TECHNICAL ASSISTANCE COMPLETION REPORT

Division: RSAN

<table>
<tr><td colspan="3">TA No. and Name: TA 5866-REG: Fourth Agriculture and Natural Resources Research at CGIAR Centers: Conservation and Use of Native Tropical Fruit Species Biodiversity in Asia</td><td colspan="3">Amount Approved: $1,200,000
Revised Amount: N/A</td></tr>
<tr><td colspan="2">Executing Agency: International Plant Genetic Resources Institute (IPGRI)</td><td>Source of Funding: TASF</td><td>TA Amount Undisbursed:
-</td><td colspan="2">TA Amount Utilized
$1,200,000</td></tr>
<tr><td colspan="3">Date</td><td colspan="3">Completion Date</td></tr>
<tr><td>Approval
14 Oct 1999</td><td>Signing
13 Jan 00</td><td>Fielding of Consultants
13 Jan 00</td><td>Original
31 December 2002</td><td colspan="2">Actual
31 March 2004</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td colspan="3">Closing Date</td></tr>
<tr><td>Original
31 December 2002</td><td colspan="2">Actual
October 2004[1]</td></tr>
</table>

Description

Tropical fruit species are very important for the Asian region as sources of supplemental food, nutritionally balanced diets, medicines, timber, firewood, and livestock feed as well for enhancing both household incomes and national revenues. The fast-eroding diversity in these species needs concerted conservation efforts for present and future use. Recognizing the role of tropical fruit species in the region in enhancing nutritional security, reducing poverty, and protecting the environment, the Asian Development Bank (ADB) provided funding support to the International Plant Genetic Resources Institute (IPGRI) to undertake the project on the "Conservation and Use of Native Tropical Fruit Species Biodiversity in Asia" (TA 5866) in collaboration with Bangladesh, People's Republic of China (PRC), India, Indonesia, Malaysia, Nepal, Philippines, Sri Lanka, Thailand, and Viet Nam.

Objectives and Scope

The main objective of the technical assistance (TA) was to improve the conservation and use of the genetic resources of priority tropical fruit species in 10 Asian countries, which is in line with ADB's long-term goals of improving human nutrition and reducing poverty in its developing member countries (DMCs). Preserving biodiversity and genetic resources of tropical fruit species would contribute towards enhancing productivity and better nutrition for poor farmers. The scope of the TA included locating and collecting diversity, characterizing and evaluating existing diversity, conserving germplasm, strengthening national capacity (including human resource development) and collaboration and sharing of information, technologies, and germplasm.

Evaluation of Inputs

The project was formulated in consultation with and inputs from the 10 participating countries. A Memorandum of Agreement was established between IPGRI as the executing agency (EA) and the national agricultural research system (NARS) in each country to develop, plan, and undertake the activities under the TA. The priority crops and activities for each country were decided and agreed upon during the project inception meeting. Country Coordinators were also assigned the responsibility of implementing the TA in each participating country. The Project Coordinator and a Technical Coordinator provided inputs assisted by newly recruited Scientific Assistant, Programme Assistant, and Data Documentation Assistant. In addition, services of 10 consultants were employed for specific tasks. Contributions by NARS were mostly in kind, e.g., use of experimental fields, farm implements, laboratories, genebanks and/or seed storage facilities, as well as the use of their research and field staff and administrative services, with the EA providing the necessary facilities and effective administrative and technical guidance. Counterpart funds were also obtained from the Food and Agriculture Organization (FAO) and local based nongovernment organizations. Three annual meetings and a writeshop were organized to generate the final report for the Project.

Evaluation of Outputs

The TA achieved outputs which were significantly higher than originally targeted in many areas such as: (i) collecting and conserving threatened diversity; (ii) identifying gaps in collection and areas of diversity; (iii) documenting information, characterizing accessions, and identifying elite lines for direct use by farmers or in breeding programmes; (iv) identifying constraints and opportunities based on socioeconomic surveys; (v) human resource development and capacity building; (vi) promoting partners' collaboration and potential development of fruit crops; and (vii) prioritizing fruit crops in the national development agendas of governments.

1. ***Locating and collecting diversity*****:** A total of 2,184 accessions of mango, citrus, rambutan, jackfruit, litchi, and mangosteen were collected. Twenty-eight ecogeographic surveys were conducted and 42 diversity maps were produced. Data on existing and collected materials were documented, digitized and databases developed. A total of 5,102 accessions of mango, citrus, rambutan, jackfruit, litchi, and mangosteen were documented. Gaps in collections were also identified and mapped out.

[1] Pending closure of TA contract amount.

