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PRIORITY ISSUES WHICH STAP SHOULD ADDRESS IN GEF PHASE III

(Prepared by the Scientific and Technical Advisory Panel)

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April, 2002

STAP Secretariat
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Preface

It is a pleasure to present the final report of the "*Priority Issues Which STAP Should Address in GEF Phase III*".

This report was prepared by STAP Members with support from the STAP Secretariat.

Prof. Madhav Gadgil
STAP Chairman

Executive Summary

The Priorities paper was prepared by the outgoing Scientific and Technical Advisory Panel (STAP II) of the Global Environmental Facility (GEF), and identifies a number of priorities that the incoming Scientific and Technical Advisory Panel III (STAP III) should consider in GEF III.

The paper is organized around five major sections comprising of the three main focal areas of the GEF portfolio, namely: (i) *Bio-diversity*; (ii) *Land and Water*; and, (iii) *Climate*; and, separate sections on (iv) *Adaptation* and (v) *Generic Cross-Sectoral Issues*. Although "*Adaptation*" is normally addressed under the Climate Focal Area, for this paper, Adaptation is addressed separately because of its crosscutting nature. Furthermore there is a section on Generic Cross-Sectoral Issues addresses questions that arise in all the Focal Areas and that are not necessarily linked to any particular technology or intervention.

Under each focal area, the paper provides a background brief - which presents a succinct review of the status of the GEF portfolio in the respective focal area and identifies the initiatives that account for most of the activities and funding. This is followed by a discussion of key selected gaps and emerging issues that are likely to be important to the current and planned GEF initiatives in the respective focal area. On the basis of the identified gaps and emerging issues and taking into account the limited resources (especially time) available to the Scientific and Technical Advisory Panel (STAP), priorities are presented.

In the biodiversity focal area, the significant scientific questions of high priority that STAP III may wish to address include ways and approaches to: deploy local or indigenous ecological knowledge to develop plans for management of natural resources; build upon traditional practices of conservation in the new and ever changing social, demographic, political, economic, technological contexts; promote conservation and prudent use of common property resources; to promote and manage green markets and trade in biodiversity. It also puts forward the questions of adaptive management in the context of the limited predictability of complex natural systems, the management of production landscapes, the role of corridors, the rapid change in agro-ecosystems, and ecosystem restoration. Lastly issues are raised related to the impact of biotechnologies and GMS on biodiversity, of subsidies for environmentally undesirable inputs, and on the promotion of synergies across conventions, including incentives in relation to environmental services that are the foci of the various conventions.

In Land and Water, STAP identified the priorities of the development of: a flexible and adaptive approach to land and water management in the GEF portfolio; methodologies for incorporating land and water management issues in adaptation issues; the most appropriate community-centred approaches that are essential in addressing land and water management successfully; and of an integrated perspective in the way STAP addresses the issues related to land and water, biodiversity, climate change. It also proposed the evaluation of science-based transboundary diagnostic analyses (TDAs) and strategic action plans (SAPs) to demonstrate their efficiency and benefits; the development of initiatives that would improve the dissemination of available data on land degradation, water pollution and hydrological changes at various levels; the reorganization of OP#10 taking into account the new OP that will address the POPs issue, and paying attention to the growing relevance of sewage contamination.

In the climate change focal area, the priorities are: strengthening GEF's role in improving the efficiency of future buildings stock in developing countries; development of innovative, low cost and sustainable renewable energy initiatives aimed at reducing GHGEs from biofuels use in developing countries; and the development of effective institutional and financial mechanisms – involving both

the private and public sector - for the establishment of a network of research centres of excellence in the developing world that would address the question of advancing renewable and energy efficiency technologies in the developing world. In Transport, STAP recommends a number of options to diversify the GEF portfolio, including Public Rapid Transit (PRT), which encompasses Bus Rapid Transit (BRT), Light Rail Transit (LRT) and Trolley Electric Buses (Tbuses); Traffic Demand Management (TDM); Non-motorized Transport (NMT); and, Land-Use Planning (LUP). It also identified the question of how to reduce GHGEs from intra and inter-city freight transport as priority, and the examination of institutional options for improving the collection and dissemination of data and information on the impact of various sustainable transport options. Lastly it recommends innovative measures for enhancing participation, promotion, social marketing and awareness creation of sustainable transport options. Cross-cutting to all energy OPs, STAP put the emphasis on: the importance of evaluating the importance of modularity as an ideal approach for GEF energy interventions; ensuring that greater attention is given to upstream capacity building and policy formulation issues that are central to sustainable energy interventions; the development of a flexible set of tools (regulatory, fiscal, technical guidelines) that promote sustainable energy in a rapidly reforming energy sector; the evaluation of the impact of energy sector reforms on sustainable energy development; exploring GEF interventions that would ensure continued support for medium and long-term energy R&D in a reforming energy sector; and lastly the identification of win-win options that would promote sustainable energy in a rapidly reforming energy sector while ensure the provision of low-cost energy services to the rural and urban poor.

Adaptation was treated separately, and as demonstrated by the very long list of gaps and emerging issues, it is a new science with numerous scientific and methodological questions that are still unanswered. Development of a critical mass of expertise is clearly an important priority for the GEF portfolio and STAP III should take the lead in providing the requisite technical and strategic advice. Foremost, it is recommended that STAP III: provides guidance on options that would ensure the required broadening of the traditional sector-specific and discipline-specific approaches prevalent in current science and policy communities, respectively; reviews the suitability of the incremental cost model to the *Adaptation* question; examines how GEF could establish capacity building as the core activity of *Adaptation* initiatives; and the development of options for streamlining the various steps needed for *Adaptation* interventions (e.g. from risk assessments to surveys, planning and finally implementation).

Cross-cutting to all focal areas, STAP also formulated a number of generic issues that STAP III may wish to look into, namely scientific and technical tools for addressing cross-cutting issues; local participation and indigenous knowledge; poverty and equity and capacity building. With regard to the latter, STAP III should consider setting aside significant amount of its time and attention to providing advice on the design of the most effective capacity building initiatives across the various GEF Focal areas.

