IRRI Genebank Review 2019

Programme: Genebank Platform

Genebank reviewed: IRRI	**Site visit Dates:**	6 – 10 May 2019
	Review report Date:	03 June 2019
	Center and Crop Trust responses:	15 August 2019

Place: Los Baños, Philippines

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	Observation	Recommendation for clearance	Due date	Responses
1	1 minor observation	Find alternative site(s) for temperate japonicas and any other unadapted varieties.	Test and report finding by end 2021.	IRRI: Agreed. We will explore two options - South Korea and Northern Philippines. Both these sites have been explored before, however due to logistical challenges it was not effective. These options will be reconsidered with a different set of partners and alternative arrangements. Crop Trust: Working with partners on regeneration has repeatedly met with challenges. IRRI can only keep trying but determining capacity needs at the outset and close follow up is clearly important.
2	2 minor observations	Review practice of maintaining and monitoring multiple seed generations in the active collection (pros, cons, cost-effectiveness).	Report by end 2021.	IRRI: Agreed. We will review this practice. Practice of maintaining multiple entries in the active collection is a precautionary/safety measure. Now that GRIMS has integrated seed quality management, the following steps will be done: - complete inventory/verification process and identify seedlots due for discarding - review and transfer oldest stock of an accession with amount 60g or below from the active collection to base collection and label as reserved for planting (will serve as a safety measure in case of mislabeling errors or generation count issue). - do not process when there are still enough seeds in active and the purpose is not seed regeneration, e.g. excess harvest from experiment. Crop Trust: We agree with the recommendation and are glad to see IRRI taking steps.

3	2 minor observations	Improve the protocol for breaking dormancy in *O.glaberrima.*	Report on experiments by end 2021.	IRRI: We will take up the recommendation only after ensuring that other institutes are not working on it. We will discuss this with AfricaRice. Crop Trust: Agree with recommendation and response.
4	3 major observations, 3 minor observations	Undertake a comprehensive analysis of the state of the wild species collection: amount of seed in storage (MTS and LTS), viability testing; accessions with expected genetic bottlenecks or contamination, available data, importance for breeding, use over last years, required GRIMS adaptations, and other relevant elements to be able to draw-up a plan for improving the management of the wild species collection.	Report progress end 2019.	IRRI: Agreed. We will have a comprehensive assessment of state of wild sp. as recommended. An action plan will be drawn by end of 2019 but we are not sure how long it will take to fully implement these. Several species-specific methods exist and are already being practiced but more needs to be done. This would require considerable amount of research and resources. Crop Trust: Crop Trust appreciates the ongoing efforts on wild species and recognizes the challenges. The collection requires appropriate management right now with or without academic research. IRRI receives considerable funding in its current budget for wild species management which covers a dedicated team of eight staff and the management of the screenhouse. ICARDA, CIAT and ILRI have considerable experience in managing large collections of different wild species and, no doubt, would have pragmatic approaches to share with IRRI. The recommendation here requests IRRI to improve the documentation and understanding of the status of the collection as a first priority. This should be possible without additional resources. Any additional investment should be considered carefully in the context of priorities and need.
5	2 minor observations	Further develop "Distribution and exchange of rice genetic resources" SOP to add principles and procedures for handling large or repeated requests, and for active follow-up with requestors to monitor satisfaction, address any issues raised (viz seed, data, service), better understand needs, exchange data and develop collaboration. Include also the principal of	Revise SOP by end 2019.	IRRI: (1) Issues regarding handling large and multiple requests would need broader consultation and has to be discussed at Genebank Platform level. Also changes to ITGRFA that could happen very soon should be considered. SOP could be revised based on that. (2) We will review and finalize the ways and means to better connect with users. Some points we are considering are - to coordinate with the Seed Health Unit to improve seed handling before shipping; update the feedback form being sent by SHU and monitor it; conduct user satisfaction survey once in every five years to gather feedback from users; adding features on genebank page which provides latest news; participation in breeders' meet to connect and extend the outreach. The SOP will be updated to reflect the above points. Crop Trust: The Crop Trust agrees with the recommendation and considers that IRRI should put in place approaches to follow up with external users to assess satisfaction on a regular basis and at least annually, as is expected in any QMS. Further

