



INTERNATIONAL YEAR OF
PLANT HEALTH
2020

Germplasm / Rol de la Unidad de Sanidad y Cuarentena del CIP en la prevención de plagas transfronterizas en Germoplasma”

G. Müller

Lima & CCCAP, November 18 -22, 2019

CGIAR & Crop trust: Awareness week campaigns on phytosanitation



- Increase awareness on phytosanitary obligations and emerging challenges
- Showcase tools and technologies for seed health testing and phytosanitary controls in CG centers

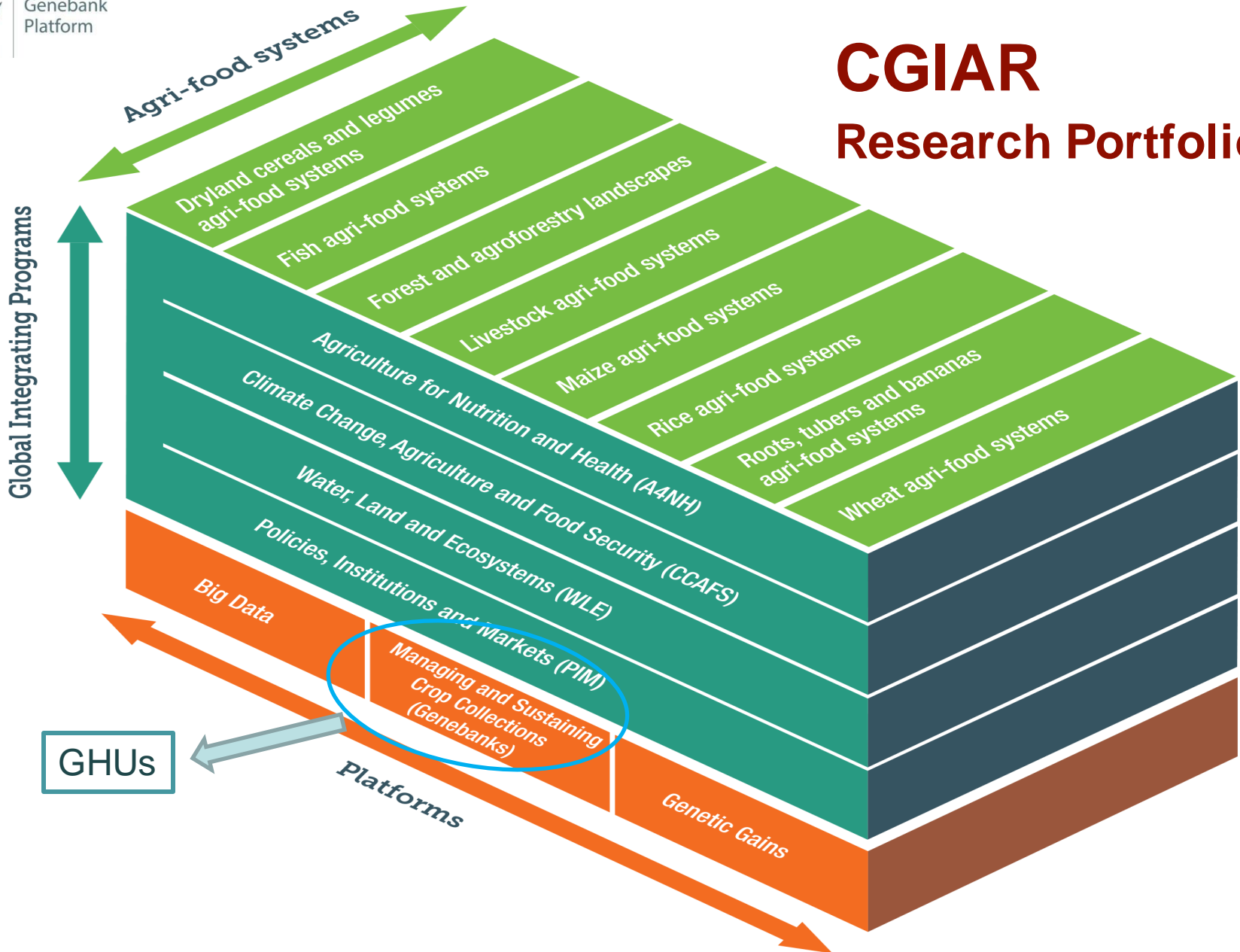


- Joint activities with national quarantine authorities
- Communication channels (posters, flyers, webinars, blogs, etc.)



Genebank
Platform

CGIAR Research Portfolio



Genebank Platform: Modules

Conservation Module *(with GHU component)*

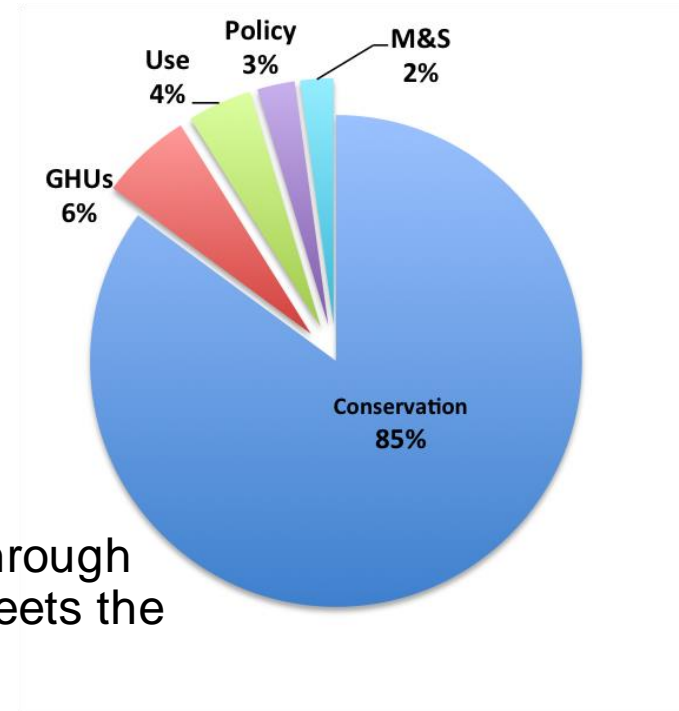
- Core genebank operations and ensure **'disease-free'** germplasm availability
- Improve core genebank operations and management

