Cryopreservation of Crop Species Contributes to the World Food Security

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More than 800 million people are undernourished and 200 million children under five years of age are underweight. Since the world’s population is expected to reach more than 10 billion by 2050, reliable and sustainable improvements in crop yield are needed. Food security is a strong, sustainable, local or regional food system that ensures access to affordable, nutritious and culturally appropriate food to all people at all times. The conservation and sustainable utilization of plant genetic resources are the keys to improving agricultural productivity and sustainability. Conservation of crop genetic resources classically happens through field and seed collections. Also CWR (crop wild relatives) are important sources for crop improvement and their natural habitats are under threat. For vegetatively propagated crops in vitro collections were established that have a major drawback that they are labour demanding to maintain and subject to somaclonal variation. Cryopreservation (i.e. storage at -196°C) can play an essential role in the safe long term conservation of plants (i) that do not produce seed or viable seed (like bananas), (ii) that produce non storable (recalcitrant) seed (like cacao) or (iii) that are vegetatively propagated because a specific gene combination is required (potatoes and fruit trees like apple). Publications on cryopreservation of different plant species are available since the 1980s but the technique was only in a few cases applied to store larger collections. It was only with the development of vitiﬁcation based protocols such as droplet vitriﬁcation [1] that cryopreservation is becoming a routine practice in CGIAR (Consultative Group on International Agricultural Research) centres for crops such as banana, cassava and potato. For example, 905 banana accessions (63% of the in vitro collection) belonging to 30 different genomic banana groups are now safely stored in liquid nitrogen by Bioversity International in Leuven, Belgium.

Reference: