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WORKSHOP ON SRI LANKA
NATIONAL CONSERVATION STRATEGY

Donald Alford
May, 1986

Environmental Planning and Management Project
International Institute for Environment and Development

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May, 1986

Donald Alford
Random DuBois

I. INTRODUCTION

It is the purpose of this report to summarize salient aspects of activities performed by the authors during a consultancy in Sri Lanka during May, 1986 to provide assistance in the preparation of a National Conservation Strategy (NCS). Specifically, this report includes:

a. a brief history of NCS's generally and of the Sri Lanka NCS process;

b. a description of the Sri Lanka 1986 NCS workshop and its results;

c. a suggested implementation plan, schedule and terms of reference for drafting the final NCS document;

II. A BRIEF HISTORY

II-1. The World Conservation Strategy

The World Conservation Strategy (WCS) was launched in 1980 by the International Union for the Conservation of Nature and Natural Resources (IUCN) with the advise, cooperation, and financial assistance of the United Nations Environment Program (UNEP) and the World Wildlife Fund (WWF), and in collaboration with the Food and Agricultural Organization of the United Nations (FAO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The aim of the World Conservation Strategy is to achieve the three main objectives of living resource conservation:

a. to maintain essential ecological processes and life-support systems, on which human survival and development depend;

b. to preserve genetic diversity, on which depends the functioning of many of the above processes and life-support systems, the breeding programs necessary for the protection and improvement of cultivated plants, domesticated animals and microorganisms, as well as much scientific and medical advance, technical innovation and the security of the many industries that use living resources;

c. to ensure the sustainable utilization of species and ecosystems which support rural communities as well as major industries;

As a part of the World Conservation Strategy, it was recommended that every country review the extent to which it is achieving conservation, concentrating on the priority requirements and on the main obstacles to them and present the results of the review in the form of a National Conservation Strategy (NCS).

As of May, 1983, a total of 25 countries, including Sri Lanka, had reached some intermediate phase in the preparation of a National Conservation Strategy. At that time, only two countries (South Africa, Spain) had completed the NCS. As of the date of this report (1986) several additional countries have completed an NCS, but a complete listing of these countries is not available to us.

II-2. The Sri Lanka National Conservation Strategy

The Sri Lanka National Conservation Strategy was initiated by a visit of Mr. Brian Johnson (Program Director, International Institute for Environment and Development, IIED) to Sri Lanka in July, 1982. During this visit, Mr. Johnson met with President Jayewardene and senior members of his government. At that time, President Jayewardene endorsed the need to develop a National Conservation Strategy for Sri Lanka. Following these meetings, the Prime Minister, Mr. Premadasa, proposed to the President that a senior level committee, composed of representatives from several Ministries be appointed for the preparation of the document. This recommendation was approved, members were appointed and approved by Cabinet in November, 1982 (see Annex 1.).

At the first meeting of this task force, it was agreed:

- a. that a draft terms of reference for the Task Force would be prepared;
- b. that the terms of reference would identify the priority areas for conservation;
- c. that the Conservation Strategy would be accompanied by an Action Plan, identifying strategies for immediate implementation, action programs on each strategy as well as the identification of the Agencies that would be responsible for co-ordination and implementation;
- d. that the task force would involve all Agencies, responsible for management of natural resources as well as user organizations in the preparation of the National Strategy;
- e. that the first draft of a National Strategy, when ready, would be circulated among all such Agencies and a feed-back be obtained;
- f. the public participation would be ensured in the exercise, by way of obtaining Memoranda through an

advertisement based upon the agreed terms of reference;

g. that studies already carried out by Agencies like the Natural Resources, Science and Energy Authority would be obtained and incorporated in the National Strategy, as relevant.

It was also agreed at this meeting that the Central Environmental Authority (CEA), situated in the Prime Minister's Ministry of Local Governments, Housing and Construction would provide secretarial and other supporting services to the NCS Task Force. (Source of Information: CEA Board Paper 0582, Jan. 7, 1982).

At the second meeting of the NCS Task Force (January 10, 1982), terms of reference were defined and approved, as follows:

a. examine the present status of our natural resources in relation to their conservation and utilization for the future;

b. identify conservation objectives with particular emphasis on preservation of natural ecosystems, genetic diversity, endangered species and life-support systems;

c. examine the causes and intensity of environmental degradation and recommend urgent remedial action;

d. identify obstacles to conservation and recommend measures to overcome them;

e. indicate financial requirements and recommend the legislative and administrative framework to implement the National Conservation Strategy;

f. recommend measures required to strengthen education, training and research for the implementation of a National Education Strategy;

g. propose guidelines for use in policy-making for the integration of conservation and development (Source of Information: Task Force Minute, dated January 10, 1983).

At this second meeting, a strategy for soliciting public participation was also adopted. The public, including government sectors and NGO's not participating directly, would be notified through advertisements taken in Sinhala, Tamil and English-language newspapers. Other sectors (Ministries, Departments, NGO's and known scientific personnel) would be contacted through individualized written requests.

A third meeting of the NCS Task Force was held on February 21, 1983. At this meeting, it was agreed to request various Ministries to forward short notes on the present policy, as well as long-term and medium-term strategies, with regard to conservation and development. The subject areas to be con-

sidered by these notes were:

- a. Soil
- b. Water
- c. Agricultural Development
- d. Wildlife and National Parks
- e. Marine Fisheries
- f. Inland Fisheries
- g. Ocean Resources
- h. Industrial Development
- i. Human Settlements
- j. Urban Development
- k. Tourism
- l. Highways
- m. Transport
- n. Manpower Development
- o. Atmosphere

(Source of Information: NCS Task Force Minute PDD/PL/2/72/82).

A fourth meeting of the NCS Task Force, held on March 31, 1983, agreed to appoint selected consultants to be charged with responsibility for the preparation of preliminary drafts of subsections of the NCS. The topics of these papers were identified as:

- a. Soil, Water, Genetic Resources, Agricultural Development
- b. Wildlife, National Parks, Endangered Species
- c. Human Settlements, Urban Development, Tourism
- d. Industrial Development, Transport, Highways
- e. Aquatic Resources

Consultants were identified in each area with the exception of e. (Aquatic Resources). It was agreed that each would be invited to participate and would be given a suitable honorarium for such participation. It was also agreed that a consultant to deal with the topic of aquatic resources would be identified and contacted. (Source of Information: Task Force Minute, undated).

At the fifth meeting of the Task Force, held on May 23, 1983, it was agreed that Chena Agriculture was an important topic and should be the subject of an in-depth analysis. It was also agreed to appoint a Chief Editor, to co-ordinate all aspects of the preparation of a National Conservation Strategy. (NCS Task Force Minute, undated).

The sixth meeting of the Task Force was held on June 9, 1983. At that time, a Chief Editor was appointed and, together with consultant sectoral experts, entrusted with the task of preparing subject area chapters. It was agreed that this group would constitute the NCS Editorial Board.

During the period June, 1983 - July, 1984, activities were

largely confined to identifying and contacting consultant authors for individual sector papers. Some difficulties were experienced in locating individuals who were both qualified to write on a given topic and who were also able to commit the time required to produce a final document.

In July, 1984, with the assistance of the International Institute for Environment and Development (IIED), the International Union for the Conservation of Nature and Natural Resources (IUCN) and the U.S. Agency for International Development (USAID), Mr. Random DuBois arrived in Sri Lanka to fulfill a short consultancy as a Consultant Editor. Mr. DuBois met with each sector consultant/author individually to ensure that each understood the terms of reference of their responsibilities, and provided each with IUCN reference materials on the World Conservation Strategy and on the preparation of National Conservation Strategies.

In September, 1984, Mr. DuBois and the NCS Task Force held a Residential Workshop, to allow all sector consultant/authors to discuss problems of mutual concern and to provide a forum for discussions dealing with general concepts relating to the preparation of a National Conservation Strategy (See Annex #2).

Following this Residential Workshop, a seventh meeting of the NCS Task Force was held on October 5, 1984, at which an Editorial Board was appointed. The Editorial Board, consisting of six senior sector editors, would have the responsibility of editing each of the commissioned papers as they became available. For a variety of reasons, the position of Chief Editor remained unfilled.

During the period May, 1985 to April, 1986, the Editorial Board held eleven (11) formal meetings, under the chairmanship of the Chairman of the NCS Task Force, primarily to consider individual sectoral papers, as they became ready for editorial review.

In May, 1986, Mr. Random DuBois and Mr. Donald Alford, with the assistance of the International Institute for Environment and Development (IIED) and the U.S. Agency for International Development (USAID), arrived in Sri Lanka to serve a short consultancy as Consultant Editor and Resource Systems Analyst, respectively. Their terms of reference were generally to assess and begin a synthesis of materials produced to date, and, in conjunction with the NCS Task Force, prepare and conduct a second Residential Workshop. This workshop was to be attended by all sectoral consultant/authors, members of the Editorial Board and the NCS Task Force members. This workshop was held on May 17-18, 1986. Salient aspects of workshop proceedings and results are discussed below.

III. The 1986 National Conservation Strategy Residential Workshop..

III-1. Objectives of Workshop

The objectives of the 1986 National Conservation Strategy Residential Workshop were:

- a. to review sector paper abstracts for their sector characterizations and modify where appropriate;
- b. to undertake a preliminary identification of natural resources and development issues judged to be of national significance which should be addressed by the Sri Lanka NCS, define these issues and draft initial mitigative strategies;
- c. to draft an NCS Table of Contents
- d. to draft a plan leading to preparation of a draft National Conservation Strategy and final acceptance of this document by the Government of Sri Lanka;
- e. to re-instill momentum in the NCS process in Sri Lanka;
- f. to re-introduce the NCS concepts, on which a National Strategy should be based, to a consideration of individual sector papers.

III-2 Pre-Workshop Activities

At the time a decision was made to hold a second Residential Workshop in May, 1986, a total of twenty-seven (27) sector papers has been commissioned. At the time of the arrival of DuBois and Alford in early May, 1986, these papers were in various stages of the review process, and not all had been finally accepted by the Editorial Board. In addition, not all papers were accompanied by author-supplied summary abstracts. In order to provide a common framework for workshop discussions of sectoral papers, the consultants prepared abstracts for all papers available at the time (a total of 22 out of 27). In several cases, these abstracts were based upon partial drafts. In every case, it was intended that these summary/abstracts would serve only as points of departure for a discussion of the sectoral topic at the workshop, and would not be a substitute for an official summary/abstract, to be completed ultimately by the individual consultant authors. In every case where they were available, the summaries prepared by the individual authors were used in preference to those prepared by the visiting consultants.

III-3. The Workshop

At the workshop, consideration of sector papers was undertaken by five workgroups, the composition of which was determined by the Chairman of the Workshop. Each workgroup

consisted of a Chairman (commonly, a member of the Editorial Board), a Recording Secretary, and the authors of the papers to be reviewed and one or more Resource Persons, to provide information and guidance to the discussions, as requested.

Each workgroup was assigned four-five sector papers for review and comment. The decision to allocate a sub-set of sectoral papers to individual workgroups, rather than consider each paper in plenary session, was made in order to ensure that all papers received adequate consideration in the limited time available of this phase of the workshop. A listing of workgroup membership and papers considered by each is given in Annex #2.

Consideration of Issues and Strategies was undertaken using a combination of the workgroups assigned earlier for sector paper review, and a plenary session. Each workgroup was assigned two major issues, which had been identified by IIED/USAID Consultants from an analysis of sectoral papers and in consultation with Workshop Chairman. Each workgroup was requested to consider the relevance of the issue to the Sri Lankan situation. If the issue was felt to be relevant, the workgroup was requested to develop a preliminary list of possible mitigation strategies. At the conclusion of the discussions of individual workgroups, the workgroup Chairman was asked to present the result of the group's deliberations to a plenary session, for general consideration and discussion by the group as a whole.

Discussions related to an appropriate format and Table of Contents for a National Conservation Strategy were undertaken in plenary session. As examples to guide the discussion, the format suggested by IUCN, in their document, "National Conservation Strategies: A Framework for Sustainable Development" (Jan, 1984) and the format adopted by the Philippine NCS, were used. Each participant was invited to comment on the applicability of these formats to the particular circumstances in Sri Lanka, and to suggest modifications, additions or deletions. (See Annex #3 for general workshop format).

