December 2005

Regional strategy for conservation and utilization of crop diversity in the:

South, Southeast and East Asia region

Disclaimer

This document has been developed by the regional plant genetic resources networks in the South, Southeast and East Asia (SSEEA). Namely the Regional Network for Conservation and Utilization of Plant Genetic Resources in East Asia (EA-PGR), the Regional Co-operation in Southeast Asia for Plant Genetic Resources (RECSEA-PGR) and the South Asia Network on Plant Genetic Resources (SANPGR). For more information about the Networks, contact Bioversity International, Asia Pacific Oceania **Regional Office – Malaysia**, P.O. Box 236, UPM Post Office, Serdang, 43400 Selangor Darul Ehsan, Malaysia. Email: bioversity-apo@cgiar.org.

The objective of this Strategy is to provide a framework for the efficient and effective *ex situ* conservation of the most important crop diversity collections in the SSEEA region, and to promote the availability of these plant genetic resources for food and agriculture.

The Global Crop Diversity Trust (the Trust) provided support towards this initiative and considers the document, particularly those portions pertaining directly to the Trust's mandated areas of interest, to be an important input to the Trust's own planning and work. We expect the Strategy to continue to evolve, as appropriate, and for the Network to lead this on-going process.

The Regional Strategy is the strategy of the region. The Trust does not take responsibility for its contents or for the accuracy or completeness of the information contained in the document. Please direct specific questions and comments to the regional strategy coordinator mentioned in the document.

Global Crop Diversity Trust
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1. Coordination

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Name of organization:	Bioversity International Office for Asia, the Pacific and Oceania (APO)
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Countries involved:	SSEEA member countries (Bangladesh, Bhutan, China, India, Indonesia, Japan, Malaysia, Mongolia, Nepal, PDR Korea, the Philippines, R. Korea, Sri Lanka, Thailand, Vietnam)
Future potential:	Cambodia, Lao PDR, Maldives, Myanmar)

2. Executive Summary

The South, Southeast and East Asia (SSEEA) region is very rich in diversity of several crops and their conservation is extremely important. The significant efforts by the national programmes in several SSEEA countries have been made in the past and most of these focused on actions related to collecting, characterizing, evaluating, documenting and conserving the crop diversity extant in the region. However, these efforts had not been very exhaustive in all the countries due to constraints of resources which need to be strengthened. In addition, inadequate facilities and human capacity to manage the collections properly may lead to a situation where the collections are there but may not be viable anymore and hence can be lost forever.

To facilitate increased efforts and to promote collaboration, the three subregional networks, The South Asia Network on Plant Genetic Resources (SANPGR), the Regional Network for Plant Genetic Resources in East Asia (EA-PGR) and Regional Cooperation for Plant Genetic Resources in Southeast Asia (RECSEA-PGR) were organized through the assistance and facilitation of Bioversity International.

These subregional plant genetic resources (PGR) networks, mostly composed of heads of their national genebanks as national focal points, have conducted joint activities and meetings which are of mutual benefit to the members. The main purpose of these meetings was to review the progress of activities relating to different aspects of PGR and to develop plans for collaborative activities. Despite lack of major funding (except for the EA-PGR which was available only during the last 5 years), the networks helped the countries to develop individual national programmes as well as conducted some joint activities of PGR collection, evaluation and limited bilateral exchanges of the collected materials. Bioversity International is continuing to assist the three subregional networks by continuing to act as their Secretariat (shared at Bioversity-APO's three offices) at the request of the network members.

The recent estimate puts the global *ex situ* collections at over 6 million accessions in more than 1300 genebanks around the world. Eleven Consultative Groups on International Agricultural Research (CGIAR) Centers maintain around 660,000 accessions and a recent study conducted by the International Food Policy Research Institute (IFPRI) and the System-Wide Genetic Resources Programme (SGRP) estimated the cost of maintaining these collections between 0.45M USD to 1.0 M USD per year per Center.

The cost of maintaining PGR in national genebanks would also be variable. The need to provide a reliable source of funding to maintain the most important *ex situ* collections, especially of the most important food and other crops identified in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) Annex 1 is, therefore, of utmost importance. Specifically, Articles 18.1 and 18.2 of the ITPGRFA indicate that "Contracting Parties undertake to implement a funding strategy for the implementation of this Treaty in accordance with the provisions of this Article" and "the objectives of the funding strategy shall be to enhance the availability, transparency, efficiency and effectiveness of the provisions of financial resources to implement activities under this Treaty".

In this spirit, the Global Crop Diversity Trust (or the Trust) was put in place in 2003 as an independent and internationally funded body to support the ITPGRFA by raising an endowment fund of 260M USD generating approximately 12 M USD per year to provide funding support, in perpetuity, to conserve the most important *ex situ* collections of the most important food crops listed in Annex 1 of the Treaty. This support is prioritized in terms of a regional conservation and global crop diversity strategies as basis.

3. Objectives

The main objective of the SSEEA regional strategy is to promote and assist in the development of an effective and efficient arrangement for the conservation of the most important crop diversity collections in the region.

The development of the SSEEA regional conservation strategy mainly involved the 3 PGR Networks; the East Asia PGR Network (4 countries), South Asia PGR Network (6 countries but only 5 were active) and Regional Cooperation for Plant Genetic Resources Network (RECSEA-PGR) for Southeast Asia (5 countries but it was agreed that Papua New Guinea would be included in the Pacific region). There were also representatives from regional organizations such as the Asia Pacific Association of Agricultural Research Institutions (APAARI), FAO-RAP, Asia Pacific Association of Forest Research Institutions (APAFRI) and other CGIAR Centers (IRRI and ICRISAT). Bioversity-APO was designated by the group as the facilitating institution in the development of the SSEEA regional conservation strategy.

The consultation process started in October 15-18, 2004 in Beijing, PROC and the second consultation was conducted in Kuala Lumpur, Malaysia on September 6-9, 2005 which is the subject of this report. These consultation processes were both funded and supported by Bioversity International and the Trust (see list of participants in Annexes). In between these two major consultation process, Bioversity-APO facilitated the inputs of the national programmes through the three PGR Networks and consolidated outputs into a SSEEA Regional Strategy Draft Document which served as a working paper for the consultation process.

This consultation process at Beijing in 2004 identified key stakeholders and networks in the region involved in PGR conservation and sustainable use. This also produced the initial list of the most important food crops in the region with reference to Annex 1 list of the Treaty. Tasks and timetable for the succeeding steps in the development of the SSEEA regional strategy was also finalized along with the roles and responsibilities for both the national programmes and the other stakeholders including Bioversity-APO. An initial draft strategy was also generated as a result of the inputs from the national focal points of the three PGR networks which served as a working paper for the next consultation process in Kuala Lumpur.

The consultation process in Kuala Lumpur, Malaysia, September 6-9, 2005 started off from the first draft strategy for SSEEA. During this consultation process, the list of priority crops were finalized based on identified criteria developed by the group. Criteria and identification of the most important collections, the required collaboration and partnerships for its most effective conservation were also identified and agreed upon. It was agreed that the collaboration will be primarily through the three PGR networks, with existing crop networks in the region such as INGER for rice, BAPNet for banana, COGENT for coconut, ANSWER for sweet potato, CLAN for legumes, TaroGen for taro and SAVERNet for vegetables. It will also take place with existing regional institutional networks such as APAARI, APAFRI, SAARC, ASEAN and CGIAR Centers in the region such as Bioversity, IRRI, ICRISAT and others.

4. Introduction

Major challenges faced by the world today are extreme poverty, hunger and malnutrition as well as increasing habitat destruction and environmental degradation. The demands placed on agriculture will significantly increase due to ever increasing population pressure, unabated ecosystem degradation and climate change including the Asian countries. Meeting the demands of food security will only be possible if we continue to have access to the genetic diversity of crops and their wild relatives that provide breeders and farmers with raw materials required to improve their crops.

Conservation and maintenance of crop genetic diversity in *ex situ* genebanks and on farmers' fields is very important for the future of humanity. *Ex situ* genebanks greatly facilitate access to and use of genetic resources, if materials are available in adequate sample sizes, have minimum genetic drift over time and are free from pests and diseases. Further, *ex situ* collections offer the user an opportunity at one place to access, with one request, a large range of diversity, often from different origins and on which comparative passport, characterization and evaluation data are available. Today, crop diversity is under threat not only in the wild and at farmers' fields but also in the genebanks built around the world.

The South, Southeast and East Asia (SSEEA) region is very rich in diversity of several crops and their conservation is extremely important. The significant efforts by the national programmes in several SSEEA countries have been made in the past and most of these focused on actions related to collecting, characterizing, evaluating, documenting and conserving the crop diversity extant in the region. However, these efforts had not been very exhaustive in all the countries due to constraints of resources which need to be strengthened. In addition, inadequate facilities and human capacity to manage the collections properly may

lead to a situation where the collections are there but may not be viable anymore and hence can be lost forever.
To facilitate increased efforts and to promote collaboration, the three subregional networks, The South Asia Network on Plant Genetic Resources (SANPGR), the Regional Network for Plant Genetic Resources in East Asia (EA-PGR) and Regional Cooperation for Plant Genetic Resources in Southeast Asia (RECSEA-PGR) were organized through the assistance and facilitation of Bioversity International.

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5. Purpose of this Document

The Trust has envisaged two approaches to identifying and prioritizing eligible collections for upgrading and long-term conservation. The approaches are complementary. One approach is to identify key *ex situ* collections of globally important crops on a region-by-region basis. The other is to prioritize collections for funding on a crop-by-crop basis at the global level. Together, the two approaches will contribute to the establishment of a rational global system for the conservation of important crop diversity. This document deals with the first approach, i.e. regional strategy.

This process brings together the managers of PGR, and other relevant experts in the SSEEA countries to describe and implement the most efficient and effective strategies for ensuring the long-term conservation and availability of the crops that are vital to the world's food security. Such strategies will not only involve the holders of the PGR, but also other institutions and individuals that can contribute to the conservation, regeneration, characterization, evaluation, documentation and distribution of the target PGR.

The development of regional conservation strategies, as a first step, involves a wide consultation of existing regional and sub-regional PGR networks. For the purpose of developing the regional strategies for the APO region, it was agreed that there would be two major regions: a) the Pacific and b) the South, Southeast and East Asia (SSEEA). The first draft of the regional conservation strategy for the Pacific has been developed and is now with the Trust for its feed back.

This document is the result of wide ranging consultations among the individual subregional network countries and among the networks that started in October 2004 in Beijing, Peoples' Republic of China.

6. Objectives

The ultimate goal of the SSEEA conservation strategy is to promote and assist in the development of an effective and efficient arrangement for the conservation of the most important crop diversity collections in the region. The specific objectives are to:

- Assess, in close consultation with representatives of the relevant PGR regional networks and other relevant institutions and stakeholders, a strategy for the efficient and effective conservation of the genetic resources in the region and identify priority collections eligible for long-term support from the Global Crop Diversity Trust and their urgent upgrading and capacity building needs
- Promote the rationalization of conservation efforts at regional and global levels, e.g. through encouraging partnerships and sharing facilities and tasks
- Conserve existing diversity of SSEEA priority crops safely and sustainably
- Improve access to SSEEA crop diversity available to farmers, crop improvement scientists and other researchers
- Build capacity to study genetic diversity in crop genepools in the SSEEA region, identify accession with useful traits/genes and contribute to germplasm enhancement

7. Expected outputs

The expected initial outputs of the development of a regional conservation strategy are the following;

- An evaluation and assessment, in consultation with representatives of the relevant networks and other stakeholders, of the collections of most importance in the region considering its primary or secondary centres of diversity;
- A regional ranking of the collections of the crops identified above that are 'most important' in terms of size, extent of diversity, holdings of wild relatives and other standards of assessment, carried out in consultation with members of relevant regional networks and;
- A conservation strategy and recommendations for funding priority collections, promoting partnerships and sharing responsibilities, facilities and tasks.

The efforts are expected to result in:

- Crop genetic resources in SSEEA region safely conserved and utilized in the most cost-effective manner and utilized with improvements to
    - Storage and maintenance (seed, in vitro, field)
    - Regeneration
    - Documentation
    - Characterization
    - Germplasm health
    - Distribution
- Agreed genebank management standards in place at national and regional levels
- Regional Plant Genetic Resources for Food and Agriculture (PGRFA) conserved safely on a long-term basis especially for species listed in Annex 1 of the International Treaty on PGRFA (ITPGRFA)
- Safety duplication of important collections done to avoid the risk of loss of germplasm due to unforeseen circumstances

- Germplasm with desirable traits identified and made available to breeders
- Training for skill enhancement in specific areas organized to improve the regional capacity in the following specific areas

8. Process and Progress to Date

In order to work on the SSEEA strategy, a meeting of representatives of the three subregional PGR networks in Asia (SANPGR, RECSEA-PGR and EA-PGR) was organized with support from the Trust and the Bioversity-APO office in Beijing, Peoples Republic of China, 15-18 October 2004.

At this meeting, the network member-representatives became familiar with the Trust and they also agreed on an approach, process and on a framework for developing the regional strategy and identified initial priorities (crops, collections and upgrading/capacity building needs). The meeting also developed the initial components of a regional conservation strategy to be further refined with a wider consultation of national partners and other key stakeholders in the region.

The meeting of the SSEEA networks in Beijing also resulted in identification of most of the:

1) organizations, persons and forum to lead the strategy development process,
2) organizations that can take responsibility for process development,
3) institutions and networks which can be involved in designing the strategy and in developing the framework for the current status document along with priority crops and rationale.

Work on identification of institutions that would be involved as capacity development providers, and agreement on information needed and mechanism for gathering the needed information for developing the strategy and developing framework for the strategy along with timelines for the activities was also achieved to a great extent. Subregional components of the strategy for the three networks were discussed in working groups and the strategy, crop priorities, coordination mechanism, stakeholders and the time-frame for completing the strategy was agreed.

During November 2004 and May 2005, the Chairs of the three subregional networks consulted and developed the first draft of the subregional strategy, which was refined in June 2005. A synthesis based on these three reports was developed as a draft Strategy which was the basis for further deliberation and refinement in a regional meeting held in Kuala Lumpur, Malaysia on September 7-9, 2005.