		proactive distribution to extend the outreach of the genebank and increase its user community. Remove time-sensitive appendices and provide links to where updated versions can be accessed.		concrete actions will be required to understand users' needs and to be more proactive in expanding the user community.
6	1 minor observation	(1) Complete passport data gaps in the information system and upload to Genesys for IRRI-held accessions in the Bioversity Collecting Missions database. (2) Correct errors in data uploaded to Genesys including entry for subtaxa fields (3) Prepare a workplan for pursuing options to fill other passport data gaps (i.e. checking websites, contacting donor institutions, etc.)	Complete data, correct errors and prepare workplan by end 2019.	IRRI: We agree that data about accessions should be improved. Lot of germplasm that are in IRRI genebank were collected at times when standard norms for collection were not in practice and thus several gaps exists in passport data. To improve the data correctness we will follow the reviewers' recommendations. -We will develop a workplan to fill the gaps based on information from various sources including check Bioversity Collecting Missions database, and wherever possible contacting donor institutes and websites. However, given our past experience, one has to be cautious in using data from external websites and publications -Errors in Genesys have to be fixed. While some errors are to be fixed at our end, some are to be fixed by Genesys team and we are giving them necessary feedback. We believe subtaxa means varietal grouping in rice. This is an important piece of information and is useful in many ways to manage and to use the germplasm. However, there is no reliable way to make this grouping. The practice of grouping based on phenotypic characterization was abandoned in 2006 as it was not reliable. Molecular characterization is the only reliable way to make this grouping, however, this needs significant time and resources. -Addressing the above will increase the PDCI score. Another way to increase PDCI is to finalize how we handle the issue of passport data for genetic stocks. Inclusion of genetic stocks in the Genesys without passport data has caused our PDCI score to go down. Crop Trust: Crop Trust strongly endorses this recommendation. All genebanks face the same issue that IRRI faces. There are some basic approaches and practices to improve passport data and these should be intrinsic to IRRI's culture in managing data resources. We believe this recommendation is absolutely imperative. The

				reference to errors in Genesys needs to be followed up. All data in Genesys comes directly from IRRI – errors therefore originate from data uploads from IRRI. The PDCI also takes account of genetic stocks and breeding materials so this should not affect your score.
7	1 minor observation	Investigate data management tools that will allow prediction of 'peaks' or 'dips' in operations and thus facilitate oversight and forward planning of resources and budget.	Report by end 2019	IRRI: Agreed. We will create additional functions/windows in GRIMS to show predictions like number of accessions for regeneration or viability monitoring for the next 5 years considering last germination date, and if possible, amount in storage. We're already exploring GRIN-Global as possible alternative for information management, but per our initial evaluation, GRIMS is more flexible and customizable to user's need. Going forward if GRIN-Global can have all the necessary functionalities needed by us then we can consider shifting to new platform. Crop Trust: Crop Trust agrees with the recommendation and IRRI's efforts to consider new tools and adopting GRIN-Global.
8	1 major observation	Increase visibility of genebank on IRRI website and develop a workplan for enhancing public access to information on the IRRI genebank and to IRRI-generated evaluation data.	Develop workplan by end of 2019	IRRI: Agreed. We will discuss with IRRI Comms/ITS and ensure increased visibility of Genebank in the IRRI website. We have communicated with ITS regarding accessibility of IRGCIS outside IRRI; it is in a 'not secured' site (http instead of https) that may be causing restrictions to some users so we will request ITS if possible, to transfer to https. Further, we already set-up GRIN-Global in AWS instance and will start migrating passport, inventory and characterization data this 2019. Crop Trust: Crop Trust agrees with recommendation and responses and presumes there is high level support for this recommendation since the DDG is involved on all correspondence.
9	1 minor observation	1. Increase staff resources dedicated to conservation research and scientific research related to IRRI's role as a center of excellence 2. Prioritise genebank operational constraints for conservation research.	Report on actions by end 2020	IRRI: 1. Staff resources could be increased only if some routine management tasks could be automated/outsourced or with additional funding. We believe IRS FTE to conservation management and research is sufficient (currently, it is 1.65). Apart from the LPA we have other bilateral grants which are supporting this. Some NRS under LPA are already assisting in conservation research. 2. Agreed. There may be scope to reallocate NRS to support this work. This will be explored after a comprehensive assessment of wild collection. Crop Trust: The priority is to focus on easing the operational constraints of the genebank and we are happy to see that IRRI agrees with this recommendation. The IRS FTE allocation appears to be sufficient if the focus is on such priority constraints.

10	1 minor observation	Enhance genebank teamwork in processing wild species.	Report on actions by end 2019.	IRRI: Agreed. This will be done. At the moment we are considering re-examining the 'Division of labor' based on species. The wild rice team and data management team are now closely working on integrating the modifications in wild rice management to GRIMS. Crop Trust: Crop Trust wholeheartedly agrees with this recommendation. The management activities of the wild species team should be mainstreamed into core operations. Integration into GRIMS will help markedly with this. However more effort will be needed to ensure that decisions on seed thresholds and regeneration priorities, etc. for wild species is supported by the whole genebank and is not just the responsibility and domain of one individual acting alone. We hope that integration generally between the different genebank teams is improved over the coming years.

Introduction

Commissioned by the CGIAR Genebank Platform, the review was carried out by Dr Theo van Hintum, Head of the Centre for Genetic Resources, The Netherlands and Jane Toll, former staff of the Crop Trust and past Coordinator of the CGIAR System-wide Genetic Resources Program. The reviewers were supported by Charlotte Lusty, Genebank Program Coordinator, Crop Trust.