III-2. Workshop Results

III-2.a Review of Sectoral Papers

At the time of preparation of this report, official results of workshop proceedings were not available. These are being prepared under the direction of Mr. R.A. Wijewansa, Director, Environmental Management, Central Environmental Authority, who acted as Workshop Rapporteur. When they become available, Mr. Wijewansa will transmit them to Mr. E. Loken of USAID, for inclusion as an Annex to this report. Deliberations by each workgroup were submitted by workgroup chairmen in written form, rather than presented verbally before a plenary session.

The summaries prepared by IIED/USAID consultants are included here as Annex # 4.

III-2.b Issue Identification and Mitigation Strategies

The following major issues were discussed both by individual workgroups and in plenary session:

- a. the need for intersectoral co-ordination, including assignment of subjects and functions;
- b. the need for research, additional studies, data banks, data analysis and information retrieval systems;
- c. the need for changes in the institutional/organizational framework (both public and private sectors), including NGO participation;
- d. the role and definition of appropriate technology policies for sustainable growth;
- e. the need for improvement in the planning and implementation process, including integration of environmental concerns into planning and Environmental Impact Assessment (EIA) process;
- f. the need for environmental education, public awareness and popular participation;
- g. the need for strengthening legislation and institutional support for law enforcement;
- h. the need for staffing and training requirements in relation to enforcement of environmental quality standards/criteria and monitoring of environmental quality;
- i. the need for national parks, conservation areas, field laboratories and demonstration centers;
- j. the need for regional and international co-operation.

As with the considerations of the individual sector papers, the official results of the discussions of the above issues by individual workgroups was not available at the time this report was written. They will be transmitted to Mr. E. Loken, USAID, by Mr. R. Wijewansa for inclusion as an Annex to this report upon completion.

Each workgroup chairman reported on the results of the deliberations of his group to a plenary session. The following comments are based upon a subjective interpretation of this plenary discussion by one of us (Alford), and are to be considered tentative pending availability of official record.

Each of the major issues was accepted in principle as having relevance for the Sri Lankan situation. It was generally agreed that each represented an area in which improvement could be made. No attempt was made to develop a ranking, or to incorporate related issues into a broader statement of the situation. It was generally agreed that resolution of those issues involving administration and/or implementation of issues and strategies should be undertaken through existing Agencies, where possible, rather than the creation of new Agencies or Departments. The question of final issue definition, and of developing a hierarchy of issue priorities was deferred to the NCS Task Force.

IV. Implementation Procedure and Schedule

It was agreed in plenary session that the following implementation schedule and procedure could be submitted to the NCS Task Force for consideration:

A National Conservation Strategy Secretariat could be created, for the purpose of drafting a National Conservation Strategy. This Secretariat could be located within the Central Environmental Authority, under the immediate supervision of Mr. R.A. Wijewansa. It would report, through him, directly to the Chairman of the NCS Task Force. The Secretariat could have, as a primary responsibility, the preparation of an initial draft of a National Conservation Strategy, circulation of this draft for review and comment as directed by the NCS Task Force, and revision of this draft to reflect review comments. It could then have the responsibility for the preparation of a final draft of a National Conservation Strategy, based upon review comments, discussions with representatives of Ministries, NGO's, selected scientific/technical personnel and the general public.

The Secretariat could consist of:

1. One Project Director, experienced in technical writing, information synthesis and analysis. This individual would work closely with all interested or involved parties, to make certain that the final document represented a consensus of opinion on the subject.

2. Two or three Research Assistants, responsible for assembling, synthesizing and analyzing required information and producing preliminary drafts of sections of the NCS, under the general supervision of the Project Director.

3. A secretary/typist, responsible for preparing drafts of manuscript for review, maintaining necessary records and other duties, as required by NCS Secretariat, under supervision of Project Director.

The NCS Secretariat could be created by July 1, 1986, in order to facilitate the commencement of the drafting of a preliminary NCS.

During the period required for Secretariat formation, an on-going attempt could be made to complete final drafts of all sector papers. This would involve a completion of a preliminary draft by sector authors, review by Editorial Board, incorporation of review comments by sector author to produce final draft, preparation by author of summary abstract, acceptance of both complete manuscript and summary abstract by Editorial Board and transmittal to NCS Secretariat and NCS Task Force. A deadline for completion of this phase could be set for approximately August 1, 1986, so as to provide maximum time for Secretariat to work with materials contained in all sector papers.

Following the formation of the NCS Secretariat, the Project Director could meet with the NCS Task Force to finalize the NCS format and Table of Contents. This could occur in early July, 1986.

This NCS format and Table of Contents will, to a large extent determine the nature and extent of additional information required in addition to that already contained in the sector papers, and will help to determine the nature of information synthesis required.

The process of synthesizing sectoral information, defining information gaps, developing the necessary information to fill those gaps and preparing an initial draft of the NCS for broad circulation and review could take three months, to be completed during the period August 1 - November 1, 1986.

Following completion of an initial NCS draft, the draft could be circulated to a group identified by the NCS Task Force for review and comment. This review group could be identified so as to represent a broad range of interests and responsibilities within both governmental and nongovernmental elements of Sri Lanka. Such a review should take approximately one month, and might be completed by December 1, 1986.

Following this broad review, the NCS Secretariat could incorporate review comments, with assistance from NCS Task Force, and prepare an interim draft of the manuscript. This process could require two months, and should be completed by February 1, 1987.

Upon completion of an interim draft of the Sri Lanka National Conservation Strategy, a Residential Workshop could be held. This Workshop could be held to brief Permanent Secretaries on the contents of the interim NCS and to obtain their advise on any additions, modification or deletions which might be necessary. At this time, the interim document could also be submitted to the President and Prime Minister for review and comment. This process should require approximately one month, and could be completed by March 1, 1987.

Based upon comments received from Permanent Secretaries at the Workshop, and from the President and Prime Minister, or their appointed representatives, the NCS Secretariat could prepare a final draft of the Sri Lanka National Conservation Strategy for submittal to the Cabinet for consideration and approval. This process could require two months and could be completed by May 1, 1987.

Based upon the interim NCS draft, and coincident with preparation of a final draft, the NCS Secretariat could begin the formulation of Action Plans for the implementation of NCS strategies. This activity could be undertaken in close collaboration with the NCS Task Force, the NCS Editorial Board, relevant government agencies and NGO's. This activity would require an estimated three months, and could overlap with preparation of final draft of NCS, so as to be completed at approximately the same time as the National Conservation Strategy receives approval from the Cabinet (May 1, 1987).

V. Proposed Format and Table of Contents

V-1. General Comments

It is felt that a final selection of the format and table of contents of the Sri Lanka National Conservation Strategy is the ultimate responsibility of the NCS Task Force, with the advise of the NCS Editorial Board, where required. The following suggestions for a possible format and table of contents are based primarily on the suggested format contained in the IUCN document to which reference was made in Section III-1 above (see also Annex #5).. It was our sense of the plenary discussion on this topic that this format was preferred by a majority of those attending the Workshop. Where the annotations of the IUCN format are felt to be relevant to the Sri Lanka situation, no attempt has been made to include them here. In those cases where a heading is given without an annotation, the reader is referred to the IUCN document. It is felt that the most important definitional problem involves that of converting the considerable amount of sectoral information available to the NCS Secretariat into a form which reflects the basic needs and objectives of the NCS process. We have therefore expanded the discussion of those sections which deal specifically with questions of definition, with the existing data base and with way in which that data base should be synthesized.

V-1.a Comments on the Table of Contents

1. INTRODUCTION

1.1 CONSERVATION FOR SUSTAINABLE DEVELOPMENT

a. In addition to a discussion of the "philosophies of conservation and development", it is suggested that this section could usefully define the terms, e.g.:

Development: Modification(s) of the biosphere, application of human, financial, living and non-living resources to satisfy human needs and improve quality of human life.

Conservation: Management of human use of the biosphere so that it may yield the greatest sustainable benefits to present generations while maintaining potential to meet needs of succeeding generations.

Essential Ecological Processes: Those processes that are governed, supported or strongly moderated by ecosystems and are essential for food production, health. "Life-support" system is a short-hand expression for the main ecosystems involved, e.g., watershed forests, coastal wetlands and fisheries, soil/water relationships in agricultural regions, etc.

1.2 THE NATIONAL CONSERVATION STRATEGY INITIATIVE

It was the sense of the consultants that the discussion in plenary session concluded that this section is not particularly useful, at least at this place in the text. It might be included, if at all, in a foreword or as an appendix.

2. THE CURRENT SITUATION

It is suggested that initially, the most difficult task facing the NCS Secretariat, and its Director, will be the definition of a conceptual framework, in terms of which the large volume of sectoral information available to them may be structured. Such a conceptual framework could be based upon the major ecosystems of Sri Lanka. This would allow the NCS Secretariat to consider each of the major sectors (e.g., agriculture, industry, urbanization, species preservation, fisheries, forestry, etc) in terms of its impact, if any, on these ecosystems. It is suggested that the principle ecosystems of Sri Lanka are:

1. The Watershed Forest System(s)
2. The Agricultural System(s)
3. The Coastal and Freshwater System(s)

The topic of genetic diversity cuts broadly across all these systems. It could be discussed where appropriate in the context of: (a.) preservation of cultivars, (b.) preservation of potential pharmaceutical species, (c.) exclusion of exotic species, (d.) avoiding total habitat destruction, (e.) preservation of endemic species and remnants of the Deccan flora.

The three basic ecosystems listed above may be further sub-divided, for the purpose of adding specificity to the discussion into "Wet" and "Dry" zone ecosystems (this sub-division will not be strictly applicable to the Coastal System, but will apply to all the others). This division is based upon the existing "Agro-ecological" model of Sri Lanka, which includes, as well, an "Intermediate" zone. Since it is a transitional zone, and thus more difficult to define precisely, its inclusion or exclusion is considered to be a matter for arbitrary decision. For the purposes of this discussion, only a single zone will be considered here, although the treatment of all would be essentially the same.

THE PHYSICAL CHARACTERISTICS

I. Wet Zone

A. The Watershed Forest System

1. Uplands

- a. Soils
- b. Water
- c. Biota
- d. Existing Uses
- e. Existing or Potential Pollution (e.g., erosion, sediment production and transport, agricultural chemical, sewage and other domestic wastes, alteration of runoff regimes or groundwater, etc.

2. Lowlands

a-e. As above where appropriate

B. Agricultural Ecosystems

1. Uplands

a-e. As above where appropriate

2. Lowlands

a-e. As above where appropriate

C. Freshwater Ecosystems

1. Uplands

a-e. As above where appropriate

2. Lowlands

a-e. As above where appropriate

D. Coastal/Marine Ecosystems

1. Estuarine

2. Oceanic

E. Human Population

1. Spatial Distribution

2. Historical Demographics

3. Projected Demographics

4. Significance (e.g., population driving force in consumption, production. Given an increasing population, such as is projected for Sri Lanka, "sustainable development" implies constantly rising levels of pressure on all ecosystems.)

THE INFRASTRUCTURE CHARACTERISTICS

I. The Economy

A. The Production Sector

1. Agriculture
2. Manufacturing
3. Services

B. The Consumption Sector

1. The Market Economy
2. Subsistence Economies
3. Per Capita (for each above)
4. Regional Patterns
5. Import/Export
6. Etc.

C. Energy Sector

1. Sources
2. Alternatives
3. Impacts
4. Etc.

D. Cultural Factors

This section could focus on the Buddhist tradition of respect for nature. It is felt that this is an area in which Sri Lanka has a contribution to make to the international NCS process

(Notes: the Agro-ecological model includes a "midland" zone which a cursory inspection suggests does not differ in any significant aspects from the "upland" zone, except perhaps in the matter of altitude above sealevel. It has therefore been omitted from this discussion, and may be included, if desired at the appropriate place within the suggested format. The extent to which the discussions in this section are developed is an editorial decision, but should be sufficient to allow a reader with no training in ecosystem analysis to understand and appreciate the basic interactions involved in the physical system and the potential uses and impacts of the infrastructure system. A fundamental point which could be made is that the physical system is characterized by processes related to gravity, and that the potential impact of any given resource use is, in part, related to the altitudinal position of the point of use with respect to other ecosystems. For example, deforestation of an upland forest watershed system may produce changes in the surface runoff and sediment which will affect all lower ecosystems. Changes in the characteristics of a coastal ecosystem, on the other hand, will have no impact on ecosystems outside the coastal system, with possible exception of the immediately-adjacent lowlands. A second gravity-related process, which can be indexed to slope angle, is erosion and sediment transport. The Agro-ecological model of Sri Lanka can be used as a preliminary source of information concerning this parameter, inasmuch as it is one of the characteristics discussed, at least in qualitative terms.

