion IV	Indicators 4.3

Indicators to be measured every 5 years.

Criterion 1	Indicators 1.1 and 1.2
Criterion 2	Indicators 2a.1 to 2c.1
Criterion 3:	Indicators all
Criterion 4:	Indicators 4.1 and 4.
Criterion 5:	Indicators all
Criterion 6:	Indicators 6.1 to 6b.1
Criterion 7:	Indicators all

DATA AVAILABILITY

An assessment of returns given in annual reports and updates on the state of forests indicates that most member countries of the dry-zone Africa process are likely to have data on and be able to measure the following indicators. Annual return appendices (ARA) forms prepared at forest management units and pooled for the whole country at the head quarters, were very resourceful sources of data for assessment.

Member countries of the dry-zone Africa process have noted that it is the quality and not quantity of data that matter. Because the span of expected changes in indicators varies from one to five years, and given the expense involved in data collection, it is considered prudent to monitor changes at intervals of five years.

Although the experience reported with Kenyan data cannot be regarded as a model, it shows that data is available for most of the indicators developed for the dryzone Africa process. Quite often, relevant data are scattered in different returns held by agencies responsible for managing specific resources, but can be accessed by a responsible officer, where there is need. In making the first entry, responsible persons should strive to follow FAO guidelines, and support this with copies of relevant laws, regulations, and assessment procedures. Once initial baselines are developed subsequent work will become progressively easier.

PROBLEMS AND CONSTRAINTS

UNEP and FAO have provided fora where concepts, terminology and definitions used were discussed exhaustively among member countries to develop a common understanding in the interpretation of parameters and assessment of indicators. In some cases the measurement of key indicators for which a country has data may be constrained by lack of funds and trained manpower. Experience show that this constrain can be forestalled by tying the process to on-going research and management programmes within the mandates and work plans of responsible institutions in government and NGO bodies. This would encourage responsible officer to assess relevant parameters and generate C & I data for national reporting.

MODE OF REPORTING

The dry zone Africa process should strive to develop a standard database that would hold data

from member countries and equipped with an appropriate software that would handle data storage and management. Such an interactive database system should be replicated in member countries at national levels, to hold data from all forest districts. The central database can be held at FAO/UNEP, forest bureau and a copy of it hosted on a website.

Arrangements would be made to provide access to such a database on the website to authorize users through the internet. The users should have the rights to update their pages which will from time to time, update the central database.

Such a facility would particularly enable managers to raise standard queries to effect desired analysis and to provide information on the state of a specific indicator, implications of its performance and possible effects this may have on related indicators, on the state of the forest such as, the effect of clearing of a given forest on the state of water resources of a catchment basin.

This development would enable the process to generate primary and secondary utility information that is essential for transforming the use of C&I into essential building blocks for promoting sustainable forest management, at all levels.

Table 1

A list of Key sets of C & I from the dryzone Africa process

CRITERION 1: MAINTAINANCE AND IMPROVEMENT OF FOREST RESOURCES INCLUDING THEIR CONTRIBUTIONS TO GLOBAL CARBON CYCLE

Indicator 1.1: The Total Land Area Under Forests, Plantations and Other Wooded Formations

Indicator 1.2: Biomass (and its changes over time).

CRITERION 2: CONSERVATION AND ENHANCEMENT OF BIOLOGICAL DIVERSITY IN FOREST ECOSYSTEMS.

Ecosystem Indicators

Indicator 2a.1: Area by Type of Vegetation – Natural or Man-Made

Indicator 2a. 2: Extent of Protected Areas

Indicator 2a.3: Fragmentation of Forests

Indicator 2b.1: Resources Exploitation Systems Used

Indicator 2c.1: Average Number of Provenances (and their changes over time).

CRITERION 3: MAINTAINANCE OF FOREST ECOSYSTEM HEALTH, VITALITY AND INTERGRITY

Indicator 3.1: Area and Percentage of Forest (natural and man-made) Modified

Indicator 3.2: Bush Encroachment

Indicator 3.3: Trends in Crop Yields

Indicator 3.4: Percentage of the Population Employed in Crop and Livestock Farming.

CRITERION 4: MAINTAINANCE AND ENHANCEMENT OF PRODUCTIVE FUNCTIONS OF FORESTS AND OTHER WOODED LANDS

Indicator 4.1: Extent and Percentage of Forests and Other Wooded Lands Managed According to a Management Plan.

Indicator 4.2: Growing Stock

Indicator 4.3: Annual Consumption of Wood for Energy.

CRITERION 5: MAINTAINANCE AND IMPROVEMENT OF PROTECTIVE FUNCTIONS IN FOREST MANAGEMENT.

Indicator 5.1: Areas and Percentages of Forests and other Wooded Areas Managed Mainly for the Production of Water, Protection of Watersheds, Riverine Zones and for Flood Control.

CRITERION 6: MAINTAINANCE OF AND ENHANCEMENT OF SOCIO-ECONOMIC BENEFITS.

Indicator 6.1: Value of Wood Products

Indicator 6.2: Value of Non-Wood Forest Products (NWFP)

Indicator 6.3: Ecotourism (including hunting and recreation).

Indicator 6.4: Share of the Forest Sector in GNP

Indicator 6.5: Value of Primary and Secondary Industries

Indicator 6.6: Value of Biomass Energy

Indicator 6.7: Forest Sector Trade Balance

Distribution of Benefits:

Indicator 6b.1: Employment Generation, Notably in Rural Areas.

Indicator 6b.2: Contributions to Food Security and Practice

CRITERION 7: ADEQUACY OF LEGAL, INSTITUTIONAL AND POLICY FRAMEWORK FOR SUSTAINABLE FOREST MANAGEMENT

Indicator 7.1: Policy Framework

Indicator 7.2: Existence of a Legislative, and Regulatory Framework

Indicator 7.3: Institutional, Human and Financial Capacity.

Indicator 7.4: Research and Development Capacity

Indicator 7.5: Existence of Incentives for Investments in the Forestry Sector.

Indicator 7.6: Existence of Measures to Facilitate Transfer of Technologies.