Folder Title:	Environmental Guidelines for Forestry Projects - May 1990 - Non Traditional Business (Forestry) - 2 Copies
Folder ID:	22748I
Series:	Reference material on agricultural policies
Dates:	05/01/1990 – 05/01/1990
Fonds:	Records of the Agriculture and Rural Development Sector
ISAD Reference Code:	WB IBRD/IDA AGR-556S
Digitized:	11/03/2023

Environmental Guidelines For Forestry Projects

MAY 1990
NON TRADITIONAL BUSINESS (FORESTRY)

Environmental Guidelines For Forestry Projects

Note:

Shell Companies are separate and distinct entities, but in this document the collective expressions "Shell" and "Group" are sometimes used for convenience in contexts where reference is made to the companies of the Royal Dutch/Shell Group in general or where no useful purpose is served by identifying the particular Shell company or companies.

MAY 1990
NON TRADITIONAL BUSINESS (FORESTRY)

ENVIRONMENTAL GUIDELINES FOR FORESTRY PROJECTS

A MESSAGE FROM J.M.H. VAN ENGELSHOVEN

Forestry is a major activity of the Non-Traditional Business Sector. Although Shell Companies will already have given clear instructions as to responsible environmental management in specific local circumstances, it is now felt important to formalise the principles involved for Shell Companies operating forestry projects both now and in the future.

It is Group policy that Shell Companies should "strive to be among the leaders in environmental protection...". In the context of forestry, which is particularly prominent in the environmental debate, this requires considerable care and attention in the implementation of these guidelines.

I firmly believe that our operation of environmentally responsible forestry projects will make a major contribution to the global need for tree plantings; this in turn will help both to absorb carbon dioxide and to protect the world's remaining natural forests.

CONTENTS

1. INTRODUCTION

Environmental issues connected with forestry and related industries fall into five broad categories:

(i) The degradation and destruction of natural forests and potential negative impact on forest dwelling people, uniquely bio-diverse forest ecosystems, and reduced prospects for sustainable production of forest plant foods, fruit, fuelwood, medicinal products, wildlife and timber.

(ii) The effects of tree plantations on the environment, with particular reference to their possible adverse effect on water catchment yield, restriction of public access to essential grazing and fuelwood supply and on soil fertility.

(iii) Forestry and its relationship to other land uses; in particular, the role of forests and trees to contribute to sustainable and increased agricultural productivity via their positive impact on reduced wind velocity, increased moisture retention, improved crop yield and increased fuelwood supply.

(iv) Waste disposal from manufacturing plants.

(v) Chemical residues in pulp and paper production.

The significance of these issues must not be under-estimated. Loss of forests is perceived increasingly by the public as being linked inextricably to such issues as global warming, climatic change, atmospheric pollution, desertification, floods and loss of biodiversity. In the tropics, such environmental degradation impacts most adversely on the rural and urban poor.

These issues are complex and there are no simple answers. The heart of the debate is how effectively to combine conservation and economic development. The essence of responsible environmental management is that we should know what we are doing and what the effects are now and what they are likely to be, seen from a combination of ecological, social and economic perspectives. With this knowledge, the consequences of what we are doing become more manageable and we can take steps to improve our management practices.

This paper outlines the environmental guidelines which Shell Companies should follow in the identification, evaluation and implementation of forestry projects whether working alone as Operating Companies or in joint ventures with third parties.

These guidelines provide a general framework within which Operating Companies should draw up operating procedures. Further background information can be obtained from the publications listed in the bibliography attached as Annex A. Reviews of these guidelines will be necessary from time to time to take account of new research findings, technologies and control procedures.

The following terms used in this document require explanation – natural forest, sustained timber production, conservation and tree plantations. These are given in Annex B.

2. BUSINESS PRINCIPLES AND ENVIRONMENTAL GUIDELINES

Within the Group, Business Sectors in the Service Companies and Operating Companies may issue their own environmental guidelines, for which the following extract from the Statement of General Business Principles of the Royal Dutch/Shell Group of Companies can serve as a basis:-

> "It is the policy of Shell companies to conduct their activities in such a way as to take foremost account of the health and safety of their employees and of other persons, and to give proper regard to the conservation of the environment. In implementing this policy Shell companies not only comply with the requirements of the relevant legislation but promote in an appropriate manner measures for the protection of health, safety and the environment for all who may be affected directly or indirectly by their activities."

This extract is also quoted in the Policy Guidelines on Health, Safety and Environmental Conservation (dated August 1985) endorsed by the Steering Committee for Safety and Environmental Conservation (within the Service Companies) which give further guidance on the implementation of the policy referred to in the extract.

