

DEPARTMENT OF
AGRICULTURAL ECONOMICS
AND EXTENSION

WORKING PAPER

State Forestry Organisations and
Forest Policy in Africa

by

Kay Muir

Working Paper AEE 2/91

DEPARTMENT OF AGRICULTURAL ECONOMICS & EXTENSION
FACULTY OF AGRICULTURE, UNIVERSITY OF ZIMBABWE
P.O. BOX MP 167, MOUNT PLEASANT, HARARE
ZIMBABWE

State Forestry Organisations and

Forest Policy in Africa

by

Kay Muir

Working Paper AEE 2/91

**Department of Agricultural Economics and Extension
Faculty of Agriculture
University of Zimbabwe
P O Box MP167
Mount Pleasant
Harare
ZIMBABWE**

December, 1990

Views expressed in this paper are those of the author alone and do not necessarily express the views of the Department, University or any other person or institution.

Working Papers are published with minimal formal review by the Department of Agricultural Economics and Extension and are circulated to disseminate information and invite comment, criticism and suggestions

STATE FORESTRY ORGANISATIONS AND FOREST POLICY IN AFRICA

INTRODUCTION

Deforestation in Africa is estimated at over 3 million hectares per year (WRI, 1988). The major cause of deforestation is the clearing of woodland for cultivation. Where large forest reserves exist and where the new activity generates more revenue than the natural forest can contribute, deforestation is an acceptable manifestation of increasing populations and economic development.

Natural forests are, however, not evenly distributed and in some regions clearing forest for cultivation and fencing are the major factors in land degradation and desertification. Deforestation as a result of the demand for wood fuel is extensive in the vicinity of urban areas and in the more arid and heavily populated rural areas with fuelwood demand estimated to be 620% in excess of supply in Niger (Anderson and Fishwick, 1984). The mining of indigenous hardwoods for local industry and export timber reduces the capital stock but it is only in a few countries that it is an important contributor to deforestation. Diminished supplies of local building timber cause hardships but are not a major factor in deforestation. Fire (especially for rainforests) prevents regeneration thereby causing significant shifts in the woody vegetation profiles and contributing to deforestation.

The consequences of deforestation and the serious implications for desertification and

climate changes have been well documented. There has also been some recent emphasis on the role of deforestation in global warming and in diminishing biodiversity and gene pools. Of more immediate concern to African policy makers is the impact of desertification on sustainable production and the impact of deforestation on household and national economies. Over the last few decades research on the impacts of deforestation with respect to household economics has concentrated on wood fuel availability¹. Less research is available on the role of non-timber forest products, but studies indicate that they can play an important role in food security and income generation (Asibey, 1988). The implications for national economies of diminished hardwood supplies are acknowledged but very little work has been carried out on sustainable management, utilisation and regeneration of natural woodlands.

In many African countries all tree-related issues are entrusted to a State forest unit which is primarily concerned with industrial timber production. The exploitation of indigenous hardwoods for export and furniture manufacture and plantations of exotic timber species for wood, pulp and paper industries has been their major concern. Little or no research was carried out as to the suitability of indigenous species for the development of the local industries since the introduced exotics (predominantly pine, eucalyptus and wattle) adapted well. Indigenous forests were cleared for mono-exotic plantations and the timber industry was designed to mirror those of industrialised countries. In recent years these agencies also have become responsible for major afforestation and agroforestry projects.

¹ See Anderson and Fishwick (1984) for an overview of the issues

The advantage of an exotic-based timber industry is that localised research and training are unnecessary; thus all Africa's commercial tree expertise derives from industrialised countries². The disadvantage is that in the process these exotic species are replacing indigenous forests without any assessment of the value or potential of the indigenous trees in their own right. In addition, this practice reduces biological diversity. The advantages of all tree-related activities being centralised in one agency are also the concentration of expertise and reduced training needs. The disadvantage is that these bodies are usually very poorly equipped to relate to the needs of any but the commercial timber industry.