Use Module

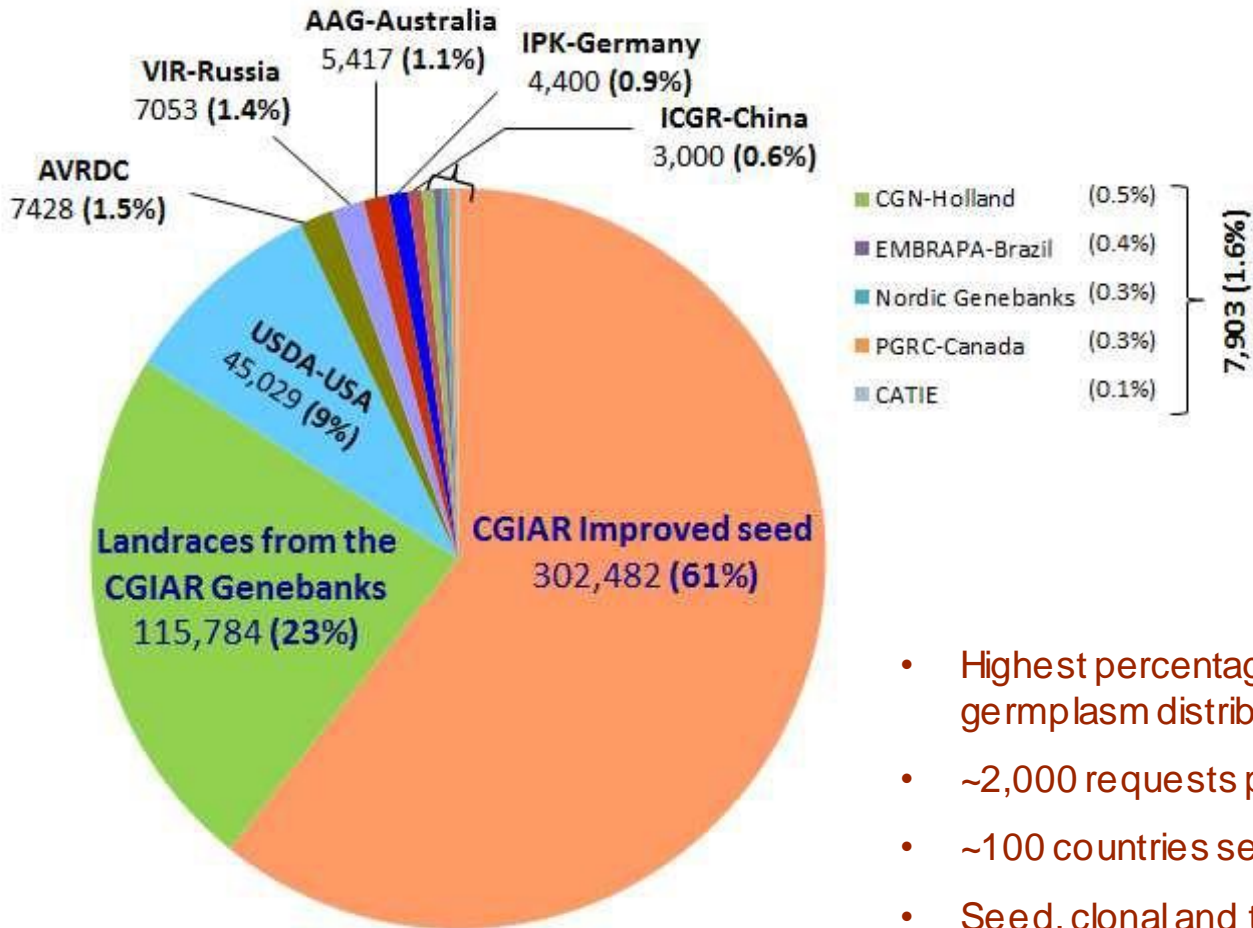
- To facilitate more effective access and use through
- targeted delivery of germplasm that better meets the needs of users

Policy Module

- To ensure Centers comply with international policies and laws, increase their influence in policy-making processes and strengthen capacity of national programs



CGIAR leads international distribution of germplasm



- Highest percentage of international germplasm distribution
- ~2,000 requests per year
- ~100 countries served per year
- Seed, clonal and tree germplasm (landraces, improved lines and wild accessions)

Germplasm Distribution

International germplasm exchanges have been the main factor in the diversification and improvement of world agriculture.



But it also implies a risk if it is not done responsibly ...

...the introduction of exotic pests to territories where they were not before.