It is felt that this section is critical for two reasons:

1. It establishes the "boundary conditions" of the problem of conservation and development; it states what is available, where and how much of it there is, and what the potential impact of unwise development will be, in terms of specific, identifiable ecosystems.

2. It establishes a point of departure for all that follows. Inevitably, there will be those who will not feel that any changes in existing sectoral planning procedures is required. In the first instance, this section should be addressed to that audience, and not to those (presumably the majority) who are convinced of the need to introduce the broader perspective of "sustainable development" into the planning process.

Some principles to guide the discussion:

1. Highland areas are primarily "source" areas for all lower (altitudinally) ecosystems, e.g., changes in the water or sediment balance of this ecosystem will ultimately affect all "downstream" ecosystems. Erosion potential, as a result of improper resource use, is high.

2. Lowland areas are much less important as sources of water or sediment. Specific runoff is low (most precipitation is consumed by evapotranspiration) and erosion potential is low, due to low slope angles. Primary problems involve introduction of pollutions, e.g., from agricultural chemicals, and water quality changes associated with evapotranspiration during irrigation.

3. Coastal systems are site of major urban and industrial centers. These represent primary sources of pollution (e.g., industrial wastes, urban garbage and sewage) for local pollution of water sources and for export to coastal marine ecosystems.

2.2 THE DEVELOPMENT CONTEXT

This section could emphasize the present importance of the major development sectors (The Infrastructure, p. 16) from the perspective of historical trends and projections of trends, based upon existing planning documents. In this section, the range of ecosystem impacts, which are treated normally as "externalities" by standard sectoral planning procedures, could be illustrated by an analysis of a single major development strategy now being pursued by the government of Sri Lanka. By analogy, it could then be argued that what is true for one may be true for all. Such an analysis has been performed on the Mahaweli project by IIED, and could be made available to the NCS Project Director and Task Force for consideration for this section.

2.3 INTERNATIONAL IMPLICATIONS

From the IUCN document, which modifications as relevant for Sri Lanka.

2.4 OBSTACLES TO CONSERVATION

From the IUCN document, supplemented by the results of the Workshop discussions, where relevant

3. THE STRATEGY

So that all readers will understand the meaning of "strategy", it is suggested that the term be defined at the outset of this section, perhaps as, "A National Conservation Strategy is a plan, designed to overcome identified obstacles to sustainable development and to develop approaches to overcoming these obstacles".

3.1 PURPOSES OF THE SRI LANKA NCS.

It is suggested that this section could be a simple restatement of the President's charge to the Task Force at the time of appointment. It could be modified, if desired, to reflect any additions or modifications he might wish to make.

In any event, this section could reflect the views at the highest levels of government and could be prepared in close collaboration with spokesmen for those levels.

- 3.2 OPERATIONAL PRINCIPLES
- 3.3 SUMMARY OF ISSUES AND ACTIONS
- 3.4 VEHICLES FOR PRIORITY ACTION
- 3.5 INTERNAL RESPONSIBILITIES
- 4 IMPLEMENTATION
- 5 MONITORING
- 6 APPENDICES

It is suggested that all these sections depend upon completion of the NCS through section 3.1, and cannot be undertaken in any by the most general fashion until the preliminary draft is completed and reviewed to that point.

VI. Supplemental Activities

It is suggested that a Third Workshop be held during March, 1987 to brief the Permanent Secretaries, and others as identified by the NCS Task Force, on the contents of the interim NCS draft.

VII. Existing or Potential Obstacles

No obstacles to the completion of a Sri Lanka National Conservation Strategy are foreseen.

Annex 1

TASK FORCE FOR THE PREPARATION OF
A NATIONAL CONSERVATION STRATEGY

BOARD PAPER NO.05/82

CENTRAL ENVIRONMENTAL AUTHORITY

TASK FORCE FOR THE PREPARATION OF
A NATIONAL CONSERVATION STRATEGY

His Excellency the President has appointed the following Task Force for the preparation of a National Conservation Strategy :

1. Mr. K.H.J.Wijeyadasa - Addl. Secretary,
MY/L.G.,H.& C. and Chairman,
Central Environmental
Authority (as Chairman)
2. Dr. R.P.Jayawardena - Director General, Natural
Resources, Energy &
Science Authority.
3. Dr.Hiran W.Jayawardena - Chairman, National Aquatic
Resources Agency.
4. Mr. Lyn de Alwis - Director of Wildlife
Conservation.
5. Mr. V.R. Nanayakkara - Conservator of Forests.
6. Mr. Merrick Perera - Director of National
Planning.
7. Mr. S.R. Amarasinghe - Director of Coast Conservation.
8. Dr. Walter Fernando - Director of Agriculture.
9. Mr. T.W. Hoffman - Wildlife & Nature Protection
Society of Sri Lanka.
10. Mr. W.D. Ailapperuma - General Manager,
Central Environmental Authority
(as Secretary).

He has instructed that this National Strategy should be based on the guidelines provided by the World Conservation Strategy, which

has been prepared by the International Union for the Conservation of Nature with the advice, co-operation and assistance of the UNEP and the World Wildlife Fund and in collaboration with the F.A.O. and the UNESCO. The World Conservation Strategy has presented a statement of conservation priorities and a broad plan for achieving them. The theme that has emerged from this strategy is that conservation and sustainable development are inseparable, and that development activities have to be planned within a frame-work of environmental protection and management.

His Excellency has further stated that in the context of Sri Lanka's accelerated development programmes, the preparation of a National Conservation Strategy is of urgent national importance.

Approval of the Authority is requested for the provision of secretarial and other supporting services for this Task Force, from the funds of the Central Environmental Authority.



CHAIRMAN,
CENTRAL ENVIRONMENTAL AUTHORITY.

31st December, 1982,

Annex 2
RESIDENTIAL WORKSHOP
SRI LANKA NATIONAL CONSERVATION STRATEGY, (NCS)
SEPTEMBER, 1984

RESIDENTIAL WORKSHOP
SRI LANKA NATIONAL CONSERVATION STRATEGY (NCS)
SEPTEMBER 1 & 2

PROVISIONAL AGENDA

DAY I

TIME	SUBJECT	PERSON	DURATION (Mts.)
0900	<u>Session I - INTRODUCTION</u>		
	NCS-Scope, Objectives & Agenda of Workshop	Mr.K.H.J. Wijayadasa (Chairman/Task Force)	20
	The NCS Process	Mr. Random DuBois Consultant Editor, NCS	10
	Supply of Physical Data for Evolving a NCS	Mr.S.D.C. Nanayakkara Surveyor General	10
		Mr. S. Berugoda Dy. Surveyor General	
		Mr. Martin Sommer Remote Sensing-Swiss Project	
	Information Sources	Mr.W.S.M. Fernando D/Census & Statistics	10
	Rapporteur : Mr.R.A. Wijewansa		
0950	QUESTIONS		10
1000	TEA		15
1015	<u>Session II - NATURAL RESOURCE ENDOWMENT</u>		
	Introduced by Mr.Lyn de. Alwis		05
	Physical Context	Prof.G.H. Peiris Dept. of Geography University of Peradeniya	10
	Soils	Prof.M.W. Thenabadu Head, Dept. of Agricultural Chemistry University of Peradeniya	10
	Natural Forests	Dr.(Mrs.)C.V.S. Gunatilleke Lecturer in Botany University of Peradeniya	10
	Wildlife	Mr.Lyn de alwis D/Zoological Gardens	10
	Rapporteur : Mr.V.K. Nanayakkara		
1100	DISCUSSION		20

TIME	SUBJECT	PERSON	DURATION (Mts.)
1120	<u>Session III-NATURAL RESOURCES ENDOWMENT(CONT'D)</u>		
	Mineral Resources	Mr.D. Jayawardena Technical Director State Mining & Mineral Dev. Corporation and Dy. Director of Geological Survey Dept.	10
	Water Resources	Prof.M.W. Thenabadu	10
	Living Aquatic Resources	Mr. Anton Atapattu Director of Fisheries (Marine) Ministry of Fisheries Maligawatte.	10
	Coastal & Marine Resources	Mrs. D. Sadacharan Deputy Manager/Planning Coast Conservation Dept.	10
	Genetic Resources	Prof.W.E. Ratnayake Head, Dept. of Zoology University of Sri Jayewardenepura	10
	Rapporteur : Mrs.M. Samarakoon		
1210	DISCUSSION		20
1230	LUNCH		60
0130	<u>Session IV - HUMAN & DEVELOPMENT CONTEXT</u>		
	Introduced by Dr. Lloyd Fernando, D/National Planning My/Finance and Planning		05
	Development Issues	Dr.A.D.V.de S. Indraratne D/Planning & Research University Grants Commission	10
	Population	Dr.(Miss)Kusuma Gunawardena Associate Professor University of Colombo	10
	Human Settlements	Dr.Percy Silva Head,Dept. of Geography University of Colombo	10
	Tourism	Mr.Renton de Alwis D/Research & International Affairs Ceylon Tourist Board	10
	Rapporteur : Mr.W.D. Ailapperuma		
0215	DISCUSSION		20

TIME	SUBJECT	PERSON	DURATION (Mts.)
0235	<u>Session V-HUMAN & DEVELOPMENT CONTEXT (CONT'D)</u>		
	Plantation Agriculture	Dr.R.L. de Silva Director-General Tea Board	10
	Field Crops	Prof.T. Jogaratnam D/Post-graduate Institute of Agriculture	10
	Animal Husbandary	Prof.A.S.B. Rajaguru Head, Dept. of Animal Science University of Peradeniya	10
	Chena & Dry Farming	Dr.G.W.E. Fernando Director/Agriculture (or his nominee)	10
	Rapporteur: Mr.R.A. Wijewansa		
0315	DISCUSSION		20
0335	TEA		15

Session VI-HUMAN & DEVELOPMENT CONTEXT (CONT'D)

0350	Cultural Resources	Dr. Roland Silva Director-General, Cultural Triangle Project Buddhaloka Mawatha, Colombo 07.	10
	Energy	Prof.J.A. Gunawardena Prof. of Electrical Engineering University of Peradeniya	10
	Industries	Mr.H.R. Perera / Mr R.W.D.Piyatilake D/Policy & Planning ,My/Industries	10
	Air, Soil & Water Pollution	Mr.E.E. JeyaRaj D/Env't. Protection, CEA	10
	Natural Hazards	Dr.M.U.A. Tennakoon D/Rural Banking & Staff Training College Central Bank	10
	Environmental Education	Dr.(Miss)R. Raheem Lecturer in English, University of Colombo	10
	Human Health	Dr.H.M.S.S.D. Herath Senior Medical Officer Env't. & Occupational Health, My/Health	10
	Rapporteur : Mr.E.E. JeyaRaj		

0500	DISCUSSION		20
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DAY 2

TIME	SUBJECT	PERSON	DURATION(Mts)
0900	<u>Session VII-OPEN DISCUSSION</u> Introduced by Mr.R. DuBois Inter-sectoral Linkages Rapporteurs: Mr.R.A. Wijewansa & Mrs.M. Samarakoon		90
1030	TEA		15
1045	<u>Session VIII-OPEN DISCUSSION</u> Introduced by Mr.K.H.J. Wijayadasa Policy Guidelines for Integration of Conservation and Development Rapporteurs: M/s. W.D. Ailapperuma & V.K. Nanayakkara		90
1215	LUNCH		60
	<u>Session IX</u>		
0115	Mechanics of Paper Preparation	Mr.R. DuBois	30
0145	Future schedule of events and Deadlines		30
0215	DISCUSSION		45
0300	TEA		15
	<u>Session X</u>		
0315	Tabling of Workshop Report and Recommendations and Passing out of revised abstracts		30
0345	QUESTIONS		15
0400	CONCLUSION		