The Kuala Lumpur meeting was participated by 15 member country representatives of the three sub-regional networks (SANPGR, RECSEA-PGR and EAPGR), by the representatives from the Global Crop Diversity Trust (the Trust), FAO-RAP, ICRISAT, IRRI, APAARI and APAFRI. During this meeting, a Steering Committee (SC) was formed to provide guidance in the overall development process of generating the regional conservation strategy until it is finally approved and endorsed. The SC is composed of representatives from the three sub-regional PGR Networks, FAO-RAP, ICRISAT, IRRI, Bioversity and APAARI.

To date, designation of all members of the SC have been approved by their Heads of Institutions. The meeting also recommended the needed activities and timetables required

until the approval and endorsement of the regional conservation strategy. Presentation to APAARI for its feedback and endorsement of the regional conservation strategy has been scheduled for early November, 2005 during its general assembly meeting.

9. Essential conservation activities

The basic conservation activities which are essential to maintain and make available an existing collection over the long-term include:

1) storage and maintenance (seed, in vitro, field),
2) safety-duplication,
3) regeneration,
4) characterization,
5) documentation,
6) health of germplasm,
7) distribution/links to users,
8) acquisition.

The maintenance of *ex situ* collections, in particular, requires a stable, sustainable and perpetual funding stream. Furthermore, *ex situ* conservation has seen a considerable reduction in donor[1] support in recent years, in favour of funding for *in situ* conservation. However, the complementarity's of *in situ* and *ex situ* conservation is also more important than just an emphasis on either one as both needs to exist side by side to bring about sustainable conservation, evolution and use of plant genetic resources. The Trust emphasizes on adopting a rational conservation system for *ex situ* conservation. Some major characteristics of this system are:

- Include the genetic diversity of the major part of the genepool of a given crop – efforts in the proposed strategy is to focus on within a region for most crops and on global genetic diversity for few crops and to put in place mechanisms to ensure its conservation efficiently and effectively over the long-term
- Ensure appropriate standards of long-term conservation and management are met
- Minimize unintended and unnecessary duplication within and among collections
- Provide effective safety back-up arrangements for all conserved accessions
- Ensure the accessions are readily available and that access to them is assured under the terms and conditions of the International Treaty
- Provide comprehensive and easily accessible information across the whole genepool in question
- Include participants that may not conserve collections but provide other critical services such as regeneration, evaluation and documentation
- Adequately complement *in situ* conservation efforts

For such systems to be effective in the SSEEA it would require that:

- Responsibilities for specific activities and functions related to the conservation of a given crop are clear and are assumed by the most appropriate institutions.
- Credibility, trust and a willingness to collaborate and share information and material among the various holders of collections, service providers and other stakeholders needs to be established.

[1] Donor includes organizations, foundations and governments

- As proposed, collaboration is voluntary and all participants should gain from their involvement.
- Necessary partnerships, coordination and decision-making mechanisms, in the form of the three subregional networks that are party to this strategy exist and function effectively.
- There are appropriate links with relevant institutions, networks, users etc., as exemplified in different locations in this Strategy.
- Institutional commitment is provided and additional funding and other resources required should be sourced.

10. Eligibility analysis for Global Crop Diversity Trust support

The status of countries with respect to being qualified for the eligibility principles and eligibility criteria as set out by the Trust is given in Annex 5 and 6. The collections in this strategy have been identified based on

- Conservation objective of the collections
- Scope of the collection
- Commitments of the holders of collections

The Eligibility Principles and Criteria relate to specific collections and not to a country. However, since most of the collections identified are in the public domain with individual governments taking almost entire responsibility for them, the principles and criteria are evaluated against each country as they would be defacto applicable to the collections. We have chosen this path as assessing these for individual collections in 15 countries would be too cumbersome and repetitive. Some countries are still in the process of working out their official accession to the Treaty. For example, Nepal is in the process of signing the International Treaty. The Agriculture Minister has signed the proposal and submitted to the cabinet for approval.

The holders of germplasm collections in SSEEA are highly qualified for the support of the Trust, as will be made clearer in the foregoing discussion. The germplasm holders in Bangladesh, DPR Korea, Mongolia, Nepal and Vietnam need support for developing basic capacity of human resources and management systems to maintain their plant genetic resources and to achieve the conformity with agreed scientific and technical standards of management, and the facilities to effectively maintain the collections, while other countries need to develop capacity for more modern techniques for characterization, evaluation and utilization.

This information provided in Annex 6 is based on information on specific collections. However, as the number of collections in each country are highly variable, an attempt has been made to average the percentage figures per country over all the collections in a country. It must also be noted that most of the collections are in fact multi-crop collections (or genebanks) and there are indeed very few single crop/species collections. Hence, this aggregation becomes necessary, which is more complex as some of the genebanks may be holding the most important collections along with not so important ones.

As can be seen from the information in the Annex 5 and 6, there are still a few major gaps within a country as well as between countries. Links with users in some countries appear to be very effective (based on distribution data), while these are not to the same extent in others. The conclusion that can be drawn is that there are no sufficient human resources and

management systems in place and the facilities are inadequate in certain collections and countries However, in countries such as China, India, Japan and Republic of Korea, where the human and other resources are significantly better than the others (Bangladesh, Mongolia, Democratic Peoples Republic of Korea), there are still gaps as the collections are large and have grown during the last decade or two.

The situation in Indonesia, Malaysia and Thailand is slightly different mainly because they do not have a centralized national PGR system, while the Philippines and Vietnam have long established national systems, albeit not very adequate in terms of resources. Later in the Strategy, efforts to mitigate this situation will be suggested so that the identified collections of high importance could be provided with long-term support along with capacity building and upgrading.

11. Status of *ex situ* PGR collections in the SSEEA countries

Collecting of germplasm was conducted in all countries in the region through the involvement of research institutions, universities, local agricultural extension agencies and farmers. A total of 850,977 (Malaysia entry not yet completed) accessions of the most important crops including wild relatives has been collected and maintained by the countries in the region. A total of 264,800 accessions of a target 10 priority crops identified for South Asia are maintained in genebanks including the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) genebank. The crops of importance in Maldives include coconut, banana, mango and chilli. The number of collections of these crops maintained in Maldives is not known. In addition, the national programme involving PGR activities is not well established at the national level and hence the information on various aspects has not been included.

The base collections were established in China, India, Japan and the Republic of Korea with optimum conditions and to some extent in the Philippines and Vietnam. Modern facilities have been established in Bhutan and Thailand and the moving of material from dispersed collections into this facility is underway. In the rest of the countries, the conservation facilities are in relatively poor conditions. The active collections are usually maintained in the provinces or substations of national agricultural research system in medium-term genebanks and also with research institutes, universities and experimental stations with varied storage conditions. These genebanks and institutions are responsible for germplasm regeneration, characterization, distribution and utilization.

For vegetatively propagated crops, the field genebanks are used to maintain the diversity collected in the region. The crop species, for example fruit trees, can not be stored as seed samples and are stored in the fields with proper protection facilities. For safety of germplasm collections of vegetatively propagated crop species, in vitro techniques are used to maintain the viability of these crop species in the tubers which are maintained in controlled conditions.

Characterization and documentation are carried out by the national programmes in each country. The data on accessions are recorded and documented with computerized information systems accessible by breeders and other researchers. Most SSEEA countries have established national PGR documentation systems. Standard descriptors for passport data were used by all the institutes involved in PGR activities for documenting accessions.

For example, China has set up Chinese Crop Germplasm Resources Information Network (http://icgr.caas.net.cn/), including characterization distribution information system of crop genetic resources, fingerprinting automatic recognition system, regeneration monitoring system and image system for wild plants.

In R. Korea, characterization data, based on the Rural Development Administration (RDA) crop-specific descriptors including image database are computerized for management and utilization of plant germplasm. Special software for collecting image data of stored accessions was developed to determine grain shape and measure their sizes. The seed image database has been developed for the 25,000 conserved accessions of about 100 species. The information system of RDA-GB can be accessed at http://genebank.rda.go.kr/. The database for vegetatively propagated PGR is under construction in collaboration with the institutions holding accessions in their field gene-banks.

In Mongolia, with the support of Bioversity International, electronic database management has been conducted since 1998 and at present passport data of over 8000 accessions is stored in GMS system. As a result of activity in 1996-2000, the passport data of all accessions was completed at PSARI Genebank. Passport, characteristics and illustrated data from Japan can be accessed through the internet at http://www.gene.affrc.go.jp.

All SSEEA countries have made efforts to improve and use their germplasm collections in cooperation with plant breeders and other relevant researchers. Through distribution of germplasm to farmers, many landraces have been used by farmers for production.

For example, a survey on the use of germplasm of ten crops, namely rice, wheat, corn, soybean, citrus, Chinese cabbage, mulberry, cucumber, tea and cotton in China showed that a total of 178 landraces were directly used in production, with an annual growing area of 848,000 ha, accounting for about 1% of the total cultivated area (Gao Weidong et al. 2001).

Each country in the region has established several national crop improvement programmes which use germplasm as basic materials for variety improvement. By using local germplasm, these countries have developed large numbers of improved cultivars for different crops including wheat, rice, maize, sorghum, millet, soybean, groundnut, vegetables and fruits. Some countries such as China, India and R. Korea have made efforts to develop core collections for some major crops and identify molecular markers to determine the diversity of core collections (Wang 2004; Park and Cho 2004).

The other uses of germplasm mainly include the following areas and variety of institutions and universities working on genetics, botany, plant taxonomy, biological diversity, plant physiology, plant biochemistry, molecular biology, genetic engineering, cytological engineering and environmental biology make use of genetic resources conserved in different collections in the SSEEA region.
The level of evaluation and characterization, utilization and documentation are shown in Annex 1: Table 1, 2 and 3.

12. Crops of greatest importance, available in countries listed but not those in IRRI, ICRISAT and other CGIAR centres

In this section, specific crops on Annex 1 of the ITPGRFA of greatest importance to the agriculture of the SSEEA region or to a few countries in the region are identified based on agreed criteria/factors during the SSEEA meeting in October 2004. Either many of these, as indicated originate in the region or SSEEA is a secondary centre of diversity. The information on crops of greatest importance in particular countries was provided by the Directors/Heads of Plant Genetic Resources Programme, who are the country coordinators in their respective countries. Based on group discussions organized by Bioversity International and the Trust for developing the conservation and utilization Strategy for South, Southeast and East Asia (SSEEA) from 15-18 October 2004 at Beijing, the crops of greatest importance were identified based on their value in agriculture development, food security and the extent of diversity present along with wild relatives and are given in order of priority in Annex 2: Table 4.

The crops of greatest importance have been identified in respective countries keeping in view the criteria that were determined by all the National PGR Coordinators as given hereunder:

Criteria discussed and agreed on:

- Centre of diversity (Primary or secondary)
- Level of subregional, regional and global importance as food and nutritional crop (including feeds and fodder for animals)
- Presence of regional and/or international collections
- Usefulness as crops for marginal areas and subsistence agriculture
- Livelihood security for smallholders
- Threat to the genetic diversity *in situ*/on- farm
- Crop with unique advantage to the sub-region or region

Based on these criteria, the proposed list of priority crops in the SSEEA region is given in Table 5.

Table 5. Priority crops and ranking assigned by individual subregional network

Crops	SANPGR	RECSEA-PGR	EA-PGR
Rice	1	1	2
Citrus	10	4	7
Vigna	5	7	5
Eggplant	7	10	11
Wheat	3		1
Maize	2		3
Banana	8	2	
Barley	11		8
Sorghum	12		9
Coconut	13	5	
Potato	15		10
Sweet potato	19	3	

Crops	SANPGR	RECSEA-PGR	EA-PGR
Cassava	18	6	
Yams	20	8	
Taro	21	9	
Breadfruit	24	11	
Apple			4
Medicago			6
Finger millet	6		
Chickpea	9		
Pigeon pea	4		
Lentil	14		
Beans	16		
Pearl millet	17		
Lathyrus	22		
Strawberry	23		

Technical opinion was expressed that, for the SEA region yams should get higher priority than that of Cassava, RECSEA to reconsider this ranking.

These were further discussed and elaborated and these details are given in Table 6.

Table 6. Crops of greatest importance and first priority for support

No	Crops/ Species	Countries in the region	Factors/indicators of importance
1.	Rice	SSEEA (Bangladesh, Bhutan, China, India, Indonesia, Japan, Malaysia, Mongolia, Nepal, PDR Korea, the Philippines, R. Korea, Sri Lanka, Thailand, Vietnam	▪ Food security (major staple food) and sustainable agriculture ▪ Highest diversity including wild species ▪ Originated in the region and SSEEA is the primary centre for rice diversity ▪ Priority indicated by all sub-regions ▪ World's most important collection exists in the region ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion Need for utilization and crop improvement
2.	Maize	SSEEA (Bangladesh, Bhutan, China, India, Indonesia, Nepal, PDR Korea, the Philippines, R. Korea, Sri Lanka, Thailand, Vietnam)	▪ Food security and sustainable agriculture ▪ Unique diversity (i.e. waxy characteristics, adaptable for highland condition) ▪ Feed and fodder for animals, poultry ▪ Areas under cultivation increasing ▪ Priority indicated by all sub-regions
3	Wheat	SSEEA (Bhutan, India, Nepal, Bangladesh EA	▪ Food security and sustainable agriculture ▪ Rich diversity, specially for wild relatives ▪ Unique diversity for short duration and cold tolerance ▪ High priority by two sub-regions ▪ Very important collections such as Kihara's, Vavilov's exist

No	Crops/ Species	Countries in the region	Factors/indicators of importance
4.	Sorghum	SSEEA (First priority in India and Sri Lanka and second priority in Nepal and Bhutan EA	▪ Drought tolerant ▪ Dual purpose (food, fodder) Important for food security and sustainable agriculture ▪ Largest collection in this region ▪ Secondary centre of diversity ▪ High priority given by two sub-regions
5.	Citrus	SSEEA (China, Japan, R. Korea, Malaysia, the Philippines, Indonesia, Vietnam, India)	▪ Primary and secondary centres and high diversity ▪ Important tropical/sub-tropical fruit ▪ Food and nutritional security High value as cash crop and important for income generation at HH level and country level ▪ Good export value ▪ High priority given by two sub-regions ▪ Agricultural development ▪ High import bill ▪ Closely linked with Asia's traditional culture ▪ Indigenous crop
6.	Vigna	SSEEA (SEA/EA)	▪ Highest diversity Sustainable agriculture [soil improvement & protection, low input required (saves fertilizer)] ▪ Food security ▪ High value as cash crop ▪ Diverse uses Large collections ▪ Major protein source for vegetarians
7.	Barley	SSEEA (India, Nepal, EA)	▪ Highest diversity ▪ Food security and sustainable livelihoods ▪ High value crop for brewery
8.	Eggplant	SSEEA (India, Sri Lanka, Nepal, Bangladesh, SEA)	▪ Originated in the region ▪ Highest diversity ▪ One of the most important vegetables in the region ▪ Large collections exist Important for sustainable agriculture and income generation
9.	Banana	SSEEA (India, Sri Lanka, Malaysia, Philippines, Indonesia, Vietnam, Thailand)	▪ Primary and secondary centres of diversity ▪ Food and nutrition security ▪ Sustainable livelihoods and income generation ▪ Large collections ▪ Materials and associated characterization data available and accessible ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement
10.	Coconut	SSEEA (India, Sri Lanka, SEA)	▪ Centre of origin and diversity ▪ Large collections including two sites of international genebanks ▪ Food security and sustainable livelihoods ▪ Multiple uses and income generation ▪ Agricultural development Income generation ▪ Closely linked with Asia's traditional culture

No	Crops/ Species	Countries in the region	Factors/indicators of importance
11.	Apple	EA	▪ Nutritional security ▪ Originated in the sub-region ▪ Diversity exists ▪ Income generation ▪ Sustainable agriculture ▪ Priority indicated by all countries
12.	Beans	SEA First priority in India, Bhutan, Sri Lanka and second priority in Nepal	▪ Important source of protein ▪ Widely used as vegetable and pulse crops
13.	Cassava	SEA (Indonesia, Malaysia, the Philippines)	▪ Potential use in Agro-based industry ▪ Rich diversity ▪ Food and nutrition security : Medium important as food crop in many mountainous areas, high value on processing industry ▪ Secondary centre of diversity Cultural value
14.	Chickpea	First priority in India, Nepal, Sri Lanka and Bangladesh	▪ Major pulse crop in the sub-region ▪ Rich diversity
15.	Cowpea	SEA no info	▪
16.	Finger millet	First priority in India, Nepal and Bhutan and second priority in Sri Lanka	▪ Suitability for cultivation on marginal lands ▪ Low input requirement ▪ High protein and good balance of amino acids - good for diabetics
17.	Lentil	First priority in Bangladesh, India, Nepal and second priority in Bhutan and Sri Lanka	▪ Most important pulse crop in the sub-region ▪ Rich variability in India and Nepal
18.	Medicago	EA	▪ Forage for animals ▪ Soil improvement ▪ Environmental protection
19.	Pearl millet	SA (First priority in Bhutan, India, Sri Lanka and Bangladesh)	▪ Important crop in the sub-region -particularly for low rainfall area ▪ Rich diversity
20.	Potato	EA	▪ Food security ▪ Diversity in landraces ▪ Income generation: starch, chips
21.	Pigeon pea	SA (First priority in India, second priority in Nepal, Sri Lanka)	▪ Food security ▪ Income generation ▪ Important pulse crop
22.	Taro	SEA (the Philippines, Vietnam)	▪ Food and nutritional security: High importance as famine foods at poor areas. ▪ Crop used as food and vegetable ▪ Value for sustainable agriculture in midland and upland areas ▪ Center of diversity: Primary ▪ Cultural value: Taro production closely links to different traditional customs of many ethnic minorities

No	Crops/ Species	Countries in the region	Factors/indicators of importance
23.	Strawberry	SEA (Indonesia, Malaysia, the Philippines, Vietnam)	▪ SEA is secondary centre of diversity ▪ High diversity ▪ Food security ▪ Agricultural development ▪ Income generation ▪ Potential use in agro-based industry
24.	Sweet potato	SEA (Indonesia, Malaysia, the Philippines, Vietnam)	▪ Food and nutritional security: High importance as famine foods in adverse ecological areas ▪ Income generation: Important cash & export crop in the country ▪ Rich diversity Important animal feed ▪ Centre of diversity: Secondary ▪ Potential use in Agro-based industry
26.	Yams	SEA (Indonesia, Malaysia, the Philippines, Vietnam)	▪ Accessions with wild species ▪ Food and nutritional security ▪ Income generation: Important cash & export crop in the country ▪ Multi-use crops: Food, vegetable, medicine ▪ Centre of diversity: Primary for Discorea esculenta, Secondary for Discorea alata ▪ High cultural value
27.	Brassica	Philippines	▪ Secondary center of diversity ▪ Food security
28.	Peas	Philippines	▪ Food security

SSEEA – South, Southeast and East Asia
SEA – Southeast Asia
EA – East Asia
SA – South Asia

13. Collections of greatest importance and priority for support

The Country Coordinators in different countries from the three networks were consulted. Based on the information provided by the Country Coordinators of the countries in the region, the collections of greatest importance and priority for support were identified as 'most important' in terms of size, extent/scope of diversity as defined by the network members and other experts.

Criteria for identifying collections which are of high priority for long- term support as developed by participants were;

- Collections in public domain
- Distinct collections (landraces, wild relatives)
- Collections with no safety duplication
- Collections under threat
- Collections with specific traits and from specific ecologies
- Collections that meet all the eligibility criteria
- Collections with sufficient eco-geographical representation/ Size of the collections
- Collections from institutions where regional /international collaborations are on-going

- Collections representing interdependence for germplasm at regional and global level to support food and nutritional security
- Collections represented by materials which are readily available for exchange as determined by plant health and quarantine requirements
- Collections having at least the minimum passport data

The above criteria were suggested in group discussions taking examples of three crops, namely, rice, *Vigna* and *Citrus*. In addition to these generic criteria, some will be crop specific, for example, in the case of citrus the urgency and need to move collections from high risk field collections to seed genebanks and cryobanks. For legumes such as *Vigna*, the sustainability of collections to environment and agricultural system conditions can be additional criteria.

It is important to note that it was also agreed that these criteria will not be used in isolation but in combination with the other sets of criteria in the list and as qualitative information.

The details of crop species, current holders, factors/indicators for assigning priority and access level information are given in Annex 5.

14. Collaboration for effective and efficient conservation in the region

14.1 Coordination of PGRFA activities.

The participants were divided into two groups to deliberate on the "main areas of collaboration", "why and how to collaborate?" and "mechanism for collaboration". The mechanisms for collaboration are listed below and the areas of collaboration and how indicated in the Table 7.

Mechanisms for collaboration:

- Ratification of IT
- Placing collections in the public domain
- Steering committee to guide the development of the PD collections (Members would be countries with collections in PD)
- Mobilize the support of politicians/policy makers
- Trust to catalyze national programmes to put germplasm in public domain
- Develop regional collaborative projects
- Crop specific network
- Sharing expertise, training, joint evaluation projects to promote collaboration
- Training (including molecular characterization)/ exchange visits/ workshops Develop institutional linkages
- Use existing mechanism; bilateral agreement, sub-regional networking and exchange of germplasm
- Mechanism to review progress

Table 7. Main areas of collaboration, reason for collaboration

Main areas of collaboration	Why and how to collaborate
Documentation•	▪ To know what is and where ▪ Data on traits ▪ Identify unique traits ▪ Common data descriptor code/scale for sharing information ▪ Common descriptors ▪ Common information sharing platform
Maintenance	▪ Sharing facilities, expertise in areas such as cryopreservation ▪ Sharing methods, protocols, practices in long-term conservation, e.g. existing collaboration ▪ How do genebanks know what to improve? ▪ Genebank management system, performance monitoring, quality management, good practices (Do's and don'ts) ▪ Rationalization of collections through identification of probable duplicates using appropriate technologies
Regeneration	▪ To ensure regeneration in the environment of adaptation
Safety duplicates	▪ Black box
Quarantine	▪ Harmonization of regulations[2] ▪ Sharing expertise and technologies/protocols and in Pest Risk Analysis ▪ Specialized institutes to examine germplasm in order to have pests and disease free materials ▪ Crop dependence
Distribution	▪ Sharing efforts in distribution ▪ Policy related to germplasm exchange
Characterization	▪

14.2 Strategy for coordination and facilitation

Subregional level

The coordination and facilitation of the strategy at the national level in the countries in the South Asia region are done by the Country Coordinators who are dealing with the plant genetic resources in their respective countries. The Coordination at the sub-regional level is done by the Chair of the SANPGR and is supported by the Vice-Chair. Currently, India is the chair and Nepal is the Vice-chair of SANPGR. The network secretariat at Bioversity International South Asia Office, New Delhi is facilitating the coordination and finalization of the strategy.

The activities will be implemented through the regional Network for Conservation and Use of Plant Genetic Resources for East Asia (EA-PGR). The coordinating mechanism of EA-PGR will be applied in the implementation of this strategy. The regional coordinating body will be the Interim Secretariat of the EA-PGR and national coordinating institutes will be as follows:

1) Institute of Crop Science, CAAS, Beijing, China
2) National Institute of Agrobiological Sciences, Tsukuba, Japan
3) Pyongyang Crop Genetic Resources Institute, Pyongyang, DPR Korea

[2] We are aware that there is the FAO's Asia Pacific Plant Protection Commission and the International Plant Protection Convention. Through FAO, this issue can be addressed to promote safe movement of germplasm in Asia and the Pacific.

4) Director, Genetic Division, National Institute of Agricultural Biotechnology, RDA, Suwon, Republic of Korea
5) Mongolian State University of Agriculture, Ulaanbaatar, Mongolia

RECSEA-PGR

Collaborative arrangements are facilitated through networking. Networks provide a mechanism for sharing information/knowledge and germplasm, transferring technology and standardizing procedures, as well as in undertaking collaborative R&D programs, including capability building. The crop germplasm networks facilitate the standardization of germplasm collection, maintenance, evaluation and documentation, and also enhance capacity building that includes exchange of experts/scientists and upgrading of facilities. Most countries in the region are members of several commodity-based PGR networks and linkages and these networks and international institutions will be sustained.

For a regional system of conservation to be efficient and to ensure links to users, the system has to be under the aegis of a formal regional inter-governmental organization, such as the Association of Southeast Asian Nations (ASEAN), with government commitment to share financial or material contribution in the operation of the network. For organized dissemination of improved rice germplasm and information, the International Network for Genetic Evaluation of Rice (INGER) facilitates the unrestricted, free and safe exchange of rice germplasm and the free sharing of information not only among NARES and IARC partners, but also with the private sector.

For banana, collaborative arrangements will be made with the International Network for the Improvement of Banana and Plantain (INIBAP) of Bioversity International and the Southeast Asia Banana Germplasm Resources Center (SABGRC) based in the Bureau of Plant Industry – Davao National Crop R&D Center, Philippines and national germplasm centers maintaining banana germplasm in the region. INIBAP coordinates a global research effort on Musa, promotes and strengthens research collaboration in national and global levels, while SABGRC retrieves and collects all banana cultivars within the Southeast Asian region.

Regional collaboration will be enhanced through the Banana Asia Pacific Network (BAPNET), as Bioversity/INIBAP facilitates BAPNET activities in the following areas: germplasm management, information development and exchange, banana resource development, and strategic planning. Thus, regional priorities are established and reviewed regularly by the BAPNET secretariat. INIBAP also upgrades the capability of scientists/researchers and banana growers through trainings, particularly on the production and utilization aspects.

For sweetpotato, collaborative arrangements will be made with the International Potato Center (CIP) through the Asian Network for Sweetpotato Genetic Resources (ANSWER). CIP supports germplasm conservation at national and global levels by monitoring duplicate collections, supplying clones as potential parent material for national breeding, providing training and expertise support in germplasm characterization. Sweetpotato is one of CIP's mandate crops through which it seeks to achieve food security and reduce poverty through scientific research and related activities.

On the other hand, ANSWER employs various strategies (e.g. *ex situ*, in vitro, cryopreservation, and others) for the conservation of sweetpotato genetic resources. ANSWER has also initiated capacity building among member-countries with regard to

maintenance, characterization, evaluation and documentation of their respective sweetpotato genetic resources.

For coconut, the International Coconut Genetic Resources Network (COGENT) of Bioversity International has subregional networks, for South Asia, Southeast Asia and the Pacific. The coconut accessions of the Asia and the Pacific are listed in the Coconut Genetic Resources Database (CGRD) established by Bioversity-COGENT.

A key objective of the Trust is to contribute to the development of an efficient and effective global system of *ex situ* conservation of PGR. A willingness to collaborate with others, e.g. through a willingness to share facilities, resources and information, is essential to achieving this objective. Partnership may also be important for carrying out certain essential services which may be performed better somewhere else than at the institution where a collection is held.

For developing and implementing an effective conservation strategy at the regional level, the following are critical:

- Credibility and trust amongst the collection holders in the region
- Willingness to collaborate with partners within and outside of the region
- Links with existing collaborative frameworks such as networks
- Adequate funding to support the system
- Agreed conservation standards
- Sharing of conservation responsibilities amongst partners for activities

In order to achieve this, the three subregional partners have come together thus forming the larger SSEEA region for developing this conservation strategy. For the purpose of developing the strategy, preliminary identification of priorities/crops was done during the SSEEA Meeting in October 2004. The Chairs of the three subregional networks interacted with the individual national consultation on SSEEA meeting outputs including consultation with CG centres in their subregions. Subregional components and finalization of regional proposal was done by the Chairs which were facilitated by the secretariat (based at Bioversity International) and these three proposals were submitted to Bioversity International. Bioversity International, in consultation with subregional coordinators and with regional and international agencies at SSEEA level developed the draft strategy for discussion and further refinement.

Implementation arrangements need to be discussed and finalized.