Plant pests are responsible for the loss of up to 40 percent of world food crops and commercial losses in agricultural products that exceed USD 220 billion annually¹



Zebra chip in potato²

Fuente: Munyaneza et al., 2010



Huanglongbing in citrus fruits³



Mal de Panamá in banano⁴



Fall Armyworm in maize⁵

1. Fuente, FAO
2. Munyaneza et al., 2010
3. SENASA - Peru
4. Croplif eLA.
5. CIMMYT

IMPORTANCE OF PLANT DISEASES IN THE ECONOMY OF THE SOCIETIES:

Plant diseases reduce the variety of plants that can develop in a given geographical area by destroying all plants of certain species susceptible to a particular disease.

- For example, the American chestnut was wiped out of the forests of North America by the blight caused by *Endothia parasitica*.

Plant diseases have also changed the way people live

- Some countries have had to replace wheat with rye or corn due to the Black Wheat Rust (*Puccinia graminis*).
- In England in the 19th century, coffee was replaced by tea because coffee plantations in one of its colonies in Ceylon were razed by rust (*Hemileia vastatrix*)
- In Central America, the “mal dePanama”, caused by *Fusarium oxysporum* f.sp. *cubense*, forced many countries to stop growing bananas and / or plantains.
- In Peru, the cultivation of flax was promoted during World War II, but in a very short time it was practically destroyed by *Fusarium oxysporum* f.sp. *lini*.

International Germplasm Health Requirements

IPPC recommendations in the 6th International Plant Protection Congress (August 1993, Montreal, Canada)

Germplasm distribution activity, has an inherent risk of introducing exotic plant pests – **pathogens, insects, weeds, etc.** – that could result in potential economic losses.

- Each center should take adequate measures to reduce the risk of pest and pathogen spread with germplasm exchange
- Standardize procedures for handling plant health to cope with diverse quarantine systems in different countries
- Comply with IPPC and NPPO procedures
- Led to the establishment of Germplasm Health Units (GHUs)

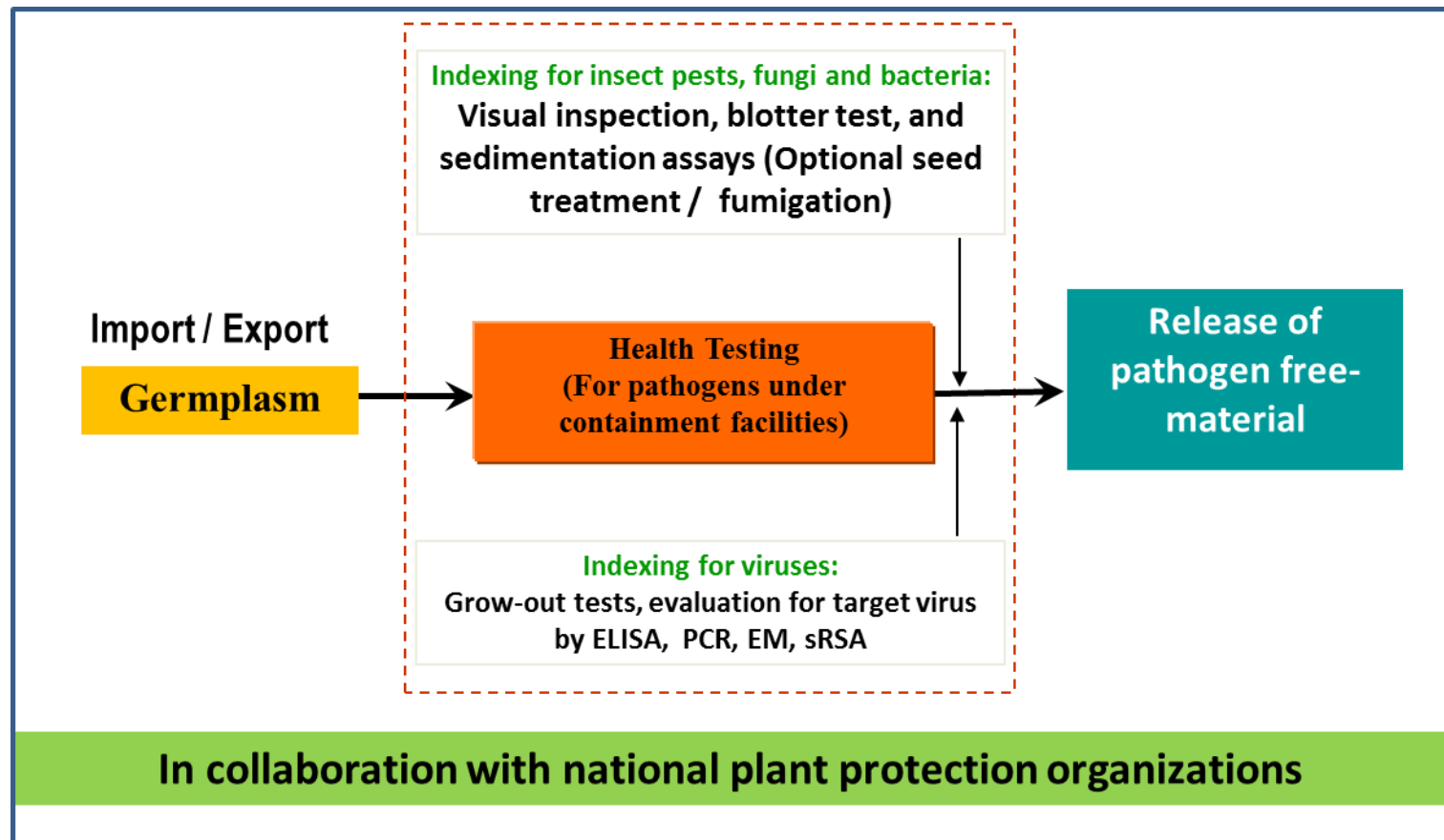


Plant Quarantine and the International Transfer of Germplasm

Donald L. Plucknett
Nigel J. H. Smith

GHUs ensuring safe exchange of germplasm

- Eleven CGIAR Genebanks manage over 750,000 accessions in 35 collections around the world
- GHUs provide phytosanitary services to the 35 collections held by the 11 CGIAR centers
- In situ, Ex situ, in vitro and cryo collections



