

A FRAMEWORK FOR NATURAL FOREST INVESTMENTS WITH COMMENTS ON EQUITY

J.M. NANI-NUTAKOR¹ AND PETER BOATENG²

¹PRIVATE CONSULTANT: UNIVERSITY P. O. BOX 225, UST., KUMASI, GHANA.

²PRIVATE CONSULTANT: WALDBAU, P. O. BOX 912, TAKORADI, GHANA.

ABSTRACT

This paper discusses the natural forest investments and equitable distribution of costs and benefits for sustainable forest management. The importance of natural forests is emphasised and economic investment is explained in general terms and linked with forestry investments. Five major forestry investment areas are described, and the sources of investment flows are described for Ghana as an example.

The issue of equity in the distribution of forestry costs and benefits is discussed briefly, and illustrated with the economic theory of income distribution. Three possible approaches or strategies for easing the burden of investment costs on the public purse are suggested, namely:

- review of funding structure,
- review of forest ownership structure, and
- review of decision-making structure or procedures.

The theory of equitable or "ideal" distribution of income to factors is explained. What is equitable - in the long run - is not a matter only of economic theory, but also of social and economic reality - in the sense that no section of society becomes more disadvantaged than others.

Key words: Forest investment, equity, sustainable forest management.

INTRODUCTION

Forests (natural as well as man-made) constitute a strategic resource for national development in many countries where they are found. They are capital assets of utmost economic and social importance, and they exercise great and invaluable influence on nations' environment - not only in West/Central Africa but also all over the world.

In the West/Central African sub-region, the natural forests may be categorised into two broad management categories, viz.:

- the category of reserved, or protected and consciously managed forests, and
- the category of un-reserved (i.e. un-protected) forests; these latter may be assumed to be unprotected and un-managed in the sense that the first category is.

The term "natural forests" should not be taken to refer only to the tropical high (rain) forests -THF- but it also includes other types of natural vegetation such as the coastal and interior

savannas and woodlands. For the purpose of this paper and conference however, the term and the

discussions following will mostly restrict its meaning to the THF's which by law are protected and productively and sustainably managed by the forestry departments and management agencies established under law by the governments of the various countries in the West/Central African Sub-region.

The economic, socio-cultural, and environmental value of forests is acknowledged world-wide, and in most countries, governments underscore this importance by making laws which enforce the protection, production and sustainable management of their forests and resources. In Ghana for example, the 1992 Constitution made provision for the establishment of a Forestry Commission with responsibility for the regulation of the management and utilisation of the forest resources, and the co-ordination of policies in relation to them. There is further provision in the same Constitution for the grant of rights, concessions and contracts in respect of the exploitation of the resources. Such grants must, however, be ratified by Parliament.

Economic investment and natural forest investment

We discuss the concept or theory of investment briefly, after which we will attempt an explanation of the term natural forest investment. Hellström and Palo (1995) consider that forest protection and sustainable management activities are investment projects and could be undertaken from a private business point of view as well as from a national economic point of view. They observe that returns on these two forestry investments (and on others) have been studied less than conventional investment in (capital projects) goods and services, but that over the past decade,

analytical literature around them has grown. In their recent study with special reference to private investments in forestry research and related activities, Helstrom et - al (1995) have noted that public funding in forestry research in particular has been on the decline.

What is investment?

By investment we mean the formation of capital assets (Mansfield 1979). Baumol and Blinder (1986) have defined investment as the "*flow of resources into the production of new capital. It is the labour, steel, and other inputs (factors of production) devoted to the construction of factories, ware-houses, rail roads, airports, dams, and other pieces of capital during some period of time*". These investment goods (as they are called) are most often not for immediate consumption, but are created in order to promote further production especially of consumption goods (Lipsey 1993).

What is (natural) forest investment?

In the light of, and parallel to the above definitions, (natural) forest investment may appropriately be defined as the formation (through protection, conservation and sustainable management) of forests which we have already described as a strategic resource and capital asset for national development.

Again, (natural) forest investment is the flow of resources into the production of new forests - in the sense that forests are a renewable resource, and all resources devoted to their protection, conservation and sustainable management constitute an act of investment; also, the forests so protected and managed themselves become investment goods. In fact, current forest investments are expected to result in the production of future forest utilities - economic, social, etc.

