# FARMERS' KNOWLEDGE OF WILD *MUSA* IN INDIA

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# FOREWORD

India is a treasure chest of biodiversity that hosts a large variety of plants and animals. It has been one of the major centres of origin and distribution for both wild and cultivated bananas (*Musa* spp.), especially for *balbisiana*-derived hybrids.

Due to the antiquity of bananas in India, their great diversity and long history of domestication, bananas are interwoven with national heritage and culture and have great socio-economic significance. The rich genetic diversity is an irreplaceable resource, providing materials for introduction, domestication and improvement programmes as well as opportunities for the search and selection of *Musa* genotypes resistant to pests and diseases.

The broad genetic pool maintained by farmers can be used for future banana crop improvement as banana is essentially a clonally propagated crop with many sterile species, which makes progress through conventional breeding slow and difficult. Due to the limited number of landraces and commercial varieties available and their asexual reproduction, bananas have a narrow genetic pool that makes them vulnerable to pests and diseases. As a result, new breeding methods and tools, including biotechnology and mutation breeding, will be helpful to develop resistant bananas for cultivation without the threat of genetic drift.

The Food and Agriculture Organization of the United Nations (FAO) is committed to preserving agricultural biodiversity as a way of helping people develop a suitable livelihood base for their own resources. The Organization has long been concerned with conservation and sustainable use issues, which have been the focus of various Regular Programme work and field-based activities. With regard to bananas, FAO is concerned about the disappearance of wild bananas and how human presence and expansion affect their biology, especially in Southeast Asia. The Organization calls for greater use of genetic diversity for strengthening breeding programmes in developing countries and for promoting awareness of the inevitable consequences of a narrow genetic base in crops and the need for a broader genetic base, especially in the case of commercial bananas.

The present case study provides an insight into the indigenous technical knowledge regarding multiple uses of wild and cultivated bananas for the benefit and advantage of the local population in India. The study provides a picture of distribution of wild and cultivated *Musa* species of interest in the country; it sets out the vital role of local knowledge in conserving biodiversity and ecosystem function in the different agro-ecological zones of India where *Musa* species occur. The study also describes in detail the involvement of the tribal and farming communities in the conservation, maintenance, perpetuation and spread of banana genetic diversity.

This report synthesizes the available information and documents existing data from micro-sample surveys on the status and trends of the indigenous knowledge, innovations and practices of local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biological diversity of wild and cultivated *Musa* species in India. It summarizes the implications of farmers' production systems on the ecosystem and contributes to a better understanding of some of the causes and effects directly related to the risk of loss of banana biodiversity in India. Strategies are recommended for expanding the use of wild *Musa* in breeding programmes beyond its traditional use for food, feed, herbal medicine and handicraft, as most of the desired resistant gene sources to biotic and abiotic stresses are harboured by the wild species. The report contains valuable information on wild *Musa* and identifies various issues to be addressed.

Researchers, banana scientists and policy-makers will find the material useful, and the study will contribute to the dissemination of indigenous knowledge, technical information and consolidated research results on the practices relevant to the customary management, conservation and sustainable use of biological diversity of wild *Musa* that may be at risk of disappearing. This will support sustainable agriculture development and *Musa* improvement initiatives as well as FAO's Special Programme for Food Security (SPFS).

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# INTRODUCTION

In India, bananas are interwoven with national heritage and culture and have great socio-economic significance. Bananas have been accepted as the symbol of prosperity and fertility and has been nurtured within the sacred precincts. It has been rightly referred to as 'Kalpatharu' (a plant of all virtues) owing to its multifaceted uses by humans.

In India, bananas are known for its antiquity from its mention in the epic, Ramayana (2020 B.C.), Kautilya's Arthasastra (300-400 B.C.) and its presence in paintings and sculptures of Ajantha and Ellora (600 B.C.) caves of Maharashtra. Growing bananas and mention of dwarf stature bananas and a banana having reddish sap have been quoted in Tamil literature dating back to 120 B.C.

Banana is the name given to a group of commodities that includes dessert bananas, cooking bananas and beer bananas. It not only represents the sweet dessert fruits, but is also a staple food of 400 million people in the underdeveloped and developing economies.

Bananas are grown in more than 120 countries over an area of 10 million ha contributing to the production of 95 million tonnes (Anon., 2001). India has been the largest producer of bananas with an annual production of 16 million tonnes from an area of 0.4 million ha and accounts for nearly 15 percent of the global production (Singh, 2002).

Due to antiquity of bananas in India, their long history of domestication and the great diversity of dessert cultivars, a large number of banana clones are believed to have originated in India. One of the earlier collections, *Musa acuminate ssp. burmanniccoides* has contributed significantly to many breeding programmes across the globe for developing varieties resistant to sigatoka leaf spot disease.

With the increased realization that some wild species are being over-exploited, the relationship between *in situ* and *ex situ* conservation benefits and costs for wild species as well as the impact of farmers' practices on the ecosystem should help guide policies as to whether species conservation should take place in nature or the nursery, or both.

Apart from the conservation issue, the indigenous knowledge of wild species of *Musa*, for instance, is a treasure, but little information is available on this aspect and the methodology or protocol for its meaningful utility is still lacking.

In this report, the author provides an overview of general occurrence and ethnobotanical knowledge of *Musa* species in different geographical locations and agro-ecological zones in India, and then describes *Musa* genetic diversity and its conservation by ethnic groups and the implications of production practices on the ecosystem. The report provides an understanding of some of the causes and effects directly related to loss of *Musa* genetic diversity and makes recommendations on steps that should be taken to expand the use of wild *Musa* in breeding programmes.

# SCOPE OF THE STUDY AND METHODS

The author's employment in the National Research Centre for Banana under the Indian Council of Agricultural Research (ICAR) has enabled her to travel far and wide across the Indian subcontinent and undertake exploration programmes. These explorations stretched over a period ranging from 25 to 30 days travelling across the targeted areas and camping among the local tribes.

Focus group discussions, group interviews, interactions with local heads and local doctors among the tribes, informal conversation with women folk gave an insight into the Indigenous Technical Knowledge (ITK) with regard to the use of wild and cultivated species for their advantage. Participatory transect walks in various landscapes with men and women also added information on *Musa* usage. Details on the exploration zones are given in Table 1.

Interaction with local headpersons gave a picture of distribution of wild *Musa* species of interest, both in their locality and among neighbourhood areas. During the interactions with village folk, much information on seasons of flowering, fruit type, usage of fruits, nature of stress under natural conditions, means of species perpetuation, human interventions in their perpetuation and spread, etc. were gathered. Emphasis was also given on gender diversity and involvement of tribal and farming folk in the conservation and maintenance of genetic diversity. Discussions with women helped in gathering information on the issues like gender involvement in genetic conservation of *Musa* species in their backyards or in the vicinity of villages or in protected areas within the forests. A general questionnaire (Table 2) was developed and used during the surveys and exploration process.

As a routine exercise during explorations, *Musa* Descriptor (Anon., 1996) was used in which information regarding passport data, crop management data, collection site environment and *in situ* plant descriptor, etc., were collected.