14.3 Regional partners

For organizing the conservation activities effectively, it is suggested that the:

- Existing network on particular crops, including commodity crops, CLAN, TaroGen, COGENT, INIBAP, BAPNET, INGER, SAVERNET should be involved. The expectation from these organizations is that they would develop the crop specific strategies taking note of the regional strategy and the collections identified at the regional level.
- Joint research and conservation programme within different sub-regional networks
    - Sharing storage facilities and responsibilities
    - Seed crops/ genebanks

- Vegetatively propagated crops to set regional field genebank
- In vitro and cryopreservation of crops and leading organization or country in conservation activities

Table 8. Priority crops of countries in SSEEA

Crops	SANPGR	RECSEA	EAPGR	SSEEA	Leading country
Rice	1	1	1	1	IRRI
Maize	1	1	1	2	China/India
Wheat	1		1	3	China/India
Sorghum	1		2	4	ICRISAT
Citrus		1	2	5	China
Vigna			2	6	Japan/ R. Korea/AVRDC/Vietnam
Barley	2		2	7	China
Eggplant		3		8	India/AVRDC
Banana		1		9	Philippines/ INIBAP
Coconut		1		10	COGENT
Apple			2		China
Beans	2	1			Malaysia
Cassava		2			Thailand
Chickpea	1				ICRISAT
Finger millet	2				India/ICRISAT
Lentil	2				India/Nepal
Medicago			2		Mongolia
Pearl millet	1				ICRISAT
Potato		1			CIP
Pigeon pea	1				ICRISAT
Taro		3			PNG/Vietnam
Strawberry		2			Thailand
Sweet potato		1			Philippines/PNG
Yams		2			Philippines
Black gram		3			Thailand, Vietnam
Breadfruit		3			Malaysia

Note: When an international institute or CG is located in the region, it is proposed that they take the lead in the coordination of the conservation of the crops of priority. In other cases, it is proposed that a national programme with the capacity and expertise lead the coordination.

14.4 Other linkages

Regional linkages

- AIAT – with an institute in every province of Indonesia that closely collaborates with farmers

- IATADI (Indonesia)
- IWETRI (Indonesia)
- Phu Ho Fruit Crop Center (Vietnam)
- PIONIR (Indonesia)
- SPTN-HPS (Indonesia)
- University of Mulawarman (Indonesia)

Other linkages

- ANSWER - employs various strategies (*ex situ*, in vitro, cryopreservation) for the conservation of sweetpotato genetic resources; has initiated capacity building among member-countries with regard to maintenance, characterization, evaluation and documentation of their respective sweetpotato genetic resources
- BAPNET – enhances regional collaboration by facilitating access to germplasm and information on banana production
- CIP – supports germplasm conservation at national and global levels by monitoring duplicate collections, supplying clones as potential parent material for national breeding, and by providing training and expertise support in germplasm characterization; currently developing a global strategy for sweetpotato
- COGENT – with listing of coconut accessions of SEA through the CGRD; currently developing a regional and global strategy for coconut
- FAO – provides technical support and documentation
- INIBAP – facilitates BAPNET activities on germplasm management, information development and exchange, banana resource development, and strategic planning; conducts cultivar selection
- Bioversity – provides technical support
- IRRI – distributes rice germplasm materials with conformity to all relevant national, international, and bilateral agreements and legislation (phytosanitary regulations, import/export regulations, appropriate Material Transfer Agreement (MTA)
- KUL – conducts collaborative studies on nematode resistance of banana
- SABGRC – retrieves and collects all banana cultivars within SEA
- Cornell University (identified by Indonesia)

Table 9. Plant genetic resources activities and key institutions

Activities	Key Institutions	Remarks
Conservation	ICGR, NIAS, NIAB, NBPGR, ICRISAT, PGRC, NPGRL, VASI, MARDI, DOA (Thai), IRRI, AVRDC, AARD (Indonesia)	Other institutions to be identified after regional consultations
Characterization and evaluation	ICGR, NIAS, NIAB, NBPGR, ICRISAT, PGRC, NPGRL, VASI, MARDI, DOA (Thai), IRRI, AVRDC, AARD (Indonesia)	Involving universities in different countries
Molecular characterization	NBPGR, NIAS, NIAB, ICGR, MARDI	Link to advanced laboratories in the North countries, as and when needed
Regeneration/multiplication	ICGR, NIAS, NIAB, NBPGR, ICRISAT, PGRC, NPGRL, VASI, MARDI, DOA (Thai), IRRI, AVRDC, AARD (Indonesia)	National systems to be involved
Information and databases	ICGR, NIAS, NIAB, NBPGR, ICRISAT, PGRC, NPGRL, VASI, MARDI, DOA (Thai), IRRI, AVRDC, AARD (Indonesia)	IARCs
Germplasm exchange,	ICGR, NIAS, NIAB, NBPGR, ICRISAT, PGRC, NPGRL, VASI, MARDI, DOA (Thai), IRRI, AVRDC,	

Activities	Key Institutions	Remarks
including benefit sharing	AARD (Indonesia)	
Capacity building	Centres of Excellence for Training, CG centres	Involving universities in different countries
Public awareness and resource generation	Sub-regional networks and CG centres	With active support from The Trust and Bioversity International

The expected role of international/regional collections could be:

- Black box safety duplication/backup of national collections in at least one additional genebank in the region or within the county
- Field genebanks should be safely duplicated in in vitro collections
- The development of information system should be led by international centres in consultation with national programmes for integration and sharing
- Capacity building: international centres play specific role.

14.5 Distribution linkages

A willingness to collaborate with others, e.g. through a willingness to share facilities, resources and information, is essential to achieve the key objective of contributing to the development of an efficient and effective global system of *ex situ* conservation of PGR. Partnership is also very important for carrying out certain essential services which may be performed better somewhere else than at the institution where a collection is held. An effective conservation strategy at the regional level will aim to:

1) conserve existing crop diversity over the long-term,
2) meet agreed standards of management,
3) have minimum unplanned duplication,
4) have safety back-up arrangements.
5) ensure availability and access to the material,
6) have easily accessible information systems,
7) be cost-effective,
8) meet national and regional needs.

For such a system to work, the following are critical:

1) credibility and trust amongst the collection holders in the region,
2) willingness to collaborate with partners within and outside of the region,
3) links with existing collaborative frameworks such as networks,
4) adequate funding to support the system,
5) agreed conservation standards.

Sharing of conservation responsibilities amongst partners for activities such as:

1) storage (e.g. a regional genebank holds collections on behalf of several countries or a number of genebanks take responsibility for conserving a genepool/s),
2) documentation (e.g. the development and sharing of common or linked information systems),
3) regeneration,

4) characterization and evaluation, including pre-breeding efforts,
5) safety duplication,
6) germplasm health (standards and monitoring),
7) germplasm exchange and distribution.

Here we need to indicate specific collaborative arrangement between the countries and collections. These collaborative arrangements will be discussed and finalized during the SSEEA meeting in September 2005.

Collaboration with sub-regional/regional networks, namely, South Asia Association for Regional Cooperation (SAARC), Asia Pacific Association of Agricultural Research Institutions (APAARI), the ICRISAT, International Rice Research Institute (IRRI), FAO will be strengthened and the consultation with these organizations will be done to finalize the conservation strategy for the SSEEA region. ICRISAT and IRRI have been and are consulted in the process as the collections and services of these centres will be the key in the collaboration.

15. Capacity building and upgrading requirement

Capacity building and upgrading requirements have only been listed for those institutes where immediate capacity building and upgrading is required. It is assumed that indicative costs are those funds being requested from the Trust and not the total costs of the activity. For effective and efficient conservation of priority crop germplasm collections, it is extremely essential to upgrade/build national capacity in different countries in the region. All the countries in the region do not possess the required infrastructure and facilities to conserve the germplasm and need assistance. The human resource development by way of training programmes is also very important in most of the countries.

Based on the deliberations on areas and needs for collaboration, the following areas for capacity building and upgrading were identified:

1) Development of common information platforms for sharing such as common descriptors, data standards, protocols on conservation such as cryopreservation, genebank management systems, performance monitoring, quality management and good practices;
2) Harmonization of regulations especially on facilitating PGR exchanges;
3) Technical assistance for facilitating country ratification of the ITPGRFA;
4) Public awareness; and
5) Policy on use of black box and other forms of conservation strategy sharing.

16. Proposed arrangement for ensuring effective conservation

The proposed arrangements for ensuring effective conservation of priority collections in different countries will include identification of a main institute responsible for conservation, identification of other institutes, which will provide specific services and the user links. The crop-wise responsibilities entrusted to different institutes are given in Annex 6.

The Steering Committee[3] (SC) will take this process up to the level of endorsement by NARS and APAARI and simultaneously work for the ministerial endorsement. For political endorsement by APAARI, information will be provided to it on the process of development of the strategy and a draft before its meeting in November 2005. If agreeable to FAO, the SC will work, along with the Trust, to table the strategy at the Ministerial conference of FAO in May, 2006 for its endorsement. Key people in all the member countries will be informed about the process as well as the strategy.

Representatives of the Commission on PGR will be similarly informed (through Mr. Lim Engsiang and the Trust). For regional collaboration, it will be easier if there is a ministerial/secretarial endorsement. The two step process of endorsement will be through the heads of NARS (APAARI) and then at the ministerial level at a later date. Endorsement by the FAO to table the agenda on the Ministerial Conference in May, 2006 should first be obtained through the FAO, Bangkok Office (Note: Dr. Nyat Quat Ng will find out from the responsible officers from FAORAP to see if it is possible and assist in this process). APAARI can endorse the regional strategy even if not all countries are members of this regional forum. SC will be reviewed after the submission of strategy to the Trust and political/administrative endorsement for appropriateness and completeness of membership as it relates to implementation of the regional conservation strategy.

17. Work plan

This is a 3-year strategy and implemented on a year by year basis.

17.1 East Asia

Year 1

- Carry out regeneration, characterization and documentation of 4550 accessions of wheat (1000), rice (1000), maize (700), apple (250), *Vigna* (200), *Medicago* (100), *Citrus* (200), barley (600) and sorghum (500)
- Develop regional core collections of priority crops and identify and distribute useful materials
- Develop the guidelines for monitoring the viability of seeds at genebanks; develop guidelines for monitoring and controlling pests and diseases; the protocols for in vitro conservation of apple and citrus germplasm; improve documentation systems at different genebanks
- Organize two training courses; upgrade conservation facilities; improve national policies

Year 2

- Carry out regeneration, characterization and documentation of 4600 accessions of wheat (1000), rice (1000), maize (700), apple (300), *Vigna* (200), *Medicago* (100), *Citrus* (200), barley (600) and sorghum (500)
- Develop regional core collections of priority crops and identify and distribute useful materials
- Develop the guidelines for monitoring the viability of seeds at genebanks; develop guidelines for monitoring and controlling pests and diseases; the protocols for in vitro

[3] A Steering Committee for the SSEEA was established during the meeting during 7-9 September in Kuala Lumpur

conservation of apple and *citrus* germplasm; improve documentation systems at different genebanks
- Organize two training courses, improve national policies

Year 3
- Carry out regeneration, characterization and documentation of 4500 accessions of wheat (1000), rice (1000), maize (600), apple (300), *Vigna* (100), *Medicago* (100), *Citrus* (100), barley (800) and sorghum (500)
- Identify and distribute useful materials
- Test the guidelines, tools, protocols and documentation system
- Organize one training course, improve national policies

17.2 South Asia

Year 1
- Targeting collecting from specific areas for specific traits, inventory and mapping of genetic diversity
- Regeneration of targeted accessions and their processing and storage
- Improve the management of collections of identified crop; monitoring of seed viability and seed health in accessions held in genebanks for long term storage; strengthening field genebanks for conservation of perennial wild relatives
- Conserve, characterize and document genetic diversity of identified priority crops; evaluation of germplasm for nutritional traits; molecular characterization; exploring ultra-dry seed storage and other zero-energy based conservation options
- Capacity building and upgrading genebank facilities
- Enhancing knowledge on database management, in vitro conservation and cryopreservation, molecular characterization and seed processing and genebank management through training programmes

Year 2
- Targeting collecting from specific areas for specific traits, inventory and mapping of genetic diversity
- Regeneration of targeted accessions and their processing and storage
- Improve the management of collections of identified crop; monitoring of seed viability and seed health in accessions held in genebanks for long term storage; strengthening field genebanks for conservation of perennial wild relatives
- Conserve, characterize and document genetic diversity of identified priority crops; evaluation of germplasm for nutritional traits; molecular characterization; exploring ultra dry seed storage and other zero-energy based conservation options
- Capacity building and upgrading genebank facilities
- Enhancing knowledge on database management, in vitro conservation and cryopreservation, molecular characterization and seed processing and genebank management through training programmes

Year 3
- Targeting collecting from specific areas for specific traits, inventory and mapping of genetic diversity
- Regeneration of targeted accessions and their processing and storage

- Improve the management of collections of identified crop; monitoring of seed viability and seed health in accessions held in genebanks for long term storage; strengthening field genebanks for conservation of perennial wild relatives
- Conserve, characterize and document genetic diversity of identified priority crops; evaluation of germplasm for nutritional traits; molecular characterization; ultra desiccation studies; exploring zero-energy based conservation options
- Capacity building and upgrading genebank facilities
- Enhancing knowledge on database management, in vitro conservation and cryopreservation, molecular characterization and seed processing and genebank management through training programmes

17.3 Southeast Asia

Year 1

- Improve the management of collections of identified crop; monitoring of seed viability and seed health in accessions held in genebanks for long term storage; strengthening field genebanks for conservation of perennial wild relatives
- Capacity building and upgrading genebank facilities
- Enhancing knowledge on database management, in vitro conservation and cryopreservation, molecular characterization and seed processing and genebank management through training programmes
- Regeneration of materials in critical danger of loss of viability

Year 2

- Targeting collecting from specific areas for specific traits, inventory and mapping of genetic diversity
- Improve the management of collections of identified crop; monitoring of seed viability and seed health in accessions held in genebanks for long term storage; strengthening field genebanks for conservation of perennial wild relatives
- Conserve, characterize and document genetic diversity of identified priority crops; evaluation of germplasm for nutritional traits; molecular characterization;
- Capacity building and upgrading genebank facilities
- Enhancing knowledge on database management, molecular characterization and seed processing and genebank management through training programmes
- Regeneration of materials in critical danger of loss of viability
- Use of identified materials with desirable traits for base broadening towards utilization

Year 3

- Targeting collecting from specific areas for specific traits, inventory and mapping of genetic diversity
- Regeneration of targeted accessions and their processing and storage
- Improve the management of collections of identified crop; monitoring of seed viability and seed health in accessions held in genebanks for long term storage; strengthening field genebanks for conservation of perennial wild relatives
- Conserve, characterize and document genetic diversity of identified priority crops; evaluation of germplasm for nutritional traits; molecular characterization; ultra desiccation studies; exploring zero-energy based conservation options
- Capacity building and upgrading genebank facilities

- Enhancing knowledge on database management, in vitro conservation and cryopreservation, molecular characterization and seed processing and genebank management through training programmes
- Use of identified materials with desirable traits for base broadening towards utilization

In all cases, one of the indicators used will include as a verifiable indicator the number of accessions of crops (wild relatives) regenerated, for which CG centers are named as safety back up centers, should be those not already deposited for safety duplication. Hence after regeneration portion of seeds are sent to the CG centers for safety duplication.

