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T2PP003:

Necessity for implementing quality management system in genebanks

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Globally genebanks have a critical function as a source of biological genetic diversity, especially when climate change is threatening agriculture and its diversity. Apart from preserving germplasm under long-term conditions, characterization, regeneration, viability testing, distribution and safety duplication are some of the major activities of the genebank which involve significant human and machine intervention. To manage these factors efficiently and effectively and mitigate the risks involved, genebanks require strong quality management system (QMS). A QMS for genebank can be defined as a set of policies, processes and procedures required to plan and execute the operations. Risk management is essential for achieving an effective quality management system, it enables an organization to determine the factors that could cause its processes to deviate from the planned results. ICRISAT's R.S Paroda genebank which conserves over 129,900 accessions of 11 dryland cereals and legumes, has implemented a QMS complying to the requirements of FAO's Genebank Standards, International policies and donor specific requirements. Standard operating procedures (SOP) are developed for Acquisition, Conservation, Distribution, Safety Duplication, Information management, Characterization and Regeneration of germplasm. The measuring and testing equipment is periodically calibrated to ensure that they make correct and accurate measurements, guidelines and operating instructions are available with safety precautions, Staff is being trained regularly to improve their skills and competencies. Implementing a QMS within an organization needs to be a top management decision. QMS helps to instill confidence in interested parties like users, partners, statutory & regulatory bodies and donors about the competence of genebank. A large number of under-resourced genebanks require more investment to meet QMS requirements, key to such investments is the commitment to performance and quality management.

T2PP004:

Seed quality management of genetic resources conserved at ICRISAT Genebank

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Seed quality plays a major role in enhancing agricultural productivity. Several pre-and post-harvest factors such as production environment, time of harvesting, processing and storage conditions have a great impact on initial seed quality and subsequent longevity. The ICRISAT genebank conserves over 129,900 accessions of 11 dryland cereals and legumes, that have originated from 144 countries, conserved under medium-term storage (MTS; 4°C and 20% RH) and long-term storage (LTS, -20°C in vacuum packed aluminum foil pouches) conditions. Maintaining seed quality of such a large collection requires a careful planning and standard protocols for seed production and storage, and the ICRISAT genebank follows the International Genebank Standards (FAO 2014) for germplasm conservation. The longevity of seeds can be improved to a larger extent with comparatively little investment. A walk-in seed-drying room with 15°C and 15% RH is used for drying seeds of different crops with initial moisture contents between 8.6 to 11.9% are safely dried to 3.2 to 5.9% within four weeks for long-term conservation. Groundnut seeds dried up to 4% moisture content under 15°C and 15% RH retain viability considerably for longer periods and storing seeds in the vacuum packing further enhanced seed longevity. Similarly, observations on seed moisture content and viability of pearl millet accessions under different periods of humidification revealed that diverse pearl millet seeds could be safely dried and germinated over wide seed moisture regimes (5–11%). Such processes save time, space and resources for handling large numbers of germplasm accessions during testing/monitoring seed viability. Mean viability of active collections conserved for 3 to 25 years at ICRISAT genebank ranged between 93% and 98% and the mean of all accessions (129,935) is 95%, which is well above the minimum standards (85%) for active collections. The viability of seeds stored in a genebank decrease gradually during storage and genebank accessions (active and base collections) are monitored regularly. The full benefits of any conservation system are realized only when the seeds that go into storage have high initial quality. Therefore, maximum seed quality and vigour are of paramount importance in germplasm management and productivity enhancement.