

## Asia Pacific Forest Genetic Resources Programme (APFORGEN)<sup>1</sup> The way to the Inception Workshop, Kuala Lumpur, 15–18 July 2003

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### **Background and rationale**

The Asia-Pacific region is diverse in many ways. Its forests vary from humid tropical rain forests to boreal forests and to desert scrubs. The tropical forests host most of the terrestrial biodiversity in the region. Rapid economic development and population growth have greatly affected forests and forestry in the region (Durst 2000). Despite its economic prosperity, the region is suffering from a lack of policies that could reconcile economic growth with sustainable use of resources, particularly forest ecosystems, which are being severely affected by land use changes. The Asia-Pacific Forestry Sector Outlook Study projected, among other issues that demand for the wide range of forest products and services will continue to increase, the multiple roles of forests will receive increased attention, and the roles and opportunities for all forest sector stakeholders are dynamic and changing (Durst 2000).

The forests are important both, for the region's wood-based industries and also for over a billion rural people. More than half of the world's population lives in the Asia Pacific region, which is both a threat and opportunity for the forest sector. There is a constant need to increase agricultural production for the increasing population and currently wood energy is a basic source of fuel for more than 2 billion people in the region (Durst 2000). In addition to fuelwood and traditional medicines, forests provide a significant amount of foods that supplement what is obtained from agriculture, thus increasing food security (Warner 2000). Forests also have an important role in poverty alleviation through the income generating opportunities that various wood and non-wood forest products (NTFPs) offer to local communities. The forests in the region also have global significance as a source for industrial wood and non-wood products and currently, for example, the region accounts for about 40 percent of all internationally traded NTFPs (Durst 2000).

In addition to the direct contribution as noted above, forests host significant amount of wild relatives of crops and other useful plants, though much of their value is generally unrecognised. They also contain numerous plant species that have potential to become future crops. Thus, conservation of forests is an important element in conservation of agricultural biodiversity. In addition, forests contribute to ecosystem services, such as carbon sequestration and control of soil erosion. Forests are important to watershed management, thus contributing to water quality and quantity as well.

Presently, in many countries, forest resources are threatened by deforestation, forest fragmentation and habitat degradation as a result of unsustainable harvesting of forest products and the conversion of forests to agriculture and urban development. Human activities and forest degradation are also reducing forest genetic diversity at unprecedented rates as well as food security and income opportunities for millions of people (Lipper 2000). Forest genetic diversity is needed by rural people, farmers, foresters and breeders to sustainably manage forest species with desired characteristics for the benefit of present and future generations.

Climate change makes conservation of forest genetic resources an even more urgent task. It is possible to increase the long-term use of trees and other forest species in the future only if the evolutionary potential of forest species is safeguarded, i.e. the species are able to adapt to the changing environmental conditions following the climatic change. Thus, management of forest genetic resources is an integral component of sustainable use of forests.

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During the past decade, international dialogues on forests have considerably promoted the development of sustainable forest management. However, although the need to conserve and manage forest genetic resources has long been recognised in international fora, no global action plan has been developed for this purpose. The FAO Panel of Experts on Forest Gene Resources plays a major role in providing recommendations at the global level and has stressed the need to strengthen national programmes and regional collaboration on forest genetic resources in different parts of the world.

Several countries in the Asia Pacific region have taken steps to implement sustainable forest management practices. However, there is a need to further promote management of forest genetic resources *per se* within this process. Better management of forest genetic diversity will also help countries to fulfil their commitments as agreed under the Convention on Biological Diversity (CBD) and to maintain diversity for future use. While the CBD recognises that countries have sovereign rights over their own biological resources, it also assigns them the responsibility for conserving their biological diversity and urges them to use the biological resources in a sustainable manner. Countries are also urged to enhance technical and scientific cooperation, training and information exchange on conservation and sustainable use of biological diversity. However, national programmes on forest genetic resources are not well established in most countries in the region.

One of the major problems for designing a positive agenda for these issues is the lack of coordinated efforts and support for the establishment of national programmes on forest genetic resources despite the fact that several existing species-specific networks carry out valuable work in the region. These include the International Neem Network, TEAKNET, the International Network on *Leucaena* Research and Development (LEUCANET), the International Network on Bamboo and Rattan (INBAR) and the International Centre for Research and Training on Seabuckthorn (ICRTS) (see Sigaud *et al.* 2000 for a review). The worldwide Tropical Montane Cloud Forest Initiative, focusing on conservation of overall biodiversity, is also operating in the Asia Pacific region. However, a number of island states in the South Pacific, are collaborating under a formal networking framework, the South Pacific Regional Initiative on Forest Genetic Resources (SPRIG).