Annex 2

COMPOSITION OF WORKING GROUPS FOR NCS WORKSHOP

COMPOSITION OF WORKING GROUPS FOR NCS WORKSHOP

WORKING GROUP I

Chairman : Prof. A.D.V. De S. Indraratna
Secretary : Mr V K Nanayakkara
Authors : Prof. A.D.V. De S. Indraratna
(Development Issues)
: Mr V K Nanayakkara
(Population)
: Dr. Percy Silva
(Human Settlements)
: Prof. A.S.B. Rajaguru
(Animal Production)

MINERAL RESOURCES

Observer : Dr. R.H. Wickramasinghe

WORKING GROUP II

Chairman : Prof. B.A. Abeywickrema
Secretary : Mr N.B.F. Bhareti
Authors : Mr. M. Pushparajah
(Forestry)
: Mr E.E. JeyaRaj
(Air, Soil and Water Pollution)
: Prof. W.E. Ratnayake/
Dr. S.D.G. Jayawardena
(Genetic Resources)
: Mr. M.W.P. Wijesinghe
(Water Resources)

NATURAL FORESTS

: Mr D.M. Fernando
(Editor)
Resource Person : Mr. V.R. Nanayakkara

WORKING GROUP III

Chairman : Dr. Lloyd Fernando
Secretary : Mr. M.S. Wijeratne
Authors : Prof. J.A. Gunawardena
(Energy)
: Mr. P. Endagama
(Cultural Resources)
: Mr. M.S. Wijeratne
(Industries)
: Dr. S.W. Kotagama
(Environmental Education)

TOURISM

: Mr. G.B.A. Fernando
(Editor)
Resource Person : Mr. Ivan Samarawickrema

WORKING GROUP IV

Chairman : Mr Lyn de Alwis
Secretary : Dr. M.U.A. Tennakoon
Authors : Mr. Lyn de Alwis
(Wildlife)
: Dr. M.U.A. Tennakoon
(Natural Hazards)
: Mr. A.R. Atapattu
(Living Aquatic Resources)
: Mrs. D. Sadacharan
(Coastal & Marine Resource Systems)
: Prof. M.W. Thenabadu
(Soil Management)
: Mr I.D.T. de Mel
(Editor)
Resource Persons: Mr Aloy Fernando
Dr. F.N. Ponnampereuma
Mr. S.R. Amarasinghe
Observer : Dr. Ravi Pereira

WORKING GROUP V

Chairman : Dr. S.T. Senewiratne
Secretary : Dr. S.T.W. Kirinde
Authors : Dr. R.L. de Silva
(Plantation Agriculture)
: Dr. G.W. E. Fernando/Dr. M. Sikurajapathy/
Dr. S. Somasiri
(Chena)
: Mr. S. Dimantha
(Land Utilization)
: Dr. S.T.W. Kirinde
(Minor Export Crops)

ANNUAL CROPS

Resource Person : Mr. Nanda Abeywickrema

RESOURCE PERSONS

Mr. K.H.J. Wijayadasa / Chairman, Task Force
Mr. Ivan Samarawickrema / Secretary, Ministry of Mahaweli Dev.
Mr. Aloy Fernando / Addl. Secretary, Ministry of Fisheries
Mr. Nanda Abeywickrema / Secretary, Ministry of Lands & Land Dev.
Mr. R.A. Wijewansa / CEA
Mr. S.R. Amarasinghe / Task Force
Mr. G.W.E. Fernando / Task Force
Mr. Eric Loken / USAID
Mr. R. DuBois / IIED
Dr. D. Alford / IIED

OBSERVERS

Dr. R.H. Wickremasinghe, Working Member / CEA
Dr. Ravi Pereira, Head, Environmental Unit / NARA

Annex 3

RESIDENTIAL WORKSHOP
SRI LANKA NATIONAL CONSERVATION STRATEGY (NCS)
AGENDA

RESIDENTIAL WORKSHOP
SRI LANKA NATIONAL CONSERVATION STRATEGY (NCS)
MAY 16-18, 1986

A G E N D A

DAY 1.

TIME	SUBJECT	DURATION (MTS.)
1830	SESSION 1 - INTRODUCTION	
	- Welcoming Address/ Introductions	- K.H.J. Wijayadasa Chairman / Task Force)
	- Brief Summarization of Sri Lanka NCS History)
	- Workshop Objectives)
	- Distribution of Materials	CEA Staff) 60
	- Workshop mechanics	- R. DuBois - Consultant Editor/IIED)
	- Workshop Logistics	- R.A. Wijewansa Co-ordinating Editor)
	- Questions)
1930		
1945	- Work Group Chairmen / Secretaries meeting Rapporteur : R.A. Wijewansa	15

DAY 2

TIME	SUBJECT	DURATION (MTS.)
0730	- Submission of Summary Reviews	- Authors
0830	SESSION 2 - SECTOR PAPER SUMMARY REVIEWS (Plenary)	
	- Review of NCS Process	- D. Alford, Resource Systems Analyst
	- Distribution of Corrected Sector Paper)	- CEA Staff
	Summaries)

TIME	SUBJECT	DURATION (MTS.)
Continued.	- Work Group Objectives/ Mechanics	10
	- Questions (Work Groups)	5
0900	- Summary Review	Work Groups
1000	T E A	15
1015	- Summary Review (Plenary)	- Work Groups
1215	- Comments	- Work Group Chairmen
	- Submission of Revised Summaries and Working Group Minutes	- Work Group Secretaries
1245	L U N C H	
1400	SESSION 3 - SL NCS ISSUE DEFINITION (Plenary)	
	- Presentation of Issue Analysis	15
	- Discussion	
	- Identification of Priority Issues	
	- Work Group Assignments (work groups)	45
1500	Issue Definition/ Strategy Formulation	- Work Groups
1600	T E A	
1615	- Issue Definition/ Strategy Formulation (Plenary)	- Work Groups
1700	- Presentation of results	- Work Group Chairmen
	- Submission of Issue Strategy Drafts	Work Group Secretaries
	- Adjourn	

DAY 3.

TIME	SUBJECT	DURATION (MTS.)
0830	SESSION 4 - SL NCS STRUCTURE/IMPLEMENTATION (Plenary) - STRUCTURE	
	- Presentation of Alternative) NCS Approaches and Table of) - D. Alford Contents)	30
	- Discussion of TOC)	90
		90
1030	T E A	
1045	- Implementation) (Plenary))	- K.H.J. Wijayadasa
	- Introduction	- R. DuBois 15
	- Discussion	- Lloyd Fernando
	- Discussion on Imple-) mentation Programme)	90
	- Closing Ceremonies	
1230	L U N C H	
	C L O S E	

Annex 4

SECTOR PAPER SUMMARIES

SESSION 2

SECTOR PAPER SUMMARY REVIEWS

MORNING 17-05.86

1. SECTORAL APPROACH (REVIEW)

Attempt a brief review of each sector paper abstract with a view to identifying obvious gaps shortcomings, contradictions etc in relation to NCS Terms of Reference i.e.

- (a) Identification of conservation objectives for the preservation of natural ecosystems, genetic diversity, endangered species ;
- (b) Conservation / Development. parameters

2. SECTORAL APPROACH (ISSUES)

Identify the main issues such as causes for degradation obstacles to conservation and the areas for priority attention.

3. SECTORAL APPROACH - (STRATEGIES)

This would include recommended remedial measures for environmentally sound and sustainable growth ranging from policies and programmes, legal and institutional matters, administrative and financial considerations and interventions in the fields of Education, Research and Technology.

4. IMPORTANT

- (a) It is important that the deliberations are narrowed down to above aspects.
- (b) Adopt a systems approach
- (c) Confine discussions to salient/key factors issues and remedies.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON :
'SOIL DEVELOPMENT FOR SUSTAINABLE USE'- M.W. THENABADU

SECTOR SIGNIFICANCE

Soil is basic to agricultural production. Soil must be considered a non-renewable resource and must be protected from unwise uses which cause deterioration (erosion, loss of nutrients, compaction, etc.). Accelerated erosion is caused by unwise land use. Soil is protected from natural erosion by vegetation. Major soil development potential / problems exist in dry zone. Little land left to be developed in s.w. wet zone. Coastal erosion is a problem in some places. Earthslips are locally important.

PRESENT POLICY / SECTOR OBJECTIVES

Approximately 50% of surface area of Sri Lanka is presently under some form of cultivation, which increases the erosion potential there.

Legislation presently exists, in the term of Soil Conservation Act/ Beach Conservation Act to control land use practices which may lead to accelerated erosion.

The objectives must focus on developing procedures to minimize soil erosion.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. Conservation practices are not incorporated in to land-use plans consistently ;
2. Use of flood plains presently uncontrolled ;
3. Little attention presently given to potential for water quality deterioration as a result of erosion / sediment transport ;
4. Financial incentives for wise use of soils do not now exist.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Incorporate soil conservation practices into land-use planning ;
2. Design and construct storm runoff control structures ;
3. Limit use of flood plains ;
4. Locate tourist / secretarial activities in such a way as to minimize erosion ;
5. CEA should be given increased authority for soil conservation ;
6. Each development site, for whatever use, should be evaluated for erosion potential prior to development, using standard method.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON
"LAND UTILIZATION"

Sunil Dimantha

SECTOR SIGNIFICANCE :

1. Total surface area 6.5 million hectares of which 5.5 million, suitable for agricultural use. This represents 0.3 hectares/person.
2. Agriculture is major land use in Sri Lanka.
3. Exported agricultural products account for % of Sri Lankan annual income.

PRESENT POLICY/SECTOR OBJECTIVES :

Ministry of Lands and Land Development has major responsibility for land and land use. Land development schemes have been frequently badly planned in the cause of political expediency (e.g., as a solution to unemployment problem). Currently, nine Ministries are involved in some aspect of land use policy development/planning.

KEY SECTORAL ISSUES AND CONSTRAINTS :

1. Land area is fixed. Without an increase in agricultural productivity per hectare, an increasing population will lead inevitably to decreasing amounts of agricultural produce per person.
2. Wise land use requires scientific planning.
3. Existing legislative measures to control land use are weak. (Land Development Ordinance and the Soil Conservation Act).
4. Main constraint is lack of central organisation to plan, control and monitor land use.
5. Sufficient data on which to base decisions are lacking.
6. Soil erosion is major problem. (Note: include current land use statistics).

INTER SECTORAL RAMIFICATIONS :

Land utilization is basic to all aspects of resource conservation and development in Sri Lanka. It involves primarily the use of soil, a life support resource, and as such, should be given a high priority in all sectoral planning activities.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION :

1. Data acquisition and processing.
2. Development of land information system (Computer-based)
3. Additional research
4. Land Use Planning based upon an identification on national objectives, completion of an inventory of the resource, selection of "best" use for each land category identified.
5. Development and reorganisation of Institutions.
6. Education, extension and support services.
7. Revision of legislation.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON
"LIVING AQUATIC RESOURCES"

(Abstract based on preliminary draft of paper)

SECTOR SIGNIFICANCE :

1. Fisheries contribute 2% to GDP but supplies 70% of the animal protein to Sri Lankans.
2. It provides direct employment to 80,000, ancillary employment to 30,000, and supports an estimated dependent population of 500,000.
3. Major "aquatic water bodies" important for fisheries are : bays/lagoons/coastal waters ; 40,000 km² of marine areas (EEZ) and 260,000 ha of water bodies of which 120,000 ha are coastal in character and 137,000 represent tanks and reservoirs.
4. Of the 185,000 m.tons taken in 1980, 84% originated from the marine fisheries sector.
5. 90% of total supply of fish is produced locally.
6. There are 32,600 fishing craft in Sri Lanka of which 42% are mechanised producing 71% of the catch. In addition to these craft there exists the traditional beach seine fishery.
7. Inland fish production is dominated by Tilapia ; this sector's production "doubled" from 8 to 16 thousand m.tons between 1971 and in 1983 mostly originated from reservoirs.
8. Export industry (high value species) accounted for US 20 million in 1983.

PRESENT POLICY/SECTOR OBJECTIVES :

1. Fisheries development strategy proposes to increase annual production to 22 kg/head ; create employment within the sector; improve socio-economic conditions of fishermen ; and increase exports of marine products.