18. References

Gao, W., V. Ramanatha Rao, et al., Eds. 2001. Plant Genetic Resources Conservation and Use in China, Proceedings of national workshop on conservation and utilization of plant genetic resources, 25-27 Oct. 1999. Beijing, China. Institute of Crop Germplasm Resources, CAAS and Bioversity International Office for East Asia, Beijing.

Park, Y.J. and E. G. Cho. 2004. Current Status and Recent Progress of Conservation and Use of PGRs in R. of Korea. Presented at the 5th Meeting of the Regional Network for Conservation and Utilization of Plant Genetic Resources in East Asia (EA-PGR), Beijing, China, 12-14 October 2004

Wang, S. 2004. Plant Genetic Diversity Conservation, Evaluation and Utilization in China. Presented at the 5th Meeting of the Regional Network for Conservation and Utilization of Plant Genetic Resources in East Asia (EA-PGR), Beijing, China, 12-14 October 2004

Annex 1: Tables

Bangladesh=BG
Bhutan= BH
Republic of China= CN
India = IN
Indonesia = ID
Japan =JP
Malaysia = MS
Maldives =ML
Mongolia = MO
Nepal = NP
PDR Korea=PK
Philippines= PH
R. Korea = RK
Sri Lanka=SL
Thailand =TH
Vietnam= VM

Table 1. Status of ex situ PGR collections in different countries

Enquiry	BG	BH	CN	IN	ID	JP	MS	MO	NP	PK	PH	RK	SL	TH	VM
PGR activities coordinated at national level	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes
National Programme formally established: if yes, please specify the date	Yes	Yes	Yes	Yes; 1976		Yes		Yes	Yes	Yes	No	Yes	Yes; 1988	-	Yes
Genebanks with national PGR responsibilities exists	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
National Inventory (NI)** exists	Yes	No	No	No*		Yes	Yes	No	Yes	No	Yes	No	Yes		Yes
NI available on the web. If yes, please provide the web site address:	No	No	No	No		Yes		No	No	No	No	No	No		
Has the country signed the ITPGRFA?	Yes	Yes	No	Yes		No	Yes	No	No ***	Yes	No	No	No	No **	No **
If not, is it in the process of doing so?											Yes				
Has the country ratified the ITPGRFA?	Yes	Yes	No ***	Yes		No ***	Yes	No ***	No ***	Yes	No	No ***	No	No **	No **
If not, is it in the process of doing so?											Yes				

* Many accessions have been inventoried. However, many institutes/agencies across the country are yet to be included as part of national gene bank collections and accessions therein be inventoried.
** In the process of ratification

Table 2. Status of documentation of PGR collections in different SSEEA countries

Enquiry	BG	BH	CN	IN	ID	JP	MS	MO	NP	PK	PH	RK	SL	TH	VM
Number of institutes with *ex situ* PGR collections in the country	3 Inst 5 RS	1 GB 1 RS	c. 70	c. 60		26	7	5	1	Approx. 10	44	Approx. 10	1		
Estimated total number of PGR accessions held by the institutes	21000	1000 in GB & 250 in RS	380,000	304,923		204,692	Approx 20,000	20,300	10,737	40,700	64,351 (644 sp)	143,000	10,972		
National PGR documentation system exists	Yes	Yes	Yes	Yes*		Yes	No	Yes	Yes	Yes	No	Yes	No		
Use of standard descriptors for passport data used by all or most of the institutes for documenting accessions	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	No	Yes	Yes		
Estimated proportion (%) of existing PGR information available in electronic format	70-80%	30-50%	100%	30-50%		100%	>90%	10-30%	50-70%	30-50%	50-70%	70-90%	40%		

* Many accessions have been inventoried. However, many institutes/agencies across the country are yet to be included as part of national genebank collections and accessions therein be inventoried.

Table 3. Type of data available in genebanks in SSEEA countries (figures in % of accessions held)

Enquiry	BG	BH	CN	IN	ID	JP	MS	MO	NP	PK	PH	RK	SL	TH	VM
Passport	80	50	100	50 – 60	75	100	60	85	100	100	90	100	100	75	75
Characterization / Evaluation															
Morphological	30	2	52	20 –	-	80	30	40	40	86	40	72	50	-	-
Pests & diseases; abiotic stress				30							60				
Biochemical											3				
Molecular											7				
Indigenous knowledge	0	0	0	<5	-	<10	5	10	0	5	5	20	0	-	-
Distribution	7	0	30	10	-	60	5	-	0	100	15	11.6	0	-	-

Note: 100% accessions in Sri Lanka and Nepal have passport data for some characters

Table 4. Accessions of crops of greatest importance available in SSEEA countries listed but not those in IRRI, ICRISAT and other CGIAR Centers. Figures in parenthesis indicate importance.

Crop	BG	BH	CN	IN	IN	ID	JP	MS	MO	NP	PK	PH	RK	SL	TH	VM	Total
Rice	7000 (3)	212 (3)	64084 (3)	73813 (3)	72841 (3)	12590 (1)	41081 (3)	11470 (1)		2963 (3)	12093 (3)	99,078 (1)	25604 (3)	4000 (1)	43732 (1)	9000 (1)	405748
Maize	69 (2)	61 (3)	16939 (3)	6124 (3)	5929 (3)	875	5959 (3)		84 (1)	511 (3)	7168 (3)	2,249 (2)	6943 (3)	599 (3)	193	450	48029
Wheat	559 (3)	3 (3)	40973 (3)	34887 (3)	34101 (3)		33559 (3)		6783 (3)	390 (3)	8355 (3)		17219 (3)	(1)			141942
Sorghum	162 (1)	1 (2)	15315 (3)	17530 (3)	17679 (2)		5266 (3)		16 (1)	34 (2)	849 (3)		2613 (3)	130 (3)			42065
Vigna	581 (2)	20 (3)	13649 (3)	5548 (3)	4990 (3)		6481 (3)			650 (2)	95 (1)	9,309 (7)	5889 (2)	203 (3)	446	550	42863
Barley		11 (2)	18132 (3)	8384 (2)	8288 (2)		23421 (3)		5255 (3)		4504 (2)		18296 (3)				77907
Eggplant		0 (1)	1495 (2)	3416 (3)	3030 (3)		2055 (3)	- (7)	23 (1)		339 (2)	767 (10)	250 (3)	305 (1)			8264
Banana		0 (1)		907 (3)	78 (3)	202		250 (2)				389 (4)		30 (1)		103	1052
Coconut		0 (1)		189 (2)	189 (2)	115		48 (3)				352 (3)		222 (1)	52	65	1043
Beans	551	51 (2)		1514 (2)	1514 (2)			- (8)		650		1,221 (14)		222 (1)			4209
Cassava		0 (1)		1635 (2)	1635 (2)	450		120 (5)				253 (9)		20 (2)			2478
Potato		2 (2)	2000 (3)	2644 (3)	1290 (2)		578 (1)		90 (3)		578 (1)		937 (3)				5475
Cowpea		10 (2)		2984 (3)	2939 (3)									321 (2)			3270
Finger Millet	2 (1)	3 (3)		8678 (3)	8064 (3)					877 (3)				293 (2)			9239
Lentil	406	3		2041	2086					489				38			3022

Crop	BG	BH	CN	IN	IN	ID	JP	MS	MO	NP	PK	PH	RK	SL	TH	VM	Total
	(3)	(2)		(2)	(2)					(3)				(3)			
Medicago		0 (2)		28 (1)	28 (1)												28
Chickpea	752 (2)	0 (1)		11802 (3)	11655 (3)					424 (3)				77 (3)			12908
Pearl millet	2 (1)	0 (3)		6744 (3)	6907 (2)					*				4 (3)			6913
Pigeon pea	79 (1)	0 (1)		7118 (3)	6647 (3)					279 (3)				61 (3)			7066
Taro		0 (1)		1100 (1)	1100 (1)			- (9)				283 (13)		25 (2)		400	1808
Strawberry		0 (2)		39 (1)	39 (1)							51 (16)					90
Sweet potato		0 (1)		3061 (2)	3061 (2)	1732		80 (4)				2,442 (5)		50 (2)		530	7895
Yams		0 (2)		1436 (1)	1436 (1)	165		- (6)				683 (6)		30 (2)		210	2524
Breadfruit		0 (1)		-	-			127				438 (12)					565
Apple		0 (3)	703 (3)	205 (1)	205 (1)		2752 (3)		7 (1)		520 (3)	790 (15)	2171 (3)				7148
Lathyrus		0 (1)		2486 (1)	2486 (1)							184 (8)					2670
Citrus		0 (3)	1041 (3)	150 (3)	99 (3)	174	2185 (3)	80				150 (11)	387 (3)	40 (2)		600	4756
Total	**10163**	**377**	**174331**	**204463**	**198316**	**16303**	**123337**	**12175**	**12258**	**7267**	**34501**	**118,639**	**80309**	**6670**	**44423**	**11908**	**850977**

*Information on number of accessions not received

() Figures in parenthesis indicate the importance of crops to the country: 3 = Very important, 2 = Important, 1= Not important

Table 5. Collections of greatest importance and priority for support

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
1	Rice	National Bureau of Plant Genetic Resources (NBPGR), Pusa Campus, New Delhi 110 012, India	73029	▪ One of the largest collections in the world ▪ Unique collections available ▪ Largely characterized ▪ Polyphyletic domestication has resulted in evolution of wide spectrum of genetic diversity	Yes
		Plant Genetic Resources Centres (PGRC), Peradeniya, Sri Lanka	3872	▪ Food security ▪ Major staple food ▪ Rich diversity including wild relatives	Yes
		Agriculture Botany Division National Agriculture Research Institute (NARI), Khumaltar, Kathmandu, Nepal	2963	▪ Food security ▪ Major staple food ▪ Rich diversity including wild relatives	Yes
		Plant Genetic Resources Centre (PGRC), Bangladesh Agriculture Research Institute (BARI), Gazipur, Bangladesh	7000	▪ Major staple food ▪ Rich diversity	Yes
		National Biodiversity Centre (NBC), Thimphu, Bhutan	212	▪ Major staple food ▪ Rich diversity	Yes
		Institute of Crop Science, CAAS, Beijing, China	64084	▪ One of largest collections in the world ▪ Many unique landraces ▪ Wide range coverage ▪ Fully characterized ▪ Wild relatives ▪ Unique characteristics	Yes
		China Rice Research Institute	12000	▪ Represent East part of China ▪ Diversity in landraces ▪ Traits for early maturity	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		National Institute of Agrobiological Science, Tsukuba, Japan	41081	▪ One of largest collections in the world ▪ Many unique landraces ▪ Fully characterized	Yes
		National Institute of Genetics, Shizuoka, Japan	1700	▪ Wild species with great diversity ▪ Special accessions collected by Kihara	
		Pyongyang Crop Genetic Resources Institute, Pyongyang, DPR Korea	12093	▪ Many unique landraces ▪ Cold resistance ▪ Early maturity ▪ Fully characterized	Yes
		National Institute of Agricultural Biotechnology, Suwon, R. Korea	25604	▪ One of largest collections in the region ▪ Many unique landraces ▪ Cold resistance ▪ Fully characterized	Yes
		SE Asia Indonesian Center for Agricultural Biotechnology and Genetic Resources Research Institute Indonesian Institute for Rice Research	10090 2500	▪ Great diversity with several wild sp. (one of the largest collection in the world)	Yes
		MARDI, P.O. BOX 12301, General Post Office, 50774 Kuala Lumpur, Malaysia	11470	▪ High diversity ▪ Contain many land races and wild relatives ▪ Materials and its associated characterization data available and accessible	Yes
		Thailand Dept. of Agriculture	43,732	▪ Largest national collection ▪ Local varieties and represent genetic diversity of the region ▪ Not fully evaluated – 90% of morphological evaluation and partly of biotic and abiotic stress have been done ▪ Molecular characterization data on 10 % of organization collection ▪ Used in on-going breeding programme	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		National Crop Genebank, Plant Genetic Resources Center (PGRC), Vietnam Agricultural Science Institute (VASI)	9000	▪ Endemic crop, Vietnam is in the ▪ Primary diversity centre of Rice (*Oryza*). ▪ Important to be exploited for agriculture development and food security ▪ Existence of rich wild relatives ▪ Largest collection in seed genebank with rich genetic diversity ▪ Collection almost fully characterized ▪ Some ethno botanical research	Yes
		Philippines IRRI-GRC PhilRice, DA Dept. of Agronomy, UPLB-CA Others: CLSU BPI-LGNCRDC, DA CMU SPCP	99,078 90,000 7,594 1,154 235 15 32 48	▪ Secondary center of diversity ▪ Food security (staple) ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
		ICABIOGRAD IIRR MARDI Thailand Dept. of Agriculture Vietnam PGRC VASI IRRI-GRC PhilRice, DA Dept. of Agronomy, UPLB-CA	(74,639) for SEA, need for individual collections	▪ High diversity ▪ Thailand has largest national collection (43,732 acc) ▪ Materials and associated characterization data available and accessible ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
2	Maize	Indonesian Center for Agricultural Biotechnology and Genetic Resources Research Institute	875	▪ Wide diversity	Yes
		Thailand Dept. of Agriculture	193	▪ Includes genetic diversity found in other countries ▪ Used in on-going breeding programme	Some