Principal forest investment or forest management areas

We propose here four major forest investment or management areas or functions into which investment resources may be channelled:-

- Protection forestry;
- Production forestry and industrial utilisation;
- Amenity (cultural and welfare) forestry;
- Forestry research and education.

These strategic or functional and management areas are explained briefly:-

1. *Protection forestry* - this function is necessary and is undertaken to ensure favourable climatic and physical conditions for countries; to safeguard water resources, soil fertility, environmental quality and stability, conservation of biological diversity, and to minimize the damage by floods and erosion to rivers and farm lands. In almost all the West/Central Africa countries, governments take it upon themselves to invest resources in the protection and conservation of the forests in order to produce new or renewed capital services and assets. In West Africa, the duties of protecting and conserving forests are carried out by the national governments through the Forestry Department (Ghana), the State Forestry Department (Nigeria), the Forest Development Agency (Liberia), and the Forestry Administration (Cameroon) (Abeney 1995). Each of these agencies receives financial and other resources from their respective state governments.

2. *Production forestry and industrial utilisation* - taken with the function of protecting forests, this function is a most important investment function undertaken by most West African countries. Production forestry is for the supply in perpetuity, at

reasonable rates, of all forms of forest produce which can be economically produced within a country, and are required for agricultural, domestic and industrial purposes as well as for exports. Here also, the West African national governments devote considerable investment funds for production forestry or the management of the national forests on a sustainable basis. The utilisation industry, which includes loggers (extraction/harvesting firms) and processors (sawmillers, plywood and veneer firms), consists entirely of private sector investors who pay various types of levies and taxes to the state for the right to exploit the forest resources of wood and timber.

3. *Amenity forestry* - aims at the conservation of adequate forest areas for recreation, ecotourism, and in promoting public awareness in forestry. This area has been developing rapidly in most countries in recent times. In Ghana for example, important amenity forests are the Nini Sushien, Bia and Kakum National Parks, the Ankasa, Assin Attandanso, Shai Hills, Bia South Game Production Reserves, and Mole Game Park.

4. *Forestry for research and education* - forests may also be reserved solely for the conduct of research, education and conservation of biological diversity. For Ghana, two examples are the Bobiri and the Pra Anum Forest Reserves. In Ghana and Nigeria forestry research investment resources are provided for the Forestry Research Institute of Ghana (FORIG) and the Forestry Research Institute of Nigeria (FRIN) respectively.

The fore-going account shows that in most West African countries, some, though perhaps relatively inadequate investment funds and resource flows are being devoted to the

forestry sector for the creation of renewed and new forestry capital, assets and utilities.

Natural forest investment - sources of funds

Because of the lack of relevant data for all countries in the West/Central African sub-region, much of the discussions in this and subsequent sections will be illustrated largely with data derived from and applicable to Ghana's situation only. We will examine the funding sources corresponding to the four major forestry investment/management areas mentioned above. In Ghana investment fund-flows into the "pure" forestry sector (i.e. excluding the extractive and processing industries) may be categorized as internal or external to the forestry industry and trade.

- The internal sources - which are self financing - are taken to mean funds arising out of the distribution of revenue generated from timber harvesting, processing and trade (both domestic and exports). These would include, for example, levies on timber products and royalties, rent, taxes - including sales tax -

and other collections as part of timber production. All of the funds derived from these sources accrue to the government for re-allocation to various fiscal/financial and other purposes.

- The external sources of investment funds derive from all other funding arrangements which might be used to intervene in the timber markets. They could include, for example, general tax revenues in producer or consumer countries, and/or international private/government assistance such as grants.

Both sources of funding could and probably should apply to capital expenditure as well as to

continuing financing of annual or periodic activities. The possibilities of self-financing sustainable management are limited. Competition from timber from other countries and regions (temperate, boreal, tropical) and from other competitive materials would certainly limit the extent to which increases in costs associated with sustainable management could be simply passed on to final consumers.

Table 1 gives a list of official forest fees which accrue to the Government of Ghana (GOG), or its various agencies. The table shows the level of fees, where standardised, and the procedure for collection (column 3). These fees are a broad mixture of different types of payments, including payments for services, as in the case of export levy, taxation of the stumpage value of the timber, as in the case of royalties and concession rent, and penalties for transgressing forest management regulations. The Forestry Improvement Levy raised by the Association of Ghana Timber Industries (AGTI) is not included here because it is an informal payment.

