



Organización de las Naciones
Unidas para la Alimentación
y la Agricultura



Tratado Internacional
SOBRE LOS RECURSOS FITOGENÉTICOS
PARA LA ALIMENTACIÓN Y LA AGRICULTURA

Tema 15.4 del programa provisional

OCTAVA REUNIÓN DEL ÓRGANO RECTOR

Roma, 11-16 de noviembre de 2019

Informes de las instituciones que han estipulado acuerdos con el Órgano Rector de conformidad con el artículo 15 del Tratado Internacional

Resumen

El presente documento contiene los informes proporcionados por las instituciones internacionales que han firmado acuerdos con el Órgano Rector con arreglo al artículo 15 del Tratado Internacional. En los apéndices de este documento figuran los informes según los recibió la Secretaría, para su consideración por el Órgano Rector. Este documento también contiene información actualizada sobre las actividades realizadas por el Secretario durante el bienio en relación con colecciones internacionales de germoplasma mantenidas en virtud del artículo 15 del Tratado Internacional y para cuyo mantenimiento existen grandes dificultades.

Orientación que se solicita

Se invita al Órgano Rector a considerar los informes y la información presentados en este documento, así como a brindar orientaciones adicionales, teniendo en cuenta los elementos de una posible resolución que figuran en el Apéndice 1.

Es posible acceder a este documento utilizando el código de respuesta rápida impreso en esta página. Esta es una iniciativa de la FAO para minimizar su impacto ambiental y promover comunicaciones más verdes. Pueden consultarse más documentos en el sitio <http://www.fao.org/plant-treaty/meetings/meetings-detail/es/c/1155625/>.



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I. INTRODUCCIÓN

1. El Órgano Rector recibe periódicamente informes de las instituciones internacionales que han firmado acuerdos con él de conformidad con el artículo 15 del Tratado Internacional, en relación con la gestión y distribución del germoplasma con arreglo a lo establecido en el Sistema multilateral. Los informes también abarcan cuestiones relativas al correcto mantenimiento de las colecciones, así como a la cooperación en el marco del Tratado Internacional. En su séptima reunión, el Órgano Rector invitó a las instituciones internacionales pertinentes a que presentaran esos informes para la octava reunión¹.
2. En el momento de publicación del presente documento, la Secretaría había recibido seis informes, en concreto:
 - un informe colectivo de los 11 centros del Grupo Consultivo para la Investigación Agrícola Internacional (CGIAR) que firmaron acuerdos en virtud del artículo 15 del Tratado Internacional;
 - un informe adicional del Centro Mundial de Agrosilvicultura (ICRAF);
 - un informe del Centro Internacional de Agricultura Biosalina (ICBA);
 - un informe de la Secretaría de la Comunidad del Pacífico;
 - un informe del Centro Agronómico Tropical de Investigación y Enseñanza (CATIE);
 - un informe del Gobierno de Papua Nueva Guinea, en calidad de anfitrión del Banco Internacional de Germoplasma del Coco para el Pacífico Sur.
3. En los apéndices 2 a 6 de este documento se presentan al Órgano Rector los seis informes tal como se recibieron² ³. En el presente documento se ofrece un resumen del contenido de los seis informes. También se facilita información actualizada sobre las actividades llevadas a cabo por el Secretario en el bienio en el ejercicio de sus responsabilidades en virtud del artículo 15.1 g) del Tratado Internacional, así como de conformidad con las condiciones de los acuerdos estipulados con arreglo a sus disposiciones, en relación con las colecciones que, según se ha informado, se encuentran amenazadas. Además, se informa al Órgano Rector de un nuevo acuerdo firmado en virtud del artículo 15 en el bienio, y de los esfuerzos realizados para promover nuevos acuerdos.

II. RESUMEN DE LOS INFORMES RECIBIDOS

4. En el informe de los centros del CGIAR se facilita información actualizada sobre el número de muestras que constituyen las colecciones de germoplasma de los 11 centros, el número de muestras distribuidas desde 2006 y el desglose regional correspondiente. Asimismo, se proporciona información sobre el amplio abanico de actividades emprendidas por el CGIAR para mantener la calidad de las colecciones de germoplasma y añadir valor a las mismas. En el informe se resume, además, el compromiso del CGIAR, como Sistema y a nivel de los distintos centros, en relación con las actividades entre reuniones, entre otras cosas, para mejorar el Sistema multilateral y fomentar la aplicación del Sistema mundial de información y los derechos del agricultor. También se destaca que los centros están aprovechando cada vez más los avances tecnológicos para generar y analizar datos de secuencias genéticas a fin de mejorar la conservación y la utilización sostenible, así como la distribución de beneficios.
5. En el informe del ICRAF se presenta un desglose adicional de las cifras relativas a las colecciones de germoplasma, su distribución y adquisición, en el marco del acuerdo suscrito en virtud del artículo 15. También se facilita información sobre las iniciativas destinadas a caracterizar la colección del ICRAF a través de herramientas fenotípicas y moleculares, y el intercambio de información, en beneficio de los agricultores y otras partes interesadas, y las políticas para recabar el compromiso mutuo entre agricultores y científicos en reconocimiento de los derechos del agricultor.

¹ Resolución 12/2017, párrs. 14 y 15. La Resolución está disponible en: <http://www.fao.org/3/MV091ES/mv091es.pdf>.

² Los informes adicionales que reciba la Secretaría se publicarán en una adición al presente documento de trabajo.

³ Por razones de economía, los seis informes solo están disponibles en el idioma en que se recibieron.

6. El informe del ICBA se elaboró tras la firma del acuerdo suscrito en virtud del artículo 15 en marzo de 2019 (véase el párrafo 21, a continuación). En él se proporciona la cifra global de los materiales conservados en los bancos de germoplasma del ICBA y se facilitan datos relativos a la adquisición y la distribución. Se proporciona, asimismo, información sobre las iniciativas del ICBA para facilitar el acceso a la colección, en forma de directrices para la solicitud de semillas, y un acuerdo relativo a los datos de las muestras con objeto de que la información esté disponible a través de Genesys.
7. En el informe de la Secretaría de la Comunidad del Pacífico se proporcionan cifras relativas a las colecciones de germoplasma, y a su distribución y adquisición. También se facilita información sobre las medidas institucionales adoptadas para garantizar la sostenibilidad, la eficiencia y la mejora de las repercusiones a largo plazo del Centro para los Cultivos y los Árboles del Pacífico (CePaCT) mediante el apoyo de los donantes. Asimismo, se hace referencia a la ampliación del mandato del CePaCT al coco y las especies arbóreas forestales, en aras de adoptar un enfoque holístico para la seguridad alimentaria y la nutrición, y a diversas actividades relacionadas con la generación y distribución de beneficios no monetarios derivados del uso del germoplasma.
8. El informe del CATIE contiene una evaluación del estado de la colección que posee, tanto en el campo como en la cámara frigorífica. Las cifras relativas a la distribución de germoplasma mediante el Acuerdo normalizado de transferencia de material (ANTM) hacen pensar en un cierto interés en el germoplasma del CATIE por parte de receptores de diferentes lugares geográficos. Además, en el informe se hace referencia a la importancia de determinadas colecciones para los sistemas agrícolas regionales. A pesar de ello, se subraya que los fondos disponibles para mantener y regenerar las muestras son insuficientes, especialmente habida cuenta de la menor capacidad de conservación en el campo y en la cámara frigorífica, así como de los efectos negativos de las plagas. Por consiguiente, el riesgo de pérdida de germoplasma es significativo. A este respecto, se facilita información actualizada sobre la aplicación de las recomendaciones del equipo de tareas que el Secretario convocó conjuntamente con el Fondo Mundial para la Diversidad de Cultivos en septiembre de 2017 y, en particular, sobre el apoyo financiero y político provisional que el Gobierno de Costa Rica prestó en el curso del bienio para mantener la cámara frigorífica. En cuanto a las colecciones de campo del CATIE, el informe también se refiere a la asistencia prestada por el Fondo Mundial para la Diversidad de Cultivos, con el fin de evaluar el valor estratégico mundial de la colección de café en vista de la necesidad de su mantenimiento a largo plazo.
9. En el informe del Gobierno de Papua Nueva Guinea sobre la colección internacional de coco para el Pacífico Sur, se facilita información sobre la reubicación en curso de la colección en el territorio de Papua Nueva Guinea debido a la amenaza de infección por una enfermedad de las plantas. Se señala, asimismo, la posible duplicación de la colección en otros dos países de la región, a saber, Fiji y Samoa. A este respecto, el Órgano Rector podría observar que, en el marco de un proyecto del Fondo de distribución de beneficios recientemente aprobado, se respaldará dicha duplicación⁴. En el informe del Gobierno también se informa del apoyo prestado por los donantes y los proyectos de investigación en curso.
10. Los informes ponen de manifiesto el compromiso continuo de las instituciones contempladas en el artículo 15 con la aplicación integral del Tratado Internacional y los acuerdos concertados con el Órgano Rector. En este contexto, la conservación y distribución de germoplasma es un componente que conduce a actividades de colaboración con asociados locales, regionales e internacionales para alcanzar los objetivos del Tratado Internacional, así como a un compromiso en materia de políticas para la gestión de las colecciones de conformidad con la orientación normativa brindada por el Órgano Rector. Los informes también ofrecen una perspectiva de la situación real, las amenazas y el material disponible en las colecciones, y de las necesidades de fomento de la capacidad conexas, que puede ser de utilidad para los donantes y los asociados técnicos dispuestos a apoyar la gestión de las colecciones.

⁴ Véase el proyecto *Safeguarding threatened coconut diversity within the upgraded International Coconut Genebank for the South Pacific* (Salvaguardia de la diversidad del coco amenazada dentro del Banco Internacional de Germoplasma del Coco para el Pacífico Sur mejorado), en la lista de proyectos aprobados en la cuarta convocatoria de propuestas del Fondo de distribución de beneficios, disponible en: <http://www.fao.org/3/ca5173en/ca5173en.pdf>.

III. OTRAS ACTIVIDADES PERTINENTES

Consultas y aportaciones a los procesos entre reuniones

11. En su séptima reunión, el Órgano Rector pidió al Secretario que, a reserva de la disponibilidad de recursos financieros, mantuviera consultas de carácter regular o periódico con las instituciones que habían estipulado acuerdos en virtud del artículo 15 del Tratado Internacional, con respecto a la aplicación de los acuerdos y las orientaciones normativas, y que presentara informes al Órgano Rector en cada reunión⁵.

12. Durante el bienio 2018-19, las instituciones contempladas en el artículo 15 participaron activamente y realizaron valiosas aportaciones en diferentes procesos entre reuniones, en los que también compartieron sus experiencias en la aplicación del Sistema multilateral y el Sistema mundial de información, en particular mediante la adopción de identificadores digitales de objetos (DOI)⁶. Con respecto a las reuniones del Grupo de trabajo especial de composición abierta para mejorar el funcionamiento del Sistema multilateral, el CGIAR presentó aportaciones sobre una serie de cuestiones que reflejaban experiencias en el cumplimiento de las obligaciones contraídas en virtud de los acuerdos concertados de conformidad con el artículo 15 en relación con el Sistema multilateral. Estas incluían información sobre enfoques prácticos, con un costo mínimo de transacción, para la distribución de germoplasma a los agricultores, así como sobre la adaptación práctica del Anexo 1 del ANTM para permitir, en particular, la distribución de grandes volúmenes de germoplasma y recursos fitogenéticos objeto de mejoramiento.

13. El Secretario celebró consultas y colaboró en el contexto de las actividades de fomento de la capacidad sobre cuestiones de políticas relacionadas con la gestión del germoplasma en el marco del Sistema multilateral y la relación con la aplicación nacional del Protocolo de Nagoya del Convenio sobre la Diversidad Biológica. Dichas consultas incluían cuestiones relacionadas con la distribución de germoplasma de cultivos no enumerados en el Anexo I del Tratado, de conformidad con el artículo 15.1 b) del Tratado Internacional, y la decisión conexas adoptada por el Órgano Rector en su segunda reunión en relación con las notas interpretativas del ANTM⁷.

14. A la luz del amplio alcance de participación de las instituciones contempladas en el artículo 15 en las múltiples líneas de trabajo del Tratado Internacional, es necesario y conveniente seguir manteniendo consultas periódicas entre el Secretario y las instituciones pertinentes sobre la aplicación de los acuerdos, y reforzar dicha práctica.

Apoyo al mantenimiento de las colecciones

15. En su séptima reunión, el Órgano Rector tomó nota de los esfuerzos que se estaban realizando por salvaguardar las colecciones internacionales cuyo correcto mantenimiento estaba en riesgo o amenazado, y pidió al Secretario que continuara ejerciendo sus responsabilidades de conformidad con el artículo 15 del Tratado Internacional, en estrecha colaboración con los gobiernos hospedantes, según correspondiera, y en asociación con otros gobiernos interesados e instituciones pertinentes con capacidad para proporcionar el apoyo técnico y de otro tipo necesario para estos esfuerzos⁸.

16. El artículo 15 del Tratado y los acuerdos celebrados en virtud del mismo prevén que, si el correcto mantenimiento de las colecciones *ex situ* se ve dificultado o amenazado por la circunstancia que fuere, incluidos los casos de fuerza mayor, el Secretario, con la aprobación del país hospedante, deberá ayudar en la medida de lo posible a llevar a cabo su evacuación o transferencia. Con arreglo a los acuerdos, la institución internacional signataria se compromete a ocuparse de estas colecciones

⁵ Resolución 12/2017, párr. 16.

⁶ Los documentos de trabajo y de información para la octava reunión del Órgano Rector, relacionados con el Sistema multilateral y el Sistema mundial de información (temas 8.1 y 10 del programa, respectivamente) contienen información actualizada adicional sobre los progresos realizados en la aplicación por parte del CGIAR y otras instituciones contempladas en el artículo 15.

⁷ El documento IT/GB-8/19/15.4/1, *Informe sobre la cooperación con otros órganos y organizaciones internacionales*, contiene más información sobre las actividades conjuntas de fomento de la capacidad con el CGIAR y Bioversity International en particular.

⁸ Resolución 12/2017, párr. 17.

ex situ y administrarlas de conformidad con las normas aceptadas internacionalmente. A petición de las instituciones internacionales signatarias, el Secretario del Tratado Internacional se compromete a prestar o a movilizar el apoyo técnico apropiado.

17. Sobre la base de ese mandato y de la orientación brindada por el Órgano Rector, el Secretario dirigió los esfuerzos en el bienio 2018-19 hacia dos colecciones *ex situ* amenazadas, a saber, la colección mantenida por el CATIE y el Banco Internacional de Germoplasma del Coco para África y el Océano Índico, con sede en Côte d'Ivoire. El Órgano Rector ya había recibido información sobre las amenazas persistentes para ambas colecciones en su séptima reunión⁹.

18. Además de la información contenida en el informe del CATIE sobre el apoyo provisional del Gobierno de Costa Rica, el Secretario facilitó varias reuniones de alto nivel, o asistió a ellas, tanto en Roma como en San José, para alertar sobre la importancia de la colección de germoplasma que el CATIE mantenía en el ámbito del Tratado Internacional. Entre ellas, cabe citar las reuniones entre el Director General y la Administración superior de la FAO y el Gobierno de Costa Rica, representado por el Ministro de Agricultura y Ganadería. Más recientemente, en una carta del Director General de la FAO dirigida al Ministro de Agricultura y Ganadería, en respuesta a la solicitud de asistencia, se subraya el papel fundamental del Tratado Internacional en el mantenimiento y fomento del sistema mundial de conservación del germoplasma. Se pidió asimismo al Subdirector General responsable del Departamento de Clima, Biodiversidad, Tierras y Aguas de la FAO, y al Secretario que ayudaran a facilitar la movilización de recursos y la asistencia técnica de las Partes Contratantes, los donantes institucionales y los asociados técnicos.

19. Con respecto a la colección del coco albergada en Côte d'Ivoire, la Secretaría, en cooperación con la Representación de la FAO en Côte d'Ivoire, contribuyó a tres misiones de asesoramiento solicitadas por el Gobierno de Côte d'Ivoire y dirigidas por el Centro de Cooperación Internacional en Investigación Agronómica para el Desarrollo (CIRAD) francés, en octubre de 2018 y en abril y junio de 2019, con el fin de evaluar las opciones para la reubicación de la colección. La estación Marc Delorme alberga el Banco Internacional de Germoplasma del Coco para África y el Océano Índico, que comprende 49 muestras, entre ellas, 11 muestras únicas de cocoteros. El Centro Nacional de Investigación Agrícola (CNRA) se ocupa de la estación. El lugar del banco de germoplasma se ha vendido y se ha clasificado como terreno para el desarrollo urbano, lo que supone una grave amenaza para la colección y los ensayos relacionados. En los estudios de viabilidad y de costos resultantes de las misiones se subraya que, dado que la salvaguardia de la colección internacional es una prioridad absoluta, se podrían adoptar diversas medidas para mantenerla, entre ellas, la congelación y la conservación de polen, la recolección y la conservación *in vitro* de embriones zigóticos, o su criopreservación, con el apoyo de Côte d'Ivoire o de otro país. Además, sería conveniente llevar a cabo una duplicación de las muestras más importantes de la colección en otros lugares de Côte d'Ivoire, y posiblemente fuera del país. Se evaluaron todos los aspectos técnicos y financieros de los diferentes módulos de trabajo relativos a la reubicación de la estación, incluidos los módulos para la criopreservación de polen y embriones. El Gobierno de Côte d'Ivoire podría señalar a la atención de la comunidad internacional las estimaciones de los costos resultantes de dicha operación, para respaldar el rescate y la transferencia de la colección. Como seguimiento inmediato, ya se ha preparado una nota de exposición de conceptos de la primera fase que se ha presentado a un mecanismo de financiación bajo la dirección del coordinador interino de la Red internacional de recursos genéticos del coco (COGENT) de Bioversity International. En la nota de exposición de conceptos se solicitan fondos para apoyar la colección de embriones de 20 muestras prioritarias, la conservación *in vitro*, la criopreservación y la transferencia de embriones fuera de Côte d'Ivoire.

⁹ Documento IT/GB-7/17/17/24, *Informes de las instituciones que han estipulado acuerdos con el Órgano Rector de conformidad con el artículo 15 del Tratado Internacional*, párrs. 13 y 14, disponible en: <http://www.fao.org/3/a-mu437s.pdf>.

20. Con miras a establecer una cooperación con la Comunidad Internacional del Coco (ICC), como nuevo anfitrión y coordinador de la Red COGENT, de conformidad con una decisión adoptada por el Comité Directivo de la Red COGENT en octubre de 2017, el Secretario facilitó la transferencia oficial de esas funciones de Bioversity International a la Comunidad Internacional del Coco, mediante un acuerdo entre ambas instituciones. La FAO señalará el acuerdo a la atención de los gobiernos hospedantes que firmaron acuerdos en virtud del artículo 15 del Tratado Internacional o los acuerdos anteriores concertados con la FAO relativos a los materiales mantenidos en depósito. Un representante de la Secretaría asistió a la Conferencia Ministerial de la Comunidad Internacional del Coco en agosto de 2019, donde la ICC y Bioversity International firmaron oficialmente el acuerdo relativo a la transferencia de las funciones para coordinar y acoger la Red COGENT. El representante de la Secretaría se dirigió a la Conferencia Ministerial para presentar las posibilidades que ofrecía el Tratado Internacional, en particular mediante los acuerdos concertados en virtud del artículo 15, en lo referente a la seguridad jurídica y el apoyo operativo a las colecciones de la Red COGENT.

Nuevos acuerdos

21. En su séptima reunión, el Órgano Rector pidió al Secretario que prosiguiera sus esfuerzos para lograr acuerdos con otras instituciones internacionales pertinentes de conformidad con el artículo 15 del Tratado¹⁰. En marzo de 2019, el ICBA y la FAO, en nombre del Órgano Rector del Tratado Internacional, firmaron un acuerdo que incluía la colección internacional de germoplasma que albergaba el ICBA en el ámbito del Tratado Internacional¹¹. En este contexto, el Secretario está facilitando, en cooperación con el Fondo Mundial para la Diversidad de Cultivos, la documentación de la colección de germoplasma en línea, para su futura inclusión en la plataforma Genesys y su vinculación con el Sistema mundial de información a través de los identificadores digitales de objeto. Para fomentar la cooperación en el marco del Tratado Internacional, el ICBA acogerá la reunión regional del Cercano Oriente de preparación de la octava reunión del Órgano Rector, en septiembre de 2019. Paralelamente a la reunión regional, la Secretaría también organizará un taller interno de capacitación para el personal del ICBA sobre la aplicación del acuerdo concertado en virtud del artículo 15.

22. En lo que respecta a las colecciones de la Red COGENT, el Secretario está celebrando consultas con el Gobierno de Indonesia, que alberga la colección internacional de coco para Asia sudoriental y oriental, en relación con la posible celebración de un acuerdo en virtud del artículo 15 del Tratado que sustituya al acuerdo firmado con la FAO en 1999 relativo a las colecciones mantenidas en depósito. La inclusión de todas las colecciones actuales y futuras de la Red COGENT en el ámbito del Tratado Internacional constituye una esfera de posible cooperación con la Comunidad Internacional del Coco en el futuro.

23. El Secretario mantiene actualmente conversaciones con el Consejo Oleícola Internacional (COI) sobre posibles ámbitos de colaboración, incluida la perspectiva de concertar un acuerdo con el COI en virtud del artículo 15 del Tratado Internacional con respecto a las colecciones de campo que recaen en el ámbito de competencia del COI.

IV. ORIENTACIÓN QUE SE SOLICITA

24. Se invita al Órgano Rector a considerar los informes y la información presentados en este documento, así como a brindar orientación, teniendo en cuenta los elementos de una posible resolución que figuran en el Apéndice 1 de este documento.

¹⁰ Resolución 12/2017, párr. 19.

¹¹ El texto del acuerdo está disponible en inglés en: <http://www.fao.org/3/ca4349en/ca4349en.pdf>.

APÉNDICE 1**Proyecto de Resolución XX/2019****Cooperación con otros órganos y organizaciones internacionales****Parte II: Instituciones mencionadas en el artículo 15****EL ÓRGANO RECTOR,**

Recordando las disposiciones del artículo 15.1 del Tratado Internacional;

1. **Toma nota** de la información proporcionada en los informes de las instituciones que han estipulado acuerdos en virtud del artículo 15 del Tratado Internacional y **elogia** a aquellas instituciones que presentaron informes por los valiosos contenidos, además de **alentarles** a continuar facilitando información similar en futuras reuniones del Órgano Rector;
2. **Invita** a las instituciones que no hayan presentado informes a hacerlo en la novena reunión del Órgano Rector y **pide** al Secretario que comunique esta invitación a dichas instituciones;
3. **Pide** al Secretario que, a reserva de la disponibilidad de recursos financieros, siga manteniendo consultas de carácter regular o periódico con las instituciones que han estipulado acuerdos en virtud del artículo 15 del Tratado Internacional, con respecto a la aplicación de los acuerdos y las orientaciones normativas, y que presente informes al Órgano Rector en cada reunión;
4. **Toma nota** de los esfuerzos en curso para garantizar la seguridad de las colecciones internacionales cuyo correcto mantenimiento está en peligro o amenazado y **agradece** en particular a los gobiernos de Costa Rica, Côte d'Ivoire y Papua Nueva Guinea sus esfuerzos para contribuir al correcto mantenimiento de las colecciones que albergan;
5. **Pide** al Secretario que continúe ejerciendo sus responsabilidades y prestando apoyo de conformidad con el artículo 15 del Tratado Internacional, en estrecha colaboración con los gobiernos hospedantes, según corresponda, y en asociación con otros gobiernos interesados e instituciones pertinentes con capacidad para prestar el apoyo técnico y de otro tipo necesario para estos esfuerzos;
6. **Invita** a las Partes Contratantes, los donantes y otras partes interesadas a prestar el apoyo financiero y material necesario para facilitar dichos esfuerzos;
7. **Acoge con beneplácito** a la Comunidad Internacional del Coco (ICC) como nuevo anfitrión y coordinador de la Red internacional de recursos genéticos del coco (COGENT) e **invita** a la ICC a reforzar su colaboración con el Secretario en la aplicación de los acuerdos concertados en virtud del artículo 15 del Tratado, especialmente en lo que respecta al correcto mantenimiento de las colecciones bajo su coordinación y a concertar acuerdos para que otras colecciones internacionales de coco se mantengan bajo los auspicios del Tratado Internacional; **invita** a los gobiernos hospedantes de las colecciones de coco que aún no lo hayan hecho a firmar acuerdos en virtud del artículo 15 del Tratado Internacional;
8. **Acoge con agrado** el acuerdo suscrito con el Centro Internacional de Agricultura Biosalina (ICBA), e **invita** al ICBA a reforzar la cooperación con el Secretario y las instituciones pertinentes para la aplicación del acuerdo y la orientación normativa;
9. **Pide** al Secretario que siga esforzándose para lograr acuerdos con otras instituciones internacionales pertinentes que cumplan los requisitos del artículo 15 del Tratado Internacional.

APPENDIX 2

Report by the eleven CGIAR Centers that signed agreements under Article 15 of the Treaty

Executive Summary

This report provides an update on the status of the PGRFA collections maintained by the eleven CGIAR Centers that signed Article 15 agreements with the Governing Body in 2006. As of December 31, 2018, these Centers held over 758,000 accessions of crop, forage, and tree germplasm which they maintain in their genebanks and make available under the SMTA.

During the first 12 years of their operation under the ITPGRFA framework, from January 2007 to December 2018 inclusive, the Centers' genebanks and breeding programs combined distributed over 5 million PGRFA samples under almost 58,000 SMTAs. 31% was sent to recipients in Asia, 20% to recipients in African, 16% to recipients in Latin America and the Caribbean, 14% to the Near East, and 13%, 5% and 1% to Europe, North America and South West Pacific, respectively.

Centers engage in a range of activities, both on their own, and collectively, to maintain the quality of, and add value to, the PGRFA collections which they hold, on behalf of the international community, under the ITPGRFA framework. This report highlights a range of such activities including Centers' efforts to: maintain collections free of pests and diseases; develop tools and methods to identify gaps in the international collections; measure genetic diversity within genebank accessions; and develop genebank quality management systems.

Since the 7th session of the Governing Body in 2017, CGIAR has been actively engaged in a range of intersessional policy making processes under the ITPGRFA framework. The most important such process for CGIAR has been the negotiations to enhance the functioning of the multilateral system of access and benefit-sharing. The outcome of these negotiations is critically important to the CGIAR Centers, both as hosts of international PGRFA collections and as international public organizations engaged in plant breeding and agricultural development. The outcomes of these negotiation could have profound effects on the conservation, and sustainable use of PGRFA, equitable benefit sharing, and ultimately, long-term development outcomes. This report includes a summary of measures which CGIAR considers important to include/reflect in the final package of measures adopted by the Governing Body to enhance the multilateral system, and which have been stressed by CGIAR representatives, over the course of the last two years, at the meetings of the Working Group to Enhance the Functioning of the Multilateral System.

CGIAR Centers are actively promoting Farmers' Rights in the context of much of their agricultural research and development activities. In 2018 and 2019, CGIAR Centers participated in meetings of the Ad Hoc Technical Expert Group on Farmers' Rights, and made written submissions to those meetings drawing on their experiences. Those submissions are made available through links included in this report.

The CGIAR Centers have participated actively in a number of processes under the ITPGRFA framework including the development of the Global Information System (GLIS), the FAO/Bioversity/Treaty Secretariat Joint Program to strengthen capacities to implement the multilateral system, the Ad Hoc Technical Committee on Sustainable Use of Plant Genetic Resources for Food and Agriculture (ACSU). Details of those activities, and links to written submissions from CGIAR are provided in this report.

Centers are increasingly taking advantage of technological advances to generate and analyze genetic sequence data to enhance the abilities to conserve PGRFA, use it sustainably, and generate and share benefits. Through this report, CGIAR shares a 34 page report it previously submitted to the CBD's Ad Hoc Technical Expert Group that describes how Centers' genebanks and breeding programs are using digital sequence information. This report is relevant to the discussions that the Governing Body will

have with respect to digital sequence information during its eighth session, in the framework of the development of the ITPGRFA's multiyear programme of work.

I. Introduction

CGIAR routinely makes reports to the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), with respect to their experiences operating under the framework of their 2006 Article 15 agreements with the Governing Body, and their contributions to the implementation of the ITPGRFA more generally.¹

These reports always include core information about holdings and distributions of PGRFA by the Centers under the ITPGRFA framework, and CGIAR contributions to Treaty-related activities and outcomes over the previous biennia.

In addition, CGIAR takes advantage of these biennial reports to highlight different aspects of our management and use of PGRFA. For example, our report to the Seventh Session of the Governing Body in 2017 featured additional focus on CGIAR Centers' characterization and plant breeding activities, how Centers' distribute PGRFA under Development, and the new CGIAR structure. This report features additional information about the Centers' management of ex situ collections, including efforts to ensure germplasm health, develop genebank Quality Management Systems, identify gaps in PGRFA collections, and use of digital sequence information to analyze genetic diversity within accessions.

CGIAR is making an additional, separate submission to this session of the Governing Body in response to Resolution 4/2017.

II. Holdings and distributions under the ITPGRFA framework

A. HOLDINGS

The eleven CGIAR Centres that signed Article 15 agreements with the Governing Body of the ITPGRFA in 2006 currently conserve and make available, using the standard material transfer agreement (SMTA), a total of 758,221 accessions of crop, tree and forage germplasm. Details concerning the Centres, crop collections and numbers of accessions available for distribution under the SMTA are included in Table 1.

Every year, the CGIAR Genebank Platform, which is coordinated by the Global Crop Diversity Trust, publishes an annual report concerning the Centers' management of the Article 15 collections, which are available on line.² Governing Body representatives are encouraged to familiarize themselves with those reports, which include much more information about the management of those collections than can be included in the CGIAR biannual reports to the Governing Body.

Table 1: PGRFA conserved and made available by CGIAR Centres' genebanks pursuant to their Article 15 agreements with the Governing Body

Center	Crop	Accessions available with SMTA
AfricaRice	Rice	21,300
Bioversity	Banana	1,566
CIAT	Beans	37,938

¹ CGIAR reports to the Second, Third, Fourth, Sixth and Seventh Sessions of the Governing Body are available at <http://www.fao.org/3/a-be157e.pdf>, <http://www.fao.org/3/a-be109e.pdf>, <http://www.fao.org/3/a-be118e.pdf>, <http://www.fao.org/3/a-mo439e.pdf>; and <http://www.fao.org/3/a-mu437e.pdf> respectively

² All of the Genebank Platform annual reports, from 2012 to 2018 are available at <https://www.genebanks.org/resources/annual-reports/>

	Cassava	6,155
	Forages	22,694
CIMMYT	Maize	28,494
	Wheat	155,325
CIP	Andean roots & tubers	1,178
	Potato	7,049
	Sweetpotato	7,967
ICARDA	Barley	32,160
	Chickpea	15,324
	Faba bean	9979
	Forages	27,466
	Grasspea	4,334
	Lentil	13,519
	Pea	6,129
	Wheat	42,982
ICRAF	Fruit trees	8,246
	Multipurpose trees	6,336
ICRISAT	Chickpea	19,266
	Ground nut	15,039
	Pearl millet	23,414
	Pigeon pea	13,482
	Small millets	11,691
	Sorghum	40,332
IITA	Banana	393
	Cassava	3,184
	Cowpea	17,051
	Maize	1,561
	Miscellaneous legumes	6,623
	Yam	5,839

ILRI	Forages	18,639
IRRI	Rice	125,566
	Total	758,221

Source: Global Crop Diversity Trust/CGIAR On-line Reporting Tool, covering period up to December 31, 2018.

On World Food Day, 16 October 2018, IRRI and the Global Crop Diversity Trust signed an agreement whereby IRRI will receive 1.4 million USD/year, in perpetuity, to support the maintenance of the international rice collection it hosts under the ITPGRFA framework. It is anticipated that other collections hosted by CGIAR Centers will eventually benefit from similar forms of 'in perpetuity' support from the Global Crop Diversity Trust.

B. DISTRIBUTIONS OF PGRFA BY CGIAR CENTERS

In total, the CGIAR Centers have distributed over five million PGRFA samples under approximately 57,000 SMTAs during the 12 years they have been operating under the ITPGRFA framework. The majority of the PGRFA distributed were improved materials from the Centers' breeding programs. While it varies from year to year, twenty to twenty-five percent of the materials distributed are from the genebanks. Table 2 provides details of materials distributed (from both genebanks and breeding programs³) by each CGIAR Center.

Table 2: CGIAR Centers' transfers of PGRFA with SMTAs, 2007 to 2019.

Center	SMTAs	Samples	PUD	From	To
AfricaRice	521	47,806	28,821	2007-03-05	2018-11-23
Bioversity	460	7,189	730	2007-01-24	2018-12-12
CIAT	2,672	257,594	36,544	2007-01-05	2019-02-19
CIMMYT	23,275	2,758,519	0	2007-03-16	2018-12-30
CIP	674	19,053	11,488	2007-01-19	2019-07-01
ICARDA	14,049	967,368	862,881	2007-02-13	2018-12-23
ICRAF	223	969	0	2011-09-03	2018-12-20
ICRISAT	5,172	226,844	64,690	2009-11-11	2019-02-04
IITA	806	33,805	0	2007-03-07	2018-12-04
ILRI	858	10,810	0	2007-02-22	2018-12-05
IRRI	8,115	689,586	407,022	2007-01-04	2018-12-19
Total	56,825	5,019,543	1,412,176		

Source: ITPGRFA Secretariat

³ Not all Article 15 Centers have breeding programs, e.g., Bioversity, ICRAF, ILRI.

Eighty-one percent of the materials referred to in Table 2 were sent to recipients in developing countries. Eighteen percent was sent to recipients in developed countries. More details concerning regional distributions of PGRFA by CGIAR Centers are provided in Figure 1.

Figure 1: Regions of recipients of germplasm from CGIAR Centers' genebanks and breeding programs 2007-2018 inclusive.

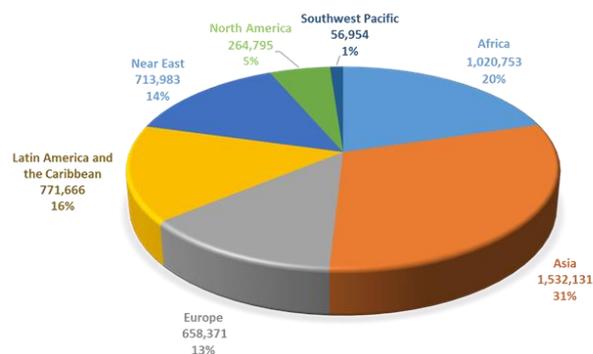
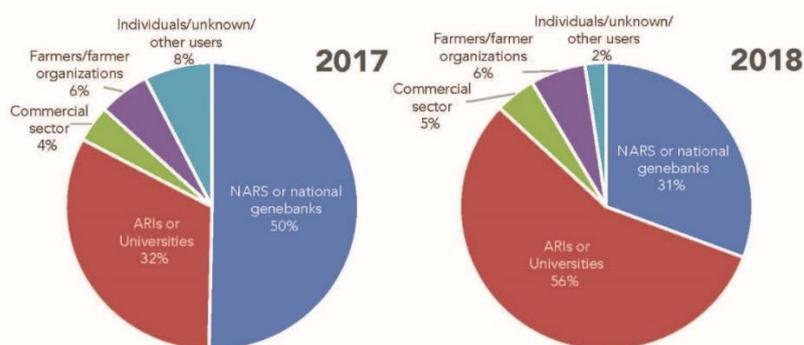


Figure 2 provides percentages for each type of recipients of materials from the CGIAR Genebanks⁴, with the largest groups being NARS and national genebanks (in 2017) and advanced research institutes and universities (in 2018). The smallest group of recipients both years was the commercial sector.

Figure 2: Types of recipients of germplasm distributed by CGIAR genebanks



C. DISTRIBUTION OF NON-ANNEX 1 MATERIALS

Only 1% of the PGRFA distributed by the Centers belongs to non-Annex 1 crops. Following the decision of the Second Session of the Governing Body in 2009, the CGIAR Centers have been using the SMTA to distribute non-Annex 1 materials from their in trust germplasm collections and other materials acquired with permission from the providers for the Centre to make it available using the

⁴ Reports of SMTA transfers by providers to the Secretariat/Governing Body, following GB Resolution 5/2009, do not identify general classes of recipients (e.g., public research organizations, seed company, farmer, genebank, etc). CGIAR/GCDT collect such information independently for the genebanks. There is no centralized system for recording this information from the CGIAR breeding programs. To address this gap, CGIAR and Treaty Secretariat are developing mechanisms through which Centers can voluntarily report types of recipients when they report their SMTA transfers in the future. Given that this information, at an aggregate level, is critically important for monitoring the overall performance of the multilateral system, CGIAR would like to encourage all providers to voluntarily report this data in the future (and the Secretariat to provide requisite support).

SMTA. Since that time, the CGIAR Centers have communicated repeatedly to the Governing Body that they would like to continue this practice. While the amount of non-annex 1 materials distributed by the Centers is small, transaction costs associated with maintaining a system for distributing non-Annex 1 materials differently from Annex 1 materials would be significantly greater. The Centers appreciate the administrative efficacy of being allowed to use the same transfer instrument for both Annex 1 and non-Annex 1 materials.

D. PREVENTION OF TRANSBOUNDARY SPREAD OF PESTS AND PHYTOSANITARY SAFETY OF GERMPLASM

Transboundary spread of pathogens, pests and noxious weeds (collectively referred as pests) are one of the biggest threats to global food security and biodiversity. The global movement of agricultural commodities, including germplasm, have been recognized as a major contributor for transboundary spread of pests, due to their inherent ability to serve as carriers of pests. Introduction of exotic pests can have devastating consequences as exemplified by the recent outbreaks of fall army worm in Africa and Asia, wheat blast in Bangladesh and maize lethal necrosis in East Africa. The CGIAR Centers recognize pests as a serious threat to germplasm collections, conservation, regeneration and distribution. The Centers' Germplasm Health Units (GHUs), which are supported through the Genebanks Platform, in conjunction with the national plant protection organizations (NPPOs), ensure compliance with the phytosanitary and quarantine measures of the FAO-International Plant Protection Convention (IPPC). These measures include production of pest-free germplasm, germplasm health indexing using a range of standard methods to ascertain germplasm freedom from quarantine pathogens, and procurement of phytosanitary permits from NPPOs to fulfil the phytosanitary obligations prescribed by the recipient countries.

