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10 Sepember, 2002

A report to the Inspector General of Forests of the
Pakistan Ministry of Environment and Rural Development;
The Pakistan Forest Institute, Peshawar; WWF-Pakistan; and LEAD – Pakistan

A project concept for capacity building in forest biodiversity conservation for Pakistan 2002 – 2007

Ara – Rwal, a partially protected mosaic of dry woodlands in the Salt Range of north-western Punjab, Pakistan, photograph by Gordon Brent Ingram

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Executive Summary

This report* is an impartial assessment of the needs and prospects for an extended initiative on capacity building for forest biodiversity conservation in Pakistan. This assessment has involved research, interviews, ongoing email contact, and field work in three missions to Pakistan over the last two years. This document focuses on the particular needs for and interests in such an initiative, explores the particular set of activities that could allow conservation of native forests to contribute to local development, and identifies the institutions, agencies and organisations, and respective experts, who could best contribute to programme development.

Biological diversity is inheritable variation and the populations, ecosystems, landscapes and dynamic processes that sustain it. Forest biological diversity is that which is associated with ecosystems dominated by trees and, in the case of rangeland, perennial shrubs that can grow into tree forms. The biological diversity of a particular landscape unit is typically conceived as three strata: ecosystems, species and intra-specific genetic diversity. The greatest single threat to loss of biodiversity today is from habitat modification and destruction, especially loss of forests, associated with human land use. Some other more common causes of loss of biological diversity include over-exploitation of certain species, introduction and invasions of non-native species which have few controls in local ecosystems and the beginnings of the onslaught of climate change and sea level rise. When

* The opinions in this report are intended to represent those of the author, only, and do not necessary reflect the policies or interests of any institution in Canada, Pakistan or elsewhere.

habitat, unique ecosystem types, species and complexes of genes are lost so are options for current and future development. In every community are groups of people, who are particularly invested in the continued existence of certain species, habitat, and ecosystems – stakeholders who become more vulnerable and poorer when these natural services deteriorate or are lost. Conservation interventions can enhance options for improvements in the local quality of life, including standard indices of social development, or can effectively further impoverishes more vulnerable groups. Only forms of forest biodiversity conservation that both maintain local species, genetic diversity and ecosystems while enhancing a range of strategies for social development, particularly of the rural poor, are viable, sustainable and ethically defensible.

Throughout the world, there are major deficiencies in capacities for forest biodiversity conservation. In the world today, the gaps in expertise in Pakistan are particularly acute. One reason is that there tend to be lower levels of knowledge on conservation requirements for drier forest, woodland and rangeland types – and poorer levels of knowledge on the threats to and losses of associated biodiversity. If left unattended by the international community, these losses (and associated deficiencies in education, research and associated institutional capabilities) around forest biodiversity will increasingly limit options for social development in rural (and increasingly urban) Pakistan. The biggest gaps in capacities, for slowing losses of native forest and enhancing local development through biodiversity conservation, that has been identified is in postgraduate and professional education. Without an increase in research, conservation and project management expertise, extending to social as well as natural factor, Pakistan will be increasingly unable to take advantage of and qualify for international funds for forest biodiversity research and conservation.

The core of this concept for capacity building, and its problem statement and priority topics in a subsequent curriculum, can therefore best be based around strategies to minimize not only the loss of forest biodiversity but the associated of development options. But how exactly can loss of biodiversity preclude future development options and actually contribute to further declines in the quality of life in Pakistan? There are a group of natural services that are effectively removed when certain forest habitat and species become extirpated, as in local disappearances, or even become extinct (throughout the region and world).

- Local communities become poorer when they no longer have access to species and habitat to which they depended and which they did not pay for. Some of these species and habitats may have made unique contributions to diets, health care delivery, housing and culture which cannot be readily replaced.
- When substitutions for lost species, habitats and natural services are possible, the displaced uses either put additional pressure on remaining species and habitats or involve purchase of substitute products. The need for purchase of more goods, on what is often the same or declining real income, effectively takes away income needed for other important products, such as food, medicine and education. Thus, communities in largely subsistence economies, or that were formerly subsistence

economies, are made effectively poorer with the loss of formerly free products and services. These social losses extend from the more subsistence-oriented communities to most of the rural poor in Pakistan.

- The relationships described above extend well beyond the more remote parts of Pakistan to the suburbs and even the more urban cores of most of the country's metropolitan areas. Native forests, and associated habitat and species, have been particularly vulnerable to intensification of agriculture, expansion of infrastructure and other forms of urban sprawl.
- The relationship between loss of native forests and the deterioration of freshwater resources in Pakistan, in recent decades, has been poorly assessed but is indisputable. Typically, the poorest people, most dependent on common resources and spaces, have been most vulnerable. But the loss of native forest, even if it was only scrubland, have contributed to the higher cost of living, and a lowering of living standards, to the remainder of the economy more directly dependent on district, provincial and national markets. In some areas, there appear to be similar relationships between forest loss and social impoverishment at work around fuel wood and medicinal species.
- The benefits of native forests to adjacent agriculture have not always been well-documented for Pakistan except in maintaining microclimate and water regimens. But certainly the loss of any native trees, in a country with such dramatic rural population increases and agricultural intensification causes strains on the remaining ecological (and social) infrastructure.

As well as causing direct declines in current living standards, extinguishing of forest biodiversity is contributing to losses of badly needed options for further socio-economic development – including possibilities for project that could have taken place in the near future as related to:

- ecotourism;
- new forms of agriculture and agro-forestry;
- heightened production of natural products associated with native ecosystems and less desiccated landscapes;
- surveying, conservation and utilization of the genetic resources of wild species; and
- improvement in watersheds and water output through restoration of forests with well-adapted native forest species.

There is a third category of losses that can be considered kinds of social costs that are displaced on to other groups and organizations.

- The damage caused by degradation and conversion of the remaining natural forests of Pakistan will create more work for Forest Departments and park managers further over-extending government programmes.
- Displacement of people from subsistence livelihoods, centred on native forests, creates more pressure for education, retraining, and job creation at a time when unemployment levels are continuing to rise.

- Women and children are often more vulnerable to losses of the biological resources and natural services of native forests than are adult males in large part because of the continued obstacles to females for education, employment and wage-based income generation.
- Similarly, tribal (and related cultural, religious and language) minorities are more vulnerable to loss of native forests and forest biodiversity and often are caught in dilemmas around survival strategies: between worsening poverty while attempting to maintain traditional lifestyles or assimilating in ways that are unsatisfying and that risk cultural impoverishment.
- The resulting impoverishment of rural populations, in areas formerly dominated by native forests, woodlands and scrubland are contributing to migrations to cities and towns putting additional pressures on Pakistan's urban environments.

Poverty alleviation has become an integral part of viable, biodiversity conservation, and protection of forest biological resources has become crucial to rural development.

A number of developments were identified that require new educational and research initiatives in order to adequately conserve the remaining native forests, and associated landscapes, species, and genetic resources in Pakistan.

- The loss of native forests and associated species appears to be intensifying as rural poverty deepens.
- Fields relevant to forest biodiversity conservation, such as conservation biology and environmental planning, have expanded dramatically – with environmental management and forestry programmes in Pakistan not keeping current.
- There has been a marked insufficiency in international support for forest biodiversity conservation in Pakistan, especially around education and research, because of lack of knowledge of remaining forest in the country and drift towards isolation since the country became a nuclear power.
- There has been a growth in methods of better linking forest conservation and local development – approaches that have often not been transferred to Pakistan.
- Pakistan is rich in local knowledge on forests, biodiversity and local approaches to stewardship and conservation. Yet few approaches to respect for and use of local knowledge have been integrated into forestry and environmental management in Pakistan.
- The role of ecotourism in forest biodiversity conservation that contributes to local development has been barely explored within Pakistan.
- Over the last two decades, a global movement has emerged for (forest) ecosystem restoration that while have great relevance to the country has rarely been covered in courses and research programmes.
- The implications of and benefits from native forest (species) conservation and restoration has been poorly explored for Pakistan's suburban and urban areas.
- Frameworks for stakeholder analysis, extending to the various social groups with interests in forest biodiversity and its conservation, have become more sophisticated – though remain poorly explored for contexts in Pakistan.

This concept for capacity-building is a response to three structural gaps and eight poorly attended topics in current educational and research aspects of forest conservation and management programmes in Pakistan.

- The current educational offerings around forest and biodiversity in Pakistan are not fully preparing individuals to conduct research in the kind of under-funded and unstable organizational settings that have almost become the norm in Pakistan. In other words, the kind of problem-solving necessary, for these kinds of difficult research situations is not reflected in curricula.
- A second weakness, in current educational offerings on forests and biodiversity, is around the lack of education for individuals to be cross-sectoral and to involve the wide range of stakeholders who might have the combined set of resources to protect a forest ecosystem or species.
- A third structural weakness, in current educational offerings on forests and biodiversity, is that there is no real national centre for forest biodiversity research and training. The only national educational centre, on forests and wildlife, is the Pakistan Forest Institute. It has been consistently under-funded and attacked by non-governmental organisations. However, NGOs in Pakistan have not been interested or capable of developing an alternative to the PFI. What workshops, outside of the PFI, that have been developed, on aspects of forest biodiversity conservation, have not been made available on a regular and dependable basis nor have they involved the level of instruction necessary for actual and somewhat comprehensive conservation.

There are a number strategic expertise and skills, that are necessary to develop and implement goals in forest diversity in coming years that are not presently being taught or are being insufficiently covered in current postsecondary curriculum in Pakistan. The following aspects of forest biodiversity conservation are where skill levels, for forest biodiversity conservation, of professionals appear to be weakest in Pakistan and there are the most pressing needs for more capacity building:

1. field work in more remote areas;
2. field work on species and ecosystems at risk (with expertise and knowledge needed for specific forest types, ecosystems, types of organisms, and species);
3. identification of critical habitat for species and ecosystems at risk of regional disappearance (extirpation) or complete disappearance (extinction);
4. field work and ecogeographical surveying on species with genetic resources;
5. regional and national levels of monitoring & assessment the status of native forests and associated ecosystems and species;
6. mapping and geographic information systems for an increasing range of scales and uses;
7. GIS better linked to decision-support for land use planning, land management and conservation planning;
8. modelling with spatial components (linked to GIS);
9. site planning (often linked to conservation planning and restoration);

10. ethnographic techniques for obtaining local knowledge;
11. ethnographic, cross-cultural and communication techniques for research on local management of forest ecosystems and resources;
12. ethnographic, cross-cultural and communication techniques for collaborative and locally based forest conservation and development concepts, proposals and plans;
13. communication and media skills in transmitting concepts about forests, species, conservation, sustainability and local development;
14. spatial planning, at various scales, for biodiversity conservation (involving various protected area categories and managed landscapes) (and often involving digital tools such as GIS);
15. institutional analysis, policy development, programme development and problem-solving at provincial and more local levels;
16. ecosystem recovery strategies for particular wildland and biodiversity rich areas, such as the Salt Range, involving a range of agencies, levels of governments and sectors;
17. restoration goals and techniques for native forests and species; and
18. urban forestry and restoration of native perennials in cores of cities and suburban areas.

The central aspect of the strategy for capacity building and transfer of expertise is to create a critical mass of Pakistani professionals, educators and scholars actively engaged in and communicating about research on forest biodiversity and integrating conservation programmes into sustainable development. The following are the key aspects of this strategy.

1. Central to this capacity building concept is the creation of an annual M.Sc. and post-M.Sc.-level course. After considerable discussion, the concept that is most attractive to people interviewed is the establishment of an annual, month-long course where half of the time is in the field. Each year, the focus of the field work could shift to a different native forest ecosystem type and set of threatened landscapes and species.
2. Part of the topics in such a course would extend to further training in being educators, trainers and supportive peers for some aspects of forest biodiversity research and conservation in Pakistan.
3. A key aspect of the intensive course would be a supervised final project, on forest biodiversity research and conservation that would be developed cooperatively between the student, their employers and the educators in the course. The student could then have a period such as three months to complete a modest research design, conservation plan or programme proposal as part of their professional work. The educators from the intensive course could provide email supervision and at least one field visit as part of support for this aspect of the educational experience.
4. Another aspect of the strategy would be to involve current M.Sc. students by increased supervision of and support for M.Sc. thesis research when it involved forest biodiversity conservation.
5. As well as the intensive course, a series of specialized, week-long workshops, in advanced topics will be necessary to develop adequate levels of expertise.

6. Such a course could eventually be expanded to a certificate programme with week-long workshops, on more specialized topics, were offered semi-regularly as follow-up to the core course. The certificate programme could function as part of a modest kind of post-M.Sc. certification or perhaps one day the core of an M.Sc. programme on forest biodiversity conservation.
7. The development of the core course and workshops would be intended to involve on-going collaboration of the following experts:
   a. Pakistani experts already involved in forest biodiversity research, conservation and postgraduate education at the major national institution on forests, the PFI;
   b. Pakistani experts involved in forest biodiversity research, conservation and postgraduate education in other educational institutions, in government and in NGOs; and
   c. At least one, foreign, mid-career or senior educator and researcher would be necessary -- with achievements in teaching, publications and forest biodiversity conservation programmes. To provide sufficient outside support, it would be necessary that at least one of the foreign advisors had an ongoing advisory appointment, to either the PFI or another Pakistani university, that was at least half-time every year for a number of years.
8. The group that forms to offer the course, workshop and supervision could also provide consultative services on government and nongovernmental project development. The support that the network of experts could provide to agencies and organizations would be, effectively, a set of extension services – the kinds often provided by educational institutions.

As for possible administrative structures for project development, the only group that has expressed a prolonged interest, in providing an administrative home for an extended initiative on research and education for forest biodiversity, is the PFI. WWF-Pakistan and LEAD-Pakistan have both expressed interest in organizing and obtaining funding for more workshops related to more specific topics. The problem is that the PFI, as a government institute with ties to the University of Peshawar, is barely able to maintain the programmes around forests and forestry for which it already has a mandate. And the Wildlife Management Branch of the PFI is particularly under-funded and in need of new sources of funding for field work, transport and equipment. Even if modest levels of funding are obtained for capacity building in forest biodiversity conservation, as it appears likely, an administrative structure is necessary that does not overwhelm and complicate the broader educational and research responsibilities of the PFI. One solution is to provide the initiative with an administrative home at the PFI while creating a separate, advisory body and secretariat involving the participation of government and even international agencies, nongovernmental organizations and scientific researchers. Such framework could be designed to insure that funds and equipment for this project remain allocated to research and capacity building in forest biodiversity conservation.

The features of such an initiative, based at the PFI, could include the following features.

- The location of the course(s) could be half at PFI and half time in the field and in other postsecondary institutions in the country.
- The field locations could change each year to focus on different forest ecosystems.
- The workshops could be organized for relevant areas of the country.
- An advisory council could be responsible to organizing funding with a high degree of transparency.
- The PFI already has a collaborative link with the University of Peshawar. There may be advantages in offering the intensive course and a future M.Sc. programme, for forest biodiversity conservation, jointly between the PFI and other postsecondary education institutions.

There would be a number of ways for other institutions to affiliate with such an initiative – that today has the formal interest of the

- PFI,
- Karavan Leaders and
- side stream environmental design.

One means for additional groups to affiliate with such an initiative is through an advisory body – that works to obtain funds for a programme administratively 'housed' at the PFI.

Another way that other institutions, agencies and organizations could affiliate with this project is through the following cooperative relationships:

1. applying for admission and paying (in money or in-kind support) close to the real costs of the training for personnel from those collaborating organizations;
2. collaboration around research and conservation programmes during and following field aspects of courses and workshops; and
3. contribution of experts for guest lectures in the course or particular workshops.

So far, the only nongovernmental organisations in Pakistan that have expressed interest in more capacity building for forest biodiversity conservation have only been WWF-Pakistan and LEAD-Pakistan.

The following project phases and activities would be the most important operations in the initiative.

Phase 1:
2002 - 2003
Development of organizational and fund base and curriculum for intensive course

1. development of an annual M.Sc. and post-M.Sc.-level course intensive course
   a. development of the initial curriculum
   b. initial development graphically oriented lectures and other educational materials

   c. consultative workshops and tutorials with participating PFI staff and graduate students
   d. presentation of the relevant lectures as part of consultative workshops and tutorials
   e. beginning of a transfer framework through assignment of responsibilities for further development of lectures
   f. beginning more comprehensive strategy for transfer of the material and expertise to national counterparts
   g. evaluation of the initial consultative workshops
   h. initial field surveys in the Salt Range
   i. first offering of the month-long course
   j. initial prospectus for the first intensive course
   k. development of application forms and selection procedures

2. further training educators, trainers and supportive peers
   a. consultations on the topics, illustrative material available, and the most appropriate means to make presentations – in terms of the capacity building
   b. discussion of needs for capacity building

3. supervision of the final projects
   a. compile a set of educational objectives for the supervision
   b. linked application involving each applicant's employer
   c. first and second supervisor assigned for support in completion of the final report
   d. setting grading and other evaluation criteria
   e. creating evaluation procedure for gauging the benefits of the final projects

4. support and supervision for M.Sc. students
   a. consultative meetings with the Pakistani experts to list of current gaps in M.Sc. research support
   b. identification of needs for additional supervising around forest biodiversity conservation
   c. identification of a set of additional or strengthened kinds supervision activities
   d. first supervised M. Sc. students embark upon some the topics
   e. evaluation of quality of the M.Sc. research in forest biodiversity conservation.

5. specialized, week-long workshops
   a. consultations on topics for workshops
   b. setting a list of priority workshops for 2004 – 2005 period
   c. organizations choose to organize and develop particular workshops

6. expansion of the intensive course and workshops to a certificate or M.Sc. programme in forest biodiversity conservation
   a. consultations with Pakistani experts

7. increase levels of collaboration between Pakistani experts
   a. compilation of list of Pakistani experts involved in forest biodiversity conservation
   b. formation of an advisory group
   c. compilation of list of programme managers and other possible clients
   d. locate other researchers and professionals
   e. initial email list of Pakistani (and foreign) experts
   f. identification of communication and information needs of experts

8. consultative and other extension services
   a. discussion paper on consultation and extension needs
   b. initial discussion of priorities for an expanded research programme

Phase 2:
2004 – 2005
Development of intensive course, workshops & research framework

1. further development of annual intensive course
   a. evaluation of first full intensive course with adjustment to course structure and material
   b. supervision of the final projects of the students from the first course
   c. evaluation of links between the final projects and capacity building
   d. evaluation of 2003 course field work, in the Salt Range, with choices on field locations for subsequent offerings of the course
   e. revised prospectus and application forms for the 2004 and 2005 intensive courses
   f. intensive course offered second and third time
   g. evaluation of second and third offerings of intensive course
   h. strategy for complete transfer of the course by the end of 2007

2. further training as educators, trainers and supportive peers
   a. consultative meetings
   b. production and distribution of educational materials to graduates of the intensive course
   c. national conference on the status of forest biodiversity in Pakistan with discussion of educational needs

3. supervision of the final projects
   a. consultative meetings
   b. national conference on the status of forest biodiversity in Pakistan and discussion of educational and extension needs

4. M.Sc. thesis research in forest biodiversity conservation
   a. evaluation of the first theses of the initiative
   b. initiation of new M.Sc. thesis research and its supervision
   c. discussion paper on additional supervising needs for M.Sc. thesis research

   d. expanded supervision and support for M.Sc. thesis research
   e. evaluation of the quality of the M.Sc. research in forest biodiversity conservation.

5. workshops
   a. scheduling and development of the expanded set of workshops
   b. evaluation format and evaluation of the workshops
   c. priorities for workshops for 2006 and 2007

6. certificate or M.Sc. programme in forest biodiversity conservation
   a. discussion paper for expanded and structured set of post-graduate offerings in forest biodiversity conservation
   b. consultative meetings to determine the institutions willing to develop and collaborate around such programmes

7. increase levels of collaboration between Pakistani experts
   a. national conference on the status of and conservation needs for forest biodiversity in Pakistan and discussion of research needs
   b. improve the level of internet and other digital communications technologies
   c. electronic newsletter and mailing list

8. consultative services
   a. building on the institutional contacts made through supervising the final projects
   b. collaborative research projects
   c. investigations in how forest conservation can contribute to local development.
   d. a set of priorities for an expanded research programme

Phase 3:
2006 – 2007
Expansion of intensive course into a programme &
development of research and consultation programme

1. fourth and fifth offering of the intensive course
   a. evaluation of past courses
   b. links between the final projects and capacity building would be further evaluated
   c. field work and its location continue to be evaluated
   d. implementation of the transfer strategy

2. training as extension educators
   a. consultative meetings
   b. educational materials to graduates of the intensive course developed and distributed
   c. organize provincial and bioregional meetings on capacity building needs related to extension support

3. supervision of final projects
    a. consultative meetings
    b. final evaluation of the student projects
    c. final document on supervision of projects for organizational capacity building

4. M.Sc. thesis research
    a. further support for supervision
    b. evaluation of thesis research
    c. supervision support expanded
    d. development of manual for supervisors
    e. expand the numbers of researchers working on M.Sc. theses
    f. support for Ph.D. studies for some of the authors of some of the more successful M.Sc. theses
    g. initiation of publication programme based around M.Sc. theses

5. workshops
    a. previous workshops evaluated
    b. expanded set of guidelines and expectations for the educational delivery of workshops
    c. support for local expertise in social development
    d. revised set of priorities for workshop topics
    e. organizational commitments for developing and offering particular workshops
    f. development and offering of the specialized workshops
    g. development of materials for the material in paper and CD Rom form

6. certificate or new M.Sc. programme
    a. discussion paper
    b. identification of gaps in the current educational offerings
    c. academic framework forged
    d. framework for transfer of credit from previous intensive course and workshops established
    e. prospectus developed

7. collaboration of Pakistani experts
    a. organizing of provincial and bioregional meetings
    b. development of extended research programmes
    c. publications as collaborative anthologies
    d. peer review frameworks established
    e. electronic exchange of information

8. consultative and other extension services
    a. formation of an extension agency
    b. follow-up programmes that support the graduates of the course

c. involvement of the necessary expertise to better develop projects on an indefinite basis

Such an initiative would invariably involve a number of funding proposals. Even if one donor were found, there would be at least 3 phases of proposals and funding – with subsequent funding possible when the goals of earlier phases were achieved. Probably, a single donor will not be located. Proposals to multiple donors could be for different aspects of the project – with little or no overlapping of items that were funded. The kinds of specific proposals and grants that might be workable include the following:

- personnel costs such as for some of the extra work of PFI staff, the foreign advisor(s), and other Pakistani experts;
- development of the early phases of the intensive courses;
- the consultations around the early phases of course development;
- travel and field work necessary for development of field aspects of the course;
- costs of each offering the intensive course;
- travel costs and per diems for the students;
- repair and maintenance of vehicles;
- a digital projector for the intensive course and workshops;
- development and offering of particular workshops or series of workshops;
- consultations for and development of a network of experts;
- consultations for and development of an advisory group for the initiative;
- the national conference and particular (bio)regional and provincial conferences;
- status reports;
- remote sensing and field work for particular areas, research questions and lessons in the courses and workshops;
- acquisition of books for a library;
- acquisition of computer equipment for the lessons and research;
- support for M.Sc. research and advising;
- upgrading of computer, lines and other communication equipment;
- consultations on an expanded M.Sc. programme;
- consulting to particular government programmes;
- development of an extension programme;
- socio-economic and ecotourism studies;
- conservation plans;
- a range of project-based costs for enhancing local development through forest conservation;
- recovery plans of ecosystems and species;
- ethnobotanical and ethnoscience studies that could be used to enhance the local development aspects of forest conservation;
- facilities to enhance the local development aspects of forest conservation;
- library materials; and
- publications and development of a publication series.

Depending on the amounts of money proposed and the interests of particular donors, proposals and grants could be for single or several of these budget lines as well as for larger groups. Funding for particular items could be for a brief period, such as year, for the entire three phases of the project.

The funding strategy for an initiative such as this is the choice of the Government of Pakistan and its agencies, institutions, nongovernmental and more grassroots organizations. There are a number of alternative strategies for funding this initiative:

1. conventional bilateral or United Nations funding from a single donor;
2. conventional bilateral or United Nations funding from a small number of donors;
3. funding through a large number of small grants from foreign government agencies and nongovernmental organizations; and
4. funding through various grants from foreign government agencies and nongovernmental organizations combined with tuition, user fees and other charges paid internally.

Introduction

This report is intended as an objective assessment of the needs and prospects for an extended initiative on capacity building for forest biodiversity conservation in Pakistan. This assessment has involved considerable research, interviews, ongoing email contact, and field work -- in three missions to Pakistan over the last two years. The document focuses on the particular needs for and interests in such an initiative, explores the particular set of activities that could allow conservation of native forests to contribute to local development, and identifies the institutions, agencies and organisations, and respective experts, who could best contribute to programme development.

Throughout the world, there are major deficiencies in capacities for research and programme development for forest biodiversity conservation. In Pakistan, the gaps in capacities for forest biodiversity are particular acute because of

1. rapid rates of forest, woodland and rangeland degradation and loss;

2. insufficient knowledge on biodiversity conservation for drier forest, woodland and rangeland types[1]; and

3. The particularly low levels of support for the one national institute focused on forests.

In this report, I describe the current gaps in institutional capabilities in forest biodiversity conservation and sketch some strategies to improve and strengthen capacities.

Biological diversity is inheritable variation and the populations, ecosystems, landscapes and dynamic processes that sustain it. Forest biological diversity is that which is associated with ecosystems dominated by trees and, in the case of rangeland, perennial shrubs that can grow into tree forms. The biological diversity of a particular landscape unit is typically conceived as three strata: ecosystems, species and intra-specific genetic diversity. The organisms in the species level of forest biological diversity can include vascular and non-vascular plants and vertebrate (with backbones) (Roberts 1977, 1991) and invertebrate animals (such as insects). The greatest single threat to loss of biodiversity today is from habitat modification and destruction, especially loss of forests, associated with human land use. Some other more common causes of loss of biological diversity include over-exploitation of certain species, introduction and invasions of non-native species which have few controls in local ecosystems and the beginnings of the onslaught of climate change and sea level rise. When habitat, unique ecosystem types, species and complexes of genes are lost so are options for current and future development. In every community are groups of people, who are particularly invested in the continued existence of certain species, habitat,

[1] "Forest," in this document, is meant to include humid ecosystems, where a great majority of vegetation cover is dominated by trees, to woodlands, with less tree cover along with shrubs and grasslands, to rangeland scrub dominated by perennials that sometimes grow into semi-arid woodland. This definition extends to nearly all of the native vegetation in the northern half of Pakistan, much in the western half of the country, as well as pockets of riparian and mangrove along adjacent to some rivers and the coast. Unless otherwise indicated, the use of the word "forest" and the terms of the project are limited to native species and ecosystems and do not include plantations and exotic species.

and ecosystems – stakeholders who become more vulnerable and poorer when these natural services deteriorate or are lost. Conservation interventions can enhance options for improvements in the local quality of life, including standard indices of social development, or can effectively further impoverishes more vulnerable groups. Only forms of forest biodiversity conservation that both maintain local species, genetic diversity and ecosystems while enhancing a range of strategies for social development, particularly of the rural poor, are viable, sustainable and ethically defensible.

This report is the culmination of two years of discussion on how to best increase institutional capacities in forest biodiversity conservation, and related research, in Pakistan. The investigations behind this report has involved three visits to Pakistan, with over 50 meetings and interviews, several periods in the field, and email contact, some ongoing, with scores of individuals. In the following report, I recommend an emphasis on post-M.Sc. training in English as part of a broader strategy to increase the level of expertise of researchers, programme managers and educators. The goal is to quickly create some tangible results in slowing the loss of native forests and associated species and genetic resources. The individuals with the highest priority for training and subsequent support would be conceived as teachers and trainers who would transfer key ideas to other colleagues and to students – who more often work in Urdu and other Pakistani languages. The core of these recommendations is for an annual, intensive course in forest biodiversity conservation to be organized by the Pakistan Forest Institute (PFI). I recommend that the course be a month long and half be in the field. The first half of the instruction would best be at that institution, in Peshawar, with the other half of the time in the field. Each year that the course was taught could involve a different focus on a native forest ecosystem type at risk. After each course was offered, there could be a period to complete a final project, linked to the professional's work and approved by their employer. The final project could be supervised in subsequent months as part of the satisfactory completion of the course.

In addition, a number of week-long courses and workshops, on more specialized topics, with most held in the field, are recommended. These workshops could be organized by the PFI, where there was interest, personnel and funding, or by nongovernmental organizations that had a particular interest the topic.