The lack of coordinated efforts in the APO region is especially true in the case of natural forests. This is surprising when one considers the fact that these forests supply raw materials for many economically valuable goods and products in addition to providing important environmental services. Dipterocarps are a good example of this negligence. Timber and non-timber products derived from these natural forests provide substantial revenues for many countries, especially in Southeast Asia. At local level, their importance is also considerable where lowland tropical rainforests, commonly dominated by dipterocarps, host a huge array of biological diversity and support the livelihood of rural people in numerous ways. Several institutions have been conducting research on dipterocarps and their genetic resources in the region but the major factor constraining progress has been the lack of coordinated action with well-defined objectives and priorities (Bawa 1998).

A new regional network with a holistic scope to conservation and management of forest genetic resources and well-defined objectives is needed to facilitate the establishment and strengthening of national programmes on forest genetic resources and alleviate the various problems and obstacles in the Asia Pacific region. Through networking, it is possible to avoid duplication of efforts and to gain synergy among collaborating countries and other stakeholders. This promotes partnership and efficient use of limited resources. Networking can also enhance the dialogue between scientists, managers, policy-makers and users, and increase interaction between different sectors at the national and regional levels.

### **Development of APFORGEN**

The need to enhance regional collaboration and support national efforts on conservation and use of forest biological diversity has been highlighted in various meetings and workshops held in the Asia Pacific region during the past years. This has paved the way for the development of a regional programme on forest genetic resources. The following sections provide a short overview of these efforts.

The Asia Pacific Association of Forestry Research Institutions (APAFRI) held a regional seminar on 26–27 March 1999 during which its member institutions presented their visions and country-based research needs (Hoon and Awang 2000). The discussions during this seminar focused on a wide range of issues from environmental values of forests to globalisation and economic changes (APAFRI 1999a). The seminar identified APAFRI as a key facilitator for regional collaboration and information exchange to enhance forestry research in the region. The key recommendations of the seminar concerning networking are summarised as follows (APAFRI 1999b):

- Information support services at national and institutional levels should be upgraded so that the national, regional and global knowledge pool can be better utilised.
- Area and skill-based regional and global networking efforts should be strengthened.
- APAFRI should promote information exchange in the rapidly developing areas of science, such as biodiversity assessment and conservation, and biotechnology.
- APAFRI should also support the establishment of research networks to meet the needs of its members, and to strengthen the cooperation among the researchers through networking.

In addition to these recommendations, many papers and country reports presented at that seminar identified other needs for research and development that are closely related to conservation and use of forest genetic resources, e.g. sustainable management of natural forest, tree improvement and domestication (Hoon and Awang 2000). Action plans and research needs to conserve forest genetic resources in Asia have also been examined (Ramanatha Rao and Koskela 2001).

During the XXI IUFRO World Congress in Kuala Lumpur in August 2000, APAFRI and IPGRI discussed informally with several of their partners regarding the need to enhance regional collaboration on forest genetic resources. After the Congress, APAFRI and IPGRI continued these discussions and in November 2000, the IPGRI Regional Office for Asia, the Pacific and Oceania formally approached APAFRI during its Executive Committee meeting and presented a concept note for increasing regional networking on forest genetic resources (Koskela 2000). Other relevant international and regional organisations were also notified of these discussions.

### **FORGENMAP**

Since 1997, the Forest Genetic Resources Conservation and Management Project (FORGENMAP) has been securing forest seed sources and improving seed supply for reforestation and rehabilitation purposes in Thailand. The FORGENMAP is being implemented by the Royal Forest Department (RFD) of Thailand and funded jointly by the RFD and the Danish Cooperation for Environment and Development (DANCED, now under the Danish International Development Agency (Danida)). Similar Danish-supported projects have also been carried out or are currently being implemented in several other Southeast Asian countries (i.e. Cambodia, Indonesia, Lao PDR and Vietnam) and in South Asia (Nepal).

While the major focus of these projects has been on improvement of tree seed sources and supply, they have also contributed to the conservation and management of forest genetic resources in a broader sense. Between 25 February and 10 March 2001, FORGENMAP organised a regional workshop for Southeast Asian countries in Thailand. This workshop brought together delegates from Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Thailand and Vietnam. Myanmar was unable to send a delegate but provided a country report. IPGRI, the FAO Forestry Research Support Programme for Asia and the Pacific (FORSPA) and the Danida Forest Seed Centre (DFSC) provided additional support and their staff also participated in the workshop. In addition, the CSIRO Forestry and Forest Products, Australia provided technical contributions to the workshop. This Southeast Asian workshop assessed the national status of forest genetic resources in different countries and initiated strategic thinking on how to improve conservation and management of forest

genetic resources at both national and regional levels. It also made several recommendations for further action (Koskela *et al.* 2002). One of the workshop recommendations was that, in future efforts, special emphasis should be given to enhance regional networking on conservation and use of forest genetic resources. Furthermore, the delegates suggested that IPGRI should coordinate further action in collaboration with other relevant international and regional organizations.