It is important to note that the priorities proposed in this paper are indicative and largely designed to assist in formulation of the near-term workplan of STAP III. It is expected that STAP III will prepare, in its first set of meetings, more comprehensive and detailed priorities that reflect the expertise, skills and comparative advantage of its constituent members as well as the evolving GEF portfolio and guidance from the GEF Council and relevant United Nations Conventions

1.0 Introduction

Prepared by the outgoing Scientific and Technical Advisory Panel (STAP II) of the Global Environmental Facility (GEF), this paper identifies a number of priorities for the incoming Scientific and Technical Advisory Panel III (STAP III) should consider in GEF III

The paper is organized around five major sections comprising of the three main focal areas of the GEF portfolio, namely: (i) *Bio-diversity*; (ii) *Land and Water*; and, (iii) *Climate*; and, separate sections on (iv) *Adaptation* and (v) *Generic Cross-Sectoral Issues*. Although "*Adaptation*" is normally addressed under the Climate Focal Area, for this paper, Adaptation is addressed separately. By its very nature, Adaptation is a crosscutting issue that covers all the three Focal areas. Consequently, many of the issues and questions raised in the Adaptation section would be of relevance to all focal areas. The section on Generic Cross-Sectoral Issues addresses questions that arise in all the Focal Areas and that are not necessarily linked to any particular technology or intervention.

Under each focal area, the paper provides a background brief - which presents a succinct review of the status of the GEF portfolio in the respective focal area and identifies the initiatives that account for most of the activities and funding. This is followed by a discussion of key selected gaps and emerging issues that are likely to be important to the current and planned GEF initiatives in the respective focal area. On the basis of the identified gaps and emerging issues and taking into account the limited resources (especially time) available to the Scientific and Technical Advisory Panel (STAP), priorities are presented.

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2.0 Biodiversity Focal Area

2.1 Background

As the principal financing mechanism for the Convention on Biological Diversity (CBD), the GEF funded biodiversity projects were initially designed to addressed critical bio-diversity issues in the following four types of ecosystems: (i) arid and semi –arid zones; (ii) coastal, marine, and freshwater resources; (iii) forests; and, (iv) mountains. Between 1991 and 1999, GEF allocated US$ 991 million in grants and mobilized an additional US$ 1.5 billion in co-financing for its GEF portfolio.

The biodiversity portfolio of the GEF has only recently shifted from an overwhelming emphasis on projects that primarily deal with formally protected areas and the institutions that support them. While many of these projects include important efforts to incorporate human populations into conservation areas, these efforts were largely a secondary rather than primary focus of the projects.

An important shortcoming of GEF efforts in the area of Biodiversity Conservation is the dearth of appropriate alternative technologies or livelihoods that are offered to communities affected by the projects. Virtually every project includes a plan to replace destructive or otherwise flawed resource use practices with sustainable and biodiversity-friendly patterns. Very, very few projects effectively deliver on this promise.

As the GEF portfolio moves away from purely protected-area efforts and toward projects that work

more closely with rural communities, this limitation becomes ever more important.

The scientific issues this problem raises are very important. Most biodiversity conservation projects are located in areas where conventional approaches to production are not feasible or not profitable. It is often for that very reason that considerable biological diversity remains in the area. Such regions are often characterized by precipitous slopes, arid climates, frequent floods sparse human populations, inaccessibility to markets and credit sources, or all of the above in varying combinations. The communities affected are frequently cultural minorities and tend to be little conversant with conventional science or dominant urban ways. Solutions to complex sets of production problems are not easy to design for the best of agronomists, foresters or other scientists. Solutions need to be complex, site-specific, and unconventional. Few GEF projects appear to have considered how difficult such solutions are apt to be. Most put far more effort into the sciences of measuring and managing wildlife populations - techniques that are better understood and more easily applied.

If appropriate and conservationist production styles are to be promoted, where will such models or examples come from? One of the few available sources and one that is often overlooked or, at best, underused is local or indigenous knowledge and practice; the many examples of resource management practices that exist in indigenous and local communities throughout the biodiversity-rich regions of the world.

Parties to Convention on Biological Diversity have agreed to Article 8j that instructs them to "respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices" .

Why then is the plethora of models, the wealth of information that resides in local communities actually little used? There are, of course, important social and political reasons. Those who developed and use these practices are by definition not modern, they are usually not rich, they are often disparaged and disenfranchised minority peoples. But apart from these powerful social factors, there are others that may be characterized more clearly as scientific and technical issues. Local and indigenous knowledge and practice are usually misunderstood or not even noticed because the best science available on the subject is not being applied in GEF.

There is a good deal of work now being produced that shows local practice and knowledge to be:

- Not confined just to knowledge about uses and products (e.g. uses of medicinal plants) but also about processes (how ecosystems and landscapes are transformed)

- Dynamic and therefore can offer solutions to modern, changing problems. They are not just threatened "age-old wisdom" but are frequently "hybrid", changing patterns.

- Responsive to market and policy fluctuations.

- Very complex and cyclic. Any part of these production cycles seen in isolation can be and often is misinterpreted as destructive or unproductive behavior.

- Visually confusing and virtually invisible to short-term visitors, precisely because they often involve high levels of biodiversity.

- Distributed unevenly throughout the communities. While "common resources" are often important, there is always difference in expertise. The "alternatives" to what has been determined to be destructive resource management are often found within the same community. Experts in biodiversity-friendly resource management are rarely easily accessible political leaders of the community.

- Site and situation specific

These reassessments of local and indigenous practice and knowledge are the results of much recent, insightful scientific research and thought. If GEF projects are to succeed in the central task of helping communities adopt conservationist and profitable practices, project personnel must better appreciate and apply existing research results and analyses and consider far more seriously the need to carry out directed research in specific sites and situations. While we must see to it that local knowledge and practice play a far more important role in GEF projects, we must resist making it yet another standard category or replicable "package" that can fit neatly into any project document. Local insights are important because that they are all different and transgress the usual categories; they are insights born in and adapted to local, specific contexts.

Globally, we are now moving towards elaborating a new paradigm for managing biodiversity with conservation being complemented by sustainable use and benefit sharing as significant objectives, as acknowledged by the CBD. The CBD has also adopted the ecosystem approach which draws our attention to the management of the broader land and waterscape; to integrating human use; to involving people at as decentralized a level as possible; and, to implementing an adaptive management approach. The new OPs on agrobiodiversity and integrated ecosystem management represent a movement towards these perspectives.

The management regime under the new paradigm would go beyond conservation of biodiversity through exclusion of human use in protected areas, though conservation would continue to remain a central objective. The management would also attempt to reduce human demand through more efficient use, e.g., energy-efficient woodstoves. Furthermore, it would attempt to enhance the quality of life of local communities through (i) promoting sustainable, environment-friendly livelihoods, (ii) creating incentives for conservation, sustainable use, and ecorestoration and (iii) involving people in planning, implementation and monitoring of conservation, sustainable use and ecorestoration activities. Such endeavors would contribute significantly towards poverty alleviation as well.