After exhaustive discussions, this author has concluded that the best administrative framework for such an initiative is provided by the Pakistan Forest Institute. Put it simply, no other institution or organization in Pakistan has the depth of experience, protracted commitment and expertise at **education** to have the credibility to embark on new initiatives for forest biodiversity conservation. Given the extent of the crisis around loss of forest biodiversity, and its stark implications for options for rural development, it might be preferable to have a second educational programme in the country on forest conservation. Given the difficulties that the PFI has experienced in recent years, with declining funding, it might be in the better interests of Pakistan to have some kind of 'competitor' in another educational institution that provided at an M.Sc. in forest conservation as part of environmental management. But there are no other postsecondary educational institutions in Pakistan focused on forests. Few other institutions in Pakistan provide courses, or even workshops, around forest biodiversity, habitat or ecosystem management – especially at the M.Sc. and Ph.D. levels. The

workshops that NGOs have often developed, typically through foreign assistance, have been offered irregularly and have often been lacking the depth necessary to solve interdisciplinary problems and develop new programmes. With sufficient interest and cooperation, some partnerships between other educational institutions and nongovernmental organizations, around course development and enrolment in forest biodiversity conservation, might be worthwhile. Given the scarce resources available such an approach is highly advisable – for workshops on certain topics whether there is expertise within a nongovernmental organization. Some other educational and non-governmental organizations, that have expressed some interest in seeing more forest biodiversity conservation capacity building, are discussed later in this report. But the arguing for a capacity-building programme centred within the PFI is based on the view that a stable institutional home, focused foremost on education and research, is key to developing the level of expertise, supporting at least 50 professionals, necessary to design and carry out the kinds of research and to develop the kinds of program that could slow and reverse losses in native forests and associated species.

Today, biodiversity conservation training in Pakistan, when it is being offered at all, is being crammed into a few short workshops that are offered sporadically. This lack of an educational infrastructure in forest biodiversity conservation in Pakistan is exacerbating a situation where an elite, often with either international educations, manage environmental projects where field-oriented staff work, often heroically, having been given little training in theory, problem-based research and, in deed, in problem-solving. In the current situation, Pakistani professionals are being effectively being denied access to the rapidly expanding body of conservation solutions. Within South Asia, this gap in knowledge, on contemporary approaches is particularly stark in Pakistani government agencies and nongovernmental organizations. This is effectively eroding credibility and limiting possibilities for international support and collaborations for forest conservation for sustainable development in Pakistan.

In developing this report, one stark contradiction repeatedly became apparent. The loss of native forest and associated species is creating a crisis in rural life in Pakistan that warrants a wide range of new government (and nongovernmental) initiatives – that are innovative and comprehensive. It is necessary for such initiatives to be a various scales: from the site and landscape unit to the district, species, and critical habitat and ecosystems levels – and extending to broader ecological regions within Pakistan. Additional training is necessary for this changing and often volatile situation. Requirements for management and protection of forests, species and ecosystems-at-risk, in the context of rural develop, warrant new kinds of educational initiatives. Current students and already-established professionals deserve, in deed to be effective require, additional training on forest biodiversity conservation. But over the last decade, typical stop-gap solutions to this lag in education and capacities have been the occasional workshop available for more elite programme managers, researchers and educators. The contradiction is that with all of the talk of programmatic solutions to forest and biodiversity loss, the institutions that could provide rigorous and problem-based educational programmes, specifically the PFI, are receiving declining funding – especially in relation to the international funds going to the NGOs. In other words, the current crises in rapid losses of native forests and forest biodiversity in Pakistan are being

exacerbated by an over-emphasis on action-oriented NGOs – that do not have enough capacity to respond to more than a few crises. Their approaches largely piece-meal and incomplete – for what it is going to prepare agencies (and their own organizations) for what it will require to develop viable programmes for arresting losing native forests and associated biodiversity. At a time when postsecondary education in Pakistan is suffering severely, the notion that a few workshops or some courses outside of the country can provide the basis for professionals to effectively address the daunting problems faced around rapid losses in forests and forest biodiversity in Pakistan today, is illusion when not hubris.

This report is coming at a difficult but surprisingly opportune time for Pakistan. Few twelve-month periods could be more problematic for building capacity in such long-term social investments as forest biodiversity conservation. Given that the both living standards (and native forest cover) in rural (and urban) life is Pakistan has declined so markedly, there may be some new opportunities for outside support. Clearly the environmental sector, including various organizational and political formations, has survived these difficult times rather intact. Survivors of years of working in under-funded government educational and research institutions have perhaps better skills to develop innovative approaches in capacity building than managers of better-funded NGOs. And there are signs of declining levels of funding for larger projects[*], with funds from bilateral and United Nations sources, and a shift to smaller, better managed projects with higher levels of documentation.

This study has involved 3 visits to Pakistan over the last 24 months. There would have been a 4th visit in early 2002 but it was postponed until late 2002 on the recommendation of the Canadian consular services. In the three visits, field work was conducted in the Salt Range of the Punjab (Raja 2001) with a brief visit to Sonmiami Lagoon in Balochistan. The first visit was under the auspices of the International Institute for Aerospace Survey and Earth Science of The Netherlands and the PFI -- with funding from the Netherlands Ministry of Foreign Affairs. Soon after the first visit, I was encouraged by Mr. Mian Muhammad Shafiq, Assistant Secretary Wildlife, Wildlife Management Branch, of the PFI, whose group had provide the vehicle for the first field work in the Salt Range, to develop a collaborative research and training projects with the PFI related to forest biodiversity conservation. The second and third visits involved

[*] One example of the kinds of larger projects that have tended to not support formal education, let alone centres of educational excellence, was the Pakistan Environment Programme (PEP) of the Canadian International Development Agency and IUCN. This 5 year (1996-2001) CDN$15 million (slightly under US$10m) project was designed to strengthen key institutions involved in implementing Pakistan's National Conservation Strategy but did not involve a comprehensive educational component nor the PFI. But with all of the interest in institutional capacity building around environmental management, little went to forest or biodiversity conservation. See http://www.iucn.ca/english/Programme/PEP/ & http://www.acdi-cida.gc.ca/cida_ind.nsf/8949395286e4d3a58525641300568be1/b22e001663d1bb02852568e80062e493?OpenDocument#sec4 . It is unclear how much of those funds actually went to IUCN Pakistan, to other parts of the IUCN organization, and to the Canadian consultants in the project, Wendy Quarry, Cowater International Inc., 411 Roosevelt Avenue, Ottawa, Ontario K2A 3X9, tel. (613) 722-6434, email: cowater@compuserve.com .

meetings with, and some travel for, WWF-Pakistan and included contact with a number of other groups involved in forest biodiversity research and conservation in Pakistan.

In the following pages, I substantiate the thinking behind and the nature of the recommendations sketched above. Beginning with the two year history of this study, I define the problem statement to which the proposed capacity building programme responds. I then describe some of the most glaring gaps in current educational programmes and between current educational offerings and needs for expertise in implementation. Some principles for forest biodiversity conservation that contributes to rural development in Pakistan are then explored. I then propose some principles for postgraduate education in forest biodiversity conservation and identify some unmet national & regional needs for capacity building in forest biodiversity conservation. Target audiences for capacity building are then identified. Some project goals for capacity building for forest biodiversity conservation for Pakistan are outlined along with strategies for capacity building & transfer of expertise. After outlining the most important components of this project, I make recommendations on a viable administrative structure and suggest some possible affiliations with other institutions and organizations.

After two years of discussions, I make recommendations on the educators, experts and other personnel, within a team concept, that I believe is more appropriate and viable for this capacity building programme. I propose some project phases for the 2002 – 2007 period along with project milestones and evaluation frameworks. I then explore a funding strategy and possible sources of support. After an abbreviated set of acknowledgements are the references, for the material mentioned, and then the appendices. The biographies of the proposed team members and followed by a list of some of the most key topics for a course in forest biodiversity conservation for Pakistan. The last three appendices are a series of lists of the most important budget lines that will require funding to begin to develop the proposed programme. It would be inappropriate and premature to propose a budget in this background document and initial set of recommendations. Multiple funding proposals, to a number of sources, involving various time periods, will be necessary and these specific points are outside the terms of this report.

Forest biodiversity conservation as part of local development & poverty alleviation

It has been 20 years since the IUCN World Parks Conference which stressed the links between habitat conservation and improvement in rural life with the slogan ‘parks for sustainable development’. Since then, notions of biodiversity (Wilson & Peter 1988, Gaston 1996, Reaka-Kudla 1997), related social values (Dietz & Stern 1998), habitat, conservation (Dobson 1998), networks of protected habitat that extend well beyond the notions of parks that were institutionalized in the colonial era (Ingram 1996), and social development (through certain forms of habitat conservation) (Ingram 1994, Kothari &Vania 2000, Koziell 2001, Koziell & Saunders 2001) have been much further articulated. In recent years, the social costs of loss of local biological diversity, particularly for forest communities, has been better understand with new methods for confirming links between forest destruction and rural poverty (Perrings et al. 1997) and certain forms of conservation and enhanced options for social development (Ingram 1996).

Today, we are witnessing a second wave of the biodiversity conservation revolution that has come to dominate forestry and wildlife management in many parts of the world over the last fifteen years. Today, there are increasing expectations, especially from funding bodies, for better linking research, conservation planning and programmes for alleviation of rural poverty. Pakistan signed the *Convention on Biological Diversity* early on, on June 5, 1992, and was party to the Convention's ratification in 1994.

Over the last ten years, a number of impressive, but poorly implement, reports on and plans for Pakistan have been advanced at the national and provincial levels. Just before Pakistan chose to be one of the lead nations in the Convention, there was the 1991 IUCN-World Conservation Monitoring Center *Biodiversity Guide to Pakistan (*IUCN-WCMC 1991*)*. The 1992 *Forestry Sector Master Plan, National Perspective (*Government of Pakistan, Ried Collins and Associates (Canada) & Silviconsult Ltd. (Sweden). 1992.) was written a few years too early to reflect Pakistan's growing commitment to biodiversity diversity – and the opportunities the Convention has afforded many countries (though not so far Pakistan) for expansion of forest conservation and the forest sector in general. And for example the 1992 perspective did not fully reflect the shift taking place in much of forest management, at the time, towards higher levels of forest habitat and biodiversity conservation (Norse et al. 1986, Carey & Curtis. 1996). There was the 1992 IUCN and Government of Pakistan. 1992 *The Pakistan National Conservation Strategy (*IUCN & Government of Pakistan. 1992). There have been a number of provincial strategies such as the 1996. *Sarhad Provincial Conservation Strategy (*IUCN & Government of North West Frontier Province. 1996*)* and the exceptional, 2000 *Balochistan Conservation Strategy (*IUCN – Pakistan and Government of Balochistan. 2000). Building on its early achievements in strategizing at the national level, the IUCN also organized the *Biodiversity Action Plan for Pakistan (*Government of Pakistan-WWF-IUCN. 2000*)*. What is particularly striking about these important documents, from today's vantage point, are the relatively vague and often underdeveloped passages on forest conservation, forest biodiversity, both conservation planning and conservation implementation, education and other forms of capacity building. The people who would be most responsible for and engaged in forest biodiversity conservation are largely unacknowledged.

To a large extent, this report is focused on 'implementation gap' in those previous documents. The weaknesses of these reports, around both forest biodiversity and education, have exacerbated obstacles to development of effective programmes. Weaknesses in the agendas of these earlier reports, in a country where much of the most threatened habitat involves patches of trees and shrubs and where postsecondary education is permanently under-funded, has lead to only minor levels of achievements in both actual forest biodiversity conservation and in improvements of professional capacities in that regard. In looking carefully at the biodiversity and forest strategies produced for Pakistan over the last decade, and what they have called for and effectively required, much more is needed in education and other forms of professional and research capacities. In order to achieve the most important goals of those national and provincial commitments – while many fragments of native forest and associated species 'hang on to life' in what, for many, could be their last decade -- a new, more focused strategy, on both forest biodiversity conservation and capacity building, is needed.

In exploring a forest biodiversity conservation capacity building strategy for Pakistan, over the last two years, I found a great deal of general support from both conservationist and foresters. In addition, I note some movements external to Pakistan that increase the relevance of such a strategy. As implementation of the *Convention on Biological Diversity* moves into its second decade, two developments suggest that it is an opportune time for an initiative around educations and institutional capacities for forest biodiversity. First, concerns for forest biodiversity, and indicators for adequate conservation, are taking a higher profile in the work of the Convention[*]. Secondly, tighter programme links are being made between biodiversity loss and poverty alleviation in both programme development and capacity building. Pakistan scores relatively high, perhaps in the top ten countries on earth, in terms of combined indices for richness of its (drier) forest biodiversity, threats to its forests, and levels of rural poverty. Perhaps more than any country on earth, the correlations between indicators of degradation and loss of forest biodiversity and declines in rural living standards have been most obvious in Pakistan. Today, Pakistan is in the unenviable position of being rated by the United Nations Development Programme as 138, of 178 countries, in terms of overall quality of life (Peritz 2002). With such stark trends in rural and urban life, support for forest biodiversity conservation will be increasingly linked to strategies to reverse declines in living standards. New approaches to forest biodiversity conservation would be built on the kinds of community forestry approaches that have been developed in Pakistan and in other parts of South Asia. And trees, native forest and wildlife, even when having no direct market values, often provide tangible benefits to the strata of the rural poor most at risk.

So far, the forest and the biodiversity crises in Pakistan have barely been articulated, especially in terms of implications for rural development. The implications of loss of native forest and biodiversity have only begun to be described in both national (Shafiq 1995, Zahid 2000) and more local terms. Rarely have the intensifying social inequalities from these losses been carefully assessed in Pakistan. And while there is some appreciation for the problems of global loss of tropical rain forest amongst intellectuals (Khalid 2000), the implications of degradation and disappearance of remaining rural fragments of drier forest, woodland and rangeland, in Pakistan and in other drier forests, woodlands and rangelands in South Asia, remain poorly explored -- especially by the urban elite. As well as providing up-to-date scientific tools, an underlying goal of forest biodiversity capacity building is address a larger social function of creating a critical framework for understanding inter-relationships between communities, trees, ecosystems, and species at risk, land use and potential development options. And there are some indications that various parts of Pakistani society want to development new means to conserve and restore forests and forest biodiversity -- as part of land management for more equitable social development.

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[*] See Proceedings of the 6th Conference on Parties to the Convention on Biological Diversity, 7 – 10 April, 2002, The Hague, The Netherlands, on file, Secretariat of the Convention on Biological Diversity, Montréal, Canada. http://www.iisd.ca/linkages/vol09/ For an additional overview of Pakistan's framework for conservation of biological diversity, see http://www.un.org/esa/earthsummit/pakis-cp.htm#chap15 .

The core of this concept for capacity building, and its problem statement and priority topics in a subsequent curriculum, can therefore best be based around strategies to minimize not only the loss of forest biodiversity but the associated of development options. But how exactly can loss of biodiversity preclude future development options and actually contribute to further declines in the quality of life in Pakistan? There are a group of natural services that are effectively removed when certain forest habitat and species become extirpated, as in local disappearances, or even become extinct (throughout the region and world).

- Local communities become poorer when they no longer have access to species and habitat to which they depended and which they did not pay for. Some of these species and habitats may have made unique contributions to diets, health care delivery, housing and culture which cannot be readily replaced.

- When substitutions for lost species, habitats and natural services are possible, the displaced uses either put additional pressure on remaining species and habitats or involve purchase of substitute products. The need for purchase of more goods, on what is often the same or declining real income, effectively takes away income needed for other important products, such as food, medicine and education. Thus, communities in largely subsistence economies, or that were formerly subsistence economies, are made effectively poorer with the loss of formerly free products and services. These social losses extend from the more subsistence-oriented communities to most of the rural poor in Pakistan.

- The relationships described above extend well beyond the more remote parts of Pakistan to the suburbs and even the more urban cores of most of the country's metropolitan areas. Native forests, and associated habitat and species, have been particularly vulnerable to intensification of agriculture, expansion of infrastructure and other forms of urban sprawl.

- The relationship between loss of native forests and the deterioration of freshwater resources in Pakistan, in recent decades, has been poorly assessed but is indisputable. Typically, the poorest people, most dependent on common resources and spaces, have been most vulnerable. But the loss of native forest, even if it was only scrubland, have contributed to the higher cost of living, and a lowering of living standards, to the remainder of the economy more directly dependent on district, provincial and national markets. In some areas, there appear to be similar relationships between forest loss and social impoverishment at work around fuel wood and medicinal species.

- The benefits of native forests to adjacent agriculture have not always been well-documented for Pakistan except in maintaining microclimate and water regimens. But certainly the loss of any native trees, in a country with such dramatic rural population increases and agricultural intensification causes strains on the remaining ecological (and social) infrastructure.

As well as causing direct declines in current living standards, extinguishing of forest biodiversity is contributing to losses of badly needed options for further socio-economic development – including possibilities for project that could have taken place in the near future as related to:

- ecotourism;
- new forms of agriculture and agro-forestry;
- heightened production of natural products associated with native ecosystems and less desiccated landscapes;
- surveying, conservation and utilization of the genetic resources of wild species (Ingram 1984, 1990, Ingram and Williams 1984, 1993); and
- improvement in watersheds and water output through restoration of forests with well-adapted native forest species.

There is a third category of losses that can be considered kinds of social costs that are displaced on to other groups and organizations.

- The damage caused by degradation and conversion of the remaining natural forests of Pakistan will create more work for Forest Departments and park managers further over-extending government programmes.

- Displacement of people from subsistence livelihoods, centred on native forests, creates more pressure for education, retraining, and job creation at a time when unemployment levels are continuing to rise.

- Women and children are often more vulnerable to losses of the biological resources and natural services of native forests than are adult males in large part because of the continued obstacles to females for education, employment and wage-based income generation.

- Similarly, tribal (and related cultural, religious and language) minorities are more vulnerable to loss of native forests and forest biodiversity and often are caught in dilemmas around survival strategies: between worsening poverty while attempting to maintain traditional lifestyles or assimilating in ways that are unsatisfying and that risk cultural impoverishment (Colchester 1994).

- The resulting impoverishment of rural populations, in areas formerly dominated by native forests, woodlands and scrubland are contributing to migrations to cities and towns putting additional pressures on Pakistan's urban environments.

Poverty alleviation has become an integral part of viable, biodiversity conservation, and protection of forest biological resources has become crucial to rural development, for the following reasons. First, efforts for biological conservation do not have, and will never have, the moral basis for exacerbating social inequities – especially

those that diminish prospects for diet, health and security of the most vulnerable populations. Secondly, forest and biodiversity conservation is not viable if it exacerbates social conflicts – especially around those efforts to protect habitats and species. Thirdly, alliances of local stakeholders, in support of forms of native forest and biodiversity conservation that are socially beneficial, comprise the best base for constructing viable and sustainable programmes – especially in countries such as Pakistan where land management agencies have been progressively under-funded and weakened. This third point suggests a new emphasis in capacity building in Pakistan: on also preparing the researcher, conservation planner and programme manager to interact more directly and transparently with leaders of local communities.

Problem statement:
Gaps in educational programmes for capacities in research & conservation

The loss of native forests, and associated species, is an intensifying problem in Pakistan – one with grave implications for development options. There have often not been the funds for the kinds of protracted government (and nongovernmental) programmes needed to counter the land use that degrades forests. Intensifying rural poverty has often curtailed alternatives to forest degradation and destruction. Much of the global concern for forests has centred on tropical rainforests and the drier woodlands and scrub forests of countries such as Pakistan have often been neglected in international discussions. And the educational programmes on forest conservation, available to Pakistanis, have often fallen short, in depth, resources and programmatic cohesion.

There have been a number of impressive initiatives on environmental education in Pakistan. However the educational offerings on forest biodiversity and conservation have remained irregular and lacking in sufficient depth and structure to prepare professionals to develop the necessary research, habitat protection and restoration programmes. The most serious gap that was identified was in postgraduate education: in M.Sc. course offerings, in support for M.Sc. thesis research, and in post-M.Sc. professional training. While this point, and that advanced level of education, was consistently mentioned in interviews, the gap extends back to Bachelor-level training. There is a broader gap in postsecondary curriculum in Pakistan, outside of the PFI, on forests, especially around habitat and non-timber uses, and biological diversity. How biodiversity issues are being treated, in the few other postsecondary programmes involving environment in Pakistan, remains unclear. And there is certainly some work on surveying and conservation for specific groups of organisms, such as for plants in botany department. But there are no indications of much comprehensive research or curriculum development, on protection and restoration of forest ecosystems, particular that involves field work and implementation, in this respect.

In a country with severe shortages in basic educational facilities, why should a gap in postsecondary education be the focus of a national initiative with proposed support from donors associated with bilateral, nongovernmental and even United Nations-linked organizations? The first answer is that in order for Pakistani personnel, currently involved in forest biodiversity research and conservation, to be effective, in often deteriorating situations in coming years, new levels of scientific, management and problem-solving expertise is necessary. In other words, this gap in capacities has become so severe, even

in comparison to other South Asian and Middle Eastern countries, that it constrains the effective use of the scant funds made available, including from international donors, for forest biodiversity conservation in Pakistan. A second, and longer, answer to the question is that a new generation of teachers and trainers is necessary to transfer information on forest biodiversity conservation, often from English to Urdu, into a broad base of government agencies and nongovernmental organizations. The current levels of scientific standards and new approaches to problem-solving in areas of rural (and urban) poverty, that could be articulated, would have direct benefits to both project efficiency and impact – and to prospects for cooperative links with organizations within and outside of Pakistan.

In developing this project concept, I have identified three structural gaps in current educational programmes in Pakistan, eight poorly attended topics in curricula, and a number of strategic needs for more technical expertise for project development in the coming years.

- Of the structural gaps in current educational programmes in Pakistan, the current educational offerings around forest and biodiversity in Pakistan are not fully preparing individuals to conduct research in the kind of under-funded and unstable organizational settings that have almost become the norm. When confronted with the enormity of the obstacles to slowing loss of native habitat, relative intact natural ecosystems, and associated species, most individuals, fortunate enough to have a position in government or an NGO. In other words, the kind of problem-solving necessary, for these kinds of difficult research situations is not reflected in curricula.

- A second structural weakness, in current educational offerings on forests and biodiversity, is around the lack of education for individuals to be cross-sectoral and to involve the wide range of stakeholders who might have the combined set of resources to protect a forest ecosystem or species.

- A third structural weakness, in current educational offerings on forests and biodiversity, is that there is no real national centre for forest biodiversity research and training. The only national educational centre, on forests and wildlife, is the Pakistan Forest Institute. It has been consistently under-funded and attacked by non-governmental organisations. However, NGOs in Pakistan have not been interested or capable of developing an alternative to the PKI. What workshops, outside of the PFI, that have been developed, on aspects of forest biodiversity conservation, have not been made available on a regular and dependable basis nor have they involved the level of instruction necessary for actual and somewhat comprehensive conservation.

Ten developments were identified that warrant careful responses and programme development in educational and research aspects of forest conservation in Pakistan. Rooted in insufficient social resources allocated to post-secondary education and research, these problems increasingly limit the effectiveness of the major programme for education

and research on forests in Pakistan: the Pakistan Forest Institute (PFI) of the University of Peshawar.

1. **Intensified loss of forests and associated species** has utterly changed how remaining natural vegetation and tree cover is valued and utilized. While wood and fibre production continue to have economic roles, remaining natural forests have increasing values as watersheds, habitat for traditional economic products, habitat for species at risk, and sites of tourism. In this changing situation, it has been difficult to upgrade and expand relevant educational and research programmes in forest biodiversity conservation.

2. Over the last two decades, **fields such as conservation biology and environmental planning have expanded dramatically** – in turn transforming how forest resources and wildlife can be managed and such decision-making integrated into local development. It has been difficult for forestry faculties, even in wealthier countries, to keep up with relevant development. Without support for expanded education and research, in these areas, and for subsequent programme development based on more 'ecosystem management' and other contemporary principles, options for sustainable rural development will further decline in Pakistan over the coming years.

3. Even compared to other developing countries, there has been a **marked insufficiency in international support for forest biodiversity conservation in Pakistan around education and research**. While new international programmes, emerging from the *Convention on Biological Diversity* and sustainable timber harvesting certification initiatives, have sometimes brought in new funds for forest conservation in Pakistan few of these projects have focused on education or the major national institute for forests: the PFI.

4. New technologies are transforming how forests are viewed and assessed – and how they are conserved. In this rapidly changing context, it has been difficult to develop **necessary training and research programmes that link new technologies to forest conservation and local development**. Development in remote sensing (satellite imagery) and geographical information systems (GIS), in particular, warrant new workshops and courses – particularly in the possibilities of better linking forest biodiversity assessment and conservation with local development.

5. The tremendous body of **local knowledge**, on protection and management of native forests and species, has only begun to be queried and compiled and is often still largely ignored in conservation and development programmes.

6. Local approaches to conservation and management of forest ecosystems and species are needed to enhance for conventional government and nongovernmental

efforts for **new, more locally based and sustainable forms of rural development**.

7. Areas with relatively large, remaining areas of native forest, and rare wildlife and plants, are increasingly attractive for **ecotourism** for Pakistanis. Training and research for **forest conservation combined with ecotourism** is increasingly desirable for Pakistan but there have been few courses and workshops in this expanding field.

8. Over the last two decades, a global movement has emerged for (forest) **ecosystem restoration**. This paradigm, emphasizing the advantages of re-establishing native species in a range of successional phases and the control of invasive exotics, has not always seemed particularly relevant for impoverished rural districts. In recent years, this "native species," "ecosystem management," or "re-inhabitation" approach has been increasingly explored as part of efforts to maintain local biodiversity (and to enhance development options for respective communities). So far, there have been few opportunities to discuss the implications of this approach for management of forest landscapes in Pakistan.

9. Increasing portions of the natural forests in more populated regions are becoming part of rapidly expanding metropolitan regions. In these areas, **forest conservation must be integrated with suburban and urban planning**.

10. Frameworks for **stakeholder analysis** around forests, biological resources and conservation are being expanded to better acknowledge and respond to marginalised groups as related to gender, culture, location, and economic underdevelopment.

There are a number strategic expertise and skills, that are necessary to develop and implement goals in forest diversity in coming years that are not presently being taught or are being insufficiently covered in current postsecondary curriculum in Pakistan. The following aspects of forest biodiversity conservation are where skill levels, for forest biodiversity conservation, of professionals appear to be weakest in Pakistan and there are the most pressing needs for more capacity building:

19. field work in more remote areas;

20. field work on species and ecosystems at risk (with expertise and knowledge needed for specific forest types, ecosystems, types of organisms, and species);

21. identification of critical habitat for species and ecosystems at risk of regional disappearance (extirpation) or complete disappearance (extinction);

22. field work and ecogeographical surveying (Ingram 1986, 1990) on species with genetic resources;

23. regional and national levels of monitoring & assessment the status of native forests and associated ecosystems and species[*];

24. mapping and geographic information systems for an increasing range of scales and uses;

25. GIS better linked to decision-support for land use planning, land management and conservation planning (Thomson et al. 1996);

26. modelling with spatial components (linked to GIS);

27. site planning (often linked to conservation planning and restoration);

28. ethnographic techniques for obtaining local knowledge;

29. ethnographic, cross-cultural and communication techniques for research on local management of forest ecosystems and resources;

30. ethnographic, cross-cultural and communication techniques for collaborative and locally based forest conservation and development concepts, proposals and plans;

31. communication and media skills in transmitting concepts about forests, species, conservation, sustainability and local development;

32. spatial planning, at various scales, for biodiversity conservation (involving various protected area categories and managed landscapes) (and often involving digital tools such as GIS);

33. institutional analysis, policy development (Grumbine 1994), programme development and problem-solving at provincial and more local levels;

34. ecosystem recovery strategies for particular wildland and biodiversity rich areas, such as the Salt Range, involving a range of agencies, levels of governments and sectors;

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[*] Knowledge of forest ecosystems and their status in Pakistan remains poor. Data is not always flowing to the kinds of global data centres that can, in turn, highlight needs for additional conservation measures. In just one example of this gap in data on forests in Pakistan, see the World Biodiversity Atlas of the World Conservation Monitoring Centre (WCMC), Cambridge, UK, http://stort.unep-wcmc.org/imaps/gb2002/book/viewer.htm (8 2002).
The map for Pakistan (Map 5.5 Current forest cover), one of the most widely accessible guides to forest status, does not even indicate the larger areas of tropical dry forest in the Salt Range. While there may be an error in how the WCMC is interpreting information on drier forests and woodlands, such as those in Pakistan, it is more likely that field information, key to mapping drier forests, is not flowing out of Pakistan – in part because of lack of budgets but more likely because of gaps in expertise.