The major problems facing forestry in Africa include all the issues which hamper development and the misallocation of all natural resources: very low income and education levels, high population growth rates, poor infrastructure, lack of investment in research, training and extension, poor economic policies and distorted international markets. These issues are all important to forest policy in varying degrees throughout Africa but they are not addressed here. This paper will be restricted to those policies which directly affect the maintenance, development and utilisation of forest resources and their impacts on attitudes to trees.

FOREST POLICY DEVELOPMENT

Policy is a deliberate intervention by the State to the existing order so as to improve human

² This refers to expertise in the formal sector. There is much traditional expertise which remains untapped and undocumented.

welfare or to redistribute assets and income. If the status quo were acceptable there would be no need for state intervention and hence no need to develop appropriate and relevant forest policies. Some policies are necessary to counteract interventions in other sectors of the economy, some are designed to redistribute wealth. A limited number of forest interventions are specifically designed to account for the externalities which would not be reflected if offtake and production were allowed to find their own levels. These externalities and the pricing decisions related to them are well documented (see e.g. Krutilla and Fisher, 1975), as are the tenurial issues which are blamed for much of the deforestation and lack of investment in tree planting in Africa (Fortmann and Riddell, 1985).³

State intervention through either regulation or direct participation is probably higher, worldwide, for forestry than any other productive sector. Much of this can be related to the externalities referred to above. The essential role of forests for environmental protection often means that client populations are not situated in the immediate vicinity of the forest. The long-term nature of investments in most forest enterprises is another rationale for state participation in forestry.

Forest policy, as with any other, can only be assessed in relation to its objectives. When

³ It is important to note the distinction between common property and open access and to recognise that local controls have often broken down with modernisation and increased populations. New, locally developed, controls may therefore, be necessary for common property woodlands and plantations to succeed. It is not necessary to individualise access but it is essential to control access and to clearly relate the costs and benefits of any social forestry programme.

formulating policies it is essential that the full causal chain is understood and all the actors and affected communities are clearly designated together with their objectives. If the state or national objectives conflict with those of the local community it is most unlikely that any project or regulation will be effective. Effective sanctions are impossible unless the community accepts their legitimacy. In order to avoid conflicts and/or accommodate the objectives of local populations, it is essential that these be explicitly documented. This applies to all client communities, urban or rural, subsistence or commercial.

Clawson (1980) outlines a useful series of steps to be followed when formulating policy which includes an assessment of all the options physically, economically, socially and operationally. An aspect which is not made explicit is the importance of understanding the objectives of all the different participators in a forest policy. When measuring success or failure, it should be possible to assess the results directly against the specific policy objective, the overall enterprise objective/s and then to assess the costs in relation to any of the other objectives of the forest sector and affected communities.

The evidence from many African countries indicates that rural afforestation is becoming an important role for many state forestry agencies. These programmes have often failed in the past and the evidence points increasingly to the lack of clearly outlined objectives and/or seriously conflicting objectives between client populations and implementing agencies. This would indicate that much of the blame for the failures is not necessarily related to poor execution but to wrongly conceived policies and mechanisms. Some of the major problems

forest policy must address for the various forest sectors with their different functions are considered below.

FOREST POLICY FOR RURAL DEVELOPMENT

The emphasis of farm, social or community forestry and rural afforestation programmes generally, is to encourage greater tree cover in the rural areas to avoid progressive deforestation and the resulting environmental degradation. In a few isolated instances it may actually be designed primarily to facilitate rural development and increase incomes.

If it is accepted that rural communities will act in their own best interests given the existing circumstances, it is unlikely that they would deliberately degrade the environment. Increased man-land ratios, changing social systems, increased demands and macro-policies which encourage deforestation have all combined to make it difficult for trees to compete as a valuable land use (Pimentel, Floyd, Teel and Bourns, 1989). Until the returns to peasant communities are sufficient to ensure a reasonable return on investment, it is unlikely that major government afforestation programmes will be sustainable. Whilst the farmers may follow initially the requests to plant trees and woodlots, if their anticipated returns are not forthcoming, they soon will become disillusioned.⁴ In Kenya the Forest Department is making an effort to change its orientation to incorporate farmers' goals but the Department struggles to operate alone as a development agency (Kiriinya, C., 1989).