### **APFORGEN**

During late 2001 and early 2002, APAFRI and IPGRI intensified their collaboration and held a number of joint meetings. A result of those interactions was to initiate the Asia Pacific Forest Genetic Resources Programme (APFORGEN). Soon it became obvious that not only the Southeast Asian countries but also other countries in the Asia Pacific region could benefit from increased regional collaboration on forest genetic resources. Furthermore, as IPGRI was already coordinating similar regional programmes in other parts of the world (namely the European Forest Genetic Resources Programme (EUFORGEN) and the Sub-Saharan Forest Genetic Resources Programme (SAFORGEN)), lessons learnt from them were carefully analysed while initiating APFORGEN.

It has also been agreed that the initial focus of APFORGEN should be on tropical and sub-tropical forests as these host most of the terrestrial biodiversity in the APO region and are exposed to major threats. It was further agreed to focus on South, Southeast and East Asia, as the SPRIG Programme was already operational in the Pacific. A consultation process was then engaged with selected APAFRI members and IPGRI partners in February 2002 to find out:

1. What kind of activities on forest genetic resources different institutions are involved in
2. What is the level of existing regional collaboration and the countries' interest to increase this collaboration
3. What human and financial resources are available
4. What activities are needed to strengthen the countries' capacity to conserve and sustainably use forest genetic resources
5. What are the most important priority forest species for regional collaboration

In 2002, APAFRI and IPGRI developed joint proposals or concept notes to obtain start-up funding for APFORGEN and these were submitted to various donor agencies, such as the Canadian International Development Agency (CIDA), Ford Foundation, the Ministry of Foreign Affairs of Finland and the International Tropical Timber Organization (ITTO), to name a few. Unfortunately, none of the fund-raising efforts have yet been successful. The ITTO proposal was executed in collaboration with Forest Research Institute Malaysia (FRIM) and in early 2003 a revised version was submitted. More feedback is expected from ITTO in early 2004.

APAFRI and IPGRI have also been promoting APFORGEN in various meetings in the region. For example, in April 2002, APFORGEN was presented at the ASEM (Asia-Europe Meeting) Workshop on Conservation and Sustainable Use of Forests, held in Chiang Mai, Thailand. APAFRI and IPGRI also organised a Satellite Meeting for their partners during the *'Bringing Back the Forests – Policies and Practises for Degraded Lands and Forests'* Conference, held in Kuala Lumpur in October 2002. The participants of this Satellite Meeting recommended that APAFRI and IPGRI organise an inception meeting in June or July 2003 to discuss and identify priorities for APFORGEN. As a follow-up to this recommendation, the Inception Workshop of APFORGEN is now organized. The purpose of this workshop is to assess the present status and the activities that have taken place in the Southeast Asian countries since the 2001 workshop in Thailand. The workshop would also provide clear recommendations regarding the operational structure of APFORGEN as well as its objectives, priorities and future work on conservation and use of forest genetic resources in the Asia Pacific region.

**Results of the APFORGEN consultation process in 2002**

At the end of February 2002, APAFRI and IPGRI initiated a consultation process with potential national partners and had sent out a questionnaire to 21 institutes in 14 countries in the region. The objective of that consultation was to obtain information about the activities that were being carried out by their partners and the research and capacity-building needs on conservation and use of forest genetic resources. It also explored what kind of resources partners were willing to commit for the development and implementation of APFORGEN activities in each country.

By September 2002, a total of 16 partners in 13 countries had indicated their strong interest on APFORGEN and provided valuable feedback. These partners were Bangladesh Forest Research Institute, Indian Council for Forestry Research and Education, Department of Forest Research and Survey of Nepal, Tree Improvement and Silviculture Component of Nepal, Pakistan Forest Research Institute, Sri Lanka Forest Department, Cambodian Department of Forestry and Wildlife, Research and Development Centre for Biotechnology and Forest Tree Improvement of Indonesia, Forest Research Centre in Lao PDR, Forest Research Institute Malaysia, College of Forestry and Natural Resources in the Philippines, Royal Forest Department and Kasetsart University in Thailand, Forest Science Institute of Vietnam, and Research Institute of Forestry and Research Institute of Tropical Forestry, both under the Chinese Academy of Forestry.

The scope of work and areas of activities carried out by the partners are summarised in Appendix 1. Most of the work carried out under research and development (R&D) activities focused on *in situ* and *ex situ* conservation, tree improvement and evaluation of species and provenances. Many of the partners have also been dealing with silvicultural and agroforestry systems as well as NTFPs. In addition, a large number of partners were carrying out genetic studies. Training and extension activities were focused on short-term training courses, production of training materials and providing extension services. Similarly, most partners were also focusing on planning and implementation for *in situ* and *ex situ* conservation. Other common activities in this category included natural forest management, tree plantations and tree improvement.

The feedback revealed that much of the international collaboration on forest genetic resources took place with partners outside the Asia Pacific region. International collaboration was generally bilateral, involving an Asian country and one or more of European or US agencies in the form of relatively short-term projects. Similar bilateral arrangements prevailed in cooperation between the Asia Pacific countries and Australia, Japan and South Korea. Only a few activities or projects had been carried out between the neighbouring countries or with other countries that replied to this consultation. In some cases, these activities included exchange of information and forest germplasm but this kind of regional collaboration did not seem to be widespread. Subsequently, all partners indicated that there was a need to enhance regional collaboration with other countries in the region and that they considered APFORGEN as a very useful initiative. A regional approach to conservation of forest genetic resources is necessary as forest ecosystems and species span across the political boundaries.