35. restoration goals and techniques for native forests and species; and

36. urban forestry and restoration of native perennials in cores of cities and suburban areas.

Some principles for forest biodiversity conservation that contributes to rural development in Pakistan

In calling for increased support for capacity building for forest biodiversity conservation in Pakistan, I define such efforts in the following ways. Programmes of interventions to conserve and re-establish forest and rangeland species, ecosystems and genetic resources can contribute to rural (and urban development) when they improve upon all or a significant portion of the following conditions:

1. assure the survival and restore populations of **species at risk** of extinction and which have been and continue to be less common;

2. conserve the full, intra-specific diversity of species with **genetic resources** – particularly for use in local forests, agriculture and rangelands;

3. provides **sources of seed** and other genetic resources for restoration of degraded rural (and urban) ecosystems in the region;

4. supports **local knowledge** and local capabilities for more sustainable harvest and management of **traditional subsistence species** of particular importance to aspects of rural life;

5. introduce of traditional **subsistence species into market economies** in ways that are sustainable and bring benefits back to source communities;

6. restore and enhance **watersheds** while leading to more sustainable and equitable use and distribution of water resources;

7. contribute to re-established and restoration of regional, **ecological infrastructure** through formation of district and provincial networks of parks, other protected areas and management areas;

8. establish or expand low impact and sustainable forms of **tourism** centred on combinations of recreational, ecological, heritage and cultural values;

9. restore **dynamic landscape processes** (such as some wildfire) and the general resilience of local ecosystems across broader district and regional units;

10. **sequester carbon** in later successional forests thus contributing to the lowering of green house gases in the atmosphere;

11. **lower reliance on low-diversity plantations** and on non-native forest species;

12. provide economically viable **alternatives to large-scale, narcotics growing**;

13. support **local approaches to forest ecosystem restoration**, and re-introduction and native species; and

14. **enhance local governance** frameworks and the position of often marginalized rural stakeholders tribal and ethnic minorities and rural workers.

Some goals for postgraduate education in forest biodiversity conservation

No particular group of students, in the world today, are especially more skilled, in comparison to Pakistani environmental professionals, in developing solutions to the loss of forests and forest biodiversity. However, there have been some components of the postgraduate forestry and wildlife management curricula in Pakistan that have not been emphasized and could prepare individuals and peer networks for developing innovative solutions. It is now worthwhile to consider how to learn, and to teach, various kinds of problem-solving – that could be applied, directly, to the development of research and actual conservation programmes.

1. **Interdisciplinary approaches** to the compilation of information have been a feature of forestry for decades. But today individuals and programmes focused on forest biodiversity are increasingly forced to deal with an even broader range of natural and social science fields. For example, most foresters are not also conservation biologists, environmental planners, or social scientists but can learn how to better work with that information and respective professionals. Such integrative approaches to work with information can be taught.

2. Insufficient **absorption of scientific and other technical material in English** continues to limit the effectiveness of conservation programmes in Pakistan. In many countries where English is not always the first language, such as Canada, there is a growing body of techniques on how to increase cognitive absorption of highly specialized written material such as on forest biodiversity and conservation.

3. Throughout the world, there remain large gaps in capabilities in **hypothesis development and research design** of a particularly applied nature and that are oriented to biodiversity conservation. In the context of Pakistan, this gap is making it even more difficult to focus scant research funds on the most important questions related to the survival of species and ecosystems.

4. In situations where libraries are grossly inadequate and internet connections are slow and nonexistent, **creative strategies for data collection** are necessary. In a country where regional and district personnel often have very little access to up-

to-date information, ways to most effectively work with what little knowledge base there is, around local forests and biodiversity, are sorely needed. Skills in research designs and strategies that best work with the sources that are available can be developed – and adapted for a range of situations in Pakistan.

5. As forests and habitat dwindle, decision-making will become increasingly spatial. A new set of skills for **spatial aspects of decision-making**, a kind of forestry and environmental planning for forest biodiversity conservation, are necessary. Such skills go beyond use of maps, making plans and using GIS to broader forms of spatial thinking – material that has, so far, not often been formally taught in Pakistan.

6. Many professionals in Pakistan involved in biodiversity conservation are mid-level and will increasingly be under pressure to engage in **policy analysis and development**. Yet most individuals at this level are preoccupied with, and often terribly frustrated with, just trying to implement. Some 'space' to work with, and in some cases rethink and provide alternatives to, policy, related to forests and biodiversity, is necessary.

7. **Project design and evaluation skills**, especially related to largely non-market values such as forest biodiversity, remain relatively weak in the forest, conservation and biology sectors in Pakistan. This expertise will be increasingly important for adapting projects and increasing performance levels.

8. Innovation remains largely unrewarded in the Pakistani context except, sometimes, at higher management levels. New capabilities in creative, **problem-solving** in research design, programme development and implement are necessary and can be taught.

9. Overall capabilities in **teaching**, either formally or in the work place, on forest and biodiversity conservation remain weak and limited to a small number of (relatively poorly rewarded) educators. More educators are needed with M.Sc. and Ph.D. degrees are willing to teach, train and exchange knowledge in both formal course and peer work place settings.

10. Each generation, social context and set of environmental problems and issues requires new forms of **leadership** – especially that which leads to new forms of innovation while building on the achievements of previous waves of professionals. With the emphasis in leadership in environmental issues being on the nongovernmental sector, over the last decade, new approaches are now needed that serve a wider range of settings from NGOs to government offices to local stakeholders to research groups.

Unmet national & regional needs
for capacity building in forest biodiversity conservation

There is currently no comprehensive programme, and only a limited number of relevant courses, for forest biodiversity conservation in Pakistan. The wildlife management and general forestry programmes at the PFI offers the most relevant offerings as do a few universities. For example, the Biological Research Centre, of Karachi University, is increasingly concerned with species conservation that sometimes extends to forest ecosystems. In terms of education and other forms of training, following first and second degrees, a number of nongovernmental agencies have been offering relevant workshops. Typically intensive courses of several days duration, this training has been the mainstay for more advanced expertise necessary for forest biodiversity conservation.

Based on recent developments and trends, many of which have only become clear in recent years, I believe that the current offerings of the PFI, other Pakistani universities and the nongovernmental organizations, will not be anywhere near adequate to provide Pakistani researchers, conservationist, planners and managers with the necessary training to slow losses of forests, forest habitat and forest biodiversity. International education for the elite, in the forms of foreign degree programmes and workshops, can increase the flow of expertise and innovative ideas. But the importance of these endeavours, within national strategies of capacity building, will decline in coming years for two reasons. The first reason is that in order to develop effective forest biodiversity conservation and restoration strategies, a great deal of more regional, local and ecosystem-specific knowledge is necessary. Today, many Pakistani professionals have a general framework for understanding loss of forests and local species. But the particular dynamics of each forest ecosystem, and associated species, is either left to the knowledge base of often under-supported field staff or is neither known nor the subject of research. The second reason why the common solution of international education, to a gap in local capacities in Pakistan, is not going to be effective in coming years is that forest biodiversity conservation, especially when part of programmes of sustainable development and poverty alleviation, requires careful ‘translation’ into Urdu and often regional languages as well. Unless internationally educated personnel are trained to transfer their new expertise from English into other Pakistani languages, a gap will persist in field-based problem-solving. And it is often this level that the little, day-to-day losses of native forest and species can be best arrested.

The training in forest biodiversity conservation offered by other universities and NGOs in Pakistan will remain important – but may well have peaked in impact. For forest ecosystems and associated biodiversity, that continue to have central roles in options for local development, the PFI, with satellite programmes in lower level forestry education programmes, represents the sole hope of capacity building in forest biodiversity research and conservation. This will be the case until such time as there was significantly more funding in some other university programmes specifically created to address the loss of forest biodiversity. In the current climate for international and national funding of education and environmental management, this latter option is highly unlikely. Thus, the only hope for the kind of extended capacity building in forest biodiversity conservation, at the level that is needed to implement new programmes typically with international funds which typically extends to M.Sc. studies and after, remains the PFI.

One of the most unfortunate aspects of the meetings with professionals that I had in Pakistan, even with PFI graduates, was the almost universal rejection of consideration of this institution as a centre for forest and biodiversity conservation. On a number of occasions, in parts of Pakistan to the south of Peshawar, was the stated criticism that the PFI was not committed to dealing with non-timber forest issues and of habitat conservation and more comprehensive land use planning. However accurate these perceptions might have been in past years, this is not the case today. A second criticism has been that there are a number of forest, woodland and rangeland type ecosystems in the south of the country that have not been adequately considered in the work of the PFI. And the PFI has been so constrained in travel funds that it has been too expensive to travel to the southern half of the country.

Today, the PFI is under-funded and beleaguered. The PFI is perhaps the most under-funded of the major educational and research centres for forest conservation in South Asia. Yet this institute has the only complete post-secondary programme on forests in Pakistan. The PFI's B.Sc. and M.Sc. degrees remain the pillars for any programme of developing professionals for more effective forest biodiversity conservation. In recent years, the influence and overall educational impact of PFI has declined because of:

1. declining funding to post-secondary institutions in Pakistan;

2. the difficulties (common throughout the world) in making the shift in emphasis in forest management from wood production to a range of market and non-market values;

3. a marked decline in security in rural parts of North-West Frontier Province (being on the border with Afghanistan); and

4. the diverting of nearly all of the international assistance funds for biodiversity conservation in Pakistan, that were intended by capacity building, away from all post-secondary institutions to workshops administered by nongovernmental organizations and non-educational government offices.

The current situation, and the declines in the capacities of the PFI, are reversible and, in deed, `unsustainable'. Unless the national government of Pakistan were to find very large sums of money to quickly set a completely new forest colleague, the fortunes of the PFI, as the national centre for forests and conservation, are bound to improve. Forests and biodiversity in Pakistan, though dwindling, remain highly valuable and there are some market forces and government policies that will, in the longer-term, contribute to a demand for effective conservation. The new levels of research and project implementation necessary for effective programmes require considerably more field work – an area of postsecondary in which the PFI has a particularly solid set of achievements. The vastly increased human population base, over the last two generations, along the globalization of the markets for forest projects has taken pressures off of fibre production and shifted priorities to watershed, subsistence, genetic diversity, and wildlife and tourism values. All of these changes suggest that what little native forests are left in some

areas will engender a heightened level of concern at local and district levels. And forest and wildlife conservation and restoration have the increasing support of a broad sector of the population, particularly the youth, to the point where there could, in the coming years, be positive impacts to local political economies.

There are virtually no prospects for another postsecondary programme in forests and forest conservation being developed and funded elsewhere in Pakistan in the coming years. Even though the need, because of dwindling forests and rural poverty, for more educational offerings is acute the one prospect for sustained postsecondary education and research programmes is the PFI. The nongovernmental organizations in Pakistan have offered training on an erratic basis. This has been related more to short-term availability of funds than a comprehensive education programme. The only body engaged in programme development for forest biodiversity conservation remains the PFI.

If there were a prolonged period of support for forest biodiversity education, research and subsequent government and non-governmental programme development, such as the three to five years outlined in this proposal, the PFI could take on more of an international role in filling some key gaps.

1. The PFI could become the **major centre for forests and forest conservation in South Asian outside of India**. A number of nationals of South Asian countries outside of India are being effectively denied access to key conservation and sustainable development knowledge and expertise because of the difficulties of obtaining visas. And when more travel between Pakistan and India is again possible, the expertise of the PFI, extending from arid regions to the cooler parts of the Himalayan forests (biomes that also extend into India), might make courses and workshops attractive to some Indian nationals from the northwest of their country.

2. Unfortunately, there are few international centres for education and research in forest conservation in many of the **Islamic countries** – outside of perhaps Indonesia and Malaysia. Yet the drier forests in many of the regions around Pakistan are under intensifying pressures. In the coming years, the conservation of these drier forests will be crucial to identifying rural development options, in deed prospects. Prospects for continued development of educational institutions in Peshawar will depend on increasing the general level of security. If higher levels of security are re-established in Peshawar, over the coming years, the PFI could take on a regional role – especially for nationals too often denied access to visas for training in India and Europe.

3. There is an ecological gap in expertise in forests and forest conservation that PFI would also be in an opportune position to fill: **drier, subtropical and warm temperate forests and scrub.** Indian forest institutes, even if they were available for attendance by Pakistanis, are oriented to more tropical and humid forests. In contrast, the forest conditions, for which the PFI has had a long history of instruction and research, are relevant to many parts of central Asia, the Middle East and even North Africa.

The development of a new programme in forest biodiversity conservation at the PFI, within its current framework, could be a key development in research on and the arresting of losses of native forests and associated biodiversity. It remains unlikely that the PFI can muster the support to do this alone. Roles for and 'input' from NGOs, particularly WWF and LEAD, in development of a PFI are worthwhile and perhaps essential if funding proposals are to have sufficient credibility to receive support from international donors. The involvement of such nongovernmental organizations, in an advisory council, for the development of such a programme based at the PFI, would be one strategy to insure that more contemporary approaches to forest conservation, rather than simply timber management, were infused through course offerings. And there could be numerous opportunities for NGOs to develop and offer even more workshops, ones that could be made more effective by links to core training based at the PFI.

Target audiences for capacity building

The most serious gap in current capacities for forest biodiversity conservation is at the M.Sc. and post-M.Sc. levels – the individuals who often become the programme managers, research coordinators, trainers and educators. The core of any capacity building effort in 2002 to 2007 could best address this gap and link improvements to benefits to less trained and field-oriented managers. In a sense, this is a kind of 'trickle down' strategies that many NGOs around the world have rightfully challenged in recent decades. But unless this stratum of decision-makers in Pakistan is better prepared, other international support, whether to government agencies or NGOs, has poor prospects for being effectively utilized.

In the project concept proposed in this study, the central priority is on providing a course, subsequent supervision and follow-up courses in research and programme development. The central function of such a project (or set of overlapping projects) would be to provide at least 50 individuals with educational material, structured lectures, field laboratories and supervision over a 4 year period. Such a project would focus on a particular set of professionals, working for environmental, scientific and development agencies and organizations, preoccupied with particular forest settings in Pakistan. This focus on particular forest ecosystems in Pakistan, with respective investigations of local species, human culture, land use and political economies, could best be embarked up after a few years of operating an intensive general course in forest biodiversity conservation. The best model of this ecosystem-based approach to forest management is the country, so far, is the work of Prof. S. M. Saifullah of the University of Karachi and his former student, Mr. Fayyaz Rasool of WWF, on the inventorying (Saifullah, Rasool and Iftikhar 1999), management, conservation and restoration (Rasool 2000) of Pakistan's mangroves.

The following is a list of the groups for capacity building whose support could generate the easiest and most strategic improvements in research, conservation planning and programme implementation in the coming five years.

<u>individuals</u>

1. The primary group for this programme consists of Pakistani professionals with at least one M.Sc. or M.A. degree, and at least one degree related to forestry,

biology or environmental management. Typically, these individuals are working in government agencies, educational institutions and nongovernmental organizations or working in commerce trying to find a niche for their skills.

2. A second group, where new educational resources could generate benefits for a broader programme of capacity building, are M.Sc. students working on a theses related to forest biodiversity conservation. A few may be able to find the time and approval to attend a full month course, while having the necessary command of technical English, and could then be provided with advising specifically for topics in forest biodiversity conservation.

3. Since the PFI M.Sc. forestry programme is quite full, many of the M.Sc. students at the PFI may well only have time for a small number of more public lectures. In addition, B.Sc. students can (and want to) also absorb the key ideas related for forest biodiversity and its conservation. For this group, a group of public lectures could be made accessible – in terms of use of English (with some Urdu) and reliance on particularly readable graphics. Greater resources on forest biodiversity conservation to this group could plants some key ideas in the minds of young professionals – many whose work around forests would be increasingly dominated by concerns for habitat and species at risk.

institutions

1. Personnel currently working in Pakistan national and provincial government agencies, particularly, but not limited to, the Department of Forests, need more access to training courses in biodiversity conservation. They are particularly in need of further scientific and managerial expertise if they are to successful managing the new programmes that would be possible with additional international support.

2. While prospects are that the PFI will remain the sole institute that offers a complete national programme in forests and forest conservation, the proposed course is relevant to the offerings of a number of university departments in Pakistan. The course would be also oriented to scholars and researchers working in these university groups – who would be expected to develop new lectures and courses for their students.

3. The programme would be highly relevant to mid-level researchers and managers in nongovernmental organizations – who already have considerable expertise but who have often not had access to many journals or workshops.

conservation & development settings within Pakistan

Perhaps a third to a half of the land mass of Pakistan is comprised of areas, such as those listed below, where new knowledge and techniques for forest management and conservation would have immediate utility in improving local living standards.

1. Heightened expertise in forest biodiversity research and conservation could substantially improve living standards in biodiversity rich areas and regions of large tracts of wildland areas -- with relatively high portions of local landscapes still in native forests. Often with local groups dependent on forest resources, such areas have national and global value as new parks and managed cultural landscapes. Culturally and ecologically appropriate, tourism, and ongoing research and restoration programmes, could improve socio-economic conditions in such as areas as

    - the Salt Range, Punjab (Raja 2001),
    - Sonmiani Lagoon, Balochistan,
    - the larger remaining tracts of the juniper forests of Balochistan,
    - remaining riparian forests of the Punjab and Sindh, and
    - large areas of the foothills of the Himalayas.

2. New expertise in forest biodiversity conservation could be used to benefit life in rural areas where native forests are dwindling rapidly and remaining forests are particularly strategic (which is currently the case for large parts of each region of Pakistan).

3. For native forest restoration, in rural areas which have or could have high levels of public support, new levels of scientific and managerial expertise are needed.

4. The suburbs, and some central urban areas, of the major urban areas of Pakistan warrant more restoration of urban forests of native species. Sometimes restoration of the forest and woodland habitats and populations of some species at risk has or could have high levels of public support (currently the case within some parts of the metropolitan region of every major city in Pakistan).

Some project goals for capacity building for forest biodiversity conservation for Pakistan

With so many land use-related threats (and such global problems as climate change) to forest biodiversity in Pakistan, where is it best to begin in improving capacities in forest biodiversity research, conservation planning and programme development? The solution in this report centres on giving post-M.Sc. educational support to up to 50 people who could become leaders in government, NGOs and research institutions. More specifically, the project goals are to provide a range of support and resources through

1. M.Sc. and post-M.Sc. education (courses and workshops),
2. subsequent supervision,
3. the nurturing of an ongoing peer-based support network, and
4. ongoing consultative support in development of research and conservation programmes.

Under the general goal of enhancement of professional performance around forest biodiversity conservation, a number of more specific priorities have been proposed in capacity building:

1. improvement in skills in the transfer (and discussion) of new scientific material from a field that is primarily in English to teachers and officials who work and supervise in Urdu;

2. enhancement of monitoring and research capacities around the status of native forests;

3. enhancement of monitoring and research capacities around species at risk;

4. enhancement of surveying, assessment, and monitoring capacities around forest species with genetic resources;

5. enhancement of expertise in data collection for forest conservation planning and subsequent protection and monitoring;

6. enhancement in expertise spatial decision-making, creation of proposed plans (on hardcopy and increasingly digitally) and necessary graphic communication;

7. enhancement of monitoring, research and programme development capacities around restoration of native forest habitat and species;

8. improving capabilities in supervising socio-economic studies related to development of programmes for forest biodiversity conservation;

9. improving capabilities in writing and implementing project and grant proposals and subsequent business plans for forest conservation as rural development projects; and

10. improving capabilities in ethnographic research and cultural sensitivity to strengthen communication between local people and forest professionals.

Strategies for capacity building & transfer of expertise

The central aspect of the strategy for capacity building and transfer of expertise is to create a critical mass of Pakistani professionals, educators and scholars actively engaged in and communicating about research on forest biodiversity and integrating conservation programmes into sustainable development. The following are the key aspects of this strategy.

9. Central to this capacity building concept is the **creation of an annual M.Sc. and post-M.Sc.-level course**. After considerable discussion, the concept that is most attractive to people interviewed is the establishment of an annual, month-long

course where half of the time is in the field. Each year, the focus of the field work could shift to a different native forest ecosystem type and set of threatened landscapes and species.

10. Part of the topics in such a course would extend to **further training in being educators, trainers and supportive peers** for some aspects of forest biodiversity research and conservation in Pakistan.

11. A key aspect of the intensive course would be a **supervised final project**, on forest biodiversity research and conservation that would be developed cooperatively between the student, their employers and the educators in the course. The student could then have a period such as three months to complete a modest research design, conservation plan or programme proposal as part of their professional work. The educators from the intensive course could provide email supervision and at least one field visit as part of support for this aspect of the educational experience.

12. Another aspect of the strategy would be to involve current M.Sc. students by increased supervision of and **support for M.Sc. thesis research** when it involved forest biodiversity conservation.

13. As well as the intensive course, a series of **specialized, week-long workshops**, in advanced topics will be necessary to develop adequate levels of expertise.

14. Such a course could eventually be **expanded to a certificate programme** with week-long workshops, on more specialized topics, were offered semi-regularly as follow-up to the core course. The certificate programme could function as part of a modest kind of post-M.Sc. certification or perhaps one day the core of an M.Sc. programme on forest biodiversity conservation.

15. The development of the core course and workshops would be intended to involve **on-going collaboration of the following experts**:

    a. Pakistani experts already involved in forest biodiversity research, conservation and postgraduate education at the major national institution on forests, the PFI;

    b. Pakistani experts involved in forest biodiversity research, conservation and postgraduate education in other educational institutions, in government and in NGOs; and

    c. At least one, foreign, mid-career or senior educator and researcher would be necessary -- with achievements in teaching, publications and forest biodiversity conservation programmes. To provide sufficient outside support, it would be necessary that at least one of the foreign advisors had

an ongoing advisory appointment, to either the PFI or another Pakistani university, that was at least half-time every year for a number of years.

16. The group that forms to offer the course, workshop and supervision could also provide **consultative services** on government and nongovernmental project development. The support that the network of experts could provide to agencies and organizations would be, effectively, a set of extension services – the kinds often provided by educational institutions.

Project components

Based on the strategy above, this project concept consists of seven components centred on the development and aftermath of a one month intensive course that is offered on an annual basis. All activities in the proposed project fall within the following categories of activities:

1. development of an annual M.Sc. and post-M.Sc.-level course intensive course half of which held in the field;

2. further training in being educators, trainers and supportive peers specifically in forest biodiversity research and conservation and its integration into sustainable development;

3. supervision of final projects in the months after the course period as part of credit for completion of the course;

4. support for M.Sc. thesis research in forest biodiversity conservation;

5. specialized, week-long workshops;

6. eventual expansion of the intensive course and workshops to a certificate or even an M.Sc. programme in forest biodiversity conservation;

7. on-going collaboration of Pakistani experts from various universities, government departments and nongovernmental organizations; and

8. consultative services for development of forest biodiversity research and conservation projects.

1. course development

- The central concept activity of this project is development and teaching of a month-long, intensive introductory course, half in the field, on forest biodiversity conservation.

- The intensive course could be offered at least 3 times over the next 4 years.

- The course could be oriented to Pakistani professionals already with forestry and environmental M.Sc. degrees and some advanced M.Sc. students, from the PFI, focused on forest biodiversity conservation.

- Before the first formal course is offered, most likely in 2002, there could be consultative workshops in late 2002 or early 2003. Focused on the topics that would be covered in the formal course, the consultative workshops, for development of the course, could have a maximum of 10 PFI experts and professionals from other parts of Pakistan.

- The class size of the formal courses could go up to a maximum of 20 in formal offerings of the course.

- The course would involve six days of instruction per week (Monday through Saturday), from 0800 hours to 1400 hours. The exception is on Fridays when instruction is only from 0800 hours to 1200 hours. Between 1000 hours and 1100 hours, there is a short break for tea.

- The portions of the course offered in classrooms would involve a high degree of graphic presentation with digital projection with a great deal of maps, photographs and charts presented. This course material in digital form would be available to each student and transferred to the partners of this project, such as the PFI, to be re-used and reworked on an indefinite basis.

- Two of the four weeks of the course would be offered in the field – preferably within one district and set of forest landscapes. The preferred location of the field work for the first offering of the course is the Salt Range of the central Punjab. In terms of an optimal range of drier subtropical forest types (in various states), relatively high levels of biodiversity, economy of transport from the PFI, comfort, safety and security, the Salt Range is a relatively easy area for the PFI to arrange two weeks of field work. As for an itinerary, 3 or 4 forest settings would be selected for 3 days of field work each.

- In subsequent years, the course could be moved to different native forest ecosystems in Pakistan as part of a process of building up more knowledge on the status and conservation and development options for each ecological and socio-economic setting.

- For an intensive course like this, with supervision, the optimal class size is 15 to 20. The number of the participants in the initial consultations could be slightly less.

2. <u>training as educators, trainers and supportive peers</u>
   - In a country where there is an acute shortage of educational options, those fortunate enough to obtain postgraduate training are rarely in a position, or

inclined, to pass on their expertise and to create a support peer network of exchange. It is necessary to break this elitist approach to information flow and education (and lack of education) through putting priority on training research and programme managers who are also good teachers and willing to transfer such knowledge as part of their work.

- The course will embody a strategy for transfer of English-based knowledge to Urdu speakers. To a large degree, this intensive course is intended to train teachers in English who will in turn transfer concepts into Urdu and other Pakistani languages on an indefinite basis. These will be opportunities in the course of each lecture, laboratory and discussion period to translate the concepts, presented in English, into Urdu.

3. supervision of student final projects as part of completion of the course
   - A central function of the proposed capacity building is to prepare professionals for higher levels of and more creative problem-solving. These skills require more than lectures and more time than is afforded in workshops and intensive courses. Thus, the goal of the intensive course is for students to not only absorb key material, on the principles of forest biodiversity and conservation, but to demonstrate capabilities to improve the performance of their teams, programmes, agencies and institutes.

   - Most land management, natural resources, and research agencies in Pakistan are functioning at such fiscally impaired levels that much of the material and implications of the intensive course could seem irrelevant or impossible to apply in day-to-day work. In the supervision of the final project, each student would be given advice and resources on how to apply some of the more relevant topics and techniques of the course.

   - A 3 month supervision period, after the dates of the actual course, for some kind of applied project (the parameters of which could be set in advance by each student's employer) could lead to a professional project such as a research, organizational or work plan or proposal for a new programme.

   - Perhaps 40% of the grade of the course could come from an examination on the last morning of the course. In the afternoon, each student could present an outline of a project that they will pursue in the following three months.

   - The emphasis in the final project would be on creative thinking and problem solving related to the professionals work place and programmes. The emphasis would be on quality not quantity. Thus, there could be a strict minimum and maximum size set for the document such as between 2,000 and 4,000 words.

   - Supervision would typically be by post or, where available, email with the possibility of perhaps 2 meetings with supervisors – typically one being a PFI

instructor and the other being a foreign or Pakistani researcher working outside of the PFI. If funds were made available, supervisors could spend one or two days with each student while the projects were being developed.

- Completion of the project would involve an hour presentation to the course supervisor(s) and the student's work place supervisors.

4. support for M.Sc. thesis research in forest biodiversity conservation
   - As more students are becoming interested in acquiring expertise in forest biodiversity conservation, more support for related thesis work, especially some of the M.Sc. students at the PFI, will be worthwhile.
   - The kinds of increased support for and supervision of student research, around biodiversity and conservation research, that are increasingly worthwhile includes

     - more time in the field – for both students (sometimes with their supervisors),
     - more training in work in difficult field conditions,
     - more meetings between the student and their supervisor(s),
     - more than one supervisor when the topic is interdisciplinary,
     - more on-going email contact between students and their supervisor, and
     - more compilation of background material by supervisors as preparatory tutorials for aspects of the thesis research.

5. specialized, week-long workshops

After the core course is development, there will be need for further instruction and applications of many specialized topics in forest biodiversity conservation.

- It will be worthwhile to expand on a number of topics which could only be covered in an hour in the intensive month, in three to six day workshops.
- These courses would be offered where funding and interest allowed and would involve more in-depth instruction in some of the material touch upon in the month-long course.
- Where appropriate, some of these courses would also be field-oriented.