⁴ The failure of the Zimbabwe eucalyptus project to produce the cash incomes farmers anticipated is causing some farmers to refuse to participate in more appropriate tree-growing schemes (Casey and Muir, 1987).

A major fault with social forestry programmes in Africa is that they do not take a holistic approach and are not implemented as part of an overall rural development programme. Instead foresters implement a programme of tree planting with a particular goal in mind.

Thus in Zimbabwe eucalyptus has been selected as a fast-growing tree (with which the Forestry Commission is familiar) to stem the tide of desertification by providing poles and fuelwood. The fact that the population has only a limited use for poles; the fact that they do not consider the shortage of fuelwood sufficient to warrant the major investments of time and resources required by the projects and the fact that the eucalypts can have negative environmental impacts, are not sufficient to overcome the Forestry Commission's inexperience with any other tree species. The policy ignores the dangers of species concentration, the danger of wetland drying and the danger of disillusioning the rural population. The findings from the pilot phase of a World Bank rural afforestation project acknowledged the shortcomings. The World Bank internal appraisal of the project stated that the most attractive option for increasing fuelwood in communal areas would be through management and harvesting of the indigenous woodland, recognising that the economic costs of wood from this source would be the lowest. Where indigenous woodland was already insufficient to meet local demand, the most viable option to increase supply would be to incorporate tree planting into farm plans (agroforestry) rather than establishing community woodlots. The importance of working through the agricultural extension network was stressed. It was, therefore, incomprehensible that, in the same document, the actual

proposals for the rural afforestation project eucalyptus only were to be planted in woodlots belonging to target groups and local authorities with a statement that some other species may be provided for a few farmers' woodlots. Only 0.5% of funds were allocated to agroforestry development and whilst working with the agricultural agencies was encouraged, very few funds were allocated with most of the emphasis remaining on forestry officers working directly with farmers, groups and schools. This totally ignored all current research on the need for project designs to be holistic and based on popular participation. It completely disregarded its own findings from the pilot project and other work carried out by the Bank (Gorse and Steeds, 1987; Falloux and Mukendi, 1988). After vociferous opposition, the proposed project has been amended. Greater "lip-service" is now paid to the importance of indigenous woodlands, appropriate farm species and agroforestry. Time will tell whether these changes are real or cosmetic.

In Nigeria the afforestation programme had as a major goal the establishment of shelterbelts to stop wind-erosion despite acknowledging that they are expensive compared to farm forestry. The major expense is fencing to protect the trees. Investment in controlling livestock may be more cost-effective but because of agency compartmentalisation there is little co-operation between livestock specialists and foresters. Casey (1989) makes an innovative suggestion for incorporating shelterbelts in farm forestry and rearranging the fencing, which would result in significant savings and increased land area protected. The major thrust of such a programme would be to work with the farmers rather than offer cash incentives for seedling survival.

Rural afforestation programmes designed to produce woodfuel or building timber have seldom been assessed in the light of their opportunity costs to local farmers. Programmes to protect the environment could often be adjusted to incorporate some of the farmer priorities and thus avoid conflicts and failures. State forestry institutions designed to service industrial timber needs are poorly placed to implement farm forestry and rural afforestation projects. Even where the importance of incorporating farmer priorities in these projects is widely recognised and where they are explicitly incorporated in the project mandate, few of the projects actually address these issues.

It is essential that a more integrated approach to land use is developed which considers all the natural resources in the farm system. Agriculturalists should consider trees an essential component of the farming systems they are developing. Foresters should develop technologies for natural woodland management, agroforestry, household forestry and environmental protection which incorporate the farmers' priorities. Farm forestry remains, however, an integral part of the farm system and afforestation programmes would be less expensive and more appropriate if they were incorporated into existing organisations servicing peasant farmers (Muir and Casey, 1989).

There are several policy options in addressing any afforestation project:

- to conserve and more effectively manage the woodlands,

- to plant more trees,

to provide access to substitutes,
to reduce demand.