Furthermore, Environmental Management Guidelines (dated June 1987) have been issued by the Shell Environmental Conservation Committee. In a message prefacing these Guidelines, Shell Companies are exhorted to comply with the principles expressed in the Policy Guidelines in the following manner:

> "As with other business considerations, we should strive to be among the leaders in environmental protection within the context of each operation. This implies a pro-active attitude and awareness of environmental issues.
>
> To achieve this high level in environmental performance requires visible personal commitment by management...."

These have been followed since by:

> "Environmental Impact Assessment Guide" (1988)
> "Environmental Auditing Guide" (1988)
> "Waste Management Guide" (1989)

This document below is issued by the Non-Traditional Business Division (NTB) of SIPC. It should be read in conjunction with the documents setting out policy and policy guidelines referred to above but its purpose is to deal in greater detail with the environmental principles relating to forestry and related industries.

3. ENVIRONMENTAL PRINCIPLES

(a) Depending on the viewpoint, forests perform a number of functions. From a human perspective, forests both natural and planted, are land use resources which provide a range of benefits from forest plant and animal foods, medicines, fruits, fodder, fuelwood, building poles and other timber products, as well as wildlife habitats, watershed protection and biodiversity. From an ecological perspective natural forests are sensitive ecosystems, the disturbance of which can have effects well outside their own boundaries, for example, on the atmospheric carbon cycle which in turn may affect the global environment.

A reconciliation of these seemingly conflicting perspectives can be found in the concept of sustainability. One definition of sustainable development is "development that meets the needs of the present generation without preventing future generations from meeting their own needs". In terms of land use this requires that each generation maintains and passes on a stock of land resources no less productive or utilisable than the stock it inherited. Such land resources must include natural forests and other sensitive ecosystems as well as sufficient and productive land for urban development, agriculture, tree plantations and recreation etc. There are three fundamental principles in achieving a sustainable balance.

Firstly, land utilisation is the ultimate concern of national and local Governments and the people who own or occupy the land. Resource based industry can use land only with the support of Governments and people.

Secondly, if assets, whether they be in the form of land or tree plantations or natural forests, are to be utilised but not depleted, then conservation or sustained production must be practised.

Thirdly, in order to manage, it is essential to improve our knowledge and understanding of the patterns and processes of the ecosystem. We must do this prior to and during development. In any forestry environment this requires screening, baseline surveys, impact assessment and constant monitoring if long term sustainability and site integrity are to be maintained.

(b) In the wood processing industry, the issues of solid waste handling and disposal, atmospheric emissions and liquid effluent discharges are addressed by regulations and guidelines developed by international agencies (UN, FAO, World Bank etc.) as well as state, federal and local government legislation. It is the intention of Shell Companies to be amongst the industry leaders in environmental conservation. This means adopting best available technologies where practicable rather than just doing the minimum required by law. Group requirements for environmental protection will meet or exceed international standards. The principle in any operation is to apply Group requirements or local regulations, whichever are more stringent. (The principles of environmental management in wood processing industries are similar to those applying to the Group's other manufacturing business and are covered by publications listed in the bibliography. Further details about specific international environmental standards are available from NTB Division of SIPC).

4. IMPLEMENTATION

Shell Companies with forestry operations should implement environmental practices as follows:-

(a) During the assessment phase of any potential forestry project, Shell Companies will conduct land use studies to determine whether the project concept is consistent with legislation and land use policies, and to what extent present and projected uses are sustainable.

(b) Before the feasibility study stage of a project, potential environmental and social issues must be identified. Baseline surveys and full environmental impact assessments (EIA) will be essential parts of the operational planning process and will be conducted in such a way as to meet the requirements of Governments and relevant communities.

(c) Consult and take into account the views of interested parties – particularly local people – both before operational plans are finalised and during the life of the project.

(d) Protect and conserve areas identified as sensitive ecosystems, particulary natural forests in tropical areas. Where possible, sensitive ecosystems damaged by previous operations will be rehabilitated.

(e) Natural forest clearance will be avoided. Tree planting will only be established on non-forested/degraded land considered suitable after land use studies.

(f) Conduct all forestry operations in such a way as to minimise irreversible damage, to maintain site integrity and where possible to enhance long term productivity, by taking account of factors such as potential impact on forest dwelling people, fauna, soils, erosion, nutrient depletion, hydrological balances, long term sustainability of sites etc.

(g) In logging operations adopt practices to ensure minimal damage to topsoil, to residual standing trees and to young regeneration.

(h) In plantation forestry, set up early field trials on site to match species and provenances to the site and to identify and adapt to local circumstances the most appropriate silvicultural techniques.

(i) Monitor the effects of plantations on their environments throughout the life of the project, including social, economic and physical impacts.

(j) Protect and conserve sites of archaeological, cultural or topographical importance.

(k) Base environmental controls in wood processing operations on stringent international standards. Where applicable, the standards will be designed to reflect specific site requirements, and will be in line with the highest international standards and regulations. These include those published by the Swedish Environmental Protection Board, the United States Environmental Protection Agency (EPA), the Provincial and Federal Governments in Canada, the World Bank (IFC) and United Nations (FAO). Processing facilities acquired as going concerns will be upgraded to meet the standards contained in those guidelines.