In 2018, the 11 Article 15 Centers' GHUs tested a total of 175,064 samples of 81,507 PGRFA accessions conserved in CGIAR genebanks. This process eliminated 11,554 (6.6%) samples infected with pests which were replaced with healthy stocks (Table 3). NB: much of this testing is routinely conducted, including when materials are regenerated by the genebanks.

With respect to germplasm distributed or acquired by the genebanks, in 2018, GHUs tested 3,774 samples coming into genebanks and 9,951 distributed by the genebanks. Out of the tested materials, 56 samples coming into the genebanks, and 1,022 samples that were to be distributed were found to be infected, and were subsequently eliminated.

With respect to the acquisition and distribution of germplasm from Centers' breeding programs, in 2018, GHUs tested 10,236 samples received, and 61,326 samples distributed, by those programs.

Most of the pests detected are native to specific species. Viral pathogens are most frequently intercepted in seed of legumes and in clonal crops. Centers only distribute germplasm that is free of quarantine pests. On occasion, considerable resources are required in the form of staff time, testing facilities and multiple tests (at an average cost of \$10 per sample) to ensure that materials are healthy before being distributed.

Table 3: Germplasm samples from CGIAR genebanks processed for conservation and distribution in 2018

Center	Total accessions analysed	Total samples analysed	Total samples rejected	Total diagnostic reactions
AfricaRice	1,459	1,710	-	2,610
Bioversity	192	374	92	1104
CIAT	10,520	12,145	1,348	61,255

CIMMYT	8,194	1,489	151	22,778
CIP	2,420	7,342	702	56,057
ICARDA	30,178	24,328	446	309,472
ICRAF	531	531	-	-
ICRISAT	6,778	6,792	842	13,585
IITA	7,846	118,614	7,074	138,505
ILRI	1,204	1,739	256	6,922
IRRI	12,185	-	643	-
Total	81,507	175,064	11,554	612,287

(Source: Global Crop Diversity Trust/CGIAR On-line Reporting Tool)

The CGIAR GHUs have invested in research and development to create new tools and procedures for phytosanitary cleaning of germplasm and seed health indexing. In 2018, The GHUs made significant progress improving technologies for clonal crop virus indexing, for example, through developing and adapting a small RNA Sequencing Analysis (sRSA)-based high-throughput sequencing (HTS) method. This is an excellent method for testing the presence or absence of regulated quarantine viruses in planting materials. Research and development efforts were also initiated to develop non-invasive seed health testing methods based on multi-spectral imaging technologies as an alternative to laborious and time-consuming conventional seed health testing methods.

Several achievements were reached in 2018 in various Centers: (i) development and application of molecular virus indexing method for the detection of frogskin-associated viruses in cassava increased the availability of the CIAT cassava collection from 9% in 2017 to 78% by end of 2018; (ii) a new protocol for maize seed sampling for maize lethal necrosis (Maize chlorotic mottle virus) testing was developed for maize seed health testing by CIMMYT; (iii) a new ELISA method was developed for testing bacterial blight (*Xanthomonas axonopodis* pv. *Phaseoli*) pathogen in cassava germplasm; (iv) feasibility study has been conducted for testing Banana mild mosaic virus in botanic seed and embryos of *Musa* spp.; (v) improved wheat seed treatment methods contributed to the decrease in percent of infected wheat accessions with common bunt from 1.7% (during 2014) to 0.06% (during 2018) at ICARDA; (vi) Plant Pathology Laboratory Management System for GHU data management was developed for efficient data management by CIP; and (vii) efficacy of 17 fungicides were tested to identify the best fungicide composition to improve ground seed phytosanitation by ICRISAT.

In addition, GHUs have been working towards developing a quality accredited system termed as the 'GreenPass' protocol. The GreenPass would enable rapid distribution of "phytosanitary-clean" germplasm from CGIAR Centers to partners. Consultation with key stakeholders, including FAO International Plant Protection Convention (FAO-IPPC), FAO and National Plant Protection Organizations were initiated in 2017 and 2018 to identify needs and develop a roadmap for exploring/developing a GreenPass protocol. If adopted, the 'GreenPass' protocol would avoid delays in germplasm distribution due to redundant phytosanitary procedures.

In 2018, GHUs organized at least one workshop in each of the eleven Article 15 Centers to train internal staff and national partners in application of phytosanitary procedures and seed health indexing using a range of conventional and molecular methods. At least 100 national partners benefited from the GHU capacity development efforts through various training workshops organized in the 11 Centers.

As part of the GHU Community of Practice (GHU CoP), GHUs have organized a phytosanitary awareness month (October -November 2018) focussing on the topic “GHUs in combating invasive pests and diseases”. All GHUs organized activities to raise awareness about the importance of phytosanitary health, emerging transboundary pests and pathogens, new risks to germplasm health and GHUs preparedness to tackle challenges.

GHUs have pro-actively aligned with the FAO-IPPC in promoting the UN International Year of Plant Health 2020 (IYPH 2020). Formal linkages with the FAO-IPPC Secretariat have been established for GHU participation in IYPH2020 to highlight “phytosanitary safety in prevention of transboundary spread of pests”. GHUs will organize various events together with national and regional partners to promote the IYPH in 2020.

E. PGRFA UNDER DEVELOPMENT

CGIAR provided details in reports to the last two sessions of the Governing Body concerning Centers' management of PGRFA under Development. In this report, therefore we only provide a few highlights.

Some Centers identify all their improved materials derived from multilateral system germplasm as PGRFA under development. Other Centers choose not to do so when they are not adding terms and conditions to those in the SMTA when distributing PGRFA under Development. Centers may (and frequently do) introduce Center-improved materials into the genebanks, where they receive accession numbers, and are distributed along with other materials in the genebanks.

When transferring PGRFA under Development, Centres may impose one or more of the following obligations upon recipients, requiring them to:

- share characterization, evaluation, research data;
- acknowledge the sources of materials if/when research findings and data are published;
- obtain approval before passing the material to subsequent recipients;
- either notify, or obtain approval before seeking to register or commercialize new varieties incorporating the PGRFA under Development;
- provide a sample of any released varieties to the genebank;
- acknowledge the provider when derived material is commercialized;
- not commercialize the material in the form received; and
- acknowledge that the PGRFA under Development is the intellectual property of the Provider.

In addition to needing to comply with the ITPGRFA and the SMTA, the Centres' management (including distribution) of PGRFA under Development also must be compliant with the CGIAR Principles on the Management of Intellectual Assets (IA Principles).⁵ The IA Principles underscore that access to PGRFA must be facilitated in accordance with the ITPGRFA and provide guidance on how the CGIAR Centres can exercise the discretion they have as Providers of PGRFA under Development under the ITPGRFA. The IA Principles address (and limit) the kinds of restrictions that Centres can place on Centre-improved materials and establish threshold criteria for justifications that Centres must satisfy for creating such restrictions. More information about the IA Principles are provided in 'The status of implementation of the CGIAR Principles on the Management of Intellectual Assets: a submission from CGIAR to the Eighth Session of the Governing Body of the ITPGRFA'.

⁵ The full text of the Intellectual Asset Principles is available at <https://hdl.handle.net/10947/4486>

III. Highlights of additional activities to manage/add value to international PGRFA collections maintained by CGIAR Centers

A. USE OF DIGITAL OBJECT IDENTIFIERS UNDER THE GLOBAL INFORMATION SYSTEM (GLIS DOIS)

As of end of May 2019 781,514 GLIS DOIs have been assigned to materials hosted by CGIAR Centers. See Table 4 for details. Almost all of these DOIs have been assigned to materials that are accessioned in Centers' genebanks, including landraces, wild relatives, and Center-improved materials (i.e., breeding and elite lines) that Centers have decided to conserve long term and make available through the Multilateral System). There have been a few pilot programs to assign DOIs to Centers' breeding materials, but CGIAR Centers are not currently minting GLIS DOIs for breeding materials in a systematic manner. Some Centers have organized seminars on the advantages of assigning GLIS DOIs for breeders' materials, and discussions are ongoing on how to best integrate DOIs in breeders' work, including by linking genebanks' databases with the breeders' databases.

Table 4: Numbers of DOIs minted, per Center, as of May 21, 2019

Center	PGRFA with GLIS DOIs
AfricaRice	21,300
Bioversity	1,598
CIAT	67,770
CIMMYT	204,646
CIP	17,982
ICARDA	156,901
ICRAF	12,999
ICRISAT	120,431
IITA	34,651
ILRI	18,639
IRRI	124,597
TOTAL	781,514

Source: GLIS, May 21, 2019

Most Centers already include, or are in the process of putting systems in place to include, GLIS DOIs of germplasm in Annex 1 of the SMTA when transferring PGRFA samples from the genebanks to requestors. By the end of 2019, nine out of the eleven Article 15 Centers will be routinely providing GLIS DOIs with the SMTA. In addition, some centres include DOIs on seed packages, envelopes or tubes containing germplasm for distribution.

GLIS DOIs are displayed on the websites of all eleven Centers and Genesys (<https://www.genesys-pgr.org/welcome>) when users search for and order germplasm conserved in the CGIAR genebanks. In addition, GLIS DOIs of Musa accessions maintained by Bioversity International are included in the databases of the Musa Germplasm Information System (MGIS, <https://www.crop-diversity.org/mgis/>).

The CIP genebank also maintains a search and order system that includes DOIs linking accession and trait information. Similarly CIMMYT is planning to include DOIs of all the wheat and maize accessions maintained in CIMMYT genebank in the databases of Germinate (<https://ics.hutton.ac.uk/get-germinate/>). These public databases (MGIS and Germinate) provide phenotypic and genotypic data in addition to passport data.

Some Centers have started to include GLIS DOIs in online platforms that focus primarily on genomic sequence information, like the Banana Genome Hub (<https://banana-genome-hub.southgreen.fr/>) and the rice-specific platform SNP-Seek (<http://snp-seek.irri.org/>). It appears that GenBank, GigaDB, EMBL-EBI and other online platforms which are widely used for uploading big data in biology and genetics are not equipped to handle GLIS DOIs. They would likely need to adjust their databases to include this information and to facilitate the linking with the GLIS.

Given that DOIs were minted only recently there has not been much time for scientists to include them in papers submitted to journals for publication. That said, scientists from a few Centers have already published peer reviewed journal articles which include GLIS DOIs of the germplasm involved in the work described in the articles. Additional papers including DOIs have been submitted to journals and are being reviewed. Centers, and likely all other DOI users, are encountering challenges referencing GLIS DOIs in journal articles. A major attraction of the DOI system is the potential to associate GLIS DOIs for PGRFA with DOIs for associated information, such as DOIs for publications and online datasets, thus bringing associated information within the scope of GLIS and ensuring that it does in fact remain associated with the PGRFA it describes. However, the technology to do so automatically is currently unable to retrieve DOIs that are embedded in the main body of a publication, including text, tables, figures and supplementary information. Currently, to enable GLIS to automatically discover the GLIS DOIs referred to in a publication, all those GLIS DOIs must be listed in the reference section. However, listing PGRFA in the reference section is not standard practice, so journal editors need to develop and implement appropriate new standards. CGIAR scientists are working closely with journal editors and with the Treaty Secretariat to implement appropriate standards for listing GLIS DOIs in references; and in the longer term to seek an improved solution. Of course, in the meantime, users can easily upload to GLIS links to associated information in any of the ways developed by the Treaty Secretariat.

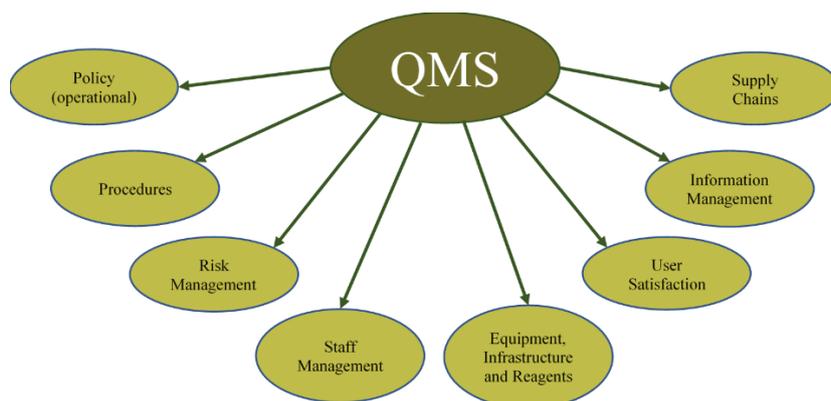
More information on Centers' uses of GLIS DOIs are available in a recent submission from CGIAR to the GLIS Steering Committee which is available on line.⁶

B. QUALITY MANAGEMENT SYSTEMS

The CGIAR Centers' genebanks continue to elevate the standards of their operations through various quality management systems. CIP is currently accredited to the ISO 17025:2017 standard through the United Kingdom Accreditation Service while CIMMYT has applied for a re-certification to the ISO 9001:2015 standard through SAI Global. The remaining nine genebanks follow the “Genebank QMS”, a tailored QM system supported by the CGIAR Genebank Platform and the Global Crop Diversity Trust. In 2018, the Genebank QMS expanded its basic areas of QMS to include eight elements which are documented, audited and improved periodically. Fig 3 below shows the eight areas which are part of the Genebank QMS.

Fig. 3. CGIAR genebanks document activities in eight QMS areas (above) and improve them through internal audits and external reviews.

⁶ CGIAR Centers' use of Digital Object Identifiers (DOIs): a submission to the Advisory Committee on the Global Information System, available at <https://hdl.handle.net/10568/102457>



Currently the Genebank Assessment System provides both internal and external assessments that evaluate the degree to which continual improvements are made and adherence to international standards. Internal documentation audits and external reviews are undertaken by independent consultant(s) with both quality management and relevant technical expertise. During 2018-2019, the genebanks underwent internal documentation audits of six procedures: acquisition, conservation, regeneration, characterization, safety duplication and distribution. The audits were conducted in collaboration with the Genebank Platform Policy Module and the Centers' GHUs to ensure a seamless integration of genetic resources policies and phytosanitary health into operational procedures. To date, 367 improvements have been made through the internal auditing system.

System-wide external reviews of the genebanks are executed under the CGIAR Genebank Platform with the purpose of assessing workflow efficiency and optimization, germplasm use (DOIs, subsets), trend analysis, and partnerships (GHU's, breeders, CRPs, NARS and regional). Experts may also provide an independent assessment of the effectiveness of the information and quality management systems and the degree to which these ensure that genebanks meet regulatory policy and achieve continual improvement. External assessments are conducted every 5-6 years and provide recommendations for improvement that are incorporated into the annual quality improvement plans (QIPs). All CGIAR genebanks are being reviewed for the second time during 2019-2020.

On an annual basis, genebank managers develop QIPs to address pending findings/recommendations, purchase new technologies or tools and optimize operations, equipment or facilities. The QI plan represents an individualized strategy that integrates all areas of development and progress, and, in particular, ensures that any pending recommendations are resolved and funds are carefully justified. QIPs are submitted for approval to the Genebank Platform at the beginning of each year.

In 2018, improvement actions were cross-referenced with conservation standards and key performance indicators (KPIs) and ownership, deadlines and estimated costs were allocated to the activities. Development of improvement activities in association with standards and indicators allows for the precise identification of the standard's requirements and the measurement of progress.

The CGIAR Genebank Platform has supported capacity building for QMS for scientists and research managers from both CGIAR Centers and national agricultural research programs. At least one Genebank Operations and Advanced Learning (GOAL) workshop is coordinated annually. Genebank staff from both inside and outside the CGIAR discuss updates, research results and best practices. Discussion groups share or formulate standards and SOPs and develop improvement plans as outputs of these meetings. During 2018, GOAL-QMS workshops were held in Lebanon and the Philippines and in 2019, QMS workshops are planned in Portugal, Côte d'Ivoire and Niger.

C. GENESYS

Genesys continues to evolve to serve the genetic resources community and users for accession-specific information from both the CGIAR's and national programs' genebanks globally. Under the framework of the CGIAR Genebank Platform and in cooperation with the Global Crop Diversity Trust, Centers

have continued to contribute to Genesys' development. In 2018, about 50% of the 4.2 million historic and active accession records was updated (i.e. confirmed) in Genesys. Data from CGIAR genebanks is, for the most part, complete and up to date.

The Genesys infrastructure and systems were actively maintained and updated throughout 2017-2018 with key changes and updates to the database and website. The following paragraphs summarize these advances.

In 2018, a new Genesys website was tested (<https://beta.genesys-pgr.org>) aimed at consolidating and simplifying frontend development. API endpoints were developed to enable authorized users to access parts of the Genesys database in their own websites and tools. The Genesys Upload Wizard for GRIN-Global is an example of one of the tools using the new APIs. Completion of data migration and launching of the new website is expected in 2019.

The Genesys Phenotypic Catalogue, a two-year project managed by the Global Crop Diversity Trust and funded by Germany's Federal Office for Agriculture and Food (BLE) was completed in 2018. The Catalogue enables characterization and evaluation datasets on genebank accessions to be accessible via Genesys. The Catalogue allows genebanks to publish documented datasets in various file formats and provide information on descriptors that are used for the germplasm characterization or evaluation and data encoding. The funding from BLE allowed the engagement of six national and regional genebanks in building the initial database, which resulted in 79 published datasets when the project closed in August 2018. Since then, existing characterization and evaluation data in about 2,000 datasets (the bulk from CIMMYT and ICARDA) have also been migrated. As of 31 December 2018, the datasets published on Genesys included data on 230,000 accessions by nine CGIAR genebanks.

In 2018, support was added for managing and publishing collection subsets: core- and mini-core collections, and other lists of material targeting specific uses or purposes. By January 2019, 29 subsets from CIAT, ILRI and ICRISAT were published.⁷

Since 2015, Genesys counts on tools for validating the spelling of scientific species names according to GRIN Taxonomy and validating collection coordinates according to country borders and bodies of water.⁸ In early 2018, Genesys compiled a report for each of the CGIAR genebanks on potential typos in scientific names and issues with geo-data. CGIAR genebanks have committed to address the issues identified and update their data on Genesys.

Since 2018, Genesys allows data providers to bulk and upload images, PDFs and other documents associated with accessions. The tools for allowing these features were tested with IRRI, ILRI and ICARDA in 2018 and are now available to all data providers.⁹

As a live database, updates to data on Genesys can happen on a daily basis presenting a challenge in annual reporting. As of late December 2018, Genesys captures and records the following genebank metrics (by institute, by crop) on a daily basis:

- Number of accessions
- Number of accessions with DOI assigned
- Average PDCI
- Number of accessions documented in published datasets
- Last updates of passport data

⁷ Available at <https://beta.genesys-pgr.org/subsets>

⁸ Available at <https://validator.genesys-pgr.org>

⁹ An example of an accession where an image was attached may be seen at <https://beta.genesys-pgr.org/10.18730/G4SJW>.

