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HIGHLIGHTS OF THE WORK OF STAP DURING GEF 1 (1995-1998)

(Prepared by The Scientific and Technical Advisory Panel [STAP])

PREFACE

It is a great pleasure to present to you this report about the activities and the main findings of STAP during GEF 1 (1995-1998).

Providing strategic advice to GEF and reviewing the quality of its work has been a challenging and rewarding experience to our eleven member committee.

With this report we reflect our accountability to GEF. Our work has been carried out in response to requests from the Council, the GEF Secretariat and the Implementing Agencies, World Bank, UNEP and UNDP.

We are happy that many of our findings have already been absorbed by the Implementing Agencies. Still there is much to be done to keep the GEF abreast of the developments on Science and Technology.

We would like to acknowledge the support of the 400 Experts of the STAP Roster and the 300 experts/workshop participants that helped us to prepare the strategic advice. The GEF Secretariat and the Implementing Agencies are acknowledged for their active support and guidance. Last but not least, the STAP Secretariat provided by UNEP and headed by Dr. Mark Griffith, is greatly acknowledged for the continuous assistance and support.

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INTRODUCTION

- 1. The members of the Scientific and Technical Advisory Panel (STAP) to the Global Environment Facility (GEF) were appointed in February 1995. The Panel held its first meeting in April 1995 and operated within the guidelines as set out in its Terms of Reference¹ approved by the GEF Council in October 1995; namely:
 - (a) strategic advice as a means to advance a better understanding of the issues of the global environment and how to address them;
 - (b) Roster of Experts, development and maintenance;
 - (c) selective review of projects;
 - (d) cooperation and coordination with the Scientific and Technical bodies of the Conventions; and
 - (e) providing a forum for integrating expertise on science and technology as well as providing an important conduit between the GEF and the wider scientific and technical community.
- 2. The guidance for STAP work was provided from a number of sources, including the GEF Council, the GEF Secretariat and the Implementing Agencies as well as STAP Business Plans which were approved annually as part of the GEF Corporate Budget. In addition, to ensure that STAP strategic advice closely matched the needs, STAP convened strategic sessions with the GEF Secretariat and the Implementing Agencies to regularly discuss the "demand" for the short-, medium-, and long-term.
- During GEF 1 (1995 1998) STAP provided strategic advice on:
 - (a) Biodiversity;
 - (b) Climate Change;
 - (c) International Waters; and
 - (d) Land Degradation as it relates to these focal areas.

GEF Terms of Reference of the Scientific and Technical Advisory Panel (STAP), Mandate, Composition and Role, GEF/C.6/Inf.7, October 6, 1995.

Programmes. STAP also provided the scientific and technical basis for new Operational Programmes.

- 8. For example, STAP's review of the scientific and technological options in the transport sector are right in time for the preparation of the Transport Energy Operational Programme. Likewise, its advice on clean coal came at an important moment, just as the operational implications of fossil fuel projects on the objectives of the Operational Programmes were under review.
- 9. STAP's technical energy-related work has had a significant impact on GEF operations both at the policy and operational levels. For example, the workshops on renewable energy, by focusing on the strategically important concepts that underlie specific operational programmes (concepts such as learning curves), pushed the policy work forward as the portfolios are reviewed against the programmatic objectives set. Similarly, STAP's workshop on land degradation provided policy guidance to the GEF on this issue. Finally, STAP's work on Sustainable Use of Biodiversity has laid the basis for a more effective approach of GEF in this field.

BIODIVERSITY

10. The focus of STAP's efforts in the biodiversity focal area has been centered around the transition from conserving biodiversity through protection measures towards development of sustainable use projects. Moreover, STAP developed an overview paper on Targeted Research to support the focal area.

Sustainable Use of Biodiversity

- 11. In accordance with the guidance provided to STAP a report entitled "Implementing of the Biodiversity Convention: The Ecosystem Approach as a Strategy to Achieve Sustainability in the Use of Biodiversity" was prepared by STAP in collaboration with the scientific and technical body of the Biological Convention and made available to the GEF Council in 1996. This report triggered additional activities by STAP.
- 12. As a response to the needs identified by GEF, Implementing Agencies and Secretariat, STAP convened a workshop with international experts on Sustainable Use of Biodiversity. The aim of the workshop held in Malaysia from November 24-26,1997 was to clarify the concept and to provide strategic and operational advise to the GEF. Scientific papers on the economic, ecological and social aspects of sustainable use and case study reports provided the input for the workshop. The results of the discussions made clear that a major shift in the way conservation has been defined and practiced would be needed in order to include successfully the sustainable use component.