The review was technical and focused on the quality management system that is being put in place. It included an audit of the standard operating procedures (SOP) for key operations. The reviewers were provided with the SOP documentation, Platform documents (online reporting tool reports), the genebank's 5-year plan, a self-assessment, various other documents and a User Survey done by CropTrust.

The main phase of the review was the visit to IRRI's location at Los Baños, The Philippines, which took place May 6 to 10, 2019. On arrival at IRRI, the reviewers were briefed on the institute's research structure by Dr Jackie Hughes, Deputy Director General and programme leaders, and were introduced to the genebank and its staff by Dr Venuprasad Ramaiah, Head of the genebank.

Over four days, the reviewers interviewed the teams responsible for the different operations, inspected the facilities and processes, and met with the technical staff at their workstations. Intense discussions were held with the heads of the operational teams, namely Flora Guzman, Manager Genebank Operations; Renato Reano, Head Field Operations; Grace Capilit, Head Data Management; Maria Hilario, Head Wild Rice; Jae-Sung Lee, Conservation Researcher; and the Head of the Genebank, Dr Ramaiah.

Part audit of SOPs and part technical assessment, this type of review was new to the Platform. The IRRI genebank was a testing ground and this review a pathfinder for those to come. The genebank's well developed QMS and robust SOPs, and the professionalism and transparency of its staff were critical to the trialing of this new review approach. The reviewers gratefully acknowledge the cooperation and patience of the IRRI genebank staff throughout the review.

Findings

The audit of the SOPs and the reviewers' assessments of processes needing improvement are detailed in the attached Review Checklist. There are 16 minor observations and 4 major observations, resulting in 20 suggested improvements and 10 recommendations for clearance. The overall findings were presented to IRRI management and the genebank's staff on the final day and discussed.

The relatively low number of recommendations and minor observations are a reflection of the high overall standard of operation of the IRRI genebank. It is a large and impressive operation, and a leader in bar-code tracking and automation within the Platform. The genebank merits the accolade of 'the pearl in IRRI's crown' (to quote IRRI's Deputy Director, Dr Hughes) and the reputation of being one of the best genebanks in the world. That there have been no apparent disruptions to the genebank's operations with the recent change of genebank Head is testament to the competence of the staff and in particular the manager Paola Guzman, who is the lynchpin of the operations. It is also a reflection of the genebank's comprehensive, well-established processes that are underpinned at every step by an equally comprehensive and well-established information management system (GRIMS). However, the dependency of the genebank on key staff who are close to retirement and on GRIMS which is based on old technology, underscores the importance of the staff succession arrangements underway and the need to upgrade the information management system.

The review's main recommendations concern aspects that impact on the genebank's reputation and fulfillment of its international obligations, but that also afford opportunities for furthering its status as a 'center of excellence' in genebanking. Two crucial aspects are the genebank's visibility and its use by the user community, worldwide. Limited information on the collection is available on the internet and currently, only through Genesys. Also, use of the collection is very strongly skewed to IRRI internal users. Consequently, the review recommendations include addressing data gaps in Genesys, giving the genebank visibility on the IRRI website, increasing the range of data available by, as priority, giving access to IRRI evaluation data on the collection, and actively expanding the user community and collaboration with donor institutes to the collection.

Increasing operating efficiency is central to the genebank's ambition to be a center of excellence and to its long-term sustainability. The review endorses continuing efforts to introduce automation and undertake conservation research, but emphasizes that the focus should be on finding practical solutions to alleviating constraints and reducing costs in day-to-day operations, such as viability testing. The ability to predict forthcoming 'peaks' in activities such as regeneration, viability testing and distributions are important for the efficient management of workloads and resources. It wasn't possible to readily gain such an overview from GRIMS, so the review recommends the development of 'tools' to create overviews and facilitate planning.

Management of the wild species collection does not meet expected standards. The wild species team is attempting to address past shortcomings in the handling of this difficult material. However, given the increasing interest in wild species (underscored in the User Survey), the collection needs to be mainstreamed into the overall genebank operation and better integrated into the workflows and responsibilities of the various teams. It also needs greater practical research attention to improve processing protocols. A recent inventory of the collection has revealed missing samples, low seed numbers and other major concerns. The review recommends a

thorough and comprehensive assessment of the state of the collection to lay the basis for planning a way forward for conserving wild species.

At the time of the review, the genebank operations and facilities were split into two relatively distant physical locations. In the main location, offices, storage chambers, germination testing and the automated germination testing facility were further divided between two floors and also by temporary doors and walls. There are, therefore, two levels of consolidation in facilities required: that of the two locations, which requires considerable funding and, therefore, is a longer-term goal and that of the re-consolidation of offices, labs and storage chambers in the main location. The latter has been delayed already by two years and clearly should not be delayed any longer.

The reviewers congratulate the staff of the genebank on the excellent job they are doing and hope that their recommendations for improving the operations of the genebank will help them continue to achieve high standards.

Jane Toll and Theo van Hintum
May 20th, 2019