Most partners indicated that they were willing to provide in-kind support to facilitate and coordinate APFORGEN activities at national level. The in-kind support included assignment of part-time professional staff to act as focal points and provision of associated office space and facilities. Several partners also indicated their willingness to establish joint field trials, for example, and that they would be able to cover, at least partly, the costs related to these kinds of activities.

The partners highlighted a wide range of issues and activities to strengthen the countries' capacity to conserve and sustainably use forest genetic resources. At the institute level, there seemed to be a large demand for long-term capacity-building as well as short-term training on conservation methods, monitoring and evaluation of genetic resources, documentation and information management, and development of proposals and projects. At the national level, the partners frequently considered that development of new or revision of existing policies and strategies would be needed to promote long-term conservation and sustainable use of forest genetic resources. A number of countries specifically indicated

that establishment of a national body or programme to coordinate the efforts would be much needed. The feedback also indicated that links between conservation of forest genetic resources and the overall biodiversity conservation needed improvement. Similarly, many partners highlighted the need for increased efforts for linking genetic conservation and forest management as well as management of protected areas and promotion of inter-sectoral collaboration.

For future R&D efforts, the partners indicated a number of activities that can be broadly grouped as follows (not in any order of priority). Firstly, many partners felt a need for national assessment of forest genetic resources to be carried out in their country, including mapping of species' natural distribution areas and evaluation of genetic diversity. The need to apply GIS tools for the assessments was also highlighted. Secondly, the need to enhance genetic conservation efforts was frequently emphasised. A wide range of topics on genetic conservation was mentioned, such as germplasm collection and storage, establishment of *in situ* and *ex situ* conservation areas, conservation through use, indicators for monitoring biodiversity, endangered species, taxonomy and involvement of local people in conservation. Thirdly, the increased use of biotechnology in management of forest genetic resources, for example in studies on population genetics, tree breeding and micropropagation of planting materials was noted. Fourthly, the need to increase the use of forest genetic resources in tree improvement, plantation establishment and management of natural forests was also often mentioned. In addition to these four broad categories, the partners also indicated the need to enhance information dissemination and increase the awareness on genetic conservation among forestry professionals and the general public.

In the questionnaire, a list of priority species, developed by the Southeast Asian workshop on forest genetic resources in 2001, was provided to the partners and they were asked to indicate which of those species they considered important for APFORGEN. Furthermore, the partners in South Asian countries and in China were specifically asked to suggest additional priority species, as these countries did not participate in the previous workshop in 2001. The results regarding the priority species are presented in Appendix 2.

### **Overall objective and scope of APFORGEN**

The broad objective of APFORGEN is to promote the management of tropical forest genetic diversity more equitably, productively and sustainably in the member countries in the Asia Pacific region (currently 13 countries, namely Bangladesh, India, Nepal, Pakistan, Sri Lanka, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Thailand, Vietnam and China). Other countries in the region are welcome to join the Programme. The specific objectives of the programme are to: strengthen national programmes on forest genetic diversity in the participating countries, enhance regional networking and collaboration on conservation and management of forest genetic resources, locate, characterize, conserve and appropriately deploy genetic diversity of selected priority forest species, increase sustainable management and use of genetic diversity in natural and man-made forests

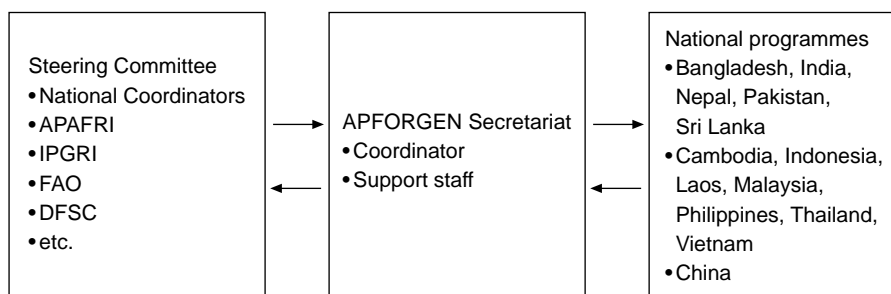
The main activities of the Programme are (1) promoting the establishment and strengthening of national programmes on forest genetic resources, (2) locating forest genetic diversity, (3) developing and applying appropriate conservation methods and strategies, and (4) increasing the level of management and use of tropical forest genetic diversity in the participating countries. Regional activities, including information exchange, development of regional conservation strategies and action plans, country-to-country technology transfer and exchange of forest germplasm, will also be facilitated. The Programme will focus on priority forest species, which are identified by the participating countries themselves. The activities will be linked to ongoing networking efforts on forest genetic resources in the South Pacific, i.e. to the SPRIG programme so that the APFORGEN countries can learn from the experiences of the Pacific countries and also to increase information exchange with them. These are considered to be necessary activities to provide the countries a sound basis for long-term conservation and sustainable management of tropical forests in the Asia Pacific region. A tentative logical framework for the APFORGEN Programme is presented in Appendix 3.