- encouragement with the system of incentives and disincentives that combine to enhance conservation and sustainable use.
- (iii) Economics applied to compare alternative use options can establish what incentives it takes (e.g. in \$/ha.) to induce the land holders to sustainable use practices; assuming that the different preferences and endowments of different actors are realistically reflected.
- (iv) Economics has developed a menu of ways to estimate the benefits of sustainable resource uses and conservation. Benefit categories and appropriate estimation methods are available so that the total economic value of an area can be estimated for alternative management regimes.
- (d) Global benefits through replication should be the slogan of sustainable use projects.

Criteria for sustainable use projects should not be limited to the global significance of components of biodiversity. Any incremental cost and global benefit estimates should incorporate the notion of replicability and the related (potential) gains. The major challenge of sustainable use projects is to develop new ways of combining use and conservation. Often the existing incentive structure at local, national or international level does promote unsustainable use. Through experimentation and innovation new schemes can be identified that will help to remove barriers in knowledge and institutions.

- (e) Concepts identified for sustainable use projects, examples:
 - (i) In the case of arid- and semi-arid ecosystems a number of specific activities were suggested for protected areas and buffer zones; rangelands, wild foods and cropping land husbandry:
 - promotion of multi land-use/multi-species production systems;
 - enhancing/protecting biodiversity by application of ad hoc grazing methodologies described in the literature; and
 - development of integrated management systems aiming at diversifying and enhancing the productivity in a sustainable regime.

- review and development of appropriate policy frameworks to facilitate sustainable use;
- (v) identification and adoption of positive incentives/cross transfers;
- (vi) study impact of alien species;
- (vii) identification of water resource status/constraints;
- (viii) inclusion of biodiversity considerations in Environmental Impact Assessment (EIA);
- (ix) analyze potential similarities in terrestrial "green revolution" that lead to diversity loss and to present fisheries techniques and the potentiality of alternative strategies and techniques;
- (x) analysis of biosafety aspects of mari-culture;
- (xi) economic evaluation of the functions of natural systems: for example the role of coral reefs in coastal protection and the contribution of coral reefs, see grass beds and mangroves to fisheries production; and
- (xii) the relations between local indigenous knowledge and scientific knowledge as related to specific cases.
- (g) Time is crucial. It takes at least 5 to 10 years to implement and gain sufficient experience with a sustainable use project.

A sustainable use project usually involves the development of new practices in the use of biological resources and new ways of generating livelihoods. Institution building and the generation of trust through experience are crucial elements for sustainability. From case studies it is clear that the nature and the timing of the financial support is more crucial than the volume.

CLIMATE CHANGE

13. All of the tasks identified for STAP to undertake in the focal area of climate change during the period under consideration were successfully completed and the outputs made available to the GEF Council. As a means of ensuring the widest possible input on the issues emerging in this focal area, STAP has adopted the approach of

development, potential constraints on RETs development, and the institutional issues relating to the exploitation of potential markets; and

- (iii) Support for training aimed at strengthening the indigenous technological capacity relating to renewables.
- (b) Assistance to developing countries in RET policy development by monitoring and evaluating the strengths and weaknesses of various programmes around the world aimed at promoting RETs and widely disseminating this information by supporting RET policy analytic capacity-building in developing countries, and by encouraging dialogue in developing countries between policy leaders and representatives of the industrial sectors of the developing and industrialized countries interested in marketing RETs in the developing world.
- (c) Assist with the establishment of regional training institutes relating to renewable technologies with the view of: (i) helping developing countries acquire a strong indigenous capacity for assessing the prospects for RETs, their potential societal impacts, and the institutional issues relating to their dissemination, and (ii) promoting a base level of indigenous technological capability that would enhance the likelihood that the technology transfer process carried out in international industrial collaborations would be effective and efficient.