These endeavours would call for elaboration of new institutions and management regimes that would be transparent, accountable, flexible and participatory. They would distribute, in a more equitable fashion, resources currently largely monopolised by a bureaucratic apparatus that is often opaque, rigid and authoritarian. The accompanying lack of accountability can promote corruption as well as inappropriate and wasteful management practices. However, putting an alternative transparent, adaptive and participatory system in place is not a straightforward matter. This challenge calls for careful analysis from a natural as well as social scientific and technological perspective.

2.2 Gaps and Emerging Issues

Although the biodiversity portfolio has focused on protected areas, we perceive some remaining gaps and the need for more work. These include significant gaps in coverage in terms of representativeness and continuity, and in the management of protected areas.

- There are important gaps in conservation outside of formally protected areas, especially of domesticated biodiversity and in production and other managed landscapes.

- We lack an effectively integrated environmental, economic, social, political, and cultural perspective on biodiversity conservation.

- We perceive a dearth of appropriate alternative technologies or livelihoods offered to communities affected by conservation projects and a lack of appreciation of locally developed technologies.

- Little has been done by the GEF on the priority items of benefit-sharing, payment for environmental services, and other incentives.

- We perceive an important gap in work concerning the impacts of GMOs and other emerging biotechnologies.

- There is little understanding of the probable impacts of global change on biodiversity.

- There are, as yet, few projects that effectively address linkages or synergies among the conventions.

- In respect to all the above gaps, we find a great need to build capacity in recipient countries.

2.3 Priorities

The significant scientific questions of high priority that STAP III may wish to address include the following:

- How to deploy local or indigenous ecological knowledge to develop plans for management of natural resources, including planning, implementation, monitoring and adaptively redesigning the management regime on the basis of learning through doing? How to combine folk and scientific knowledge?
- How to sustain and build upon traditional practices of conservation in the new and ever changing social, demographic, political, economic, technological contexts?
- How to decide on appropriate levels of economic incentives for provision of environmental services such as biodiversity conservation, watershed protection and carbon sequestration?
- How to promote conservation and prudent use of common property resources? How do social structures and institutions influence patterns of management of common property resources?
- How to reevaluate and manage green markets and trade in biodiversity?
- How to manage heterogeneous landscapes including conservation and production areas? How to design a system of conservation areas on different spatial scales and with different levels of human use? What are the roles of corridors, stepping stones in such systems?
- How predictable are complex natural systems? What are the implications of the limits to predictability in designing management regimes? How to update predictions of behavior of complex natural systems by assimilating information on the state of the system generated through ongoing monitoring programs? How to design management interventions so as to maximize learning in the process of utilization? How to develop adaptive management regimes?

- How is rapid change in agroecosystems, including the replacement of diverse and cyclic smallholder systems by large-scale plantations of export crops affecting both wild and domesticated biodiversity?
- How to recuperate disturbed areas and reestablish ecosystem functions and habitats?
- How to redeploy effectively the financial resources today devoted to payment of subsidies to environmentally undesirable inputs such as synthetic pesticides, and to running the bureaucratic apparatus?
- What is the impact of emerging biotechnologies and GMOs on biodiversity?

How to promote synergies across conventions, including incentives in relation to environmental services that are the foci of the various conventions.

3.0 Land and Water Management

3.1 Background

Between 1991 to December 31, 2001, overall GEF financing to international waters efforts amounting to US$ 444 million (excluding co-financing). Currently, "Land and Water " issues have been dealt within the OP8 Waterbody-based, OP9 Integrated Land and Water multiple focal area and the OP10 contaminant–based initiatives. Although "Land and Water" issues have been included in OP9, the challenge of ensuring the full integration of land and water issues in GEF programs remains. This will be particularly important in the newly initiated OP12 on integrated ecosystems management.

Another important challenge will be strengthening the links between land degradation and other major focal areas of the GEF, namely International Waters, Climate Change and Biodiversity. Interventions on land degradation influence climate; water quantity and quality; changes in coastal sedimentation patterns; degradation of biodiversity habitat; and, which, in turn, trigger a number of important socio-economic feedback effects. Changes in land use contribute to land degradation which, in turn, can lead to loss of biodiversity; alteration of the hydrological cycle; and, deterioration of water quality. This process is particularly important in dryland areas

The GEF needs to develop an integrated understanding of land and water issues that recognize the pre-requisite for a management approach that seeks to meet multiple objectives through a variety of means. In adopting this approach, it must link a number of different environmental, economic, social, political and cultural perspectives on the environment. The challenge is to find a practical way of linking these different perspectives so that we can think of environment as a whole. Many management strategies only succeed where they have been designed with the full participation of all key stakeholders who are well placed to pursue the multiple objectives central to an integrated approach.

The understanding of the natural environment as a continuum that must be dealt with an integrated perspective is relatively new. As a result, scientific tools available for the holistic understanding of environmental processes especially of those occurring in the marine realm are still scarce. Consequently, the barriers to be overcome for the successful implementation of an integrated management approach are not only of a technological and scientific nature, but are also deeply embedded in the conventional ways of thinking and of assessing the impact of human life on the

natural ecosystem.

3.2 Gaps & emerging issues

Progress towards the desired integration depends on new scientific approaches, as well as on attitudinal changes at the level of both the individual and society. Starting with the easier integrated scientific approach issue, several important questions remain unanswered. What is needed to ensure sustainability of land, coastal and water resources and attain the necessary integrated management? If sustainability is understood as the maintenance of critical environmental assets, what is needed from science to ensure that maintenance? Which are the acceptable levels of carrying capacity as to guarantee the functionality of the land, water and coastal systems, and from the other side to satisfy societal needs for products and services?

Uncontrollable anthropogenic factors, which, for instance, pertain to rapid population growth interact with the complexity of the natural environment to undermine scientific predictions as well as the efforts of conservation initiatives. There is a need for improved scientific tools that can establish adequate (or desirable) levels of key environmental indicators and for monitoring changes in sustainability (or carrying capacity). The scientific tools should be able to respond to early signs of changes as well as be sufficiently flexible and robust to allow deployment under different settings. A major challenge is to progress from the present status of using environmental indicators that respond well to individual or sectoral alterations (increase in nutrient concentration, occurrence of algae blooms) to a more complex stage of observation in which indicators are used to spot systemic changes. Furthermore, scientific tools must become effective in differentiating sources of alterations, a task that is not trivial.

This integrated perspective may require tools that use regional as opposed to local monitoring techniques (as for instance, a whole hydrographic basin as opposed to a single river or bay).

In developing countries, data and information on the status and properties of the land, water and coastal environments are scarce. Equally deficient is the capability to organize the existing information so as to allow causal chain identification through a cross-linking of events (for example, the relation between level of sewage contamination in the beaches and the number of working hours lost due to enteric diseases). Policymakers must deal with the uncertainties that are inherent in the evolving science of land, water and coastal resources. There is need for improving access to scientific information that is organized in a format that can be useful to policy makers and program managers.