GHU at all stages of germplasm flow

- Wild species
- Landraces
- Improved lines
- Research materials

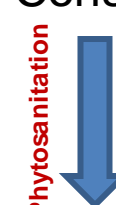
- Ex-situ conservation
- In-situ conservation
- Cryo conservation
- Back-up conservation

- Research (genotyping, other)
- Pre-breeding
- Breeding
- Evaluation trials
- Variety
- Germplasm
- Seed systems

Collection



Conservation



Distribution

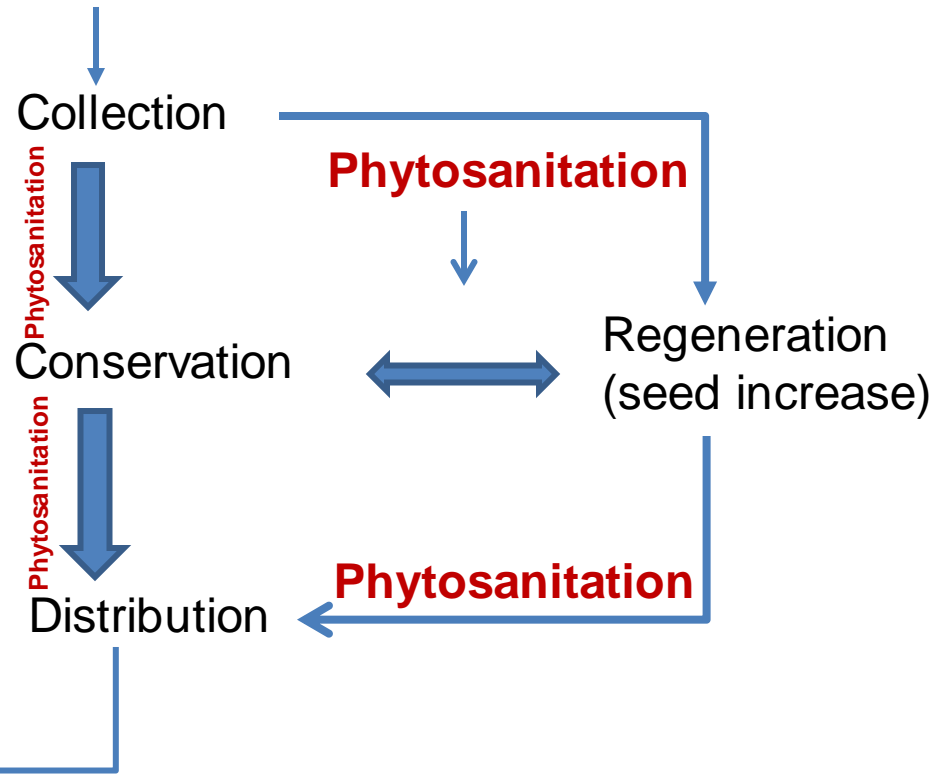
Phytosanitation



Regeneration
(seed increase)