2. From 1978, the inland fisheries sector was given high priority by the Sri Lanka Government.
3. The Government provides production incentives in the form of subsidies, credit and fiscal (eg. tax holidays, investment relief, etc.)
4. The Ministry of Fisheries was re-organised to include a research division in 1979. In 1981 NARA under Ministry of Fisheries was established to conduct basic research.

KEY SECTORAL ISSUES AND CONSTRAINTS :

1. The socio-economic conditions of fishermen seem poor.
2. Assuming food habits remain constant (i.e. fish contribute 70% of animal protein consumed in Sri Lanka) population projections predict 460,000 mt. will be needed by 2001 (1983 = 217 mt.).
3. Development of inland fisheries and aquaculture has been slow due to religious and cultural reasons.
4. The purse seine fishery since its introduction in 1973 has proliferated and been the cause of "small man/big man" fishing conflicts.
5. There has been a decrease in fish exports from 1978 to 1983.
6. Data from a recent fishery survey indicates Annual Sustained Yield has been reached in coastal pelagics and any expansion of the sector must occur from demersal species.
7. To fully utilize the inland living water resources greater inter-agency coordination is required. (e.g. between MDA, Irrigation Department, etc.)
8. Extra-national poaching occurs in Sri Lanka waters.
9. Fish kills resulting from pollution (Kelani river incident).
10. Dynamiting of fish.
11. Information is scanty on offshore living resources.
12. Need for larger boats/capital to exploit offshore resources
13. Inland fish culture suffers from inadequate supply of fish seed, inappropriate technology and low demand.
14. Inadequacy of trained personnel to enforce existing regulations.

KEY INTER SECTORAL RAMIFICATIONS :

1. Upstream pollution of rivers (industrial/fishing conflicts)
2. Displacement/beach access (tourism/fishing conflicts)

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION :

1. Focus on preserving catch and reduce post-harvest losses and increase un/under utilized fish resources.
2. Apply advanced technology, incentives to encourage private sector participation and alternative support schemes.
3. Increase inland production by intensified stocking of large reservoirs, development of aquaculture in seasonal tanks, development of ponds, cage and pen culture, and provision of subsidies for purchase of boats and construction.
4. Sri Lanka Navy resources need to be enlarged to enforce existing fishing provisions.
5. Carefully plan tourism development.
6. Limit availability of dynamiting.
7. Due to reaching MSY in coastal pelagic fishery there is a need to expand the industry in offshore and inland waters.
8. Need for resource surveys to upgrade existing data bases and define ASY.
9. Development of inland fisheries should be continued.
10. Strict control of industrial effluents affecting inland/coastal waters.
11. Increase research on fish and shellfish culture.
12. Increase the number and level of training of field officers for enforcement and instill conservation concepts.
13. Promote international cooperation in fisheries management and pollution prevention.

NATIONAL CONSERVATION STRATEGY

SECTOR PAPER ON TOURISM - SUMMARY

1. Tourism, which was the fourth largest foreign exchange earning industry in Sri Lanka, at its peak growth period in 1982, has made a visible impact on the physical and socio-cultural environment of the country.
2. The industry since its inception in an organized manner in 1966, has registered an average growth rate of over 21 per cent per annum, with the period 1977-82 registering an annual growth of over 27 per cent. From a mere 18,900 tourist arrivals and US \$ 1.2 million foreign exchange earnings in 1966/67, the industry performance levels, grew to 407,230 arrivals and US \$ 146.6 million in exchange earnings in 1982, creating around 65,000 employment opportunities.
3. Tourism infrastructure growth, which had a predominant concentration on the coastal areas during all stages of its development, is backing up a product mix of natural, cultural and social resources.
4. While the initial tourism plans^{1,2} laid definite emphasis on the need to maintain a high quality environment to sustain balanced tourism growth, later phases of unplanned development resulted in situations of imbalance, with the creation of informal tourist centres such as those at Hikkaduwa, Negombo, Unawatuna, Arugambay, Mt. Lavinia and Kalkudah.
5. These centres together with lapses in planning in the formal sector have given rise to problems such as beach erosion (due to the construction of hotels and other tourist facilities without adequate set-back zones), disposal of sewage and other waste material to coastal waters and other waterbodies, reduction of scenic vistas of the natural environment, ecocide of coral reefs, reclamation of mangrove swamps, destruction of coastal vegetation and problems such as touting, drug abuse, boy prostitution, school absenteeism, child beggary and other negative cultural interactions.
6. On the side of positive impact, tourism has resulted in the generation of higher income levels, quality employment opportunities, positive cultural interactions, improvement of economic opportunities in resource

Contd..2/

¹ Tourist Development Act No. 14 of 1968

² Ceylon Tourism Plan, 1967

scarce areas such as Hikkaduwa, Arugambay and Kalkudah, improved built environmental vistas in planned tourist areas increased revenue for cultural restoration work and provided a revival in local arts and crafts.

7. Although tourism has experienced a temporary setback due to the ethnic disturbances of mid 1983 and later development of terrorism, the quality of the tourism product Sri Lanka has to offer, should enable the country to get back into a growth path, upon the solution of these problems
8. Taking the present accommodation and other facilities into account, it is estimated that Sri Lanka would require an arrival level of 600,000 tourists per year with a composition of around 70 per cent from the developed tourist generating countries (e.g. Western Europe, North America, Australia, Japan) in order to sustain the present plant at economically feasible levels. In terms of the environmental carrying capacities of the already developed areas, the maximum arrivals level that could be catered to would also be that same level, given that immediate corrective action is taken to replan areas such as Hikkaduwa, Unawatuna and Negombo to overcome the problems of coastal erosion, sewage and other waste disposal eco-side of coral reefs and mangrove areas and prevalent socio-cultural problems.
9. Since there is already development moratoriums on Hikkaduwa and Negombo and a development zoning scheme³ established for the coastal areas the possibilities for future development of tourism and recreational facilities are envisaged only on the East Coastal and Mahaweli development areas. With these infrastructure facilities Sri Lanka may expand its tourist arrivals level to 800,000 a year while maintaining a reasonable balance in its natural environment.

RECOMMENDED ACTION STRATEGIES

10. The impact of these arrival levels on the socio-cultural environment will have to be given careful consideration. One such consideration would be, to direct attention on receiving 'quality' tourists as against 'mass' tourists by encouraging, special interest, incentive and convention tourism segments, while the other would be to launch effective

Contd..3/

³ Report of the Committee appointed to demarcate areas for tourism development in the coastal belt of Sri Lanka - Colombo, Ceylon Tourist Board - 1982.

public awareness campaigns highlighting the positive and negative impacts of tourism followed by continuous public participation campaigns. These campaigns should be directed towards the tourists as well, highlighting the country's concern in conserving its resources and the quality of its environment.

11. At the implementation level it is proposed that all areas where tourism development has taken place, be declared as 'Tourist Development Areas' under the Tourist Development Act of 1968, to enable regulation of activities related to tourism by the Ceylon Tourist Board. In guiding development activities for the future, all projects should be accompanied by an Environmental Impact Assessment Statement which should be evaluated by an interagency committee consisting of the CEA, UDA, Coast Conservation Department (when applicable), Ministry of Cultural Affairs and a representative of NGO's working on environmental issues. Other organisations such as the Ministry for Mahaweli Development, GCEC and the Local Government Agency of the project location should represent the Committee when applicable.
12. Master Plans prepared for tourism development in future should give adequate consideration to the environmental carrying capacities of tourist development areas and include strategies for ensuring the implementation of the interagency zoning committee recommendations for Coastal area tourist development and for taking corrective action in restoring the environmental quality of areas such as Hikkaduwa⁴, Negombo, Unawatuna, Mt. Lavinia, Arugambay, Beruwala and Bentota.
13. An urgent need exists at present to carry out an inventory of waste water and sewage disposal systems of hotels and other tourist facilities in the country and to establish disposal standards.
14. A similar inventory should also be made of all environmental resources supporting tourism, classified according to tourist development regions.
15. It is recommended that the establishment of the proposed marine sanctuaries at Hikkaduwa, Kalpitiya and Unawatuna be carried out on a priority basis, through a coordinated effort of the National Aquatic Resources Agency,

Contd..4/

⁴ On the lines of the proposed Hikkaduwa Development Plan, prepared by the UDA.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON "INDUSTRY"

(Abstract based on preliminary draft of paper)

SECTOR SIGNIFICANCE :

1. In 1984, the manufacturing industry (including export processing of primary products) contributed 15.4% to GNP .
2. Most industries are located within 20 miles of Colombo with a concurrent high incidence of pollution in this area ;
3. The private sector accounts for about 35% of organised industry dominated by textiles, food processing, leather, rubber, plastics, bricks and tiles ;
4. Most LIAC-approved industries fall into small-to-medium size industries.

PRESENT POLICY/SECTOR OBJECTIVES :

1. Relevant policies from Sri Lanka Industrial Policy "booklet" state that it is the Government's policy to :
 - make maximum use of indigenous raw-materials and other natural resources ;
 - locate industries whenever possible in rural areas;
 - foster research enabling the lower and more efficient use of energy dependent on imported fuels and promote greater utilization of resources within the country.
2. At present there is heavy emphasis on promoting foreign investment in Sri Lanka through the GCEC and FIAC and promotion of local capital investment through LIAC.
3. FIAC and LIAC have questions on application materials regarding potential environmental issues associated with the proposed activity ;
4. Possible future policy options include increasing incentives on employment - intensive and import substitution industries over capital/import intensive ;
5. Government emphasis on private sector industries will be on those where Sri Lanka has advantages (eg. certain Agro-industries) selected manufacturing and light engineering industries, and mineral processing.
6. The GCEC is aware of industrial pollution and has laid down minimum standards for discharges in selected zones.

KEY SECTORAL ISSUES AND CONSTRAINTS

Public Sector Industries :

1. Industry/Pollution Issues include :
 - a. Ceramics - injudicious mining
- breeding places for mosquitos
- atmospheric pollution
- fuelwood demand
 - b. Cement - landscape disruption
 - c. Mining - atmospheric pollution
- landscape disruption
 - d. Chemicals - water/atmospheric pollution
 - e. Oil refinery - water/atmospheric pollution
 - f. Fertilizer production - water pollution/fish kills.
2. Public sector corporations have shown a lack of awareness of need to protect natural environment due to scarcity of trained and experienced managerial technical staff.
3. The biggest source of motor vehicle pollution is from inadequate combustion of diesel fuel caused by poor engine maintenance.
4. There is a need for environmental education in secondary schools through the post-graduate level.
5. The private sector generally views anti-pollution measures as constraints.
6. There is an absence of appreciation from public/private sector industrialists of the need for environmental planning.
7. The public awareness of the dangers of industrial pollution is low.
8. Environmental assessment at present is inadequate.
9. There is an additional need for legal enactments and background standards to compare industrial effluents.
10. Inadequate laboratory monitoring capabilities.
11. Inadequate technical personnel.
12. Absence of funding for pollution control implementation.

Page...3

KEY INTER SECTORAL RAMIFICATIONS

1. Coral extraction/lime production/coastal erosion
2. Mineral resources/extraction/landscape despoilation
3. Human-industrial discharges/water ways/fish kills.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Government recognition of need for industrial environmental pollution control measures ;
2. EIA requirements from approving Authorities ;
3. Pollution studies and implementation of mitigative measures ;
4. Training ;
5. Increased staffing of country's laboratories ;
6. Passage of new environmental amendments ;
7. Curriculum development in environmental conservation/ engineering.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON "ENERGY"

(Uncompleted)

SECTOR SIGNIFICANCE

1. Almost all energy in Sri Lanka comes from 1 of 3 sources: fuelwood, petroleum and hydropower. Petroleum is wholly imported, the other two are indigenous ; firewood is the prime source of energy in Sri Lanka.
2. Half the country's energy is consumed in the domestic sector for cooking and lighting in the majority of households using fuelwood for cooking.
3. Transport and industry is almost entirely dependent on imported oil.
4. Fuelwood consumption estimates range from 5 to 7.5 million tons/annum for the years 1979-81 and is the prime source of energy for 90% of the people.
5. As living standards improve households are expected to increasingly turn to electricity, kerosene and lpg for fuel sources ; wood charcoal is also gaining in popularity.
6. Fuelwood makes a minimum contribution towards industrial energy while it makes no contribution transport. This use pattern is indirectly correlated with price of petroleum.
7. Most fuelwood is collected on a non-commercial basis.