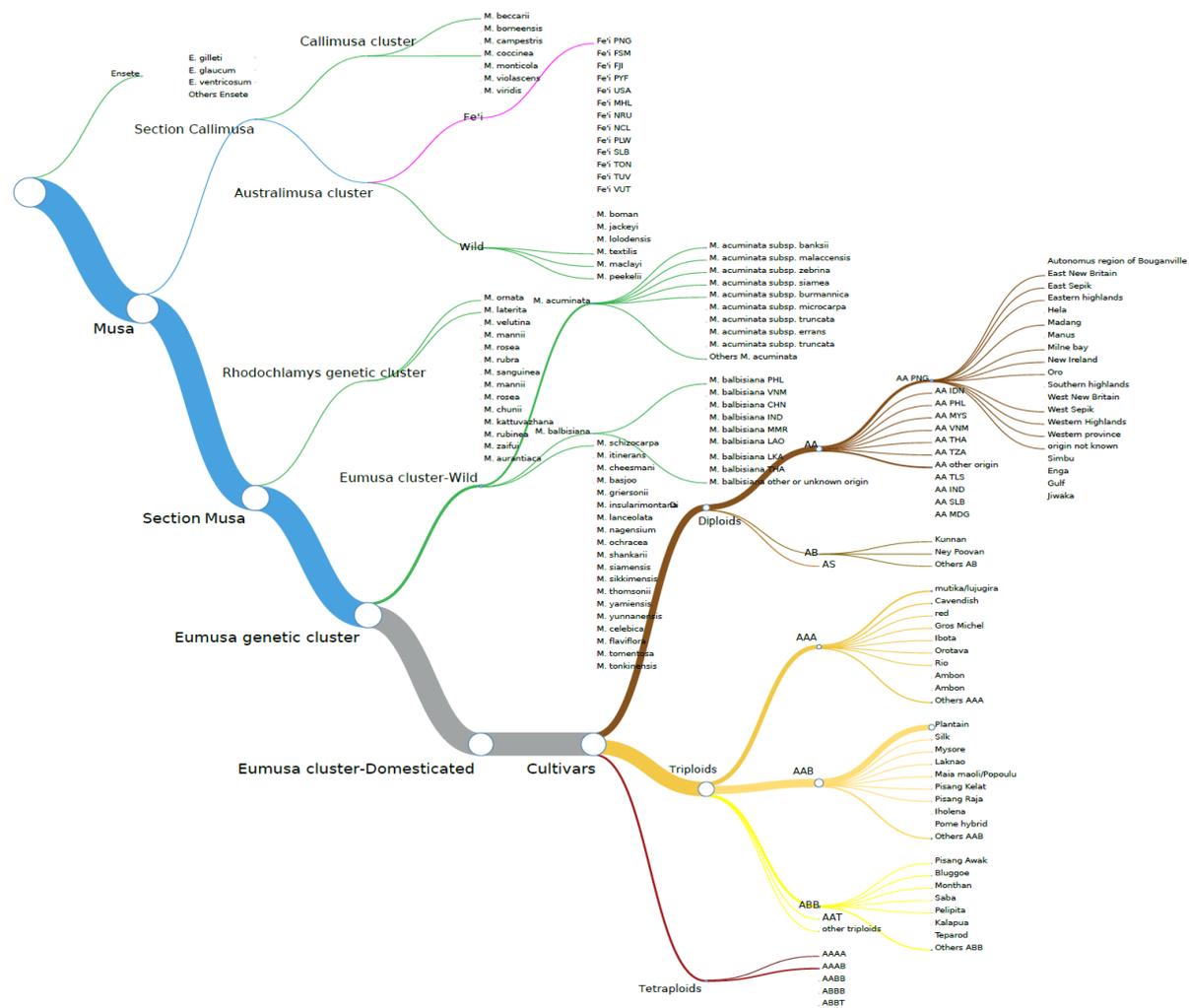
These values are now automatically uploaded to the online reporting tool of the CGIAR Genebank Platform, which greatly facilitates annual reporting.

D. IDENTIFYING GAPS IN THE COLLECTIONS

CGIAR Centres are undertaking a series of activities, coordinated by the Global Crop Diversity Trust under the Conservation Module of the CGIAR Genebank Platform, to measure the representation of crop genetic diversity conserved ex situ and hence to identify gaps in collections. (Additional, complementary information about this and other CGIAR Genebank Platform activities is available in the report to the Governing Body from the Global Crop Diversity Trust.)

The analysis has focused on the CGIAR-hosted PGRFA collections only thus far, and thus cannot be used for drawing conclusions about the overall global state of ex situ conservation. Three complementary approaches are being used and combined to identify the gaps.

First, Diversity Trees have been constructed for 22 crops.¹⁰ The banana diversity tree is reproduced in Figure 3 below. The trees are developed using published literature and expert knowledge to quantify the distribution of diversity in each crop gene pool, leading to quantitative estimates of gaps by comparison with the actual composition of collections.



¹⁰ Results of this analysis are available at <https://genesys-pgr.p.gitlab.croptrust.org/diversity-tree-editor/#>

Figure 3. Diversity tree for the banana genepool. The width (thickness) of each line is proportional to the number of accessions conserved within each cluster/group at the International Transit Center held by Bioversity International.

Second, spatial analyses have been undertaken using a method developed by CIAT to assess the eco-geographic gaps and coverage of current CGIAR crop collections. The method, which works best for collections with a high percentage of available information on the latitude-longitude of origin of accessions, looks for relationships between geographic patterns in crop distribution with the genetic structuring, and uses these relationships to build distribution models for crop landraces.¹¹

Third, a method for trait-based gap analyses has been developed by ICARDA. This approach focuses on analysis of distribution of adaptive priority traits in relation to the environment using machine learning to make predictions. . It works best where landraces have been associated with an environment for long enough for their traits to become associated with their environment, and presupposes well-characterized collections.

Table 5 summarizes the current status of gap analyses by crop.

Table 5: Status of gap analyses by crop

Crop	Diversity Tree	Spatial analysis	Trait analysis
Banana / Plantain	Tree for all the genepool with accessions mapped	Banana, done using no landrace groups	
Rice	Tree for all the genepool with accessions mapped	African rice, based on genetic clusters. Asian rice, based on groups (indica, temperate japonica, tropical japonica, aus, aromatic)	Rice yellow mottle virus (African rice)
Barley	Tree for all the genepool with accessions mapped	Done based on winter/spring and domestication (2-row vs. 6-row)	Frost tolerance
Grass pea	Tree for all the genepool with accessions mapped		
Wheat	Tree for all the genepool with accessions mapped	Durum wheat and bread wheat, based on genetic clusters	
Maize	Tree for all the genepool with accessions mapped	Americas (based on genetic clusters) and Africa (based on environmental clusters)	

¹¹ An overview of the method and some results for common bean landraces in the Americas is available at <https://www.slideshare.net/ciatdapa/landrace-gap-analysis-methodology-and-bean-results>.

Beans	Tree for all the genepool with accessions mapped	Common bean (Americas). Lima bean underway.	
Groundnut	Tree for all the genepool with accessions mapped	Planned for 2019	
Pea	Tree for all the genepool with accessions mapped		
Sweet Potato	Tree for all the genepool with accessions mapped		
Sorghum	only Tree	Based on basic races	Shoot fly; grain mould
Bambara Groundnut	only tree		
Cowpea	Tree for all the genepool with accessions mapped	Planned for 2019	
Potato	Tree to be updated	Done based on the taxonomy of Spooner & Hawkes	Late blight, Cyst nematode pa2, Cyst nematode pa3
Chickpea	Drafted Tree	Analysis is underway with ICARDA.	
Faba bean	Drafted Tree		
Alfalfa	Drafted Tree		
Lentil	Drafted Tree	Done ignoring subgroups	
Cassava	Initiated	Planned for 2019.	
Finger Millet			
Pearl Millet	Tree for all the genepool with accessions mapped		
Taro	Initiated	Asia and the Pacific, done at crop level with CePaCT.	

The Centers are continuing work on all three methods to identify gaps in the international collections they host. The results of these analyses, combined with additional information such as availability of relevant materials in other collections around the world, the possibility of collecting new materials, etc., will inform Centers' strategies for addressing the gaps identified. .

E. USING GENETIC SEQUENCE INFORMATION TO ANALYZE INTRA-ACCESSION DIVERSITY

In 2018, CGIAR genebanks initiated a three-year project, funded by the Genebanks Platform, called the A15 Multi-Crop Seed Heterogeneity Initiative whose objective is to understand the level of genetic diversity housed in genebank collections by assessing the within-accession variability along with inter- and intraspecific diversity. Genotyping can comprehensively characterize collections and reveal the diversity and population structure within and among these collections. Few studies have systematically evaluated within-accession variability and recent genomics work has shown that even in selfing crops such as soybean there are significant regions of the chromosome with hotspots of variation. In this project, multiple individuals (genotypes) from an accession have been subjected to high throughput genotyping (DArTseq) in order to assess variability between individuals of the same accession and between different accessions.

Identifying heterozygosity and heterogeneity within selected in-trust accessions will be useful for generating baseline information concerning the diversity of collections across multiple crops. The data will be useful for understanding crop evolution, managing genebank collections. It could also potentially contribute to the longer term utility of the collections by researchers/genebank users as it contributes to the increased understanding of the genetic structure of the collection.

In particular, the objectives of the project are:

- To generate information on accession heterogeneity to be used for improved management of the genebank collections;
- To identify species and accessions with high or low levels of variability;
- To provide training for scientists in national agricultural research organizations to generate and use the same (and or similar data) on their own;
- To generate and share information for users searching through and requesting materials from the genebanks
- To train scientists in national agricultural organizations to use the data to inform how they manage their ex situ collections;
- To develop and share information about the heterogeneity of crops conserved in international collections hosted by CGIAR Centers.

In the first phase of the project, seven Centers' genebanks selected ~100 accessions to genotype with a target of 10-25 individual seedlings per accession. Participating Centers were ILRI, AfricaRice, CIMMYT, CIP, IITA, ICRISAT, ICARDA. Each center extracted DNA and arranged with Diversity Arrays (Australia) for high throughput genotyping (DArTseq). Over 865 accessions and 14,000 samples were processed.

A training workshop will be held at CIMMYT in August 2019 to help the seven genebanks and scientists from interested national agricultural research organizations with analysis and interpretation of the collected sequence data. The Centers that did not participate in the first phase (Bioversity, CIAT, ICRAF, and IRRI) will participate in the second phase. A second training workshop will be held in 2020 for these Centers and scientists from national agricultural research organizations.

One critical component of the project is to engage students and scientists from national agricultural research organizations to work with this data and build their capacities to analyze and use genetic sequence information.

F. CAPACITY BUILDING EFFORTS

The CGIAR Genebank Platform organized 28 capacity building workshops in 2017 and 2018, involving almost 800 participants from CGIAR Centers and national agricultural research organizations, focusing on genetic resource conservation, characterization and documentation, and policy issues related to the management of plant genetic resources.

The Genebank Platform Policy Module organized five, one-week, regionally focussed, genetic resources policy training workshops for mixed groups of scientists from CGIAR and national agricultural research organizations, and National Focal Points for the ITPGRFA and Nagoya Protocol. They involved resource persons from the Secretariats of the ITPGRFA and the CBD, the ABS Capacity Building Initiative, the United Nations Development Programme, CGIAR Centers and national public agencies.

In 2018, the CGIAR System Management Office published the Guidelines on the Nagoya Protocol for CGIAR Research Centres.¹² The development of these guidelines was led by the Genebank Platform, and counted on the contribution from access and benefit-sharing experts within and outside CGIAR, including the Secretariats of the Convention on Biological Diversity, the ITPGRFA, and the ABS Capacity Development Initiative. The guidelines were approved by the Director Generals of Article 15 CGIAR Centers and the CGIAR System Management Board.

Under the framework of the FAO/Bioversity/Treaty Secretariat Joint Program to strengthen capacity of the national partners to implement the multilateral system, Bioversity led the development and publication of two documents to help policy actors develop national access and benefit sharing systems to implement the ITPGRFA (in a mutually supportive way with the Nagoya Protocol) and to make decisions in the day-to-day administration of those systems.¹³ Bioversity also coordinated two projects, funded by the Government of the Netherlands and the Darwin initiative, working with national partners to implement the Plant Treaty and the Nagoya Protocol in mutually supportive ways.

Centers' genebanks have organized in total more than 1,300 raising awareness and training events that have involved more than 15,000 participants. These events have included genebanks' visits and tours, farmers' open days, hosting visiting researchers, scholars, students, and participating in capacity building events organized by other organizations.

IV. CGIAR involvement in ITPGRFA intersessional processes (since the 7th session of the Governing Body)

CGIAR has actively participated in several processes and activities during the intersessional period, including those highlighted in the following subsections. Much of CGIAR's engagement in these processes was coordinated by the Policy Module of the CGIAR Genebank Platform, in consultation with: Director Generals of all the eleven Article 15 CGIAR Centres; CGIAR System Management Board; CGIAR System Management Office; Centers' genebank managers, and Centers' intellectual property focal points. In 2017, a CGIAR Genetic Resource Policy Working Group was created to facilitate system-wide consideration of genetic resource policy issues including many of those addressed in ITPGRFA intersessional processes. Finally, the Genebank Platform Policy Module also

¹² The guidelines are available online in English (<https://cgspace.cgiar.org/bitstream/handle/10568/96240/Guidelines-for-CGIAR-Research-Centers-to-operate-in-compliance-with-the-Nagoya-Protocol.pdf?sequence=6>), Spanish (<https://cgspace.cgiar.org/bitstream/handle/10568/96971/Directrices-ES.pdf?sequence=5&isAllowed=y>) and French (<https://cgspace.cgiar.org/bitstream/handle/10568/96976/Directrices-FR.pdf?sequence=1&isAllowed=y>)

¹³ Joint Capacity Building Programme (2018), Decision-making tool for national implementation of the Plant Treaty's multilateral system of access and benefit sharing, Bioversity, Rome. Available at: <https://www.bioversityinternational.org/e-library/publications/detail/decision-making-tool-for-national-implementation-of-the-plant-treatys-multilateral-system-of-access/>

Joint Capacity Building Programme (2018). Mutually supportive implementation of the Nagoya Protocol and the Plant Treaty: Scenarios for consideration by national focal points and other interested stakeholders. Available online in English at: https://www.bioversityinternational.org/fileadmin/user_upload/research/research_portfolio/policies_for_crop/Mutually_supportive_implementation_scenarios.pdf; and in French at: https://www.bioversityinternational.org/fileadmin/user_upload/research/research_portfolio/policies_for_crop/Mutually_Supportive_Implementation_Scenarios_French.pdf

convenes multistakeholder consultation meetings to get feedback and advice from a range of stakeholders. The first such meeting was held in July 2018.¹⁴

A. PROCESS TO ENHANCE THE FUNCTIONING OF THE MULTILATERAL SYSTEM OF ACCESS AND BENEFIT SHARING

In 2018 and 2019 CGIAR participated in the Eighth and Ninth Meetings of the Ad Hoc Open-ended Working Group to Enhance the Functioning of the Multilateral System of Access and Benefit-sharing (WG-EFMLS) held in October 2018 and June 2019 respectively. CGIAR representatives also participated in the four informal consultations organized by the Co-Chairs of the WG-EFMLS in Rome (July 2018), Costa Rica (January, 2019), Addis Ababa (March, 2019) and Rome (May, 2019).

Over the course of those meetings, CGIAR made submissions addressing a number of issues, including the importance of:

- developing low-transaction-cost options to increase monetary benefit-sharing, including through a) governments making annual contributions to the benefit sharing fund; and/or b) adoption of a system based on revised and improved SMTA Article 6.11 (i.e. what has subsequently come to be referred to as the subscription system);
- proactively addressing the risk of inadvertently ‘driving off’ a wide range of traditional recipients of materials from the multilateral system while revising it to generate more monetary benefit-sharing from bigger seed companies. This can be achieved by not requiring payments (and not requiring related annual statements) from subscribers whose seed sales fall below certain threshold (yet to be determined) every year;
- introducing termination clauses to address commercial users’ long standing concerns about never-ending benefit sharing obligations and related transaction costs associated with track and tracing their use of germplasm under the current SMTA;
- preserving CGIAR Centers’ flexibility to provide germplasm, under the SMTA, to recipients in countries that are not Contracting Parties to the ITPGRFA, given that three Centers are hosted by non-Contracting Parties, and that in trust PGRFA collections include materials originally collected from non-Contracting Parties;
- explicitly recognizing -- in the Governing Body decision adopting the revised SMTA and other elements of the enhanced multilateral system -- that there are practical limits on CGIAR Centres’ (and other providers’) ability to respond to blanket requests for samples of large numbers of accessions. This has always been important to recognize, but now potentially more so than ever, given possible increased demand from subscribers;
- revising Annex 1 of the SMTA in ways that are practical so that it can be used by CGIAR Centers (and other providers) distributing large volumes of material, much of which is PGRFA under Development;
- addressing tensions related to benefit sharing from use of digital sequence information through a resolution by the Governing Body stating that payments from subscribers reflects value to commercial users of access to and use of both genetic resources and genomic information. It is essential in this context to avoid developing benefit sharing norms and procedures that will undermine the accessibility of data for agricultural research and development;
- developing practical, minimum transaction-cost, approaches to distributing materials in the multilateral system to farmers, and for subsequent farmer-to-farmer exchanges and uses;

¹⁴ The meeting included 6 participants from CGIAR, and 7 participants from a combination of seed companies/International Seed Federation, civil society organization, delegates from Europe, African and Near East regional groups under the framework of the ITPGRFA, the ITPGRFA Secretariat, and one of the co-chairs of the Ad Hoc Open-ended Working Group to Enhance the Functioning of the Multilateral System of Access and Benefit-sharing (WG-EFMLS). The report of the meeting is available at <https://hdl.handle.net/10568/102410>.

- ensuring Centers are not made responsible to track and trace benefit-sharing payments from recipients to whom they send PGRFA under the SMTA
- expanding the coverage of the multilateral system -- and Annex 1 of the ITPGRFA -- potentially to include all PGRFA;
- the Secretariat developing awareness and capacity strengthening materials as well as tools to assist new users of the revised multilateral system. Without such materials, the Centers -- as the biggest providers of PGRFA in the multilateral system -- could be overwhelmed with requests for assistance;
- promoting non-monetary benefit sharing (in addition to monetary benefit sharing) as part of the process for enhancing the multilateral system of access and benefit-sharing.

A number of these issues were addressed in written submissions that CGIAR made to the WG-EFMLS and the informal consultation meetings.¹⁵

B. FARMERS' RIGHTS

Representatives from the CGIAR participated in the First and Second Meeting of the Ad Hoc Technical Expert Group on Farmers' Rights (in September 2018 and May 2019 respectively). CGIAR made a submission with cases from eight Centres for the preparation of the Inventory of National Measures, Best Practices and Lessons Learned from the Realization of Farmers' Rights, as set out in Article 9 of the Treaty. They are now available on line.¹⁶ Governing Body delegates are reminded that the CGIAR reports to the 7th Session of the Governing Body in 2017 included information about CGIAR policies to promote farmers' rights

C. SUSTAINABLE USE

Experts from CGIAR participated in the Electronic Consultation of the Ad Hoc Technical Committee on Sustainable Use of Plant Genetic Resources for Food and Agriculture (ACSU) and provided their views on the elements covered by the consultation:

- Elements of a draft Proposal for a new Programme of Work on Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture and Supporting Initiatives 2020 – 2023
- The Proceedings of the Informal Meeting of Experts “Exploring possible elements of a Joint Programme on biodiversity in agriculture for sustainable use of PGRFA 2020-2030”
- Joint Programme on Biodiversity in Agriculture for Sustainable Use of PGRFA
- A draft Survey on Technology Transfer

D. CONSERVATION

In addition to all of the conservation related activities described in Sections II and III above, the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture, the Global Crop Diversity Trust and the International Center for Tropical Agriculture (CIAT) are working together to provide baseline and metrics for the conservation and availability for use of plant genetic resources for food and agriculture. CIAT is leading the research activity, which is supported by the Government of Norway. An expert consultation to review methods and preliminary findings was organized in Rome in June 2019.