(l) Review frequently the environmental monitoring and control systems and actual performance after start-up to ensure compliance with the required standards, to evaluate their relevance and to update and amend where necessary.

(m) Ensure that in joint venture operations, the partners (current or prospective) will support the implementation of these environmental guidelines. Partnerships should only be considered with companies whose reputation for environmental responsibility is considered sound.

The recommendations above contain many qualitative factors which require investigation during a project assessment stage and management during the life of a forestry project. It is the responsbility of the local Shell Company to make the necessary judgements and decisions within the framework of these guidelines. The NTB Division of SIPC is available to give advice on the standards required for compliance with the policy of Shell Companies.

5. AUDITS

Environmental audits should be carried out on a regular basis in accordance with Group policy. The objective of such audits is to check that an operation complies with local and Group guidelines, and if appropriate present recommendations for improvements.

6. ACKNOWLEDGEMENTS

In drawing up these guidelines the expert assistance of the following is gratefully acknowledged – World Bank, World Resources Institute, Oxford Forestry Institute, Food and Agricultural Organisation of the United Nations (FAO), Worldwide Fund for Nature (WWF) (International and UK), Friends of the Earth (FOE), International Institute for Environment and Development, International Union for the Conservation of Nature (IUCN), and Tropenbos.

ANNEX A

BIBLIOGRAPHY

1. Adlard, P.G., 1988. "Fast Growing Trees in Social Forestry Programmes" *World Bank* (Environment Department working paper – *unpublished*).

2. Das, B.L., 1988. "Eucalypts gain in popularity with farmers", correspondence in *Commonwealth Forestry Review No. 213* December 1988.

3. Davidson, Dr. J., 1985. "Setting aside the idea that Eucalypts are always bad", *FAO Working Paper No. 10* Assistance to the Forestry Sector of Bangladesh.

4. Graham-Bryce, I., 1988. "Environmental Responsibilities - an industry view", *Shell Selected Paper*.

5. Joyce, C., 1988. "The tree that caused a riot", *New Scientist* 18th February, 1988.

6. Poore, Duncan, 1989. "No Timber Without Trees", IIED Earthscan Publications Ltd.

7. Poore, M.E.D., and Fries, C., 1985. "The ecological effects of *Eucalyptus*", *FAO Forestry Paper 59*.

8. Poore, M.E.D. and Sayer J., 1987, "The Management of Tropical Moist Forest Lands - Ecological Guidelines", IUCN.

9. Pulp mill standards and regulations published by the Swedish Environmental Protection Board, USA EPA, Provincial and Federal Governments in Canada, the World Bank and FAO.

10. Report to the Minister for Industry, Australia, 1987, "Pulp Mills - Modern Technology and Environmental Protection" published by CSIRO, June 1989.

11. Royal Dutch/Shell Group of Companies, 1988. "Statement of General Business Principles".

12. Sargent, Caroline, 1990 "The Khun Song Plantation Project. A socio-economic and environmental analysis, and recommendations towards the establishment and management of a plantation in Chanthaburi Province by Shell Companies of Thailand", IIED.

13. SIPC, 1988. "Forestry and the Environment", Forestry Environment Brief No.1.

14. SIPC, 1988. "The *Eucalyptus* Issue", Forestry Environment Brief No. 2.

15. SIPM, 1987. "Environmental Management Guidelines" published by the Shell Product, Safety and Environmental Conservation Committee.

16. SIPM, 1988. "Environmental Auditing Guide", Shell PSE Committee.

17. SIPM, 1988. "Environmental Impact Assessment Guide", Shell PSE Committee.

18. SIPM, 1989. "Waste Management Guide", Shell PSE Committee.

19. World Bank, 1988. "Standards for Evaluating Tropical Moist Forest Projects", (unpublished).

ANNEX B

EXPLANATIONS

Natural Forest (extract from Poore, Duncan, 1989 "No Timber Without Trees", IIED Earthscan)

"The term is used in contrast to forest plantations ("forest crops raised artificially either by sowing or planting"), which are in general areas in which the naturally occurring tree species have been totally replaced by planted trees (see also below). Natural forest includes a range of types which have been subjected to varying degrees of modification by man and which grade almost imperceptibly into one another. The following list illustrates this range, starting with those that are least modified:

(a) Virgin forest (compare with b, c and d below), essentially unmodified by human activity; this will contain gaps caused by the normal death and regeneration of trees and may include areas or phases which have been affected by natural events such as landslides, typhoons or volcanic activity.

(b) Forest, similar to the above, the composition and structure of which may have been modified by the hunting and gathering activities of indigenous peoples.