Table 2 provides information on 'forest-fee-collection' over the three year period, 1989-1991. From 1989 to 1990, there was an increase of about 45% in forest-fee-collection; this however declined from the 1990 figure to the 1991 one, by about 18%.

Calculated on the per cubic meter (m^3) basis, these fees amounted to less than \$5.0, and have been considered grossly inadequate for sustainable forest management, protection and conservation. Accordingly, there has been strong representation from many quarters (eg. the World Bank) for substantial upward review of the various forest fees and levies.

Table 1: Official Forest Fee Schedule, 1993 (Ghana).

Responsible Institution	Fee	Current Set by Consultation ¹
Forestry Department (FD)		
Royalties	Variable	MLNR ² (now MLF) after Ad Hoc Committee ³
Concession rent	¢100/ha	Timber Lease Committee ⁴
Compensation payments	Variable	Magisterial Courts
Fines	Variable	Timber Lease Committee ⁴
Property mark	¢50,000/conc.	FD
Taungya fees	Variable	FD: costs of cleaning perimeter of area
Permits: major forest products	Variable	Royalty rates: MLNR (now MLF)
Permits: minor forest products	Variable	Forestry Department
Concession prep. fee ⁵	¢500,000	FD
Lands Commission (LC)		
Royalties	Variable	MLNR (now MLF) after Ad Hoc Committee ³
Concession rent	¢100/ha	Timber Lease Committee ⁴
Forest Products Inspection Bureau (FPIB)		
Retailer Registration Fee	¢5000 p.a	FPIB
Exporter Registration Fee	¢30000 p.a.	FPIB
Sale of LMCs	¢200/log	FPIB
Export levy (cedis)	2% FOB value	FPIB/TEDB to cover institution costs
Timber Export Devel. Board (TEDB)		
Export levy (foreign curr.)	1% FOB value	TEDB/FPIB to cover institution costs
Export Promotion Council (EPC)		
Registration fee	¢30,000 p.a.	EPC
Ghana Chamber of Commerce (GCC)		
Export document fee	¢5000/cargo	GCC
Ghana Shippers Council (GSC)		
Registration fee	¢120,000 p.a.	GSC

1. Where only one institution decides, there is no consultation on level of fee.

2. The Ministry of Lands and Natural Resources (MLNR) was replaced by the Ministry of Lands and Forests (MLF) in 1993.

3. Ad Hoc Committee formed by representatives of FD, TEDB, FPIB, Forestry Commission (FC) and the Association of Ghana Timber Industry (AGTI)

4. Timber Lease Committee formed by FD, TEDB, FPIB, FC and Lands Commission (LC).

5. Introduced in 1992, this is a once only fee for preparation of the concession.

Source: Study of Incentives for the Sustainable Management of the Tropical High Forest of Ghana Part 1: Situation Analysis. First Draft Final Report, June, 1993 prepared by IIED and FD Ghana for ITTO.

Table 2: Collection of Forest Fees 1989-1991 (thousands of dollars)

Forest Fee	1989	1990	1991	Average	\$/ m ³
Royalties ¹	2,180	2,903	2,060	2,381	2.03
Concession rent ²	15	8	6	10	0.01
Compensation payments	0	0	1	1	0.00
Fines, penalties	0	0	5	2	0.00
Property mark, misc. ³	42	47	38	42	0.04
Taungya fees	0	0	0	0	0.00
Permits: Major Forest Prods.	71	217	185	158	0.13
Permits: Minor Forest Prods.	21	21	17	20	0.02
Silvicultural fees ⁴	17	13	5	12	0.01
Registration fees ⁵	24	24	24	24	0.02
Sale of LMCs ⁶	25	30	62	39	0.03
30% export levy ⁷	2,088	3,257	2,960	2,768	2.36
Other regul. bodies ⁸				70	0.06
Total Forest Fees	4,484	6,520	5,363	55,526	4.72

1. Assumes a 50% collection rate for Lands Commission outside forest reserves (Section 5.1.2).
2. Concession rent figures were not available from Lands Commission
3. Includes felling inspections and sale of abandoned logs.
4. The Silvicultural Fee was discontinued from 1992
5. From General Woods 3 (1992). 1991 \$ equivalent used for all years
6. Calculated at Cedis 50 per log 1987-1990. The 1991 figure is from General Woods (1993).
7. 3% export levy of all exports. TEDB calculate that only 2.6% is actually collected, mainly due to defaulters on the levy collected in foreign exchange.
8. Export Promotion Council, Ghana Shippers Council and Ghana Chamber of Commerce: Revenue estimated on the basis of the number of exporters registered with FPIB in 1991.