An initial list of some of the topics that are worth expanding on, especially for the situation in Pakistan around linking biodiversity research and conservation to local development, are the following:

- inventory and assessment techniques for specific ecosystems and species;
- determination of minimum viable population criteria, for certain species, and construction of models;
- surveys and determination of critical habitat for species and ecosystems at risk;
- development of recovery strategies for species and ecosystems at risk;
- surveying and *in situ* conservation of forest and rangeland genetic resources (including wild relatives of crops);

- specific techniques for planning and design of networks of protected habitat for certain kinds of organisms such as, for example, populations of rare and threatened plant species (Ingram 1996);
- specific remote sensing and geographic information system software, sources of data and possible applications;
- ethnographic techniques for local knowledge and management of forest biodiversity;
- landscape ecology and spatial modelling for forest biodiversity conservation planning (Ingram 2000b, 2002);
- the implications of climate change and strategies for forest biodiversity conservation in Pakistan;
- site planning for forest biodiversity conservation (Ingram 2000a)
- socio-economic research for local initiatives for forest biodiversity conservation (and development);
- conflict resolution around forests, forest conservation & land use;
- restoration techniques for particular forest ecosystems and species;
- strategic national and provincial-level planning for forest biodiversity conservation;
- restoration techniques for particular species and ecosystems;
- software for graphic communication around conservation proposals; and
- conservation and restoration of urban and suburban native forest and habitat in metropolitan regions.

6. expansion of intensive course & workshops into a certificate or M.Sc. programme

Some kind of forest biodiversity conservation M.Sc. programme offered either as a concentration within the PFI M.Sc. programme or at another institution, will be necessary in the coming years.

- There are numerous advantages to having such a forest biodiversity conservation programme associated with the PFI – since this institution remains the only functioning postgraduate programme on forests in the country.

- There might also be advantages in offering such a programme jointly with another university -- or at least having some shared courses with another university.

- Whether or not the PFI was the administrative home for such a programme, it would be necessary to offer some courses and field research components in the southern half of Pakistan.

7. enhance collaboration of Pakistani between experts

There are number of modest initiatives that could increase collaboration around forest biodiversity research and conservation in Pakistan. An underlying goal with this component of the project is to develop a more functional network for information exchange and other forms of peer support.

- The 2002 – 2003 period, for the preparation of the first month-long course, can involve consultative workshops, in a number of parts of the country. These meeting can obtain input to fully recognize the achievements, so far, of Pakistani researchers, conservation planners, foresters and programme managers.

- In the coming years, it would be worthwhile to create a roster of experts and to contribute to or create specific pages on websites – specifically on aspects of forest biodiversity assessment and conservation in Pakistan.

- In the 2005 – 2007 period, it should be worthwhile to hold a series of conferences, or day-long colloquiums, on the status and prospects for conservation of particular forest ecosystems in Pakistan. The goal of these meetings could be to begin to create the organization framework for ecosystem recovery teams beginning through:
    - exchange of information on the structure and associated biodiversity for each forest ecosystem type;
    - identification of threatened and vulnerable communities, species (Shafiq 1997) and genetic resources;
    - identification of groups of organisms that are particularly vulnerable at the broader ecoregional and national levels (as with Mian Muhammad Shafiq's 1999 discussion on crane conservation);
    - identification of priorities for further research to support conservation initiatives;
    - laying the basis for more comprehensive conservation planning and new initiatives in protected and managed areas;
    - initiating frameworks for stakeholders directing and contributing to conservation initiatives;
    - tying conservation initiatives to both protection of habitat and species and to economic development; and
    - restoration priorities, approaches and techniques for specific forest ecosystems.

8. consultative services for development of research and conservation projects

A final component necessary for the 2002 – 2007 would be development of a consultative, extension network where educators and researchers would be able to contribute more regularly to project development in forest biodiversity research and conservation. Both educators and researchers would need to be more available for providing information and advice. If there was funding, such contributions might be made part of their professional responsibilities. As part of an expanded service function for educators and researchers, the following initiatives might be worthwhile:

- development of extension positions specifically for the linking of forest biodiversity conservation and locally based, rural economic development;

- publications of pamphlets, posters and educational reports oriented to enhancing the linking of forest biodiversity conservation and locally based, rural economic development; and

- organization of consultative workshops and reports on prospects of forest biodiversity conservation and locally based, rural economic development for particular districts within Pakistan.

Possible administrative structures for project development

In my interviews over the last two years, the only group that has expressed a prolonged interest, in providing an administrative home for an extended initiative on research and education for forest biodiversity, is the PFI. WWF-Pakistan and LEAD-Pakistan have both expressed interest in organizing and obtaining funding for more workshops related to more specific topics. The problem is that the PFI, as a government institute with ties to the University of Peshawar, is barely able to maintain the programmes around forests and forestry for which it already has a mandate. And the Wildlife Management Branch of the PFI is particularly under-funded and in need of new sources of funding for field work, transport and equipment. Even if modest levels of funding are obtained for capacity building in forest biodiversity conservation, as it appears likely, an administrative structure is necessary that does not overwhelm and complicate the broader educational and research responsibilities of the PFI. One solution is to provide the initiative with an administrative home at the PFI while creating a separate, advisory body and secretariat involving the participation of government and even international agencies, nongovernmental organizations and scientific researchers. Such framework could be designed to insure that funds and equipment for this project remain allocated to research and capacity building in forest biodiversity conservation.

The features of such an initiative, based at the PFI, could include the following features.

- The location of the course(s) could be half at PFI and half time in the field and in other postsecondary institutions in the country.

- The field locations could change each year to focus on different forest ecosystems.

- The workshops could be organized for relevant areas of the country.

- An advisory council could be responsible to organizing funding with a high degree of transparency.

- The PFI already has a collaborative link with the University of Peshawar. There may be advantages in offering the intensive course and a future M.Sc. programme, for forest biodiversity conservation, jointly between the PFI and other postsecondary education institutions.

Affiliated institutions & organizations

There would be a number of ways for other institutions to affiliate with such an initiative – that today has the formal interest of the

PFI,
Karavan Leaders and
side stream environmental design.

One means for additional groups to affiliate with such an initiative is through an advisory body – that works to obtain funds for a programme administratively 'housed' at the PFI.

Another way that other institutions, agencies and organizations could affiliate with this project is through the following cooperative relationships:

4. applying for admission and paying (in money or in-kind support) close to the real costs of the training for personnel from those collaborating organizations;

5. collaboration around research and conservation programmes during and following field aspects of courses and workshops; and

6. contribution of experts for guest lectures in the course or particular workshops.

So far, the only nongovernmental organisations in Pakistan that have expressed interest in more capacity building for forest biodiversity conservation have only been

WWF-Pakistan
and
LEAD-Pakistan.

Qualified personnel

Over the last two years, it has not been easy finding individuals with sufficient expertise for M.Sc. and post-M.Sc. training in forest biodiversity research and conservation. Many of the individuals in Pakistan, with specialized skills in aspects of forest biodiversity conservation, have not been trained in being educators nor have expressed particular interest in spending many hours acquiring expertise to teach as part of capacity building. At the present, enough individuals have been located to initially develop the intensive course and some of the workshops. But for the additional phases of such an extended initiative, more skilled individuals will be needed. The gap is particularly acute for individuals with doctorates specifically focused on forest biodiversity diversity, conservation planning and geomatics – who have established careers in field research, geomatics, publications and postsecondary education. To attract such individuals to the project, the rewards will be substantial. As has been discussed with the PFI, and the nongovernmental organizations that have expressed interest in capacity building in forest biodiversity conservation, a number of partners will be necessary. The expertise that has been identified is grouped below as

a. current PFI staff,
b. other university staff in Pakistan,
c. personnel working in nongovernmental organizations, and
d. foreign educators and researchers.

The following personnel at PFI have identified with the needed expertise in education and research and who can make themselves available to contribute to the project:

1. Dr. Sardar RAFIQUE, Ph.D., Director Forest Education Division email: smrafiquedr@yahoo.com

2. Dr. Mohammad AYYAZ, Ph.D., Acting Director General of PFI email: dgpfi@brain.net.pk

3. Mr. Shafiq Muhammad MIAN, Assistant Secretary Wildlife, Wildlife Management Branch, of the PFI, email: pfilib@hotmail.com; pfilib@brain.net.pk

4. Mr. Ghayyas Ahmad RAJA, M.Sc., Lecturer email: ghayyas@brain.net.pk

5. Mr. Ali MISKEEN and Mr. Idrees MUHAMMAD of the Wildlife Branch email: dgpfi@brain.net.pk

6. Ms. Mamoona Wali MALIK, Forest Education Division email: mamoonawali@hotmail.com

7. Mr. Zarif RAJA, Forest Education Division email: smrafique@yahoo.com

The following expert was identified for:

- advising on organizing of extended field training and sometimes difficult field conditions;
- training in travel and safety in difficult field conditions; and
- ecotourism as part of initiatives that combine forest conservation with local economic development.

Mr. Umer AZIZ
Karavan Leaders (Pvt.) Ltd.,
F 26 Commercial, Phase 1 - DHA,
Lahore Cantt
telephone: + + 92 42 572 93 80, +
++ 92 42 572 32 64
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Karavan Leaders is a private organization with the most experience, in Pakistan, in development of educational, research and recreational tours of remote parts of Pakistan. Clients include Pakistani universities, Pakistanis engaged in ecotourism and foreign researchers and tourists focused on mountaineering, wildlife and traditional culture. remaining forest biodiversity and species-at-risk (biodiversity at risk) is often in remote and rugged areas where a degree of training is needed around such techniques as use of ropes. Safety and efficiency are important issues for management and development of field research programmes. Karavan has the most extensive achievements in serving post-secondary institutions in Pakistan in organizing and leading educational groups in remote and difficult field conditions.

Two Pakistani experts were identified through contact with WWF-Pakistan. They are perhaps the most expert individuals on inventorying of mangrove ecosystems in Pakistan and restoration of those same forests.

Prof. S. M. SAIFULLAH
Director, Director of the Biological Research Centre, Karachi University
address:
Mangrove Ecosystem Laboratory
Department of Botany
University of Karachi
Karachi 75270
fax: 496 3124; 496 3373
tel. 479001 / 2288, 2397
tel. (res.) 4988502
email: smsaifullah2001@yahoo.com

Mr. Fayyaz RASOOL
WWF-Pakistan
606 – 607 Fortune Centre
6th floor, block C
PECHS, Shahrae Faisal
Kararchi
tel. 021 – 4544791 – 92
fax. 021 4544790
email: fayyaz19us@yahoo.com

Prof. Saifullah has expressed availability to provide guidance on research programmes around mangrove surveying, monitoring and conservation. But because he is scheduled to retire in September 2003, he has described other possible contributions to the initiative as only ‘nominal’.

While the expertise within Pakistan is impressive, there have been too few individuals who have completed doctorates in forest biodiversity and conservation

planning. Those that have been identified have not had opportunities to develop their expertise in education and development of publications – and often have not had a chance to continue to conduct much field research. And South Asian experts, on such field as forests and forest biodiversity, are increasingly recruited for projects based in Europe and North America. Because of this gap, the contributions of foreign educators and researchers, expert in forest biodiversity conservation, will be necessary – at least for the coming five years. The central goal of this project concept is to create a `critical mass', of knowledge and perspectives, from the interactions of Pakistani and foreign educators and researchers, over the next five years. The goal would be to sufficiently transfer the knowledge base that, after five years, foreign expertise would not be essential to conceive and carry out credible research and conservation programmes around forest biodiversity.

The strategy that I have proposed for capacity building in forest biodiversity conservation in Pakistan is based on bringing the expertise of foreign, mid-career educators and researchers, in forest biodiversity conservation, into the country, on a regular basis, so that it can be transferred and adapted on a more ongoing basis. At least one mid-career or senior expert, in forest biodiversity conservation, with a history of education, research, publications and project development is needed – and one with some expertise in drier forest and woodland ecosystems. Unfortunately, the prospects of bringing in outside educators, researchers and conservationists, from virtually anywhere in the world, have declined over the last year. The author of this report remains the only individual who could be found who would be willing to develop such a project over the coming years. And as security has deteriorated, my constraints related to personal safety, have tightened. The one other outside candidate located as a teacher, Mr. Arend de Haas of The Netherlands, who was quite successful teaching geomatics to Pakistan professionals, left his mission to Pakistan prematurely after worries about security in Karachi in February of 2001. And I am under tremendous pressure to not work much in Pakistan and to increase my levels of personal security.

The other potential source of expertise on forest biodiversity conservation, directly, to the east will remain effectively unavailable for some time. The border with India continues to be a formidable barrier to the transmission of knowledge, to Pakistan, from related programmes in India. One Indian citizen, the recent recipient of a prestigious young Indian scientist award, has expressed limited availability to advise and contribute to development of curriculum and research programmes.

Dr. Harini NAGENDRA
Asia Research Coordinator
Center for the Study of Institutions, Population, and Environmental Change (CIPEC), Indiana University,
408 N. Indiana Avenue,
Bloomington IN 47408, USA
email: nagendra@indiana.edu

A recent graduate of the Indian Institute of Technology, much of her time is already allocated for periods in the USA, Nepal, India and Central America.

Team concept

Over the course of the first five years of such a coordinated effort in capacity-building, the following types of responsibilities and part-term appointments would be necessary:

1. senior administrative support;
2. development of project concept, course & research programme;
3. coordination & administration of course & expanded research programme;
4. planning & management of field components of courses, workshops & field research;
5. core lecturers in intensive course;
6. advising on development of socio-economic aspects of course and research programme; supervision of final projects for the course in the following months;
7. enhanced supervision and support for M.Sc. theses in forest biodiversity conservation; and
8. technical support (especially in the field).

In considering the tasks necessary for the work, the following are the kinds of positions, personnel and qualifications necessary to develop such a programme.

1. senior administrative support
    a. the Director of the PFI or (if there is no Director as is the case today) the Acting Director
    b. the Director of the Forest Education Division
    c. advisory group of researchers and professionals

2. development of project concept, course & research programme
    a. foreign mid-career forest biodiversity conservation educator(s) and researcher(s)
    b. a PFI teacher and researcher who has already completed a course in forest biodiversity conservation
    c. Assistant Secretary Wildlife, Wildlife Management Branch, of the PFI

3. coordination & administration of course & expanded research programme
    a. Director Forest Education, PFI
    b. Assistant Secretary Wildlife, Wildlife Management Branch, of the PFI &
    c. foreign mid-career forest biodiversity conservation educator(s) and researcher(s) for international aspects

4. planning & management of field components of courses, workshops & field research
    a. PFI lecturer who has completed courses and field research in forest biodiversity conservation
    b. Assistant Secretary Wildlife, Wildlife Management Branch, PFI &

   c. Pakistani expert in extreme field work (Karavan Leaders)

5. core lecturers in intensive course
   a. foreign expert and
   b. PFI lecturer, PFI, who has completed courses and research in forest biodiversity conservation
   c. Assistant Secretary Wildlife, Wildlife Management Branch, PFI
   d. trainer for advanced field travel, safety & security
   e. PFI experts selected by
      a. Director Forest Education PFI &
      b. Acting Director General of PFI

6. advising on development of socio-economic aspects of course and research programme
   a. PFI experts selected by Director Forest Education, PFI
      with the contributions of
   b. lecturers, PFI
   c. ecotourism expert, Karavan Leaders

7. supervision of final projects for the course in the following months
   a. Assistant Secretary Wildlife, Wildlife Management Branch, of the PFI
   b. Lecturer, PFI &
   c. foreign expert
      with guidance from
   d. Director Forest Education, PFI &
   e. Acting Director General of PFI

8. enhanced supervision and support for M.Sc. theses in forest biodiversity conservation
   a. Assistant Secretary Wildlife, Wildlife Management Branch, PFI
   b. lecturers, PFI
   c. foreign expert
   d. ecotourism expert, Karavan Leaders
      with guidance from
   e. Director Forest Education, PFI &
   f. Acting Director General of PFI

9. technical support (especially in the field)
   a. Assistant Secretary Wildlife, Wildlife Management Branch, PFI
   b. Director Forest Education, PFI
   c. field biologist technicians, PFI

In reviewing the credentials of the individuals who have expressed availability, the following appointments may be appropriate:

senior administrative support:

a. Dr. Rafique SARDAR, Director Forest Education, PFI &
b. Dr. Ayaz MOHAMMAD, Acting Director General of PFI

development of project concept, course & research programme:

a. Dr. Gordon Brent INGRAM,
b. Mr. Ghayyas Ahmad RAJA, Lecturer, PFI &
c. Mr. Shafiq Muhammad MIAN, Assistant Secretary Wildlife, Wildlife Management Branch, PFI
d. email input from Dr. Harini Nagendra
e. input from Prof. S. M. SAIFULLAH and Mr. Fayyaz RASOOL on aspects of mangrove inventory, conservation and restoration
f. input from other Pakistani experts on other forest ecosystems types

coordination & administration of course & expanded research programme:

a. Dr. Rafique SARDAR, Director Forest Education, PFI
b. Mr. Shafiq Muhammad MIAN, Assistant Secretary Wildlife, Wildlife Management Branch, PFI &
c. Dr. Gordon Brent Ingram (international aspects)

planning & management of field components of course & field research:

a. Mr. Ghayyas Ahmad RAJA, Lecturer, PFI
b. Mr. Shafiq Muhammad MIAN, Assistant Secretary Wildlife, Wildlife Management Branch, PFI &
c. Mr. Umer AZIZ, Pakistani expert in extreme field work (Karavan Leaders)

core lecturers in course:

a. Dr Gordon Brent INGRAM and
b. Mr. Ghayyas Ahmad RAJA, Lecturer, PFI
c. Mr. Shafiq Muhammad MIAN, Assistant Secretary Wildlife, Wildlife Management Branch, PFI
d. Mr. Umer AZIZ (advanced field training for travel, safety & security), Karavan Leaders

PFI experts selected by

e. Dr. Rafique SARDAR, Director Forest Education PFI;
f. Dr. Ayaz MOHAMMAD, Acting Director General of PFI; &
g. email input from Dr. Harini Nagendra
h. input from Prof. S. M. SAIFULLAH and Mr. Fayyaz RASOOL on aspects of mangrove inventory, conservation and restoration
i. input from other Pakistani experts (when located) on other forest ecosystems types

advising on development of socio-economic aspects of course and research programme (including some field work) & providing relevant lectures:

a. PFI experts selected by Dr. Rafique SARDAR, Director Forest Education, PFI
   with the contributions of
b. Ms. Mamoona Wali MALIK, Lecturer, PFI
c. Mr. Zarif RAJA, Lecturer, PFI &
d. Mr. Umer AZIZ, ecotourism expert, Karavan Leaders

supervision of final projects for the course in the following months:

a. Mr. Shafiq Muhammad MIAN, Assistant Secretary Wildlife, Wildlife Management Branch, of the PFI
b. Mr. Ghayyas Ahmad RAJA, Lecturer, PFI &
c. Dr. Gordon Brent INGRAM
   with guidance from
d. Dr. Rafique SARDAR, Director Forest Education, PFI &
e. Dr. Ayaz MOHAMMAD, Acting Director General of PFI

enhanced supervision and support for M.Sc. theses in forest biodiversity conservation:

a. Mr. Shafiq Muhammad MIAN, Assistant Secretary Wildlife, Wildlife Management Branch, PFI
b. Mr. Ghayyas Ahmad RAJA, Lecturer, PFI &
c. Dr. Gordon Brent INGRAM
d. (and other with guidance from
e. Ms. Mamoona Wali MALIK, Lecturer, PFI
f. Mr. Zarif RAJA, Lecturer, PFI &
g. Mr. Umer AZIZ, ecotourism expert, Karavan Leaders
   with guidance from
h. Dr. Rafique SARDAR, Director Forest Education, PFI &
i. Dr. Ayaz MOHAMMAD, Acting Director General of PFI

technical support (especially in the field work):

a. coordinated by Mr. Shafiq Muhammad MIAN, Assistant Secretary Wildlife, Wildlife Management Branch, of the PFI,
b. the guidance of Dr. Rafique SARDAR, Director Forest Education, PFI
c. Mr. Ali MISKEEN, field biologist technician, PFI
d. Mr. Idrees MUHAMMAD, field biologist technician, PFI

The experts from the other educational institutions and the nongovernmental organizations, such as Dr. Prof. S. M. SAIFULLAH from Karachi University and Mr. RASOOL from WWF-Pakistan, could be invited to provide lectures, days in the field and workshops on topics where they were expert and when they were available.

Project phases

This project concept involves three phases over the coming years. The proposed dates are based on realistic projections around modest levels of cooperation within Pakistan (and the PFI) and external funding. The following are the proposed project years and phases.

Year 1 = 2002 (Phase 1)
Year 2 = 2003 (Phase 1)
Year 3 = 2004 (Phase 2)
Year 4 = 2005 (Phase 2)
Year 5 = 2006 (Phase 3)
Year 6 = 2007 (Phase 3)

Phase 1:
2002 - 2003
Development of organizational and fund base and curriculum for intensive course

In this, the initial, phase of the project, the emphasis will be on

- consultations,
- introductory discussions for institutional links between education, capacity building and programme development,
- initial formation of collaborative networks, and
- development of a curriculum for the month-long, intensive courses.

Of the eight components of the overall initiative, the following would be the most important work for this phase.

9. development of an **annual M.Sc. and post-M.Sc.-level course intensive course** --The most important work in this phase is the initial development of the annual M.Sc. and post-M.Sc.-level course intensive course. The following would be the initial activities for this work.

   l. Much of the **development of the curriculum**, as outlined in Appendix II, could be continuation of the current work of the foreign advisor -- with closer collaboration of PFI staff and other Pakistani experts. Perhaps half of these tasks could be completed by the end of 2002 with the other half of the tasks largely completed in the first half of 2003.

   m. Along with the basic course material, that could be presented verbally and on black boards, would be development of a set of **graphically oriented lectures and other educational materials** presented through digital projection. These electronic files could be created in Word – PDF and PowerPoint formats and could be transferred by the foreign advisor to other teachers, participating experts from outside of the PFI, and participants through CD Rom. These files and formats for presentation would become a key aspect of the transfer of

material to Pakistani experts – material that could be expanded and further adapted to the Pakistani national, provincial and ecoregional (of specific forest ecosystems) contexts on an ongoing basis. Much of the initial work on the electronic files could be completed by mid-2003.

n. The foreign advisor could make initial presentations of the key lectures, in blocks of 3 to 5 days, as part of **consultative workshops and tutorials with participating PFI staff and graduate students**, late in 2002 and early 2003.

o. For interested experts outside of the PFI, **presentation of the relevant lectures as part of consultative workshops and tutorials** could take place late in 2002 and early 2003.

p. Out of the consultations would be the **beginning of a transfer framework through assignment of responsibilities for further development of lectures** involving both the foreign advisor(s) and interested Pakistani experts. For each lecture and period of field instruction, there would be a major and an assistant lecturer who would volunteer and be assigned to take responsibility, with the foreign advisor, for the ongoing development of this educational material and ongoing literature surveys of respective topics. The initial assignments for lecture and field instruction development could be proposed to the PFI and the advisory body for the initiative by the end of the first quarter of 2003.

q. In this same period would be discussions on a **more comprehensive strategy for transfer of the material and expertise to national counterparts** and their institutions and organizations in the 2003 – 2006 period. This strategy could be developed by the foreign advisor(s) and the document could be submitted to and reviewed by the PFI and the advisory body for the initiative in the second half of 2003.

r. An **evaluation of the consultative workshops** given in December 2002 and early 2003 would be necessary in the first quarter of 2003. Further development of the material into a month-long course, by the foreign advisor in collaboration with the counter-parts for each lecture and module of training in field methods, would be necessary in the second and third quarter of 2003.

s. In preparation for some field-oriented consultative workshops, to be held in late 2002 and early 2003, and in preparation for the first month-long course in late 2003, at least **4 weeks of field surveys in the Salt Range**, in the fourth quarter of 2002, would be necessary. This work would focus on identification of areas and sites in the area appropriate for examples for field visits and for instruction in field methods. This work would be in late 2002 and early 2003 and involve the foreign advisor, Karavan Leaders, and some of the national counter-part experts.

t. The **first offering of the month-long course** (half in the Salt Range) would be in late 2003. Enrolment for this first course could best be limited to 15 professionals from outside of the PFI (with possibilities of the participation of some Pakistani M.Sc. students).

u. The writing and production of an **initial prospectus for the first intensive course**, to be offered in late 2003, would be necessary by mid-2003. There would need to be work on development of an electronic and postal mailing list related to this course. Formation of a secretariat for this work, associated with the advisory group and the PFI, would be necessary.

v. Student **application forms and selection procedures** for the first course, that would also relate the work of individuals in organizations, would be necessary by mid-2003. Formation of a selection committee, under the auspices of the initiative's advisory group, would also be necessary.

10. **further training in being educators, trainers and supportive peers** specifically in forest biodiversity research and conservation and its integration into sustainable development -- A key aspect of this initiative, throughout all three proposed phases, is further support for Pakistani researchers and professionals as educators, trainers and supportive peers -- specifically for the complex field of forest biodiversity research and conservation and its integration into sustainable development. The work in improved teaching capacities in forest biodiversity research and conservation would begin with the following activities.

    c. In the initial presentation of the key lectures, to PFI and other Pakistani experts in late 2002 and early 2003, there would be a subsequent **discussion of the topics, illustrative material available, and the most appropriate means to make presentations – in terms of the capacity building** priorities proposed in this concept document in conjunction to the priorities of participating institutions and organizations.

    d. It will be necessary to develop a fuller set of objectives and a **strategy for the capacity building**, in a separate document, following the late 2002 and early 2003 consultative workshops with PFI staff and other Pakistani experts. The initial draft of this document could be proposed by the foreign advisor in collaboration with the Pakistani experts participating in this initiative in the first half of 2003. The document, that provides the basis for the educational programme of the initiative, could be submitted to, reviewed, revised and approved by the advisory body for the initiatives in the second half of 2003.

11. **supervision of the final projects** in the months after the course period as part of credit for completion of the course – This concept, of a supervised project as part of completion of an intensive course, is a relatively new concept for professional

development in Pakistan. In this first phase of this work, the emphasis would be on exploring an approach and set of supervision practices that would be appropriate for the work place and organizational contexts of the professionals who were enrolled in the intensive course.

f. Based on the consultations in late 2002 and early 2003 the foreign and Pakistani expert(s) would **compile a set of educational objectives for the supervision** that would follow the course (and how this additional training would further contributes to forest biodiversity conservation that contributes to practical social and economic development in Pakistan). A draft document could be completed and submitted, to the advisory group for the initiative, by the end of the first half of 2003. Review, revision and adoption of the objectives and practices of the supervision phase could take place in the second half of 2003 – months before the intensive course commenced.

g. As part of the student application process, for the first month-long course in late 2003, **a linked application from each applicant's employer would be necessary**. The key question in this aspect of the application is around whether or not the successful applicant's employers are committed to supporting the student in their final project – with willingness of the prospective student's supervisor to apply the project from the course as part of the student's work responsibilities and with some support with access to resources, travel and communications.

h. Within the first week of the first intensive course, each student would have a **first and second supervisor assigned** for support in completion of the final report. The support of supervisors would extend until the deadline for the completion of the final project. A minimum and maximum level of appropriate supervision would be set as well as grading criteria. A standard level of supervision might include

    i. weekly postal or email support,
    ii. a one day visit in the field, and
    iii. an hour to two hour presentation by the student, of their final project, to their workplace and project supervisors.

i. **Grading and other evaluation criteria** would be set in the second half of 2003.

j. An **evaluation procedure would also be set for gauging the benefits of the final projects**, of the students, for actual forest conservation in Pakistan and its contribution to local development. These benefits constitute the key reason and rationale for funding the entire initiative. Such a broader framework for evaluation of project impacts could be established in the second half of 2003 (if not sooner).

12. support for M.Sc. thesis research in forest biodiversity conservation – The work on increasing **support and supervision for M.Sc. students at the PFI, specifically in forest biodiversity conservation,** could begin in early 2003 when the next group of students selects their topics. The following are the activities that can be carried out in 2002 - 2003.

    f. In the 2002 – 2003 **consultative meetings with the Pakistani experts involved with this project a list of current gaps in M.Sc. research support** for forest biodiversity conservation topics can be compiled by the foreign advisor.

    g. The points from the initial discussions on **needs for additional supervising around forest biodiversity conservation could be worked into a discussion paper** and circulated and discussed within the PFI and to the advisory group for the entire initiative. In the same process, a set of topics, appropriate for relatively short M.Sc. research schedules, can be compiled along with a list of topics that are most relevant for

        - forest biodiversity inventorying,
        - forest mapping,
        - conservation planning,
        - forest restoration, and
        - forest biodiversity conservation that enhances local development.

    h. Out of the draft discussion paper, **a set of additional or strengthened kinds supervision activities**, for forest biodiversity research, can be proposed to the PFI and the advisory group, discussed, revised and approved by early 2003.

    i. In early 2003, a small group of **M. Sc. students could embark upon some the topics identified above -- with the support of PFI supervisors and invited outside experts**. In the case of advisors and assisting supervisors, not based in Peshawar, some improved communication lines, through email, will be necessary.

    j. By the end of 2003 and the completion of the M.Sc. theses, outside readers could provide frank and confidential **comments about the quality of the M.Sc. research in forest biodiversity conservation**.