More in-depth review of the existing GEF Land and Water OPs, highlighted the following additional gaps and emerging issues:

- The need for the Existing Land and Water OPs to be rationalized to minimize the overlap with new OPs (i.e. OP#12 on integrated ecosystem management and the envisaged OP on POPs) and to strengthen a holistic approach for solving the problems of Land and Water management.

- Climate change (CC) is an important factor in land and water management, but in the present portfolio the link with CC is weak.

- With the reduced use of conventionally products of controlling pests and vectors, new methods of

pest control need to be tested in pilot projects.

- Recent findings indicate the risk of water contamination by hormones, antibiotics and other substances excreted by humans and released by pharmaceutical and agriculture activities, and that reach water bodies via sewage and drainage water. There may be a case to reformulate OP9 to enable the operational program address this growing problem.

- With the banning of the traditional and efficient method for controlling fouling in ship hulls, an increase in alien species transport may occur. This must be taken into consideration in the preparation of future ship related GEF projects.

3.3 Priorities

Taking into account the above, it is suggested that STAP III focuses on the following near-term priorities:

- Development of a flexible and adaptive approach to land and water management in the GEF portfolio.

- Methodologies for incorporating land and water management issues in adaptation issues.

- Development of an integrated perspective in the way STAP addresses the issues related to land and water, biodiversity, climate change.

- Evaluation of science-based transboundary diagnostic analyses (TDAs) and strategic action plans (SAPs) is necessary to demonstrate their efficiency and benefits.

- Proposing initiatives that would improve the dissemination of available data on land degradation, water pollution and hydrological changes at various levels (space and time).

- Identification of the most appropriate community-centred approaches that are essential in addressing land and water management successfully. The proposed approaches should also provide methodologies for the incorporation of indigenous knowledge in developing and implementing land and water projects.

- Reorganization of OP#10 should take account of the new OP that will address the POPs issue that is currently under preparation. It is also important that special attention is paid to the growing relevance of sewage contamination, which is more complex than the traditional concern over N and P contaminants.

4.0 Climate Change Focal Area

4.1 Background

From the initiation of the pilot phase in 1991 to June 30, 2000, the GEF has supported a portfolio of 272 climate change projects amounting to $7.1 billion (Table 1). The portfolio includes:

- the full range of renewable energy projects, such as photovoltaics for over 500,000 solar home systems, health clinics, water pumping and others;

- thermal solar water heaters;
- thermal solar power stations;
- methane recovery from coal beds and landfill gas;
- biomass for power generation; wind; micro-hydro;
- fuel cells for transport and studies of fuel cells for power generation;
- a very wide range of energy efficiency activities and projects; and
- a large number of projects and policy development studies ('enabling activities').

Table 1. GEF Climate Change Portfolio by Type of Project, as of June 30, 2000

Type of Project	**No. of Projects**	**GEF funds, $ millions**	**Total Project Cost, $millions**
Enabling activities (field studies, project preparation and other)	142	82	89
Energy Efficiency	40	251	1,727
Renewable Energy and Low carbon Projects:			
• Near-commercial uses [a/]	52	395	3,948
• entailing incremental costs	10	200	684
Sustainable Transport [b/]	3	15	26
Short-term measures [c/]	25	137	628
Totals	272	1,081	7,102

***Source**: Draft report on The GEF Climate Change Program Study by Eric Martinot and Ramesh Ramankutty of the GEF Secretariat, March 30, 2001.*
a/ Renewable energy and other projects such as use of landfill gas and coal bed methane leakage that are thought to be economically justified but require efforts to address 'market barriers'.
b/ This is a relatively new operational program, hence the still-low number of activities.
c/ Low cost near-term options for reducing emissions that are not covered by the preceding categories.

It is relevant to recall how innovative this portfolio is, for it marked a new dimension to international co-operation in the development and finance of energy projects. Historically (and quite properly before the mitigation of climate change became an issue), private and public finance had been concentrated on fossil fuels and hydro-electric schemes, and given the scale and growth of demands in developing countries today, this continues today. Renewable energy, especially, was considered a fringe area for research and few projects were financed; nor, except among a small minority of engineers and scientists, did it seem relevant for the needs of developing countries.

In barely ten years, thanks to R&D, demonstration projects and incentives for the development and use of renewable energy technologies in many countries, we have seen the picture totally transformed:

- Markets for renewable energy technologies expanded substantially, albeit from a small base, in developing as in the industrial countries.
- Costs declined appreciably—five-fold in the case of wind and two-fold in the case of photovoltaics—due to innovation and scale economies in supply. Analysis consistently shows that the scope for further innovation and scale economies is appreciable.

- Major energy companies, as well as a large number of manufacturers, have embarked on substantial investment programs—in fuel cells, as well as in renewable energy.
- Every country in the OECD now has policies in place to support the increased use of renewable energy. The targets are often ambitious: it is not unusual for a country to adopt a 10-20% target for electricity generation from renewable energy in the next 10-20 years.
- The review by Goldemberg, Martinot and Miller, "Energy Since Rio: Achievements and Promising Strategies", shows that a large number of developing countries, including the populous countries of India, China and Brazil, are likewise developing targets and financial policies to further the development and use of renewable energy.
- The reports of the IPCC (First, Second and Third Assessments), the G-8 Renewable Energy Task Force, the World Energy Assessment, and a now large number of national policy studies and studies by academics, have consistently shown that a low carbon future is fully attainable based on renewable energy and energy efficiency. And those reports with the authority to make policy recommendations, most recently the G-8 report, have fully endorsed the directions of the GEF's portfolio and called for its further expansion.
- It has further been shown that a low carbon future, based on renewable energy and 'linked' technologies such as hydrogen and fuel cells, is fully consistent with the goals of developing countries achieving economic prosperity on a broad basis, and of the rich countries continuing to enjoy a rising level of prosperity also. Indeed, it now seems possible that economic prospects, in the broadest sense, will be *improved* by the transition to a low carbon world, even neglecting the environmental benefits. (Figure 1.)

All this has been achieved in the space of barely a decade, on budgets that are exceedingly small in relation to the scale of the problem in hand and the size of the energy industry. It is an admirable achievement of the GEF that it identified these trends and the potential of renewable energy (and also of efficient end-use technologies) in its earliest phases and succeeded, in a short period, in mobilizing appreciable resources to support the emergence of renewable energy in developing countries.