Options for a GEF Programme on Transport

- 16. In an effort to draw on the widest possible expertise in transport sectors as a means of providing strategic advice on the scientific and technological issues and options in the transport sector, STAP organized a specialized workshop and prepared a report on "Options for Mitigating Greenhouse Gas Emissions in the Transport Sector" in March 1997.
- 17. The major themes that emerged from the workshop were the following:
 - (a) There was consensus on general agreement of the need for the GEF to establish an Operational Programme focusing on the Transport Sector to address GHG emissions from this sector with the initial emphasis placed on the urban transport sub-sector.
 - (b) Three priority initiatives were identified which could be the focus of GEF's work in the Transport Sector; namely:

Reducing GHG Emissions in Coal Systems

- 18. In order to assist STAP in providing advice on "advanced clean coal" technologies and what the GEF can do to stimulate the introduction of such technologies, STAP convened a workshop on "Prospects for Reducing GHG Emissions in Coal Systems". The outputs of the workshop formed the basis of STAP's advice to the GEF in the report "Prospects for Reducing GHG Emissions in Coal Systems".
- 19. The STAP found because of the large and rapidly growing demand for coal, particularly in Asia, that the GEF should consider pursuing activities that could steer coal onto a more climate-friendly path, if this could be done in ways that do not detract from GEF activities aimed at helping launch various renewable energy technologies in the global energy market. The STAP also recommended that it may well be feasible and desirable to launch important new activities relating to coal in the context of existing GEF Operational Programmes. Getting experience with coal activities this way would help ensure a proper balance between coal and renewable projects as the GEF evolves a coal strategy and understands better what its comparative advantage is in helping steer coal along a more climate-friendly path.
- 20. Should the GEF decide to launch a Programme relating to coal, STAP advised that it should be in the context of a strategic plan in which near-term actions are consistent with and supportive of long-term objectives. Moreover, a systems approach to coal should be taken with the new aim to exploit the many potential synergisms that offer multiple benefits in addition to reduced GHG emissions.
- 21. STAP identified an exemplary set of near-term (next 1-5 years), medium-term (5-15 years) and long-term (15+ years) actions that might make up such a strategy, namely:
 - (a) Near-Term Measures
 - (i) Enact strict local air pollution regulatory measures in ways that would encourage the adoption of clean-coal technologies, of which modern gasification technologies are especially promising.
 - (ii) Discourage the use of those coal technologies that exacerbate GHG emissions, as a means of encouraging gasification-based technologies.
 - (iii) Introduce gas price reforms that would facilitate the expanded use of town gas derived from coal as an alternative to home use of direct coal combustion in countries where coal is so used today.

hydrogen and methanol derived from coal as energy carriers delivered to vehicles.

(c) Long-Term Measures

- (i) Commercialize hydrogen fuel cell technology in transportation markets, emphasizing buses, two- and three-wheel vehicles, and locomotives.
- (ii) Commercialize hydrogen fuel-cell CHP systems for apartment and commercial building applications.
- (iii) Produce hydrogen from Coal Bed Methane (CBM) and from coal, with injection and sequestration of the separated CO2 into CBM reservoirs for stimulating additional recovery of methane from coal beds. This hydrogen would serve both industrial markets (e.g., ammonia production and petroleum refining) and the new hydrogen fuel markets.

Technology Transfer and Innovation

- 22. In order to advise the GEF as to the most promising strategies for introducing clean and low GHG-emitting and innovative energy technologies in developing countries, STAP convened a workshop on technology transfer in the energy sector. The outputs of the workshop form the basis of STAP's advice to GEF.
- 23. The workshop addressed the issue of technology transfer as a process for creating a sustainable capacity for introducing into developing country markets energy technologies characterized by both reduced GHG emissions and enhanced local benefits. International technology transfer, inter-sectoral spillovers and domestic technology generation are significant variants of this process.

24. The major findings of STAP are:

- (a) Capacity Building: Capacity building is needed to assess, select, import or develop, manage, adapt or replicate appropriate innovative energy technologies and also to innovate:
 - a base-level of indigenous technological capability is needed for each of the major candidate innovative energy technologies; and
 - (ii) an energy technology assessment capacity independent of both the pressures of technology promoters and the technology selection

which contained a set of widely reviewed recommendations for GEF. The main findings of the report are summarized as follows:

- (a) As a result of increasing concentrations of greenhouse gases in the atmosphere, the global climate is expected to change at a rate unprecedented in human history. Even in the hypothetical case of an immediate stabilization of greenhouse gas concentrations, climate will continue to change for decades. Therefore, in addition to continued mitigation efforts, it is crucial to identify the needs and opportunities to adaptation.
- (b) Climate change will mainly be felt through changes in the return periods of extreme weather events. Particularly vulnerable systems are human health, water and river systems, agriculture, coastal zones, urban areas, and infrastructure. Moreover, natural ecosystems in general are vulnerable as their capacity to migrate is seriously reduced as a result of agriculture, infrastructure and human settlements. Considerable impact is to be expected. However, adaptation can significantly reduce impact. In fact, society's ability to cope with climate change depends to a large extent on its capabilities to adjust.
- (c) In considering adaptation to climate change, three different types of activities can be identified:
 - (i) Enhancing capabilities in (i) short-term climate prediction, (ii) long-term weather forecasting, (iii) the dissemination of such information (including early-warning systems), and (iv) the ultimate use of such information.
 - (ii) Technological and institutional capacity building for adaptation, particularly in the following sectors: water resources, agriculture, land use planning, design of infrastructural works, and public health.
 - (iii) Targeted Research to investigate the need and cost-effectiveness of anticipatory planning for a number of cases in a number of countries/regions.

Adaptation options to be considered include:

 increasing the robustness of infrastructural designs and longterm investments;

Emerging Technologies and Methods

30. Recent advances in technologies and methods for monitoring and analysis in international waters projects, particularly in OECD countries have led to both improvement in quality and cost reductions. To improve the quality of GEF International Waters projects STAP has advocated the adoption of these new methods. To promote this advance STAP has prepared a report "Emerging Technologies and Methods for Monitoring and Analysis of International Waters". The report served as input to the STAP Expert Group Workshop on Emerging Technologies, in The Philippines in February 1998, for experts and GEF project managers. The longer term plan is to try the new methods in existing GEF International Waters projects alongside the traditional methods.

Globality and the Regional Approach

- 31. In addition to the Theme paper on International Waters STAP undertook a number of studies in response to GEF Council requests. These included "The Concept of Globality in the GEF Focal Area of International Waters", "Incremental Cost in the GEF Focal Area to the International Waters Focal Area" and "The Regional Approach in International Waters".
- 32. These three papers sought to establish a basis for deciding what International Waters projects are eligible in GEF funding. STAP recognized that many limited area transboundary projects had been accepted by GEF and that this could continue in the future. However, STAP drew attention to the scope for future projects that could be developed on a regional basis but have important global benefits. These include the management of very large scale pollution, of the habitats of migratory species, including the introduction of global observations designed to improve the effectiveness of regional water management and management of the effects of global climate change. On the basis of the STAP analysis it was decided to adopt the regional approach as a starting point for the Global International Waters Assessment.
- 33. The study on Incremental Costs pointed out that in the development of the incremental cost concept for application to projects under the GEF, little attention has been paid to the focal area of International Waters. Incremental costs can be justified by the achievement of benefits that extend beyond the national area, for example in conserving living resources that are naturally transboundary, and introducing practices and technologies that also improve the water quality beyond national boundaries.

- (b) In rainfed and/or irrigated agriculture ecosystems:
 - (i) Activities related to the control of water and wind erosion, more efficient use of water, reduction of salinisation or alkilinization, management of wetlands, and control of fertility depletion.
- (c) In rangeland/pastoral ecosystems
 - (i) Activities related to measures to prevent land degradation and promote land rehabilitation.

Given the extensive nature of rangeland ecosystems, effective measures to control land degradation should rely more on prevention and rehabilitation rather than restoration.

38. The outcome of the workshop provided the basis for the GEF Secretariat decision paper to the May 1997 Council meeting on "Follow-up to the STAP Workshop on Land Degradation". In addition, a technical assessment of the workshop outcomes was undertaken by STAP as an input for the GEF decision document.