13. **specialized, week-long workshops** – The emphasis, in this period, is on developing the first month-long intensive course and not on the workshop. However, a number of topics, that cannot be adequately covered in such a short period, and that warrant further educational offerings, will become evident.

d. In the late 2002 – 2003 **consultations**, PFI and other Pakistani experts will suggest to the foreign advisor the material that is most important for the month-long intensive course and what is more appropriate for 3 to 5 day workshops in subsequent years.

e. By the middle of 2003, a **list of priority workshops for the 2004 – 2005 period could be compiled** by the foreign advisor and circulated for discussion – to the PFI, to the advisory group of this initiative, to partner organizations in Pakistan and to foreign donors.

f. Through the advisory group, various institutions, agencies and nongovernmental organizations would **choose to organize and develop particular workshops** by the end of 2003.

14. eventual **expansion of the intensive course and workshops to a certificate or even an M.Sc. programme in forest biodiversity conservation** -- The work of discussing and developing such a programme is for Phase III.

    b. In the 2002 and 2003 **consultations with Pakistani experts**, any suggestions for and ideas about a dedicated M.Sc. programme in forest biodiversity conservation could be noted for future discussions.

15. **increase levels of collaboration between Pakistani experts** from various universities, government departments and nongovernmental organizations – The focus in this phase is on development of a list of possible collaborators in the consultations around the development of the month-long intensive course.

    g. In the late 2002 and early 2003 consultations, **compilation of a more complete list of Pakistani experts** involved in forest biodiversity conservation.

    h. For a project with a number of collaborating individuals, agencies, organizations and funding bodies, the **formation of an advisory group**, a board or committee, is necessary by the middle of 2003.

    i. In the formation of an advisory body of the organizational and institutional 'stakeholders' for forest biodiversity conservation capacity building, **a list of programme managers and other possible clients would be compiled** by early 2003.

    j. Throughout 2003, there can be work with each participating agency, organization and institution to **locate any other researchers and professionals**, in Pakistan, qualified for and available to contribute the capacity-building.

k. By the middle of 2003, **an initial email list of Pakistani (and foreign) experts**, able to contribute to forest biodiversity conservation, could be compiled. A quarterly newsletter, on the programme, could be sent out.

l. An assessment for the **communication and information needs** of these experts will be necessary by the end of 2003. In this document, recommendations and costing for expanded internet and computer access at the PFI, as well as for collaborating organizations, will be necessary.

16. **consultative services** for linked, forest biodiversity research, conservation planning, implementation and local development projects – The initial work in developing consultative arrangements between the network of experts, involved in the course and workshop, and the organizations, that will need support in developing forest conservation programmes that contribute to local development, would be through supervising the final projects of the students in the first month-long course in late 2003 (with supervision extending into Phase II). Thus, much of the work for these activities in this Phase are the same as those described in Phase 1.3 b – d.

    c. In work with each participating agencies, organizations and institutions in 2002 and 2003 a set of priorities for internal capacity-building in forest biodiversity conservation that contributes to local development would be identified and compiled with a subsequent **discussion document** circulated to and discussed by the advisory group.

    d. In work with each participating agencies, organizations and institutions in 2002 and 2003 **a set of priorities for an expanded research programme** could be compiled and circulated.

Phase 2: 2004 – 2005 Development of intensive course, workshops & research framework

In this second phase of the project concept, the emphasis is on offering the month-long course to more people and in supporting and building on the work of the graduates, and the organizations for which they work.

9. **further development of annual intensive course** – The work in the intensive course in 2004 and 2005 would be in learning from the lessons of the first offering of the complete course, in late 2003, and refining the second and third offerings of the course.

    i. The first, full offering of the course, in late 2003, would be **evaluated and the course structure and material adjusted** accordingly.

j. Comments, on the **links between the final projects and capacity building would be evaluated**. Some interviews of students, their employers and instructors would be worthwhile in this evaluation. Recommendations on adjustments to supervision of the final projects would be made by the end of the second quarter of 2004.

k. The **2003 course field work, in the Salt Range, would also be evaluated and choices on field locations** for subsequent offerings of the course could be made. A choice would be made to continue with and adjust the sites in the Salt Range or to move on to a different set of forest ecosystems in Pakistan. If the course stayed in the Salt Range, another 2 to 4 weeks of field work might be necessary for the Salt Range in mid to late 2004. If another set of forest ecosystems were chosen, 4 to 6 weeks of field work would be necessary in the same period. A similar set of activities would be necessary for the same periods in 2005.

l. A **revised prospectus and application forms for the 2004 and 2005 intensive courses** would be sent out by the end of the second quarters of 2004 and 2005.

m. The **intensive course would again be offered** in late 2004 and 2005.

n. The same kind of **evaluation processes** as described in Phase 2.1.a. would be applied for the 2004 and 2005 offerings of the month-long course.

o. By the end of 2005, a **strategy for complete transfer of the course** to Pakistani experts and institutions would be necessary.

10. **further training in being educators, trainers and supportive peers** specifically in forest biodiversity research and conservation and its integration into sustainable development

d. **Consultative meetings** on improving the training in the intensive course and in subsequent student preparation to transfer this knowledge to local counterparts will be necessary in 2004 and 2005.

e. An set of **educational materials to graduates of the intensive course can be developed**, in electronic form such as on a CD Rom, and distributed to the graduates of the first two years of the course in 2005 (and to other graduates in subsequent years).

f. By 2005, it would be worthwhile to have organized a **national conference on the status of forest biodiversity in Pakistan**, current research and conservation planning, and educational and capacity building needs.

Achievements in improving educational offerings and unmet needs could be presented in a session and discussed in a panel.

11. **supervision of the final projects** from the intensive course in the months after the course period as part of credit for completion of the course – This supervision component of courses is still relatively new for Pakistan and will take another year, in 2004, to fully apply.

c. **Consultative meetings** on ways to further develop supervision for the projects, and work with respective agencies, institutions and organizations would be necessary in 2004 and 2005.

d. In a **national conference on the status of forest biodiversity in Pakistan**, current research and conservation planning, and educational and capacity building needs, there could be discussions on organizational and programme needs certain sessions, panels and workshops.

12. support for **M.Sc. thesis research in forest biodiversity conservation**

f. There can be an **evaluation of the first theses of the programme**, begun in 2003 and 2004, by PFI staff, participating agencies and organizations and the foreign advisor(s).

g. There can be **initiation of new M.Sc. thesis research and its supervision**, on forest biodiversity conservation, in 2004 and 2005. There might be the resources and interest, by this point, to increase the number of theses in forest biodiversity over those initiated in 2003.

h. In 2005, the **discussion paper on additional supervising needs for M.Sc. theses** on forest biodiversity conservation could be worked into a discussion paper can be further discussed and revised through the advisory group.

i. Based on the discussion paper mentioned above, **expanded supervision and support for M.Sc. thesis research** in forest biodiversity conservation can be made available.

j. By the end of 2005 and the completion of the second set of M.Sc. theses, outside readers could provide frank and confidential **comments about the quality of the M.Sc. research in forest biodiversity conservation**.

13. specialized, week-long **workshops**

d. The institutions who made the commitments in 2003 could **schedule and develop the workshops** with the support of the network of experts and advisory group over 2004 and 2005.

e. A format for **evaluation of the workshop**s could be developed in the first half of 2004 through the experts in the advisory group.

f. By mid-2005, the **priorities for workshops** for 2006 and 2007 could be set through the advisory group (along with an evaluation of the workshops that took place in 2004 and early 2005).

14. expansion of the intensive course and workshops to a **certificate or even an M.Sc. programme in forest biodiversity conservation** – In this period, the advantages of a particular concentration in or a separate M.Sc. programme can be explored along with an M.Sc. or post-M.Sc. certificate or diploma programme in forest biodiversity conservation.

    c. By mid-2004, a **discussion paper** could be drafted, for circulation in late 2004 and 2005 on an **expanded and structured set of post-graduate offerings in forest biodiversity conservation**. That discussion paper could be coordinated by PFI staff and the foreign advisor(s). The terms of reference for such as discussion could involve the input of the PFI, the University of Peshawar, the Inspector General of Forests, and the advisory group for the initiative and could explore the following questions:

        i. how best to expand post-graduate course offerings in forest biodiversity conservation such as through the current PFI M.Sc. programme, through a distinct concentration within that programme, through a different M.Sc. programme offered through the PFI or through a different M.Sc. programme offered jointly through the PFI and other universities;

        ii. how best to support expanded post-graduate research for forest biodiversity conservation; and

        iii. various advantages of different models of post-M.Sc. training such as ad hoc workshops with no formal certification or more structured certificate or diploma programmes.

    d. By mid-2005, there could be **consultative meetings to determine the institutions willing to develop and collaborate around such programmes** can be determined with recommendations on an organization framework made to the initiative's advisory group by PFI and other Pakistan experts and the foreign advisor(s) by last 2005.

15. **increase levels of collaboration between Pakistani experts** from various universities, government departments and nongovernmental organizations

d. A **national conference on the status of and conservation needs for forest biodiversity in Pakistan**, held by 2005, could included sessions and workshops to discuss an expanded organizational framework that would further increase the level of collaboration between agencies and institutions inside and outside of the country.

e. In the 2004 and 2005 period, it will be necessary to quickly **improve the level of internet and other digital communications technologies** for this programme within the PFI and for inside and between collaborating institutions and agencies.

f. In the 2004 and 2005 period, the **electronic newsletter and mailing list** for Pakistani experts, researchers and practitioners in forest biodiversity conservation could be expanded. For individuals working in remote areas without or with limited access to email, strategies for communications alternatives and better access to internet would be worthwhile.

16. **consultative services** for linked, forest biodiversity research, conservation planning, implementation and local development projects

e. The key work in developing a framework for providing consultative services in this phase is **building on the institutional contacts made through supervising the final projects**. The relationships developed with the organizations and institutions in 2003 and 2004 will require monitoring and ongoing follow-up.

f. In 2004 and 2005, a set of collaborative **research projects** could be initiated that would usually involve a number of institutions, agencies and organizations. This work would be focused on aspects of inventorying, monitoring, conservation planning, forest management, and forest restoration for particular districts, forests and species.

g. A component of all of the 2004 and 2005 research would involve **investigations in how forest conservation measures could more fully contribute to local development**.

h. In work with each participating agencies, organizations and institutions in 2004 and 2005, **a set of priorities for an expanded research programme** could be further compiled, revised and circulated.

Phase 3: 2006 – 2007 Expansion of intensive course into a programme & development of research and consultation programme

In this third and final phase of the project concept, the emphasis would be on complete transfer of expertise to Pakistan and further building of national institutional links. The goal is to largely remove the need for ongoing advising by foreign experts in the following areas of work with native forests:

i. inventory,
ii. mapping,
iii. monitoring,
iv. conservation planning,
v. restoration, and
vi. socio-economic assessment.

9. development of an annual M.Sc. and post-M.Sc.-level course **intensive course** half of which held in the field – In complete transfer of the course to Pakistani institutions and experts, a number of activities would be necessary.

    e. Further **evaluation** of the effectiveness of the course, in 2004 and 2005, and overall instructional needs would be necessary in 2006.

    f. The **supervision of the final projects** of the students from the third, fourth and fifth offerings of the course would continue to be a key aspect of this initiative.

    g. **Links between the final projects and capacity building would be further evaluated**. Further interviews of students, their employers and instructors would be worthwhile in this evaluation with adjustments made on an ongoing basis...

    h. The **field work and its location continue to be evaluated** and choices on for field locations of subsequent offerings of the month-long intensive course could be made.

    i. **Implementation of the transfer strategy**, developed at the end of 2005, would be a major part of the work of this phase particularly in 2007.

10. further **training as extension educators** specifically in forest biodiversity research and conservation and its integration into sustainable development

    d. More **consultative meetings,** on improving the training in the intensive course especially as part of transfer of expertise to local counterparts, will be key work in 2006 and 2007.

    e. Development of additional sets of **educational materials to graduates of the intensive course can be developed**, in electronic form such as on a CD Rom

and distributed to the graduates, will be a key activity for the final implementation of the initiative.

f. After a national conference on the status of forest biodiversity in Pakistan, it will be worthwhile to **organize provincial and bioregional meetings**, particularly in 2006 and 2007, on current research and conservation planning, and educational and capacity building needs – for specific forest ecosystems. Achievements in improving educational offerings and unmet needs could be presented in a session and discussed in a panel.

11. **supervision of final projects** in the months after the course period as part of credit for completion of the course

    d. More **consultative meetings,** on improving supervision around the final projects and their implementation, will be necessary in 2006 and 2007.

    e. A **final evaluation of the student projects**, their benefits to programme development, would be necessary by the end of 2007.

    f. A **final document, or even a published manual** for the region, on supervision of projects that both contribute to forest biodiversity conservation and local development would be worthwhile by late 2007.

12. support for **M.Sc. thesis research** in forest biodiversity conservation

    h. further **supervision** of the M.Sc. thesis research, specifically on forest biodiversity conservation, in this period

    i. There can be an **evaluation of thesis research** (and theses) from 2003, 2004 and perhaps some from 2005 (if they are completed) in 2005.

    j. The **supervision support can be expanded** for M.Sc. research in forest biodiversity conservation.

    k. Further standards can be set in a 2006 **manual for supervisors**.

    l. In the 2006 and 2007 period, there could be possibilities to **expand the numbers of researchers working on M.Sc. theses** in forest biodiversity.

    m. Also in this period, it should be possible to arrange support for one or two Pakistani **Ph.D. students**, with particularly successful M.Sc. theses, for studies at universities outside of Pakistan, on forest biodiversity conservation topics within Pakistan.

n. A **publication programme** can be established that could involve a website, a monograph series and special issues proposed for already established Pakistani (and international) journals. Particular lines of publication research could be the following:

i. inventorying and monitoring;
ii. mapping and geomatics;
iii. conservation planning, land management and decision-support;
iv. status of ecosystems, species and gene pools at risk; and
v. forest restoration.

13. specialized, week-long **workshops**

h. The 2004 and 2005 workshops would be **evaluated** by the first half of 2006.

i. A **revised set of guidelines and expectations for the educational delivery** of the 2006 and 2007 workshops would be submitted to the advisory group, revised and approved by mid-2006.

j. In this period, it will still be necessary to work to assure that the workshops contribute to **building of local expertise in social development** as well as biodiversity conservation. A discussion paper with recommendations to the advisory group would be necessary by mid-2006.

k. A **revised set of priorities for workshop topics** would be submitted to the advisory group, revised and approved by mid-2006.

l. **Organizational commitments for developing and offering particular workshops**, in 2006 and 2007, would be made in the first half of 2006.

m. Several **specialized workshops** would be offered each year in 2006 and 2007.

n. Material from some of the workshops would be **developed for publication** as manuals and technical guidelines in printed or CD Rom form.

14. expansion of the intensive course and workshops to a **certificate or even an M.Sc. programme** in forest biodiversity conservation – This would be the first phase of developing the expanded programme and activities would depend on the recommendations that were accepted by the advisory group for the entire initiative. The following activities would be the minimum necessary for any of the options that might emerge for such a programme.

f. In the first half of 2006, could be a **discussion paper**, directed to the advisory group, on specific educational and professionals goals for such a specific M.Sc. or post-M.Sc. diploma programme.

g. In the first half of 2006, **gaps in the current educational offerings could be identified** in a discussion paper to the advisory group on the initiative.

h. In 2007, an **academic framework** could be forged, involving decisions of the advisory body and participating post-secondary educational institutions.

i. A formula and system of **transfer of credit**, for individuals who have already attended the month-long intensive course and / or some of the workshop could be established by the first half of 2007.

j. The first **prospectus** for the new M.Sc. or certificate programme could be completed in the second half of 2007.

15. on-going **collaboration of Pakistani experts** from various universities, government departments and nongovernmental organizations

f. Much of the work in this phase would be in building on the enhanced level of achievement coming out of the national conference on forest biodiversity diversity conservation. The next step in enhancing collaboration would come through **organizing provincial and bioregional meetings** on current research and conservation planning, and educational and capacity building needs – for specific forest ecosystems.

g. By the beginning of this phase in early 2006, it will be necessary to have begun **extended research programmes** related to

i. inventorying and monitoring;
ii. mapping and geomatics;
iii. conservation planning, land management and decision-support; and
iv. forest restoration

for the most vulnerable forest regions, ecosystems, species and gene pools in Pakistan.

h. Many of the **publications will be collaborative anthologies** but with all scholarly work, care must be taken to build peer-support, trust and cooperation (sometimes requiring meetings).

i. In determining what material to publish, care must be taken to build procedures for inclusive, unbiased and transparent **peer review** that involves both national and international experts.

j. Further work on **electronic exchange of information** including email newsletters, websites, and exchange of CD Roms will be necessary. To

facilitate this, further work on enhancing electronic communications for some participants will continue to be necessary.

16. **consultative and other extension services** for linked, forest biodiversity research, conservation planning, implementation and local development projects – The function of this the last work of the last phase of this initiative would be to optimize the flow of information and expertise to professionals, agencies and community-based organizations. A number of the steps in Phase 3 would already contribute to this work such Phases 3.2.a-c, 3.4.f, 3.5.c and 3.7.3.

    d. Some kind of formal **extension agency**, council or organization, preferably linking university and government agencies, would probably be worthwhile. As the other phases of the work of this initiative were completed, with responsibilities devolved to various partner organizations and agencies, the advisory group for the initiative could be transformed into such a secretariat for extension. A council with a small secretariat could link researchers, educators, planners, locally based professionals and local organisations.

    e. One of the functions of such an extension office would be to further develop and maintain **follow-up programmes that support the graduates of the course,** workshops and the proposed diploma or M.Sc. programme in better developing programmes on forest biodiversity conservation in their respective professional positions – years after these individuals would studying in the proposed programme.

    f. Another function of such an extension office and council would be to act as a clearinghouse for information around possible consultative relationships for **involvement of the necessary expertise to better develop projects** for forest biodiversity conservation that contributes to local development.

Distribution of activities & responsibilities

In this section, I recommend how each organization, that has already expressed some interest in participating in the initiative, might best contribute. There is much work to be done and not an excess of Pakistani organizations interested in contributing to the initiative. Certainly, in the present funding climate the financial rewards will be limited. This project is centred on the quality of education and creativity and impact of research for development of human resources -- in contrast to the emphases of other environmental projects, involving foreign funding, in Pakistan. Keeping in mind the heavy emphasis on student contact, preparation of educational materials, field work in difficult environments, intercultural contact, follow-up and support, the expertise of the organisations, which have expressed interests in contributing, were evaluated. Evaluation criteria included proven expertise in education and research, interest in collaboration between institutions, agencies and nongovernmental organizations and proven efficiency in education and research working with limited fiscal resources.

My recommendations for responsibilities include the roles of 'lead' and 'supporting' or simply 'joint'. In addition, part of the proposed initiative calls for an advisory group (a consortium of interested organizations that could include PFI, WWF, LEAD and Pakistani government agencies). As well as some activities being organized by the advisory group, and short-term consultants, this new organization could later have a secretariat (that could become the extension office for forest biodiversity conservation in Pakistan).

Phase 1:
2002 - 2003
Development of organizational and fund base and curriculum for intensive course

1. development of an annual M.Sc. and post-M.Sc.-level course intensive course
a. development of the initial curriculum
(lead: foreign advisor; support: PFI, Karavan Leaders with the support of some other Pakistani experts and organizations)

b. initial development graphically oriented lectures and other educational materials
lead: foreign advisor;
support: PFI with the support of some other Pakistani experts

c. consultative workshops and tutorials with participating PFI staff and graduate students
lead: foreign advisor;
support: PFI with the support of some other Pakistani experts, interesting Pakistani government agencies and nongovernmental organizations, advisory group

d. presentation of the relevant lectures as part of consultative workshops and tutorials
lead: foreign advisor;
support: PFI with the support of some other Pakistani experts

e. beginning of a transfer framework through assignment of responsibilities for further development of lectures
lead: foreign advisor;
support: PFI, Karavan Leaders with the support of some other Pakistani experts

f. beginning more comprehensive strategy for transfer of the material and expertise to national counterparts
lead: foreign advisor;
support: PFI, Karavan Leaders, with the support of some other Pakistani experts, advisory group

g. evaluation of the initial consultative workshops
lead: foreign advisor, PFI & Karavan Leaders
support: some other Pakistani experts, interested Pakistani government agencies and nongovernmental organizations, advisory group

h. initial surveys of educational sites in the Salt Range
joint: Karavan, PFI & foreign advisor

i. first offering of the month-long course
joint: PFI, foreign advisor, Karavan Leaders
support: other Pakistani experts

j. initial prospectus for the first intensive course
lead: PFI
support: foreign advisor, Karavan Leaders, some other Pakistani experts

k. development of application forms and selection procedures
lead: PFI
support: foreign advisor and Karavan Leaders, advisory group

2. further training educators, trainers and supportive peers
a. consultations on the topics, illustrative material available, and the most appropriate means to make presentations – in terms of the capacity building
leads: foreign advisor(s), PFI & Karavan Leaders
support: WWF, LEAD and other Pakistani experts, advisory group

b. discussion of needs for capacity building
leads: foreign advisor & PFI
support: WWF, LEAD and other Pakistani experts, advisory group

3. supervision of the final projects
a. compile a set of educational objectives for the supervision
leads: foreign advisor & PFI
support: WWF, LEAD and other Pakistani experts, advisory group

b. linked application involving each applicant's employer
lead: PFI
support: Pakistani government agencies, WWF, LEAD and other Pakistani experts, advisory group, foreign advisory

c. first and second supervisor assigned for support in completion of the final report
lead: PFI
support: foreign advisor

d. setting grading and other evaluation criteria
lead: PFI
support: foreign advisor

e. creating evaluation procedure for gauging the benefits of the final projects

lead: foreign advisor & PFI
support: advisory group, interested Pakistani agencies and organizations, some other Pakistani experts

4. support and supervision for M.Sc. students

a. consultative meetings with the Pakistani experts to list of current gaps in M.Sc. research support
lead: foreign advisor
support: foreign advisor, LEAD, WWF, Pakistani government agencies, other Pakistani experts, advisory group

b. identification of needs for additional supervising around forest biodiversity conservation
leads: PFI & foreign advisor, advisory group

c. identification of a set of additional or strengthened kinds supervision activities
leads: PFI & foreign advisor
support: advisory group

d. first supervised M. Sc. students embark upon some the topics
leads: PFI & foreign advisor

e. evaluation of quality of the M.Sc. research in forest biodiversity conservation
leads: PFI & foreign advisor, advisory group

5. specialized, week-long workshops
a. consultations on topics for workshops
lead: foreign advisor;
support: PFI, LEAD, WWF, and other Pakistani advisors, advisory group

b. setting a list of priority workshops for 2004 – 2005 period
lead: foreign advisor
support: PFI, LEAD, WWF, and other Pakistani advisors, advisory group

c. organizations choose to organize and develop particular workshops
lead: foreign advisor
support: PFI, LEAD, WWF, and other Pakistani advisors, advisory group

6. expansion of the intensive course and workshops to a certificate or M.Sc. programme in forest biodiversity conservation
a. consultations with Pakistani experts
lead: PFI in cooperation with other universities
support: foreign advisor & advisory group

7. increase levels of collaboration between Pakistani experts

a. compilation of list of Pakistani experts involved in forest biodiversity conservation
lead: PFI
support: advisory group

b. formation of an advisory group (all participants in this initiative with support of foreign advisor)
lead: PFI, interested nongovernmental organizations, interested governmental agencies
support: other interested Pakistani universities, other Pakistani experts

c. compilation of list of programme managers and other possible clients
lead: PFI
support: advisory group, other Pakistani expert and foreign advisor

d. locate other researchers and professionals
lead: PFI
support: advisory group and foreign advisor

e. initial email list of Pakistani (and foreign) experts
lead: PFI
support: advisory group and foreign advisor

f. identification of communication and information needs of experts
lead: PFI and foreign advisor
support: advisory group and interested Pakistani government organizations and experts

8. consultative and other extension services
a. discussion paper on consultation and extension needs
lead: advisory group and foreign advisor
support: PFI and interest Pakistani government agencies and nongovernmental organisations

b. initial discussion of priorities for an expanded research programme
lead: foreign advisor and the PFI
support: advisory group

Phase 2:
2004 – 2005
Development of intensive course,
workshops & research framework

1. further development of annual intensive course
a. evaluation of first full intensive course with adjustment to course structure and material
leads: advisory group, PFI, Karavan Leaders and foreign advisor(s)
support: students from the first offering of the course, other Pakistani experts

b. supervision of the final projects of the students from the first course

leads: PFI and foreign advisor(s)

c. evaluation of links between the final projects and capacity building
leads: advisory group, PFI and foreign advisor(s)
support: organizations of students from the first offering of the course, other Pakistani experts

d. evaluation of 2003 course field work, in the Salt Range, with choices on field locations for subsequent offerings of the course
leads: advisory group, PFI, Karavan Leaders and foreign advisor(s)
support: students from the first offering of the course, other Pakistani experts

e. revised prospectus and application forms for the 2004 and 2005 intensive courses
lead: PFI, foreign advisor(s)
support: Karavan Leaders

f. intensive course offered second and third time
joint: PFI, foreign advisor(s), Karavan Leaders
support: other Pakistani experts

g. evaluation of second and third offerings of intensive course
joint: advisory group, PFI, foreign advisor(s), Karavan Leaders
support: other Pakistani experts and interested Pakistani government agencies and nongovernmental organizations

h. completion of strategy for complete transfer of the course by the end of 2007
joint: advisory group, PFI, foreign advisor(s), Karavan Leaders
support: other Pakistani experts and interested Pakistani government agencies and nongovernmental organizations

2. further training as educators, trainers and supportive peers
a. consultative meetings
leads: foreign advisor(s), PFI & Karavan Leaders
support: WWF, LEAD and other Pakistani experts, advisory group

b. production and distribution of educational materials to graduates of the intensive course
leads: foreign advisor(s) & PFI
support: advisory group, interested Pakistan government agencies and nongovernmental organizations

c. national conference on the status of forest biodiversity in Pakistan with discussion of educational needs
leads: PFI, interested Pakistan government agencies and nongovernmental organizations
support: foreign advisor(s), interested Pakistani experts

3. supervision of the final projects
a. consultative meetings
leads: PFI and foreign advisor(s)

b. discussion of educational and extension needs at national conference on the status of forest biodiversity in Pakistan
leads: PFI and foreign advisor(s)
support: interested Pakistan government agencies and nongovernmental organizations

4. M.Sc. thesis research in forest biodiversity conservation
a. evaluation of the first theses of the initiative
leads: PFI and foreign advisor(s)
support: advisory group

b. initiation of new M.Sc. thesis research and its supervision
leads: PFI and foreign advisor(s)
support: advisory group

c. discussion paper on additional supervising needs for M.Sc. thesis research
leads: PFI and foreign advisor(s)
support: advisory group

d. expanded supervision and support for M.Sc. thesis research
leads: PFI and foreign advisor(s)
support: advisory group

e. evaluation of the quality of the M.Sc. research in forest biodiversity conservation.
leads: PFI and foreign advisor(s)
support: advisory group and interested Pakistani experts

5. workshops
a. scheduling and development of the expanded set of workshops
b. evaluation format and evaluation of the workshops
c. setting priorities for workshops for 2006 and 2007
joint: PFI, WWF, LEAD, foreign advisor(s)
support: advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

6. certificate or M.Sc. programme in forest biodiversity conservation
a. discussion paper for expanded and structured set of post-graduate offerings in forest biodiversity conservation
b. consultative meetings to determine the institutions willing to develop and collaborate around such programmes
joint: PFI, other interested Pakistani university programmes, foreign advisor(s)

support: advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

7. increase levels of collaboration between Pakistani experts
a. discussion of research needs in national conference on the status of and conservation needs for forest biodiversity in Pakistan
joint: PFI, WWF, LEAD, foreign advisor(s)
support: advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

b. improve the level of internet and other digital communications technologies
joint: PFI and foreign advisor(s)
support: advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

c. electronic newsletter and mailing list
joint: PFI and foreign advisor(s)
support: advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

8. consultative services
a. building on the institutional contacts made through supervising the final projects
leads: advisory group, interested Pakistani government agencies and nongovernmental organizations, PFI
support: interested Pakistani experts, foreign advisor(s)

b. collaborative research projects
leads: PFI, other interested Pakistani universities, foreign advisor(s), WWF
support: advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

c. further investigations in how forest conservation can contribute to local development.
d. a set of priorities for an expanded research programme
leads: PFI, other interested Pakistani universities, foreign advisor(s), WWF
support: advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

Phase 3:
2006 – 2007
Expansion of intensive course into a programme & development of research and consultation programme

1. fourth and fifth offering of the intensive course
a. evaluation of past courses
b. links between the final projects and capacity building would be further evaluated

c. field work and its location continue to be evaluated
d. implementation of the transfer strategy
joint: PFI, foreign advisor(s), Karavan Leaders
support: advisory group, other Pakistani experts, interested Pakistani experts, government agencies and nongovernmental organizations

2. training as extension educators
a. consultative meetings
leads: PFI, foreign expert(s)
support: interested government agencies and nongovernmental organizations

b. educational materials to graduates of the intensive course developed and distributed
leads: PFI, foreign expert(s), interested Pakistani experts
support: interested government agencies and nongovernmental organizations

c. organize provincial and bioregional meetings on capacity building needs related to extension support
leads: PFI, foreign expert(s), interested Pakistani experts
support: interested government agencies and nongovernmental organizations

3. supervision of final projects
a. consultative meetings
b. final evaluation of the student projects
c. final document on supervision of projects for organizational capacity building
leads: PFI and foreign advisor(s)
support: interested Pakistan government agencies and nongovernmental organizations

4. M.Sc. thesis research
a. supervision support
b. evaluation of thesis research
c. supervision support expanded
d. development of manual for supervisors
e. expand the numbers of researchers working on M.Sc. theses
f. support for Ph.D. studies for some of the authors of some of the more successful M.Sc. theses
g. initiation of publication programme based around M.Sc. theses
leads: PFI, foreign advisor(s) & advisory group
support: interested Pakistan government agencies and nongovernmental organizations

5. workshops
a. previous workshops evaluated
b. expanded set of guidelines and expectations for the educational delivery of workshops
c. support for local expertise in social development
d. revised set of priorities for workshop topics
e. organizational commitments for developing and offering particular workshops

f. development and offering of the specialized workshops
g. development of materials for the material in paper and CD Rom form
leads: PFI, foreign advisor(s) & advisory group
support: interested Pakistan government agencies and nongovernmental organizations

6. certificate or new M.Sc. programme
a. discussion paper
b. identification of gaps in the current educational offerings
c. academic framework forged
d. framework for transfer of credit from previous intensive course and workshops established
e. prospectus developed
leads: PFI, foreign advisor(s), advisory group & interested Pakistani universities interested in providing resources
support: interested Pakistan government agencies and nongovernmental organizations

7. collaboration of Pakistani experts
a. organizing of provincial and bioregional meetings
b. development of extended research programmes
c. publications as collaborative anthologies
d. peer review frameworks established
e. electronic exchange of information
joint: PFI, WWF, LEAD
support: foreign advisor(s), advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

8. consultative and other extension services
a. formation of an extension agency
b. follow-up programmes that support the graduates of the course
c. involvement of the necessary expertise to better develop projects on an indefinite basis
joint: PFI, interested government agencies, WWF, LEAD
support: foreign advisor(s), advisory group, interested Pakistani experts, interested Pakistani government agencies and nongovernmental organisations

The teams proposed above are based on careful consideration of what organisational partnerships would be most able to be successful with limited fiscal and human resources. However, much of the proposed work may not be particularly interesting (if only because it is not lucrative) to the organisations proposed above as leads. So other groups and organisations may be in a position to be leads on some of this work if there is no indication, within the coming year, of interest from the organisations proposed here. Such flexibility and inclusiveness will be key to the full development and implementation of the initiative.

