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联合国粮食及农业组织

国际条约
粮食和农业植物遗传资源

暂定议程议题 15.4

管理机构第八届会议

2019 年 11 月 11－16 日，罗马

根据《国际条约》第 15 条与管理机构签订协定的机构报告

内容提要

本文载有根据《国际条约》第 15 条与管理机构签署协定的国际机构提交的报告。各份报告按秘书处收到的原文载于本文附录，供管理机构审议。本文还载有本两年度秘书根据《国际条约》第 15 条持有的国际种质资源收集品开展的最新活动情况，这些收集品的持续保管目前遇到巨大困难。

征求指导意见

请管理机构审议本文所载报告及其他信息，并结合附录 1 所载一项可能的决议要点，提供进一步指导。

本文件可通过此页快速响应二维码读取；粮农组织采用此二维码旨在尽量减轻环境影响并倡导以更为环保的方式开展交流。
其他文件可访问：http://www.fao.org/plant-treaty/meetings/meetings-detail/en/c/1111365/。

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I. 引 言

1. 管理机构定期收到根据《国际条约》第 15 条与其签署协定的国际机构，就根据多边系统条款管理和分发种质资源提交的报告。这些报告还涉及与收集品的有序保管和《国际条约》框架内的合作有关的问题。在第七届会议上，管理机构邀请相关国际机构向第八届会议提交此类报告。[1]

2. 在本文件发布之日，秘书处已收到以下六份报告：

- 根据《国际条约》第 15 条签署协定的国际农研磋商组织 11 个国际农研中心的总体报告；
- 世界混农林业中心的补充报告；
- 国际生物盐化农业中心的报告；
- 太平洋共同体秘书处的报告；
- 热带农业研究培训中心的报告；
- 南太平洋国际椰子基因库所在国巴布亚新几内亚政府的报告

3. 本文件附录 2 – 6 所载六份报告按收到的原文提交给管理机构。[2] [3]本文件载有六份报告的内容综述。本文件还介绍了本两年度秘书在履行《国际条约》第 15.1(g)条规定的职责方面，同时根据按照该条规定签订的协定条款，就据报受到威胁的收集品开展的最新活动情况。本文件还向管理机构通报了本两年度根据第 15 条签署的一项新协定，以及推动新协定的努力。

II. 收到的报告摘要

4. 国际农研磋商组织各农研中心的报告介绍了有关 11 个中心所持种质资源收集品含有的材料数量、2006 年以来分发的样本数量和此类分发活动的区域细分的最新情况。该报告还通报了国际农研磋商组织为了维护种质资源收集品质量并实现其增值而开展的各种活动。该报告还概述了国际农研磋商组织全系统和各中心参与闭会期间活动的情况，除其他目的外，这些活动旨在加强多边系统，实施全球信息系统，并落实“农民的权利”。该报告强调，各中心日益利用技术进步来生成并分析遗传序列数据，以便促进保存和可持续利用以及利益分享。

5. 世界混农林业中心的报告提供了在第 15 条所述协定的框架内持有、分发和获取种质资源的进一步数字明细。该报告还通报了通过表型和分子工具对该中心收集品进行特性鉴定的举措，惠及农民及其他利益相关方的信息分享活动，以及认识到“农民的权利”从而促进农民与科研人员相互合作的政策。

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[1] 第 12/2017 号决议，第 14-15 段。该决议可查阅：http://www.fao.org/3/a-mv091e.pdf。

[2] 秘书处可能收到的任何补充报告都将作为本工作文件的增编发布。

[3] 为了节省起见，只以收到的原文语文提供六份报告。

6. 国际生物盐化农业中心在 2019 年 3 月签署第 15 条所述协定后提交了报告（见下文第 21 段）。该报告提供了该中心基因库持有、获取和分发种质资源总数。该报告通报了该中心便利获取收集品的举措，即编制了种子申请准则，并签订了一项通过 Genesys 提供材料层面信息的数据协定。

7. 太平洋共同体秘书处的报告含有持有、分发和获取种质资源的数字。该报告还介绍了采取的制度措施，旨在通过捐助方的资助，保证太平洋作物和树木中心的长期可持续性、效率和更大影响力。该报告还提及，该中心在探索全面的粮食安全和营养方针的过程中，已将职责扩展到椰子和林木物种，并提及了创造和分享因利用种质资源而产生的非经济利益的各种活动。