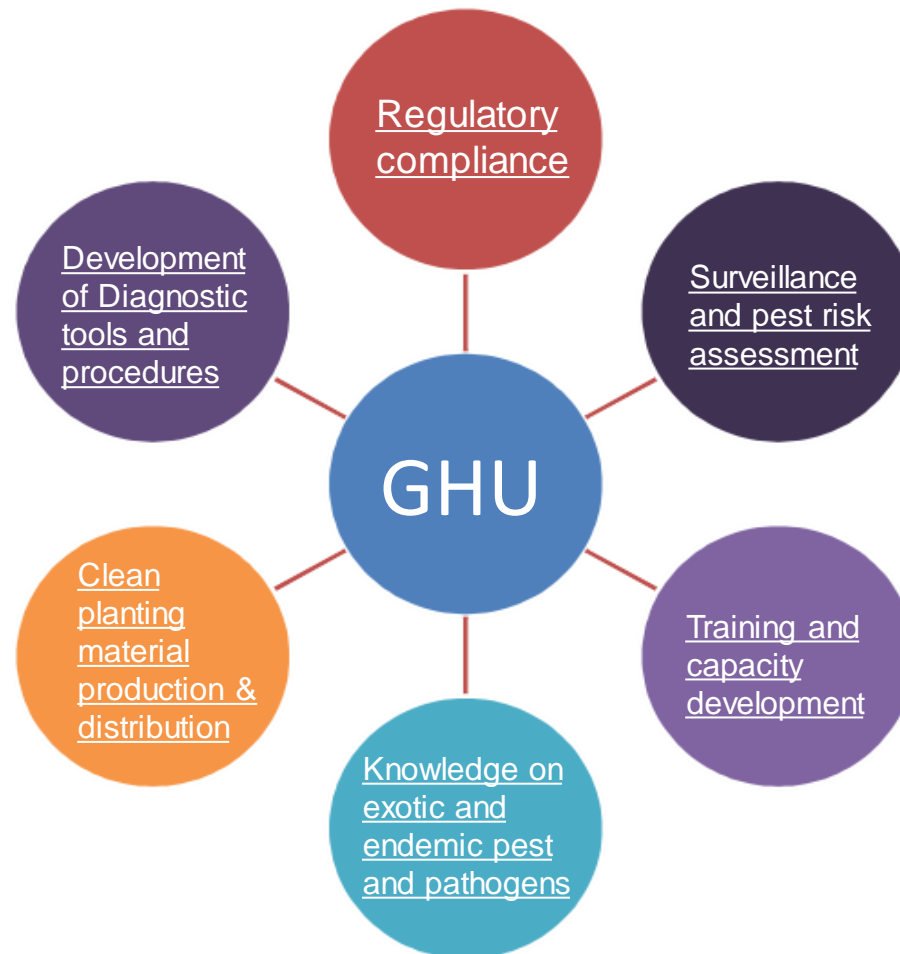


Phytosanitation



GHUs ensure phytosanitary safety of genetic resources

Research & Service functions



CIP – HQU, is aligned with national and international standards



Food and Agriculture
Organization of the
United Nations



International Plant Protection Convention
Protecting the world's plant resources from pests

International Standards for Phytosanitary Measures (ISPMs)

RPPOs

Asia and Pacific Plant Protection Commission (APPPC)

Comunidad Andina (CA)

Comite de Sanidad Vegetal del Cono Sur (COSAVE)

European and Mediterranean Plant Protection Organization (EPPO)

Inter-African Phytosanitary Council (IAPSC)

Near East Plant Protection Organization (NEPPO)

North American Plant Protection Organization (NAPPO)

Organismo Internacional Regional de Sanidad Agropecuaria (OIRSA)

Pacific Plant Protection Organization (PPPO)

NPPOs

SENASA

KEPHIS

Etc.

- **EPPO technical guidelines PM 7/98 (2010)**
- FAO/IPGRI Technical Guidelines for the safe movement of germplasm: Potato N°19 (1997)
- FAO/IBPGR Technical Guidelines for the safe movement of germplasm: sweetpotato (1989)

[Next](#)

GHUs: Surveillance and Pest Risk Assessment

The main role of CIP's GHU is to enforce the plant health policy within CIP through the surveillance and monitoring of plant health, control of harmful organisms (HO) and/or perform risk analysis and develop / implement measures to prevent or limit their spread.

N° 2.1.2

OPERATIONAL POLICY ON PROCEDURES OF GENETIC RESOURCES CONSERVATION, GERMPLASM ACQUISITION AND DISTRIBUTION



Distribution

No material will be distributed from CIP outside of Peru that has not been cleaned from all pathogens for which the Center routinely tests except by written permission of the CIP Director General. In-house phytosanitary testing of genetic resources will adhere to globally recognized best practices thus ensuring the safe international movement of germplasm that complies or exceeds applicable distribution and biosafety regulations. An exception is plant material for repatriation.

Distribution of genetic material in CIP-Peru will follow regulations on Internal Quarantine and Movement of Genetic material in CIP (see below). All material to be distributed must have correct information, including the complete CIP Number.

Awareness and exchange of pest distribution knowledge on exotic and endemic pest and pathogens with NPPOs



La Molina, 02 de Noviembre de 2016

CARTA-0580-2016-MINAGRI-SENASA-DSV

Señor
Dr. JAN KREUZE
Jefe de la Unidad de Cuarentena
Centro Internacional de la Papa – CIP
Av. La Molina N° 1895
La Molina.-

Asunto : Información sobre Longidorus en Perú
Referencia : CSI-CC-002-2016

Tengo el agrado de dirigirme a usted, en atención al documento de la referencia, para agradecerle por la valiosa información brindada. Además, manifestarle que la información será analizada y tomada en cuenta en las actividades del SENASA.

Es propicia la ocasión, para expresar los sentimientos de mi consideración.

Atentamente,



From: MOISES EUGENIO PACHECO ENCISO <MPACHECO@senasa.gob.pe>
Sent: Thursday, September 06, 2018 8:05 PM
To: Perez, Wilmer (CIP) <W.PEREZ@CGIAR.ORG>; odolores@senas.gob.pe; Johny Fernando Naccha Oyola <JNACCHA@senasa.gob.pe>
Cc: Kreuze, Jan (CIP) <J.KREUZE@CGIAR.ORG>; Andrade, Jorge (CIP) <J.ANDRADE@CGIAR.ORG>; Devaux, Andre (CIP- Quito) <A.DEVAUX@CGIAR.ORG>; Gamarra, Heidy (CIP) <H.GAMARRA@CGIAR.ORG>; Johny Fernando Naccha Oyola <JNACCHA@senasa.gob.pe>; LUISA BETTY MATOS NONOGAWA <LMATOS@senasa.gob.pe>; Cecilia Felicitas Levano Stella <CLEVANO@senasa.gob.pe>; Jose Manuel Galarza Bazan <jgalarza@senasa.gob.pe>; Orlando Antonio Dolores Salas <ODOLORES@senasa.gob.pe>; Jorge Tanaka Nakamacho <jtanka@senasa.gob.pe>; Carlos Ruben Torres Limache <CTORRES@senasa.gob.pe>; Julio Ernesto Marin Horna <MARIN@senasa.gob.pe>; Joam Yesenia Ambrosio Ramos <jambrosio@senasa.gob.pe>
Subject: RE: Información importante plaga de papa

Estimado Wilmer

Agradezco la información remitida y tomamos nota de la misma.