Milestones & evaluation frameworks

The following would be the key achievements that would be necessary each year in order for the project to progress for the proposed level of capacity building and impacts as defined by forest biodiversity conservation and local development.

Year 1 = 2002 (Phase 1)

1. further consultations with the PFI, Karavan Leaders and the initial foreign advisor (Ingram)
2. presentation of the key educational material to the PFI and Karavan Leaders by the initial foreign advisor
3. initial field work on identification of educational and research sites for the first month-long intensive course.

Year 2 = 2003 (Phase 1)

1. consultations between the PFI, Karavan Leaders and the initial foreign advisor and interested Pakistani government agencies, nongovernmental organisations, and experts and the formation of an advisory group for an extended initiative
2. assigned of a PFI or other Pakistan expert for collaborative roles, with the foreign advisor(s), on development of the lectures for the first intensive course
3. development of course prospectus and application and enrolment procedures
4. development of links with government agencies, universities and nongovernmental organizations for development of and support for student final projects
5. consultations on workshops on specialized topics
6. offering of the first intensive course in late 2003

Year 3 = 2004 (Phase 2)

1. first supervision of final projects in early 2004
2. evaluation of first intensive course
3. first offerings of workshops on specialized topics
4. further development and offering of second intensive course
5. completion (and evaluation) of first M.Sc. theses)
6. consultations for an initial set of research and conservation priorities for forest biodiversity
7. development of planning and organizations framework for a national conference forest biodiversity assessment and conservation
8. development of following and support material for graduates of intensive course
9. consultations on a more cohesive programme, at the M.Sc. or post-M.Sc. diploma level, on forest biodiversity conservation

Year 4 = 2005 (Phase 2)

1. further development and offering of third intensive course
2. more workshops on specialized topics
3. national conference on forest biodiversity assessment and conservation held late in the 2005 or early 2006

4. development of a plan for a more cohesive programme, at the M.Sc. or post-M.Sc. diploma level, on forest biodiversity conservation
5. completion (and evaluation) of second set of M.Sc. theses)

Year 5 = 2006 (Phase 3)

1. further development and offering of fourth intensive course
2. further workshop offerings
3. development of a final transfer strategy for the expertise and learning material for the intensive course
4. development of an extension concept for ongoing support to institutions on forest biodiversity research and conservation
5. completion (and evaluation) of third set of M.Sc. theses
6. provincial and bioregional follow-up meetings to the national conference

Year 6 = 2007 (Phase 3)

1. further development and offering of fifth intensive course
2. completion (and evaluation) of fourth set of M.Sc. theses
3. completion of final transfer strategy for the expertise and learning material for the intensive course
4. first year of a more cohesive programme, at the M.Sc. or post-M.Sc. diploma level, on forest biodiversity conservation
5. implementation of an extension concept for ongoing support to institutions on forest biodiversity research and conservation
6. completion of the key provincial and bioregional follow-up meetings to the national conference

With the course of the first phase of this capacity building, from 2002 to 2007, there would best be three reviews:

1. in mid-2004, after the first intensive course has been offered and completed and the supervised final projects have been completed;

2. mid-2006 focused on the impacts and benefits provided from the three offers of the intensive course, the workshops and collaborations developed in phase 2; and

3. mid-2007 at end of the three phases of this proposed initiative in capacity building.

In the three reviews, assessment committees could be constituted with 4 persons: 2 Pakistani and 2 foreign experts, chosen by mutual agreement by project partners and funding organizations.

Indicators for evaluation of project performance

Another key development in this initiative would be the emphasis on rather specific and tangible indicators and measures as related to project performance and management of donor funds. Consistent with the mission of this initiative, there would best be indicators and measures related to the following 4 programme areas:

1. educational achievements,

2. increased cooperation between Pakistani organisations and experts, and

3. actual research contributing to
    a. both conservation and
    b. socio-economic development.

In terms of education achievements the indicators and measures could include the following:

a. number of students successfully completing the intensive course (with the final project);
b. level of absorption and application of the key topics and skills in the courses and workshops;
c. number of new M.Sc. theses focused on aspects of forest biodiversity conservation; and
d. the extent of new research as related to the number and proportion of new initiatives related to conservation forest ecosystems in Pakistan.

Increased cooperation between Pakistani organisations and experts could be evaluated in terms of the following indicators and measures:

a. number and extent of agencies, institutions, organizations and experts involved with the initial consultations and advisory group of the initiative;
b. the level of contribute of in-kind resources, particularly human resources, contributed by Pakistani agencies, institutions, organizations and experts;
c. number of organizations involved through the final projects of the intensive course;
d. numbers of person involved with consultations and mailing lists;
e. number of persons involved with a national conference on forest biodiversity conservation;
f. number of persons involved with provincial and bioregional conferences on forest biodiversity conservation;
g. increased levels of communication and exchange and transfer of material, as related to organizations, particular offices and individuals, as a result of the initiative; and
h. increased levels of key technologies, such as remote sensing and GIS for forest conservation, in participating organizations, particular offices and individuals, as a result of the initiative.

As for actual forest conservation, to which aspects of the initiative will have initially contributed, the following are the most obvious indicators and measures:

a. the cumulative impacts on the land base (and effective protection of native forests) in terms of the numbers of graduates of the course and workshop responsible for forest areas;
b. the number of currently established protected and managed forest areas that graduates of courses and workshops are associated in subsequent years;
c. the number of proposals for new protected and managed forest areas to which graduates of the course and workshops contribute in subsequent years;
d. the number of forest ecosystem recovery strategies areas to which graduates of the course and workshops contribute in subsequent years;
e. the number of recovery strategies and restoration projects for particular forest-dependent species and gene pools to which graduates of the course and workshops contribute in subsequent years; and
f. number of new forest biodiversity research and conservation initiatives involving remote sensing and GIS with the involvement of graduates of the course and workshops.

In terms of indicators and measures of real socio-economic development, associated with forest research and conservation measures, the following are most relevant for the current situation in Pakistan:

a. the number of the conservation projects that have provisions for and that subsequently generate improvements in socio-economic conditions;
b. increased levels of rural education (extending to the numbers of rural residents successfully completing intensive courses and workshops);
c. increased levels of education, through successful graduates of the course and workshops, for women;
d. increased levels of education, through successful graduates of the course and workshops, for language and ethnic minorities (including tribal peoples) extending to the numbers of minority students successfully completing intensive courses and workshops;
e. number of research and conservation projects leading to ecotourism development in subsequent years;
f. the number of forest conservation projects that provide tangible improvements in local environments as related to water quality, water availability, shade, erosion control, and access to traditional species; and
g. the number of forest conservation projects that can generate (or at least partially contribute to) increased services in local health care, education, and security – as well as which create new jobs, support local culture and lessen social inequities.

Given that this is a fairly extensive list of goals and prospective benefits, it will be necessary for particular funding proposals, focused on certain phases and activities within the initiative, set specific objectives that can be evaluated within the timeframes of the specific funding cycles.

Funding strategy & possible sources

It is highly unlikely in the present economic and fiscal climate in Pakistan that local funds can be found to sufficiently expand the country's forest education and research capabilities in order to arrest the further loss of forest habitat and species. This project concept outlines a rationale for funding from international sources. Part of this rationale centres on the fact that little of the international funds that have yet to flow to Pakistan, for biodiversity research and conservation have been focused on M.Sc. and post-M.Sc. capacity-building, even though there are programmes for this. Virtually none of the funds for biodiversity conservation in Pakistan have been specifically directed for capacity building around management of native forest, conservation of forest habitats and species at risk, and development of respective human communities. The core of the argument for support of aspects of this project is that the community of international funding bodies has incorrectly 'written off' Pakistan as a priority recipient of funds for forest biodiversity research and conservation and have effectively stopped believing that significant native forests exist in Pakistan. But in Pakistan today there remain hundreds of ecosystem types and species at risk which require forest. And there remain millions of Pakistanis dependent on products and ecological services, from native forests, where market-based alternatives remain available or largely unaffordable.

Overall funding for international development and environmental management, from the governments of wealthier countries, has been on the decline for a number of year as in the case of Canada (Canada, Government of 2002: 102 – 103). But funding for research, education, environmental management, forest and biodiversity conservation, and poverty alleviation, in poorer countries, has tended to continue to increase in the world through the work of a wide range of other government agencies and nongovernmental organizations. Typically, such grants for projects in forest and biodiversity conservation, and respective capacity building, are much smaller than the little funding that is still provided by bilateral and United Nations donors. Little additional margins or 'cuts' are available to such bodies as larger universities and government agencies. More often, programmes are cobbled together from a number of donors, offering a number of conditions, with individual grants often only between US$5,000. and $25,000.

Today, the days of large and extended funding packages for Pakistan are mainly gone. Security worries have constrained the presence of the staff associated with embassies and high commissions who could arrange larger projects. Unfortunately, the alternatives to bilateral and United Nations funding have also been in decline. Pakistani nongovernmental organizations have often been run like private businesses using foreign funds for elite shareholders. Government agencies, in this context have a difficult time 'competing' for funds other than those associated with bilateral and UN programmes. In these unstable times, some trends suggest some new strategies for funding initiatives such as the one proposed here. We are at the end of the time of large projects to governments

with single donors – especially for nuclear powers. There is a trend towards funding smaller, incremental projects with higher levels of fiscal accountability. Performance and project effectiveness indicators often tied to tangible signs of actual conservation, research and education. More programmatic initiatives, such as the one proposed here, typically involve multiple donors funding specific portions of projects on a piece meal basis. Such funding strategies require new levels of collaborations between both foreign and Pakistani organizations with in-kind exchanges reflecting real costs of projects. In this funding climate, funding institutions such as the PFI which has managed with very low levels of funding, rather than the NGOs which has comparatively expensive 'overheads', may be considered more attractive for some sources of funds.

Such an initiative would invariably involve a number of funding proposals. Even if one donor were found, there would be at least 3 phases of proposals and funding – with subsequent funding possible when the goals of earlier phases were achieved. Probably, a single donor will not be located. Proposals to multiple donors could be for different aspects of the project – with little or no overlapping of items that were funded. The kinds of specific proposals and grants that might be workable include the following:

- personnel costs such as for some of the extra work of PFI staff, the foreign advisor(s), and other Pakistani experts;
- development of the early phases of the intensive courses;
- the consultations around the early phases of course development;
- travel and field work necessary for development of field aspects of the course;
- costs of each offering the intensive course;
- travel costs and per diems for the students;
- repair and maintenance of vehicles;
- a digital projector for the intensive course and workshops;
- development and offering of particular workshops or series of workshops;
- consultations for and development of a network of experts;
- consultations for and development of an advisory group for the initiative;
- the national conference and particular (bio)regional and provincial conferences;
- status reports;
- remote sensing and field work for particular areas, research questions and lessons in the courses and workshops;
- acquisition of books for a library;
- acquisition of computer equipment for the lessons and research;
- support for M.Sc. research and advising;
- upgrading of computer, lines and other communication equipment;
- consultations on an expanded M.Sc. programme;
- consulting to particular government programmes;
- development of an extension programme;
- socio-economic and ecotourism studies;
- conservation plans;

- a range of project-based costs for enhancing local development through forest conservation;
- recovery plans of ecosystems and species;
- ethnobotanical and ethnoscience studies that could be used to enhance the local development aspects of forest conservation;
- facilities to enhance the local development aspects of forest conservation;
- library materials; and
- publications and development of a publication series.

Depending on the amounts of money proposed and the interests of particular donors, proposals and grants could be for single or several of these budget lines as well as for larger groups. Funding for particular items could be for a brief period, such as year, for the entire three phases of the project.

The funding strategy for an initiative such as this is the choice of the Government of Pakistan and its agencies, institutions, nongovernmental and more grassroots organizations. There are a number of alternative strategies for funding this initiative:

5. conventional bilateral or United Nations funding from a single donor;

6. conventional bilateral or United Nations funding from a small number of donors;

7. funding through a large number of small grants from foreign government agencies and nongovernmental organizations; and

8. funding through various grants from foreign government agencies and nongovernmental organizations combined with tuition, user fees and other charges paid internally.

Conventional bilateral or United Nations funding from a single donor, for large projects, has been the most influential mode for project enablement in Pakistan for nearly half a century. Projects have tended to be developed at inter-ministerial levels or, as in the case of the Global Environmental Facility, through United Nations policy and related conventions. Total funding levels are usually well over US$5 million. Funds typically go directly to one government agency and are distributed to various offices and institutions with flexibility. For forest biodiversity conservation, the most relevant environmental accord remains the *Convention on Biological Diversity*. Largely because much of Pakistan's forests are actually woodland and scrub, the benefits of more recent forums on forests and the International Tropical Timber Organization have been limited for Pakistan. Such funding would require considerable lobbying by the Ministry of Environment and Rural Development within the Government of Pakistan and with donor countries and United Nations technical agencies. Pakistan's current political and security status, its isolation within the Commonwealth and its status as a nuclear power suggest that few donor countries of sufficient presence within the country, through its embassies and High Commissions, to arrange and oversee such funding.

Conventional bilateral or United Nations funding from a small number of donors has been, perhaps, the most common mode of international assistance in recent decades. The funds typically are forwarded to one government agency and are distributed to particular offices and institutions with flexibility. There are sometimes specific constraints placed from certain donors. In this framework, there are often matching resources from, and partnerships with, Pakistani agencies and institutions. Total funding levels are usually well over US$1 million. Funds from multiple sources can be channelled through one Pakistani agency. The main advantage with this strategy is being able to combine a number of grants from programmes that require less high level political involvement. Often times, funds can be accessed that are available, more regularly, through international programmes and agreements. And often the support of one donor is dependent on the support of another – to make a complete funding package. Funding is often more incremental for two to three years rather than long-term in nature. This is the kind of funding provided by smaller international aid and research agencies such as Canada's International Development Research Centre (IDRC). Funding and subsequent project documentation tends to be focused directly on project costs with little 'overhead' for general government revenues. For many donor agencies, respective governments are requiring higher levels of detail in project reports.

There is trend towards project **funding through a large number of small grants from foreign government agencies and nongovernmental organizations**. Funding here is piece-meal with many grants being needed to complete a coordinated initiative. Grants are typically for specific aspects or operations (and other costs) of a project for one or two years. There are virtually no funds available for budget items except for those formally included in grant proposals. Funds are intended to go directly into project budgets and will not be released until confirmations of the final budgets are made. Small grants can come from the larger funding bodies, mentioned above, who often require less extensive proposals for amounts that are often well under US$25,000. A wider range of funding sources is available at this level including nongovernmental foundations such as the USA-based Turner Foundation which provides grants to foreign forest conservation projects for amounts between US$10,000 to US$25,000. Many of these foundations would not provide funds to the Government of Pakistan, directly, but would to educational institutions and nongovernmental organizations. Often these foundations require a high level of internal investment, from local organizations and agencies, in a project as well as 'matching funds' from other donors.

Funding through various grants from foreign government agencies and nongovernmental organizations combined with tuition, user fees and other charges paid internally is a growing trend. Similar to the previous strategy, this is where donors try to encourage a project to be self-supporting within a short period such as a few years. Market forces can sometimes provide additional sources of revenue. But often this income is from privatisation of previously common property resources such as water (or public education). In the case of this project, a lead institution such as the PFI could develop courses, workshops, networks and conferences, obtain some initial grants as 'capital' to develop the offerings, and then to charge the real costs to such potential 'consumers' as students, professionals and experts. These individuals and their organizations could then use their own funds or apply for more grants to cover these costs.

In beginning to evaluate, the benefits and disadvantages of the possible funding strategies, the following factors are particularly important:

1. greatest strengths of this funding strategy;
2. greatest weaknesses of this funding strategy;
3. total funds necessary with this strategy to complete this initiative;
4. level of inter-organization cooperation required;
5. level of diplomatic support necessary within the Pakistan government;
6. level of coordination necessary to attain project goals;
7. number of separate grant proposals necessary to fund a coordinated initiative;
8. level of unfunded, in-kind contributions from Pakistani organizations (mainly through labour) necessary for support from donors;
9. percentage of personnel time necessary for administration (especially for obtaining further funding);
10. level of accountability for expenditures necessary;
11. level of organizational transparency especially to satisfy donors for further funding; and
12. level of ease in obtaining funding to begin the initiative.

Below are some notes on what each strategy could be expected to entail.

strategy 1 `high profile national & international initiative'
conventional bilateral or United Nations funding from a single donor

- greatest strengths of this funding strategy: This strategy requires the highest levels of political and diplomatic support. If there was such demand for the initiative within the Government of Pakistan, it could be part of a broader policy shift that could mobilize more support for forest and environmental management, as part of poverty alleviation, in the country.
- greatest weaknesses of this funding strategy: Even with a great deal of will from the Pakistan government, it will be difficult to obtain the levels of support necessary to implement this project through conventional government channels. Perhaps the only possible sources for such single donor funding would be the Global Environmental Facility, The World Bank, and the Governments of the European Union, the UK, the USA and Canada. Additional problems would be that such modes of funding take years to arrange and can be cancelled at short notice. Such large projects are difficult to manage and with donor requirements for documentation increasing, there is a risk of politicized and publicized discussions around expenditures and propriety.
- total funds necessary with this strategy to complete this initiative: Developed as a conventional, bilateral project, implemented through the Ministry of Environment and Rural Development, the initiative could easily involve USA$5,000,000 to USA$10,000,000.
- level of inter-organization cooperation required: While an advisory group is normal for such an undertaking, much of the 'cooperation' with this strategy can be could simply be required by the office of the Minister. The weakness of such a

'top down' approach to developing cooperation between Pakistani agencies and organizations, that have not often cooperated well, is that project funding simply 'greases the wheels' of government and does not contribute to authentic understanding, trust and working relationships between organizations that are often perceived as being at odds with each other.

- level of diplomatic support necessary within the Pakistan government: The support, within the world community, for this initiative would need to be high. As well as the Pakistan government widely articulating the need for forest biodiversity conservation tied to poverty alleviation, particular donors would have to perceive the project as being key to fostering closer links between Pakistan and their country. Embassies and High Commissions would be heavily engaged – requiring specialized staff that has recently been sent away from Islamabad.
- level of coordination necessary to attain project goals: The levels of coordination for this strategy are comparatively low. But the coordination that does exist would be mandated at the government level requiring well-paid (and well-respected) managers.
- number of separate grant proposals necessary to fund a coordinated initiative: 2 to 4 phases of the same project document
- level of unfunded, in-kind contributions from Pakistani organizations (mainly through labour) necessary for support from donors: The contributions of Pakistani organizations would be comparatively low and typically under 10% of the total budget, if not lower than 5%. Such `big donors' do not often require a high level of contribution from the host country.
- percentage of personnel time necessary for administration (especially for obtaining further funding): Much of the administration of this project would be in the hands of the Ministry of Environment and Rural Development. Those offices typically could ask for 25% of the total budget for their management of the project (making the total amounts necessary unattractive to some potential donors). Typically, managers of components of a project would be responsible to a government official (often with a counterpart from the donor organization).
- level of accountability for expenditures necessary: The level of accountability with accounting and auditing would be relatively low (and flexibility relatively high). However there is great pressure on large donors, particularly from citizens organisations back home, to increase accountability (with documentation of expenditures readily available).
- level of organizational transparency especially to satisfy donors for further funding: Like the previous point, such a project would be well-publicized and the source of increasing scrutiny by citizens in the donor country.
- level of ease in obtaining funding to begin the initiative: Even if the Government of Pakistan embarked on a highly publicized initiative for forest biodiversity conservation as part of poverty alleviation, it might take years to impress a donor to the point of providing US$2,000,000 to $3,000,000 for an initial phase. However, sometimes donors are looking for project to support local development for key allies. Given how little Pakistan's allies have provided in support for rural development over the last year, such an initiative would be politically attractive.

Such a project would more attractive than most other and more conventional, development initiatives.

strategy 2 'lower profile international project(s)'
conventional bilateral or United Nations funding from a small number of donors

- greatest strengths of this funding strategy: This project would involve a class of grants which are more readily available. Such grants are largely administered from the headquarters of agencies of the United Nations and national donors. These grants would be the typical sources of funding for a national initiative that did not involve advocacy at the higher levels of diplomacy.
- greatest weaknesses of this funding strategy: Such funding packages involve a high degree of 'matching funds' and team work between several donors. There can be political and fiscal constraints causing some donors to withdraw or withhold support – making operationalisation of such a package and difficult and sometimes unstable. Perhaps the greatest weakness in this strategy is the time, often several years, that it could take to sufficiently organise a consortium of donors before project funds could be released. In addition, the 'overhead' that institutions can charge, as part of the terms of the funds available, are much lower or non-existent.
- total funds necessary with this strategy to complete this initiative: If the proposed initiative were funded with such multiple grants, funding could be kept to perhaps US$2,000,000 to US$3,000,000 over the course of the work.
- level of inter-organization cooperation required: Again, much of this work could be coordinated through the Ministry of Environment and Rural Development.
- level of diplomatic support necessary within the Pakistan government: The level of engagement of Pakistani diplomatic staff, in working with United Nations and national government agencies, would be high. To fund this initiative though this strategy would also require a high level of enthusiasm and coordination with the Government of Pakistan.
- level of coordination necessary to attain project goals: The funding levels in this strategy would probably not be sufficient to pay for a group of managers putting considerable pressure on a small group of already heavily worked administrators in the Pakistan Forest Institute.
- number of separate grant proposals necessary to fund a coordinated initiative: Three phases of grant proposals to 3 to 5 donors would involve 9 to 15 proposals.
- level of unfunded, in-kind contributions from Pakistani organizations (mainly through labour) necessary for support from donors: The expectations of in-kind contributions, in administration and services paid through core government budgets and not the donors, would increase with this strategy – to 10 to 25% of the total budget.
- percentage of personnel time necessary for administration (especially for obtaining further funding): With a smaller total budget, there would be less prospects for funding the administrative aspects of development and management of the project. Thus, it is unlikely that the amount to administration, including to the PFI, could be 10 to 25% of the total project budget.

- level of accountability for expenditures necessary: Smaller grants below US$500,000 are often less a source of scrutiny and detailed auditing. However donor governments in particular, in contrast to some of the UN technical agencies, are under growing pressure to make much more information on product auditing available to their citizens.
- level of organizational transparency especially to satisfy donors for further funding: There are few, if any, donor countries where all phases participation in a project, even at those funding levels, would not be under scrutiny. The level of organizational transparency needed, especially related to the Government of Pakistan and its agencies and institutions, would be significantly higher than has been required in the past.
- level of ease in obtaining funding to begin the initiative:

strategy 3 `piece-meal nongovernmental organization support'
funding through a large number of small grants
from foreign government agencies and nongovernmental organizations

- greatest strengths of this funding strategy: This option would allow the various institutions and nongovernmental organizations, most interested in taking leads on certain aspects of the initiative the most flexibility in applying for and managing funds for particular activities. With small grants going directly to nongovernmental organizations and institutions, the initiative would qualify for support from a range of nongovernmental organization donors, in North America and Europe. Typically such support is not available to government agencies – with government institutions, such as the PFI, possibly eligible for funds when working in cooperation with a local nongovernmental organization. Perhaps the greatest strength of this strategy is how small amounts of funds can be obtained comparatively easily (and quickly) with the submission of a short proposal along with a project concept document such as the one here.
- greatest weaknesses of this funding strategy: It might be difficult to manage such funds, from foreign nongovernmental organizations, in a manner consistent with the laws of Pakistan. While the PFI is a government institute, support could be provided through foreign nongovernmental agencies could be provided in-kind or through local nongovernmental organizations. But in leaving Islamabad 'out of the loop', funds for a government institute could contravene certain rules for fiscal administration. And there would be virtually no funds available from such foreign NGO donors to pay for administration in government agencies and institutions.
- total funds necessary with this strategy to complete this initiative: US$500,000 to US$1,000,000
- level of inter-organization cooperation required: This is the most decentralized of the strategies but would require cooperation through a well-functioning advisory group.
- level of diplomatic support necessary within the Pakistan government: This strategy would have virtually no reliance on Ministerial and diplomatic advocacy.

- level of coordination necessary to attain project goals: Without a high degree of coordination of initiative partners, it would be difficult to justify particular funding requests (and to confirm that requests would not involve duplicate funding).
- number of separate grant proposals necessary to fund a coordinated initiative: > 20 involving at least 8 donors at different phases in the initiative
- level of unfunded, in-kind contributions from Pakistani organizations (mainly through labour) necessary for support from donors: These kinds of foreign donations usually involve 25% to 50% in kind donations from the host organizations. The problem is that these internal donations involve shifting resources – sometimes away from other programme areas that are already under-supported
- percentage of personnel time necessary for administration (especially for obtaining further funding): A great deal of time would go into developing grant proposals and negotiating donations. This also could account for 10 to 25% of the labour that went into this initiative.
- level of accountability for expenditures necessary: The reporting expectations are high for such support but since the grants are small and straightforward, donors can usually be satisfied without complex and time-consuming audits.
- level of organizational transparency especially to satisfy donors for further funding: The level of organizational transparency necessary would be very high – as without this donors tend to withdraw their support.
- level of ease in obtaining funding to begin the initiative: The beauty in this strategy is that a partner in the initiative, or a consortium, can begin to apply for support as soon as they ‘sign on’ to the initiative.

strategy 4 `market-based, user fees-funded’
funding through various grants from
foreign government agencies and nongovernmental organizations
combined with tuition, user fees and other charges paid internally

- greatest strengths of this funding strategy: This strategy would highlight the full set of public and private resources necessary for capacity building. Such an approach would also highlight the extent of funds already going to the nongovernmental organizations in Pakistan that has already been ear-marked for capacity building. Such a ‘free market’ approach to funding biodiversity conservation, and related capacity building, is in vogue with some funding bodies. Such a strategy for forests and biodiversity would be perceived as somewhat novel and might attract financial support from international agencies biased towards such approaches.
- greatest weaknesses of this funding strategy: It will be difficult, and take a great deal of administrative resources, to collect fees from individuals, organizations and agencies. It would be difficult to manage cash flow when schedules of payment are not entirely dependable. Choice of individuals for admission to courses and workshops could be biased towards individuals who can either pay from personal resources or who work for organizations and agency with funds for

fees. Such a strategy would contribute to the further privatization of the public resources of Pakistan that go into education.