PRESENT POLICY/SECTOR OBJECTIVES

KEY SECTORAL ISSUES AND CONSTRAINTS :

1. Kerosene is the only possible alternative source of energy for lighting in rural areas where electricity is not available.
2. Accurate statistics on household energy use are sketchy.
3. There are no known resources of coal, oil or gas in Sri Lanka.

4. There is little likelihood of exploiting tidal, wind and solar energy as significant alternative energy sources.
5. Consumption of energy will increase due to increasing population and steady improvement in living standards.
6. Shortfalls in firewood will cause a shift to kerosene for domestic cooking and to heavy diesel and furnace oil in the industrial sector. (From Fernando's Paper).
7. The present demand for fuelwood is an estimated 9.5 million tons/annum projected to reach 12.7 m.tons/annum by 2000. An estimated 80% comes from non-forest sources. A shortage in wood resources is expected in the wet zone by 1995, and in throughout the country by 2010.
8. Fuelwood and Ag. residues are used inefficiently.

KEY INTER-SECTORAL RAMIFICATIONS

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

(From Fernando's Paper)

1. Additional fuelwood plantations are recommended to sustain a demand projected for the year 2020 when non-forest wood resources, mainly from plantations, is expected to yield only 80% of total wood demand.
2. Introduce domestic cooking stoves with greater fuel efficiencies.
3. Increase use of "batch type" biogas generators to recycle Ag. residues and existing recycling technologies.
4. Coal-fired electricity generation plants must be added in 1990s.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON "WATER RESOURCES"

M.W.P. Wijesinghe

SECTOR SIGNIFICANCE

Water resources are directly linked to all development/ conservation issues. All river basins have their headwaters in central mountain massif, where perennial rivers are formed from excess of precipitation. Much of central/northern and eastern portion of island is a water deficit zone. Utilization of water resources in major river basins has almost reached optimum levels. Only limited development of ground water at present.

PRESENT POLICY / SECTOR OBJECTIVES

Development of Mahaweli Ganga has dominated water resources development policies for past two decades.

Wells have been drilled to provide irrigation and domestic water supplies.

Water conservation and pollution control measures are currently largely ignored.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. Unwise land use practices have lead to acclerated soil erosion and water-shed deterioration..
2. There is unplanned land use and allocation in the headwaters of river basins, creating a potential for alteration of river flow regimes and quality characteristics.
3. Destruction of river bank (riparian) vegetation and land-use in flood plain produces changes in water quantity, timing and quality.
4. Management of irrigation water is essential to prevent water logging, salinization and contamination of ground water.
5. Impoundment in Tanks may lead to a drying-up of downstream marshes and water quality deterioration (eutrophication) within reservoir.
6. The ability of major government institutions to deal with water-related issues has deteriorated in recent years, largely due to reorganization efforts.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Create awareness of issues / problems among all Ministries concerned, in any way, with water resources.
2. Request appropriate ministries to conduct an evaluation of water resources (data collection, analysis, synthesis).
3. Constitute a Water Resource Council, to oversee/advice on issues related to water resources development/ conservation.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON
AIR, SOIL AND WATER POLLUTION - E. E. JEVARAJ

SECTOR SIGNIFICANCE

At the present time, air, water and soil pollution in Sri Lanka is relatively low, but potential problems exist. These are exemplified by serious pollution problems existing locally in conjunction with a cement factory ; chloro-alkali factory, urea plant (air, pollution) fertilizer complex, tanneries, textile and paper factories and agriculture (soil and water pollution). The chief cause of environmental pollution is human settlement and activity on a scale exceeding the natural recuperation capacity of the environment and / or the introduction of exotic non-biodegradable substances.

PRESENT POLICY / SECTOR OBJECTIVES

The National Environmental Act (1980) provides regulations for monitoring and control of air, land, and water pollution, and noise. The objectives of this sector should be to limit pollution to levels which are not injurious to human or animal health and to prevent irreversible changes in the environment which could result from high levels of pollutants in air, water and soil.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. State-sector industries / public bodies are chief purveyors of pollution.
2. Pollution prevention receives low priority.
3. Pollution control enforcement / permit issuance involves many separate government agencies and legal enactments.
4. There are no legally established environmental standards/criteria
5. There are insufficient base-line data and routine monitoring data collection programs.
6. There is a general lack of awareness cutting across all levels of society and government.
7. There is a lack of trained personnel and funds.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Each industrial site should be required to treat effluents.
 - A. Recycle wastewater and solid wastes ;
 - B. Pre-treatment of effluents to remove major pollutants.

Continued.

2. Environmental standards / criteria should be determined and given the force of law through passage of legislation.
 3. EIA's should include assessment of pollution potential and mitigation.
 4. Industrial zoning is necessary to provide economics of scale, ease of treatment and more effective surveillance / monitoring.
 5. A program of base-line data collection should be initiated. Routine monitoring of all problem areas should be begun.
 6. Research into new uses for industrial / agricultural wastes should be undertaken.
 7. Rural and urban sanitation schemes should be undertaken, involving treatment of sewage, production of biogas.
 8. Public awareness should be increased through education.
 9. All laws relevant to pollution control should be examined and modified / amended where necessary.
-

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON

FORESTRY"

M Pushparajah

SECTOR SIGNIFICANCE

1. Sources of fuel wood and industrial wood.

Forests :

Protect (soil, air humidity, provide shelter);

Regulate (absorb/release atmospheric gases, water, energy) ;

Produce (biomass, agricultural products, chemicals).

PRESENT POLICY/SECTOR OBJECTIVES

In dry zone forests, no normal management practiced.

In wet zone lowland forests, all trees of commercial species over certain diameter limit are felled at intervals 25-35 years.

Forests are managed under the Ministries of Lands and Land Development, Industries and Scientific Affairs and State.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. Inadequate number of trained man power
2. Lack of adequate data
3. Inadequate funds
4. Heavy encroachments and illegal felling
5. Forest fires
6. Lack of well-defined use policy.

INTER SECTORAL RAMIFICATIONS

- 1, Wildlife, Agriculture, Wood-based Industry, Water Shed Management, Energy.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Increase staff and make training compulsory
2. Creation of special forest protection unit.
3. Increase funding.
4. Increase research (Forest Research Institute)
5. Institute extension services.
6. Intensify forest management activities.
7. Accelerate reforestation.
8. Better utilization of forest products.
9. Centralize some activities.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON
"ANIMAL HUSBANDRY"

A.S.B. Rajaguru

SECTOR SIGNIFICANCE :

THE LEVEL OF PRODUCTION PER INDIVIDUAL ANIMAL AND LEVEL OF CONSUMPTION OF ANIMAL PRODUCTS PER CAPITA IS VERY LOW IN SRI LANKA. ALSO THE COUNTRY IMPORTS ABOUT 50% OF THE MILK REQUIREMENT UP TO THIS DAY. THE IMPORT EXPENDITURE FOR MILK AND MEAT IS RS.481.5 & 30.75 MILLION RESPECTIVELY FOR THE YEAR 1982.

PRESENT POLICY/SECTOR OBJECTIVES

Policy characterized by :

1. Lack of coordination
2. No original national feed policy
3. Empire building
4. Separation of crop and livestock policy.

KEY SECTORAL ISSUES AND CONSTRAINTS :

1. To increase milk and draft power.
2. To introduce rotational cross-breeding programme.
3. Introduction of Indian/European breeds.

Constraints :

See policy ?

KEY INTER SECTORAL RAMIFICATIONS :

1. Fodder production/soil conservation
2. Livestock/agriculture
3. Livestock/forestry
4. Livestock/biogas
5. Wildlife/livtstock potentially antagonistic
6. Livestock/urban development antagonistic
7. Overgrazing.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION:

1. Establish a Livestock Development Corporation to coordinate efforts.
2. Incorporate livestock needs into land use planning.
3. Encourage private sector participation.
4. Develop a national feed policy:

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ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON

"NATURAL FORESTS"

C.V.S. Gunatilleke & I.A.U.N. Gunatilleke

SECTOR SIGNIFICANCE

1. Present day natural vegetation in low-lying southwestern portion of island has evolved from "Deccan" flora. May be last remaining forest on earth of this type. 24% of flowering plant species (of 3000 total) are endemic to Sri Lanka. Forests are therefore of international biological importance.

PRESENT POLICY/SECTOR OBJECTIVES

1. Natural forests administered by Forest Department (90%) and Wildlife Conservation Department (10%). Present National Forest Policy includes :

- a. maintain, conserve and create forests ;
- b. ensure and increase supplies of smallwood and fuelwood;
- c. maintain in so far as possible sustained yields;
- d. maximize economic output, consistent with foregoing;
- e. involve local communities through social forestry.

Wildlife Conservation Department administers/enforces Fauna and Flora Protection Act by :

- a. controlling and administering National Reserves and Sanctuaries ;
- b. controlling killing/capturing of wild animals ;
- c. conduct research and game management ;
- d. promoting public interest ;
- e. regulating trade ;
- f. controlling exports imports of indigenous/exotic species;
- g. controlling dangerous animals.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. Lack of understanding of biophysical importance of forest.
2. Lack of long term planning.
3. Lack of staff.
4. Ill-defined forest boundaries.

5. Political interference.
6. Lack of inter-departmental coordination.
7. Ineffective enforcement of regulations.
8. Traditional exploitation by villages.
9. Over use of forests for research/recreation.

BEST
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INTER SECTORAL RAMIFICATIONS

1. Watershed stabilization (runoff volume and time)
2. Prevent soil erosion, nutrient loss, mass movements on slopes.
3. Maintenance of near-surface atmospheric characteristics.
4. Buffers for disease outbreaks.
5. Habitats for pollinating/dispersing agents.
6. As natural agroforestry models.
7. Genetic resources reservoir.
8. Tourism.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Prohibit further disturbance to natural forests.
2. Demarcate representative samples of each forest type.
3. Provide alternative sources of income for villagers now dependent upon forest exploitation.
4. Initiate planting of plywood species.
5. Intensify training.
6. Strengthen education, training, research.
7. Utilize forest resource non-destructively.
8. Ex-situ conservation of forest genetic resources.
9. Develop catalogue of species and location.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON ENVIRONMENTAL EDUCATION

SECTOR SIGNIFICANCE

1. Education is the primary means by which individuals can reach better understanding of their environmental context.

**BEST
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PRESENT POLICY / SECTOR OBJECTIVES

1. In Sri Lanka EE is present in one form or another from primary school onwards. In primary school it is taught through experience with science, culture and society, grades 6-8, through social studies 10-12, through biology courses.
2. Recognizing the role of non-formal education 7 field centers have been set up for environmental studies.
3. At the university EE is characterized by science specific courses with lesser emphasis on general education with advanced courses.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. EE at the primary / secondary level is constrained in SL by :
 - a. 'Spirit' of competitiveness characterizing the present approach ;
 - b. Emphasis on material which is the subject of national examination ;
 - c. Absence of sustainable reading materials ;
 - d. Absence of proper teaching manuals on the environment ;
 - e. Lack of motivation / quality in many teachers addressing EE ;
 - f. Present non-continuous teaching approach ;
 - g. Lack of emphasis in EE on roles of time, history and cultural aspects of conservation and environmental management ;
 - h. Absence of healthy teacher - student interaction ;
 - i. Poor record of SL field centers due to poor leadership ;
 - j. Ineffectiveness of school societies / clubs in promoting EE ;
 - k. Reduced exposure to EE in critical years
2. At university level no attempt exists to present an integrative approach to EE in addition there is :
 - a. An absence of dialogue between academics with interests in EE .
 - b. Lack of commitment of staff / administration to bring changes ;
 - c. Absence of university / government / private sector research programmes for EE .
 - d. Institutional regulations preventing integrative courses .
 - e. Institutional policies e.g. : the entry of long duration courses .

- f. Absence of facilities for students to be involved in community/ social work ;
- g. Absence of university field work.