### **Suggested programme structure and mode of operation**

Individual countries will join the Programme by signing an agreement specifying the contributions to be made to operate their own activities and nominating a National Coordinator. The Programme will be overseen by a Steering Committee including the National Coordinators from all participating countries who will be acting as formal representatives of their countries. The National Coordinators will also act as a link between the APFORGEN Secretariat and various national institutions carrying out work on forest genetic resources. The National Coordinators' responsibilities are also to commit relevant institutions and stakeholders within their respective countries to carry out agreed tasks and liaise between them.

In addition to the National Coordinators, it is proposed that the Steering Committee should include representatives from a few key international and regional organisations, such as APAFRI, IPGRI, FAO, the Centre for International Forestry Research (CIFOR), the International Centre for Research on Agroforestry (ICRAF), the Danida Forest Seed Centre (DFSC), the Asia Pacific Association of Agricultural Research Institutions (APAARI) and others. The Steering Committee will meet regularly to review the progress made, discuss issues relevant to the conservation and use of forest genetic resources and make recommendations for the future work of the Programme.

IPGRI and APAFRI will set up the APFORGEN Secretariat (comprising a Coordinator and support staff) at Kuala Lumpur, Malaysia to provide backstopping for the national programmes, coordinate regional efforts and monitor the implementation of the Programme activities in different countries. The Secretariat will report to the Steering Committee. An important task of the Secretariat, with support from Steering Committee members, will be to contribute to the mobilization of resources for the activities undertaken within the framework of the network. Separate concept notes and proposals will be developed for specific research, capacity building and information activities.



**Figure 1.** Proposed organisational structure of the Asia Pacific Forest Genetic Resources Programme (APFORGEN) (Note: the list of countries is based on the consultation feedback received by September 2002).

### **Expected outputs of APFORGEN**

There are two major expected outputs:

1. Active national programmes in the participating countries collaborating with each other within a well-coordinated regional network
2. Increased conservation of genetic resources of selected priority forest species and increased use of these resources in natural and human-made forests

The more specific outputs are:

#### **1. Active national programmes and an operational regional network**

- A large group of stakeholders interacting within a national programme
- Human and institutional capacities strengthened through training courses and workshops
- Information disseminated through a website and by other means
- Availability of long-term funding increased and collaborative initiatives developed among countries

- Conservation strategies and action plans developed and implemented for priority forest species
- Guidelines developed for sharing and exchange of forest germplasm and information

## **2. Increased conservation and sustainable use of priority forest species**

- Genetic diversity of priority forest species located and assessed
- Priority species conserved in cooperation with local people
- Genetic resources management guidelines developed for logging, forest rehabilitation and tree domestication
- Germplasm production, propagation and distribution methods developed for priority forest species

### **Target beneficiaries**

There are four groups of target beneficiaries for the proposed programme and its activities.

**Forest research institutions** in the participating countries will be able to increase their institutional capacity to conduct relevant research to support sustainable forest management and utilisation. Their staff will directly benefit from increasing interaction with colleagues in other countries and the training they will receive within the programme will increase their technical and scientific skills. The programme activities will also help the national research institutions to increase public awareness on conservation and sustainable use of forest genetic resources. Subsequently, this will also facilitate the institutions' attempts to obtain long-term funding for their work from the policy-makers in respective countries and improve their capacity to contribute to policy formulation at national level.

**Policy makers** in the participating countries will have a concrete way to partly fulfil their commitment to international agreements, such as the CBD. Most of the countries in the Asia Pacific region have signed and ratified the CBD and thus also committed themselves to the global efforts to conserve and sustainably use forest genetic resources among other biological resources. The policy-makers will be able to demonstrate concrete steps towards sustainable forest management as the programme aims at providing practical guidelines on how to manage forest genetic resources within the overall concept of sustainable forest management. The policy-makers will be able to develop more meaningful policies for biodiversity conservation and management as soon as the national efforts on forest genetic resources are better linked to the national forest programmes, which are already in place, in various forms and capacities, in most countries in the region.

**Local communities and NGOs** will also benefit from the proposed programme in a number of ways, both directly and indirectly. They will be invited to participate in national workshops and meetings, which will be organised to discuss and plan various conservation activities among a large group of national stakeholders. Local people will also be incorporated into the implementation of the Programme activities, such as establishment and management of *in situ* conservation areas, and collection of germplasm for research and other purposes, for example. Increased *in situ* conservation efforts for selected priority species will also enhance the conservation of other important forest species providing non-wood forest products (e.g. fruits, medicinal plants, bamboo, rattan etc.). Thus, the programme activities will generate income for local people and contribute to their food and livelihood security as well. As a long-term benefit, local communities would also be able to benefit from the improved policies on natural resources management and their implementation.