(c) Forests which have been subjected to a light cycle of shifting cultivation or in which cultivation has been abandoned, so that a full tree cover of indigenous species has been able to develop.

(d) Forests which have been subjected to various intensities and frequencies of logging, but which still remain covered with a tree or shrub cover of indigenous species. These may be of two kinds: those in which new tree growth is entirely derived from natural regeneration and others where this has been supplemented by "enrichment planting".

The first two of the above categories will be referred to as *primary forest*, the second two as *secondary forest*.

The following, both of which can make an important contribution to timber supplies, will be excluded from the definition of natural forest: areas which have been so intensively modified by cultivation, fire or other disturbance that they remain covered with grass or non-forest weeds - *degraded forest lands*; and forest plantations (as defined above), whether of native or introduced species."

Sustainable Timber Production (extract from Poore, as above)

(As applied to "Natural forest")

This phrase requires considerable explanation, both in itself and in relation to the more general term "sustainable management". The relation between these two will be explained below.

When primary forest is first logged it normally contains a high standing volume of timber, a variable proportion of which is marketable, depending upon composition and market demand. Because this standing volume has accumulated over a long period, the commercial timber is likely to be of a quality and volume that will probably not be matched in future cuts (because it contains slow-growing specimens and species, large diameters etc.) unless the logged forest is closed to further exploitation for a century or more. In this sense the first crop is, in practical terms, not repeatable.

If production of timber is to be genuinely sustainable, the single most important condition to be met is that nothing should be done that will *irreversibly reduce the potential of the forest to produce mar-*

ketable timber – that is, there should be no irreversible loss of soil, soil fertility or genetic potential in the marketable species. It does not necessarily mean that no more timber should be removed in a period of years than is produced by new growth; over-cutting in one cycle can, at least in theory, be compensated by undercutting in the next or by prolonging the cutting cycle.

But even this description of sustainable production begs several questions. For example: markets will certainly change between one phase of logging and the next - new species will become marketable and current fashions may decline. So the "timber production" to be sustained will not be the same from one cutting cycle to the next; it will contain a different mix of species. One consequence of this is that valuable species may be over-exploited initially for economic reasons.

Moreover, the forest will certainly alter somewhat in composition as a result of selective harvesting and there may even be some loss of soil fertility. But potentially damaging changes of this kind can be compensated by new investment - in these instances by the application of fertilisers or by enrichment planting. Whether to invest or not is essentially an economic decision.

The best silvicultural practice requires the calculation of the volume of timber which may be cut in one year in a given area (the "annual allowable cut" – AAC), a volume which should be set at a level that provides the maximum harvest while ensuring that no deterioration occurs in the prospects for future sustainable harvests.

When an area of virgin forest is cut the AAC depends upon the volume of marketable timber in the area which may be cut while leaving enough stems on the ground for the next crop. This is calculated from an inventory of the standing stock and an estimation of the length of the cutting cycle - the period between successive loggings. If the forest is well stocked, this figure may be high. But the situation alters for subsequent cuts, because the rates of growth of the remaining trees are changed when the first crop is removed. At this later stage it should be possible, by measurement of permanent sample plots, to determine a stable AAC which corresponds to the annual growth in volume of the forest in question. This is likely to be different from, and often but not always lower than, the AAC from the primary forest.

Sustainable Production Per Unit Area and Sustainable Supply (extract from Poore, as above)

There is sometimes also confusion between these two terms because of the use in trade statistics of "production" in quite a different sense from that defined above - to mean, in effect, the supply of timber from whatever source. We have found representatives of some countries using "sustainable timber production" to mean continuity of supply from the natural forest, implying that when one source is exhausted, another will be found. It need hardly be remarked that this usage is dangerous, for it need not include any provision for continuity of production on sites exploited and can lead to the total destruction of the resource. In fact, in this sense, supply is sustainable until it runs out; then it is someone else's problem.

Tree Plantations are even aged tree crops established by man with the intention of sustained production of high yield, uniform quality wood for specific markets. These trees may be indigenous to the site or as is more often the case, exotic. They may be established through seedlings originating from sexually produced seed or from cuttings originating from vegetative propagation. They are usually established as distinct "stands" of trees in compartments of 10 to 50 ha in size. Each compartment may comprise a mixture of species or a single species (monoculture). The latter is more often the case. In the case of seedling based plantation, there are usually several different species involved. In the case of a plantation established vegetatively (clonal), a compartment may be established with a single clone or may be multi-

clonal. It is usual in the case of a clonal plantation to use a large number of clones in any given planting year to ensure a broad genetic base.

Sustained Timber Production

(As applied to "Tree Plantations")

Sustained timber production from a tree plantation means that a regular annual yield of timber will be harvested from the plantation by either clear felling a proportion of the area planted which has reached a given rotation age or through thinning parts of the plantation, or by a combination of both. Clear felled areas will be regenerated naturally or replanted so that timber production can be sustained in perpetuity.