4.2 Gaps and Emerging Issues in the Climate Change Focal Area

4.2.1 – Energy Efficiency

There is a gap in current efforts to develop renewable energy and energy efficiency programs in developing countries. Under Operational Program OP# 5 on energy efficiency, the GEF has been able to provide, to some extent, support for investments in the diverse range of efficient end-use activities.

Although some progress has been realized in the dissemination of energy efficient technologies and approaches, there remain significant challenges, particularly in the building sector. The current GEF portfolio has been able to develop and implement innovative initiatives aimed at improving the energy efficiency of the current stock of buildings through various retrofitting measures and use of a wide array of both energy efficiency hardware and software tools. Less progress has been registered with respect to the improvement of the efficiency of future building stock which can be influenced through major changes in building standards and established practices of the architectural and construction industries. In industrialized countries (notably Europe), the implementation of public/social housing programs with efficiency targets that provided a critical mass of orders for efficient buildings for the construction industry. It also strengthened the industry's capacity to meet tighter efficiency targets and regulations thus greatly improving the efficiency of both current and new building stock. The

replication of such initiatives in developing countries has not yet been aggressively pursued in the existing OP#5 portfolio and represents a major gap that requires urgent attention. Such an approach would be appropriate for both OP#5 (energy efficiency/market barriers) and OP#7 (learning curves for new sustainable energy technologies).

Another important issue that has constrained progress in the OP#5 portfolio is the impact of energy market liberalization. Anecdotal evidence demonstrates that energy market liberalization could entrench existing inefficient technologies and constrain the wider adoption of cleaner and efficient technologies and practices. The need for a wider array of innovative institutional and legal options for promoting sustainable energy technologies practices in a liberalized energy market is challenge that is not confined to the OP#5 portfolio but is of equal relevance to all the other Climate OPs.

4.2.2 Renewables

The OP6 (renewables) GEF portfolio has registered encouraging results in the dissemination of a wide array of technologically and economically proven applications of renewable energy technologies. However, most of the technologies promoted in OP#6 have been aimed at the generation of electricity.

With a significant proportion of the developing world still largely un-electrified and reliant on biofuels which are an important source of greenhouses gases, the current OP6 portfolio has not managed to develop and disseminate technologies and approaches that would significantly reduce greenhouse gases emissions from existing biofuel devices. This gap in the OP#6 portfolio represents a major challenge that the evolving GEF portfolio needs to address.

Increased attention to biofuels in GEF portfolio would also address a key critique of GEF energy OPs – the extent to which technologies promoted under the climate portfolio narrow inequity in the target group. There some anecdotal evidence indicating that benefits accruing from new renewables may largely benefit higher income groups and not addressed the energy needs of the poor. More emphasis on improved biofuel technologies in the future climate portfolio may ensure that the equity dimension of the GEF climate OPs receives the require attention.

4.2.3 Reducing Long-Term Costs of New Sustainable Energy Technologies

Under OP#7, the GEF is able to support projects that are *technologically proven* but not yet economical *at market prices*; examples are fuel cells for de-centralized generation; solar-thermal power plant; photo-voltaics for grid-connected applications; and, hydrogen production from coal using advanced coal-gasification technologies. In these instances the rationale is that:

(a) These technologies have declining cost characteristics.

(b) GEF investment in them will help to reduce costs.

(c) Such investments have economic benefits for subsequent investments (positive externalities) provided that,

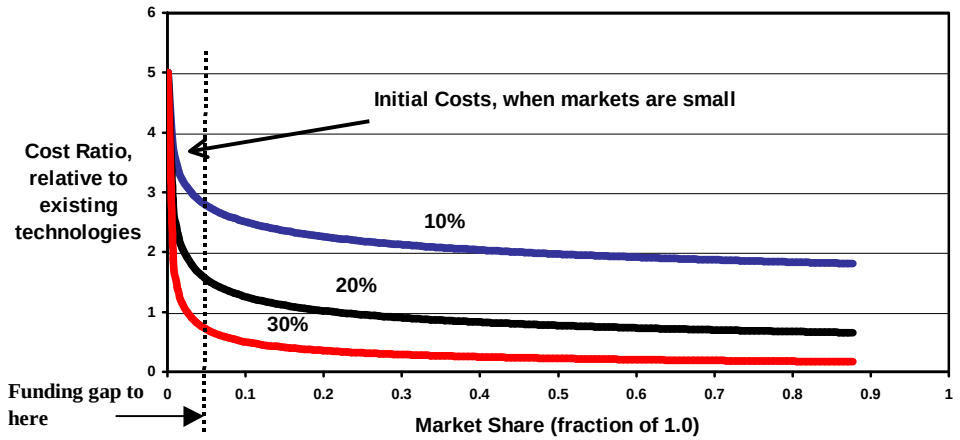
(d) Member countries of the GEF also continue to invest in their development and use (otherwise the positive externalities would not arise).

(e) There are likely to be appreciable benefits in terms of mitigating climate change if the costs are reduced and use of the technologies becomes widespread.

The positive external benefits can be large for technologies in their infancy, and with still small market shares. It is not unusual for the costs of new technologies to decline five-fold or more as their market share rises, say, from less than one hundredth of one percent to one percent, and a further two-fold if it expands to say 5% of the market and becomes an established technology. When technologies are in their early phases of development and use, the opportunities for discovery, invention, innovation and learning from experience are appreciable, in both the manufacture and use of the technologies — particularly when the technologies are modular and have short installation times, as in the above instances. In addition, there are opportunities for scale economies from batch production and in the provision of the supporting service infrastructure and the rising number of engineers and scientists involved in their development further increases the chance of innovation.

Innovation also continues of course with mature technologies, for example with all the fossil fuel technologies, but the effects on costs are most dramatic in the early phases, when cost thresholds and non-linearities are most pronounced. Figure 1 shows the effects. Note that for renewable energy technologies, and also, it is expected, for fuel cells, the coefficients lie in the mid' to high end of the range shown. The positive externalities in the early phase have been shown to be as high as 40-50% of capital costs, excluding the additional benefits of mitigating climate change.[1]

Figure 1: Threshold Effects in Technology Development
(learning rates in percentages)



1 Anderson D, and R H Williams (1993) "The Cost-Effectiveness of GEF Projects". UNDP/World Bank Working Paper 6. Washington DC: World Bank (part of the initial GEF working paper series). Based on the learning curve coefficients reviewed by A. McDonald and L. Shreattenholzer (2001), "Learning Rates for Energy Technologies", Energy Policy 29: 255-261, who give estimates for several other technologies and from other sources.