Table 3: Forestry Production Factors and Factor Owners

Land	Traditional authorities or stools; individuals
Labour and Management	The GOG employs labour and management/professional staff for its agents (the FD, FC, FORIG, etc.) to carry out duties for forest protection, production, (sustainable research/education).
Capital/Investment Funds	GOG derives funds from various sources, and in turn subvents its agents.

Table 4: Beneficiaries of stool lands revenues (as stipulated by the 4th Republican Constitution effective 7th January, 1993).

Beneficiary	Function Performed	% of Revenue Allocation
Forestry Department	Management protection conservation	70% of total revenue collected
Administrator of stool lands	Administration of stool lands	3.00 i.e. 10% of 30%
District Assembly	Land owner	14.85 i.e. 55% of 27%
Land-holding stool	Forest land owners	6.75 i.e. 25% of 27%
Traditional Authority	Forest land owners	5.40 i.e. 20% of 27%
TOTAL		100%

Source: Modified from ILED - First Final Draft Report, June, 1993, pp. 56 - 56.

- Notes:**
1. After the FD has deducted 70% of the gross revenues, the remaining 30% is allocated among the other beneficiaries as indicated in the Table.
 2. Other providers of functions which promote sustainable forest production and mangement do not have a direct share in stool and revnuens.

Forest production/management factors and factor owners

Similar to the conventional economic factors of production, the following factors contribute to forest production:-

- Forest land
- Labor and management
- Capital (investment funding)

Just as economic activity requires the services of the various productive factors, so do the protection, conservation and sustainable management of forests also require these services and/or the contribution of their owners.

In Ghana the various factors for forest production and management are owned or provided by various agents as shown in Table 3. They consist of:

- traditional authorities, stools and individuals who are the forest land owners;
- the Forestry Department which undertakes the management of the forests for sustainable supply of forest-products and services on behalf of the GOG; the Department also employs a vast amount of labour of all categories, to carry out specified duties in connection with forest protection, conservation and sustainable management.
- the GOG which provides the major proportion of the funding - ie. capital/investment funds - for the protection, conservation and sustainable forest management.

Forest Lands and Revenue Administration

Although forests may be legally reserved and protected, etc., the lands on which they stand do not belong to the government or the state. In fact, almost all the lands in the THF zones are owned by the people; they are stool lands, and to underscore this, the constitution provides that all stool lands in Ghana shall be vested in the appropriate stool on behalf of, and in trust for the subjects of the stool in accordance with customary law and usage. The placing of any forest under reservation, therefore does not change the (land) ownership status.

For the regulation and administration of stool lands under forest reserves, the 1992 Constitution of the Republic of Ghana provides for the creation of an office of the Administrator of Stool Lands (ASL) who is responsible for the establishment of a "stool land account" for each stool into which shall be paid all rents, dues, royalties, revenues, or other payments whether in the nature of income or capital from the land. It is further stipulated in Constitution that the lands commission and the ASL shall coordinate with all relevant public agencies and traditional authorities and stools in preparing a policy framework for rational and productive development and management of stool lands.

STOOL LANDS

Revenue Disbursement

The beneficiaries of the stool land account are as provided in Table 4. The Table lists the various beneficiaries of stool land revenues, the functions provided by them, and their respective rewards. We want to note that apart from the FD, the other state agencies (ie. FORIG, FC etc.) do not have any direct share in stool land revenues.

Labour and management factors for forest production

For the protection, production and sustainable management of natural forests, and for carrying out functions in connection with amenity forestry research and education, labour and management are provided by workers (labourers and technical officers) and professional management personnel engaged by the GOG. The various agencies of government in this respect are outlined in Table 5, showing the agency, forestry function, and personnel strength.