Conservation

(IUCN definition from the "World Conservation Strategy").

Conservation is the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations.

Printed in England by Shell Reprographics, London

Environmental Guidelines For Forestry Projects

MAY
NON TRADITIONAL BUSINESS (FORES

Environmental Guidelines For Forestry Projects

Note:

Shell Companies are separate and distinct entities, but in this document the collective expressions "Shell" and "Group" are sometimes used for convenience in contexts where reference is made to the companies of the Royal Dutch/Shell Group in general or where no useful purpose is served by identifying the particular Shell company or companies.

MAY 1990
NON TRADITIONAL BUSINESS (FORESTRY)

ENVIRONMENTAL GUIDELINES FOR FORESTRY PROJECTS

A MESSAGE FROM J.M.H. VAN ENGELSHOVEN

Forestry is a major activity of the Non-Traditional Business Sector. Although Shell Companies will already have given clear instructions as to responsible environmental management in specific local circumstances, it is now felt important to formalise the principles involved for Shell Companies operating forestry projects both now and in the future.

It is Group policy that Shell Companies should "strive to be among the leaders in environmental protection...". In the context of forestry, which is particularly prominent in the environmental debate, this requires considerable care and attention in the implementation of these guidelines.

I firmly believe that our operation of environmentally responsible forestry projects will make a major contribution to the global need for tree plantings; this in turn will help both to absorb carbon dioxide and to protect the world's remaining natural forests.

CONTENTS

1. INTRODUCTION

Environmental issues connected with forestry and related industries fall into five broad categories:

(i) The degradation and destruction of natural forests and potential negative impact on forest dwelling people, uniquely bio-diverse forest ecosystems, and reduced prospects for sustainable production of forest plant foods, fruit, fuelwood, medicinal products, wildlife and timber.

(ii) The effects of tree plantations on the environment, with particular reference to their possible adverse effect on water catchment yield, restriction of public access to essential grazing and fuelwood supply and on soil fertility.

(iii) Forestry and its relationship to other land uses; in particular, the role of forests and trees to contribute to sustainable and increased agricultural productivity via their positive impact on reduced wind velocity, increased moisture retention, improved crop yield and increased fuelwood supply.

(iv) Waste disposal from manufacturing plants.

(v) Chemical residues in pulp and paper production.

The significance of these issues must not be under-estimated. Loss of forests is perceived increasingly by the public as being linked inextricably to such issues as global warming, climatic change, atmospheric pollution, desertification, floods and loss of biodiversity. In the tropics, such environmental degradation impacts most adversely on the rural and urban poor.

These issues are complex and there are no simple answers. The heart of the debate is how effectively to combine conservation and economic development. The essence of responsible environmental management is that we should know what we are doing and what the effects are now and what they are likely to be, seen from a combination of ecological, social and economic perspectives. With this knowledge, the consequences of what we are doing become more manageable and we can take steps to improve our management practices.

This paper outlines the environmental guidelines which Shell Companies should follow in the identification, evaluation and implementation of forestry projects whether working alone as Operating Companies or in joint ventures with third parties.

These guidelines provide a general framework within which Operating Companies should draw up operating procedures. Further background information can be obtained from the publications listed in the bibliography attached as Annex A. Reviews of these guidelines will be necessary from time to time to take account of new research findings, technologies and control procedures.

The following terms used in this document require explanation – natural forest, sustained timber production, conservation and tree plantations. These are given in Annex B.

2. BUSINESS PRINCIPLES AND ENVIRONMENTAL GUIDELINES

Within the Group, Business Sectors in the Service Companies and Operating Companies may issue their own environmental guidelines, for which the following extract from the Statement of General Business Principles of the Royal Dutch/Shell Group of Companies can serve as a basis:-

> "It is the policy of Shell companies to conduct their activities in such a way as to take foremost account of the health and safety of their employees and of other persons, and to give proper regard to the conservation of the environment. In implementing this policy Shell companies not only comply with the requirements of the relevant legislation but promote in an appropriate manner measures for the protection of health, safety and the environment for all who may be affected directly or indirectly by their activities."

This extract is also quoted in the Policy Guidelines on Health, Safety and Environmental Conservation (dated August 1985) endorsed by the Steering Committee for Safety and Environmental Conservation (within the Service Companies) which give further guidance on the implementation of the policy referred to in the extract.

Furthermore, Environmental Management Guidelines (dated June 1987) have been issued by the Shell Environmental Conservation Committee. In a message prefacing these Guidelines, Shell Companies are exhorted to comply with the principles expressed in the Policy Guidelines in the following manner:

> "As with other business considerations, we should strive to be among the leaders in environmental protection within the context of each operation. This implies a pro-active attitude and awareness of environmental issues.
>
> To achieve this high level in environmental performance requires visible personal commitment by management...."