**Staff of government forestry departments and private forest companies** will be able to apply new genetic management guidelines while implementing reduced-impact logging, forest rehabilitation and tree domestication to increase the sustainable management and

use of forest resources. Forestry departments and companies will also benefit from the improved propagation methods for priority forest species and the increased availability of forest germplasm for reforestation, rehabilitation and establishment of commercial plantations. Subsequently, this will also provide environmental benefits for the participating countries as well as strengthen their forestry sectors, which have significant roles in national economies in several countries. Forestry departments and companies can also address practical research and development needs, which scientists and policymakers may not be aware.

### **Conclusion**

From the above discussion, it is clear that countries in the Asia Pacific region are in favour of the proposed regional programme to better coordinate conservation and management of forest genetic resources at national and regional levels. This Programme will also enable the strengthening of national programmes on forest genetic resources and support related capacity-building efforts in different countries. APFORGEN can also serve as a channel for national partners to increase collaboration with regional and international organisations to source for funding for their research work. APFORGEN is initially directed to the above-mentioned 13 countries that provided feedback for the consultation but other countries in the region are welcome to join the Programme.

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# Appendix 1

## Scope of work in different partner institutions based on the information provided during the consultation in 2002

	BGD	IND	IND	NEP	PAK	SRL	CAM	INS	LAO	MAL	PHI	THAI	VIE	CHN
	FRI	ICFRE	DFRS	TISC	FRI	FD	DFW	RDCBFTI	NAFRI	FRIM	UPLB	RFD	FSIV	RIF
<b>Research and development</b>														
Eco-geographic surveys	X	X		X	X				X		X		X	X
Genetic studies / population genetics	X	X		X	X					X	X		X	X
Reproductive biology	X	X								X	X		X	X
Germplasm collection and storing	X	X		X		X			X	X	X		X	X
Germplasm production and propagation	X	X		X		X			X	X	X		X	X
Evaluation (species and provenance trials etc)	X	X		X		X			X	X	X		X	X
Tree improvement (including domestication)	X	X		X		X			X	X	X		X	X
<i>In situ</i> conservation	X	X		X		X			X	X	X		X	X
<i>Ex situ</i> conservation	X	X		X		X			X	X	X		X	X
Taxonomy	X	X		X		X			X	X	X		X	X
Ethnobotanical studies	X	X		X		X			X	X	X		X	X
Silvicultural systems	X	X		X		X			X	X	X		X	X
Agroforestry systems	X	X			X				X	X	X		X	X
Forest management guidelines	X	X			X				X	X	X		X	X
Wood products (manufacturing / marketing)	X	X							X	X	X		X	X
Non-timber forest products	X	X		X		X			X	X	X		X	X
<b>Training and extension</b>														
Formal forestry education	X	X			X					X	X		X	X
Distance learning														
Short-term training courses	X	X		X		X			X	X	X		X	X
Production of training/extension material	X	X		X		X			X	X	X		X	X
Extension services	X	X		X		X			X	X	X		X	X
<b>Planning and implementation</b>														
National forest programmes	X	X		X		X			X	X	X		X	X
Conservation policies and strategies	X	X				X			X	X	X		X	X
Forest conservation (natural parks etc)	X	X				X			X	X	X		X	X
Germplasm collection and storing	X	X		X		X			X	X	X		X	X
Germplasm production and propagation	X	X		X		X			X	X	X		X	X
Tree improvement (including domestication)	X	X		X		X			X	X	X		X	X
<i>In situ</i> conservation	X	X		X		X			X	X	X		X	X
<i>Ex situ</i> conservation	X	X		X		X			X	X	X		X	X
Natural forest management	X	X		X		X			X	X	X		X	X
Tree plantations (including agroforestry)	X	X		X		X			X	X	X		X	X

Bangladesh: FRI=Forest Research Institute; India: ICFRE=Indian Council for Forestry Research and Education; Nepal: DFRS=Department of Forest Research and Survey, TISC=Tree Improvement and Silviculture Component; Pakistan: FRI= Forest Research Institute; Sri Lanka: FD=Forest Department; Cambodia: DFW=Department of Forestry and Wildlife; Indonesia: RDCBFTI=Research and Development Centre for Biotechnology and Forest Tree Improvement; Lao PDR: FCR=Forest Research Centre; Malaysia: FRIM=Forest Research Institute Malaysia; Philippines: CFNR=College of Forestry and Natural Resources; Thailand: RFD=Royal Forest Department, KU=Kasetsart University; Vietnam: FSIV=Forest Science Institute of Vietnam; China: RIF=Research Institute of Forestry, RITF= Research Institute of Tropical Forestry.