8. 热带农业研究培训中心的报告对该中心田间和冷藏室持有的收集品状况进行了评估。使用《标准材料转让协定》分发种质资源的数字表明，不同地点的接收方对该中心的种质资源有一定的兴趣。此外，该报告提及了某些收集品对区域农业系统的重要性。尽管如此，该报告强调，具体面对下降的田间和冷藏室保存能力，以及有害生物的不利影响，可供保管和再生材料的资金不足。因此，极有可能损失种质资源。在这方面，该报告介绍了 2017 年 9 月秘书和全球作物多样性信托基金联合召集的工作组所提建议的最新实施情况，特别是哥斯达黎加政府在本两年度为了维护冷藏室而提供的临时财政和政治支持的最新情况。有关该中心的田间收集品，该报告还提及全球作物多样性信托基金考虑到长期保管咖啡收集品的必要性，在评估其全球战略价值方面提供的协助。

9. 巴布亚新几内亚政府关于南太平洋国际椰子收集品的报告介绍了迫于一种植物疫病的感染威胁，仍在进行的巴布亚新几内亚境内收集站的迁址工作。该报告通报，可能在该区域两个其他国家，即在斐济和萨摩亚对收集品进行备份。在这方面，管理机构可以注意，最近批准的一个利益分享基金项目将为这类备份提供支持。[4] 该国政府的报告还通报了捐助方的支持工作和仍在进行的研究项目。

10. 各份报告传达了第 15 条所述机构全面实施《国际条约》及与管理机构所签订协定的持续承诺。在这方面，种质资源的保存和分发是促进与地方、区域和国际伙伴就实现《国际条约》的目标开展协作活动，以及促进根据管理机构的政策指导就管理收集品进行政策参与的一个组成部分。各份报告还展望了收集品中材料的实际状况、威胁和可获性，以及相关的能力建设需求，可以为愿意支持收集品管理工作的捐助方和技术伙伴提供信息。

[4] 见利益分享基金第四次提案征集下获批项目清单中“在升级的南太平洋国际椰子基因库中保护受到威胁的椰子多样性”项目，可查阅：http://www.fao.org/3/ca5173en/ca5173en.pdf。

III. 其他相关活动

磋商及对闭会期间进程建言献策

11. 在第七届会议上，管理机构要求秘书视资金可用情况，就实施相关协定和政策指导与第 15 条所述机构举行定期或周期性磋商，并在每届会议上向管理机构汇报工作。[5]

12. 在 2018–19 两年度，第 15 条所述机构积极参与了不同闭会期间进程，并提出了宝贵的意见，期间还分享了通过采用数字对象标识符等方式，实施多边系统和全球信息系统的经验。[6]特别关于加强多边系统运行开放性工作组的会议，国际农研磋商组织就若干问题提交了材料，其中反映了履行第 15 条所述协定有关多边系统的义务方面的经验。这些材料介绍了如何以实用方式、以最低交易成本向农民分发种质资源；如何实际调整《标准材料转让协定》附件 1，特别是以便能够分发大量种质资源和正在培育的植物遗传资源。

13. 秘书在政策问题能力建设活动中进行磋商和协作，这些问题涉及多边系统下种质资源的管理，以及《名古屋议定书》与《生物多样性公约》的国家实施工作之间的相互影响。这类磋商涵盖了根据《国际条约》第 15.1(b)条分发《条约》附件 I 未列作物种质资源的有关问题，以及管理机构第二届会议就《标准材料转让协定》的解释性脚注做出的有关决定。[7]

14. 鉴于第 15 条所述机构广泛参与《国际条约》的多个工作流程，继续并加强秘书与相关机构就实施相关协定的定期磋商，仍是必要和可取的。

对收集品保管工作的支持

15. 在第七届会议上，管理机构注意到仍在努力保全有序保管面临风险或受到威胁的国际收集品，并要求秘书酌情与所在国政府密切协作，并与其它有能力为这些努力提供技术及其他必要支持的有关政府和相关机构合作，继续履行《国际条约》15 条规定的职责。[8]

16. 《条约》第 15 条以及根据该条签订的协定规定，如果非原生境收集品的有序保管受到任何事件，包括不可抗力的阻碍或威胁，经所在国批准，秘书应尽可能协助撤出或转移。根据相关协定，缔约国际机构承诺按照国际公认的标准管理这些非原生境收集品。一经缔约国际机构请求，《国际条约》秘书即尽力提供或动员适当的技术支持。

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[5] 第 12/2017 号决议，第 16 段。

[6] 管理机构第八届会议与多边系统和全球信息系统（分别为议题 8.1 和 10）有关的工作和参考文件，载有国际农研磋商组织及其他第 15 条所述机构的进一步最新实施进展。

[7] 有关与国际农研磋商组织，特别是与国际生物多样性中心开展的联合能力建设活动，详见 IT/GB-8/19/15.4/1 号文件《与其他国际机构和组织开展合作的报告》。

[8] 第 12/2017 号决议，第 17 段。

17. 基于上述职责和管理机构的指导，在 2018–19 两年度，秘书指导了针对两套受到威胁的非原生境收集品的努力，即热带农业研究培训中心持有的收集品和设在科特迪瓦的非洲和印度洋国际椰子基因库。管理机构已在第七届会议上收到有关这两套收集品所受持续威胁的信息。[9]

18. 除了热带农业研究培训中心的报告所载有关哥斯达黎加政府临时支持的信息以外，秘书还促进或出席了在罗马和圣何塞举行的若干高级别会议，旨在提升该中心持有的受《国际条约》管辖的种质资源收集品的重要性，其中包括粮农组织总干事和高级管理层与代表哥斯达黎加政府的农业和畜牧业部长之间的会议。最近，粮农组织总干事就援助请求致信农业和畜牧业部长，信中强调了《国际条约》在维护和促进全球种质资源保存系统方面的基本作用。他要求粮农组织气候、生物多样性、土地及水利部助理总干事和秘书协助促进缔约方、机构捐助方和技术伙伴筹集资源和提供技术援助。

19. 关于设在科特迪瓦的椰子收集品，秘书处与粮农组织驻科特迪瓦代表处合作，于 2018 年 10 月、2019 年 4 月和 2019 年 6 月促成了三次由科特迪瓦政府请求并由法国国际发展农业研究中心牵头的咨询任务，目的是评估收集品的迁址方案。Marc Delorme 收集站设有非洲和印度洋国际椰子基因库，其中含有 49 份材料，包括 11 份独一无二的椰子树材料。该收集站由国家农艺研究中心主持。该基因库所在地已被售出，并被指定用于城市开发，从而对收集品及相关试验构成了严重威胁。上述任务编制的可行性和成本核算研究报告强调，鉴于保护国际收集品是绝对优先重点，因此可以采取若干保存形式，包括冷冻和保存花粉、收集并离体保存或超低温保藏合子胚，同时在科特迪瓦和/或其他国家进行备份。此外，最好在科特迪瓦的各种其他地点，也可能在国外对收集品中最重要的材料进行备份。评价了转移收集站的不同工作模块，包括花粉和胚胎超低温保藏模块的所有技术和财务环节。科特迪瓦政府可以提请国际社会注意得出的转移成本估算，使其支持收集品的抢救和转移。作为立即采取的后续行动，已编制了一份第一阶段概念说明，并提交给了国际椰子遗传资源网络驻国际生物多样性中心临时协调员领导的一个供资机制。该概念说明请求资助 20 种重点材料的胚胎收集、离体保存、超低温保藏和胚胎转出科特迪瓦。

20. 为了与国际椰子共同体建立合作，即国际椰子遗传资源网络指导委员会 2017 年 10 月决定的该网络新的所在地和协调员，秘书促进了这类职能通过国际生物多样性中心和国际椰子共同体之间的一项协定，从前者到后者的正式移交。粮农组织将提请根据《国际条约》第 15 条签署协定或此前与粮农组织签署受托协定的

[9] IT/GB-7/17/24，《〈国际条约〉第 15 条下与管理机构签订协议机构的报告》，第 13–14 段，可查阅：http://www.fao.org/3/a-mu437e.pdf。

所在国政府注意该协定。一名秘书处代表出席了 2019 年 8 月举行的国际椰子共同体部长级会议，会上该共同体和国际生物多样性中心正式签署了移交该网络协调和主持职能的协定。该秘书处代表在部长级会议上发言介绍了《国际条约》，特别是通过第 15 条所述协定，在法律确定性及对该网络收集品的业务支持方面提供的机会。