Wherever economically viable (e.g. urban areas with access to cheap hydro-power or with the increased sophistication of solar power), the provision of substitutes and reduced demand for fuelwood will play a major role in reducing deforestation, particularly in the savannah woodlands. However, where technologies are too sophisticated, expensive or inappropriate, wood will continue to supply most of Africa's energy needs.

To solve this problem, the policy attracting the most government and donor support has been woodlots of exotic monocultures. These are, however, extremely expensive (Muir and Casey, 1989, p28; Gorse and Steed, 1987 p.23; Anderson and Fishwick, 1984, p.41-42) and would require massive subsidies to be in a position to supply urban or rural needs. Research in Nigeria indicates that although exotic species grew faster, they had far lower survival rates outside research stations and that in the longer term (5-8 years) indigenous trees probably were more productive. Little work has been done on encouraging private wood fuel production and on investing in extension, training and infrastructure to promote private (whether communal or individual) woodfuel production. Floor and Gorse (p.84-87) make some excellent suggestions on institutional arrangements and requirements for implementing community-controlled commercial fuelwood operations. It would seem plausible that such schemes which take advantage of local labour, protection and policing would be very much more effective than the large government subsidised urban woodlots and rural afforestation projects.

Whether such private operations concentrate on natural forest management or tree-planting to a large extent depends on the degree of deforestation and the costs of transportation. Where needs can still be met from household gathering, it is most unlikely that either government subsidised woodlots or private enterprises will be successful. However, the commercial production of secondary products may make otherwise uneconomic projects viable (e.g. fruit farming, honey, fodder production etc.).

A multiple-use approach to rural afforestation is essential if it is to be incorporated into the small family farm system. The production of sophisticated building timber (which normally requires timber plantation conditions) is unlikely to be viable in any such system⁵, and rural afforestation projects aimed at providing local building timber would be better spending the resources on reducing demand by providing alternatives. Whilst there is much research on alternative energy sources and less wood-consumptive technologies, there is far less work on alternative building materials. Traditional building does not require large straight poles, thus allowing greater flexibility in selecting species if afforestation projects must aim at producing building timber.

The importance of including local communities in the development of rural afforestation projects is widely recognised but seldom achieved. "These observations may appear elementary but in practice it is their neglect, not their application, that is striking" (Gorse and Steed, 1987, p x). It is essential that people's needs are identified and ranked, that

⁵ Very few large commercial farms produce their own building timber

constraints to meeting these needs are recognised and that appropriate technologies are developed. The only way to ensure this is to support localised projects. The objectives of the donor and/or national implementing agency could be clearly espoused (e.g. maximising tree cover; protecting a watershed; retaining biodiversity). The community is then aware of the "costs" of the program. Within those limits, the community should be able to proceed to develop its own projects, having been provided with advice on the options available and given access to inputs and markets where appropriate. Full responsibility for distributing the costs and benefits from projects must be given to the local community (or individual farmer) and the aim should be localised management. The donor or national agency would be primarily responsible for providing the initial capital, developing appropriate technologies, increasing access to inputs and markets and to developing an effective extension and training service which is fully aware of the biological and financial implications of the various options.

A number of interesting projects are being developed in Zimbabwe under CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) where local communities are being given direct control of their indigenous hardwood and wildlife resources (Martin, 1986). The State has controlled these resources on behalf of the community for decades. The result has been alienation of these resources from the local farmers and poorly controlled laws resulting in open access. Preliminary results from the projects which have divested control to the local communities are promising although there are still problems associated with the distribution of benefits. A major initiative in all those

areas with hardwoods and wildlife on communal land is anticipated (Jansen, 1990). The programme is designed to address all natural resources and there is no reason why new afforestation projects could not be implemented in a similar manner.