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Vietnam PGRC and network institutions	450	▪ Vietnam is in the secondary diversity center ▪ Important to be exploited for food security, sustainable agriculture in remote areas and animal feed in intensive areas ▪ Large collection of open pollinization varieties in seed genebank with rich genetic diversity ▪ Collection fully characterized	Yes
		Philippines NPGRL, IPB, UPLB-CA USM Others: CLSU BPI-LGNCRDC, DA	2,248 2,011 210 4 23	▪ Unique diversity ▪ Food security (staple) ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
		National Bureau of Plant Genetic Resources (NBPGR), Pusa Campus, New Delhi 110 012, India	6107	▪ Food security ▪ Use as poultry feed ▪ Baby corn used as vegetable	Yes
		Plant Genetic Resources Centres (PGRC), Peradeniya, Sri Lanka	599	▪ Food security ▪ Use as poultry feed ▪ Baby corn used as vegetable	Yes
		Agriculture Botany Division National Agriculture Research Institute (NARI), Khumaltar, Kathmandu, Nepal	511	▪ Food security ▪ Use as poultry feed ▪ Baby corn used as vegetable	Yes
		Plant Genetic Resources Centre (PGRC), Bangladesh Agriculture Research Institute (BARI), Gazipur, Bangladesh	69	▪ Rich diversity ▪ Mainly used as poultry feed	Yes
		National Biodiversity Centre (NBC), Thimphu, Bhutan	61	▪ Rich diversity ▪ Food security	

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Institute of Crop Science, CAAS, Beijing, China	16939	▪ Largest collection in the region ▪ Fully characterized ▪ Many unique landraces ▪ Wide coverage	Yes
		Yunnan Academy of Agricultural Sciences	500	▪ Unique ▪ Waxy trait	Yes
		National Institute of Agrobiological Science, Tsukuba, Japan	5959	▪ Many unique landraces ▪ Fully characterized ▪ Wide coverage	Yes
		Pyongyang Crop Genetic Resources Institute, Pyongyang, DPR Korea	7168	▪ One of largest collections in the region ▪ Many unique landraces ▪ Early maturity	Yes
		National Institute of Agricultural Biotechnology, Suwon, R. Korea	6943	▪ Many unique landraces ▪ Fully characterized ▪ Early maturity	Yes
		Plant Science and Agricultural Research Institute, Darkhan, Mongolia	84	▪ Rare collection ▪ Many unique landraces ▪ Early maturity ▪ Cold resistance	Yes
		ICERI Thailand Dept. of Agriculture Vietnam PGRC and network institutions NPGRL, IPB, UPLB-CA USM	(3,766) for SEA, need for individual collections	▪ High diversity ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
3	Wheat	National Bureau of Plant Genetic Resources (NBPGR), Pusa Campus, New Delhi 110 012, India	34798	▪ Second major Food crop ▪ Important center of diversity of durum wheat ▪ Major crop improvement programmes in the country	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Agriculture Botany Division National Agriculture Research Institute (NARI), Khumaltar, Kathmandu, Nepal	390	▪ Food security ▪ Major staple food ▪ Rich diversity	No
		Plant Genetic Resources Centre (PGRC), Bangladesh Agriculture Research Institute (BARI), Gazipur, Bangladesh	553	▪ Food security ▪ Major staple food ▪ Rich diversity	
		East Asia Institute of Crop Science, CAAS Beijing, China	40973	▪ One of the largest collections in the world ▪ Represents genetic diversity of the region ▪ Accessions with great diversity including wild species ▪ Fully characterized ▪ Unique traits for variety improvement	Yes
		National Institute of Agrobiological Science, Tsukuba, Japan	33559	▪ One of largest collections in the region ▪ Fully characterized ▪ Unique characteristics	Yes
		3. Pyongyang Crop Genetic Resources Institute, Pyongyang, DPR Korea	8355	▪ Unique collections not presented in other collections ▪ Diversity presenting mountainous environments	Yes
		4. National Institute of Agricultural Biotechnology, Suwon, R. Korea	17219	▪ One of the large collections in the region ▪ Fully characterized	Yes
		5. Plant Science and Agricultural Research Institute, Darkhan, Mongolia	6783	▪ One of the unique collections in the world with traits resistance to cold and drought ▪ Maintaining many primary cultivars collected by Vavilov and his colleagues ▪ Unique wild relatives	Yes
4	Sorghum	South Asia National Bureau of Plant Genetic Resources (NBPGR), Pusa Campus, New Delhi 110 012, India	17673	▪ Food security ▪ Suitable for cultivation as dry-land crop ▪ Dual purpose (food/fodder)	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		ICRISAT, Patancheru, India	36774	▪ Food security ▪ Suitable for cultivation as dry-land crop ▪ Dual purpose (food/fodder)	
		East Asia Institute of Crop Science, CAAS, Beijing, China	15315	▪ Largest collection in the region ▪ Fully characterized ▪ Accessions with great diversity ▪ Many unique landraces	Yes
		National Institute of Agrobiological Science, Tsukuba, Japan	5266	▪ Many unique landraces ▪ Fully characterized ▪ Accessions with great diversity	Yes
		Pyongyang Crop Genetic Resources Institute, Pyongyang, DPR Korea	849	▪ Many unique landraces ▪ Accessions with great diversity	Yes
		National Institute of Agricultural Biotechnology, Suwon, R. Korea	2613	▪ Many unique landraces ▪ Fully characterized ▪ Accessions with great diversity	Yes
5	Citrus	East Asia Institute of Citrus of CAAS, Chongqing, China	1041	▪ Unique collection in the region ▪ Fully characterized ▪ Wide coverage ▪ Accessions with great diversity including wild species ▪ Many unique landraces	Yes
		National Institute of Fruit Tree Science, Tsukuba, Japan	2185	▪ Largest collection in the region ▪ Wide coverage ▪ Accessions with great diversity	Yes
		National Institute of Horticulture, Suwon, R. Korea	387	▪ Unique collection in the region ▪ Accessions with unique traits such as cold resistance	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		University Malaya, Malaysia	160	▪ Unique collection in the region ▪ Accessions with unique traits such as cold resistance	
		MARDI, P.O. BOX 12301, General Post Office, 50774 Kuala Lumpur, Malaysia	80	▪ Highly diverse ▪ Contain many land races and wild relatives ▪ Materials and some characterization data available and will be made accessible ▪ Indigenous	Yes
		PGRC and network institutions of the national PGR system, Vietnam	600	▪ Primary diversity center of Mandarin, Citrus nobilis, Grape Pomelo, Lemon ▪ Important to be exploited for agriculture development, poverty alleviation and export ▪ wild relatives ▪ Large collections in field genebank with rich genetic diversity ▪ Collections require duplication	Yes
		Citrus and Sub-tropic Horticulture Research Station, Indonesia	174	▪ Collection unique	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		DA-STIARC (LAES) DMMMSU BPI-BNCRDC, DA Others: DA-EVIARC BPI-LGNCRDC, DA CLSU SPCP BPI-DNCRDC, DA BPI-Iloilo ERDB USM MMSU NPGRL, IPB, UPLB-CA	184 30 20 70 4 2 4 2 20 2 2 17 2 9	▪ Secondary center of diversity ▪ Food security ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
		National Research Centre on *Citrus*	150	▪ One of the centre of diversity ▪ Wild spp./populations under threat	
6	*Vigna*	National Crop Genebank (PGRC), Vietnam	550	▪ Primary diversity center of Vigna umbellata and secondary diversity center of other Vigna species ▪ Important to be exploited for sustainable agriculture and food security ▪ Many wild relatives ▪ Large collections in seed genebank with rich genetic diversity ▪ Collection almost fully characterized	Yes
		Department of Agriculture, Thailand	446	▪ Includes genetic diversity found in other countries ▪ Used in on-going breeding programme	Some

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Philippines NPGRL, IPB, UPLB-CA BPI-LBNCRDC, DA BPI-LGNCRDC, DA Others: CLSU CMU	9,309 8,924 351 17 9 8	▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
		East Asia Institute of Crop Science of CAAS, Beijing, China	13649	▪ Largest collection in the region ▪ Accessions with diversity including wild species ▪ Wide coverage ▪ Fully characterized ▪ Many unique landraces	Yes
		National Institute of Agrobiological Science, Tsukuba, Japan	6481	▪ Accessions with great diversity including wild species ▪ Fully characterized ▪ Many unique landraces	Yes
		National Institute of Agricultural Biotechnology, Suwon, R. Korea	5889	▪ Accessions with great diversity including wild species ▪ Many unique landraces	Yes
7	Barley	Eat Asia Institute of Crop Science, CAAS, Beijing, China	18132	▪ Unique collection in the world ▪ Accessions with great diversity including wild relatives ▪ Wide coverage ▪ Many unique landraces ▪ Unique traits such as cold resistance and drought tolerance ▪ Fully characterized	Yes
		Qinghai Academy of Agricultural Sciences, Xining, China	2000	▪ Unique ▪ Traits for resistance to cold	Yes
		Tibet Academy of Agricultural and Animal Sciences, Tibet, China	2000	▪ Traits resistance to extreme environment ▪ Unique ▪ Diversity centre	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		National Institute of Agrobiological Science, Tsukuba, Japan	23471	▪ Largest collection in the region ▪ Wide coverage ▪ Many unique landraces ▪ Fully characterized ▪ Accessions with great diversity	Yes
		Pyongyang Crop Genetic Resources Institute, Pyongyang, DPR Korea	4504	▪ Many unique landraces ▪ Accessions with great diversity ▪ Unique traits for cold resistance and drought tolerance	Yes
		National Institute of Agricultural Biotechnology, Suwon, R. Korea	18296	▪ Many unique landraces ▪ Fully characterized ▪ Accessions with great diversity	Yes
		Research Institute of Agriculture and Plant Science, Darkhan, Mongolia	5255	▪ Unique collection in the region ▪ Unique traits such as cold resistance and drought tolerance ▪ Accessions with great diversity	Yes
		National Bureau of Plant Genetic Resources (NBPGR), Pusa Campus, New Delhi 110 012, India	8384	▪ Unique collection of the region ▪ Unique collection from Himalayan region	
8	Eggplant	Indonesian Vegetable Research Institute		▪ Collection with wild spp.	Yes
		NPGRL, IPB, UPLB-CA Others: BPI-LBNCRDC, DA CLSU BPI-LGNCRDC, DA	767 722 32 12 1	▪ Food security ▪ Secondary center of diversity ▪ Biggest area ▪ Most important vegetable ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
		Vegetables and Flower Research Institute of CAAS, Beijing, China	1495	▪ Unique collection ▪ Accession with great diversity	