新的协定

21. 在第七届会议上，管理机构要求秘书继续努力，争取根据《条约》第 15 条与其他相关国际机构签署协定。[10] 2019 年 3 月，国际生物盐化农业中心和代表《国际条约》管理机构的粮农组织签署了一项协定，使设在该中心的国际种质资源收集品受《国际条约》管辖。[11]在这方面，秘书正与全球作物多样性信托基金合作，促进在网上记录种质资源收集品，以便未来纳入 Genesys 平台，并通过数字对象标识符接入全球信息系统。为了促进《国际条约》框架内的合作，该中心将于 2019 年 9 月为管理机构第八届会议主办近东区域筹备会议。该区域会议结束以后，秘书处将立即就实施根据第 15 条签订的该协定，为该中心工作人员举办一场内部能力建设研讨会。

22. 关于国际椰子遗传资源网络的收集品，秘书正在征求东南亚及东亚国际椰子收集品所在国印度尼西亚政府的意见，探讨能否根据《条约》第 15 条签订一项协定，用于取代 1999 年与粮农组织签署的受托协定。使该网络所有目前和未来的收集品受《国际条约》管辖，是未来可能与国际椰子共同体合作的一个领域。

23. 秘书正与国际橄榄理事会讨论可能的协作领域，包括根据《国际条约》第 15 条，就该理事会管辖的田间收集品与其签订一项协定的前景。

IV. 征求指导意见

24. 请管理机构审议本文件所载报告及信息，并结合本文件附录 1 所载一项可能的决议要点提供指导。

[10] 第 12/2017 号决议，第 19 段。

[11] 该协定的文本可查阅：http://www.fao.org/3/ca4349en/ca4349en.pdf。

附录 1

第 XX/2019 号决议草案

与其他国际机构和组织的合作

第二部分：第 15 条所述机构

管理机构，

忆及《国际条约》第 15.1 条规定；

1. **注意到**根据《国际条约》第 15.1 条签订协定的机构报告提供的信息；**称赞**提交报告的机构所提供的宝贵内容，并**敦促**这些机构继续向管理机构今后会议提供类似信息；

2. **邀请**尚未提交任何报告的机构在管理机构第八届会议上提交这些报告，并**要求**秘书将此项要求传达给这些机构；

3. **要求**秘书视资金可用情况，继续就实施相关协定和政策指导，与根据《国际条约》第 15 条签订协定的机构举行定期或周期性磋商，并在每届会议上向管理机构汇报工作；

4. **注意到**仍在努力保全有序保管面临风险或受到威胁的国际收集品，并特别**感谢**哥斯达黎加、科特迪瓦和巴布亚新几内亚政府努力促进由其持有的收集品的有序保管；

5. **要求**秘书酌情与所在国政府密切协作，并与其它有能力为这些努力提供财政、技术及其他必要支持的有关政府和相关机构合作，继续根据《国际条约》15 条履行职责并提供支持；

6. **敦促**缔约方、捐助方及其他利益相关方提供必要的物资支持，推动相关工作；

7. **欢迎**国际椰子共同体成为国际椰子遗传资源网络新的所在地和协调员，并**邀请**该共同体加强与秘书在实施根据《条约》第 15 条签订的协定方面的协作，特别是在有序保管由其协调的收集品，以及签订协定使其他国际椰子收集品由《国际条约》主持方面；**邀请**尚未根据《国际条约》第 15 条签署协定的这类收集品所在国政府签署这些协定；

8. **欢迎**与国际生物盐化农业中心签订的协定，并**邀请**该中心加强与秘书和相关机构在实施相关协定和政策指导方面的合作；

9. **要求**秘书继续努力，争取与其他达到《国际条约》第 15 条要求的相关国际机构签署协定。

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.[12]

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 758,221accessions 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.[13] 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

[12] 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

[13] 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 programs[14]) 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

[14] 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.