2. ***Germplasm characterization and evaluation*:** A total of 3,359 accessions were characterized in target species of mango, citrus, rambutan, jackfruit, litchi, and mangosteen. The TA also identified 190 elite or promising accessions in the same target species, which will be further evaluated and used by breeders for developing better varieties or propagated and given to the farmers for cultivation and used as potential breeding stocks.
3. ***Germplasm conservation*:** A total of 1,685 accessions were added to the existing collections in the field genebanks of mango, citrus, rambutan, jackfruit, litchi, and mangosteen. Fifty-two field genebanks were identified and established, with 12 sites identified for *in situ* conservation. The framework and guidelines to develop a complementary conservation strategy for tropical fruit species were also developed.
4. ***Socioeconomic studies:*** Socioeconomic surveys in the 10 countries resulted in the identification of growers' and consumers' preferences as well as the production and marketing constraints. This will greatly help in promoting related research and development programmes in the collaborating countries. The indigenous knowledge (IK) documented on uses of some fruit species will diversify their utilization and strengthen the role of women farmers.
5. ***Institutional capacity building and training**:* A total of 91 staff from 13 countries were provided skill enhancement training in the areas of germplasm characterization and evaluation, information documentation, *in vitro* conservation and cryopreservation, ecogeographic survey and genetic diversity analysis, socioeconomic aspects, molecular characterization, molecular data analysis and scientific writing, and proposal development. Three other training programmes were organized which benefited 47 scientists. In-country training activities were provided to 75 researchers in PRC, Indonesia, and Viet Nam, and 147 farmers from the Philippines and Viet Nam. A total of 15 laboratories were provided with critical equipment to facilitate work on ecogeographic survey, distribution mapping, genetic diversity analysis, and database development.
6. ***Publications and reports*:** Reports published include descriptors for litchi, rambutan, and mangosteen; germplasm catalogues on mango, citrus, rambutan, and mangosteen; consultancy reports on socioeconomic studies; complementary conservation strategies; proposal development and scientific writing; status reports on pulasan, kuini, mangosteen and Indian gooseberry, mango, and citrus; a book on *in vitro* conservation and cryopreservation; and the proceedings of three annual meetings.
7. ***Collaboration*:** Close collaboration with sub-regional networks and links with FAO, UTFANET, TFNet, and CIRAD was established and information and technologies on PGR aspects in fruit crops exchanged. The Asia Fruit Genetic Resources Network (AFGRN) was also established along similar format with other successful networks funded by ADB. Bangladesh, India, Indonesia, Nepal, Sri Lanka, and Viet Nam have agreed to exchange germplasm, with actual exchanges already undertaken between Sri Lanka and India. The lists of fruit germplasm that can be exchanged have already been drawn by the countries involved in the network.
8. ***Dissemination of Outputs*:** The TA outputs were disseminated through scientific journals, status reports, proceedings of meetings and other publications, and a website (http://www.afgrn.net) was developed for sharing information among the partners. The potential elite lines were directly multiplied through nurseries for litchi in Viet Nam and citrus in Nepal and distributed to farmers for cultivation and fruit production.

Overall Assessment and Rating

The TA has achieved its objectives in assisting the 10 countries in the areas of collecting, characterization and evaluation, documentation and database development, conservation as well as strengthening national capacity and collaboration. The identified elite lines/germplasm with specific desirable traits will be useful to breeders for developing better varieties and can also be directly used for cultivation by farmers. National capacity has been strengthened through training programmes. The establishment of AFGRN will promote regional cooperation to access and share information through the network website. The overall accomplishments of TA have been rated as highly successful due to the commitment of NARS and IPGRI.

Major Lessons Learned

The important lessons learned from project management, sustainability and technical aspects include: (1) a 3-year timeframe for a PGR project involving perennial fruit crops is not sufficient; (ii) national programmes are willing to commit their own resources to promote research and development in tropical fruits, which are now high priority in the economic agenda of most countries in the network; (iii) findings can be linked to extension to directly benefit farmers and influence decision–making, e.g., elite material for litchi in Viet Nam and citrus in Nepal; (iv) training in socioeconomics dealing with IK, community development and use of PGR for livelihood can be very useful; and (v) germplasm exchange can take place through a bilateral Material Transfer Agreement (MTA).

Recommendations and Follow-Up Actions

The elite materials collected and identified under the project remain under the ownership of NARS and would be made available to farmers for direct use and to breeders for use in breeding programmes to develop improved varieties to increase fruit production. Follow-up activities need to be developed to promote utilization of tropical fruits through the outputs of this TA to improve nutrition and enhance income of resource-poor households. NARS need to establish links with other similar ADB-funded projects and other related government agencies in their respective countries to promote utilization of tropical fruits. IPGRI and NARSs are currently working on proposals to obtain funding from donor agencies for follow-up activities.

Prepared by Y.L. Yee Designation Principal Sector Economist