Table 5: Forestry sector institutions/agencies of the GOG showing forestry functions and Personnel Strength.

Institution	Forestry Function
Forestry Department (FD)	Protection, production and sustainable management of resources
Game & Wildlife Dept. (GWLD)	Amenity forestry
FORIG	Forestry and forest products research
IRNR	Education research (limited for purposes of teaching)
Forestry Commission (FC)	Coordination, regulation, management and utilization of forestry and wildlife resources; formulation of national policy.
Timber Export Dev. Board	Marketing and market intelligence
Forest Products Insp. Bureau (FPIB)	Monitoring of extraction Lands Commission Administrators title deeds, registers and other records.
District Assemblies	Potential in forest management ensure enforcement of bush fire laws; initiate tree-planting campaigns regulate chain saw operation etc.
Traditional Councils and Stools	Land owners. No (limited) direct management functions
Farmers	Individual owners no direct role
Concession Holders	Extraction/utilization functions only
Private sector industries	Processing and value addition

Source: Adopted from IIED.

Capital/investment for forestry production

“Pure” Forestry production (i.e. creation of forestry utilities) in Ghana is funded almost entirely by the Government of Ghana (GOG) through annual limited and inadequate subventions granted to the various public forestry agencies for their respective programs. Over the past and recent decade, increasing budgetary constraints have limited the amounts of funds that the national budget can provide, and these pressures have naturally led to suggestions for privatization of all sector programs and activities. The data in Table 6

illustrate the extent of funding borne by the GOG for various forestry investment programs.

The average budgetary allocation to the sector from GOG consolidated funds is estimated to have tripled over the period 1990 - 1994, although this source constitutes only 10.93% of total funds for the same period. Other sources of funding during 1990 - 1994 were :-

- External donors such as the World Bank, DANIDA, ODA/UK and GTZ - which provided 80.95%, of required funds.
- Forest fees and charges - 8.12%

**Table 6: Expenditure of Forestry Sector
Institutions - 1991 (million of cedis)**

Forestry Department	
General Administration	133
General Forest Cons. Service	3,508
Planning Branch	192
Rural Forestry Division	104
Sunyani Forestry School	52
FRMP Expenditure	5,642
Total	9,631
Forest Products Inspection Bureau 1,160	
Timber Export Development Board 1,469	
Forestry Research Inst. of Ghana	
GOG Funding ¹	663
FRMP Funding ¹	623
Institute of Renewable Natural Resources	
GOG Expenditure	129
FRMP Expenditure	13
Forestry Commission 103	
Game and Wildlife Department² 64	
Total Forestry Sector Cost	13,855

¹ Budgeted not actual costs

² For maintenance of parks/reserves in high forest zone, including FRMP component estimated).

Source: Adopted from IIED

Collaborative Management

To efficiently manage and allocate the forest resources of Ghana, public agencies (on behalf of the owners) and industrial users must come together to plan forest development programs and operations well into the future. In developing our public policy for sustainable management of the forest resources, we have opted to retain them in common ownership. But

at the same time we have chosen to depend almost exclusively on private enterprise to exploit them. There is very little being done by private enterprise to develop the forest resource. We must begin to talk not only of utilization contracts; it is time to talk also in terms of forest

resource protection, and sustainable production and management contracts.

To reconcile our commitment to common ownership on one hand with our commitment to private utilization on the other, we at present rely on a variety of licenses, leases, permits and other forms of property rights that provide private users with access to the resource. The form that these rights take has major consequences for how the resources are used and managed and the benefits we are able to derive from what we use.

Our current approach to protection and sustainable management of the forest resources may have to be reviewed. For example, we could consider three possible management approaches:

- firstly, we could review the *funding structure* of forest protection and management by increasing private participation in protection and sustainable management functions. This strategy could result in higher efficiency of public management agencies;
- secondly, the *ownership structure* of protection and management may be privatized; and
- thirdly, we could increase private involvement and participation in *decision-making* with regards to most forestry functional areas - i.e. protection, production and sustainable management, amenity, forestry research, etc.