- total funds necessary with this strategy to complete this initiative: The total budget for the initiative will still be between $500,000 and $1,000,000 but the funds generated could be used to develop an indefinite programme after 2007.
- level of inter-organization cooperation required: A high level of cooperation would be necessary but most partners, aside from the PFI, WWF and LEAD would have cooperation based in being consumers of capacity building services (which they would pay for through core revenues for through other grant applications separate from those necessary for this initiative).
- level of diplomatic support necessary within the Pakistan government: A great deal of ministerial and diplomatic advocacy would be necessary to obtain funds from an international donor agency, such as one allied to the World Bank or IMF.
- level of coordination necessary to attain project goals: Coordination through a lose advisory group might be sufficient – with regulation and resolution of issues more through fee schedules.
- number of separate grant proposals necessary to fund a coordinated initiative: Funding sources could well be only 3 to 5 governments or United Nations agencies organized in various phases.
- level of unfunded, in-kind contributions from Pakistani organizations (mainly through labour) necessary for support from donors: The level of unbudgeted administration services could be high as administrators were forced to also be entrepreneurs.
- percentage of personnel time necessary for administration (especially for obtaining further funding): With the element of entrepreneurship, the total percentage of personnel time going into administration could go up to over 25%.
- level of accountability for expenditures necessary: The level of accountability for the government and UN support would be similar to in strategy 2 but there might be more discretion over management of income generated from fees.
- level of organizational transparency especially to satisfy donors for further funding: Again, this would be similar to that in strategy 2 and, to maintain donor confident, it would be prudent to provide careful details on fees collected
- level of ease in obtaining funding to begin the initiative: The situation here might be similar to strategy 3 except that donors would be a nearly completely different group than the foreign nongovernmental organizations which would be the focus in strategy 3. Whereas strategy 3 would rely on support from community-based and other groups concerned with poverty alleviation and other aspects of social justice, funding from strategy 4 would come more from free-market ideologues. But support for such semi-private strategies for local development and environmental management may have already begun to wane.

Strategies 1 to 4 reflect a range of approaches to current human resources with greater rewards with Strategy 1 and the least with strategies 3 and 4. Similarly, Strategy 1 requires a particularly centralized approach to project management that would need to be effectively supervised by the Minister of Environment and Rural Development. In

contrast, Strategy 4 would allow partners to functions as allied (and sometimes competing) businesses while accepting the *de facto* privatization that has taken place around capacity building for environmental management in Pakistan. Strategies 1 and 2 embody top-down, statist approaches while Strategies 3 and 4 represent more oppositional and nongovernmental solutions corresponding to the left to right political spectrum. This consultant is not in a position to recommend which of the four strategies is best. I would prefer Strategy 1 but am pessimistic and suspect that for the coming period the donors targeted in Strategy 3 would provide the greatest chance of swift support to the people (and forests) of Pakistan. Strategy 3 is viable as an initiative centred on the modest resources of the PFI – of its Ministry provided some flexibility in more direct use of small grants provided by foreign donors. Strategy 4 is perhaps more likely to generate income in the latter phases and after the course of the initiative. But obtaining and managing user fees might be particularly difficult for a Pakistani educational institution. Strategy 4 would probably be more viable if more leadership in this initiative was taken by WWF and LEAD. But one of the flaws in Strategy 4, one that could be fatal to the entire initiative, might be that such leadership would be from organizations that do not have all the proven expertise needed in postgraduate education and research.

Strategies 1 and 2 would require a great deal of political will, advocacy, and coordination within both the Ministry of Environment and Rural Development and at diplomatic levels. But at this point, it is difficult to know what group has forgotten more about Pakistan forests: the world community, with its many environmental groups concerned with forest, or Pakistan's own government.

The four strategies have been conceived within the five-year time-frame and in terms of the distribution of responsibilities recommended in the previous section, Distribution of activities & responsibilities. This concept requires the PFI to take the lead in both educational and research activities along with considerable initiative by and contributions from WWF and LEAD. I believe that the roles that I have recommended in this report I recommend that these organizations be given until the 15th of March, 2003, six months from the release of the report, to state their interests and intentions to the Minister, along with volunteering certain resources and facilities. If the minimum interest, leadership and resources is not forthcoming at that time, I recommend that the Minister explore the involvement of other potential leads including other nongovernmental organizations and any other universities that might become interested in the initiative. But such a new configuration of partners would require a re-analysis of the advantages and disadvantages of the four strategies outlined above.

Conclusions:
Alternatives to this
initiative concept in forest biodiversity conservation capacity-building

This concept for an initiative in forest biodiversity conservation for Pakistan represents something of a paradox. The situation around native forests in the country, especially late successional phases of most ecosystems, is dire while the opportunities for new forest conservation initiatives have never been more promising. An optimist could conclude that the prospects for some forest biodiversity conservation in Pakistan, especially involving international support, was inevitable. But the paradox is that without

a highly collaborative and coordinate initiative (organizational conditions that rarely exist in Pakistan), few of the project components, outlined in this concept document, will be attractive or eligible for funding in the coming years.

The most appropriate institutional lead for a majority of the work outlined in this project concept is the PFI. There are two rationales for recommending that the PFI take the lead on at least 60% of the initiative. First, the PFI remains the only organization in Pakistan with proven commitment and expertise in both postsecondary education on forests and environmental conservation and research on the same topics. Secondly, the PFI has proven that it can effectively work with small amounts of funding – which may well be all of the international support that can be obtained for this initiative in the coming years.

For smaller, but equally strategic portions of the proposed initiative, the contributions of WWF, LEAD and even some other Pakistani universities would be needed. To achieve the goals of the initiative, in terms of capacity building for adequate levels of education, research and programme development, an advisory group to optimize cooperation and collaboration is needed. Depending on the funding strategy chosen, the Minister of Environment and Rural Development could have a central role or at least one of administrative facilitation, management and monitoring.

If a coordinated initiative is not undertaken in the coming years, focused on capacity building in native forest research, conservation planning and programme development in Pakistan, there are further risks, in deed inevitabilities, of the following kinds of losses of regional and global importance.

- There would be lost possibilities for funding postsecondary education and scientific research from international sources.

- There would be the loss of a rich set of possibilities for cooperating between government institutions, agencies and universities – as well as with nongovernmental and international organizations.

- There would be the loss of another opportunity to articulate Pakistan's development needs, within the world community, and to further carry out Pakistan's commitments for nature conservation and environmental management within the context of rural development.

- There would be no increase and possibly declines in the expertise necessary to maintain the remaining native forests, and associated biodiversity, in Pakistan.

- Perhaps the most troubling 'loss', for the short-term, would be from precluded funding opportunities because there would be insufficient numbers of Pakistani experts knowledgeable of international funding opportunities, around forest biodiversity, and capable of developing and managing projects.

- With increased destruction of forest and effective declines in expertise, there would be wide-spread losses such as disappearance of forest ecosystem types,

extirpations and extinctions of species and erosion of genetic resources. These lost biological resources would be of strategic significance for current and future efforts for sustainable development in South Asia and in the world.

- There would be loss of forest-related, natural services and this would contribute to further impoverishment of marginal social groups in Pakistan – particularly but not exclusive to remote rural areas.

- With nearly permanent disappearance of native forests in many areas of the country, there would be substantial losses of options for development of ecotourism.

With some care and thought, with some calculated risks and overtures, there are, in deed, the resources available, from a number of points inside and outside Pakistan, to slow further losses and to begin the long process of restoring and expanding the forests that we have been successful at sufficiently understanding to be able to adequately protect.

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A project concept for capacity building in forest biodiversity conservation for Pakistan 2002 – 2007
A report to the Inspector General of Forests of the Pakistan Ministry of Environment & Rural Development;
The Pakistan Forest Institute, Peshawar; WWF-Pakistan; and LEAD – Pakistan

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APPENDIX I
Biographies of proposed team members

Unless otherwise noted, the locations of courses have been in Pakistan.

Miskeen ALI has 25 years of experience as a wildlife management specialist and assistant secretary of the Wildlife Management Branch of the PFI. He has many years of experience conducting research in the field of wildlife surveys on mammals, birds and reptile's species and their habitat in the protected areas of Pakistan (national parks, wildlife sanctuary and game reserves) and other wetlands. He holds a Bachelor of Arts degree from the University of Peshawar (1986-87) and completed an additional year in a forester course in 1987-88.

Umer AZIZ, of Karavan Expeditions, was born in Lahore but has spent large parts of his life in the mountains of Pakistan. He holds an MBA (Marketing) College of Business Administration (CBA), Lahore (an authorized campus of Philippines College of Business Administration of Manila). Mr. Aziz has had over five years of experience leading educational tours and field work in various parts of Pakistan including the Salt Range. As part of his work organizing educational groups, he often instructs in wilderness travel and safety and provides interpretive talks. As well as being the primary contact for beginning to arrange tours, Umer has first-hand knowledge of most of the classic treks and educational trips offered by Karavan Leaders and is himself an accomplished mountaineer. He was a member of the first climbing team ever to climb 5300 m Malika Parbat in 1998 and since then has ascended above 6000 m many times, including climbs to the summits of Pir Peak (6363 m) and Manglik Sar (6050 m). In 1999, he made his first attempt at a 7000m-plus mountain – Golden Peak, as part of a joint French-Pakistan expedition. As well as enjoying the personal challenges offered by mountaineering, Mr. Aziz is heavily involved in the marketing aspects of tour development – work that in recent years has taken him to Nepal, China, Maldives and Sri Lanka.

Mohammad AYAZ is the Deputy Director, Technical of the PFI. He holds the following degrees: a 1966 M.Sc. in Botany and a 1979 M.Sc. in Botany from the University of Peshawar. He holds a 1986 doctorate in Forestry (Dr.rer.silv) in Institute Work Science and Operational Methods in Forestry from the University of Munich, Germany. He has also completed numerous international courses most notably: 3rd FAO / Austria training course on "Mountain Forest Roads and Harvesting,"Austria, 1981; International seminar on "Ergonomics applied to forestry" Vienna / Ossiach, Austria, 1983; 2nd Training course "Introduction to Ergonomics" PET Wageningen, The Netherlands, 1984; IUFRO Symposium on the "Role of Forest Research in Solving Socio-economic Problems in the Himalayan Region" PFI, 1987; USDA- Land Use Planning for Community Forestry and Natural Resource Development. Idaho, USA 1991; Forestry Research Management Course (Organized by CCGTM with the assistance of FAO and GTZ) 1993, Kaula Lumpur, Malaysia; Regional Course on Trade in Wood Fuel and Related Products (PFI/GOP/RWEDP/FAO), Peshawar & Thailand, 1995; GIS Forum South Asia '99, 1999. ICIMOD, Kathmandu, Nepal; and "Inter-sessional Meeting on Operation of Convention" 1999, Montreal, Canada; Training Course on "Combating Desertification" 2002. KOICA /

ICTC, Seoul, Korea. The most important courses that he has taken in Pakistan include Computer Aided Opening Up and Harvesting Planning, 1990; Interpersonal & Communication Skills in Natural Resources, 1990; Advanced Quantitative Forest Planning Workshop, 1991; Project Formulation and Appraisal, 1994; In-country Training Workshop on Monitoring and Evaluation of Forestry Projects and Programmes, 1995; and National Training Workshop on Fuel wood Trade, 1996. He teaches courses for forestry students on forest utilization, wood technology, forest engineering, logging, work studies and ergonomics. Also giving lectures to the participants of short courses in forestry and allied disciplines. Giving lectures as invited guest in the work shops, seminars and training courses organized under different forestry and environment programmes on biodiversity, protected areas management and problems in the province of NWFP in particular and the Pakistan in general. He has contributed to a number of key reports most notably the 1993 WWF-Pakistan, Ecological and Resource Survey for Forest Conservation in Pakistan; the WWF-Pakistan 1996 Study on the Present State of Protected Areas in NWFP; the 1997, GOP / UNEP / CICERO National Communication on "Climate Change Impact and Adaptation Strategies for Forestry Sector in Pakistan." He is a member of the Editorial Board of the Pakistan Journal of Forestry and the Advisory Board of the Ethnobotany Project of WWF-Pakistan. As for research experience, Dr. Ayaz has 35 years experience in research and teaching in forestry and allied disciplines like forest utilization, work study and ergonomics, forest opening up planning, forest roads and machines, biodiversity, forestry and natural resource conservation, environment, multiple-purpose tree species, medicinal plants, climate change, its impacts on forestry and adaptive measures (National Communication on Climate Change). He has authored more than 60 research publications on wood structure, wood properties and uses, timber harvesting and transportation, forest engineering, ergonomics, cost and productivity of forest operations, forestry planning, climatic change and its impacts on forestry, fuel wood energy, multiple-use tree species, medicinal plants and conservation of biodiversity, ecosystems and environment in Pakistan.

Muhammad IDREES is a Field Assistant with a 1986-87 Bachelor of Arts degree from the University of Peshawar. He has additional training through courses in Wildlife Identification and Surveying (1985, Karachi Zoological Survey Department); and Forestry (1987-88); Management Planning of National Parks (with emphasis on Khunjerab National Park, 1989). Mr. Idrees has 19 years of experience as a Wildlife Management Specialist / Assistant Secretary (Wildlife) with an emphasis on conducting research surveys of mammals, birds and reptiles, and their habitat, in the protected areas of Pakistan (national parks, wildlife sanctuaries and game reserves) as well as in the still largely unprotected wetlands of Pakistan. His most important research projects have been the following: Shisham mulberry mixture, 1974, where he was in-charge of data collection, analysis and report completion; Research on Juniper forest Balochistan, 1977-78, where he was in-charge of the Ziarat research station; Supply and demand survey of wood and wood products, 1970-80, Member of data collection and analysis team; Cost-benefit analysis of irrigated plantation, 1974-85, where he was a member of the team for data collection and analysis; and Dry zone afforestation, 1980-82, where he was involved in the experiment design and species trials. From 1982 to 2001, He has supervised the M.Sc. theses on forestry economics at the PFI.

Gordon Brent INGRAM is a landscape ecologist and environmental planner who has been conducting and supervising field work on forest biodiversity in Pakistan since 2000. His field work in Pakistan has focused on the remaining fragments of the dry, subtropical forests of the Salt Range of the Punjab and on the conservation and restoration of the mangrove forest and coastal desert landscapes of Sonmiami Lagoon on the coast of south-eastern Balochistan. Born and raised on Vancouver Island, Canada, and now based in the city of Vancouver, he has been involved with international forest biodiversity conservation work for twenty years. He holds undergraduate degrees in environmental studies and landscape photography, a 1980 M.Sc. in ecosystem management, and a 1989 Ph.D. in environmental planning (emphasizing planning for conservation of forest biodiversity) from the University of California, Berkeley. As well as working extensively on the Pacific coast of Canada, he has organized and lead extended field-oriented missions in Indonesia, the Sahel countries of the drier pars of West Africa, Yemen, Papua New Guinea, Bangladesh and China. He has also designed, developed and managed geographical information systems for biodiversity conservation for regions of North America and Asia. He has consulted to and collaborated with a wide range of United Nations and other international organizations including to the FAO, IUCN, WWF, UNESCO, CGIAR and to Canada's CIDA and IDRC. He has worked extensively with tribal and other rural communities, around the Pacific Rim, on locally initiated forest conservation – and conflicts around forest utilization and conservation that are often exacerbated by globalization and poverty. His recent work in Canada is currently the surveying and conservation planning for the relatively dry and mild (low frost and summer drought) zone in the extreme south-western corner of Canada (where he grew up). One set of ecosystems is particularly rare and under threat: Garry oak woodland and grassland now with over one hundred species at risk. As part of this work, he is developing a Rapid Biodiversity Appraisal method for conservation planning for oak ecosystems that also has relevance to some foothill areas of the Himalayas. His research also extends to social and institutional factors in forest biodiversity conservation and other aspects of the planning and design of networks of protected areas. He is the author of over 100 articles, chapters and reviews and 50 technical reports and conservation plans. He has presented over 50 guest lectures and public presentations in numerous countries. Typical of most doctoral environmental planners, he has taught and advised bachelors, masters and doctoral students for half of his career with recent appointments at the International Institute for Aerospace Survey and Earth Sciences, where he was Associate Professor, and at the University Of Victoria School Of Environmental Studies. He has also developed courses and lectured at the University of California's Berkeley and Santa Cruz campuses and the University of British Columbia.

Mamoona Wali MALIK is a lecturer at the Pakistan Forest Institute, where she teaches graduate and post-graduate classes composed of students from all parts of Pakistan and abroad. She is also gender specialist for the People and Resource Dynamic Project (PARDYP) of the International Centre for Integrated Mountain Development, Katmandu, Nepal. She started her career by joining Winrock International's technical assistance team for a forestry project of the U.S. Agency for International Development (USAID). As a resource person and training specialist at the PFI, she has worked for numerous

development projects and also for NGOs focused on women (including the NWFP & Punjab Forestry Sector Projects, the Malakand/Dir Social Forestry Projects, Khwendo Kore, United Rural Development Organization, USAID Forestry Planning & Development Project, Barani Area Development Project, PARDYP, Sarhad Rural Support Programme and Terbela Watershed Project etc). She has also presented and published a number of papers and reports on women in forestry, gender & biomass / wood energy and participatory approaches in social forestry. M.W. Muhammad received a post-graduate degree in Forestry with specialization in social forestry from the University of Peshawar, and a Professional Masters in Forestry for Rural Development from the International Institute for Aerospace Survey and Earth Sciences in the Netherlands. Ms. Mamoona is also the member of Board of Directors of Human Resource Management & Development Centre (HRMDC) & KK Women and Environmental Development Programme, and member of Executive Committee of United Rural Development Organization (URDO), NGOs working in NWFP. She also has participated in professional training courses at national and international institutions.

Harini NAGENDRA received a Ph.D. in ecology from the Indian Institute of Science, Bangalore, in 1998, for her work on developing a methodology for biodiversity assessment and landscape mapping of the Western Ghats. Her current research at the Center for the Study of Institutions, Population, and Environmental Change (CIPEC), of Indiana University in the USA involves developing methods to link remote sensing with forest plot data and institutional information to understand the human dimensions of forest cover change within a spatial context. Her research has focused on India, Nepal and Honduras.

Ghayyas Ahmad RAJA is a Lecturer-in-Forestry at the PFI in Peshawar. He holds two M.Sc. degrees: one in Forestry from Pakistan in 1989 and another in Geoinformation Science and Earth Observation from The Netherlands in 2001. As part of his M.Sc. thesis in Geoinformation Science and Earth Observation he completed a thesis on detection of dry forest and woodland in the Salt Range of the Punjab and began to explore the implications of this work for biodiversity conservation planning. He has also completed the following courses: Training of Trainers (1998) and another in basic computer programming (2001). As well as working at the PFI, Mr. Ahmad has worked as a forest manager of about 2500 acres of coniferous forests in the Murree Hills in 1991-1992 with his main duties being resource protection, soil conservation and planting. He currently teaches the courses at the PFI in forest biometrics, remote sensing and GIS, basic statistics, and research methods. Over the last four years, he has been a resource person for the GIS and remote sensing training courses at the PFI. He regularly leads field trips and extended field courses for PFI students and has worked in all of the major forest types of the country (mangrove, riparian, scrub, conifer, sub-alpine, and plantation. He is exceptionally familiar with the characteristics of all of the major forest ecosystems of Pakistan. His research interests are in forest mapping, forest change detection, biodiversity assessment and forest and biodiversity conservation planning. In recent years, he has supervised 4 M.Sc. forestry students in their thesis work in the areas of forest recreation and biodiversity conservation. He has had a central role in the

development of this project beginning with his taking a 2000 intensive course with Dr. Ingram in Forest Biodiversity Assessment and Conservation in The Netherlands. His proposed roles in this project extend to course development, teaching, field research, and some administration and coordination.

Zarif Mohammad RAJA is an Assistant Professor of Forestry at the PFI. He holds a 1970 B.Sc. degree in Forestry from the PFI and two M. Sc. degrees: on in Forestry (from the PFI in 1980) and another in Watershed Economics (USA 1988). Previously at the PFI, Mr. Zarif was a Forest Ranger from 1970 to 1983 and an Assistant Silviculturist from 1983 to 1985. His most important additional training includes courses in Forestry Extension (1991, The Philippines); Forest Economics and Management (1994, USA); and Financial and Economic Analysis (1993, Thailand). He has also attended the following courses: Renewable Resource Development (USA, 1987); Trees in arid areas for fuel wood: (USA, 1987); Applications of remote sensing (1989); Interpersonal & communication skills (1991); Sustainable resource management (1993) and Application of GIS & RS to Natural Resources Management (Nepal 1999). He teaches courses in resource economics, basic economics, forestry extension, and forest surveying. His major work in an international project was in assisting in the 1985-1992 US-AID Forestry Development Project at the PFI. His major research interests are around supply and demand of forest products and socio-economic surveys of local dependence on forest resources.

S. M. SAIFULLAH is the senior expert on Pakistan's mangrove ecosystems. A marine biologist, who has published more than 50 papers exclusively on mangroves, his Ph.D. was awarded by McGill University in Montreal, Canada. As Director of the Biological Research Centre of Karachi University, Prof. Saifullah received the 'Best University teacher Award' in 2001 from the University Grants Commission. He recently received a 'Research Productivity Allowance' for 2001-2002 from the Pakistan Ministry of Science & Technology and the 2002 Gold Medal of the Pakistan Academy of Science and Infaq Foundation.

Muhammad Rafique SARDAR is the Director of the Forest Education Division and the Range Management Officer of the PFI. He is responsible for research, development, teaching and training in range management, watershed management and the sociology of forest and watershed management. In addition, he is a key figure at the PFI in project evaluation, writing of technical reports and rendering technical advice to Pakistan government agencies. This work extends to development and management of in-service short courses in range management and watershed planning. Dr. Sardar holds a 1966 B.Sc. degree and a 1980 M.Sc. both in Forestry and both from the PFI. Fluent in English and Urdu, he holds a 1986 Ph.D. from the College of Environmental Science and Forestry, Syracuse University, USA. Additional training includes a 1994 course in project design; an 1990, FAO workshop in Socio-economic analysis and Formulation of Investment Proposals held at Kathmandu, Nepal; and the 1995, Forestry Research Project Formulation, Monitoring and Evaluation held in the Philippine and organized by FORSPA / APAFRI / UPLB. His most important consultancies include the following: to

FAO in 1991 on the RAS Project on Himalayan Pastures; was published; on the Malakand Social Forestry Project in Pakistan in 1990; the European Community in the Environmental and Rehabilitation Project in Galiyat, Kohistan (NWFP) and Murree Kotlisatian in 1992; The World Conservation Union, IUCN-SPC Support Unit, Peshawar in preparation of the Abbottabad Conservation Strategy (ACS) Sector Paper entitled "Grazing Land / Fodder Reserves in Abbottabad District"; and Frontier's Consulting Associates in 2001 and 2002 on a report "Range Management in Lachi Tehsil: A Situational Analysis for the Lachi Poverty Reduction Project" (LPRP). He has published 35 research articles including technical reports and theses research regarding Range Watershed Management and Sociology. Most of the research articles/reports are related to Hindukush Himalayan Regions.

Mian Muhammad SHAFIQ is the Assistant Secretary Wildlife at the Pakistan Forest Institute, Peshawar. He holds a 1987 M.Sc. degree in Zoology from the University of Peshawar. In addition, he has completed the following training courses: Immobilization and transportation of Black buck in All Sohanra National Park 1991; Fifth International Pheasant Symposium 1992; Identification of Birds of Prey 1993; International Wetland Management Planning 1993; Management Planning for Khunjrab National Park 1994; Snow Leopard 1994; 8th International Snow Leopard Symposium 1995; International Workshop on Conservation issues of some Migratory species: Houbara Bustard, Falcons and Cranes 1995; Consultative Workshop to Asses and Improved the status of various International Conservation Conventions (CITES, Ramsar, Convention on migratory species, Convention on Bio-diversity) and Establish research Priorities for Management of species and habitat 1997; Seminar on Wildlife Conservation at Bara Gali 1997; Training Course on Immobilization and Radiotelemetry of Brown Bears at Deosai National Park 1997; Training workshop on Integrated Conservation and Development projects at Ayubia 1998; ERNP (Environmental Rehabilitation in NWFP and Punjab) Planning Workshop 1999; UNEP / UNITAR / UNESCO Regional Training Workshop on Application of Multi-area Agreements Related to Biological Diversity, Thailand 2000; NRMP (National Resources Management Project), Planning workshop on Protected Areas "Ayubia National Park 2000; Workshop on "Base line studies of Khirthar National Park" 2000; and International Training on "Management Rural Knowledge and Extension System" at Feldafing, Germany from 16th January, 2001 to 15th February, 2001. Mr. Shafiq has spent over 10 years of service in planning, preparation and implementation of projects related chiefly to the ecology and management of wetland, distribution, population and survival problems of the wildlife of Pakistan with the following the most notable projects: Population of different bird species in Pakistan Forest Institute estate; Control of Wildboar (*Sus scrofa*) in the PFI Research Station, Kharian; House Sparrow (*Passer domasticus*) damage assessment to wheat crop in farm forestry areas; Animals and birds studies at PFI Research Station Kharian; Study of the Ecology and Biology of Chinkara (*Gazella gazella*), Urial (*Ovis orientalis*), Hog Deer (*Arix percinus*), and Neilgai (*Boselaptus tragocomelus*), at Manglot Wildlife Park, Nizampur, North West Frontier Province (NWFP); Survey of Cranes in Lakki Marwat, NWFP; Survey of Houbara Bustards (*Chlamydotis undulata*), in Dalbandin (Chaghi District), Balochistan; Coordination support in establishing research and management priorities in accordance with the national and International conservation strategies and

conventions (Convention on Biological Diversity, Ramsar Convention, and CITES); Crane migration through NWFP, Conservation problems and prospects; Annual counts (census) of waterfowls in different wetlands of Pakistan for publication in IWRB, directory (England); Surveys of Chiltan Markhor (*Capra falconeri chiltensis*) in Chiltan Hazrganji National Park, Balochistan; Faunal survey of Tanda Wildlife Park Kohat, NWFP; Over the last decade, he has taught wildlife and fisheries courses and tutorials to M.Sc. (Divisional Forest Officers) and B.Sc. (Range Forest Officers) at the PFI. In addition to regular teaching special lectures for the awareness of wildlife and its conservation are also delivered to students of schools, colleges, universities and communities. In his research and supervision of M.Sc. students, he has worked on the following topics: Impacts of Integrated Rural Development on Wildlife Management In Northern Areas; Population Status, Distribution Pattern and Habitat of Grey Partridge (*Francolinus pondicerianus*) in District Faisalabad; Habitat use By Nilgai (*Boselaphus tragocamelus*) In Manglot Wildlife Park, Nizampur, NWFP; Habitat use by Chinkara (*Gazella gazella*) In Manglot Wildlife Park, Nizampur, NWFP; Habitat use By Hog Deer (*Axis poreinus*) at Manglot Wildlife Park, Nizampur, NWFP; Habitat use By Urial (*Ovis orientalis*) at Manglot Wildlife Park, Nizampur, NWFP; and Management Plan for Manglot Wildlife Park, Nizampur, Nowshera District (NWFP); The Status of Big Mammal Species at Kunjrab National Park, Northern Areas. He has published scores of scientific and more popular articles on wildlife and habitat conservation in Pakistan.

APPENDIX II

Key topics for a course in forest biodiversity conservation for Pakistan

Biological diversity is inheritable variation and the populations, ecosystems and landscapes that sustain it. There are many reasons and means to conserve forest biodiversity. This module surveys those pressures and opportunities and highlights to use of remote sensing, GIS, and decision-support tools. In developing a post-graduate curriculum for Pakistan, I begin with these points.