INDUSTRIAL TIMBER PRODUCTION

Either explicitly or implicitly this is often the only role of foresters and forest policy. Even where the environmental protection, subsistence and habitat roles are recognised, the words "forester" or "forestry" in the modern sectors of developing and developed countries evoke pictures of commercial timber production. In Africa as in most other tropical and sub-tropical forest areas, this includes exploitation of natural forests for indigenous hardwoods and plantation forestry of exotic monocultures. The policy issues relating to exotic plantations will not be covered in this paper except in so far as the discussion of the natural forest issues relates to all commercial production.

Until very recently no attention has been given to regeneration programs for exploited natural forests. Even environmentally sensitive social scientists were recommending that "since the productivity of extensively managed natural tropical forests is relatively low.....increasing emphasis should be placed on short-rotation industrial plantations" (Repetto, 1986. p.81). However in 1988, the same author indicates that whilst the world is not short of wood, it is facing a decline of natural tropical forests (Repetto and Gillis, 1988 p.385) and that "(N)atural forest endowments remain undervalued" because they continue to be valued only for their timber and cleared for agricultural land. Much of this land has

proved to be very unproductive and fragile with most of the nutrient stock in the natural forest biomass itself. The economics of natural forest clearing require more serious investigation of the opportunity costs involved.

"Governments have typically sold off timber too cheaply, sacrificing public revenues and the undervalued non-timber benefits of the standing forest while encouraging rapid logging exploitation" (Rep and Gillis, 1988 p.1) to clear land for agriculture and timber plantations. In Zimbabwe, the clearing of natural forest to plant stands of exotic monocultures was the main function of State forestry and various policies have encouraged private operators to invest in coniferous and eucalyptus plantations. This was taken to extremes in Matabeleland where valuable indigenous hardwood forest was cleared for a totally uneconomic eucalyptus woodlot in the internationally funded Rural Afforestation Project. It is accepted that in certain areas and under certain conditions replacing natural forest with exotic plantations may be the best land-use option. The question remains - has a full evaluation been made of the options foreclosed when the natural forest is cleared?

The natural forests provide important habitats for various fauna and flora which play a significant role in local economies (Asibey, 1988; Murindagomo, 1988).⁶ The non or

⁶ When studying the farming system of a peasant community in the Zambezi valley in Zimbabwe, Murindagomo estimated that wild flora and fauna contributed approximately 60% of total family income and that wild animal meat provided 74% of subsistence income with the per capita adult consumption rate of 88 kg per annum similar to that in Luangwa Valley, Zambia. Development projects in the area do not take this into account when undertaking feasibility studies which involve major land clearing.

marginally extractive value of many of the non-timber products provides ongoing benefits. It is plausible that, in some areas, the net present value of the "secondary products", including habitat, may be greater than that from timber extraction, particularly where such extraction is at rates which destroy the natural forests. In addition the forests contribute to biological diversity, contributing valuable material for plant breeders, insecticides and pharmaceutical products. The potential contribution of indigenous flora to human welfare is currently inestimable and urgently requires research and development (Muir, 1989).

It is important to incorporate all the values of different land-use options and to include those benefits and costs which may not be reflected in market transactions. Land most valuable as watershed protection forest should not be converted to crops; a forest most valuable as a recreational park should not be harvested for timber; a forest containing immense mineral reserves should not be preserved as wilderness (Repetto and Gillis, 1988 p.17). Effective evaluations of various land-use options is important for all development projects but is especially important when future options are foreclosed by the development, as is the case when natural forests are cleared.

Many government policies encourage clearing natural forests by subsidising alternative land uses or by allowing loggers to make excessive profits and losing community or state revenues by charging very low licence fees (less than US\$0.80 per hectare in Ivory Coast, Gilles, 1988). Governments usually bear the costs of infrastructural development and there are seldom taxes imposed for the social costs of the environmental degradation which often

follows forest clearing.

In Zimbabwe it is estimated that indigenous hardwoods will be exhausted in ten years with serious implications for local furniture manufacturers. Only 2% of the country has indigenous hardwood resources and yet exports of raw timber continue despite recent attempts to curtail them. Loggers are not required to invest in natural forest regeneration or planting. There is little or no knowledge of indigenous hardwood forests and the forest service has until recently encouraged hardwood "mining" by allocating concessions to private loggers on State land and in communal areas. Industrial countries distort comparative advantage with high tariff walls on processed wood products. Developing countries then become involved in expensive subsidies to protect "infant industries" which in turn require increased deforestation.