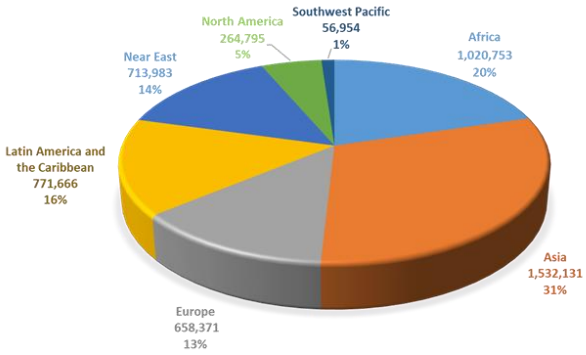
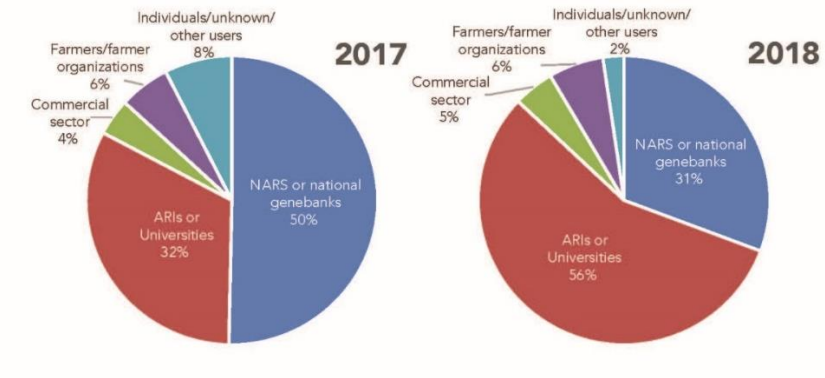


Figure 2 provides percentages for each type of recipients of materials from the CGIAR Genebanks[15], with the largest groups being NARS and national genebanks (in 2017) and advanced research institutes and universities (in 2018). The smallest group of recipients both years was the commercial sector.

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

[15] 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 Convection (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 activates 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).[16] 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'.

[16] 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, envelops 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.

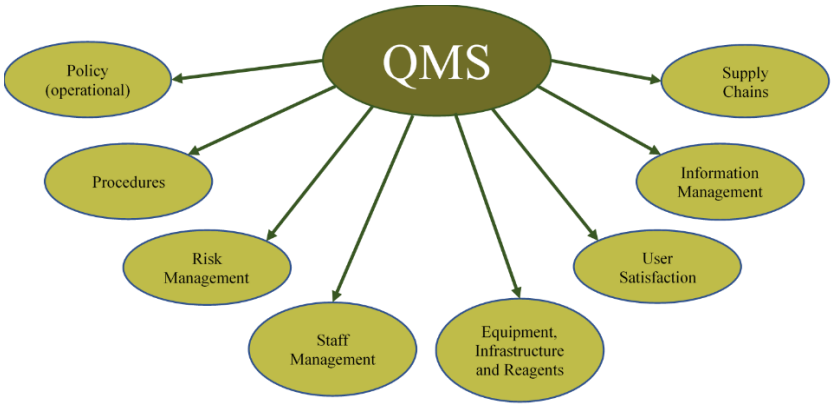
More information on Centers' uses of GLIS DOIs are available in a recent submission from CGIAR to the GLIS Steering Committee which is available on line.[17]

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.

[17] 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. [18]

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.[19]. 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.[20]