¹⁵ CGIAR submission to the Eight Meeting of the WG-EFMLS is available here: <http://www.fao.org/3/CA1882EN/ca1882en.pdf>; CGIAR submission to the Ninth Meeting of the WG-EFMLS (“Option for addressing DSI in the enhanced multilateral system of access and benefit-sharing”) is available here: <http://www.fao.org/3/ca4962en/ca4962en.pdf>

¹⁶ Available at: <http://www.fao.org/3/ca4123en/ca4123en.pdf>

V. Addressing Digital Sequence Information in the context of the ITPGRFA's multi-year programme of work.

Issues relating to digital sequence information will be addressed under two agenda items during the Eighth Session of the Governing Body. One of these agenda items concerns the ongoing negotiations to enhance the functioning of the multilateral system of access and benefit sharing. This report already has summarized, above, CGIAR submissions concerning options to address benefit-sharing associated with the use of digital sequence information in that context.¹⁷

The Governing Body will also consider digital sequence information under the agenda item related to developing the multi-year programme of work for the Plant Treaty. In particular, the Governing Body will consider the potential implications of the use of DSI on plant genetic resources for food and agriculture (PGRFA) on the objectives of the International Treaty, including exchange, access and the fair and equitable sharing of the benefits arising from their use. In preparation for the Governing Body's consideration of this issue, the Secretariat requested submissions concerning, among other things, the types and extent of uses of DSI on PGRFA, such as: characterization; breeding and genetic improvement; conservation; identification of PGRFA; and the relevance of DSI on PGRFA for food security and nutrition. CGIAR prepared a 34 page report that addresses these same issues for the Ad Hoc Technical Expert Group on Digital Sequence Information (AHTEC-DSI) convened under the framework of the Convention on Biological Diversity (CBD). The report describes how the CGIAR Centers use digital sequence information to improve their efforts to conserve plant genetic resources, to improve their crop breeding programs, generating benefits to be shared with the international community. That report is available, on line, in English, Spanish and French.¹⁸ CGIAR believes this report constitutes a useful input to the Governing Body's consideration of how DSI can be included in the multiyear programme of work.

¹⁷ See Section IV.A, and footnote 10 above.

¹⁸ Potential implications of the use of digital sequence information on genetic resources for the three objectives of the Convention on Biological Diversity A submission from CGIAR to the Secretary of the Convention on Biological Diversity. Available in English at: <https://www.cbd.int/abs/DSI-views/CGIAR-DSI-en.pdf>; in French at: <https://www.cbd.int/abs/DSI-views/CGIAR-DSI-fr.pdf>; and in Spanish at: <https://www.cbd.int/abs/DSI-views/CGIAR-DSI-es.pdf>

APPENDIX 3

Additional report by the World Agroforestry (ICRAF)



ICRAF's Biennial Report on the Implementation of the Agreement under Article 15 of the ITPGRFA

1. Introduction

The International Centre for Research in Agroforestry – ICRAF (also known by the brand name ‘World Agroforestry’) routinely makes reports to the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) through the CGIAR System, with respect to both the execution of the responsibilities of some Centres pursuant to their 2006 Article 15 agreements with the Governing Body, and their contributions to the implementation of the ITPGRFA more generally.

For the Eighth Session of the ITPGRFA Governing Body, ICRAF submits this summary report for inclusion in the Working Document prepared by the Secretariat regarding Article 15 organizations.

2. Holdings, distributions and acquisitions of PGRFA under the ITPGRFA framework

- **Holdings:** ICRAF Genebank currently holds an agroforestry tree seed collection of 6336 accessions, and 11,236 accessions of live plants held at 42 field genebanks sites located in 16 countries in Africa, Asia and Latin America. Accession information is available in publicly on ICRAF website <http://worldagroforestry.org/products/grunew/> and GENESYS <https://www.genesys-pgr.org/wiews/KEN056>. The collection is managed in line with the Revised FAO Genebank Standards (2014); however, tree germplasm uniqueness limits fulfilling some of the Genebank standard requirements such as regeneration and multiplication. Through the Genebank Platform quality management system (QMS), the ICRAF Genebank operations has been optimised to enhance the management of the collections.
- **Distribution:** ICRAF Genebank has carried out germplasm distribution within the framework of the ITPGRFA. In the last two years, the Genebank has distributed the collection as follows:
 - 655 samples with SMTA and 883 samples without SMTA from the seed collection
 - 2440 samples with SMTA and 1698 samples without SMTA from the field genebank collection.

Distribution without SMTA figures reflect material being distributed directly to farmers within the countries of collection. In addition, farmers are also engaged in participatory tree improvement and they receive the agroforestry tree germplasm under improvement as part of the project trials.

- **Acquisition:** ICRAF genebank has received 212 accessions of various agroforestry tree species as donations from partners and bilateral projects in the last two years. Germplasm acquisition has been facilitated through mutually agreed terms developed within the framework of the ITPGRFA.

3. Characterisation

To facilitate the use of agroforestry tree germplasm, ICRAF Genebank has characterised the collection phenotypically and using molecular tools. Evaluation data is also been collected periodically from the field genebank collection. This characterisation information is available under the ICRAF GRU webpage and provisions are being made to avail it via GENESYS. All the Genebank accessions have been assigned GLIS DOIs <https://www.genesys-pgr.org/wiews/KEN056>.

4. **Non-Monetary Benefits:** ICRAF continues engaging with different stakeholders and providing information on tree germplasm especially in making informed choices while considering the crucial role trees play in mitigating climate change. Farmers and other stakeholders can easily access various tools developed by ICRAF scientists that they can use in making such decisions. This include [tree species site matching](#), [Tree Seed Farmers Toolkit](#), [Africa Tree Finder Android App](#) etc.

5. **Farmers Rights:** Tree germplasm resources require large space in their growth phase with long generation intervals and are mostly perennial. To overcome such challenges, ICRAF works closely with farmers in most tree field research. ICRAF recognizes the farmers rights within the framework of the ITPGRFA and have enacted policies (the ICRAF Genetic Resources Policy and Indigenous or Traditional Knowledge Policy) to guide the scientists as they interact with farmers.

6. **Participation in initiatives under the ITPGRFA Framework:** ICRAF has been participating in the various initiatives under the ITPGRFA Framework. Specifically, in the last two years ICRAF has responded to several ITPGRFA Governing Body's meetings invitations and requests on different topics under its obligations as an Article 15 IARC. Examples include:

- GLIS-DOIs use
- Policies, programmes and activities related to biodiversity for food and agriculture
- Digital Sequence Information discussions
- Revision of the SMTA
- Realisation of Farmers rights-practice and lessons learnt
- Annual submissions on use of SMTA

Dr . Anthony Simons
Director General

APPENDIX 4**Report by the International Center for Biosaline Agriculture (ICBA)**

International Center for Biosaline Agriculture (ICBA) Report
(Since signatory of the Art 15 of ITPGRFA in March 2019)

In March 2019, ICBA signed an agreement under Article 15 of the International Treaty on Plant Genetic Resources for Food and Agriculture. The accord will help the researchers and other stakeholders to have access to the plant genetic resources for food and agriculture listed in Annex I of this Treaty and held by the ICBA shall be made available in accordance with the provisions set out in Part IV of this Treaty.

The material other than that listed in Annex I, which is received and conserved by ICBA after the coming into force of this Treaty, shall be available for access on terms consistent with those mutually agreed between the ICBA that receive the material and the country of origin of such resources or the country that has acquired those resources in accordance with the Convention on Biological Diversity or other applicable law.

During the last one year, ICBA has collected seeds of more than 670 accessions of 11 crop species from different sources. Now the number of accessions at the ICBA genebank is more than 14,500 that belongs to 265 species of crops and plants. During the same period, about 260 seed samples of 14 crops/plants were distributed among various stakeholder in the United Arab Emirates and other countries around the world.

Recently “Guidelines for Seed Request to ICBA Genebank” have been prepared containing the instructions that how a stakeholder can send a request for the germplasm present at the seedbank. The document will be available on ICBA website soon. ICBA has signed the data provider agreement with crop trust to allow the people to access the ICBA’s genebank detail globally.

APPENDIX 5**Report by the Secretariat of the Pacific Community (SPC)****The PACIFIC COMMUNITY (SPC) BIENNIAL REPORT (JULY 2017 – JULY 2019)****UNDER ‘ARTICLE 15’ AGREEMENT WITH THE INTERNATIONAL TREATY ON
PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE (ITPGRFA) OF
THE FOOD AND AGRICULTURE ORGANISATION (FAO)***Report prepared for the Eighth Session of the Governing Body of the ITPGRFA**Italy, Rome – November 2019*

Pacific
Community

Communauté
du Pacifique

1. Introduction

In the third session (June, 2009) of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), the Pacific Community (SPC) formally placed the *ex situ* collections of the Annex 1 crops that it holds in trust for the Pacific region, into the Multilateral System (MLS) of the International Treaty by concluding an agreement with the Governing Body under Article 15 of the International Treaty.

The agreement signifies a regional recognition of the importance of conserving and putting into good use the plant genetic resources of the Pacific currently held in the *ex situ* collections hosted by SPC's Centre for Pacific Crops and Trees (CePaCT) based in Suva, Fiji. This mutual partnership has greatly benefitted the region in the areas of plant genetic resources conservation, utilization and improvement.

As an obligation under the Article 15 agreement, SPC provides reports, on a biennial basis, to the Governing Body of the International Treaty through its Secretariat. These biennial updates focus primarily on the implementation of the Article 15 agreement and in addition, the implementation of the International Treaty in general in the Pacific Region.

This brief report covers the period of July 2017-June 2019 biennial.

2. Institutional support and new developments relevant to the ITPGRFA Framework.

In appreciation of the critical role PGRFA play in meeting food and nutritional needs as well as resilience building and livelihood enhancement in the Pacific, SPC has been committed in its efforts to strengthen the capacity of the CePaCT to ensure it responds well to the current and future needs of the region and beyond. These regional needs and priorities are laid out in the SPC Strategic Plan 2010-2020¹⁹, the Pacific Forum Leader's 49th meet (Nauru, 2018) recommendations²⁰ and; of course, the SDGs²¹ at the global level. Some key developments include:

- **The development of the first Business and Investment plan for the CePaCT** – an important step to guarantee sustainability, efficiency and improved impact in the long-term. The effort, having started in mid-2017 with primary support from the Australian government, was fully informed by several reviews and consultations with all relevant partners and stakeholders including the International Treaty and the Global Crop Diversity Trust. SPC acknowledges the support from the International Treaty Secretariat in the Donor-Roundtable meeting to discuss the Centre's Investment and Business case earlier this year (March 2019). Following this Donor Roundtable meeting, the Australian government

¹⁹ <https://www.spc.int/resource-centre>

²⁰ <https://www.un.org/humansecurity/wp-content/uploads/2018/09/49th-Pacific-Islands-Forum-Communiqu%C3%A9.pdf>

²¹ <https://www.undp.org/content/undp/en/home/sustainable-development-goals.html>

has once again put forth its hand to support the implementation of the CePaCT Business Plan. The Australian Hon. Minister for Foreign Affairs has announced this recently²².

- **Supporting the conservation and use of coconut genetic resources in the Pacific and beyond:** Pacific Heads and Ministers for Agriculture and Forestry in the Region in their recent meeting (Port Vila, 2017) sought SPC's assistance in protecting coconut diversity in the face of serious pests and diseases. In response, SPC through its Land Resources Division (LRD) is aligning itself to support the transition of COGENT to the International Coconut Diversity. To further complement, CePaCT's mandate will expand to coconuts in a recently approved ACIAR 'Coconuts for Livelihood' project.
- **Importance of Forest Tree species in CePaCT's mandate:** Under the new CePaCT Business Plan and in alignment with divisional realignment and prioritisation exercises, CePaCT will further expand its mandate to forest tree species that are of value to the Pacific. This is a new development brought about as part of SPC's prioritisation exercises that had been rolled out since 2015. Trees contribute positively to agricultural food systems and the environment in general and the Pacific's home to some of the unique species that under threat from both abiotic biotic stresses. Their inclusion in the CePaCT's mandate was an approach to share resources and most importantly, to take a holistic approach from a genetic resources perspective when tackling common issues like food and nutrition security.

3. Holdings, Distribution, Acquisitions under the PGRFA framework.

a. Germplasm Holdings

As of June 2019, CePaCT conserves 2,179 accessions of 17 crops in its *in-vitro*, screen houses and/or field collections (see Table 1) based in Suva, Fiji. Most of these crop collections (98.5%) are part of the Annex 1 of the Treaty's multilateral system. CePaCT holds the largest collection of taro in the world – a significant effort facilitated under SPC's close collaboration with the International Treaty and the Global Crop Diversity Trust. The major aroids, together with the yam collections, are now supported under a Long Term Grant (LTG) agreement of 50,000 USD per year with the Crop Trust. This is one of the Centre's unique achievement since joining the global fora of plant genetic resources for food and agriculture – it is the only non-CGIAR centre to be supported by the Crop Trust.

Table 1: Status of CePaCT collections as at June 2019.

ANNEX 1 Crops		
Common Name	Scientific Name	Total No. Accessions
Giant taro (Major aroids)	<i>Alocasia macrorrhizos</i>	11
Taro (Major aroids)	<i>Colocasia esculenta</i>	1140
Giant swamp taro (Major aroids)	<i>Cyrtosperma chamissonis</i>	66
Cocoyam/Tannia (Major aroids)	<i>Xanthosoma sagittifolium</i>	11

²² <https://www.spc.int/updates/news/media-release/2019/07/fjd3-million-towards-protecting-pacific-crops>

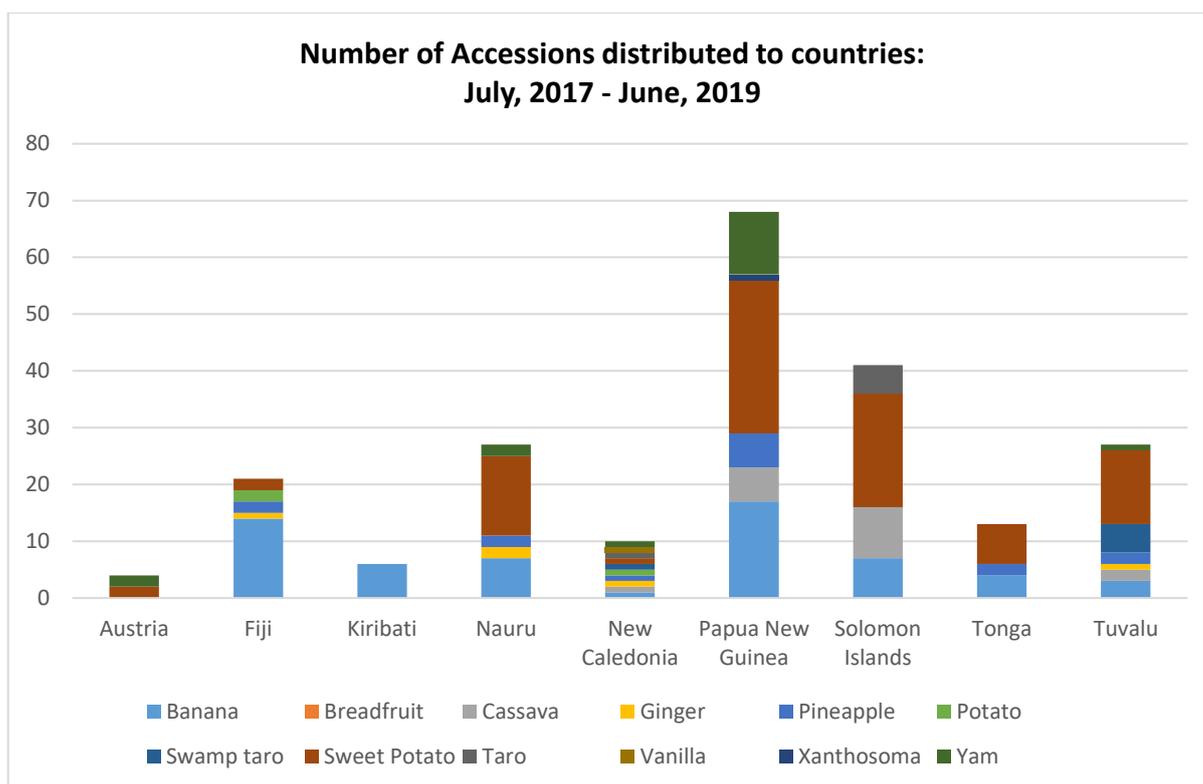
Breadfruit	<i>Artocarpus altilis</i>	33
Banana/Plantain	<i>Musa</i> spp.	158
Sweet potato	<i>Ipomoea batatas</i>	327
Cassava	<i>Manihot esculenta</i>	16
Yam	<i>Dioscorea</i> spp.	330
Potato	<i>Solanum tuberosum</i>	54
Total		2141
NON-ANNEX 1 Crops		
Common Name	Scientific Name	No. Accessions
Bele (Slippery cabbage)	<i>Abelmoschus manihot</i>	10
Pineapples	<i>Ananas comosus</i>	7
Pandanus	<i>Pandanus tectoris</i>	5
Sugarcane	<i>Saccharum</i> spp.	5
Sandalwood	<i>Santalum album</i>	1
Vanilla	<i>Vanilla fragrans</i>	4
Ginger	<i>Zingiber officinale</i>	1
Total		33
Total Accessions		2179

b. Germplasm Distributions

CePaCT distributed a total of 241 accessions (6156 samples) of 12 crops (see Graph 1 below) to 9 countries in the period of July 2017 – June 2019. All materials were shared using the SMTA of the Treaty of which there are nine in total for these periods germplasm distributions.

Purposes for the use of these materials include evaluation to identify preferred diversity based on good agronomic performance; resilience to different climatic conditions and certain pests and diseases; research and breeding as well as educational/awareness needs.

Graph 1: CePaCT germplasm distributions for the biennial: July 2017 – June 2019.



4. Germplasm acquisitions, characterisation & breeding

New open pollinated varieties of sweet potato (12 accessions) and cassava (10 accessions); landraces of taro (13 accessions) and cocoyam (14 accessions) and bele (slippery cabbage - 6 accessions) were identified and acquired by CePaCT from the Vanuatu's Agricultural Research and Technical Centre (VARTC). These varieties were top selections that came out of VARTC's evaluation trials looking at high yielding, fast growing, resilient (to relevant biotic and abiotic factors) and nutritious traits. All accessions were characterised in the field using standard mini-descriptors developed by the National Agricultural Research Institute (NARI), PNG. VARTC collections are under threat from natural disasters, Cyclone Pam (2015), as well as vandalism and theft by people. Following these issues, SPC stepped in to support Vanuatu in safeguarding their diversity. SPC will continue to look after these materials until they reached a certain stage where they will be registered into the collections. These accessions are not included in conservation data as stated above.

Regarding breeding activities, CePaCT under a collaboration with the International Atomic Energy Agency (IAEA) are currently undertaking new breeding research on selected breadfruit, yam and sweet potato accessions using irradiation methodologies. Accessions for this research had been sent from CePaCT to IAEA's Tissue culture lab for irradiation prior in 2018. These will be sent back to CePaCT where the materials will be multiplied and sent for evaluation in countries (PNG, FSM, Vanuatu and Fiji)

5. Generating/sharing non-monetary benefits

In this reporting biennial, CePaCT has been engaged in various opportunities contributing to non-monetary benefit sharing as laid out under Article 13.2 of the ITPGRFA. These include:

1. Exchange of information:

- NARCs like VARTC on new crops collected, characterised and exported to CePaCT's facilities in Fiji.