The major problem with industrial wood production from natural forests throughout Africa is that there is no sustainable production system. Where they exist, reforestation programmes involve fast-growing exotic species especially for pulpwood production.⁷ There is no replanting of natural forests and valuable indigenous species. There is little investment in natural forest regeneration, enrichment planting, or research on natural forest ecology and management.

⁷ Liberia, Industrial Pulpwood Plantation; Ivory Coast SODEFOR pulp and paper project and similar project in Gabon (Gilles, 1988).

FOREST POLICY AND ENVIRONMENTAL PROTECTION

Most forest policy acknowledges the importance of trees in environmental protection and is often designed to offset the externalities involved. It is in this area that most government subsidy and international support is required. Wherever direct beneficiaries can be established, they should be involved in paying for the costs and assisting in the management of the relevant woodlands or forest programme. Thus many watershed protection programmes can be at least partially funded by those who benefit, recompensing those expected to pay the costs. The rationale for relating costs and benefits is well established theoretically and in the literature but is seldom implemented. Programmes still rely on sanctioning those paying the costs rather than taxing the beneficiaries.

Programmes which incorporate efforts to retain adequate areas of natural forest (thus maintaining species diversity and reducing the impact of global warming and climate changes) should receive contributions internationally - possibly through one of the UN agencies. Programmes designed to ensure maximum tree cover to reduce the impact of global warming and climate changes should also receive international sponsorship. To ensure full local and national participation these programmes could be implemented along the lines of those suggested for local communities. The objectives of the international fund would be clearly laid down with specific criteria to be fulfilled; these criteria being directly related to the international benefits. Thereafter the projects should be left entirely to national or local bodies, with international support for research into indigenous woodland management, replanting, species selection and development, etc.

This would be a much more positive approach to achieving the objectives of industrial countries than the current approach of trying to ensure that all lending and aid projects meet these same objectives. Currently developing countries are made to bear the costs of international environmental protection by the increased costs of all development projects. The costs of protecting biodiversity or ozone protection should be incorporated with projects which benefit local communities, funded internationally but locally controlled. Sovereignty whether at the individual, community or national level is jealously guarded and will seldom be released for short-term benefits.

CONCLUSION

The major issues confronting forest policies in Africa are the sustainable development and utilisation of natural forests and the incorporation of trees in the farming systems. It is imperative that these issues are addressed and that resources are allocated to ensure that they receive more than superficial reference by national and international forestry agencies.

It is essential

To develop technologies to adequately manage the offtake from natural forests so as to reduce destruction. Developing appropriate management techniques requires knowledge of growth patterns, potential regeneration, spacing etc. To encourage farmers to manage natural woodlands sustainably, it may be necessary to ensure that existing institutions encourage controlled access and a more direct relationship between costs and benefits.

To increase the value of natural forests by developing the products and markets and developing wood-based industries where viable (provided that the capital costs of natural forest eradication is recognised).

To ensure that existing natural forests are not undervalued and that development proposals take full cognisance of all the benefits, including those from non-timber products.

To ensure that the alternative land-uses are not overvalued or that at least the distortions are recognised in land use plans.

Afforestation programmes in rural areas will fail unless they directly address the needs of the people. This can only be ensured if a holistic approach to land-use is taken and by allocating full responsibility for projects to the people. If rural afforestation objectives could be economically achieved by establishing large commercial timber plantations, conventionally-trained foresters would be well-placed to design and implement the projects. Commercial plantations, however, cannot achieve most of the objectives of both international and farm concern and even in those instances where they can, they are uneconomic in many situations. To adequately address the issues a complete reorientation of most national forestry bodies is required, including the employment of agricultural and social scientists to complement the foresters. It would be less expensive, however, if social forestry could be considered part of the farm system with trees receiving very much more attention in agricultural programmes. Forest services could take responsibility for research on appropriate tree technology and advise the agricultural sector; take a more active role in environmental protection, natural forest management and regeneration, and continue their involvement in industrial timber production.