Saludos



Moises E. Pacheco Enciso
Director General
Dirección de Sanidad Vegetal
Av. La Molina 1915 – Lima 12 – Perú
(511) 313-3309 / (511) 313-3300 ext. 2021
(51) 996-574-588
mpacheco@senasa.gob.pe
www.senasa.gob.pe

D8B80BFMB887



Av. La Molina N° 1915 - La Molina - Lima 12, Perú
Teléfonos: 01-3133309 ó 01-3133300 Anexo: 2000. Email: mpacheco@senasa.gob.pe
Web: www.senasa.gob.pe

Training courses & capacity development

- Preventing risk of pest and pathogen spread with germplasm
- National phytosanitary capacity development for innovations, development and extension
- Contributions to national clean planting material production systems



Sponsored by
NextGen Phytosanitation Project
& CGIAR Genebank Platform (GH Component)



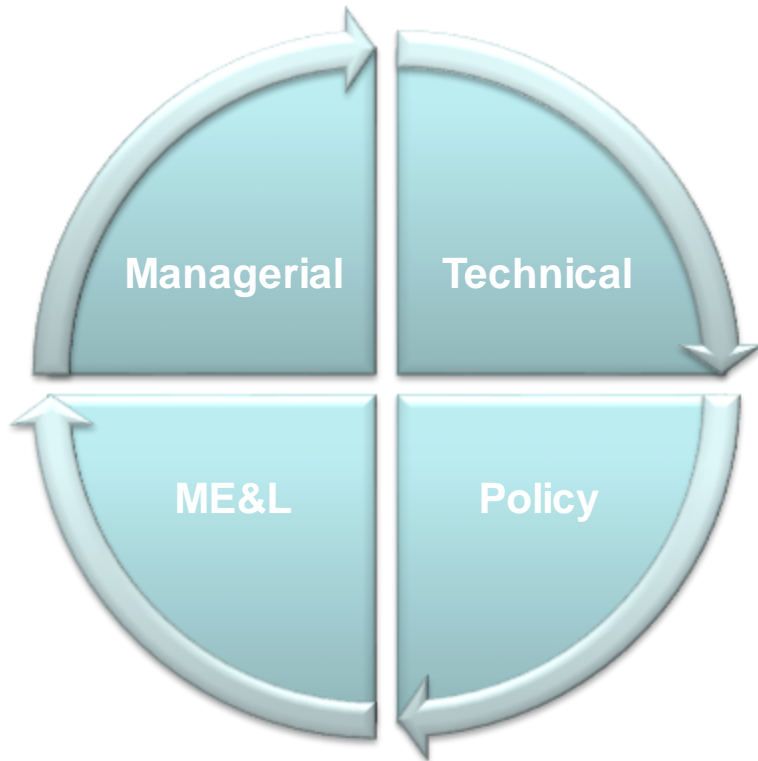
Nairobi, 25-29 June 2018



Kumasi, 18-22 June 2018

Since its foundation CIP organize several courses to share knowledge on diagnostic methods
Since 2018, CIP also offers service to prepare libraries and bioinformatic analysis

Quality Management Systems (QMS) for the CGIAR Germplasm Health Units



The Genebank Platform enables Center GHUs to upgrade their facilities and operations and to help one another to improve their performance and to work towards externally validated quality management systems

“QMS for CGIAR GHUs, similar to ISO/IEC 17025, and harmonize quality standards for laboratory management, testing protocols, facilities, equipment and training”



Quality Management System at CIP. ISO/IEC 17025 accredited Phytosanitary testing and cleaning workflows.



ISO/IEC 17025 Accreditation Website

Edit Share Add Tools Browse Muller, Giovanna (C)

Home Organization Policies Quality System Workflows Procedures Related Documents Records Form store UKAS Tools