2. Access to and transfer of technologies

- Support to VARTC in setting up Tissue Culture facilities. CePaCT provided expertise in lab design and equipment procurement. The facility is under construction.

3. Capacity building for the conservation and use of PGRFA including seed systems and outreach

- Pacific Agricultural Plant Genetic Resources Network 'Lessons Learnt Workshop' for the completed South West Pacific BSF project – PR-83-FIJI on Strengthening the resilience of Pacific Agricultural Systems to climate Change through enhanced access to and use of (Crop) Diversity. (August 2017, Nadi Fiji)
- Pacific Seed Forum Consultation workshop on Seed Systems (June 2018, Nadi Fiji)
- Seed Validation Workshop to validate findings from the Pacific Seed Forum (November 2018, Nadi Fiji)

6. CePaCT participation in initiatives under the ITPGRFA

- CePaCT Curator attending the Seventh Governing Body Meeting in Kigali, Rwanda - October 2017 as an observer on behalf of SPC. The CePaCT Curator was also invited by the Secretariat to present key outcomes and impact stories from the completed South West Pacific CPF2 project (PR-83-FIJI) in one of the Side events on food security and climate change organised by the Secretariat.
- SPC Associate Scientist-Germplasm Health Unit represented CePaCT in the Workshop for successful concept note applicants under the CPF4 of the BSF (October 2018). The workshop was to build understanding and knowledge for the full proposal development stages. The LOA for the project is under negotiations.

- THANK YOU -

APPENDIX 6

Report by the Tropical Agricultural Research and Higher Education Center (CATIE)

Informe bienal (2017 - 2019) de CATIE sobre la Implementación del Acuerdo en virtud del Artículo 15 del Tratado Internacional sobre los Recursos Fitogenéticos para la Alimentación y la Agricultura (TIRFAA)

1) Antecedentes

El Centro Agronómico Tropical Investigación y Enseñanza (CATIE) es un centro científico regional dedicado a la investigación y a la enseñanza en agricultura, agroforestería, el manejo de los recursos naturales, al desarrollo rural sostenible y a la reducción de la pobreza en América Tropical.

CATIE, por más de 70 años, ha venido trabajando activamente en la recolección, conservación, caracterización, evaluación, documentación y uso de especies hortícolas y perennes por lo que ha sido reconocido internacionalmente y designado como depositario de colecciones de germoplasma de importancia mundial. En mayo de 2004 la gran mayoría del germoplasma fue puesto por CATIE bajo los auspicios de la FAO y desde el 16 de octubre de 2006 el acceso al germoplasma, (tanto para cultivos del Anexo 1 como para aquellos que no pertenecen al Anexo 1 del TIRFAA) se rige por el Tratado Internacional de Recursos Fitogenéticos para Alimentación y Agricultura (TIRFAA) y su distribución se realiza bajo los términos descritos en el Acuerdo Normalizado de Transferencia de Material (ANTM) en virtud del Artículo 15.

Este informe proporciona una actualización de la implementación del acuerdo, así como de las actividades e iniciativas de CATIE para el período comprendido entre agosto 2017 a julio 2019.

2) Conservación

2.1.) Conservación en campo

Según el último inventario, realizado en el año 2014, un total de 4.724 accesiones son conservadas en campo. A continuación, se detalla las cantidades de accesiones por taxón:

Colección	Cantidad de accesiones
Café (<i>Coffea spp.</i>)	1.976
Cacao (<i>Theobroma spp.</i>)	1.235
Pejibaye (<i>Bactris gasipaes</i>)	592
Achiote (<i>Bixa orellana</i>)	105
Sapotaceae	123
Sapindaceae	12
Myrtaceae	106
Cítricos (<i>Citrus spp.</i>)	65
Camote (<i>Ipomoea batatas</i>)	29

Ñame (<i>Dioscorea spp.</i>)	57
Yuca (<i>Manihot esculenta</i>)	157
Macadamia (<i>Macadamia integrifolia</i>)	17
Arecaceae	83
Varios Taxones	101
Jardín Botánico	114
Total	4.772

A esta fecha es necesario realizar un nuevo inventario para conocer el estado actual de conservación, especialmente para *Bactris gasipaes*, *Bixa orellana*, y las familias Sapotaceae, Myrtaceae.

2.1.a) Financiación para conservación de germoplasma en campo

En los últimos dos años, no se han conseguido suficiente financiamiento para dar un buen mantenimiento a todas las colecciones y algunas están en riesgo de pérdida por el reducido mantenimiento en campo y la fuerte incidencia de plagas y enfermedades fungosas y virales. El riesgo es particularmente alto para pejibaye, macadamia, yuca, ñame y camote. En cacao se perdieron 3 accesiones (AGU-31, LP-4/8, PBC-123).

2.2) Conservación de semillas ortodoxas en cámara fría (-18°C)

En cámara fría se conservan 6.201 accesiones de varios taxones. El detalle se presenta en el siguiente cuadro:

Especie	Nombre común	Cantidad de accesiones
Amaranthaceae		271
<i>Amaranthus spp.</i>	Amaranto	265
<i>Chenopodium berlandieri</i>	Quínoa	2
<i>Chenopodium quinoa</i>	Quínoa	4
Cucurbitaceae		2.332
<i>Cucurbita argyrosperma</i>	Pipián	111
<i>Cucurbita ficifolia</i>	Chiverre	173
<i>Cucurbita foetidissima</i>		1
<i>Cucurbita lundelliana</i>		4
<i>Cucurbita maxima</i>	Calabaza	9

<i>Cucurbita moschata</i>	Ayote	1.613
<i>Cucurbita pepo</i>	Zucchini	169
<i>Cucurbita sp.</i>		39
<i>Cucumis sativus</i>	Pepino	8
<i>Cucumis melo</i>	Melón	13
<i>Cucumis spp.</i>		4
<i>Lagenaria siceraria</i>	Jícara, Calabaza	147
<i>Otras Cucurbitacea</i>		41
Fabaceae		1.688
<i>Phaseolus acutifolius</i>	Frijol Tepari	6
<i>Phaseolus coccineus</i>	Cubá, Ayacote	83
<i>Phaseolus dumosus</i>	Cubá, Frijol gordo	41
<i>Phaseolus lunatus</i>	Frijol lima	41
<i>Phaseolus vulgaris</i>	Frijol	680
<i>Phaseolus sp.</i>	Frijol	318
<i>Crotalaria spp.</i>	Crotalaria	32
<i>Lablab purpureus</i>	Lablab	34
<i>Pachyrhizus spp.</i>	Jícama	185
<i>Psophocarpus tetragonolobus</i>	Frijol alado	16
<i>Vigna spp.</i>	Vigna, Frijol mungo	184
<i>Otras Fabaceae</i>		68
Poaceae		412
<i>Zea mays</i>	Maíz	400
<i>Otras Poaceae</i>		12
Solanaceae		1.482
<i>Solanum lycopersicum</i>	Tomate	340
<i>Solanum pimpinellifolium</i>	Tomate cherry, tomate silvestre	81
<i>Solanum quitoense</i>	Naranjilla	13
<i>Solanum spp</i>		86

<i>Capsicum annum</i>	Chile	368
<i>Capsicum baccatum</i>	Chile	25
<i>Capsicum chinense</i>	Chile	51
<i>Capsicum frutescens</i>	Chile	274
<i>Capsicum pubescens</i>	Chile	11
<i>Physalis spp.</i>	Uchuva	76
<i>Otras Solanaceae</i>		157
Varias Familias		16
TOTAL		6.201

El inventario de los materiales conservados en cámara fría se encuentra al día.

3) Adquisiciones

Durante el período de este informe ingresaron 15 nuevas accesiones de Cacao (AMAZ-6/3, B9/10-32, DOM-14, DOM-25, DOM-3, IMC-14, IMC-38, JA-10/12, LP-4/20, LP-4/24, PA-124, PA-39, SHRS-07, SPEC-160/9, T-79/501)

4) Regeneración

Se regeneraron 106 accesiones conservadas en cámara fría, las cuales se detallan en el siguiente cuadro:

Cultivo	Cantidad de accesiones regeneradas
<i>Cucurbita moschata</i>	69
<i>Phaseolus vulgaris</i>	8
<i>Phaseolus coccineus</i>	12
<i>Pachyrhizus spp</i>	4
<i>Zea mays</i>	13
TOTAL	106

Un total de 1546 accesiones necesitan ser regeneradas para aumentar la cantidad de germoplasma disponible para distribución. Se necesita conseguir financiamiento para realizar esta labor. El detalle se presenta en el siguiente cuadro:

Taxón	Cantidad de accesiones con prioridad de regeneración
Amaranthus	205
Cannavalia	1
Crotalaria	4
Cucurbita	414
Lablab	12
Lagenaria	22
Lycopersicum	57
Pachyrhizus	70
Phaseolus	616
Physalis	5
Solanum	3
Otras Cucurbitaceae	10
Otras Fabaceae	2
Vigna	44
Zea	81
Total	1.546

En el caso de los materiales conservados en campo, es urgente una regeneración del 100% de las accesiones de frutales en general. La conservación de la colección de Sapotaceae es de suma importancia para la región, pero su renovación ha sido difícil debido al bajo éxito en la injertación. Algunas de ellas están en peligro de extinción como por ejemplo el Pan de vida (*Pouteria hypoglauca*). Situación similar ocurre para la colección de Pejibaye, una de las más importantes del mundo, ya que muchas accesiones tienen sólo un árbol.

5) Caracterización

Se caracterizaron molecularmente las siguientes 17 accesiones de cacao: (COCA-3370-5, Criollo-34, Criollo-52, Criollo-60, Criollo-62, Criollo-66, GU 128-N, GU 151-N, NA-34, OC-77, PA-169, PA-3, PA-310, Playa Alta-2, RB-41, SCA-19, SCA-9).

6) Duplicación

Quinientos noventa y un (591) accesiones se enviaron en febrero de 2018 como duplicado de seguridad a la Bóveda Mundial de Semillas en Svalbard, Noruega. A continuación se detalla la cantidad de accesiones enviadas por cultivo:

Taxón	N° de accesiones enviadas
<i>Zea</i>	80
<i>Amaranto</i>	18
<i>Cajanus</i>	5
<i>Cucurbita</i>	224
<i>Phaseolus</i>	73
<i>Lycopersicum</i>	99
<i>Vigna</i>	9
<i>Zea</i>	80
<i>Otros</i>	83
TOTAL	591

7) Distribución

Usando el Acuerdo Normalizado de Transferencia de Material (ANTM), se distribuyeron 630 accesiones a 6 países (Costa Rica, Honduras, Panamá, Guatemala, Alemania y España), incluyendo 287 accesiones de semillas ortodoxas conservados en cámara fría y 343 accesiones de cultivos conservados en campo. Los receptores de este germoplasma incluyen agricultores, empresa privada, instituciones de investigación y estudiantes. El detalle de las especies, cantidades, países y otros detalles del material genético distribuido se presenta en el siguiente cuadro:

Cantidad de accesiones distribuidas	Cultivos	Países a los que se ha distribuido	Solicitante	Tipo de solicitante
2	<i>Solanum pimpinellifolium</i> <i>Cucumis metuliferus</i>	Costa Rica	Sergio Salazar	Agricultor
7	<i>Zea mays</i> , <i>Cucurbita moschata</i> , <i>Cucurbita pepo</i> , <i>Phaseolus vulgaris</i> , <i>Capsicum annum</i> , <i>Cajanus cajan</i> , <i>Canavalia ensiformis</i> ,	Costa Rica	Miguel Ávila Arias	Agricultor

2	<i>Zea mays, Solanum lycopersicum</i>	Costa Rica	Joaquín Oviedo	Agricultor
1	<i>Physalis ixocarpa</i>	Costa Rica	Pedro Pablo Gomez	Estudiante
2	<i>Cyclanthera pedata, Cucumis metuliferus</i>	Costa Rica	Gustavo Salazar	Colegio Técnico
1	<i>Vigna unguiculata</i>	Costa Rica	Mario García	Empresa Privada
7	<i>Pachyrizus erosus, Sicana odorifera</i>	Costa Rica	Urías Cardenas Durán	Empresa Privada
2	<i>Crotalaria longirostrata, Canavalia ensiformis</i>	Costa Rica	Bataille Pierre	Agricultor
1	<i>Mucuna pruriens</i>	Costa Rica	Kevin Porras	Estudiante
1	<i>Canavalia ensiformis</i>	Costa Rica	Sergio Gutierrez	Empresa Privada
3	<i>Vigna radiata</i>	Costa Rica	Valeria Calvo	Estudiante
2	<i>Sicana odorifera, Luffa aegyptiaca</i>	Costa Rica	Emma Azofeifa Rodriguez	Agricultor
1	<i>Sicana odorifera</i>	Costa Rica	Victoria Valverde	Estudiante
20	<i>Cucurbita moschata, Cucurbita argyrosperma, Cucumis anguria, Cucumis metuliferus</i>	España	Maria Belén Pico Silvernt	Instituto de investigación
235	<i>Zea mays, Cucurbita moschata, Phaseolus spp.</i>	Guatemala	ASOCUCH	Asociación de Agricultores
8	<i>Thebroma cacao</i>	Costa Rica	Finca Rausch	Empresa privada
4	<i>Coffea arabica</i>	Costa Rica	Alejandro Galva	Productor
8	<i>Coffea arabica</i>	Guatemala	Alfonso Anzueto	Productor
33	<i>Coffea arabica</i>	Costa Rica	Starbucks Coffee Farm	Empresa privada
10	<i>Coffea arabica</i>	Alemania	Cristian Margaretic	Empresa privada
1	<i>Coffea arabica</i>	Costa Rica	Francisco Javier Sánchez	Empresa privada

110	<i>Coffea arabica</i>	Costa Rica	Coffea Diversa S.A	Empresa privada
1	<i>Vainilla planifolia</i>	Costa Rica	Jennes Matamoros	Productor
2	<i>Coffea arabica</i>	Costa Rica	Juan Marín	Productor
8	<i>Coffea arabica</i>	Costa Rica	Instituto del Café de Costa Rica	Institución nacional
61	<i>Coffea arabica</i>	Panamá	Hacienda La Esmeralda (Price Peterson)	Empresa privada
1	<i>Coffea arabica</i>	Costa Rica	José María Fallas	Productor
1	<i>Coffea arabica</i>	Costa Rica	Carlos Borjas Maradiaga	Productor
10	<i>Coffea arabica</i>	Guatemala	Alfonso Anzueto	Productor
14	<i>Coffea arabica</i>	Honduras	Antonio Juárez Castellanos	Productor
55	<i>Coffea arabica</i>	Costa Rica	Coffea Diversa S.A	Empresa privada
6	<i>Coffea arabica</i>	Costa Rica	Juan Marín	Productor
3	<i>Coffea arabica</i>	Costa Rica	José María Fallas	Productor
1	<i>Coffea arabica</i>	Costa Rica	Juan Carlos Martínez	Productor
1	<i>Coffea arabica</i>	Guatemala	Arturo de Jesus Aguirre	Productor
5	<i>Coffea arabica</i>	Guatemala	Santa Felisa Coffee Farm	Empresa privada

Los cultivos más distribuidos fueron café (*Coffea arabica*) con 334 accesiones, ayote (*Cucurbita moschata*) con 204 accesiones y maíz (*Zea mays*) con 46 accesiones.

8) Derechos del agricultor

CATIE reconoce los derechos y el papel indispensable de los agricultores y comunidades indígenas en la conservación y mejora de los recursos genéticos y en consecuencia respeta los esfuerzos nacionales e internacionales para proteger y promover los derechos de los agricultores según lo previsto en el artículo

9 del TIRFAA. En este contexto, el CATIE: 1) ha repatriado 235 accesiones de ayote y maíz a la Asociación de Productores de los Cuchumatanes (ASOCUCH) de Guatemala. ASOCUCH distribuirá esta accesiones a varios bancos comunitarios de Guatemala, Honduras y Nicaragua, los países de donde son originarias las accesiones repatriadas; y 2) como parte de la Comisión Nacional de Recursos Fitogenéticos (CONAREFI) se publicó en 2018 el documento “Los Derechos de los Agricultores(as) de Costa Rica en el Marco del Tratado Internacional de los Recursos Fitogenéticos para la Alimentación y la Agricultura” (http://ofinase.go.cr/wp-content/uploads/rffa_derechosdelagricultorcrcr.pdf), en el cual se resalta el esfuerzo del CATIE en la repatriación de germoplasma a comunidades indígenas.

9) Participación de CATIE en iniciativas en el marco del TIRFAA.

El CATIE ha participado en varias iniciativas y reuniones en el marco del TIRFAA durante el último bienio, incluidas las relacionadas con:

- Solicitud y uso a partir de 2018 del código DOI (Digital Object Identifier) en todas las accesiones incluidos en los ANTM del material distribuido
- Publicación, en la plataforma Genesys, de los datos de pasaporte de todas las accesiones conservadas <https://www.genesys-pgr.org/wIEWS/CRI001/> y 18 bases de datos de caracterización <https://beta.genesys-pgr.org/datasets/v2eE2zWdOI2?s=id> en atención al Artículo 17 del TIRFAA
- Participación activa del investigador William Solano en el Grupo de Trabajo Especial de Composición Abierta para Mejorar el funcionamiento del Sistema Multilateral de Acceso y Participación en los Beneficios
- Seminario Regional sobre la aplicación del Tratado Internacional sobre los Recursos Fitogenéticos para la Alimentación y la Agricultura

10) Búsqueda de financiamiento para conservación

Durante el último bienio CATIE ha redoblado esfuerzos en la búsqueda de apoyo para continuar con la conservación de germoplasma a largo plazo. Esos esfuerzos han rendido los siguientes frutos:

- El Gobierno de Costa Rica mediante el Decreto Ejecutivo N° 002-2018-MAG, publicado en La Gaceta el 8 de junio de 2018 oficializó y declaró de interés público la conservación de los recursos genéticos conservados a largo plazo por CATIE
- El Instituto del Café de Costa Rica en julio de 2018 realizó un apoyo financiero de US\$10.000 para el mantenimiento de la colección de café en campo
- En noviembre de 2018 el Ministerio de Agricultura y Ganadería hace efectivo un apoyo financiero de USD 17.000 al CATIE para la conservación de semillas en la cámara fría.
- El Crop Trust financió en julio 2019 una consultoría por un monto de US\$15.000 para hacer un estudio a profundidad de la colección de café que proporcionará un panorama claro del valor estratégico del germoplasma conservado y cómo se puede asegurar su preservación a largo plazo.

Estos logros dan respuesta parcial a las recomendaciones planteadas por el Grupo de Trabajo establecido por Crop Trust y el TIRFAA. Hemos sido exitosos en conseguir apoyo financiero de varias instituciones de Costa Rica pero no hemos logrado conseguir el apoyo de los organismos y mecanismos internacionales (FAO, TIRFAA, Crop Trust, entre otros) para asegurar la conservación a perpetuidad y el uso en todo el mundo de los recursos genéticos conservados en el CATIE.

APPENDIX 7

Report by the Government of Papua New Guinea

Biennial Report on the ITPGRFA Article 15 Status of the International Coconut Genebank for the South Pacific

I. Introduction

Since 2009, the International Coconut Genebank for the South Pacific (ICG-SP) in Papua New Guinea (PNG) has been managing the threat of infection by the phytoplasma, Borgia Coconut Syndrome (BCS see <http://www.cogentnetwork.org/borgia-syndrome-disease>). The phytoplasma is transmitted by insect vectors and also affects other species, including Areca palm and Banana (*Musa* spp).