There is a gap in the aggregate of current efforts across countries to develop the new technologies. Until they occupy roughly 2-5% of the market, it is not possible for them to compete with mature technologies—whose costs are also declining, albeit more slowly in relative terms—with technical progress. Exceptions are the 'niche' markets such as those that GEF projects under OPs 5 and 6 are focussed on. The financing requirements during this phase are too great for the GEF alone to shoulder. Yet many of the technologies are well suited to developing regions. The question is how the GEF or some sister organization might work with national programs in the OECD countries to foster the emergence of the new technologies in developing regions

Three closely related proposals have been put forward:[2]

- Create a consultative group on clean energy, modeled on the very successful Consultative Group on International Agricultural Research. (Proposed by Maurice Strong at special GEF panel meeting in New York, January 31, 2002.[3])
- Form a multilateral framework for channeling private sector financial resources into energy technological innovation—perhaps in the form of a "demonstration support facility" and/or a "clean technology obligation".
- Build on the Bonn/Marrakech climate accords to frame a set of linked energy, technology and related initiatives taking advantage of the Kyoto Protocol mechanisms.

Related to these are proposals by the IEA, the G8 Task Force on Renewable Energy, the GEF Secretariat, numerous NGOs and STAP II (in several meetings) to complement any such initiatives through the encouragement of a favorable policy environment for innovation and the adoption of 'clean' technologies in developing regions.

The above three proposals (and the arguments for supporting policies) are attempts to find ways of advancing the 'technology frontier' and reducing the costs of promising zero-carbon and carbon-neutral technologies in their early phases of development. The Consultative Group arrangement put forward by Maurice Strong has the advantage of appealing to an approach that has had four decades of success, in the equally difficult area of agriculture. It is relevant to add that, given the effects of climate change on yields in agriculture, the CGIAR is now turning, with the help of the GEF, to undertake research on agricultural adaptation to climate change.

The Climate Task Force of STAP II believes that the GEF should support Maurice Strong's proposal, and seek ways of taking it forward. In the first instance, it might seed fund the initiative as part of a GEF multi-regional project operation. Once established, it would be financed and managed as a separate operation to the current operational programs of the GEF.

Since a working title would be needed, it is proposed to call it an initiative to develop a Consultative Group on International Energy Research (CGIER). The STAP should help the GEF in this endeavor by working to win the support of the international scientific and engineering community for the idea.

There is, of course, no contradiction between this idea and the others noted. Many energy analysts makes the valid point that private funding is also crucial, principally to secure the participation of

2 See the review by Golbemberg, Martinot and Miller, cited earlier.

3 A similar proposal was made by World Bank staff in a symposium held with the US National Academy of Sciences in 1994: *Marshaling Technology for Development: Proceedings of the National Research Council*, Washington DC: National Academy Press. Also Ahmed and Anderson (1995), "the case for a solar initiative." World Bank Technical Working Paper Series. Washington DC: World Bank.

industry and draw on its expertise. Others similarly note that other resources could be brought to bear on technology development, and thus that any such initiative would have considerable financial leverage. The leverage would in fact be substantial—perhaps as high as 2:1 or 3:1.

What sort of projects might be financed? Examples discussed so far are:

- An international program of advanced thermal solar projects
- Grid-connected PV systems, modeled on the solar roof projects in several OECD countries.
- Offshore wind, wave, solar and tidal stream projects
- Fuel cells for decentralized electricity supplies
- Experiments in hydrogen production, storage and utilization
- Projects to restore degraded lands, forests and watersheds, and to provide bio-energy.

As with the current operational programs of the GEF, however, the portfolio would need to be worked out when the consultative arrangements are being established.

4.2.5 Transport

The GEF Transport portfolio (Operation Program, OP 11) is currently dominated by technology-oriented options. Major initiatives promoting fuel cell technology and electric/hybrid vehicles have been launched. Close to 70% of the full projects in OP11 are promoting either fuel cells or hybrid electric vehiclesConcern has been expressed over the limited number of GEF initiatives aimed at promoting non-technology options that can lead to significant modal shifts to more efficient and less polluting forms of public and freight city transport (i.e. from personal motorized transport to mass transit, buses, bicycles and walking).

A number of studies indicate that non-technology options for stimulating modal shifts can ensure short term as well as long-term abatement of GHGs emissions from urban transport systems at relatively low cost. Examples include integrated urban, land use and transportation planning; increased reliance on bus systems; traffic management and avoidance; and, fuel/vehicle tax/import duty policies. While it is somewhat intuitively straightforward to see how such non-technology options can lead to long-term modal shifts to low-GHGEs urban transport systems, it is less clear which set of options should be given priority in a developing country context. The criteria for the selection of appropriate options and the ideal sequence of implementation of identified options are also largely unknown.

A March, 2002 STAP Workshop on Sustainable Transport recommended that the GEF aggressively pursue the following options that are likely to be the most beneficial and deserve special attention from future GEF sustainable transport initiatives:

- Public Rapid Transit (PRT) which encompasses Bus Rapid Transit (BRT), Light Rail Transit (LRT) and Trolley Electric Buses (Tbuses).

- Traffic Demand Management (TDM) which includes parking measures, traffic cells, areas licensing (restricted zones) and congestion pricing.

- Non-Motorized Transport (NMT) which encompasses physically-separate NMT lanes and networks, traffic calming, strengthening NMT manufacturing and/or maintenance enterprises and

improving NMT vehicles.

- Land-Use Planning (LUP) through regulatory measures (zoning laws) and judicious location of new public facilities such as schools, hospitals, police stations and playgrounds (i.e. place public facilities in transit-friendly locations).

In addition, the Brainstorming session stressed the importance of the following crosscutting issues that should be addressed irrespective of the option that is being promoted:

- Collection and dissemination of data and information on options and respective impact.
- Participation, promotion, social marketing and awareness creation.

The STAP Brainstorming Session on Transport noted that the dissemination of success stories is still inadequate. It recommended that GEF considers the possibility of organizing regional workshops (starting with Africa which currently has no full OP 11 project) to encourage the adoption of the aforementioned proven and successful non-technology measures to a wider audience.

Because of the time limitations, the Session did not address the freight transport issue. Participants, however, noted its importance and stressed the need for further STAP attention on the issue of GHGEs from freight transport.

4.3 Priorities

From the preceding sections on gaps and emerging issues in the Climate Change focal area, it is clear that the range of questions that STAP III can address vary widely and are probably too numerous to be comprehensively addressed within the time and resource limitations of STAP III. Some form of prioritization is, therefore essential. STAP II carefully reviewed the current status of GEF portfolio, the numerous gaps and emerging issues as well as the comparative advantage and limited resources (especially time) available to STAP to propose the following priorities:

- *Efficiency:* Proposed options for strengthening GEF's role in improving the efficiency of future buildings stock in developing countries.