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

[18] Available at https://beta.genesys-pgr.org/subsets

[19] Available at https://validator.genesys-pgr.org

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

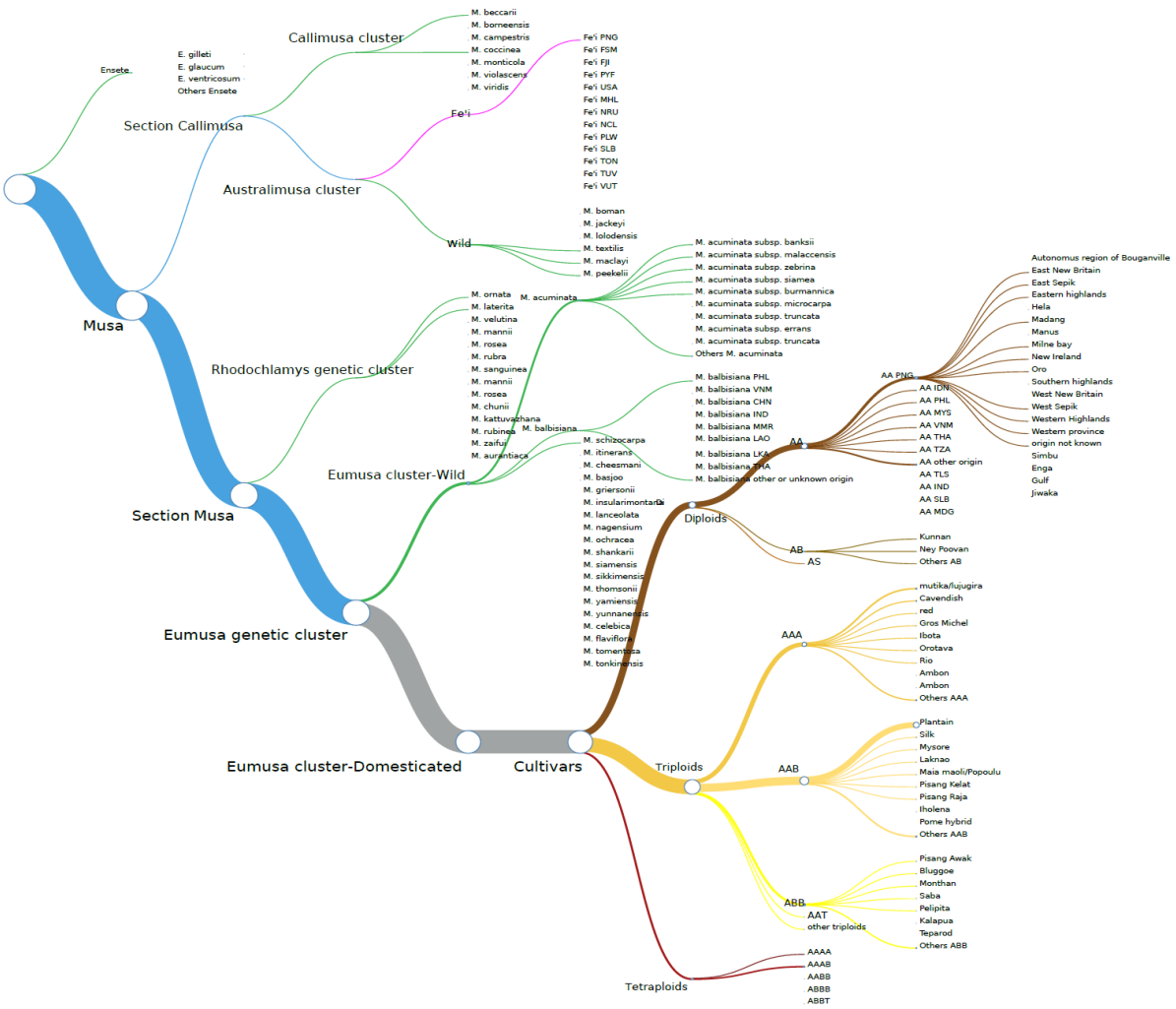
These values are now automatically uploaded to the online reporting tool of the CGIAR Genebank Platform, which greatly facilitates annual reporting.

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.[21] 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 genepool, leading to quantitative estimates of gaps by comparison with the actual composition of collections.



[21] 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.[22]

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)	

[22] 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.[23] 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.[24] 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

[23] 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)

[24] 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.[25]

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;

[25] 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.[26]

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.[27] 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.

[26] 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

[27] 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.[28]

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.[29] 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.

[28] See Section IV.A, and footnote 10 above.

[29] 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 availed 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 2010-2020[30], the Pacific Forum Leader's 49th meet (Nauru, 2018) recommendations[31] and; of course, the SDGs[32] 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

[30] https://www.spc.int/resource-centre

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

[32] 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 recently[33].

- **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)	*Alocasia macrorrhizos*	11
Taro (Major aroids)	*Colocasia esculenta*	1140
Giant swamp taro (Major aroids)	*Cyrtosperma chamissonis*	66
Cocoyam/Tannia (Major aroids)	*Xanthosoma sagittifolium*	11

[33] https://www.spc.int/updates/news/media-release/2019/07/fjd3-million-towards-protecting-pacific-crops

