

Introduction

The distribution of superior germplasm across the tropics is often the most powerful way to improve agricultural productivity. In the case of cassava, one of the most important root staples, plant quarantine authorities require since the 1980s that only *in vitro* plants be accepted for distribution worldwide, and technical guidelines for the safe movement of cassava germplasm have been produced (Frison & Feliu 1991). Since 1978 when CIAT accepted a world mandate for that crop (with 6,624 materials as to Oct. 2007 and 5,713 that have been registered in the Multilateral System of Access and Distribution of Benefits of the International Treaty on Plant Genetic Resources for Food and Agriculture within the framework of an agreement between the Governing Body of the Treaty and CIAT), the *in vitro* technique has been used, and CIAT has distributed 30,847 samples to programs in 66 countries.

Methodology for introduction and distribution of cassava germplasm

In the early 1980s the field genebank was converted into an *in vitro* genebank. Sterile cultures in artificial media have been established from disease-free mother plants produced by means of thermotherapy and meristem-tip culture and tested for cassava viruses of quarantine importance. The cultures for shipment consist of well-rooted plantlets in an agar medium, contained in properly capped 16 x 125-mm test tubes and labeled with the clone's name (Roca et al. 1989). The test tubes are packed in a bag with: a) the printed Standard Material Transfer Agreement (SMTA), b) a phytosanitary certificate, issued by the Colombian authority, c) a list of the material, d) instructions on how to handle the cultures upon receipt, e) passport information, f) morphological and biochemical evaluation, and g) import permit (Figure 1).

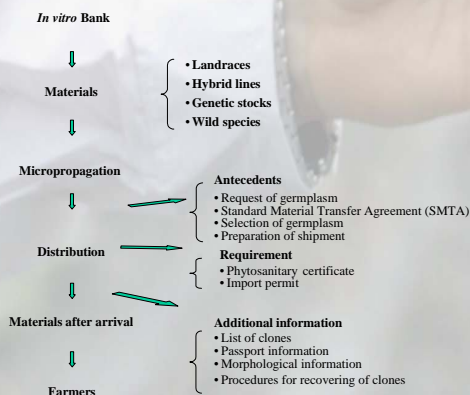


Figure 1. Flow of activities between the genebank and farmers.

Results

From 1979 to 2007 CIAT has shipped a total of 30,847 samples of cassava, for 5,865 different accessions (almost the entire collection, more than 5 times its size). For each shipment, the Genetic Resources Unit (GRU) keeps records of: i) identification and nature of recipient, ii) clones requested, iii) purpose of request, iv) acceptance of SMTA and/or MTA, and v) phytosanitary matters. Around year 2000, a substantial increase in distribution can be noted, once the collection was certified against diseases of quarantine importance (Figure 2), indicating that the effort paid off. The main recipients were CIAT Projects, who received 64.5 % of distributed accessions, while external institutions and partners received 35.5 % (Figure 3). External users are mainly national institutions of agricultural research (16.4%), universities (8.5%), commercial companies (2.1%), regional organizations (1.8%), and others (farmers, NGOs, genebanks and other CGIAR) (8.0%).

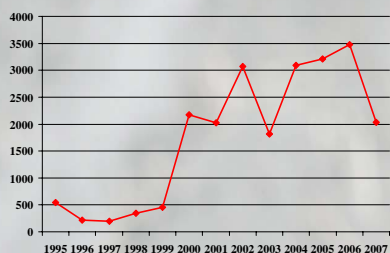


Figure 2. Annual rate of distribution of cassava germplasm by CIAT-GRU over the last thirteen years.

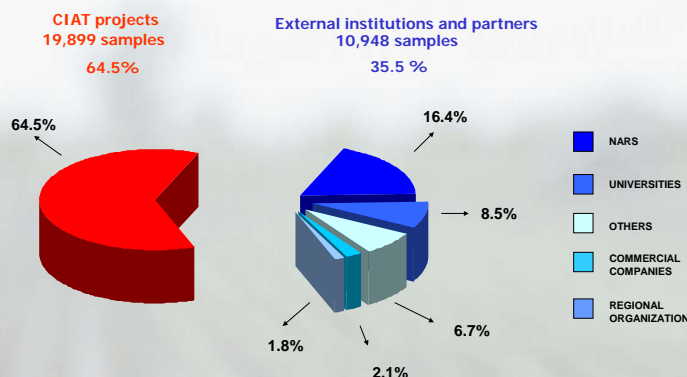


Figure 3. Distribution of cassava germplasm in the period 1979-2007.

The main purposes of distribution were: i) plant breeding to introduce genes into new hybrids, ii) evaluation of clones in other countries (agronomy), iii) applied research (screening for resistances to pests and diseases), iv) basic research (cryopreservation, general biochemistry, nutrition, etc), v) training, and vi) others (Figure 4).

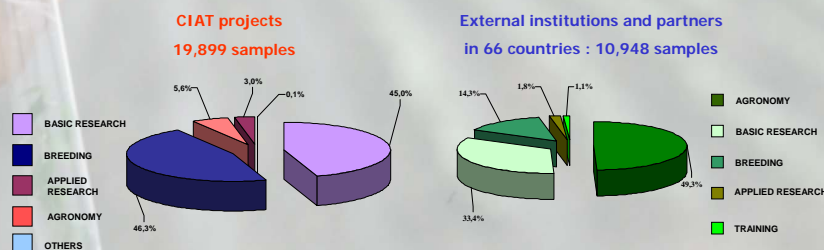


Figure 4. Main purposes in the distribution of cassava germplasm in 1979-2007.

The top five recipients (with only 50.0% of the total distributed outside, to 66 countries) were: Thailand, Brazil, Kenya, Colombia and Australia (Figure 5). Although external institutions could still make wider use of the cassava collection, these figures indicate a relatively high rate of utilization of the collection. Four shipments of cassava towards Peru, Paraguay, Cuba and Ecuador were done as part of our efforts to restore germplasm to countries. The distributed material was indeed diverse, since the top five clones were distributed only between 100 and 180 times each.

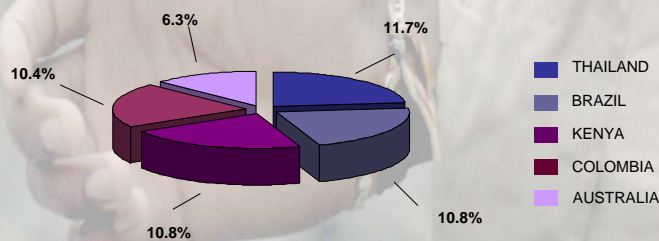


Figure 5. Recipients of cassava materials in 1979-2007.

Acknowledgements

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Literature Cited

Frison, E.A. And Feliu, E. 1991. FAO/IBPGR technical guidelines for the safe movement of cassava germplasm. Food and Agriculture Organization of the United Nations- FAO- and International Board for Plant Genetic Resources, Rome, Italy.

Roca, W.M., Chavez, R., Marin, M.L., Arias, D.I., Mafla, G., Reyes, R. 1989. *In vitro* methods of germplasm conservation. Genome 31 (2): 813-817.