- ***Renewables:*** Recommend innovative, low cost and sustainable initiatives aimed at reducing GHGEs from biofuels use in developing countries.

- *Reducing the long-term costs of new sustainable energy technologies:* Suggest effective institutional and financial mechanisms – involving both the private and public sector - for the establishment of a network of research centres of excellence in the developing world that would address the question of advancing renewable and energy efficiency technologies in the developing world.

- ***Transport:*** Recommend the most attractive options for diversifying the GEF portfolio (which is currently heavily focused on fuel cells and electric vehicles). Identified options include:

    - Public Rapid Transit (PRT), which encompasses Bus Rapid Transit (BRT), Light Rail Transit (LRT) and Trolley Electric Buses (Tbuses);
    - Traffic Demand Management (TDM);
    - Non-motorized Transport (NMT); and,

- Land-Use Planning (LUP).

- Address the question of how to reduce GHGEs from intra and inter-city freight transport;
- Propose institutional options for improving the collection and dissemination of data and information on the impact of various sustainable transport options; and
- Recommend innovative measures for enhancing participation, promotion, social marketing and awareness creation of sustainable transport options.

Cross-Cutting (Important to all Energy OPs)

- Evaluate the importance of modularity as an ideal approach for GEF energy interventions. Modularity refers to small-scale modular technologies that allow concept and pilot testing at low cost and low risk. For example, the Bus Rapid Transit (BRT) in urban transport can be tested through a few pilot road trunkways allowing the evaluation of the concept prior to full-scale implementation.
- Suggest how GEF can ensure that greater attention is given to upstream capacity building and policy formulation issues that are central to sustainable energy interventions.
- Develop a flexible set of tools (regulatory, fiscal, technical guidelines) that promote sustainable energy in a rapidly reforming energy sector.
- Evaluate the impact of energy sector reforms (as well as reforms in other sectors with significant impact on energy use e.g. transport) on sustainable energy development (energy efficiency, renewables, clean transport modes, etc).
- Propose options that would ensure the development of sustainable energy alternatives while capturing the benefits associated with market liberalization and competition.
- Suggest GEF interventions that would ensure continued support (and possibly increased) for medium and long-term energy R&D in a reforming energy sector.
- Identify win-win options that would promote sustainable energy in a rapidly reforming energy sector while ensure the provision of low-cost energy services to the rural and urban poor.
- Recommend measures that would protect the interests of the poor in GEF climate interventions.

5.0 Adaptation

5.1 Background

The Global Environment Facility (GEF) in order to respond in a timely and effective manner requested STAP II to provide strategic guidance scientific and technical advice on *Adaptation*. In response, STAP organized a Brainstorming Session in March, 2001 to explore, in a preliminary manner, the various elements which could form the basis of a GEF program for *Adaptation* and a SAP Expert Group Workshop on Adaptation and Vulnerability from February 18-20, 2002. These two activities assisted STAP in providing strategic advise to the GEF on this issue.
The initial COP/UNFCCC guidance can be summarized in the following fashion:

- Stage I activities: Identify impacts (particularly for vulnerable countries/regions) and policy options. GEF was requested to fund Stage I activities in the context of national communications.
- Stage II activities: For particularly vulnerable countries/regions, identify measures, including capacity building, to prepare for *Adaptation*. The GEF was also requested to initially fund Stage II activities in the context of national communications.
- Stage III activities: Identify measures to facilitate *Adaptation*, including insurance schemes.
- The Kyoto protocol established the Clean Development Mechanism (CDM) as a source of funding

for *Adaptation* and envisaged the future establishment of a dedicated *Adaptation* fund.

COP7/UNFCCC guidance recommended that *Adaptation* activities are financed by the following three new funds to be operated by the GEF:

- Special climate change fund.
- Least developing countries (LDC) fund to support LDCs in implementing the Convention and, in particular, to address their *Adaptation* needs.
- A new *Adaptation* fund to finance *Adaptation* projects and programs.

The GEF was requested to provide financial resources for the following activities:

- Strengthening the implementation of country-driven Stage II *Adaptation* activities.
- Establishing pilot or demonstration projects to show how *Adaptation* planning and assessment can be practically translated into projects that will provide real benefits, and may be integrated into national policy and sustainable development planning.
- Enhancing the capacity of sub-regional and/or regional information networks on vulnerability and *Adaptation* assessment.
- Building the capacity for preventive measures, planning, preparedness for disasters related to climate change, including early warning systems.

5.2 Gaps and Emerging Issues

Given the evolving state of *Adaptation* science, the Workshop made an initial attempt at identifying key gaps in the current knowledge about *Adaptation* in selected sectors as a basis for a more targeted approach for addressing *Adaptation* options. The following table presents an indicative list of gaps for selected sectors.

Major conclusions that can be drawn from the table is the lack and/or inadequacy of baseline data to meet the demands of assessment of vulnerability and *Adaptation* and the need for a better understanding and enhancement of adaptive capacity. What emerges is the need for mechanisms, particularly at the national and regional/sub-regional levels, to systematically collect, analyze and maintain appropriate data and databases which would facilitate the assessment of vulnerability and the social and economic costs associated with the implementation of *Adaptation* measures.

Areas	Knowledge Gaps
1. Biodiversity Loss	**General:** • Incomplete inventory of biodiversity (Globally, 2-20% of species have been identified); • Regional and local variations in pressures and drivers (e.g. land use changes) affecting biodiversity loss? What biodiversity is being lost? • Threshold limits of biodiversity for maintaining ecosystem structure and function; • Factors affecting species survival and extinction; • Linkages between biodiversity and ecosystem structure and functions, and ecosystems resilience; • Progress being made at the eco-regional level to understand pressures affecting biodiversity in Millennium Ecosystem Assessments (MEAs).
	Ecosystem Goods and Services: • Details of linkages between biodiversity and ecosystem goods and services; • Option, bequest and existence values of biodiversity being lost or changed; • Discrepancies between the direct local value of biodiversity and its direct market value; • Details about the importance of ecosystem processes in providing ecosystem good and services.
	Protected Areas: • The biodiversity content of protected areas, and their protection level.
	Corridors: • The importance of linear and non-linear stepping stones or corridors for biodiversity connectivity on landscapes; • The risks of corridors, and of introducting invasive species, pests and diseases; • Knowledge about landscape design and climate in terms of protected and non-protected areas.
2. **Human Settlements / Infrastructure / Health**	• Insufficient knowledge on cause-effect relationships (particularly for secondary impacts); • Insufficient information to quantify impacts; • Following from the above: inability to identify critical thresholds (also a political decision); • Specific decision criteria for adaptation options; • Limited understanding of livelihood vulnerability and resilience, particularly in marginal parts of cities; • No tools to measure the effectiveness of planning and policy; • Limited knowledge on how to involve the private sector in adaptation; • No methods for social impact assessment in relation to climate change; • Need to make more systematic use of indicators, based on case studies and anecdotal evidence; • Need for long-term data collection and evaluation; • Need for better understanding on how to influence behaviour;