	BGD		IND		NEP		PAK		SRL		CAM		INS		LAO		MAL		PHI		THAI		VIE		CHN	
	FRI	ICFRE	DFRE	TIS	DFRS	TIS	PFI	FD	DFW	IFSP	NAFRI	FRIM	UPLB	RFD	KU	FSI	V	RIF	RITF							
<i>Fokienia hodginsii</i>																										
<i>Gmelina arborea</i>	X																									
<i>Gardenia ankorensis</i>	X																									
<i>Heritiera fomes</i>																										
<i>Khaya ivorensis</i>																										
<i>Keteleeria fortunei</i>																										
<i>Lagerstroemia speciosa</i>																										
<i>Lasianthus kampuensis</i>																										
<i>Mangifera</i> spp.																										
<i>Melia azedarach</i>																										
<i>M. dubia</i>																										
<i>Morus</i> spp.																										
<i>Persea kerrii</i>																										
<i>Picea smithiana</i>																										
<i>Pinus armandii</i>																										
<i>P. caribaea</i>																										
<i>P. massoniana</i>																										
<i>P. roxburghii</i>																										
<i>P. wallichiana</i>																										
<i>P. yunnanensis</i>																										
<i>Platanocephalus chinensis</i>																										
<i>Populus deltoides</i>																										
<i>Prosopis cineraria</i>																										
<i>P. juliflora</i>																										
<i>Pterocarpus marsupium</i>																										
<i>Santalum album</i>																										
<i>Sesbania sasban/grandiflora</i>																										
<i>Shorea robusta</i>																										
<i>S. javanica</i>																										
<i>Swietenia macrophylla</i>																										
<i>Syzygium grandee</i>																										
<i>S. cumini</i>																										
<i>Taxus wallichiana</i>																										
<i>Toona ciliata</i>																										

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## Appendix 3

### *A tentative logical framework for the APFORGEN Programme*

Summary	Indicators	Means of verification	Risks and assumptions
<b>Goal:</b> To conserve, manage and sustainably use tropical forests in the Asia Pacific region.	<ul style="list-style-type: none"> <li>• Areas of conserved and sustainably managed forests increased</li> <li>• Amount of biological diversity in the remaining forests maintained</li> </ul>	<ul style="list-style-type: none"> <li>• Country reports and statistics</li> <li>• Global environmental statistics</li> </ul>	
<b>Purpose:</b> To increase networking and conservation and sustainable use of forest genetic resources in the Asia Pacific region.	<ul style="list-style-type: none"> <li>• Active national FGR programmes</li> <li>• Regional cooperation and new initiatives</li> <li>• Number of species in conservation and breeding programmes</li> <li>• Adoption of C&amp;I for FGR in forest management</li> </ul>	<ul style="list-style-type: none"> <li>• Country reports and statistics</li> <li>• Surveys on FGR status</li> <li>• Reports of the FAO Panel of Experts on FGR</li> </ul>	<ul style="list-style-type: none"> <li>• Importance of FGR recognised by policy-makers in various countries.</li> <li>• Availability of financial and human resources.</li> <li>• Different stakeholders are willing to cooperate.</li> </ul>
<b>Output 1:</b> National FGR programmes strengthened and a regional network established.	<ul style="list-style-type: none"> <li>• Active national programmes</li> <li>• Number of various stakeholders within national programmes increased</li> <li>• The network operating in the region</li> <li>• Number of new policies adopted</li> <li>• New guidelines implemented</li> <li>• Long-term national funding increased</li> </ul>	<ul style="list-style-type: none"> <li>• National and regional workshop proceedings</li> <li>• Technical reports</li> <li>• Annual programme reports</li> <li>• National forest policy and other reports by national forest programmes</li> </ul>	<ul style="list-style-type: none"> <li>• Existing national efforts have limited capacity to promote FGR conservation and management.</li> <li>• Linkages between research, policy-making and practical forest management need to be enhanced.</li> <li>• Lack of coordinated efforts to conserve and manage FGR in the region.</li> </ul>
<b>Activity A:</b> Promote capacity-building and networking among national programmes.	<ul style="list-style-type: none"> <li>• Number of training workshops</li> <li>• Number of trainees</li> <li>• Training material developed and used</li> <li>• Collaborative initiatives increased among national programmes</li> <li>• Number of joint projects increased</li> </ul>	<ul style="list-style-type: none"> <li>• National workshop proceedings</li> <li>• Technical reports</li> <li>• Training material</li> </ul>	<ul style="list-style-type: none"> <li>• Many countries in the region do not have well-established national FGR programmes.</li> <li>• Policy-makers have low priority for FGR management.</li> <li>• Lack of financial and human resources.</li> </ul>
<b>Activity B:</b> Collect, disseminate and exchange research results and other relevant information.	<ul style="list-style-type: none"> <li>• web site made available</li> <li>• Databases developed (research, publications, species conservation status)</li> <li>• Articles published and disseminated in IPGRI-APO Newsletter, IPGRI FGR research Highlights and APAFRI Brief</li> </ul>	<ul style="list-style-type: none"> <li>• Web site</li> <li>• Databases</li> <li>• Network reports</li> <li>• Various newsletters</li> </ul>	<ul style="list-style-type: none"> <li>• Relevant information is documented and available</li> <li>• Limited accessibility and awareness of existing FGR information.</li> <li>• Countries are able and willing to provide country level information for databases.</li> </ul>