Kokonasi Industri Koporesen (KIK) is therefore in the process of replacing and relocating the total complement of 55 accessions in the collection (see table below) in its previous site at the Stewart Research Station in Madang, PNG, to a new safe site in Punipuni, Milne Bay. Relocation is underway via a pre-entry quarantine coconut nursery, at Kelababala on Misima Island. After 3-6 months of quarantine, the clean germplasm was to be transferred to the new genebank site in Milne Bay. However due to administrative bottlenecks caused by the formation of a new national procurement commission (ex-tenders board), there has been a delay in the approval to purchasing the land in Punipuni, although all parties have agreed on this site.

The team is sourcing the material from original collection sites to reduce risk of phytoplasma spread and has been validating a phytoplasma field diagnostic test developed by Jimmy Botella's team at the University of Queensland. Use of other lab-based diagnostic tests based on PCR and LAMP technology should also not be ruled out. DNA extraction has been completed in the quarantine centre and 12 accessions declared clean. Ongoing vector studies are also helping to understand epidemiology and etiology of the disease so it will be better managed in the future. The combination of vector control, original sourcing and reliable molecular diagnostics, as well as duplications will reduce the risk of losing accessions to this threat.

II. Status of the collection

III. Current list of Accessions:

Table 1 List of designated Germplasm and planted in ICG-SP at SRS, Madang, PNG

SI No.	Date planted	Code	Name of Accession	Site of collection
1	1994	BBR	Baibara Tall	Village in Central Province
2	1995	ELT2	Hawain Tall	Village in East Sepik Province
3	1995	ELT3	Yangoru Tall	✓
4	1995	ELT4	Vokio Tall	✓
5	1995	ETT	Etalata Tall	Village in Musau Island
6	1994	GLT1	Pellavarua Tall	Plantation in East New Britain Province
7	1994	GLT2	Raulawat Tall	✓
8	1994	GLT3	Natava Tall	✓
9	1994	GLT4	New Massava Tall	✓
10	1995	GMT5	Natava Many Fruited Tall	✓
11	1995	HLT	Hisihu Tall	Plantation in Central Province
12	1995	KKT1	Guanaga Tall	Plantation in Karkar island
13	1995	KKT2	Kinim Tall	✓
14	1994	KKT3	Ulatava Tall	Plantation in East New Britain Province
15	1994	KWT1	Severimabu Tall	Western Province
16	1994	KWT2	Boze Tall	✓

SI No.	Date planted	Code	Name of Accession	Site of collection
17	1995	MBT3	Siagara Tall	Milne Bay Province
18	1995	MBT4	Bubuletta Tall	✓
19	1994	MLT1	Lawes Tall	Manus Province
20	1994	MLT2	Lako Tall	✓
21	1994	MLT3	Baluan Tall	✓
22	1995	MVT1	Markham Farm Tall	Morobe Province
23	1995	MVT2	Lira Tall	✓
24	1995	TRT	Talasea Tall	West New Britain Province
25	1994	NLT1	Karu Tall	Plantation in New Ireland Province
26	1994	NLT2	Kenapit Tall	Village in New Ireland Province
27	1996	NLT3	Sohu Tall	✓
28	1994	OLT1	Saiho Tall	Village in Oro Province
29	1994	OLT2	Ajoa Tall	✓
30	1994	OLT3	Kikibator Tall	✓
31	1994	PLT	Poligolo Tall	Village in Central Province
32	1994	RIT	Rennell Island Tall	Numondo Plantation, WNB
33	1995	SLT2	Wutung Tall	West Sepik Province
34	1994	VLT1	Miha Kavava Tall	Village in Gulf Province
35	1994	VLT2	Keakea Tall	✓
36	1994	VLT3	Iokea Tall	✓
37	1994	WLT1	Gaungo Tall	West New Britain Province
38	1994	WLT2	Naviro Tall	✓
39	1994	PBD	PNG Brown Dwarf	Madang
40	1995	MRD	Malayan Red Dwarf	Duplicate from Kervera, ENBP
41	1995	MYD	Malayan Yellow Dwarf	✓
42	1995	NGD	Nias Green Dwarf	✓
43	1995	NRD	Nias Red Dwarf	✓
44	1994	NYD	Nias Yellow Dwarf	✓
45	1994	RRD	Rabaul Red Dwarf	✓
46	1994	PRD1	PNG Red Dwarf 1	Village in ENBP
47	1994	PRD2	PNG Red Dwarf 2	✓
48	1995	PYD	PNG Yellow Dwarf	Villages in Milne Bay & Oro Provinces
49	1995	IRD	Ikeoa Red Dwarf	Village in Gulf Province
50	2002	BLT	Bougainville Tall	Duplicate from Kervera in ENBP from selfing
51	2002	LMT	Lamur Tall	Block in ENBP
52	2004	SBD	Spicata Brown Dwarf	Duplicate from Kervera collection in ENBP
53	2004	SYD	Spicata Yellow Dwarf	✓
54	2004	SRD	Spicata Red Dwarf	✓
55	2004	GUKT	Garuk Tall	KarKar & Bagbag Islands in Madang Province

Note blue type represents new accessions since 2002, with traits of interest, with many more potential candidates to be formally characterised.

IV. Status of acquisitions, regenerations, duplications and distributions

The final collection will be re-established in Punipuni as the new principle ICG-SP site. There is an intention to share any of these accessions with Fiji and Samoa, provided the ICG can assure there will be no risk of transferring BCS or other pest and diseases, i.e. that the phytosanitary process (also based on validated molecular diagnosis) is conforms with IPPC standards and is accepted by all parties. No accessions have been shared internationally since the BCS was identified, so as to avoid any transfer of the risk.

BCS, also known as Banana Wilt Associated Phytoplasma (BWAP) and related banana phytoplasma are more widespread and occurring in a number of provinces outside of Madang. Researchers need to establish why coconuts occurring with BWAP outside of Madang do not show BCS symptoms. So although the genebank would like to back-up the entire set of 55 accessions in another BCS/BWAP-free province, this will not be feasible until the etiology and epidemiology of these threatening pathogens has been clearly understood and the risk of spread removed.

Please refer to annex 1 for a more detailed report for 2018-2019.

V. Donor support and benefit-sharing

In conjunction with COGENT and its new host the International Coconut Community (ICC), KIK has applied for funding from the UK Darwin Initiative, to duplicate accessions (including priority accessions from Indonesia and Côte d'Ivoire) and develop a model for sustainable *in situ* conservation. '*Biodiversity and climate-change adaptation for poverty reduction in coconut communities*'. The result of the 1st round bidding will be announced in October 2019.

Mr Alan Aku of KIK has also stepped in as interim COGENT chair, replacing the recently retired KIK director Dr James Kaiulo. Along with other stakeholders he has been involved with an invited proposal bidding for funds to support the transfer of COGENT from former host Bioversity International to new host ICC. With a stronger presence in an Asia-Pacific location, it is hoped that a revitalised COGENT will also better support ICG-SP activities, including capacity building, conservation and benefit-sharing.

ACIAR have been providing 5-year support since 2014 for vector studies on BCS epidemiology.

In collaboration with the University of Queensland, KIK has helped develop the molecular BCS field diagnostic kit, funded by the PNG Government

VI. Ongoing research projects

Between 2016 and 2018, the UK Darwin Initiative provided funding to support a project aimed at *Upgrading and broadening the new South-Pacific International Coconut Genebank*, which helped to build coconut conservation capacity and produced draft guidelines for characterising coconut germplasm, as well as providing some leverage for SPC-based conservation work funded by the benefit sharing fund (BFS)

KIK has signed an MoU with CABI International to assist with development a biosecurity plan for the coconut industry in PNG, which began in March 2019. For a more detailed list of projects see Table 1 in Annex 1 and 2.

VII. Other ICG-SP needs

It is important that PNG builds capacity in tissue culture, molecular diagnostic facilities including a dedicated laboratory, equipment and capacity building programme (on breeding- including controlled hand pollination, tissue culture and cryopreservation). Any support from ITPGRFA, FAO would be most welcome in this regard.

Annex 1: Q4-2018 report**Research & Development Report for 4th Quarter 2018 Activities, On Coconut Seed Collection & Pre-Entry Quarantine Coconut Nursery****Julius Maot****4.0 Coconut Seed Collection & Pre-Entry Quarantine Coconut Nursery (PEQN)**

In-situ Coconut Seed Collection for the priority tall accessions began in the 4th Quarter of 2018 for the Southern region and all the nuts were transferred to Kelababala Pre-Entry Quarantine Coconut Nursery for germination. The collection activity for the Southern region began in October and was completed in December, 2018. The main purpose of this activity is to relocate or duplicate the genebank to Punipuni via Kelababala PEQN due to Bogia Coconut Syndrome (BCS) threat in Madang Province.

4.1 Objectives

The overall objective of this project is relocation of International Coconut Genebank from Madang to Punipuni, Milne Bay Province via Kelababala Pre-Entry Quarantine Nursery.

4.2 Methodology/Materials

The team comprised of Kokonas Indastri Koporesen (KIK) Officers and National Agriculture Quarantine and Inspection Authority of Papua New Guinea (NAQIA) led by Mr. Tore Ovasuru, Senior Breeder for KIK who did the collections for most of the Southern region in most of Central, Gulf, Western, and Oro Provinces in October 2018. Mr. Ovasuru, then freighted all the nuts collected from nine (9) different collection sites or accessions to the Pre-Entry Quarantine Nursery at Kelababala, on Misima Island, Milne Bay Province. In December, 2018, Julius Maot with KIK and NAQIA team then completed the 3 priority tall accessions for the Southern Region; 1 accession for Central Province and 2 accessions for Milne Bay Province. This brought the total number of accessions to 12 collected in 2018 and grown inside the PEQN. The total seed nuts sown in PEQN was 3,238.

The nuts collected *in-situ* were treated with fungicide and pesticide through knapsack spraying before bagging and then freighted to PEQN. NAQIA was solely responsible for all treatments of coconut seeds. Also, 4 palms were randomly selected among a population and sawdust samples were collected for each collecting sites. The sawdust samples collected were for BCS testing. All the nuts freighted to Misima Island were then sown into seedbeds inside the aphid screen house at PEQN.

4.3 Results & Discussions: Project Activities & Achievements

The three current ongoing activities out of other project activities under this project are;

- (i) *In-situ* collection of talls from original sites in PNG, excluding Madang
- (ii) Establish Pre-Entry Quarantine coconut nursery at Kelababala on Misima Island
- (iii) Establish Poly-bagged nursery at Bubuletta for Punipuni Genebank establishment

Table 1. Project activities & achievements

Objective: Genebank relocation from Madang to Milne Bay		
No.	Activity	Comments

1	<i>In-situ</i> collection of talls from original sites in PNG, excluding Madang	<ul style="list-style-type: none"> ❖ Achieved 12 accessions from Southern Region collection for priority tall collections in 2018 ❖ Other regions (New Guinea Islands & Momase) will complete in 2019 (refer to collection schedule)
2	Establish Pre-Entry Quarantine Nursery at Kelababala on Misima Island	<ul style="list-style-type: none"> ❖ PEQN establishment was achieved in the third quarter, 2018. ❖ 12 accessions were sown & growing well inside the PEQN – Achieved ❖ Germination data- completed for first 9 accessions sown in October, and ongoing for the 3 sown in December. ❖ Labelling of accessions completed in December ❖ Simple incinerator construction completed in December, 2018. ❖ BCS screening – will be undertaken in April, 2019. ❖ Transfer of PEQN seedlings – will be undertaken in April/May, 2019.
3	Establish Poly-bagged nursery at Bubuleta for Punipuni Genebank establishment	<ul style="list-style-type: none"> ❖ Nursery space clearing – Achieved ❖ Poly-bagged procurement & filling up – Outstanding or yet to be undertaken ❖ Procurement of items/tools for Bubuleta nursery – Outstanding or yet to be undertaken.

Coconut seed-nuts collection *in-situ* is ongoing and will cover regions or provinces that have no records of BCS presence. Madang as host province of BCS therefore is excluded in the *in-situ* collections. This particular activity is at the moment focussed on priority tall accessions, and for the Southern region, the priority tall accessions were completed in December, 2018. In 2019, the collection of priority tall accessions will cover New Guinea Islands and Momase regions and then probably include priority dwarf accessions in our collections. One of the major factor is the harsh weather conditions in all regions that may hinder or delay the progress of collection exercises in 2019.

At PEQN, all the coconut seedlings growth performances were normal as expected. There was concern of less number of rainy days in the 4th Quarter months but towards the end of December, the number of rainy days had increased, thus, enhanced the growth performance of coconut seedlings very much.

Table 2. Germination % after 1 month of sowing at PEQN of the 9 accessions for the 4th Quarter, 2018

Accession/Cultivar for the Southern Region	Code	Date Sown	No. of Seed-Nuts Sown	Germination recording dates with number of germinated nuts per weekly				
				5.10.18	12.10.18	19.10.18	26.10.18	2.11.18
VAILALA TALL – MIHA KAVAVA	VLT1	1.10.18	248	21 (8.5%)	36 (14.5%)	72 (29%)	117 (47.2%)	152 (61.3%)
VAILALA TALL – IOKEA	VLT3	1.10.18	250	20 (8%)	35 (14%)	62 (24.8%)	102 (40.8%)	137 (54.8%)
CENTRAL TALL – HISIU	HLT	1.10.18	250	19 (7.6%)	36 (14.4%)	89 (35.6%)	143 (57.2%)	177 (70.8%)
RENDEL ISLAND TALL - MANABO	RIT	2.10.18	377	95 (25.2%)	107 (28.4%)	149 (39.5%)	188 (49.9%)	217 (57.6%)
KIWAI TALL - SEVERIMAMBU	KWT1	1.10.18	368	14 (3.8%)	28 (7.6%)	78 (21.2%)	132 (35.9%)	193 (52.4%)
KIWAI TALL - BOZE	KWT2	2.10.18	264	21 (7.9%)	36 (13.6%)	55 (20.8%)	93 (35.2%)	120 (45.5%)
ORO TALL - SAIHO	OLT1	3.10.18	271	86 (31.7%)	116 (42.8%)	164 (60.5%)	187 (69%)	208 (76.8%)
ORO TALL - AJOA	OLT2	3.10.18	328	28 (8.5%)	31 (9.5%)	57 (17.4%)	63 (19.2%)	80 (24.4%)
KIWAI TALL - BOZE	KWT3 S/H	3.10.18	100	3 (3%)	3 (3%)	12 (12%)	32 (32%)	47 (47%)

After a month of germination, 2 of the cultivars have reached 70% and the highest or fast germinated cultivar is OLT1 (Oro Tall – Saiho) at 76.8% followed by HLT (Central Tall – Hisiu) at 70.8%. This is the character of precocity or early bearing cultivars which is expected to be translated to early flowering after field planting. Also, note that some of the seed-nuts were already germinated in bags while in the storage sheds before freighted to Misima. This is as shown on the germination records on the 05th of October, 2018 (Table 2).

Conclusion

Coconut seed nuts collection and pre-entry quarantine coconut nursery has partly achieved its objective however this activity is still ongoing. Collections of the priority tall accessions for the Southern region was achieved in the 4th Quarter, 2018. Most activities at PEQN is ongoing and the coconut seedlings are performing well in terms of growth and health status in the 4th Quarter of 2018.

Some of the part achievements for the 4th Quarter of 2018 are;

- ❖ 12 accessions collected for Southern region
- ❖ 3,238 total nuts sown in the aphid screen shed at PEQN
- ❖ Germination data recording completed for the first 9 accessions done in October, 2018
- ❖ Labelling of accessions at PEQN completed in December, 2018.
- ❖ Simple incinerator construction completed in December, 2018.

Recommendations:

- ❖ BCS screening should be done after 3-4 months at PEQN shed.
- ❖ Bubuleta poly-bagged nursery must be established, fully supported and equipped to accommodate for PEQN coconut seedlings in 2019.
- ❖ Treatment methods of seed nuts by NAQIA during collection exercises must be done using dipping methods instead of spraying to avoid any possible incursion of pests & diseases into Misima. This must apply to New Guinea Islands and Momase regions. Dipping method is more effective than spraying.
- ❖ Punipuni sites/land for the new Genebank must be cleared and ready for field planting in 2019.
- ❖ Recruitment of a Research Officer and Assistant Research Officer by KIK management to establish and look after the Genebank must be done in early 2019.

Annex 2: Research & Development Report for 1st Quarter 2019 Activities On Coconut Seed Collection & Pre-Entry Quarantine Coconut Nursery

Julius Maot

COCONUT SEED COLLECTIONS FROM THE ORIGINAL SITES AND SETTING UP THE SEED ACCESSIONS AT THE PRE-ENTRY QUARANTINE COCONUT NURSERY AT KELABABALA STATION ON MISIMA ISLAND***Background***

In-situ Coconut Seed Collection for the priority tall accessions began in the 4th Quarter of 2018 for the Southern region and all the nuts were transferred to Kelababala Pre-Entry Quarantine Coconut Nursery for germination. The collection activity for the Southern region began in October and was completed in December 2018. The main purpose of this activity is to relocate or duplicate the genebank to Punipuni via Kelababala PEQN due to Bogia Coconut Syndrome (BCS) threat in Madang Province.

In the first quarter of 2019, seedlings leaves were trimmed due to more vigorous growth and also to cater for insecticide treatments.

Also, the long awaited BCS screening process was finally done in the 1st quarter of 2019 by KIK, and its collaborative partners; NAQIA (national) and University of Queensland (international) team.

Objectives

The overall objective of this project is the relocation of International Coconut Genebank from Madang to Punipuni, Milne Bay Province via Kelababala Pre-Entry Quarantine Nursery.

Procedures

The team comprised of Kokonas Industri Koporesen (KIK) Officers and National Agriculture Quarantine and Inspection Authority of Papua New Guinea (NAQIA) led by Mr. Tore Ovasuru, Senior Breeder for KIK who did the collections for most of the Southern region in most of Central, Gulf, Western, and Oro Provinces in October 2018. Mr. Ovasuru, then freighted all the nuts collected from nine (9) different collection sites or accessions to the Pre-Entry Quarantine Nursery at Kelababala, on Misima Island, Milne Bay Province. In December 2018, Julius Maot with KIK and NAQIA team completed the 3 priority tall accessions for the Southern Region; 1 accession for Central Province and 2 accessions for Milne Bay Province. This brought the total number of accessions to 12 collected in 2018 and grown inside the PEQN. The total seed nuts sown in PEQN was 3,238.

The nuts collected *in-situ* were treated with fungicide and pesticide through knapsack spraying before bagging and then freighted to PEQN. NAQIA was solely responsible for all treatments of coconut seeds. Also, 4 palms were randomly selected among a population and sawdust samples were collected for each collecting sites. The sawdust samples collected were for BCS testing. All the nuts freighted to Misima Island were then sown into seedbeds inside the aphid screen house at PEQN.

In the first quarter of 2019, 20 leaf samples were sampled for each of the 12 accessions from the newly opened leaf or spear leaf, then were packed and brought to Madang for DNA extraction. At the same time, two of the officers; a Research Officer and a Technical Officer from Research and Development

Division at Stewart Research Station were trained by University of Queensland experts on how to extract DNA of coconut for BCS screening and were sent to University of Queensland for DNA analysis/testing (refer to results on Table 3 below).