ISO/IEC 17025 Accreditation Website

Home

51 Added by raimon, last edited by Rosario, Moises (CIP) on May 22, 2015 (view change)



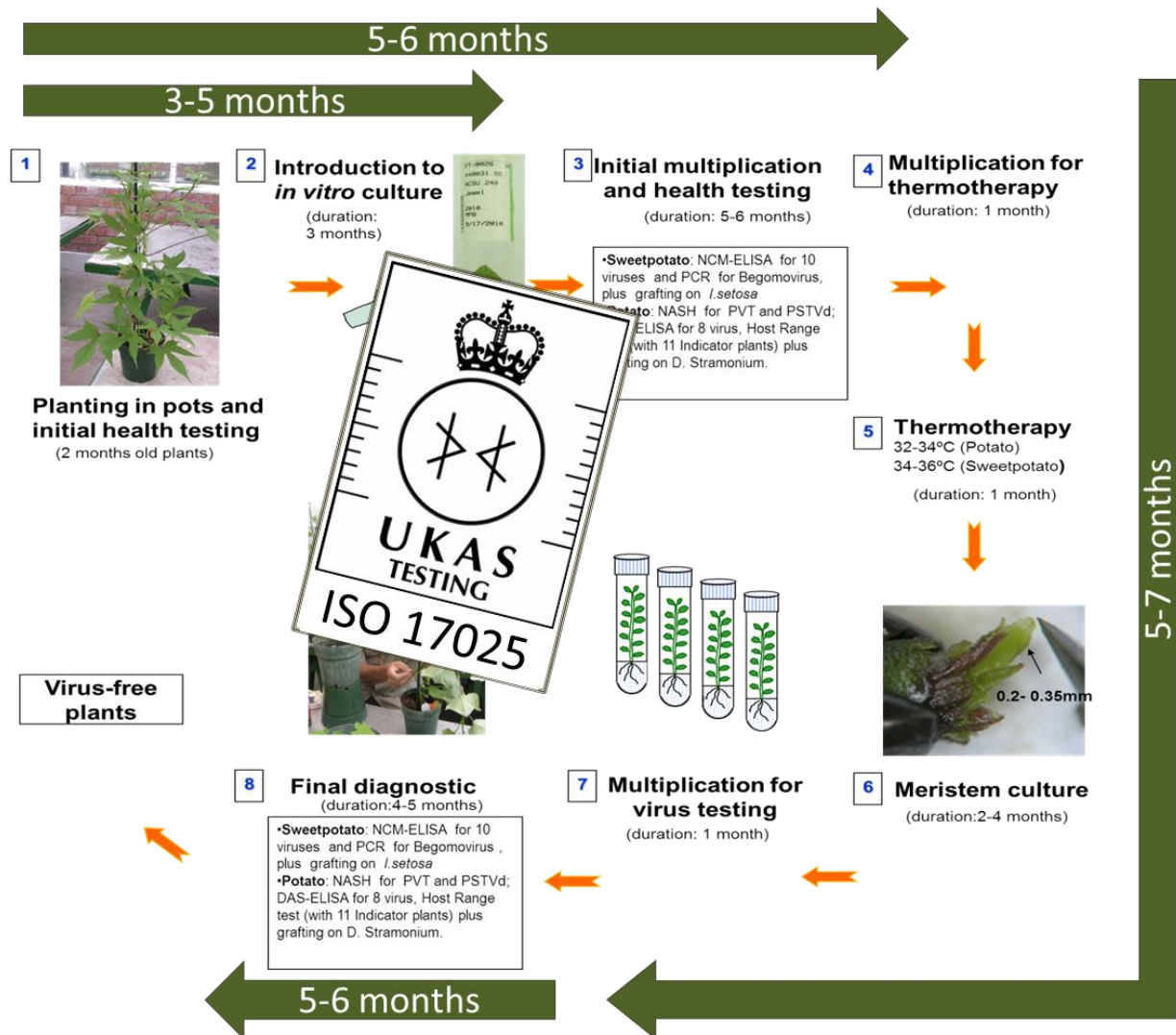
Facts about CIP's ISO accreditation:

- ISO 17025 is a worldwide Quality Standard that sets down requirements for the technical competence of a laboratory
- CIP was awarded the accreditation on February 2008 by the United Kingdom Accreditation Service (UKAS) and applies this standard to cover all aspects of germplasm management.
- CIP is the custodian of world's largest in vitro genebank, and was the first genebank to obtain International Standards Organization (ISO) accreditation for safe and secure germplasm movement.
- By gaining Accreditation for compliance with ISO 17025, CIP has given the users of the genebank a visible assurance of the quality of the germplasm being distributed.
- For information regarding the content of the website please contact Rosario Falcon (r.falcon@cgiar.org) and for feedback and comments regarding the functionality of the website please contact Henry Juarez (h.juarez@cgiar.org)




Distribution of CIP's germplasm and breeding lines – Internal Procedures accredited

Phytosanitary requirement for International distribution = HS2 status



Schedule of Accreditation
 issued by
United Kingdom Accreditation Service
 21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

| | | |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------|
|  Accredited to ISO/IEC 17025:2005 | International Potato Center (CIP) | |
| | Issue No: 001 Issue date: 22 February 2008 | Av La Molina 1595 La Molina Apartado 1558 Lima 12 Peru |
| Testing performed at the above address only | | |

DETAIL OF ACCREDITATION

| Materials/Products tested | Type of test/Properties measured/Range of measurement | Standard specifications/ Equipment/Techniques used |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| POTATO PLANTS Germplasm | <p><u>Visual Examination</u></p> <p>Detection of symptoms on grown on plants</p> <p>Detection of symptoms on host range plants after inoculation with sap and grafting</p> <p><u>Serological Testing</u></p> <p>Detection of the following pathogens: PVX, PVY, PLRV, PVS, APMV, APLV, PVV, AVB-D, PVV, PVA, PVM, PMTV, PVV, PVT viruses and PST Viroid</p> | <p>Documented in-house Methodology using Germplasm Distribution Workflow and related Workflows and Operational Procedures based on the FAO/IPGRI Technical Guidelines for the Safe Movement of Germplasm No 19 - Potato (1998)</p> <p>Acquisition, maintenance and distribution of in-vitro plant material incorporating appropriate plant pathogen screening techniques (OP10)</p> <p>OP 24</p> <p>OP 24</p> <p>OP19, OP 20, using DAS-ELISA and NASH diagnostic techniques</p> |



**Accredited
 pathogen
 testing for
 potato**



4229
Accredited to
ISO/IEC 17025:2005

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

International Potato Center (CIP)
Issue No: 001 Issue date: 22 February 2008

Testing performed at main address only

| Materials/Products tested | Type of test/Properties measured/Range of measurement | Standard specifications/ Equipment/Techniques used |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SWEET POTATO PLANTS Germplasm | <p><u>Visual examination</u></p> <p>Detection of symptoms on grown on plants</p> <p>Detection of symptoms on index plants (<i>Ipomoea setosa</i>) after grafting</p> <p><u>Serological testing</u></p> <p>Detection of the following pathogens :- SPFMV, SPLV, SPVG, SPMSV, SPMMV, SPCFV, C-6 virus, SPCSV, SPCaLV, CMV viruses</p> | <p>Documented In-house Methodology using Germplasm Distribution Workflow and related Workflows and Operational Procedures based on the FAO /IBGRI Technical Guidelines for the Safe Movement of Sweetpotato Germplasm (1989) using the following Methods- acquisition, maintenance and distribution of in-vitro plant material incorporating appropriate plant pathogen screening techniques (OP 10)</p> <p>OP22 and OP23</p> <p>OP22 and OP23</p> <p>OP21 using NCM-ELISA diagnostic techniques</p> |
| | END | |