Equitable distribution of costs and benefits of forestry production and management

The fore-going sections have given general indication of the cost to the public exchequer of programs for protecting, producing and sustainably managing the country's forests and their resources. These costs have escalated considerably in recent years and the public purse seems unable to cope with the heavy budgetary demands of the sector single-handed. In this respect fresh thinking would seem to favour active and meaningful private sector participation in all aspects of forestry protection, management, including private investments in research programs. When this is achieved, one can then talk about equitable distribution of the burden of costs and of the benefits of forestry production and management.

We turn attention to the benefits that derive from the forestry programs, and the issue of equity in their distribution. Forestry protection and management programs are a form of economic activity and, it is thought that the traditional objective of forestry has been and still remains production of stumpage; Gregory (1972) has observed appropriately that the sale of timber remains the major source of revenue to most timber land owners and investors. However, timber is not the only benefit that derives from the forests. There are many others, commonly classified under the general term - non-timber forest products, (NTFP's). The NTFP category of forest benefits includes food items (such as snails, mushroom, nuts, bush meat, fruits, etc.), wines, leaves, poles, ropes, rattans, herbs or medicinal plants; honey, resin, dyes, etc. There are also other benefits which are not marketable; examples of these may be cited as environmental quality and stability, recreation and ecotourism benefits; checking of soil erosion and protection of agricultural lands, watershed protection, and conservation of biological diversity, etc. All of these benefits constitute utilities which forest protection and sustainable management activities and functions yield.

Distribution of Benefits and Equity

Economic activity has two major aspects:-

- production of utilities - i.e. goods and services which generate income; and
- distribution of the products (i.e. income) generated by the producers (i.e. investors); this aspect represents consumption.

In economics, a simple theory of income (or benefit) distribution says that income or the benefits from production must be shared by the factors which produced them; this implies simply that income must accrue to those who bear the cost of production.

For the present we cannot discuss the issue of equitable distribution of costs and benefits for the forestry sector or industry based on empiricism, because of lack of empirical data for analysis. Also, it seems obvious to us that the forestry sector cannot be described as being a perfectly competitive industry. It is by and large a monopoly, dominated by the state and/or its agencies which are under its perfect control.

We cannot, however, dismiss out-of-hand the issues of equitable distribution of the costs of and the benefits from forestry activities, programs and industry.

First, it seems obvious that the state alone should not bear the costs of investing in forestry protection, production and management for sustainable supply of forestry resources. The various beneficiaries within the system who claim a part of the benefits should be called upon to bear some of the costs of production and creation of forestry benefits. This is simple to say or understand. The difficulty is how the distribution or sharing of costs and benefits could be done - equitably.

Gregory (1987) thinks that the question of "what constitutes an ideal distribution of wealth or income must, in the last analysis, be a matter of personal judgment. Equal monetary wealth would not yield equal welfare unless everyone

placed the same value on the possession of money, and this is certainly not true. There are many who feel equality should be interpreted in terms of opportunity, rather than wealth, but others point out that opportunity is often closely associated with wealth and income. Nevertheless, there are some widely held notions about how income and wealth should be distributed: people should not be allowed to starve; some level of medical care should be provided to all; children should be fed, clothed,

and educated even though their parents cannot bear the associated expense. And, in general, people agree that any redistribution of income should be directed from the rich to the poor. The significant aspect of distribution here is that the allocation of public goods, whether social or merit, together with the collection of taxes for their production, can influence the distribution of income and of wealth in the nation. Hence the distribution of public forest goods should in general accord with the ideas currently held by society regarding a proper income distribution". The issues of natural forest investments and equitable distribution of costs and benefits involve the following issues:-

- Disposition of rights by the government (on behalf of owners/stools) to harvest timber and occupy forested land; the terms and conditions attached to the form of tenure.
- Taxes, royalties, rents and other charges levied upon forest land, timber and primary forest products.
- Structure of markets for trees, logs and processed timber.
- The implications of tenure arrangements for the structure of the wood-based industry, having regard to its pattern of integration, concentration, ownership and control.