Summary	Indicators	Means of verification	Risks and assumptions
<b>Activity C:</b> Develop national and regional conservation strategies and action plans on forest genetic resources.	<ul style="list-style-type: none"> <li>• Workshops held</li> <li>• Conservation strategies developed and adopted</li> <li>• Action plans developed</li> <li>• Number of participating countries</li> </ul>	<ul style="list-style-type: none"> <li>• Status reports</li> <li>• Meeting reports</li> <li>• National and regional workshop proceedings</li> <li>• Programme publications</li> </ul>	<ul style="list-style-type: none"> <li>• National FGR conservation strategies and action plans poorly formulated, if any.</li> <li>• No regional FGR conservation strategies or action plans exist.</li> <li>• These are needed to enhance both regional and national activities.</li> </ul>
<b>Activity D:</b> Promote sharing and exchange of forest germplasm.	<ul style="list-style-type: none"> <li>• Code of Conduct developed for the participating countries</li> <li>• Countries signed the Code of Conduct</li> <li>• Material Transfer Agreements among the participating countries done</li> </ul>	<ul style="list-style-type: none"> <li>• Meeting reports</li> <li>• Code of Conduct</li> <li>• Material Transfer Agreements</li> </ul>	<ul style="list-style-type: none"> <li>• There is a need to develop exchange protocols that are consistent with the CBD and national legislation.</li> <li>• Countries are interested in exchanging forest germplasm to increase the use of FGR.</li> </ul>
<b>Output 2:</b> Genetic resources of priority forest species conserved and their sustainable use increased in natural and man-made forests.	<ul style="list-style-type: none"> <li>• Priority forest species conserved</li> <li>• Countries applying improved forest management methods increased</li> <li>• Genetic diversity of natural tropical forests maintained</li> <li>• Use of genetic resources increased in tree plantations and agroforestry systems</li> </ul>	<ul style="list-style-type: none"> <li>• Country reports and statistics</li> <li>• Scientific publications</li> <li>• Surveys on FGR status</li> <li>• Reports of the FAO Panel of Experts on FGR</li> <li>• Global environmental statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of information on the amount of genetic diversity and how it is located in priority forest species.</li> <li>• Present conservation efforts are inadequate.</li> <li>• Management of forest genetic diversity needs to be improved in practical forest management.</li> <li>• The potential of forest genetic resources is poorly recognised and utilised for sustainable development.</li> </ul>
<b>Activity A:</b> Locate and assess genetic diversity of priority forest species.	<ul style="list-style-type: none"> <li>• Species and populations surveyed</li> <li>• Number of genetic studies</li> <li>• Distribution maps produced</li> </ul>	<ul style="list-style-type: none"> <li>• Technical reports</li> <li>• Scientific publications</li> <li>• Country statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of information on the amount and location of genetic diversity in priority forest species.</li> </ul>
<b>Activity B:</b> Conserve priority forest species and collect traditional knowledge on their uses.	<ul style="list-style-type: none"> <li>• Number of species and conservation programmes</li> <li>• Number of <i>in situ</i> and <i>ex situ</i> conservation stands</li> <li>• Traditional knowledge collected</li> <li>• Number of local communities involved in conservation</li> </ul>	<ul style="list-style-type: none"> <li>• Technical and meeting reports</li> <li>• Other publications</li> <li>• Country statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Priority forest species are inadequately conserved.</li> <li>• Knowledge of local people on priority species and their uses is poorly documented.</li> <li>• Involvement of local people is essential for effective conservation.</li> </ul>

Summary	Indicators	Means of verification	Risks and assumptions
<p><b>Activity C:</b> Develop gene management guidelines for priority forest species (logging, forest rehabilitation and tree domestication).</p>	<ul style="list-style-type: none"> <li>• Sites, species and management systems assessed</li> <li>• Guidelines developed</li> </ul>	<ul style="list-style-type: none"> <li>• Technical reports</li> <li>• Guidelines and other publications</li> </ul>	<ul style="list-style-type: none"> <li>• Effects of logging, forest rehabilitation and tree domestication on genetic diversity of priority forest species are not properly understood.</li> <li>• It is not known how well forest genetic diversity can be recovered through forest rehabilitation measures.</li> </ul>
<p><b>Activity D:</b> Develop germplasm production, propagation and distribution methods for priority forest species.</p>	<ul style="list-style-type: none"> <li>• Species evaluated</li> <li>• Protocols and methods tested and developed</li> </ul>	<ul style="list-style-type: none"> <li>• Technical reports</li> <li>• Guidelines and other publications</li> </ul>	<ul style="list-style-type: none"> <li>• There is a lack of high quality reproductive material for forest rehabilitation, plantation establishment and agroforestry purposes.</li> </ul>