Project Activities & Achievements

The three current ongoing activities out of other project activities under this project are:

- (i) In-situ collection of talls from original sites in PNG, excluding Madang;
- (ii) Establish Pre-Entry Quarantine coconut nursery at Kelababala on Misima Island; and
- (iii) Establish Poly-bagged nursery at Bubuletta for Punipuni Genebank establishment.

Table 1. Project activities & achievements

Objective: Genebank relocation from Madang to Milne Bay

No.	Activity	Comments
1	In-situ collection of talls from original sites in PNG, excluding Madang	<ul style="list-style-type: none"> • Achieved 12 accessions from Southern Region collection for priority tall collections in 2018 • Other regions (New Guinea Islands & Momase) will be completed in 2019
2	Pre-Entry Quarantine Nursery at Kelababala on Misima Island activities	<ul style="list-style-type: none"> • PEQN establishment was achieved in the third quarter, 2018. • 12 accessions were sown & growing well inside the PEQN – Achieved • Germination data- completed for first 9 accessions sown in October, and ongoing for the 3 sown in December. • Labelling of accessions completed in December • Simple incinerator construction completed in December 2018. • 1st Quarter of 2019, procured pyrethroids insecticides for PEQN - Achieved • 1st Quarter of 2019, sprayed pyrethroids insecticide and controlled coconut insects – Achieved. • BCS screening – completed in March/April 2019 (refer to results below). • 2 KIK Female Officers (Sharon Woruba & Kalangpain Samai) were taught how to extract and process DNA by Professor Botella and Dr. Mike Mason from University of Queensland, – Achieved. • 5 Other KIK Technical Officers were also trained on the general DNA extraction method and participated on the first process of DNA extraction - Achieved • Transfer of PEQN seedlings – will be undertaken in May/June, 2019.

No.	Activity	Comments
3	Poly-bagged nursery activities at Bubuletta for Punipuni Genebank establishment	<ul style="list-style-type: none"> Nursery space clearing – Achieved Poly-bagged filling up – Achieved Poly-bagged procurement - Paid in the 1st Quarter and ready to be freighted to Madang and Punipuni from Lae. Procurement of items/tools for Bubuletta nursery – Procured most nursery tools by CDO-Milne Bay. Transferred seedlings from PEQN to be polybagged in Bubuletta nursery – will be undertaken in May/June, 2019.
4	Punipuni Genebank for planting of coconut accessions with 3 replicates	<ul style="list-style-type: none"> In 1st Quarter 2019 - Still pending and awaiting land acquisition by KIK from Maramatana LLG.

Coconut seed-nuts collection *in-situ* is ongoing and will cover regions or provinces that have no records of BCS presence. Madang as host province of BCS therefore is excluded in the *in-situ* collections. This particular activity is at the moment focused on priority tall accessions, and for the Southern region, the priority tall accessions were completed in December, 2018. In 2019, the collection of priority tall accessions will cover New Guinea Islands and Momase regions and then probably include priority dwarf accessions in our collections. One of the major factor is the harsh weather conditions in all regions that may hinder or delay the progress of collection exercises in 2019. This activity was further delayed due to Punipuni land acquisition by KIK still pending up to this stage.

At PEQN, all the coconut seedlings growth performances were normal as expected. There was concern for less number of rainy days in the 4th Quarter months but towards the end of December, the number of rainy days had increased, thus, enhanced the growth of the coconut seedlings very much. Also, as part of the Coconut Breeding program, germination data were collected as shown in Table 2 below. After a month of germination, 2 of the cultivars have reached 70% and the highest or fast-germinated cultivar is OLT1 (Oro Tall – Saiho) at 76.8% followed by HLT (Central Tall – Hisiu) at 70.8%. This is the character of precocity or early bearing cultivars that is expected to translated to early flowering after field planting. Also, note that some of the seed-nuts were already germinated in bags while in the storage sheds before freighted to Misima. This is as shown on the germination records on the 05th October 2018 for 9 accessions as well as in the first quarter of 2019 for 3 accessions (Table 2).

Table 2. Germination % after 1 month of sowing at PEQN of the 9 accessions for the 4th Quarter, 2018 and 3 accessions in 1st Quarter, 2019.

Accession/Cultivar for the Southern Region	Code	Date Sown	No. of Seed-Nuts	Germination recording dates with number of germinated nuts per weekly				
				5.10.18	12.10.18	19.10.18	26.10.18	2.11.18
Vailala Tall – Miha Kavava	VLT1	1.10.18	248	21 (8.5%)	36 (14.5%)	72 (29%)	117 (47.2%)	152 (61.3%)
Vailala Tall - Iokea	VLT3	1.10.18	250	20 (8%)	35 (14%)	62 (24.8%)	102 (40.8%)	137 (54.8%)

Central Tall - Hisiu	HLT	1.10.18	250	19 (7.6%)	36 (14.4%)	89 (35.6%)	143 (57.2%)	177 (70.8%)
Rennel Island Tall - Manabo	RIT	2.10.18	377	95 (25.2%)	107 (28.4%)	149 (39.5%)	188 (49.9%)	217 (57.6%)
Kiwai Tall - Severimambu	KWT1	1.10.18	368	14 (3.8%)	28 (7.6%)	78 (21.2%)	132 (35.9%)	193 (52.4%)
Kiwai Tall - Boze	KWT2	2.10.18	264	21 (7.9%)	36 (13.6%)	55 (20.8%)	93 (35.2%)	120 (45.5%)
Oro Tall - Saiho	OLT1	3.10.18	271	86 (31.7%)	116 (42.8%)	164 (60.5%)	187 (69%)	208 (76.8%)
Oro Tall - Ajoa	OLT2	3.10.18	328	28 (8.5%)	31 (9.5%)	57 (17.4%)	63 (19.2%)	80 (24.4%)
Kiwai Tall - Boze	KWT3 S/H	3.10.18	100	3 (3%)	3 (3%)	12 (12%)	32 (32%)	47 (47%)
Milne Bay Tall - Bubuletta	MBT4	12.12.18	250	22.02.2019 (i.e. 2 months after sowing)	145 (58% germination)			
Central Tall - Baibara	BBT	12.12.18	250		155 (62% germination)			
Milne Bay Tall - Siagara	MBT3	12.12.18	263		199 (76% germination)			

In the first quarter of 2019, a team from KIK, NAQIA (national partner) and University of Queensland (Australia – International partner) carried out BCS sampling and screening, and Mr. David Tenakanai, a Senior Entomologist and General Manager from NAQIA spotted the coconut mealy bugs and scale insects carried by ants (vector). He recommended controlling the insects with insecticides as soon as possible. The insects were controlled by pyrethroid insecticide treatment as per the recommendation from NAQIA. Prior to that, the seedlings leaves were trimmed to a manageable height due to over-grown seedlings and to clear space for effective spraying of insects as well.

20 leaves collected from each of the 12 accessions were sampled, packed and brought to Stewart Research Station for DNA extraction and processing. The University of Queensland team then brought the samples for BCS testing/analysis. The outcome of this BCS tests for each accession are shown in Table 3 below.

Table 3: Summarized BCS test result of PEQN showing negativity of BCS from *in-situ* coconut accessions by University of Queensland, Australia, 2019.

Name of Cultivar/Accessions sampled	Sample Code	BCS PCR	Coconut PCR
Vailala Local Tall 1	VLT1	-	+
Milne Bay Tall 3	MBT3	-	+
Hisiu Local Tall	HLT	-	+

Vailala Local Tall 3	VLT3	-	+
Kiwai Tall 1	KWT1	-	+
Kiwai Tall 2	KWT2	-	+
Milne Bay Tall 4	MBT4	-	+
Kiwai Tall 3 – Sweet Husk (S/H)	KWT3-S/H	-	+
Oro Local Tall 1	OLT1	-	+
Oro Local Tall 2	OLT2	-	+
Rennel Island Tall	RIT	-	+
Baibara Tall	BBT	-	+

Note: - (negative or BCS not present), + (DNA from Coconut extracted confirms presence of Coconut DNA tested).

Moreover, two KIK Officers were trained by University of Queensland experts on how to extract and process Coconut DNA. This was a great achievement because in the future BCS screening, the two trained officers will extract and process DNA in Madang, and the samples sent to University of Queensland, Australia for DNA testing and analysis.

Conclusion

Coconut seed nuts collection and pre-entry quarantine coconut nursery has partly achieved its objective, however, this activity is still on going. Collections of the priority tall accessions for the Southern region were achieved in the 4th Quarter, 2018. Most activities at PEQN is ongoing and the coconut seedlings are performing well in terms of growth and health status in the 4th Quarter of 2018 and 1st Quarter of 2019.

Some of the achievements for the 1st Quarter of 2019 and 4th Quarter of 2018 are:

- (a) BCS screening and testing completed for 12 accessions in the 1st Quarter, 2019 and the result showed no BCS present in coconut seedlings at PEQN
- (b) Insects were controlled in the PEQN by insecticide spraying as per NAQIA recommendations.
- (c) Two of the Research and Development Officers were trained on DNA processing by University of Queensland experts in the 1st Quarter of 2019.
- (d) 12 accessions collected for Southern region in 4th Quarter, 2018
- (e) 3,238 total nuts sown in the aphid screen shed at PEQN,
- (f) Germination data recording completed for the first 9 accessions done in October, 2018,
- (g) Labelling of accessions at PEQN completed in December, 2018, and
- (h) Simple incinerator construction completed in December 2018.

Way Forward

The following should be noted:

- (a) BCS screening should be carried out on 3-4 months old coconut seedlings at PEQN in Misima shed and samples brought to SRS as quickly as possible for DNA extraction.
- (b) NAQIA have to officially release the transfer of seedlings at PEQN by Chief Plant Protection Officer (CPPO) in May or June 2019 for transfer of seedlings to take place immediately. Prior to this, transfer protocols of seedlings have to be established by NAQIA and implemented by KIK at PEQN.

- (c) Bubuleta poly-bagged nursery must be established, fully supported and equipped to accommodate for PEQN coconut seedlings in 2019.
- (d) Treatment methods of seed nuts by NAQIA during collection exercises must be done using dipping methods instead of spraying to avoid any possible incursion of pests & diseases at Misima. This must apply to New Guinea Islands and MOMASE regions. Dipping method is more effective than spraying.
- (e) Punipuni sites/land for the new Genebank must be acquired by KIK as soon as possible and cleared and ready for field planting in 2019.
- (f) Seedlings from the PEQN must be transferred to Bubuleta polybag nursery in late May or early June.
- (g) Should there be any further delay in the planting site at Punipuni, the seedlings from 12 of the accessions transferred from PEQN can be planted on the spare land at Bubuleta behind the nursery site and to be managed by Milne Bay CDO as a seed garden (source of planting material).
- (h) Collection or re-collection of *in-situ* coconut accessions will continue once Punipuni is finally acquired by KIK in 2019.

Recruitment of a Research Officer and Assistant Research Officer by KIK management to establish and look after the Genebank at Punipuni should be undertaken in 2019.

Annex 3**Collection Schedule for 2019**

Accession	Code	Location	Total Nuts	Collection Dates	Officers	GPS Readings	Remarks
Central Tall	BBT	Baibara	250	3 rd -7 th December, 2018	Maot, Maora, Harold, Mathew Kasiki & NAQIA – Pere Kokoa & Geno Puka		Collect sawdust samples (4 samples/site) - completed
Milne Bay Tall	MBT4	Bubuletta	250	8 th -10 th December, 2018	As above		Collect sawdust samples (4 samples/site) - completed
Milne Bay Tall	MBT3	Siagara (Misima)	250	13 th -17 th December, 2018	As above		Collect sawdust samples (4 samples/site) - completed
Note: Southern region collections totalling 12 accessions were completed in December, 2018 and now were at PEQN on Misima Island.							
13-22nd December, 2018 Freight to Kelababala Prenursery for germination & Testing for BCS (Collection in Southern region completed)							
New Island Local Tall	NLT3	Sohu	250	21 st - 24 th April, 2019	Maot, Maora, Mathew Kasiki, Daslogo, NAQIA – Thecla Guaf & Michael Mimfin		Collect sawdust samples (4 samples/site)
New Island Local Tall	(ETT)	Bai (Etalate), Musau Island	250	25 th -27 th January, 2019	Maot, Maora, Mathew Kasiki, Daslogo, NAQIA – Thecla Guaf & Michael Mimfin		Collect sawdust samples (4 samples/site)

Accession	Code	Location	Total Nuts	Collection Dates	Officers	GPS Readings	Remarks
New Island Local Tall	NLT2	Kenapit	250	28 th – 30 th April, 2019	As above		Collect sawdust samples (4 samples/site)
Manus Local Tall	MLT1	Lawes	250	1 st -4 th May, 2019	As above + Kana & NAQIA – Thecla Guaf & Coony Posile		Collect sawdust samples (4 samples/site)
West New Britain Local Tall	WLT2	Naviro village	250	5 th -8 th May, 2019	Maot, Maora, Mathew Kasiki, Ranus + NAQIA – Anna Kawi & Douglas Siuta		Collect sawdust samples (4 samples/site)
West New Britain Tall 2	WLT1	Gaungo	250	9 th -11 th May, 2019	As above		Collect sawdust samples (4 samples/site)
Gazelle Tall	GPT01 (GLT1)	Pellevarua Plantation	250	12 th -15 th May, 2019	Maot, Maora, Mathew Kasiki, Gaula, Nongkas + NAQIA – Michelle Pius & Sadrach Bill		Collect sawdust samples (4 samples/site)
Gazelle Tall	GPT02 (GLT2)	Raulawat Plantation	250	16 th -18 th May, 2019	As above		Collect sawdust samples (4 samples/site)
Gazelle Tall	GMT5	Natava Plantation (Many Fruited Tall)	250	19 th -21 st May, 2019	As above		Collect sawdust samples (4 samples/site)
Karkar Tall	KKT2	Ulatava Plantation	250	22 nd -24 th May, 2019	As above		Collect sawdust samples (4 samples/site)

Accession	Code	Location	Total Nuts	Collection Dates	Officers	GPS Readings	Remarks
25th May -08th June, 2019: Freight to Kelababala Prenursery for germination and testing for BCS (New Guinea Islands Region)							
Sandaun Local Tall	WTT	Wutung, Sandaun	250	16 th -20 th June, 2019	Maot, Kembu, Mathew Kasiki, Risimeri +NAQIA – David Tenakanai & Peter Pouru		Collect sawdust samples (4 samples/site)
East Sepik Local Tall	ELT2	Hawaian Village	250	21st – 24th June, 2019	As above + NAQIA – David Tenakanai & Depu Ando		Collect sawdust samples (4 samples/site)
East Sepik Local	ELT4	Vokio	250	25 th -27 th June, 2019	As Above		Collect sawdust samples (4 samples/site)
Markham Tall	MVT2	Liar Village, Markham Valley	250	28 th – 30 June, 2019	As Above for KIK officers and NAQIA – David Tenakanai & Ulaiah Tongon		Collect sawdust samples (4 samples/site)
		Total seedlings/seednuts	4250 x 25% =1100 leaf samples			Total Sawdust samples	70 sawdust samples from 17 accessions
1st-20th July, 2019: Freight to Kelababala Pre-nursery for germination & test							

Annex 4 – PEQN Photos of activities carried out



Figure 1. An example of proper labelling of accessions at PEQN in one of the aphid screen nursery sheds.

Photos of aphid screen PEQN



Figure 2: Aphids screen shed 1 with nuts inside



Figure 3: 1 month old seedlings in PEQN



Figure 4: 2 months old seedlings in PEQN



Figure 5: 3 x aphid screen sheds at Kelababala PEQN

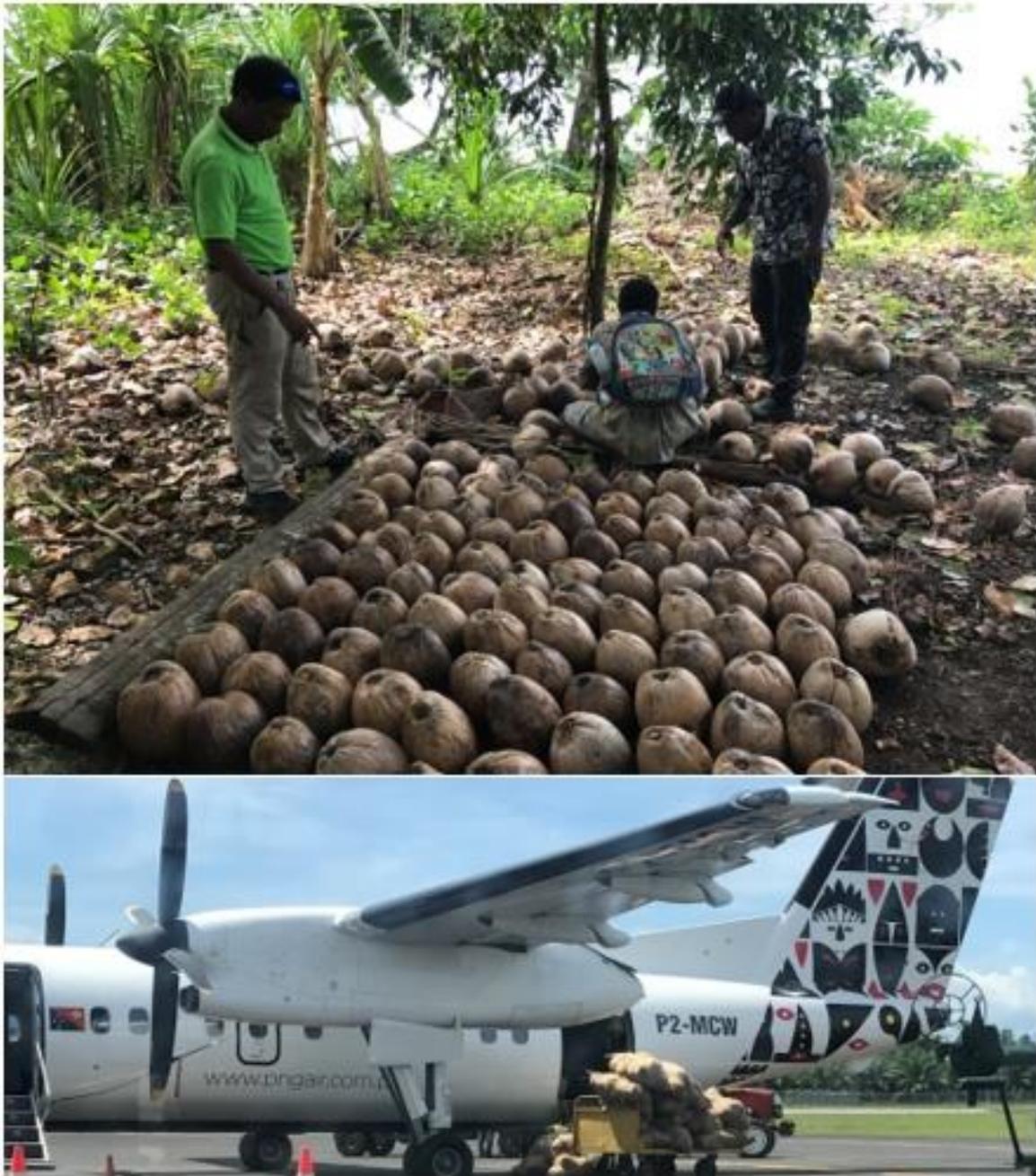
Photos of seed-nut collections and freighting to Misima

Figure 6. Seednuts collected, bagged and air freighted to PEQN nursery on Misima Island