These have been followed since by:

> "Environmental Impact Assessment Guide" (1988)
> "Environmental Auditing Guide" (1988)
> "Waste Management Guide" (1989)

This document below is issued by the Non-Traditional Business Division (NTB) of SIPC. It should be read in conjunction with the documents setting out policy and policy guidelines referred to above but its purpose is to deal in greater detail with the environmental principles relating to forestry and related industries.

3. ENVIRONMENTAL PRINCIPLES

(a) Depending on the viewpoint, forests perform a number of functions. From a human perspective, forests both natural and planted, are land use resources which provide a range of benefits from forest plant and animal foods, medicines, fruits, fodder, fuelwood, building poles and other timber products, as well as wildlife habitats, watershed protection and biodiversity. From an ecological perspective natural forests are sensitive ecosystems, the disturbance of which can have effects well outside their own boundaries, for example, on the atmospheric carbon cycle which in turn may affect the global environment.

A reconciliation of these seemingly conflicting perspectives can be found in the concept of sustainability. One definition of sustainable development is "development that meets the needs of the present generation without preventing future generations from meeting their own needs". In terms of land use this requires that each generation maintains and passes on a stock of land resources no less productive or utilisable than the stock it inherited. Such land resources must include natural forests and other sensitive ecosystems as well as sufficient and productive land for urban development, agriculture, tree plantations and recreation etc. There are three fundamental principles in achieving a sustainable balance.

Firstly, land utilisation is the ultimate concern of national and local Governments and the people who own or occupy the land. Resource based industry can use land only with the support of Governments and people.

Secondly, if assets, whether they be in the form of land or tree plantations or natural forests, are to be utilised but not depleted, then conservation or sustained production must be practised.

Thirdly, in order to manage, it is essential to improve our knowledge and understanding of the patterns and processes of the ecosystem. We must do this prior to and during development. In any forestry environment this requires screening, baseline surveys, impact assessment and constant monitoring if long term sustainability and site integrity are to be maintained.

(b) In the wood processing industry, the issues of solid waste handling and disposal, atmospheric emissions and liquid effluent discharges are addressed by regulations and guidelines developed by international agencies (UN, FAO, World Bank etc.) as well as state, federal and local government legislation. It is the intention of Shell Companies to be amongst the industry leaders in environmental conservation. This means adopting best available technologies where practicable rather than just doing the minimum required by law. Group requirements for environmental protection will meet or exceed international standards. The principle in any operation is to apply Group requirements or local regulations, whichever are more stringent. (The principles of environmental management in wood processing industries are similar to those applying to the Group's other manufacturing business and are covered by publications listed in the bibliography. Further details about specific international environmental standards are available from NTB Division of SIPC).

4. IMPLEMENTATION

Shell Companies with forestry operations should implement environmental practices as follows:-

(a) During the assessment phase of any potential forestry project, Shell Companies will conduct land use studies to determine whether the project concept is consistent with legislation and land use policies, and to what extent present and projected uses are sustainable.

(b) Before the feasibility study stage of a project, potential environmental and social issues must be identified. Baseline surveys and full environmental impact assessments (EIA) will be essential parts of the operational planning process and will be conducted in such a way as to meet the requirements of Governments and relevant communities.

(c) Consult and take into account the views of interested parties – particularly local people – both before operational plans are finalised and during the life of the project.

(d) Protect and conserve areas identified as sensitive ecosystems, particulary natural forests in tropical areas. Where possible, sensitive ecosystems damaged by previous operations will be rehabilitated.

(e) Natural forest clearance will be avoided. Tree planting will only be established on non-forested/degraded land considered suitable after land use studies.

(f) Conduct all forestry operations in such a way as to minimise irreversible damage, to maintain site integrity and where possible to enhance long term productivity, by taking account of factors such as potential impact on forest dwelling people, fauna, soils, erosion, nutrient depletion, hydrological balances, long term sustainability of sites etc.

(g) In logging operations adopt practices to ensure minimal damage to topsoil, to residual standing trees and to young regeneration.

(h) In plantation forestry, set up early field trials on site to match species and provenances to the site and to identify and adapt to local circumstances the most appropriate silvicultural techniques.

(i) Monitor the effects of plantations on their environments throughout the life of the project, including social, economic and physical impacts.

(j) Protect and conserve sites of archaeological, cultural or topographical importance.

(k) Base environmental controls in wood processing operations on stringent international standards. Where applicable, the standards will be designed to reflect specific site requirements, and will be in line with the highest international standards and regulations. These include those published by the Swedish Environmental Protection Board, the United States Environmental Protection Agency (EPA), the Provincial and Federal Governments in Canada, the World Bank (IFC) and United Nations (FAO). Processing facilities acquired as going concerns will be upgraded to meet the standards contained in those guidelines.