REFERENCES

Anderson, D. and R. Fishwick (1984) Fuelwood Consumption and Deforestation in African Countries Washington DC: World Bank Staff Working Papers No. 704

Asibey, E.O.A (1988) "Wildlife Issues in Sub-Saharan Africa" in Proceedings of Int. Symposium on Wildlife Management in Sub-Saharan Africa: Sustainable economic benefits and contribution towards rural development, October, 1987, Harare, Zimbabwe. Published by IGF, 15 Rue de Teheran, Paris. pages 32-50.

Casey, J. (1989) "Shelterbelts and Farm Forestry in Northern Nigeria" Borno State Afforestation Programme Report

Casey, J. and K. Muir (1987) "Integrating Forestry into Development Planning" CERES No 117 Vol 20:3, FAO, Rome May-June pp 33-37

Clawson, M. (1980) "An Eclectic and Inclusive Approach to Resource Policy Analysis" in P. Nemetz (ed.) Resource Policy: International Perspectives, Journal of Business Administration Vol 11 Nos 1&2 pp 57-66.

Falloux, F. and A. Mukendi (eds) (1988) Desertification Control and Renewable Resource Management in the Sahelian and Sudanian Zones of West Africa Washington DC: World Bank Technical Paper no. 70

Floor, W. and Gorse J. "Household Energy Issues in West Africa" in Falloux and Mukendi op cit

Fortmann, L. and J. Riddell (1985) Trees and Tenure: an Annotated Bibliography for Agroforesters and Others Nairobi: ICRAF

Gillis, M. (1988) West Africa: Resource Management Policies and the Tropical Forest in Repetto and Gillis, cited below.

Gorse, J. and D. Steeds (1987) Desertification in the Sahelian and Sudanian Zones of West Africa Washington DC: World Bank Technical Paper No. 61

Krutilla, J. and Fisher, A. (1975) The Economics of Natural Environments: Studies in the Valuation of Commodity and Amenity Resources Baltimore: John Hopkins Univ. Press

Martin, R. (1986) Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) Harare: Dept. National Parks and Wildlife Management, Working Doc. 1/86

Muir, K. (1989) "The Potential Role of Indigenous Resources in the Economic Development of Arid Environments in Sub-Saharan Africa: The Case of Wildlife Utilisation in Zimbabwe" Society and Natural Resources Vol 2:4 pp 307-318

Muir, K. and J. Casey (1989) "Institutional Responsibility for Social Forestry" Journal of Social Development in Africa Vol Vol 4:2, pp 27-37.

Murindagomo, F. (1988) "Wildlife Utilisation and Land Use in Angwa, mid-Zambezi Valley" Harare: Univ. of Zimbabwe, unpubl. M.Phil, Dept. Agric. Econ. and Ext.

Pimental, D. B. Floyd, W. Teel and J. Bourn (1989) "Deforestation, Biomass Depletion and Land Degradation Linkages to Policy Reform in Sub-Saharan Africa" in J. Lassoie and S. Kyle (eds) "Policy Reform and Natural Resource Management in Sub-Saharan Africa" Ithaca: Cornell University Natural Resources Research and Extension Series No. 34.

Repetto, R. (1986) World Enough and Time: Successful Strategies for Resource Management New Haven: Yale Univ. Press for World Resources Institute

Repetto, R. and M. Gillis (1988) Public Policies and the Misuse of Forest Resources Cambridge: Cambridge Univ. Press, for World Resources Institute

World Resources Institute (1988) World Resources 1988-89 New York: Basic Books Inc.



This work is licensed under a
Creative Commons
Attribution – NonCommercial - NoDerivs 3.0 License.

To view a copy of the license please see:
<http://creativecommons.org/licenses/by-nc-nd/3.0/>

This is a download from the BLDS Digital Library on OpenDocs
<http://opendocs.ids.ac.uk/opendocs/>