TARGETED RESEARCH

- 39. STAP, in consistence with the Council's guidance prepared a strategy on Targeted Research entitled "Principles for Financing Targeted Research". This document was approved by the GEF Council at its April/May, 1997 meeting. In order to facilitate the preparation of the Targeted Research paper, a number of background papers were formulated by STAP members.
- 40. Targeted Research has been defined as "goal oriented research that supports the GEF Operational Strategy by providing information, knowledge and tools that improve the quality and effectiveness of the development and implementation of GEF projects and programmes".
- 41. The Targeted Research paper provides the basis for GEF policy on research. In addition, the STAP chair has been charged with the Chairmanship of the GEF Research Committee. This committee will determine the Targeted Research projects which should receive GEF funding.

The following background papers on Targeted Research were prepared:

^{1.} Some consideration about Targeted Research on Climate Change for the STAP/GEF;

^{2.} Targeted Research in International Waters;

^{3.} Targeted Research in Land Degradation as related to GEF Focal Areas;

^{4.} Targeted Research on Biodiversity.

- an assessment of the technical review by STAP members;
- an assessment by individual task managers of the Implementing Agencies;
- follow-up consultations with Implementing Agencies and GEF Secretariat staff; and
- the results of the assessment are analyzed and contained in the Annual Review of the Roster. On the basis of the quality of the reviews decisions are made with respect to amendments of the Roster and improvements in the Operational Guidelines.
- 44. Version 1 of the Roster was produced and submitted to the GEF Council in October, 1996 and Addendum 1 in November, 1997; comprising 368 and an additional 50 experts respectively. Consistent with the Operational Guidelines for the Management of the Roster STAP prepared an "Annual Report on the Use and Management of the Roster" which was submitted to the GEF Council in November, 1997. Based upon the findings of the Annual Report various aspects of the management of the Roster were updated.

STAP'S ROLE IN THE PROJECT CYCLE

Keeping Track of Projects

- 45. As part of its strategic role, STAP kept track of the GEF projects at various stages of the project cycle and provided comments which were introduced by the STAP Chairman, as a member of GEF Operations committee (GEFOP). The comments presented by the STAP Chairman were based on written inputs received from Panel members, and synthesized by the STAP Secretariat. These comments were presented to the GEF Secretariat in written form.
- 46. STAP's scientific and technical contribution to GEFOP is not only ensuring the scientific and technical soundness of the project but also advising on new trends and available technologies. Issues raised by STAP in their comments include gaps in the GEF Portfolio, incremental costs and baselines as well as potential for replicability. The discussion on the evolving Portfolio of GEF projects is used as a basis for identifying GEF projects that merit a Selective Review.

Lake Victoria project

50. STAP considered that the Lake Victoria Environmental Management Project (LVEMP) provides an excellent example of an integrated approach to environmental management. STAP recommended that management actions be guided by an over-all strategic science plan still to be developed. Such a plan should set the targets, priorities, sampling procedures and quality control arrangements needed to achieve the goal of the LVEMP. On the basis of the Lake Victoria selective review, STAP recommends that any GEF International Waters project should have a strategic science plan, to guide management actions and to monitor the effectiveness of interventions.

Alternatives to the Slash and Burn project

51. The STAP Selective Review of Alternatives to Slash and Burn Agriculture concluded favorably as regards the GEF relevance of the project, the contribution of its activities to achieve the stated objectives, its policy relevance, its innovativeness, and its potential for replicability. It also observed that there is room for improvements as regards the interaction between the scientific community and policy makers in the countries where the pilot projects were carried out.

MOBILIZATION OF THE WIDER SCIENTIFIC COMMUNITY

- 52. Implicit in STAP's role and mandate is engaging the wider scientific community in providing scientific and technical advice on GEF policies, Operational Strategies and Programmes.
- 53. STAP has indeed mobilized the wider scientific and technical community primarily through the convening of STAP Workshops and STAP Expert Group Workshops. STAP with its modest resources, has organized wider scientific and technical inputs in its strategic advice to the GEF Council on specific issues identified by that body. Workshops were convened on "Stimulating Private Sector Initiatives for Accelerating the Introduction of Renewable Energy Technologies into the Power Sectors of Developing Countries", "Options for Mitigating Greenhouse Gas Emissions from the Transport Sector"; "Options for Improving Coal Systems to Reduce Greenhouse Gas Emissions", and "Technology Transfer and Innovation". Expert Group workshops were also convened on "Land Degradation"; "Sustainable Use of Biodiversity"; "Emerging Technologies in International Waters". These Expert Group Meetings were convened with the GEF Secretariat and the Implementing Agencies. The total number of participants/experts involved in these workshops was about 300.
- 54. STAP collaborated with the National Academy of Science (NAS) of the USA in convening a workshop on "Building Scientific Capacity into the GEF Enabling Activities

analysis and the Council's discussions, the issues can be taken up in operational terms by the GEF Secretariat and the Implementing Agencies.