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		National Institute of Crop Sciences, Tsukuba, Japan	2055	▪ Unique ▪ Diversity	
		National Institute of Agricultural Biotechnology, Suwon, R. Korea	250	▪ Unique ▪ Accession with great diversity	
		Malaysia MARDI	100 APPROX	▪ Land races	Yes
		National Bureau of Plant Genetic Resources (NBPGR), Pusa Campus, New Delhi 110 012, India	3416	▪ Primary centre of diversity ▪ Represents great spectrum of genetic diversity	
9	Banana	NRCB, Trichur	901	▪ Large collection ▪ Unique accessions ▪ Supports major breeding programme;	
		DPI&F, Australia	Not known	▪ A major collection and provides quarantine and technical backstopping services to the region	
		China	350	▪ A major collection ▪ Some unique accessions	
		Indonesian Fruit Research Institute, Indonesia	202	▪ High diversity ▪ Materials and associated characterization data available and accessible ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	
		MARDI , Malaysia	250	▪ High diversity ▪ Materials and associated characterization data available and accessible ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Philippines NPGRL, IPB, UPLB-CA BPI-DNCRDC, DA Others: BSU CLSU CMU RMTU SPCP BPI-BNCRDC, DA	389 188 129 25 10 2 17 3 15	▪ Food security ▪ Income generation (export) ▪ Agricultural development (livelihood) ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement ▪ Important national collection ▪ Primary center of diversity ▪ Provides support to long-term conservation of the Musa gene pool by carrying out field verification of accessions from the global collection at the ITC, in Belgium;	Yes
		Vietnam PGRC and network institutions	103	▪ High diversity ▪ Materials and associated characterization data available and accessible ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	
		IFRURI MARDI Vietnam PGRC and network institutions BPI-DNCRDC NPGRL, IPB, UPLB-CA	(975) for SEA, need for individual collections	▪ High diversity ▪ Materials and associated characterization data available and accessible ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
		National Research Centre for Banana, Tiruchirapalli – 620 017	907	▪ Important fruit crop ▪ Appreciable genetic diversity	
10	Coconut4	BARI, Gazipur, Bangladesh	40	▪ Nationally important diversity	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Coconut Research Institute, Lunuwila, Sri Lanka	78	▪ Nationally important diversity ▪ Unique types ▪ Wind-tolerant accessions	Yes
		CPCRI, Kasaragod, India5	212	▪ Regionally important diversity ▪ One of the largest collection ▪ Unique diversity	Yes
		SE Asia MARDI, P.O. BOX 12301, General Post Office, 50774 Kuala Lumpur, Malaysia	48	▪ Highly diverse ▪ Contain many land races and wild relatives ▪ Materials and its associated characterization data available and will be made accessible	Yes
		Bone Bone Experimental Garden, Manado6, S. Sulawesi, Indonesia	41	▪ Nationally important diversity ▪ Unique types	Yes
		Mapanget Experimental Garden, Manado, N. Sulawesi, Indonesia	74	▪ Nationally important diversity ▪ Unique types	Yes
		PCA, DA Dept. of Horticulture, UPLB-CA NCRC, LSU Others: SPCP ERDB BPI-LGNCRDC, DA	352 256 50 41 3 1 1	▪ Primary center of diversity ▪ Income generation (export, industrial) ▪ Agricultural development (livelihood) ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement ▪ Regionally important diversity ▪ One of the largest collections	Yes
		Chumphon Horticultural Research Centre, Chumphon, Thailand	52	▪ Nationally important diversity ▪ Unique types	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Dong Go Experimental Center, Ho Chi Min City, Vietnam PGRC and network institutions of the National PGR System	65	▪ primary diversity center ▪ Important to be exploited as cash crop for agriculture development, poverty alleviation and export ▪ Large collections in field genebank with rich genetic diversity ▪ Collections required duplication (include cryo preservation) ▪ Cold-tolerant accessions	Yes
	(see above)	ICOPRI MARDI Vietnam PGRC and network institutions PCA, DA Dept. of Horticulture, UPLB-CA NCRC, LSU	(367) for SEA, need for individual collections see	▪ High diversity ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
11	Apple	East Asia Institute of Pomology of CAAS, Xincheng, Hebei, China	703	▪ Accession with great diversity including wild species ▪ Wide coverage ▪ Fully characterized ▪ Many unique landraces ▪ Resistance to cold	Yes
		National Institute of Fruit Tree Science, Tsukuba, Japan	2752	▪ One of the largest collections in the world ▪ Fully characterized ▪ Many unique landraces	Yes
		Institute of Pomology of Academy of Agricultural Sciences, DPR Korea	520	▪ Accessions with cold resistance ▪ Many unique landraces ▪ Accessions not presented in other collections in the region	Yes
		Fruit Tree Research Institute, RDA, Suwon	2171	▪ One of the largest collections in the region ▪ Accessions with cold resistance ▪ Fully characterized	Yes
		Plant Science and Agricultural Research Institute, Darkhan, Mongolia	50	▪ Crab trait ▪ Resistance to cold	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
12	Beans (*Phaseolus*)	Agriculture Botany Division National Agriculture Research Institute (NARI), Khumaltar, Kathmandu, Nepal	650	▪ Food security ▪ Rich diversity ▪ Income generation	Yes
		Plant Genetic Resources Centre (PGRC), Bangladesh Agriculture Research Institute (BARI), Gazipur, Bangladesh	551	▪ Major vegetable ▪ Wide variability ▪ Found in almost all homesteads	Yes
		Philippines NPGRL, IPB, UPLB-CA BPI-LBNCRDC, DA Others: BPI-BNCRDC, DA CLSU MMSU	1,221 1,218 1 1 1	▪ Food security ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
13	Cassava	MARDI, P.O. BOX 12301, General Post Office, 50774 Kuala Lumpur, Malaysia	200	▪ Highly diverse ▪ Contain many land races and wild relatives ▪ Materials and its associated characterization data available and will be made accessible ▪ Under threat	Yes
		Indonesian Center for Agricultural Biotechnology and Genetic Resources Research Institute	450	▪ Wide diversity	
		Philippines NPGRL, IPB, UPLB-CA PRCRTC, LSU Others: ERDB BPI-LGNCRDC, DA ISU	253 64 179 1 3 6	▪ Agricultural development (livelihood) ▪ Income generation (industrial) ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
14	Chickpea	National Bureau of Plant Genetic Resources, New Delhi (base collection)	11820	▪ Major pulse crop ▪ Used as animal feed	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Indian Institute of Pulses Research (IIPR), Kanpur, India (working collection)	1090	▪ Major pulse crop ▪ Used as animal feed	Yes
		ICRISAT, Patancheru, India	17258	▪ Major pulse crop ▪ Used as animal feed	Yes
15	Cowpea				
16	Finger millet	National Bureau of Plant Genetic Resources (NBPGR), Pusa Campus, New Delhi 110 012, India	9182	▪ Food security ▪ Suitable for marginal lands ▪ Low input requirement ▪ High protein and other nutrients	Yes
		ICRISAT, Patancheru, India	5949	▪ Food security ▪ Suitable for marginal lands ▪ Low input requirement ▪ High protein and other nutrients	Yes
		Plant Genetic Resources Centres (PGRC), Peradeniya, Sri Lanka	293	▪ Food security ▪ Suitable for marginal lands ▪ Low input requirement	
17	Lentil	National Bureau of Plant Genetic Resources, New Delhi (base collection)	2041	▪ Important winter season pulse crop ▪ Rich diversity	Yes
		Indian Institute of Pulses Research (IIPR), Kanpur, India (working collection)	248	▪ Important winter season pulse crop ▪ Rich diversity	Yes
18	Medicago	East Asia Institute of Crop Science of CAAS, Beijing, China	558	▪ Wide coverage ▪ Accessions with unique traits such as drought tolerance and cold resistance	Yes
		National Institute of Agrobiological Sciences, Tsukuba, Japan	1468	▪ Largest collection in the region ▪ Wide coverage	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Institute of Animal Husbandry, Ulaanbaatar, Mongolia	272	▪ Unique collection ▪ Accessions with unique traits such as cold resistance and drought tolerance ▪ Accessions with great diversity including wild relatives	Yes
19	Pearl millet	ICRISAT, Patancheru, India	21594	▪ Dry land crop ▪ Dual purpose (food/fodder) ▪ Rich diversity	Yes
20	Potato	Keshan Agricultural Institute, Heilongjiang, China	2000	▪ Cold resistance ▪ Unique	
		Central Potato Research Institute, Shimla – 171 001	2644	▪ Important vegetable crop ▪ Include utilisation of wild species	
		Japan	2613	▪ Unique	
		Plant Science and Agricultural Research Institute, Darkhan, Mongolia	90	▪ Unique ▪ Cold resistance	
		Pyongyang Crop Genetic Resources Institute, DPR Korea	578	▪ Unique ▪ Tolerance to environmental stresses	
		National Institute of Highland Agriculture, R. Korea	1082	▪ Unique ▪ Diversity	
		Philippines NPGRL, IPB, UPLB-CA NPRCRTC, BSU Others: ISU BPI-BNCRDC, DA	150 125 23 1 1	▪ Food security ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
21	Pigeonpea	National Bureau of Plant Genetic Resources, New Delhi (base collection)	7906	▪ Major pulse crop ▪ Wide variability available	Yes
		Indian Institute of Pulses Research (IIPR), Kanpur, India (working collection)	865	▪ Major pulse crop ▪ Wide variability available	

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		ICRISAT, Patancheru, India	13632	▪ Major pulse crop ▪ Wide variability available	
22	Taro (*Colocasia*)	Vietnam National Crop Genebank (PGRC)	400	▪ Endemic crop, Vietnam is in the primary diversity centre ▪ Important to be exploited for sustainable agriculture and food security ▪ Existence of rich wild relatives ▪ Large collections in field genebank with rich genetic diversity ▪ Collection almost fully characterized ▪ Duplication of collection (in-vitro conservation) required ▪ Some ethno botanical research completed	??
		Philippines NPGRL, IPB, UPLB-CA PRCRTC, LSU NPRCRTC, BSU ISU Others: BPI-LGNCRDC, DA	283 99 175 4 4 1	▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
23	Strawberry	Philippines BPI-BNCRDC, DA BSU	51 19 32	▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
24	Sweetpotato	ICABIOGRAD RIR ILETRI MARDI UPM Vietnam PGRC NPGRL, IPB, UPLB-CA PRCRTC, LSU NPRCRTC, BSU	(3,884) for SEA, need for individual collections	▪ High diversity ▪ Large collections in field genebanks ▪ Collections require full characterization ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Vietnam National Crop Genebank (PGRC)	530	▪ Vietnam is in the secondary diversity centre ▪ Important to be exploited for sustainable agriculture, animal feed and food security ▪ Large collection in field genebank with rich genetic diversity ▪ Collection fully characterized ▪ Duplication of collection (in-vitro conservation) required ▪ Some ethno botanical research completed	Yes
		MARDI, P.O. BOX 12301, General Post Office, 50774 Kuala Lumpur, Malaysia UPM, Serdang, Selangor Malaysia	80	▪ Highly diverse ▪ Contain many land races and wild relatives ▪ Materials and its associated characterization data available and will be made accessible in the future	Yes
		Indonesian Center for Agricultural Biotechnology and Genetic Resources Research Institute (RIR, ILETRI)	1732	▪ High genetic diversity	Yes
		Philippines NPGRL, IPB, UPLB-CA PRCRTC, LSU NPRCRTC, BSU Others: BPI-BNCRDC, DA CLSU ERDB BPI-LGNCRDC, DA BPI-LBNCRDC, DA ISU	2,442 450 920 961 1 2 1 38 53 16	▪ Secondary center of diversity ▪ Food security ▪ Income generation (feeds) ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
25	Yams	Indonesian Center for Agricultural Biotechnology and Genetic Resources Research Institute	165	▪ Collection with wild sp.	Yes
		Malaysia UPM	>200Approx	▪ Land races	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
		Philippines NPGRL, IPB, UPLB-CA PRCRTC, LSU NPRCRTC, BSU Others: DMMMSU ISU LSU	683 164 378 113 2 2 24	▪ Food security ▪ Income generation (export, industrial) ▪ Vulnerability of *ex situ* collection due to threat of genetic erosion ▪ Comparative advantage and importance of collection ▪ Need for utilization and crop improvement	Yes
		Vietnam National Crop Genebank (PGRC)	210	▪ Primary diversity center of Colocasia esculenta ▪ Important to be exploited for sustainable agriculture and food security in ecologically adverse areas ▪ Existence of rich wild relatives ▪ Large collections in field genebank with rich genetic diversity ▪ Collection almost fully characterized ▪ Duplication of collection (in vitro conservation) required ▪ Some ethnobotanical research completed	Yes
26	Breadfruit	MARDI, P.O. BOX 12301, General Post Office, 50774 Kuala Lumpur, Malaysia	127	▪ Indigenous and Highly diverse ▪ Contain many land races and wild relatives ▪ Materials and limited characterization data available and will be made accessible	Yes
		Philippines BPI-BNCRDC, DA SPCP BPI-Iloilo ERDB BPI-LGNCRDC, DA QSC DA-EVIARC DA-STIARC (LAES) NPGRL, IPB, UPLB-CA	59 2 3 4 3 6 2 16 1 22	▪ Secondary center of diversity ▪ Not a priority	Yes

No.	Crop/ Species	Current holders	Number of accessions	Priority	Accession passport data available
	Brassica	Philippines NPGRL, IPB, UPLB-CA BPI-LBNCRDC, DA Others: BPI-BNCRDC, DA	438 392 41 5	▪ Secondary center of diversity ▪ Food security	Yes
	Peas	Philippines NPGRL, IPB, UPLB-CA Others: BPI-BNCRDC, DA	790 789 1	▪ Food security	Yes

Table 6. Crop-wise responsibilities for ensuring effective conservation of priority collections in different countries

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
India	Rice	National Bureau of Plant Genetic Resources (NBPGR), New Delhi	Central Rice Research Institute (CRRI), Cuttack, Orissa	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Conservation
			IRRI, the Philippines	▪ Safety duplication
	Maize	NBPGR, New Delhi	Directorate of Maize Research (DMR), New Delhi	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Conservation
	Wheat	NBPGR, New Delhi	Directorate of Wheat Research (DWR), Karnal, Haryana	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Conservation
	Sorghum	ICRISAT, Patancheru, A.P.	National Research Centre (NPC) Sorghum, Hyderabad, A.P.	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Conservation ▪ Evaluation of core collection and trait specific germplasm (ICRISAT)

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
	Finger millet	NBPGR, New Delhi	ICRISAT, Patancheru, A.P.	▪ Conservation ▪ Evaluation of core collection and trait specific germplasm (ICRISAT) ▪ Safety duplication (ICRISAT)
		ICRISAT, Patancheru, A.P.	AICRP (Small Millets), UAS, Bangalore, Karnataka	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Evaluation of core collection and trait specific germplasm (ICRISAT)
	Lentil	NBPGR, New Delhi	Indian Institute of Pulses Research (IIPR), Kanpur, U.P.	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Conservation
	Chickpea	ICRISAT, Patancheru, A.P.	IIPR, Kanpur, U.P.	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Safety duplication ▪ Evaluation of core collection and trait specific germplasm (ICRISAT)
	Pigeonpea	ICRISAT, Patancheru, A.P.	IIPR, Kanpur, U.P.	▪ Characterization, evaluation and documentation ▪ Regeneration ▪ Evaluation of core collection and trait specific germplasm (ICRISAT) ▪ Safety duplication (ICRISAT)
	Pearl Millet	ICRISAT, Patancheru, A.P.	AICRP (Pearl Millet), Jodhpur, Rajasthan	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Conservation ▪ Evaluation of core collection and trait specific germplasm (ICRISAT)
	Vigna	NBPGR, New Delhi	IIPR, Kanpur, U.P.	▪ Conservation of active collections
	Egg plant	NBPGR, New Delhi	IIVR, Varanasi, U.P.	▪ Conservation of active collections Regeneration
	Citrus	NRC on *Citrus,* Nagpur		▪ Conservation of active collections, characterisation, evaluation and use
Sri Lanka	Rice	Plant Genetic Resources Centre (PGRC), Peradeniya	Rice Research and Development Institute, Batalgoda	▪ Regeneration ▪ Characterization, evaluation and documentation ▪ Conservation
			IRRI, the Philippines	▪ Safety duplication

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
	Finger Millet	PGRC, Peradeniya	Field Crop Research and Development Institute, Mahailluppallama	▪ Characterization, evaluation and documentation ▪ Regeneration ▪ Conservation
		ICRISAT, Patancheru, A.P.		▪ Safety duplication
	Beans	PGRC, Peradeniya	Horticulture Research and Development Institute, Peradeniya	▪ Characterization, evaluation and documentation ▪ Regeneration ▪ Conservation
		ICARDA, Syria		▪ Safety duplication
Nepal	Rice	Agriculture Botany Division, NARI, Khumaltar		▪ Characterization, evaluation and documentation ▪ Conservation
		IRRI, Philippines		▪ Safety duplication
	Maize	Agriculture Botany Division, NARI, Khumaltar		▪ Characterization, evaluation and documentation ▪ Conservation
	Wheat	Agriculture Botany Division, NARI, Khumaltar		▪ Characterization, evaluation and documentation ▪ Conservation
	Finger Millet	Agriculture Botany Division, NARI, Khumaltar		▪ Characterization, evaluation and documentation ▪ Conservation
		ICRISAT, Patancheru		▪ Safety duplication
	Beans	Agriculture Botany Division, NARI, Khumaltar		▪ Characterization, evaluation and documentation ▪ Conservation
		ICARDA, Syria		▪ Safety duplication
Bhutan	Rice	National Biodiversity Centre (NBC), Thimphu		▪ Characterization, evaluation and documentation ▪ Conservation
		IRRI, the Philippines		▪ Safety duplication
	Maize	NBC, Thimphu	4 Research Centres	▪ Inventorization ▪ Germplasm collecting ▪ Characterization