(l) Review frequently the environmental monitoring and control systems and actual performance after start-up to ensure compliance with the required standards, to evaluate their relevance and to update and amend where necessary.

(m) Ensure that in joint venture operations, the partners (current or prospective) will support the implementation of these environmental guidelines. Partnerships should only be considered with companies whose reputation for environmental responsibility is considered sound.

The recommendations above contain many qualitative factors which require investigation during a project assessment stage and management during the life of a forestry project. It is the responsbility of the local Shell Company to make the necessary judgements and decisions within the framework of these guidelines. The NTB Division of SIPC is available to give advice on the standards required for compliance with the policy of Shell Companies.

5. AUDITS

Environmental audits should be carried out on a regular basis in accordance with Group policy. The objective of such audits is to check that an operation complies with local and Group guidelines, and if appropriate present recommendations for improvements.

6. ACKNOWLEDGEMENTS

In drawing up these guidelines the expert assistance of the following is gratefully acknowledged – World Bank, World Resources Institute, Oxford Forestry Institute, Food and Agricultural Organisation of the United Nations (FAO), Worldwide Fund for Nature (WWF) (International and UK), Friends of the Earth (FOE), International Institute for Environment and Development, International Union for the Conservation of Nature (IUCN), and Tropenbos.

ANNEX A

BIBLIOGRAPHY

1. Adlard, P.G., 1988. "Fast Growing Trees in Social Forestry Programmes" *World Bank* (Environment Department working paper – *unpublished*).

2. Das, B.L., 1988. "Eucalypts gain in popularity with farmers", correspondence in *Commonwealth Forestry Review No. 213* December 1988.

3. Davidson, Dr. J., 1985. "Setting aside the idea that Eucalypts are always bad", *FAO Working Paper No. 10* Assistance to the Forestry Sector of Bangladesh.

4. Graham-Bryce, I., 1988. "Environmental Responsibilities - an industry view", *Shell Selected Paper*.

5. Joyce, C., 1988. "The tree that caused a riot", *New Scientist* 18th February, 1988.

6. Poore, Duncan, 1989. "No Timber Without Trees", IIED Earthscan Publications Ltd.

7. Poore, M.E.D., and Fries, C., 1985. "The ecological effects of *Eucalyptus*", *FAO Forestry Paper 59*.

8. Poore, M.E.D. and Sayer J., 1987, "The Management of Tropical Moist Forest Lands - Ecological Guidelines", IUCN.

9. Pulp mill standards and regulations published by the Swedish Environmental Protection Board, USA EPA, Provincial and Federal Governments in Canada, the World Bank and FAO.

10. Report to the Minister for Industry, Australia, 1987, "Pulp Mills - Modern Technology and Environmental Protection" published by CSIRO, June 1989.

11. Royal Dutch/Shell Group of Companies, 1988. "Statement of General Business Principles".

12. Sargent, Caroline, 1990 "The Khun Song Plantation Project. A socio-economic and environmental analysis, and recommendations towards the establishment and management of a plantation in Chanthaburi Province by Shell Companies of Thailand", IIED.

13. SIPC, 1988. "Forestry and the Environment", Forestry Environment Brief No.1.

14. SIPC, 1988. "The *Eucalyptus* Issue", Forestry Environment Brief No. 2.

15. SIPM, 1987. "Environmental Management Guidelines" published by the Shell Product, Safety and Environmental Conservation Committee.

16. SIPM, 1988. "Environmental Auditing Guide", Shell PSE Committee.

17. SIPM, 1988. "Environmental Impact Assessment Guide", Shell PSE Committee.

18. SIPM, 1989. "Waste Management Guide", Shell PSE Committee.

19. World Bank, 1988. "Standards for Evaluating Tropical Moist Forest Projects", (unpublished).

EXPLANATIONS

Natural Forest (extract from Poore, Duncan, 1989 "No Timber Without Trees", IIED Earthscan)

"The term is used in contrast to forest plantations ("forest crops raised artificially either by sowing or planting"), which are in general areas in which the naturally occurring tree species have been totally replaced by planted trees (see also below). Natural forest includes a range of types which have been subjected to varying degrees of modification by man and which grade almost imperceptibly into one another. The following list illustrates this range, starting with those that are least modified:

(a) Virgin forest (compare with b, c and d below), essentially unmodified by human activity; this will contain gaps caused by the normal death and regeneration of trees and may include areas or phases which have been affected by natural events such as landslides, typhoons or volcanic activity.

(b) Forest, similar to the above, the composition and structure of which may have been modified by the hunting and gathering activities of indigenous peoples.

(c) Forests which have been subjected to a light cycle of shifting cultivation or in which cultivation has been abandoned, so that a full tree cover of indigenous species has been able to develop.