3. Mass media constraints are :

- a. Non-information orientation of radio/newspapers ;
- b. Need to produce TV material SL specific in EE ;
- c. Absence of Sinhala / Tamil magazines/books in EE ;
- d. Absence of appropriate materials in into centers/libraries ;
- e. NGOs need for better facilities.

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PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Formul Education

- a. Implement the proposed reforms in "Education Proposed for Reform"
- b. Change the present teaching approach to ones emphasising of
 - teaching from the environment (field studies/trips) for ages 5-10.
 - teaching about the environment (studies based on specific topics) for ages 11-14 ; and teaching for the environment (continuation of the proceeding) for grades 10-12.
- c. Emphasize realistic approaches by developing inter disciplinary approaches.
- d. Take greater care in teacher selection.
- e. Allocate adequate time to conduct field classes ;
- f. Provide appropriate guide material ;
- g. Setting up of effective field center ;
- h. Introduction of project oriented evaluations for students capabilities ;
- i. Recognition for quality EE systems personnel

2. Tertiary :

- a. Increase dialogue among academics leading to better publications.

3. Nonformal Education :

- a. Creation of Environmental Centers ;
- b. Increase quality of locally produced radio. T. programs ;
- c. Conduct environmental workshop ;
- d. Incorporate environmental NGOs into rural NGC activities

ABSTRACT SUMMARY ON NCS PAPER ON
'PLANTATION AGRICULTURE'

BEST
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SECTOR SIGNIFICANCE

1. The plantation sector dominated by tea, rubber, and coconut includes spice trees, sugar cane, cashew, palmyrah and other minor crops.
2. Of the total land area paddy, coconut, rubber and tea occupy 15, 1, and 4 per cent respectively.
3. Tea, rubber, and coconut alone accounted for 7.5% of GDP in 1982.
4. The sector provides employment to 7% of the S.L. workforce (direct) and total direct/indirect employment is estimated to be 1.4 million people.
5. S.L. will need about 86,000 ha of land to become self-sufficient in sugar production.
6. Most plantations are grown as monocultures.

PRESENT POLICY / SECTOR OBJECTIVES

1. In 1972 all land holdings over 50 acres were vested in the Land Reform Commission followed by all company-owned estates in 1975. Today this includes 63% of the total tea area and 32% of all rubber lands.
2. Since 1960 the use of chlorinated hydrocarbons has been completely banned and emphasis placed on cultural and integrative methods for pest control.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. Due to land reform laws and "politically charged" statements investment in the plantation sector has been suboptimal resulting in declining productivity.
2. Plantation management's priority is the rehabilitation of holdings.
3. Soil conservation measures are carried out by plantation and small holders haphazardly.
4. Overgrazing on coconut plantations has caused erosion.
5. Absence of wind protection has been a source of erosion on tea plantations.
6. Siting criteria are required for plantation housing projects.
7. There is an absence of planning in horticulture subsector.
 - absence of conservation-related research;
 - absence of enforcement of existing legislation.

Continued

INTERSECTORAL RAMIFICATIONS

BEST
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1. Monocultures / pests / pesticides.
2. Plantations / fuelwood demand / deforestation.
3. Tea exports / plywood production / deforestation.
4. Pruning / soil erosion / sedimentation / dam construction.
5. Boron treated rubber / utilization for furniture production / reduced supply of fuelwood / deforestation.
6. Utilization of tree clones / decrease of germplasm.
7. Sugar production / land availability / water demand.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Establish plantation research institutes focused on conservation aspects.
2. Reduce trends in land fragmentation through ensuring security of tenure.
3. Provide economic incentives to obtain private sector adherence to conservation measures.
4. Increase institutional coordination.
5. Environmental education focused particularly on small holdings.
6. Develop mini-hydro schemes.
7. Improve social infrastructure on plantations.
8. Provide land to make plantations self-sufficient in fuelwood.
9. Strengthen legislation to protect forests.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON: "CHENA"

(Abstract based on preliminary draft of paper)

SECTOR SIGNIFICANCE

1. 80% of Sri Lanka grains, pulses, and vegetables come from chena land.
2. Per capita land availability is expected to reach less than $\frac{1}{2}$ ha. by 2000.
3. Shifting cultivation is suggested as the most energy efficient production system in the country but not the most productive.
4. An estimated 1 million ha. of land is presently in production under this system.
5. The average holding size of chena is 1 ha.
6. Generally the well-drained lands of the Dry Zone are used for chena while paddy is characteristic of poorly-drained lands.
7. Chena is a sound land use system under conditions of low population density where long fallow periods are possible.
8. In the dry zone there is 1 million ha. of good arable land.
9. There exist 3 types of land ownership in governing chena production in Sri Lanka :
 - government annually issued permits (60%) ;
 - direct ownership (20%)
 - illegal encroachment. (20%)

PRESENT POLICY/ SECTOR OBJECTIVES

1. Annual permits are being converted to land development ordinance permits and direct ownership (Swarnaboomi Program)

KEY SECTORAL ISSUES AND CONSTRAINTS

1. Chena practice leads to soil fertility and weed infestation.
2. Lack of awareness in farmers of better alternative production systems or improved techniques.
3. Farmers do not have the capital to develop alternative systems.
4. Crop damage, fertility declines, weed infestation, and land availability are the ~~the~~ most serious problems perceived by farmers.
5. There is little information available which addresses correlations between fertility decline rates and soil characteristics in chena land.
6. Irrigation for dry zone arable lands will not be expanded in the foreseeable future.
7. Alternative land production systems should be characterised by low monetary investment, mixed planting, risk minimization and timely-crop establishment.

Continued.

INTER SECTORAL RAMIFICATIONS

1. Increasing population/shortened fallow periods/ soil fertility declines.
2. Increase family size/ Increase labour supply/ Increase area under chena.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Intensify agricultural research on appropriate application of agricultural machinery, ~~and~~ permanent rainfed farming, and alternatives including improved chena, perennial crop substitution, irrigated farming integration schemes combining rainfed agriculture with animal husbandry and/or irrigated agriculture.
 2. Plan formulation to replace chena with permanent rainfed farms integrated with animal husbandry.
 3. Land use planning must be considered at national, regional and local levels.
 4. Soil and water conservation measures are critical for land improvement and should be taken on at the national level.
 5. Following stabilization, old chena lands should be reforested.
 6. Institutions should be organised to support rainfed farming.
 7. Implement programs demonstrating the advantages of using chemical fertilizers.
 8. Initiate a land tenure system.
-

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON
COASTAL AND MARINE RESOURCE SYSTEMS

SECTOR SIGNIFICANCE

1. Sri Lanka's 1,700 km. of coastline is characterized by a diversity of landforms and resource systems including lagoons, estuaries, beaches, mangroves and coastal reefs.
2. Brackish water areas consist of 80 thousand ha. of estuaries and deep lagoons and 40 thousand ha. of shallow lagoons, tidal flats, and mangroves.
3. Mangroves are used : in the construction of huts, fences, stakes in fish traps and kraals ; tanning ; fruit production ; and land/soil reclamation/ preservation.
4. Sri Lanka coral reefs account for a large component of the country's fish supply and serves as a tourist attraction.
5. Of 132 species of known Sri Lanka brackishwater fish 65% are 'migrants' from the sea. In addition to fish other commercially important species include prawns, crustacea and molluscs.
6. Sri Lankan beaches are used as nesting sites by marine turtles.
7. Beaches are valued as sources of construction aggregate, heavy minerals, tourism value, storm buffer, recreational and aesthetic worth, and as a means of access for fishermen support.
8. Tourism is heavily dependent on coastal resources with 70% of all hotel rooms sited along the coast.

PRESENT POLICY/ SECTOR OBJECTIVES

1. There is no legislation restricting the export of tropical fish.
2. Through the CCD there is the power to regulate and control all development activity in the coastal zone through the permit process and the requirement of an EIA for projects where judged ~~and~~ so required.
3. CEA is empowered to recommend to the MOF a system of rational exploitation for Sri Lanka fisheries and encourage citizens to participate in clean water campaigns.
4. NARA can formulate national policies management and development of the country's natural aquatic resources, institute and conduct offshore surveys, and conduct research.

Continued.

5. Oil pollution mitigation measures exist in Sri Lanka.
6. Fisheries ordinances exist which prevent use of toxic substances.
7. Legislation is presently in draft which will empower the ministry to declare marine reserves.
8. A CZM plan is presently being prepared which will be completed by October 1986.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. Comparative surveys indicate that the mangrove area has greatly declined through 'hard' information is not available; primary sources of degradation are attributable to fuelwood exploitation, urban development, and fish pond conversion.
2. Human derived degradation of coral reefs is primarily attributed to coral mining for lime production which is exacerbating coastal erosion.
3. Estuaries/ lagoon degradation results from dredging, reclamation, landfill, upstream sources of sedimentation, waste dumping, industrial effluents, oil pollution, and human interventions affecting lagoon circulation.
4. Beach pollution partly attributable to tourism is an issue.
5. Overfishing and collection of seashells is an issue.
6. Bans on tropical fish and coral collections have met with ~~some~~ objections due to socio-economic factors.
7. At present sanctuaries declared under the Fauna and Flora protection ordinance covers only land excluding marine waters.
8. There is a general lack of qualitative and quantitative information concerning S.L. coastal resource systems.
9. Cases exist where highly productive coastal ecosystems fall outside of the CCD's geographical management mandate.

INTERSECTORAL RAMIFICATIONS

1. Significant economic development / coastal resource interlinkages include :
 - tourism / coral interactions
 - human settlements / mangrove interactions
 - aquaculture / mangrove interactions
 - upstream / downstream linkages
2. International 'linkages' :
 - pollution prevention conventions
 - protection of world cultural and natural heritage convention
 - int. trade in endangered species of wild flora and fauna
 - conservation of European wildlife and natural habitats.

page 3.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Need for research to fill data gaps.
 2. Need for the development of planning / management guidelines.
 3. Need for coastal policy identifying procedures to set priorities among coastal uses/ activities for coordination of government interventions.
 4. Identification of critical areas and management plans for future development.
 5. Increased inforcement of existing legislation regulating human activities affecting coastal areas.
 6. Development of a strategy which addresses upland activities affecting coastal areas.
 7. Develop a water quality monitoring program in key estuaries / lagoons.
-

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON :

"GENETIC RESOURCES"

W.E. Ratnayaka, et.al.

**BEST
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SECTOR SIGNIFICANCE :

1. Once lost, as a result of species extinction, the genetic information contained within that species is lost forever.
2. For some crop species e.g. rice, Sri Lanka can be considered a major center of ecogenetic diversity.
3. Due to Sri Lanka climatic/topo/edapnic factors species diversity is high.
4. Forests are a significant repository of genetic resources in Sri Lanka.

PRESENT POLICY/SECTOR OBJECTIVES :

1. Preserve genetic diversity by species preservation.

KEY SECTORAL ISSUES AND CONSTRAINTS :

1. Environmental mutagens
2. Genetic engineering .
3. Loss of genetic diversity due to forest clearing .
4. Educational and legal aspects.
5. Monoculture.
7. Lack of public/academic awareness .
8. Absence of training in basic genetics .
9. Absence of basic research in the field of mutagenicity
10. Absence of a cold storage facility for green plasm.
11. Forestry sector is charged with conflicting responsibilities i.e. forest production/conservation.

INTER SECTORAL RAMIFICATIONS :

- mutagenic/tetratogenic effects of pesticides and other agro chemicals.
- population pressure/increase production/decrease of crop genetic diversity
- population pressure/forest clearing/decline in genetic diversity.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Create a national center for human genetic studies.
2. Laboratory established to test and monitor genetically toxic substances.
3. Develop tissue culture laboratories established
4. Arboreta established and systematic collection of indigenous flora from forested lands.
5. Natural forest reserves.
6. Monitor aquatic environment.
7. Education/revision of educational curriculum/public awareness campaigns.
8. Legislation to provide effective protection for insitu genetic conservation.
9. Increase research activities in genetic conservation.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON

"MINERAL RESOURCES"

D.E. de Jayawardena

SECTOR SIGNIFICANCE

Primarily Economic

1. The major mineral based industries in Sri Lanka are ceramics and cement though quarrying for aggregate, gemming, coral mining and marble manufacture are widespread throughout the island.
- 2/ The sector is projected to contribute an estimated 100 million(\$US) to the GDP by 1987.