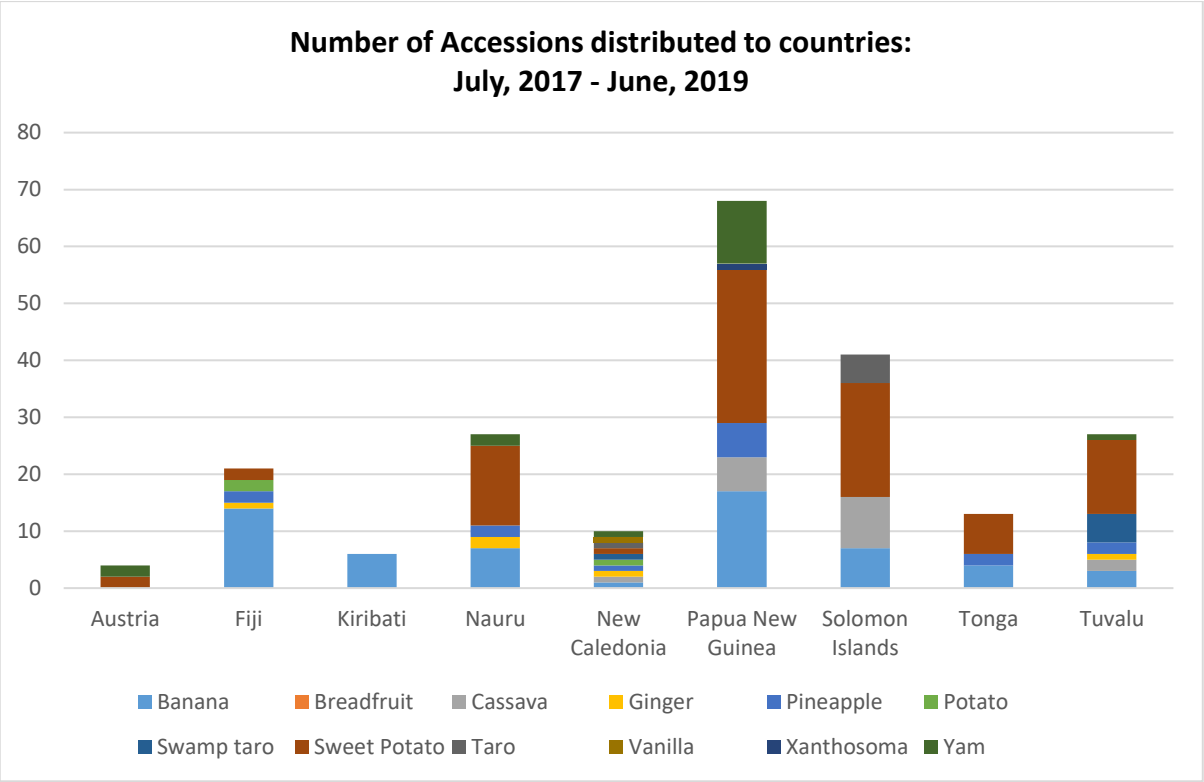
Breadfruit	*Artocarpus altilis*	33
Banana/Plantain	*Musa* spp.	158
Sweet potato	*Ipomoea batatas*	327
Cassava	*Manihot esculenta*	16
Yam	*Dioscorea* spp.	330
Potato	*Solanum tuberosum*	54
Total		**2141**
NON-ANNEX 1 Crops		
Common Name	***Scientific Name***	**No. Accessions**
Bele (Slippery cabbage)	*Abelmoschus manihot*	10
Pineapples	*Ananas comosus*	7
Pandanus	*Pandanus tectoris*	5
Sugarcane	*Saccharum spp.*	5
Sandalwood	*Santalum album*	1
Vanilla	*Vanilla fragrans*	4
Ginger	*Zingiber officinale*	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 (*Coffea spp*.)	1.976
Cacao (*Theobroma spp*.)	1.235
Pejibaye (*Bactris gasipaes*)	592
Achiote (*Bixa orellana*)	105
Sapotaceae	123
Sapindaceae	12
Myrtaceae	106
Cítricos (*Citrus spp*.)	65
Camote (*Ipomoea batatas*)	29

Ñame (*Dioscorea spp.*)	57
Yuca (*Manihot esculenta*)	157
Macadamia (*Macadamia integrifolia*)	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**
Amaranthus spp.	Amaranto	265
Chenopodium berlandieri	Quínoa	2
Chenopodium quinoa	Quínoa	4
Cucurbitaceae		**2.332**
Cucurbita argyrosperma	Pipián	111
Cucurbita ficifolia	Chiverre	173
Cucurbita foetidissima		1
Cucurbita lundelliana		4
Cucurbita maxima	Calabaza	9