- 60. The use of the Roster of Experts in GEF work and STAP's role in engaging the scientific community at national and regional level can be developed further to the benefit of the quality of GEF project identification and implementation.
- 61. The Selective Review of GEF projects by STAP should be expanded. However, consideration should be given to the participation, especially of regional experts in this process as a means of ensuring the input of specific regional knowledge and strengthening regional ownership of GEF projects.
- 62. STAP could play a more important role in identifying the need for Targeted Research aimed at improving the effectiveness of GEF projects and programmes. In close cooperation with the Implementing Agencies STAP should identify the most promising topics and assist these Agencies in formulating the Terms of Reference for Targeted Research projects.
- 63. It is important for STAP to have a systematic interaction with the Secretariat and the Implementing Agencies. Yearly strategic sessions on the STAP agenda are a most important instrument to ensure synergy. Moreover, it is important that STAP does organize informal gatherings in the margins of the GEF Council meetings to stimulate interaction with the Council members and to clarify scientific and technical issues.
- 64. STAP's interaction with the Subsidiary Bodies of the Conventions should be strengthened. As initiated under GEF 1, issues to be addressed by STAP should be identified in close consultation with the Scientific and Technical Bodies of the Conventions. The present reciprocal presence in meetings should get a formal status.

TITLE

The STAP Workshop on Stimulating Private-Sector Initiatives for Accelerating the Introduction of Renewable Energy Technologies (RETs) into the Power Sectors of Developing Countries - September, 1996

STAP Roster of Experts - Version 1, September, 1996

Scientific and Technical Advisory Panel of the Global Environment Facility, STAP Roster of Experts - October, 1996

Some Considerations about Targeted Research on Climate Change for the STAP/GEF, November, 1996

Report of the Seventh Meeting of STAP - November, 1996

Report of the Eighth Meeting of STAP - March, 1997

Progress Report of STAP Selective Reviews - March, 1997

Report of the STAP Workshop on Options for Mitigating Greenhouse Gas Emissions from the Transport Sector - March, 1997

Advanced Coal Conversion Strategies, June, 1997

Report of the Ninth Meeting of STAP, June, 1997

Report of the Tenth Meeting of STAP, September, 1997

Planning for Adaptation to Climate Change, September, 1997

Annual Review of STAP Roster of Experts, September, 1997

STAP Roster of Experts - Addendum 1 Version 1, September 1997

Prospects for Reducing GHG Emissions in Coal Systems, September, 1997

An Ecological Perspective for Sustainable Use of Biodiversity Components: Indicators of Sustainability, November 1997.

Sustainable Use: An Economic Perspective, November, 1997.

Report of the STAP Expert Group Workshop on the Sustainable Use of Biodiversity, January, 1998.

A Private Sector-led Strategy for Accelerating the Introduction of New Environmental Technologies in Developing Countries, January 1998.

A Systems Approach to Technology Transfer in the Energy Sector, January, 1998.

Emerging Technologies for Analysis and Monitoring International Waters projects, January, 1998.

ANNEX 2 ACRONYMS

CBM Coal Bed Methane

CHP Combined Heat and Power

EIA Environmental Impact Assessment

GEF Global Environment Facility

GEF/IW Global Environment Facility / International Waters

GEFOP Global Environment Facility Operations (regular interagency meeting)

GHG Greenhouse Gases

GIWA Global International Waters Assessment

GOOS Global Ocean Observation System

IGCC Integrated Gasification / Combined Cycle

IPCC Intergovernmental Panel on Climate Change

IWA International Water Assessment

LVEMP Lake Victoria Environmental Management Project

NAS National Academy of Science

NGO Non Governmental Organisation

OECD Organisation for Economic Cooperation and Development

PIR Project Implementation Review

RET Renewable Energy Technology

R&D Research and Development

STAP Scientific and Technical Advisory Panel

STE Solar Thermal Electricity