	• Need for knowledge on how to address barriers.
3. **Coastal and Marine Resources**	• Baseline information (water resources inventories, coastal morphology, fish stocks, etc.); • Existing adjustments communities have made to climate related impacts (fishing communities to reduction of revenue base during EL NINO); • Development and operationalization of a RISKS approach to adaptation to Climate Change; • Lack of site specific information needed to mainstream adaptation; • More effective development and use of socio-economic scenarios/plans/director at local/regional levels; • Adaptation Baseline Information; • Integrated Toolkits to link Systems Components; • Impacts of Economic valuations of water Resources.
4. Agriculture:	• Inadequate data and availability restricted, including government and farmers (and researchers); • Meteorological, crop, yield, water requirements, growing season calendar; • Monitoring of climate trends and outlooks relevant to agricultural planning.
	Prospective agricultural technologies: • New crop varieties; • New cultivation practices; • Identification of how existing technologies might be of benefit to different uses and conditions; • Local and regional climate forecasts.
	Multiple Stresses: • Multiple stresses and relative importance of climate and climate change in agricultural systems and food security
	Methodologies, Methods and Tools: • Existing V&A studies are inconsistent; • Limited range applied and not accessible to all countries; • Very limited in some sectors – e.g. livestock systems; • Technology transfer between institutes.
	Scales: • Focus on plot/farm scale incomplete, need ecosystem services, catchment resources; • Regional scale for markets, planning, resources, extension services.

Closely related to the issue of gaps in current scientific knowledge is the question of how to bring science and technology to bear on the process of incorporating *Adaptation* measures into sectoral policies and development projects. Key barriers to incorporation of the *Adaptation* perspective in policy that have been identified to date include:

- Uncertainties associated with climate change and the artificial distinction between climate variability and change.
- Inadequate awareness and knowledge on *Adaptation* at the policy and decision-making levels.

5.3 Priorities

As demonstrated by the very long list of gaps and emerging issues, *Adaptation* is a new science with numerous scientific and methodological questions that are still unanswered. The following listed priorities are not, by any measure, comprehensive but designed to provide suggestions for near-term priorities that STAP III may wish to take on board.

- *Adaptation* requires a very broad approach in both its science and policy responses. In the near term, it is recommended that STAP III provides guidance on options that would ensure the required broadening of the traditional sector-specific and discipline-specific approaches prevalent in current science and policy communities, respectively.

- Review the suitability of the incremental cost model to the *Adaptation* question and, if it proves appropriate, suggest methodologies for its effective implementation.

- Propose how GEF could establish capacity building as the core activity of *Adaptation* initiatives. The complexity of the Adaptation issue that demands flexible responses across numerous sectors at both policy and field levels presents developing countries with an enormous capacity and skill development challenge. Skilled Adaptation scientists and practitioners who can meet these enormous analytical and implementation challenges and who can build on existing local and indigenous know-how are simply not yet available in many parts of the developing world. Development of this critical mass of expertise is clearly an important priority for the GEF portfolio and STAP III should take the lead in providing the requisite technical and strategic advice.

- Recommend options for streamlining the various steps needed for *Adaptation* interventions (e.g. from risk assessments to surveys, planning and finally implementation).

6.0 Generic Cross-Cutting Issues

6.1 Scientific and Technical Tools for Addressing Cross-Cutting Issues

Several priorities are mentioned in all the previous five sections and could, arguably represent the most important priorities for STAP III. The first priority that is underlined in the priorities of all the focal areas is the need for the development of practical scientific and technical tools and approaches that would enable the GEF to address cross-cutting issues. Bio-diversity, land degradation, water, climate change, *Adaptation* are, in many respects, interrelated.

GEF activities and operational programs as well as institutional arrangements are, on the other hand, characterized by specialization. There is limited cross-sectoral interaction. As one of the few GEF institutions that were designed to be cross-sectoral, STAP is particularly well placed to address this challenge. It is, therefore, recommended that STAP III place high priority on the development of practical scientific and technical tools for addressing cross-cutting issues within the GEF portfolio.

6.2 Capacity Building

Linked to the cross-sectoral question is the issue of new capacity building efforts needed to develop expertise and skills that can address cross-cutting issues. All the focal area priorities stress the importance of local capacity building. STAP III should consider setting aside significant amount of its time and attention to providing advice on the design of the most effective capacity building initiatives across the various GEF Focal areas.

6.3 Local participation and indigenous knowledge

Another important priority that is repeatedly mentioned in all focal areas is the urgent need for methodological approaches for ensuring local participation and facilitating the use of the enormous reserves of indigenous knowledge. While local participation and indigenous knowledge are often perceived as being not particularly relevant to the energy projects in the Climate Change portfolio, there is growing evidence that GEF energy interventions could benefit significantly from a better understanding of the importance of local participation and indigenous knowledge.

For example, renewable energy resource assessments would greatly benefit from local indigenous know-how. Local participation can facilitate and substantially reduce the cost of sustainable transport initiatives such as non-motorized transport projects. It is recommended that STAP III pays special attention to the issue of local participation and indigenous knowledge.

6.4 Poverty and Equity

Closely linked to the issue of participation and indigenous knowledge, is the importance of addressing the impact of GEF programs on poverty and equity issues. Experience has show that it is difficult to realize project implementation success if the impact on poverty and equity is not addressed. Technologies and interventions that are perceived to be inequitable and that may be entrenching the interests of local elite groups and international investors are likely to be resisted and could lead to project failure. To date, there has been limited discussion on whether GEF interventions in the various

focal areas address poverty and equity concerns.

For example, in the Climate Change focal area, investments in high-tech and capital intensive technologies such as large-scale solar thermal plants for power generation could be perceived as inequitable as most of the critical and high cost components are imported thus yielding large benefits to international equipment and technology suppliers. In addition, for many developing countries with low levels of electrification, the generated electricity would largely benefit high and medium income groups who have access to electricity services. A similar case of inequitable impact can be made with respect to fuel cell technologies and with respect to the deployment of sophisticated modeling tools in both the climate and water focal areas. More attention on increasing the value of local content that, in turn, leads to increased local employment and enhances local incomes could help in addressing equity concerns. It is, therefore, recommended that STAP III pays special attention to the equity and poverty dimensions of GEF operational programs and advises on how the GEF can address these issues in a comprehensive fashion.