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

Capsicum annum	Chile	368
Capsicum baccatum	Chile	25
Capsicum chinense	Chile	51
Capsicum frutescens	Chile	274
Capsicum pubescens	Chile	11
Physalis spp.	Uchuva	76
Otras Solanaceae		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**
Cucurbita moschata	69
Phaseolus vulgaris	8
Phaseolus coccineus	12
Pachyrhizus spp	4
Zea mays	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

Quinientas 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**
Zea	80
Amaranto	18
Cajanus	5
Cucurbita	224
Phaseolus	73
Lycopersicum	99
Vigna	9
Zea	80
Otros	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	*Solanum pimpinellifolium* *Cucumis metuliferus*	Costa Rica	Sergio Salazar	Agricultor
7	*Zea mays, Cucurbita moschata, Cucurbita pepo, Phaseolus vulgaris, Capsicum annumm, Cajanus cajan, Canavalia ensiformis,*	Costa Rica	Miguel Ávila Arias	Agricultor

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

110	*Coffea arabica*	Costa Rica	Coffea Diversa S.A	Empresa privada
1	*Vainilla planifolia*	Costa Rica	Jennes Matamoros	Productor
2	*Coffea arabica*	Costa Rica	Juan Marín	Productor
8	*Coffea arabica*	Costa Rica	Instituto del Café de Costa Rica	Institución nacional
61	*Coffea arabica*	Panamá	Hacienda La Esmeralda (Price Peterson)	Empresa privada
1	*Coffea arabica*	Costa Rica	José María Fallas	Productor
1	*Coffea arabica*	Costa Rica	Carlos Borjas Maradiaga	Productor
10	*Coffea arabica*	Guatemala	Alfonso Anzueto	Productor
14	*Coffea arabica*	Honduras	Antonio Juárez Castellanos	Productor
55	*Coffea arabica*	Costa Rica	Coffea Diversa S.A	Empresa privada
6	*Coffea arabica*	Costa Rica	Juan Marín	Productor
3	*Coffea arabica*	Costa Rica	José María Fallas	Productor
1	*Coffea arabica*	Costa Rica	Juan Carlos Martínez	Productor
1	*Coffea arabica*	Guatemala	Arturo de Jesus Aguirre	Productor
5	*Coffea arabica*	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_derechosdelagricultorcr.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/v2eE2zWdOl2?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, Bogia Coconut Syndrome (BCS see http://www.cogentnetwork.org/bogia-syndrome-disease). The phytoplasma is transmitted by insect vectors and also affects other species, including Areca palm and Banana (Musa spp).

Kokonas Indastri 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	Liara 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, WNBP
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	Ikoea 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.

4.1Objectives

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	*In-situ* collection of talls from original sites in PNG, excluding Madang	❖ 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	❖ 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 Bubuletta for Punipuni Genebank establishment	❖ Nursery space clearing – Achieved ❖ Poly-bagged procurement & filling up – Outstanding or yet to be undertaken ❖ Procurement of items/tools for Bubuletta 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%)
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%)

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.
- Bubuletta 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 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 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	• 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	• 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	• 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	• 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) Bubuletta 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 andcleared and ready for field planting in 2019.
(f) Seedlings from the PEQN must be transferred to Bubuletta 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 Bubuletta 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	3rd-7th 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	8th-10th December, 2018	As above		Collect sawdust samples (4 samples/site) - completed
Milne Bay Tall	MBT3	Siagara (Misima)	250	13th-17th 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	21st - 24th 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	25th -27th 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	28th – 30th April, 2019	As above		Collect sawdust samples (4 samples/site
Manus Local Tall	MLT1	Lawes	250	1st-4th 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	5th-8th 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	9th-11th May, 2019	As above		Collect sawdust samples (4 samples/site)
Gazelle Tall	GPT01 (GLT1)	Pellevarua Plantation	250	12th-15th 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	16th-18th May, 2019	As above		Collect sawdust samples (4 samples/site
Gazelle Tall	GMT5	Natava Plantation (Many Fruited Tall)	250	19th-21st May, 2019	As above		Collect sawdust samples (4 samples/site)
Karkar Tall	KKT2	Ulatava Plantation	250	22nd-24th 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	16th-20th 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	25th -27th June, 2019	As Above		Collect sawdust samples (4 samples/site)
Markham Tall	MVT2	Liara Village, Markham Valley	250	28th – 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