(d) Forests which have been subjected to various intensities and frequencies of logging, but which still remain covered with a tree or shrub cover of indigenous species. These may be of two kinds: those in which new tree growth is entirely derived from natural regeneration and others where this has been supplemented by "enrichment planting".

The first two of the above categories will be referred to as *primary forest*, the second two as *secondary forest*.

The following, both of which can make an important contribution to timber supplies, will be excluded from the definition of natural forest: areas which have been so intensively modified by cultivation, fire or other disturbance that they remain covered with grass or non-forest weeds - *degraded forest lands*; and forest plantations (as defined above), whether of native or introduced species."

Sustainable Timber Production (extract from Poore, as above)

(As applied to "Natural forest")

This phrase requires considerable explanation, both in itself and in relation to the more general term "sustainable management". The relation between these two will be explained below.

When primary forest is first logged it normally contains a high standing volume of timber, a variable proportion of which is marketable, depending upon composition and market demand. Because this standing volume has accumulated over a long period, the commercial timber is likely to be of a quality and volume that will probably not be matched in future cuts (because it contains slow-growing specimens and species, large diameters etc.) unless the logged forest is closed to further exploitation for a century or more. In this sense the first crop is, in practical terms, not repeatable.

If production of timber is to be genuinely sustainable, the single most important condition to be met is that nothing should be done that will *irreversibly reduce the potential of the forest to produce mar-*

ketable timber – that is, there should be no irreversible loss of soil, soil fertility or genetic potential in the marketable species. It does not necessarily mean that no more timber should be removed in a period of years than is produced by new growth; over-cutting in one cycle can, at least in theory, be compensated by undercutting in the next or by prolonging the cutting cycle.

But even this description of sustainable production begs several questions. For example: markets will certainly change between one phase of logging and the next - new species will become marketable and current fashions may decline. So the "timber production" to be sustained will not be the same from one cutting cycle to the next; it will contain a different mix of species. One consequence of this is that valuable species may be over-exploited initially for economic reasons.

Moreover, the forest will certainly alter somewhat in composition as a result of selective harvesting and there may even be some loss of soil fertility. But potentially damaging changes of this kind can be compensated by new investment - in these instances by the application of fertilisers or by enrichment planting. Whether to invest or not is essentially an economic decision.

The best silvicultural practice requires the calculation of the volume of timber which may be cut in one year in a given area (the "annual allowable cut" – AAC), a volume which should be set at a level that provides the maximum harvest while ensuring that no deterioration occurs in the prospects for future sustainable harvests.

When an area of virgin forest is cut the AAC depends upon the volume of marketable timber in the area which may be cut while leaving enough stems on the ground for the next crop. This is calculated from an inventory of the standing stock and an estimation of the length of the cutting cycle - the period between successive loggings. If the forest is well stocked, this figure may be high. But the situation alters for subsequent cuts, because the rates of growth of the remaining trees are changed when the first crop is removed. At this later stage it should be possible, by measurement of permanent sample plots, to determine a stable AAC which corresponds to the annual growth in volume of the forest in question. This is likely to be different from, and often but not always lower than, the AAC from the primary forest.

Sustainable Production Per Unit Area and Sustainable Supply (extract from Poore, as above)

There is sometimes also confusion between these two terms because of the use in trade statistics of "production" in quite a different sense from that defined above - to mean, in effect, the supply of timber from whatever source. We have found representatives of some countries using "sustainable timber production" to mean continuity of supply from the natural forest, implying that when one source is exhausted, another will be found. It need hardly be remarked that this usage is dangerous, for it need not include any provision for continuity of production on sites exploited and can lead to the total destruction of the resource. In fact, in this sense, supply is sustainable until it runs out; then it is someone else's problem.

Tree Plantations are even aged tree crops established by man with the intention of sustained production of high yield, uniform quality wood for specific markets. These trees may be indigenous to the site or as is more often the case, exotic. They may be established through seedlings originating from sexually produced seed or from cuttings originating from vegetative propagation. They are usually established as distinct "stands" of trees in compartments of 10 to 50 ha in size. Each compartment may comprise a mixture of species or a single species (monoculture). The latter is more often the case. In the case of seedling based plantation, there are usually several different species involved. In the case of a plantation established vegetatively (clonal), a compartment may be established with a single clone or may be multi-

clonal. It is usual in the case of a clonal plantation to use a large number of clones in any given planting year to ensure a broad genetic base.

Sustained Timber Production

(As applied to "Tree Plantations")

Sustained timber production from a tree plantation means that a regular annual yield of timber will be harvested from the plantation by either clear felling a proportion of the area planted which has reached a given rotation age or through thinning parts of the plantation, or by a combination of both. Clear felled areas will be regenerated naturally or replanted so that timber production can be sustained in perpetuity.

Conservation

(IUCN definition from the "World Conservation Strategy").

Conservation is the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations.

Printed in England by Shell Reprographics, London