1. While there are expanding national and international commitments to the conservation of biological diversity, effective and comprehensive protection of these resources requires ongoing monitoring and management at the local (district-wide) basis.

2. Today, the biological diversity of forests is particularly vulnerable to loss through site-specific, landscape-wide, regional and global change (largely derived from land use-related changes).

3. Concerns for the conservation and utilization of biological resources are having an increasingly central role in forest management and related land use planning.

4. Different groups of the public, 'stakeholders', have varying and sometimes divergent priorities for what biological resources warrant conservation interventions -- with implications for local political economy.

5. Forest land use planners and managers increasingly act as (often self-interested) mediators between different social groups with different stakes in and priorities for conservation of forest biological diversity.

There are divergent social pressures for conservation of forest biological diversity. All of these forces have impacts on the nature and quality of the science (including the geomatics). The social groups with interests in forest ecosystems and surrounding landscapes involve a range of stakeholders self-defined in terms of

- proximities at various scales such as local, district, national, global;

- economies and markets from subsistence to local to more national and globalized relationships;

- cultures from the tribal and localize to more regional and national;

- access to information again from the localized, regional, national, global; and

- cultural values related to religion, ethnicity, ethics, and traditions.

There are different uses of, dependencies on and interests in particular biological resources by specific stakeholders related to:

- human cohabitation with species and habitats;
- various forms of exploitation such as subsistence, local trade and commodity production;
- enjoyment of indirect ecological services;
- tourism; and
- image production & culture.

In relation to pressures for conservation, some science-based objectives based on conservation biology can include:

- minimum areas for ecosystems and landscapes;
- a range of successional factors (and presence and lack of disturbance);
- population resilience;
- population fitness & continuing evolution; and
- desired diversity for genetic resources.

Upon completion of this module students will have attained knowledge and expertise in the following areas.

- The student will have an overview of conservation biology concepts for Pakistan's forest ecosystems. In particular, they will have introductory knowledge of the major indicators and measures of the three levels and scales of forest biodiversity that are currently employed: landscapes, species and intra-specific. There will only be an introduction to forest biodiversity inventorying and monitoring techniques providing the student with possible choices for development of research programmes.
- The student will have an overview of the major techniques for field research on forest biodiversity in Pakistan.
- The student will have an overview of the main forms of spatial representations of forest biodiversity. This will provide the student with a basis for choice of cartographic and graphic representation strategies.

- This course will provide the student with introductory knowledge of current techniques, approaches and guidelines for forest biodiversity conservation planning.

- This course will provide the student with introductory knowledge of current techniques and approaches for use of geomatics (remote sensing, geographic information systems, decision support) in forest biodiversity assessment and conservation planning.

Some key topics to be covered in the lectures, laboratories & field studies are the following:

- forest biodiversity: An overview of levels of natural variation & processes along with the human needs for its conservation
- biodiversity as comprising three levels of natural & inheritable variation: ecosystems, species &intra-specific
- threats to forest biodiversity: an overview of land use impacts & cause-effect linkages
- social and culture values around use and conservation of biodiversity
- mapping, determining the status and the monitoring of biodiversity
- inventory, assessment & conservation planning
- hierarchies, descriptions, indicators & measures of forest biodiversity
- measures and indices of species diversity in forests
- exercises on measures and indices of species diversity
- measures & indices of species diversity
- indicators of many aspects of biodiversity & human relationships
- landscapes, communities and associations: The ecosystem level of forest biodiversity
- the genetic & intra-specific level of forest biodiversity: An overview
- landscape processes for maintaining forest biodiversity
- ecosystems & genetic levels of forest biodiversity
- describing biogeography & biological richness: different levels of variation
- digital descriptions of forest biodiversity
- assessment of forest biodiversity: status & impacts from land use
- overview of forest biodiversity assessment & monitoring
- assessing threats to forest biodiversity
- spatial data linking degradation & loss of forest with status of biodiversity
- forest biodiversity monitoring methods
- assessing and monitoring spatialized cause-effect
- linkages in the loss of forest biodiversity
- implications for principles of conservation planning
- gap analysis for identifying threats to forest biodiversity & inadequately protected populations, species and ecosystems

- web sites that represent aspects of gap analysis of forest biodiversity conservation
- exploring conservation priorities
- spatial planning for habitat protection, protected area
- management & regulation of adjacent land use
- forest biodiversity (digital) conservation planning design processes
- forest biodiversity conservation planning
- conservation planning of interventions to protect forest biological diversity
- the implications of the *Convention of Biological Diversity* for forest conservation
- spatial planning for habitat protection, protected area management & regulation of adjacent land use
- overview of web sites representing conservation planning
- boundary designs of forest protected areas: Cores, buffers & corridors +*In situ* conservation of genetic resources
- corridors & networks
- scenario generation & tradeoffs analysis in spatial planning for forest biodiversity conservation
- conservation planning policy & design proposals
- some principles for planning networks of protected areas
- forest biodiversity conservation planning design processes
- aspects of forest biodiversity (digital) conservation planning design processes
- conservation planning policy & design -- the links to long-term management

The composition of the course would be dominated by the 50% / 50% split between classroom and laboratory, at the PFI, and the field. The material that was presented in the classes, in the first half of the course, could then be reiterated, further presented, and demonstrated by students in the field. In conceiving of a 24 day course, over a 28 day period, and with 12 days in the field, the following composition of topics in recommended for the intensive course.

day 1
introduction to intensive course

- introduction and overview of course
- definitions of biodiversity, conservation and sustainable development
- review of the three basic levels of local biodiversity:
  - ecosystems,
  - species and
  - intra-specific (genetic) variation
- Overview of forest ecosystems, and associated biogeography and landscape ecology, in Pakistan
- Overview of forest degradation and loss factors (for associated ecosystems, species and gene pools) in Pakistan

day 2

assessment of forest biodiversity ecosystems

- forest ecosystem classifications
- inventory techniques for dominant and subdominant species, successional phases and dynamic landscape processes
- assessment of impacts of land use & implications of climate change
- determination of status of vulnerable ecosystems
- relevant technologies particularly remote sensing and geographic information systems (GIS)

day 3

assessment of forest biodiversity species

- inventorying aspects of forest species such as presence, populations and demographics
- inventory techniques especially for forest-dependent species
- assessment of impacts of land use & implications of climate change
- determination of status of vulnerable species
- relevant technologies particularly remote sensing and GIS

day 4

assessment of forest biodiversity genetic resources

- more on inventorying species and ecogeographical surveying in intra-specific variation
- review of species in key gene pools and 'genetic resources'
- determination of key aspects of genetic diversity, threat to intra-specific variation and genetic erosion; implications of climate change
- relevant technologies particularly remote sensing and GIS

day 5

socio-cultural assessment of forests and biodiversity

- assessment of cultural factors in forest ecosystems
- forest community assessments including land use and ownership
- stakeholder inventories and analyses; conflict analysis
- collection of data on local cultures and political economy
- local knowledge related to forest management, conservation and restoration
- relevant technologies particularly remote sensing and GIS

day 6

institutional analyses for forest management, conservation & restoration

- inventory of relevant laws, agreements, initiatives and policies for forest biodiversity conservation
- forest management, conservation and restoration frameworks: traditional and modern
- categories of protected and managed areas

- analysis of effectiveness of conservation programmes
- institutional gap analysis; conflict analysis

break day on Sunday

day 7
scientific principles for forest biodiversity conservation & restoration

- criteria for ecosystem management
- criteria for habitat protection
- determining minimum viable population sizes as related to criteria for fitness, resilience and genetic resources
- maintaining a range of selection factors as related to environmental gradients, successional mosaics and habitat features
- minimum viable areas and fragmentation processes
- theories of focal and indicator species for conservation
- conservation and restoration of rare species
- criteria for forest ecosystem restoration

day 8
socio-economic & institutional factors in
forest biodiversity conservation as part of rural development

- theories and indicators of subsistence forest economies
- theories and indicators of market-based and globalized forest economies
- cultural factors in management and conservation of forest communities
- local knowledge and ethnoscience in subsistence forest communities
- traditional and locally based forest stewardship, conservation and restoration
- gendered groups in rural forest societies and economies
- the roles of marginal groups in rural forest societies and economies
- the market economics of rural forest areas
- the impacts of globalization
- indictors of quality of life in subsistence, market and globalized economies
- relationships between different groups associated with various overlapping economies
- the role of natural services and forest products in subsistence forest economies
- rapid rural appraisal in forest communities
- implications for urban forestry and neighbourhood life and economies
- research methods (introduction to days 20 to 22)

day 9
spatial aspects of conservation planning:
broader national & bioregional scales

- scales of forest biodiversity conservation

- conservation and protection as combined areas allocation, protected area management and regulation of land use in adjacent areas
- assessment of remaining habitat in regions and districts (and relevant digital technologies such as remote sensing)
- conservation interventions and inventorying possible conservation options and strategies
- political economic factors in choice of priority areas for habitat protection
- the concept of network of protected and managed areas (at various scales)
- bioregional and ecoregional planning (for biodiversity conservation)
- protected area design: cores, buffers and corridors / landscape linkages
- paper and actual parks: administrative versus actual boundaries of protected areas
- implications of island biogeography and strategies for minimizing fragmentation
- strategies for minimizing over-exploitation of forest species
- strategies to minimize invasions of non-native species
- strategies for maintaining a range of successional conditions
- protection of species at risk
- integrating *in situ* conservation of genetic resources

day 10
spatial aspects of conservation planning:
finer-scaled district, landscape and site levels

- finer-scaled, protected area design: cores, buffers and corridors / landscape linkages
- principles of site planning for biodiversity conservation
- social factors in conservation planning
- design principles
- relevant digital technologies such as GIS and decision-support

day 11
presentation & communication of conservation & restoration proposals

- the range of forest biodiversity conservation proposals:
  - institutional studies,
  - satellite images and maps,
  - research and assessment,
  - status reports,
  - conservation priorities,
  - site plans,
  - conservation plans,
  - project concepts, and
  - capacity building strategies.
- describing and presenting conservation priorities to various social groups, agencies and institutions

- components of written presentations
- components of oral presentations
- graphic presentation techniques
- relevant digital technologies where relevant

travel to the field on Sunday

day 12
introduction to the local forest ecosystems

- overview on the ecology and key natural and social factors to study for the field work for forest biodiversity inventory and conservation (Salt Range)
- travel to various forest types and cultural landscapes on the first day

day 13
instruction in travel and safety in the field

- examples of the kind of field conditions in the area
- field work in difficult areas
- modes of travel
- extended foot travel away from jeeps (and equipment needed)
- use of mountain bicycles
- use of ropes
- safety issues
- intercultural issues around collecting data and discussing conservation prospects with residents of local communities

day 14
overview of field assessment techniques (natural ecosystems)

- working with maps and remote sensing images
- introduction to use of digital technologies such as GPS and software run on notebook computers
- identification of cultural factors and forest (conservation) cultures
- local knowledge and ethnoscience
- searching for forest
- searching for latter successional phases of forest
- comparison of different forest types in the Salt Range

day 15
ecosystem inventory, mapping & assessment

- working with maps and remote sensing images
- comparison of different forest types in the Salt Range
- identification of cultural factors
- local knowledge and ethnoscience
- use of digital technologies such as GPS and software run on notebook computers

day 16
mapping succession & dynamic landscape features

- working with maps and remote sensing images
- landscape ecology processes in the Salt Range
- working with time series data
- comparison of different forest types in the Salt Range
- identification of habitat features and rarer habitats
- identification of cultural factors
- local knowledge and ethnoscience
- comparison of different forest types in the Salt Range
- use of digital technologies such as GPS and software run on notebook computers

day 17
plant species inventory, mapping & assessment

- use of finer-scaled data such as aerial photographs
- mapping based on field work
- surveying
- status reports
- autecology and synecology descriptors
- local and ethnobotanical knowledge
- photographic documentation
- comparison of different forest types in the Salt Range
- use of digital technologies such as GPS and software run on notebook computers

break day on Sunday

day 18
animal species inventory, mapping & assessment

- use of finer-scaled data such as aerial photographs
- mapping based on field work
- surveying and tracking
- status reports
- autecology and synecology descriptors
- identification of key habitat factors
- local and ethnobotanical knowledge
- photographic documentation
- comparison of different forest types in the Salt Range
- use of digital technologies such as GPS and software run on notebook computers

day 19
ecogeographical surveying of species with genetic resources

- identification of wild and weedy plant species in crop and tree gene pools and traditional varieties
- tree crops and forage management
- animal genetic resources
- land races (of plants)
- genotypes and phenotypes
- status reports
- autecology and synecology descriptors
- identification of key habitat factors
- surveys of natural and cultural landscapes
- comparison of different forest types in the Salt Range
- local and ethnobotanical knowledge
- photographic documentation
- comparison of different forest types in the Salt Range
- use of digital technologies such as GPS and software run on notebook computers

day 20
collection of socio-economic data in the field: an overview

- assessment of land use and impacts on native forests
- human population studies
- assessing local living standards
- assessing infrastructure
- intercultural techniques
- interview techniques
- determining local priorities in development
- rapid rural appraisal techniques for forest biodiversity conservation
- comparison of different forest, socio-economic and cultural contexts in the Salt Range
- use of digital technologies such as GPS and software run on notebook computers

day 21
interview techniques for local knowledge, management & perspectives

- describing local knowledge and perspectives
- describing impacts of local management
- intercultural techniques
- interview techniques
- comparison of different forest, socio-economic and cultural contexts in the Salt Range
- use of digital technologies such as GPS and software run on notebook computers

day 22
interview techniques for

conflicts & conflict resolution around forest, habitat and associated species

- conflict analysis techniques as part of rapid rural appraisal techniques for forest districts
- describing local knowledge and perspectives
- describing impacts of local management
- describing government policies and perspectives
- describing impacts of government land management
- intercultural techniques
- interview techniques
- comparison of different forest, socio-economic and cultural contexts in the Salt Range
- use of digital technologies such as GPS and software run on notebook computers

day 23

communicating conservation principles & proposals at the local level

- understanding local knowledge and perspectives as one basis for communicating conservation proposals
- describing impacts of local management as one aspect of communicating conservation proposals
- describing government policies and perspectives as aspect in communicating conservation proposals
- describing impacts of government land management as one aspect in communicating conservation proposals
- intercultural knowledge as aspect in communicating conservation proposals
- interview techniques as one aspect of communicating conservation proposals
- verbal presentations
- use of graphic material
- use of digital technologies
- working with audiences to obtain feedback before presentations
- evaluation of the effectiveness of presentations

Sunday break day & return travel to the PFI

day 24

closing day

- concluding lectures
- examination
- presentations of outlines of upcoming projects in research, conservation and programme development

APPENDIX III
Some national and bioregional priorities for research on forest biodiversity & conservation

The initial work, with increased capacities for forest biodiversity conservation, can be in better assessing the situation with forest biodiversity in Pakistan with perhaps a decade of training being necessary to complete the following tasks:

1. further refine formats (including GIS) for further determination and mapping of the forest ecosystems in Pakistan;

2. assessment of forest degradation and loss factors affecting each ecosystem

3. assessment of status of each forest ecosystems in Pakistan;

4. determination of the most representative, vulnerable and rare species associated with each forest ecosystem;

5. determination of most important species with genetic resources in each forest ecosystems;

6. assessment of species at risk, and negative impacts from land use in each forest ecosystem in Pakistan;

7. determination of forest ecosystems most at risk in Pakistan; and

8. determination of species most at risk in the forest ecosystems most at risk.

APPENDIX IV

Background on budget lines for the Pakistan Forest Institute*

In order to develop this project, the PFI would provide a great deal of in-kind support through its staff and current facilities. While, for many grant proposal, it would be necessary to calculate the level of PFI support, as the in-kind contribution of the PFI project, such calculations are in addition to the budget lines described below.

personnel costs

For developing budgets for PFI staff, there would be three categories of human resources contributions:

1. staff services provided by the PFI and the Ministry of Environment and Rural Development that are or would become normal responsibilities of the job descriptions of these individuals for which there would be **no additional charge to funding bodies**.

2. services provided by the PFI and the Ministry of Environment and Rural Development involving reworked job descriptions, specifically for this initiative, where there would be a **charge to be paid directly to the PFI** and / or to the Ministry of Environment and Rural Development.

3. services not provided by the PFI and Ministry of Environment and Rural Development where the individuals recommended could work on **outside consultancies** – separate and additional to their PFI salaries.

In the coming months, it will be necessary for the administrators of the PFI to work with the Ministry of Environment and Rural Development to determine which aspects of the positions and work below would be under each of the funding categories above:

a. senior administrative support;
b. development of project concept, course & research programme;
c. coordination & administration of course & expanded research programme;
d. planning & management of field components of courses, workshops & field research;
e. core lecturers in intensive course;

*

currency conversion rates:
CDN$1.00 = PK rp 37.36 August 6, 2002
CDN$1,00 = PK rp 41 – 35 August 2000 – August 2002
USA$1.00 = PK rp 59.52 August 6, 2002
USA$1.00 = PK rp 53 – 64 August 2000 – August 2002

f. advising on development of socio-economic aspects of course and research programme; supervision of final projects for the course in the following months;
g. enhanced supervision and support for M.Sc. theses in forest biodiversity conservation; and
h. technical support (especially in the field).

In all of my dealings with PFI staff, the amounts for outside consultancies suggested has been modest and perhaps far below the rates charged elsewhere in Pakistan and in other parts of South Asia. For example, the following consultancies have been discussed with associated amounts suggested with:

1. Rs. 15,000 (roughly US$250.) a year for two administrators for senior administrative support that is beyond the normal responsibilities at the PFI;

2. At least US $ 150. each per year to each members of the project team; and

3. Rs. 1500 (US$25.) remuneration per one hour lecture to the Pakistani guest speakers.

These amounts to not cover the range of activities and responsibilities, and the teaching and field work preparation and research, outlined in this concept. The costs of reimbursement for services outside of core staff responsibilities, to both the PFI and the Ministry along with to individuals for work outside of their job descriptions and schedules, could well total $50,000. per year. The fees charged by WWF-Pakistan and LEAD-Pakistan are often considerably higher than those levied by the PFI.

travel costs

Below are some notes on travel costs from the PFI. Again, these are modest, perhaps overly low, charges often heroic efforts to keep an educational institution serving students.

- If PFI is to make all the arrangements of travel (also hiring of jeeps), stay, etc. for a group of 20 people it would need around US$4000.

- A per diem of US $20. for days in the field for PFI teachers would be necessary.

- Allowances for assistants and drivers, in the field, would be well under US$500. per month.

- The cost of each jeep and van per month could be kept well under $500.

- Free boarding/lodging and local transport facility, but no per diem, for a group of 10 trainees for two weeks stay at PFI could total to US$1500.

equipment

To develop this initiative, and to collaborate with such better-funded organizations as WWF-Pakistan, the PFI will need to acquire a considerable amount of new equipment the most important being the following:

3 dedicated desktop computers with (with CD burners) and furniture in a secure room (US$5,000.);

high-speed lines for each computer (US$100. per month / $1200. per year);

software and licenses for remote sensing and GIS software (as much as $5,000 per year);

3 notebook computers ($6,000.);

a scanner ($400);

a laser printer ($500);

4 GPS devices (US$6,000.);

1 digital projector (US$4,000.);

Such a laboratory would need to be locked and have round the clock security (combined with librarian and computer assistant services) costing as much as US$200. per month (US$2,400 per year).

Equipment maintenance and upgrading could cost US$1,500. per year.

communications & supplies

Other communications, supplies and copying of educational and research materials could run as much as US$1,000. per year.

library development

Acquisition of key texts, for use in the room dedicated to the project, would be necessary.

- Library budget could run US$10,000. a year with some part-time work being needed to develop a catalogue a reading room at the PFI that is open to the public.

- Another $5,000 to $10,000 a year would be worthwhile to arrange copying of the books and reports, relevant to Pakistan's forests and biodiversity, in the libraries of WWF-Pakistan and the larger universities in Lahore and Karachi.

APPENDIX V
Background on the budget lines for Karavan Leaders*

- The current Karavan guide rate charged for Mr. Aziz is Pakistan Rs. 1000 per day** – roughly US$17. per day.

- This rate would be raised for some administrative work outside of guiding.

- If a daily rate of Rs. 1000 were charged for periods in the field and Rs. 1500 were charged for administration and arrangements, with 80 days a year in the field and 30 days of administration, would cost US2,436 a year.

- A system of per diem or submission of travel receipts for reimbursement, consistent with the procedures for PFI staff would be necessary. The PFI has suggested a staff per diem rate of US$20. per day.

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** 19 May 2002 MSN conversation between Mr. Aziz and Gordon Brent Ingram where Mr. Aziz quoted a Karavan guide rate of 1000 Pakistan rupees. a day for trips and base line studies.

APPENDIX VI

Background on the budget lines for the appointment of foreign advisor(s)*

Since no other foreign experts were located, with mid-career levels of experience in postsecondary education, research and project development specifically in forest biodiversity conservation, and who might be interested in spending periods in Pakistan in the coming years, the budget lines below are for Ingram. The costings below reflect those for a Canada national with extensive international experience. Because the Canadian dollar is relatively weak in the world today, particularly to the United States dollar and British pound, the amounts below are perhaps a quarter to a third lower than for nationals of the UK and the UK.

The budget lines in this section are limited to the following:

1. salary or consulting fees;
2. per diem;
3. travel expenses and related security issues;
4. insurance
5. office for work back in Canada & communications

In beginning to review charges associated with any subsequent work from a foreign advisor on this initiative, two other topics first warrant exposition. The first is the nature and amount of resources that have already gone into this project. Secondly, is the question of academic appointments as a factor affecting costings for this position.

<u>resources that have gone into development of this project concept</u>

A number of institutions and individuals have already invested in the development of this project concept.

1. This work began in the spring of 2000 with funds from the **Netherlands Ministry of Foreign Affairs** that extended to 3 months of salary and benefits (US$12,000.) plus travel to and within Pakistan (US$5,000). In the same period the Government of the Netherlands began to severely restrict its international assistance programmes in Pakistan.

2. The **Pakistan Forest Institute** provided a jeep, driver and assistant with effective financial support totalling more than US$1,000. In the last year, the PFI has provided considerable staff time for advising on development of this

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project concept. A range of expert personnel used PFI time or their own to provide, at the very least, $1,000. of support (at Pakistan rates).

3. **WWF-Pakistan** provided a great deal of hospitality, transportation (including air flights and a jeep and driver) and highly trained personnel and their financial support was more than US$2,000.

4. In 2002, the **Government of Canada** provided US$1,600. for Ingram to provide lectures and ecological design workshops that extend to forest restoration particularly in urban areas.

5. Beyond the tremendous hospitality that Pakistanis are known for, I received an exceptional level of assistance, transportation, meals, and discounts from **colleagues and their families** that would have totalled to another US$2,000.

6. To continue communicating and writing up this document, this **foreign advisor's contribution of unpaid labour** involved more than two months of time over the last year that if billed conventionally would have involved at US$15,000.

The total cost of roughly US$40,000. for this document, with only modest amounts coming from single donors, bodes well for how the funding for a project such as this could be 'cobbled' together.

academic appointments

A long-term commitment from a foreign advisor, for a project as this or even just the focus on developing the intensive course, would be involve two parallel appointments:

1. at a Pakistan university with a link to the PFI and

2. with a Canadian or other foreign institution also involved in the kinds of topics involved in this initiative.

As shall be illustrated below, it may well be easiest and cheapest to provide the funds for foreign advisors through home country universities with a non-paid 'courtesy' appointment at a Pakistan university or institute such as the PFI. As for the paying position, it could be a partial appointment such as 50% over the year with the work packed into the equivalent of 6 out of 12 months per year.

salary or consulting fees

Depending on the funding strategy chosen, there could be three different modes of calculation of remuneration and payment of salary. Strategies 1 and 2 involve sufficient funds as to pay foreign advisors at standard daily rates for international work with some UN per diem ('DSA') rates (as discussed below). This would be quite expensive and not the best use of funds in a poor country with under-funded educational institutions. For example, a

daily rate for a mid-career foreign advisor could easily be US$400. per day with an average of US$100. a month. For 4 months worth of work a year (which would need to include preparatory work back in Canada), the total could well be US$60,000. per year (totally $300,000. for 5 years).[2]

If there were a Canadian-based appointment for the life of the project (with a courtesy appointment in an institute in Pakistan), a Canadian salary base could be used. For a mid-career Associate Professor, at a Canadian university, the basic salary is roughly CDN$80,000 + 18% for benefits. A 50% appointment, over the course of a year, would amount to US$31,000. plus the cost for per diems in some of the work. Once sufficient funds were obtained for the project and a longer-term contract were possible, the foreign advisor could stop charging daily rates under Strategies 1, 2 and 4.

Funding a foreign advisor for Strategy 3 would be most difficult since grants are typically small and directed at equipment and personnel in Pakistan. In this case, the foreign advisor could accept a courtesy appointment at a Pakistan university without a defined work load. The advisor could then work on short-term contracts when funds were available. Much of this work would be on a semi-volunteer basis working at low rates when he had time between projects that paid normal rates for a modest living based in Canada. With that mode of funding, the actual work, the schedule for job completion and presence in Pakistan could be negotiated when funds were available for particular activities. A retainer of 40% would be charged before each short contract was begun with some receipts, for previously agreed upon expenses such as travel, submitted upon completion.

per diem

Unless engaged with short-term consulting, at the beginning of Strategies 1, 2 and 4, where standard UN per diems should be charged, a number of other per diem arrangements could be provided such as the following:

1. submission of receipts for agreed upon expenses;

2. submission of receipts with some support, such as for some guest houses, provided in-kind and not involving re-imbursement; and

3. work in the field that could involve basic accommodation and food for a group of educators, researchers and students.

travel expenses and related security issues

Travel funds could be provided, when there was a budget and funding, as above through

1. submission of receipts for agreed upon travel expenses;

[2] One means of calculating a based monthly salary would be CDN$94,400. for 11 months (12th month a year for vacation) = CDN$8,581. per month (US$5,578.)

2. for periods of field work where a vehicle was required either a PFI jeep and driver, at $500 per month, or, when not available, a tourist vehicle with driver at US$25. per day (for certain days);

3. travel funds for group travel arranged directly by the project.

Security for foreigners, including Canadians, has become a huge issue that has precluded options for the development of many badly needed projects in Pakistan. I have been asked repeatedly, by family, friends and colleagues, to reconsider this project and to not return to Pakistan. However, in discussions with colleagues, familiar with security issues in countries such as Pakistan, some workable guidelines have been outlined.

1. Where ever possible, foreign advisors should stay with groups of Pakistani colleagues and students.

2. At the PFI, foreign advisors are best to stay close to the PFI, in a secure guest house. With meals this could cost $20 to $30 per day. That added security might bring up the costs – but it is essential. At least one Pakistani colleague, preferably with a mobile telephone, should stay in the compound with the foreign advisor.

3. When the foreign advisors sometimes need to work in hotels in the larger cities, such as for some days of easier communications and relaxation after extended field work, they could be paid standard UN 'DSA' rates and stay only in the most secure hotels. Preferably they would submit receipts for a small number of nights agreed upon. I have already had experience negotiating modest, business rates with both the PC and Avari chains in Pakistan. With modest meals and reduced rates, such exceptional costs could be kept to US$80. per day.

insurance

Sadly, Pakistan is considered one of the most dangerous countries on earth for foreigners. This is a sadly ironic turn given the tremendous hospitality that is at the core of Pakistan culture. But even if all precautions are taken, life insurance, going to the families of foreign advisors, are crucial. Such insurance is often part of the benefits packages of Canadian universities and a minimum of US$500,000. (for the periods within Pakistan) would be necessary. In previous trips to Pakistan, basic insurance was paid for and arranged through the work place.

office for work back in Canada & communications

The advantage of a foreign advisor is that they an bring resources from their home countries. A good portion of the material for the courses and workshops can be developed in Canada and sent or brought over to Pakistan. Small charges would be necessary to contribute to modest costs for:

1. office space back Canada;
2. communications; and

3. personal equipment including computers.

Training in spoken Urdu

A month of intensive training in the local language is fairly standard for these kinds of projects involving foreigners. The University of California, Berkeley, offers such a programme in Lahore. Such costs could run to several thousand dollars.

Please note:

While funding such costs for non-Pakistanis appears daunting, there is considerable interest and concern for Pakistan in the world today – and unspent funds because so many foreign staff have been sent away. Perhaps the easiest way to arrange some funds for the foreign advisor, for the upcoming work on the developing the programme, is for the Minister of Environment and Rural Development to arrange for the Government of Pakistan to propose that some consulting funds be allocated to the Canadian advisor from the discretionary budget of the Canadian High Commissioner in Islamabad.