Accredited pathogen testing for sweetpotato



Distribution of CIP's germplasm and breeding lines – Internal Procedure

Local movement

CIPVIR System

Virology Lab Management System (CIPVIR)

Maintenance | Requests | Search/Reports | Help

CIPVIR Home > Registro de Constancia Fitosanitaria

INTERNACIONAL DEL PATATA
CIP
User: Muller
Cadenillas,
Giovanna Beatriz

Constancia Fitosanitaria

Comité de Adquisición y Distribución de Germoplasma
Unidad de Sanidad y Cuarentena
Récord Fitosanitario para el Movimiento de Material Vegetal entre las Estaciones CIP y Campos Experimentales en Perú

Note: * Indicate is obligatory to select or write

| | |
|------------------|--|
| Año del Pedido | |
| Número de Pedido | |

| | |
|--------------------------------------------|--------------|
| Persona responsable del material vegetal * | (empty) |
| Proyecto: | |
| Movimiento solicitado de * | (empty) a |
| Fecha de Embarque * | (mm/dd/aaaa) |

| | |
|-----------|---------------------------------|
| Cultivo * | Material libre de: |
| Papa | PSTVd BW (aaaa- <u>nnn</u>) |
| | SPCSV |

International distribution

INTERNACIONAL DEL PATATA
INTERNATIONAL POTATO CENTER (CIP)
Apartado 1558, Lima 12, Peru Tel: +51 1 349 6017 Fax: +51 1 317 5326
E-mail: cip@cgiar.org www.cipotato.org

Phyto 200955 IP

POTATO PHYTOSANITARY STATEMENT

This is to certify that in vitro cultures or cuttings or representative samples of them, were thoroughly examined on (date of dispatch): dd/mmyy

By (name): Dr. Jan Kreuze of the International Potato Center; and that the consignment is believed to conform to the declaration below.

ADDITIONAL DECLARATION

The following tests and procedures were performed in compliance with ISO 17025 standards. Any additional tests and procedures, whether in-house or out-sourced, were performed outside the scope of CIP's ISO accreditation.

In vitro plantlets were tested and found NEGATIVE to the following viruses / viroid: PVX, PVY, PLRV, PVS, APLV, APMoV, PVV and AVB-O by DAS-ELISA; and PVT and PSTVd by ³²P-NASH test.
In parallel, the *In vitro* plantlets were grown in a greenhouse and after two months were tested by DAS-ELISA for the viruses listed above and found NEGATIVE. Leaf samples from the grown-on plants were collected, homogenized in phosphate buffer and inoculated onto indicator plants (*Nicotina tabacum* "White Burley", *N. glutinosa*, *N. debneyii*, *N. benthamiana*, *N. bigelovi* x *N. clevelandi*, *Chenopodium quinoa*, *C. murale*, *Datura stramonium* or *D. metel* *Gomphrena globosa* and *Lycopersicon esculentum* "rutgers") and no symptoms were observed.

Other: _____

DESINFECTATION TREATMENTS

| | |
|------|-----------|
| DATE | TREATMENT |
|------|-----------|

CHEMICAL AND CONCENTRATION

Submit

To the best of our knowledge this plant material was free of disease and pests at point of dispatch. No liability shall attach to the International Potato Center, or any of its officers or representatives with respect to this statement.

Signature: _____

Date: _____

Conclusion and Prospects

- International germplasm exchanges have been the main factor in the diversification and improvement of world agriculture.
- Germplasm distribution activity has an inherent risk of introducing exotic plant pests (pathogens, insects, weeds, etc.) that could cause potential economic losses.
- Plant health protection can help eliminate hunger, reduce poverty, protect the environment and stimulate economic development.
- The main role of CIP's GHU is to enforce the plant health policy within CIP through the surveillance and monitoring of plant health, control of harmful organisms (HO) and/or perform risk analysis and develop / implement measures to prevent or limit their spread.
- To fulfill its objective, CIP-HQU unit adheres to the highest (inter)national quality standards and strives to keep improving the safety of germplasm movement by developing, adopting and implementing novel diagnostic approaches
- QMS for CGIAR GHUs, similar to ISO/IEC 17025, and harmonize quality standards for laboratory management, testing protocols, facilities, equipment and training

For more information visit: <https://www.genebanks.org/the-platform/germplasm-health/>



The International Potato Center (known by its Spanish acronym CIP) is a research-for-development organization with a focus on potato, sweetpotato, and Andean roots and tubers. CIP is dedicated to delivering sustainable science-based solutions to the pressing world issues of hunger, poverty, gender equity, climate change and the preservation of our Earth's fragile biodiversity and natural resources.

www.cipotato.org



CGIAR is a member of CGIAR

CGIAR is a global agriculture research partnership for a food secure future. Its science is carried out by the 15 research centers who are members of the CGIAR Consortium in collaboration with hundreds of partner organizations.

www.cgiar.org



GERMPLASM HEALTH UNITS: SECURING THE PATH TO FOOD SECURITY