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
Bangladesh	Rice	Plant Genetic Resources Centre (PGRC), BARI, Gazipur	Bangladesh Rice Research Institute (BRRI)	▪ Characterization, evaluation and documentation ▪ Regeneration ▪ Conservation
		IRRI, the Philippines		▪ Safety duplication
	Maize	PGRC, BARI, Gazipur		▪ Characterization, evaluation and documentation ▪ Regeneration ▪ Conservation
	Wheat	PGRC, BARI, Gazipur		▪ Characterization, evaluation and documentation ▪ Regeneration ▪ Conservation
	Beans	PGRC, BARI, Gazipur		▪ Characterization, evaluation and documentation ▪ Regeneration ▪ Conservation
		ICARDA, Syria		▪ Safety duplication
China	Wheat	ICS-CAAS	CRIR-CAAS	▪ Regeneration, ▪ characterization and documentation
	Rice	ICS-CAAS		
	Maize	ICS-CAAS		
	Apple	XIP-CAAS		
	Vigna	ICS-CAAS		
	Medicago	ICS-CAAS	GRI-CAAS	▪ Regeneration, ▪ characterization and documentation
	Citrus	CRI-CAAS		
	Barley	ICS-CAAS		
	Sorghum	ICS-CAAS	SRI-LAAS	▪ Regeneration, ▪ characterization and documentation
Japan	Wheat	NIAS		

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
	Rice	NIAS		
	Maize	NIAS		
	Apple	NIFTS		
	Vigna	NIAS		
	Medicago	NIAS		
	Citrus	NIFTS		
	Barley	NIAS		
	Sorghum	NIAS		
DPR Korea	Wheat	PCGRI		
	Rice	PCGRI	IRR	▪ Regeneration, ▪ characterization and documentation
	Maize	PCGRI	MRI	▪ Regeneration, ▪ characterization and documentation
	Apple	IP-AAS		
	Barley	PCGRI		
	Sorghum	PCGRI		
R. Korea	Wheat	NIAB-RDA		
	Rice	NIAB-RDA	ICS-RDA	▪ Regeneration, ▪ characterization and documentation
	Maize	NIAB- RDA	NICS	▪ Regeneration, ▪ characterization and documentation
	Apple	NHRI-RDA		
	Vigna	NIAB-RDA		
	Citrus	NHRI-RDA		
	Barley	NIAB-RDA		

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
	Sorghum	NIAB-RDA		
Mongolia	Wheat	PSARI	URRB	▪ Regeneration, ▪ characterization and documentation
	Maize	PSARI		
	Medicago	RIAH	PSARI	▪ Conservation, characterization and documentation
	Barley	PSARI		
Vietnam	Rice	National Crop Genebank, Plant Genetic Resources Center (PGRC), Vietnam Agricultural Science Institute (VASI)		9,000 accessions
	Citrus	PGRC and network institutions of the national PGR system		600 accessions
	Banana	PGRC and network institutions of the National PGR System		86 accessions
	Vigna	National Crop Genebank (PGRC)		550 accessions
	Taro (*Colocasia esculenta)*	National Crop Genebank (PGRC)		400 accessions
	Coconut	PGRC and network institutions of the National PGR System		65 accessions
	Sweet potato	National Crop Genebank (PGRC)		530 accessions
	Maize	PGRC and network institutions of the National PGR System		450 accessions
	Yam	National Crop Genebank (PGRC)		210 accessions
Thailand	Rice	Department of Agriculture		(43,732 accessions)
	Maize	Department of Agriculture		193 accs.
	Black gram	Department of Agriculture		446 accs.
	Bean	Department of Agriculture		86 accs.

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
	Maize	Department of Agriculture		
Indonesia	Rice	ICABIOGRRAD	IIRR	*O. Sativa* :10000 accs. and wild rice 90 accs. and IIRR 2500 accs. (Duplicate sample)
	Maize	ICABIOGRRAD		875 accessions
	Cassava	ICABIOGRRAD		450 accessions
	Sweet Potato	ICABIOGRRAD		1732 accessions
	Banana	IFRURI		*O. Sativa* :10000 accs. and wild rice 90 accs. and IIRR 2500 accs. (Duplicate sample)
	Coconut	ICOPRI		(875 accs.)
	Cytrus	CITROPHRES		(450 accs.)
	Beans	ICABIOGRRAD		(3258 accs.)
	Yams	ICABIOGRRAD		(190 accs.)
	Eggplant	IVRI		
Malaysia	Rice	MARDI, P.O. BOX 12301, General Post Office, 50774 Kuala Lumpur, Malaysia		(11,470 accessions)
	Sweet potato	MARDI, 2. Dean of Agric Faculty UPM, Serdang, Selangor Malaysia		(80 Accessions)
	Cassava	MARDI,		(120 Accessions)
	Coconut	MARDI,		(48 Accessions)
	Banana	MARDI,		450 Accessions)
	Citrus	MARDI,	University of Malaya	(80 Accessions)
	Breadfruit	MARDI,		(127 Accessions) Cempedak dan nangka
Philippines	Rice	PhilRice, DA IRRI, GRC Dept. of Agronomy, UPLB-CA	PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
	Banana	BPI-DNCRDC, DA NPGRL, IPB, UPLB-CA	INIBAP	▪ Coordinates a global research report on Musa ▪ Promotes and strengthens research collaboration in national and global levels ▪ Facilitates BAPNET activities on germplasm, management, information development and exchange, banana resource development, and strategic planning ▪ Upgrades capabilities of scientists/ researchers and banana growers on production and utilization ▪ Conducts cultivar selection
			BAPNET	▪ Enhances regional collaboration on germplasm management, information development and exchange banana resource development, and strategic planning
			SABGRC	▪ Retrieves and collects all banana cultivars within SEA region
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Sweetpotato	NPGRL, IPB, UPLB-CA PRCRTC, LSU NPRCRTC, BSU	CIP	▪ Supports germplasm conservation at national and global levels by monitoring duplicate collections, supplying clones as potential parent materials for national breeding, and by providing training and expertise support in germplasm characterization; currently developing a global strategy for sweetpotato
			ANSWER	▪ Employs various strategies (*ex situ*, in vitro, cryopreservation, etc.) for the conservation of sweetpotato genetic resources ▪ Initiated capacity building among member-countries regarding maintained, characterization, elevation, and documentation of their respective sweetpotato genetic resources
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Coconut	PCA, DA Dept. of Horticulture, UPLB-CA NCRC, CLSU	Bioversity International-COGENT	▪ With listing of coconut accessories of SEA through the CGRD ▪ Currently developing a regional and global strategy for coconut
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Maize	NPGRL, IPB, UPLB-CA USM	CIMMYT	▪ Collects and conserves maize genetic resources, including wild relatives, cytogenetic stocks and genetic populations, and molecular materials ▪ Characterizes genetic resources to identify useful diversity for dissemination to breeders and researchers ▪ Assembles, manages, and makes available to diverse partners information on maize genetic resources, in particular linking data from genomics research to pedigrees, trial results, and agronomic and socio-economic data ▪ Assesses the economic value of genetic resources and analyses policies relating to genetic resources and diversity
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Citrus	DA-STIARC DMMMSU BPI-BNCRDC, DA	PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Vigna	NPGRL, IPB, UPLB-CA BPI-LBNCRDC, DA BPI-LGNCRDC, DA	AVRDC	▪ Exchanges genetic resources and expertise among national programs, regional organizations, and the private sector ▪ Collects, characterizes, evaluates, and conserves vegetable germplasm in cooperation with national partners ▪ Enhances plant genetic resources management skills through trainings ▪ Maintains the web-based AVRDC Vegetable Genetic Resources Information System (AVGRIS) which manages the data of all vegetable germplasm conserved at AVRDC's Genetic Resources and Seed Unit (GRSU)
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
	Eggplant	NPGRL, IPB, UPLB-CA	AVRDC	▪ Exchanges genetic resources and expertise among national programs, regional organizations, and the private sector ▪ Collects, characterizes, evaluates, and conserves vegetable germplasm in cooperation with national partners ▪ Enhances plant genetic resources management skills through trainings ▪ Maintains the web-based AVRDC Vegetable Genetic Resources Information System (AVGRIS) which manages the data of all vegetable germplasm conserved at AVRDC's Genetic Resources and Seed Unit (GRSU)
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Cassava	NPGRL, IPB, UPLB-CA PRCRTC, LSU	CIAT	▪ Operates a large, state-of-the-art Genetic Resources Unit (GRU) that safeguards the genetic diversity of cassava and its wild relatives through *in situ* and *ex situ* conservation ▪ Conducts researches to improve conservation methods including ways to minimize risks to the collection ▪ Screens germplasm for disease and certification ▪ Duplicates materials in the collection ▪ Collects/acquires novel materials ▪ Maintains database on passport, characterization and evaluation of accessions in the collection ▪ Conducts training courses ▪ Distributes genetic materials of accessions free of charge, upon request, to farmers, researchers, extension agencies, universities, and biodiversity institutes with a clearly articulated need ▪ Provides advice, expertise, and training in genetic conservation as a support to national research programs in the region
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
	Yams	NPGRL, IPB, UPLB-CA PRCRTC, LSU NPRCRTC, BSU LSU	PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Taro	NPGRL, IPB, UPLB-CA PRCRTC, LSU NPRCRTC, BSU ISU	PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Breadfruit	None (*in situ* collection only)	PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Beans	NPGRL, IPB, UPLB-CA BPI-LBNCRDC, DA	CIAT	▪ Operates a large, state-of-the-art Genetic Resources Unit (GRU) that safeguards the genetic diversity of beans and its wild relatives through *in situ* and *ex situ* conservation ▪ Conducts researches to improve conservation methods including ways to minimize risks to the collection ▪ Screens germplasm for disease and certification ▪ Duplicates materials in the collection ▪ Collects/acquires novel materials ▪ Maintains database on passport, characterization and evaluation of accessions in the collection ▪ Conducts training courses ▪ Distributes genetic materials of accessions free of charge, upon request, to farmers, researchers, extension agencies, universities, and biodiversity institutes with a clearly articulated need ▪ Provides advice, expertise, and training in genetic conservation as a support to national research programs in the region
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR

Country	Crop	Main institute responsible for conservation	Other institutions providing services	Service role by other institutes
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Brassica	NPGRL, IPB, UPLB-CA BPI-LBNCRDC, DA	AVRDC	▪ Exchanges genetic resources and expertise among national programs, regional organizations, and the private sector ▪ Collects, characterizes, evaluates, and conserves vegetable germplasm in cooperation with national partners ▪ Enhances plant genetic resources management skills through trainings ▪ Maintains the web-based AVRDC Vegetable Genetic Resources Information System (AVGRIS) which manages the data of all vegetable germplasm conserved at AVRDC's Genetic Resources and Seed Unit (GRSU)
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Potato	NPGRL, IPB, UPLB-CA NPRCRTC, BSU	CIP	▪ Safeguards potato genetic resources ▪ Strengthens its use of information and training to upgrade national program capabilities ▪ Aims to create a network in which responsibilities for preservation, documentation, and distribution of genetic materials are broadly shared
			PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Peas	NPGRL, IPB, UPLB-CA	PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines
	Strawberry	BPI-BNCRDC, DA BSU	PCARRD, DOST	▪ Coordinates and monitors the PGR collaborative activities in the Philippines ▪ Directly liaises with RECSEA-PGR
			BAR, DA	▪ Coordinates and monitors the PGR collaborative activities in the Philippines

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List of Acronyms

AARD	Agency for Agricultural Research and Development
ADG	Assistant Director General
AIAT	Assessment Institute for Agricultural Technology
ANSWER	Asian Network for Sweetpotato Genetic Resources
APAFRI	Asia Pacific Association of Forestry Research Institutions
APAARI	Asia Pacific Association of Agricultural Research Institutions
ASEAN	Association of Southeast Asian Nations
AVRDC	Asian Vegetable Research and Development Center
BAPNET	Banana Asia Pacific Network
BARI	Bangladesh Agricultural Research Institute, Bangladesh
CAAS	Chinese Academy of Agricultural Sciences
CGRD	Coconut Genetic Resources Database
CIP	International Potato Center
CLAN	Cereals and Legumes Asia Network
COGENT	Coconut Genetic Resources Network
DOA (Thai)	Department of Agriculture, Thailand
EAPGR	East Asia Plant Genetic Resources Network
FAO-RAP	Food and Agriculture Organization-Regional Office for the Asia the Pacific
GMS	Genebank management software
IARC	International Agricultural Research Center
IATADI	Indonesian Agriculture Technology Assessment and Development Institute
ICGR	Institute of Crop Germplasm Resources
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
INGER	International Network for Genetic Evaluation of Rice
INIBAP	International Network for the Improvement of Banana and Plantain
IRRI	International Rice Research Institute
IRRI-GRC	International Rice Research Institute - Genetic Resources Center
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
ICABIOGRAD	Indonesian Center for Agricultural Biotechnology and Genetic Resources Research and Development
Bioversity-APO	Bioversity International- Asia, Pacific and Oceania
IWETRI	Indonesian Wetlands Research Institute
MARDI	Malaysian Agricultural Research and Development Institute
NARES	National Agricultural Research and Extension Systems
NBPGR	National Bureau of Plant Genetic Resources
NIAB	National Institute of Agrobiological Sciences, Japan
NIAS	National Institute for Agrobiological Science
NPGRL	National Plant Genetic Resources Laboratory
PCARRD	Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
PGR	Plant Genetic Resources
PGRC	Plant Genetic Resources Centres
PNG	Papua New Guinea
PSARI P	Plant Sciences and Agricultural Research Institute

RDA	Rural Development Authority, Republic of Korea
RECSEA-PGR	Regional Cooperation for Southeast Asia on Plant Genetic Resources
SAARC	South Asia Association for Regional Cooperation
SABGRC	Southeast Asia Banana Germplasm Resources Center
SANPGR	South Asia Network on Plant Genetic Resources
SAVERNET	South Asian Vegetable Research Network
SC	Steering Committee
SPTN-HPS	World Food Day Farmers and Fisherfolks Movement (Indonesian)
SSEEA	South, Southeast and East Asia Region
TaroGen	Taro Genetic Resources Network
Trust	Global Crop Diversity Trust
VASI	Vietnam Agricultural Science Institute