Areas of resources research

To tackle issues of investment, equitable distribution of costs and benefits, public agencies, the universities and research institutions will have to examine the legislation, policies, procedures and practices affecting the allocation and use of forest resources. Recommendations can then be formulated and directed to ensure that the public interest is protected, and in particular that:-

- The full contribution of the forest resources to the economic and social welfare of Ghanaians is realized in terms of the diverse commercial and environmental benefits they potentially may generate.
- The various public levies on, and the charges associated with the acquisition and retention of timber reflect the full value of the resources made available for harvesting, after fair and reasonable allowance for the costs, harvesting, forest development and profits, and that the various public revenues derived from forest resources are systematic, equitable and consistent with general taxation policy of Ghana.
- The marketing arrangements for standing timber and timber products permit their full value to be realized and are consistent with an efficient economic structure.
- The regulation of exports of forest products serves the best economic interest of the country.
- The efficiency and vigour of the wood-based industry is maintained.
- Provisions are made for the efficient management, protection and enhancement of the forest resources and for the regulation of harvesting and utilization practices.

It must be pointed out and conceded that very little work has been done in the areas listed above, hence the recommendation for research. The question of a realistic working assessment of the amount of timber that can be economically removed in each forest area, and sound criteria for determining the rate of harvesting it that will best serve the public interest will have to be resolved. Allusion here is to issues like the basis for fixing minimum felling diameters for various species as well as the annual allowable cut.

The assessment and the criteria mentioned above are of some importance - one a matter of data, the other a problem of analysis. These determine, in a large part, the size and rate of growth of the wood-based industry, which because of its importance in Ghana influences the pattern of economic development.

Forestry and environmental problem

Perhaps the most conspicuous development has been the emergence of problems relating to protection of the natural environment. Forty years ago worldwide, the environmental problem was not a major issue, partly because forest operations at the time did not, as a rule, cause much lasting ecological damage and partly because of public indifference. But no longer.

REFERENCES

Abeney, E.A. (1995): Harvesting controls - paper presented at the UNEP/CIFOR/FORIG Thematic Conference on Intergenerational maintenance and Technical Issues for Sustainable Forest Management. Sept. 12-14, 1995 FORIG, Fumesua.

Baumol, W.J. and Blinder, A. S. (1986): Economic principles and policy; 3rd. Microeconomics. Harcourt Brace Jovanovich Publishers; San Diego, N.Y., London. Pp 560.

Forestry Department Headquarters, Peninsular Malaysia (August, 1995) - Briefing Notes for the visit of H. E. Dr. Kwabena Adjei to Malaysia (August, 1995).

Today the potential impact of industrial forestry can be enormous, and environmental protection has become one of the major concerns of our time. Strenuous efforts are being made to minimize the adverse effects of industrial activity on the natural environment. But this remains one of the most sensitive issues in forestry policy today.

The world is talking about diversity, sustainability, certification and labelling of wood from certified forest, that is, sources that are under sustainable management. The ITTO has set the year 2000 when member countries are required to manage their forests in accordance with principles and criteria of sustainability. In short, the new problem today is to rationalize "forestry" as it is traditionally understood in the context of timber production, with protection of the environment and other social and non-industrial values. In the foreseeable future the trend of harmonizing forest operations and silviculture with the integrity of the natural environment will grow. There is every reason to expect that the demands for outdoor recreation, protection of rivers, fish and wildlife, preservation of the aesthetic quality of the natural landscape will increase, thus the processes of forest planning, regulation and control will be forced to respond appropriately to these needs.

Gregory, R.G. (1987). Resource Economics for Foresters. John Wiley and Sons; New York; pp 455.

Hellström, E. and Palo M. (1995): Privatization of forest sector research: Theory and European Empirical Findings. Paper presented at the XX IUFRO World Congress in Tampere, Finland, 8 Aug. 1995.

IIED and FD. (Ghana) (1993): Study of incentives for the sustainable management of the Tropical High Forest of Ghana. Published for ITTO.

James, D.E. and Throsby, C.D. (1973). Introduction to quantitative methods in economics - John Wiley and Sons, Toronto, pp. 335.

Lipsey, R.G. (1993): An introduction to positive economics. Oxford Univ. Press pp. 808.

Mansfield, E. (1979): Micro-economics. Theory and Applications. 3rd ed., W. W. Norton & Co. New York pp. 548.

Wangari M. (1995): Traditional forestry. A historical and environmental perspective. A discussion paper; Expert Consultation on Forestry Policies in Africa. FAO, Accra, Ghana.

Whitehead, G. (1986): Economics, City. Heinemann Professional Publishing pp. 444.