



# A Genetic Garden to Safeguard Minor Fruits: A Bioversity International Initiative

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## Background

Agrobiodiversity plays a pivotal role in meeting basic human needs and sustaining the planet. Wild edible fruits were an important source of food for humankind prior to the dawn of civilization and domestication especially in India. The tribal groups inhabiting forests depended on fruits growing in the wild and passed on the knowledge about their valuable traits and use from one generation to the other. Though 5,538 plant species are reported to be used for human consumption, 30 alone contribute to more than 90% of the world's total calorie intake and only 120 are economically important at the national level<sup>1</sup>. There are 256 species of underutilized and less known minor fruit plants representing 105 genera and 45 families that are grown in different Asia-Pacific regions<sup>2</sup>. This indicates that a large number of species remain in the wild and many are underutilized or less utilized.

Neglected and underutilized fruit crops constitute an important source of food and nutrition for tribal people. They can help mitigate and adapt to the effects of climate change, grow well in marginal lands without much attention and regular agricultural practices, and often remain unaffected by changing climatic conditions, helping to ensure health and nutrition security. For over a decade, efforts of Bioversity

International in India have focussed on building a global network to promote and mainstream neglected and underutilized fruit crops. In a previous initiative on tropical fruit trees implemented under a UNEP-GEF programme, we have generated valuable information on tropical fruit trees and on the role of custodian farmers in conservation of on-farm agrobiodiversity. Based on these studies, the programme has been extended to several other minor fruit crops of tropical and sub-tropical regions.



*Annona muricata*  
Credit: Bioversity International / S.B. Dandin

Top image: Genetic Garden for underutilized fruits

Credit: Bioversity International/  
S. Dsouza

<sup>1</sup> Williams and Haq 2000, Padulosi et al 2000)

<sup>2</sup> R. K. Arora, (2014) 'Diversity in underutilized plant species'

## Our Progress

The Bioversity International-Bengaluru Office, located at the College of Horticulture, University of Horticultural Sciences has established an *ex situ* Genetic Garden to collect, conserve, evaluate and popularize underutilized fruits crops of tropical and sub-tropical regions. Until now, 220 varieties representing 100 species of 55 genera and 33 families have been collected from 62 farmers of 26 districts in 7 states, 26 nurseries and 24 research organizations. The selection is carried out based on genetic diversity, information on available genetic traits and stability. Most species in the collection have come from custodian farmers directly or indirectly. At the time of collection, farmers' knowledge of the species was documented besides location/site information.



*Annona muricata*: An underutilized fruit having anti-carcinogenic properties  
Credit: Bioversity International / S.B. Dandin

Major families, genera and species maintained in the genetic garden are:

- Anacardiaceae: 5 genera, 5 species, 20 varieties

- Annonaceae: 1 genera, 7 species, 24 varieties
- Moraceae: 3 genera, 12 species, 45 varieties
- Myrtaceae: 4 genera, 14 species, 34 varieties
- Rutaceae: 3 genera, 7 species, 14 varieties
- Sapotaceae: 3 genera, 5 species, 13 varieties

Through the genetic garden, Bioversity International aims to:

- Build the capacity of custodian farmers and create promotional opportunities
- Document and validate farmers' practices to bring uniformity and ascertain their usefulness
- Establishment of a mother plant orchard for multiplication and supply of quality seed/planting material
- Increase awareness on value chain and marketing facilities to enhance farmers' incomes on a sustainable basis
- Address the identified needs of custodian farmers' by facilitating their network with:
  - Other farmers/self-help groups
  - Plant nursery and seed bank managers
  - Marketing agencies
  - Food industry.

## The Role of Custodian Farmers

Custodian farmers are playing a vital role in on-farm conservation, characterization and sustainable

use of biodiversity of underutilized fruit crops in their own way. However, their approaches need to be analysed, appreciated and incentivized. This would encourage many more farmers to get involved in the on-farm conservation and sustainable use of agrobiodiversity for the posterity.

## The Way Forward to Harness Underutilized Fruits Crops

In the next 5 years, in collaboration with the national agriculture research system, state agriculture universities, private agencies and custodian farmers, we plan to focus our efforts on:

- Re-exploration and collection of the available minor fruit crops from different geographical regions and *ex situ* conservation
- Characterization of available crops and varieties, and documentation of associated traditional knowledge
- Standardization of propagation and cultivation practices for all these crops to get better production with improved quality
- Analysis of food and nutritional value for health security
- Studies on existing food recipes and development of value-added products supported by the entire food chain
- Identifying potential species/varieties for mainstreaming
- Capacity building and empowerment of all stakeholders for on-farm conservation, use and sustainable income.

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