PRESENT POLICY/SECTOR OBJECTIVES :

1. Not discussed explicitly.
2. Administered by Geological Survey Dept., under provisions of Mines and Minerals No. 4 (1973).
3. Most mineral sector industries are controlled by government and state sector corporations.

KEY SECTORAL ISSUES AND CONSTRAINTS :

1. Lack of proper legislative control to impose environmental controls.
2. Lack of institutional facilities.
3. Lack of proper data bank.
4. Rapid expansion of the sector.

INTER SECTORAL RAMIFICATIONS :

1. Diagram in Text (p.32)
2. Large scale mining operations and gempits/stream silting/mosquito breeding areas.
3. Coral mining/coastal erosion
4. Salterns/critical habitat conversion
5. Sand mining/coastal erosion

Page...2

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTIONS :

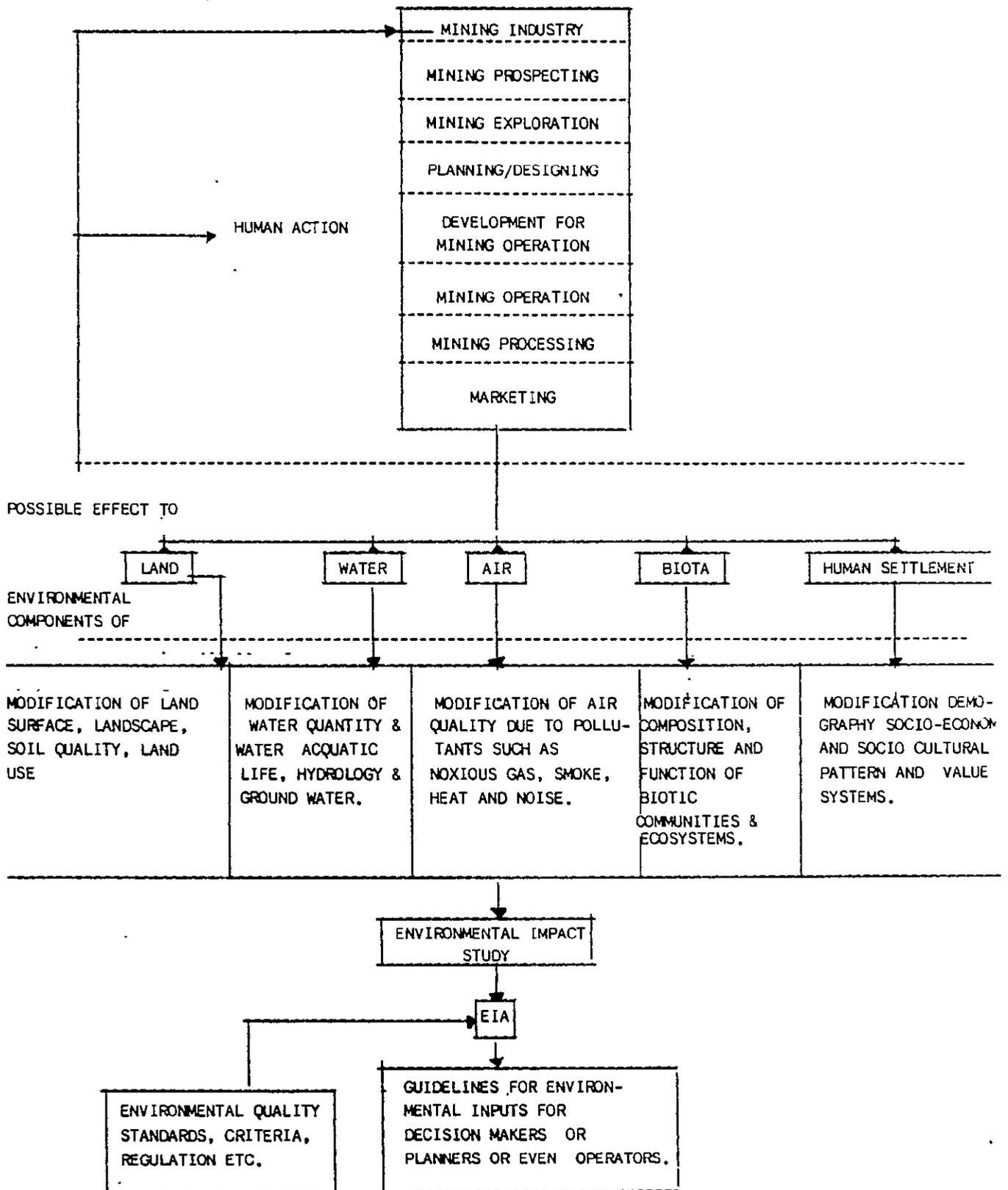
1. EIA for mining activities
2. Coordination through CEA
3. Control of state sector activities
4. Decentralization of control or authorisation mining permits
5. Environmental research in relation to mining activities.

6. Develop new areas for settlements from a regional planning perspective.
7. Develop a viable ~~of~~ ^{model} settlement for rain-fed lands.

WET ZONE

1. Allocate land rationaly amongst competing uses.
 2. Plan the use of land in the interests of all the people depending on the resource and with long-term benefits in mind rather than in the interests of particular individuals or groups.
-

FIG.5 - INTERSECTORAL LINKAGES OF THE MINING INDUSTRY



(Source- Environmental Management in the Mining Sector in Indonesia by R.J. Damopolu and Rulfaiki Djajadiningrat- Govt. of Indonesia-Proceedings of the Working Group Meeting on Environmental Management in Mineral Resource Development.

(Mineral Resource Development Series No.49 ESCAP United Nations, Newyork,1982.)

HUMAN SETTLEMENTS

BEST
AVAILABLE

SECTOR SIGNIFICANCE

Sri Lanka has experienced a rapid increase in population within the past few decades. The island's population which stood at 6.6 million in 1946 increased to 12.7 million in 1971 and 14.8 million in 1981 : an increase of approximately 125% over a thirty five year period. A part of this increase has been accommodated in existing settlements and a part in new settlements.

SECTOR OBJECTIVES

To develop settlements with a sound economic base and a healthy living environment.

PRESENT POLICY

1. Settle people on 'family farms' in the Dry Zone.
2. Offer larger farm units in the Dry Zone to enterprising commercial agriculturists.
3. Provide land for village expansion in the settled areas.

INTER-SECTORAL LINKAGES

1. Depletion on forests and wildlife.
2. Emerging health problems
3. Environmental degradation.
4. Crop diversification and regional specialization.
5. Non-farm income earning opportunities.

SECTORAL ISSUES

1. DRY ZONE

1. Health problems, environmental problems and fuelwood scarcities.
2. Income disparities and lack of off-farm income earning opportunities.
3. Shifting cultivation and the utilization of rain-fed lands for settlement.
4. Encroachments on state land.
5. Economic and social integration of old villages with new settlements.

WET ZONE

1. Pressures on the land leading to its misuse and degradation.
2. Loss of agricultural land around urban areas.
3. Suburban over-spill and urban sprawl.

PROPOSALS

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

DRY ZONE

1. Ensure that all allotments in new settlement schemes have similar income earning potential to minimise income disparities. *; ensure
market
infrastructure*
2. Provide settlers with their requirements of fuelwood and water for domestic uses.
3. Take steps to eliminate environmental problems such as salinity.
4. Provide off-farm employment opportunities-to those moving away from agriculture. and to minimize encroachments.
5. Integrate agricultural development with urban development.

ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON
"POPULATION"
V.K. Nanayakkara

SECTOR CHARACTERISTICS

1. Fluctuating population growth rate related to varying influence (with time) of migration and natural increase.
From 1953, out-migration has exceeded in-migration.
2. Population increase since World War II largely a result of decline in mortality.
3. From 1960, birth rate has declined on a steady downward trend.
4. Best estimate of ultimate stationary population is 20 - 30 million.

PRESENT POLICY / SECTOR OBJECTIVES

1. At least seven ministries involved, under general administration of Ministry of Plan Implementation. This ministry is assisted by a Population Division which is responsible for: overall policy formulation, evaluation, and analysis of family planning programmes, coordination, monitoring, identification of priority areas, promotion of research, organization and direction of district population committees (25 in numbers) (chart in paper) NGO's supplement many family planning activities. Current policy based upon "voluntarism" and lack of coercion. Incentive payments have been introduced.

KEY SECTORAL ISSUES AND CONSTRAINTS

Implications of population growth include:

1. Decrease in size of individual land holdings.
2. Opening of marginal lands to cultivation.
3. Increase in squatters on state forest lands.
4. Population growth outstripping tree growth.
5. Increasing demands for services (water supply), sewage disposal, etc.
6. Increases environmental resource exploitation and over use.

KEY INTER SECTORAL RAMIFICATIONS

1. A negative correlation between education and fertility.

Continued.

page 2.

2. Improved health care increases survival rate.
3. Fertility reduction not linked to increase in per capita income

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Expand educational / employment opportunities for women.
 2. Reduce infant mortality to reduce the need for a large number of births per family.
 3. Strengthen incentives which relate to choice of family size.
 4. Training programs for non-physicians to enable them to perform family planning activities.
 5. Avoid geographical overlaps of NGO family activities.
 6. Co-ordinate communication.
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ABSTRACT SUMMARY ON NCS SECTORAL PAPER ON: "DEVELOPMENT ISSUES"

BEST
AVAILABLE

SECTOR SIGNIFICANCE

1. Judged by per capita real income Sri Lanka ranks among the least developed countries but in terms of its physical quality of life index it is close to most developed countries.
2. The economy is agriculturally dominated (of the country's 6.5 million hectares, approximately 1/3 is cultivation within the primary sector contributing 30% to the real GNP.)
3. Of the country's total population 78% live in rural areas.
4. Rural employment accounts for more than 3/4 of total employment of which 55% is provided by the primary sector.
5. Of the country's total cultivated area, plantation agriculture occupies approximately 50% (dominated by tea, rubber and coconut).
6. Tea, rubber and coconut account for approximately 4/5 of total agricultural exports and 1/2 of total export earnings.
7. The manufacturing sector contributes 14% to the GNP. The public subsector representing 20% of the sector composition is based on exploitation of domestic raw materials.
8. Mining contributes 2.5% to the GNP.

PRESENT POLICY / SECTOR OBJECTIVES

1. From 1977 to the present the "new economic deal" set into place economic policies to promote the private sector with the following development objectives:
 - self sufficiency in food;
 - housing for all;
 - promoting the industrial sector;
 - full employment
2. The government is promoting increased plantation productivity through intensification strategies.
3. It is hoped that through agricultural extension (Mahaweli) and intensification schemes in paddy, production will reduce the need for chena cultivation.

KEY SECTORAL ISSUES AND CONSTRAINTS

1. There exists limited area suitable for physical expansion in the plantation sector.
2. Chena is estimated to account for more felled trees than newly developed permanent agricultural settlements.
3. Most dry zone primary forest has been replaced by secondary vegetation while wet zone rain forest occupies less than 20,000 acres (attributed to logging and fuelwood harvesting).
4. Fuelwood demand has increased due to population growth and resettlement schemes in the dry zone.
5. Rubber wood as a source of fuelwood has decreased due to declining production.

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page 2.

6. Traditionally, environmental planning has not been an integrative component of development planning.
7. Concentration of industries in the FIZs is resulting in concentrating sources of pollution.
8. There exists a lack of coordination among different institutions in planning.
9. The greatest threats to the Sri Lanka environment comes from encroachment, poaching, illicit timber felling, and coral ~~mining~~ mining.

INTER-SECTORAL RAMIFICATIONS

1. Population growth rates/ quality of life declines.
2. Increases in industrial development/ increase in air/water pollution.
3. Industrial development/ natural resources degradation (plywood industry).
4. Dry zone resettlement schemes/ adverse environmental impacts.
5. Inland fish production/ pollution conflicts.
6. Tourism promotion and increases in exotic species/ production trade.

PROPOSED RECOMMENDATIONS TO ISSUE RESOLUTION

1. Tighten existing legislation and increase enforcement capabilities related to forest felling, coral mining and exotic species/ product trade.
2. Increase public awareness for conservation.