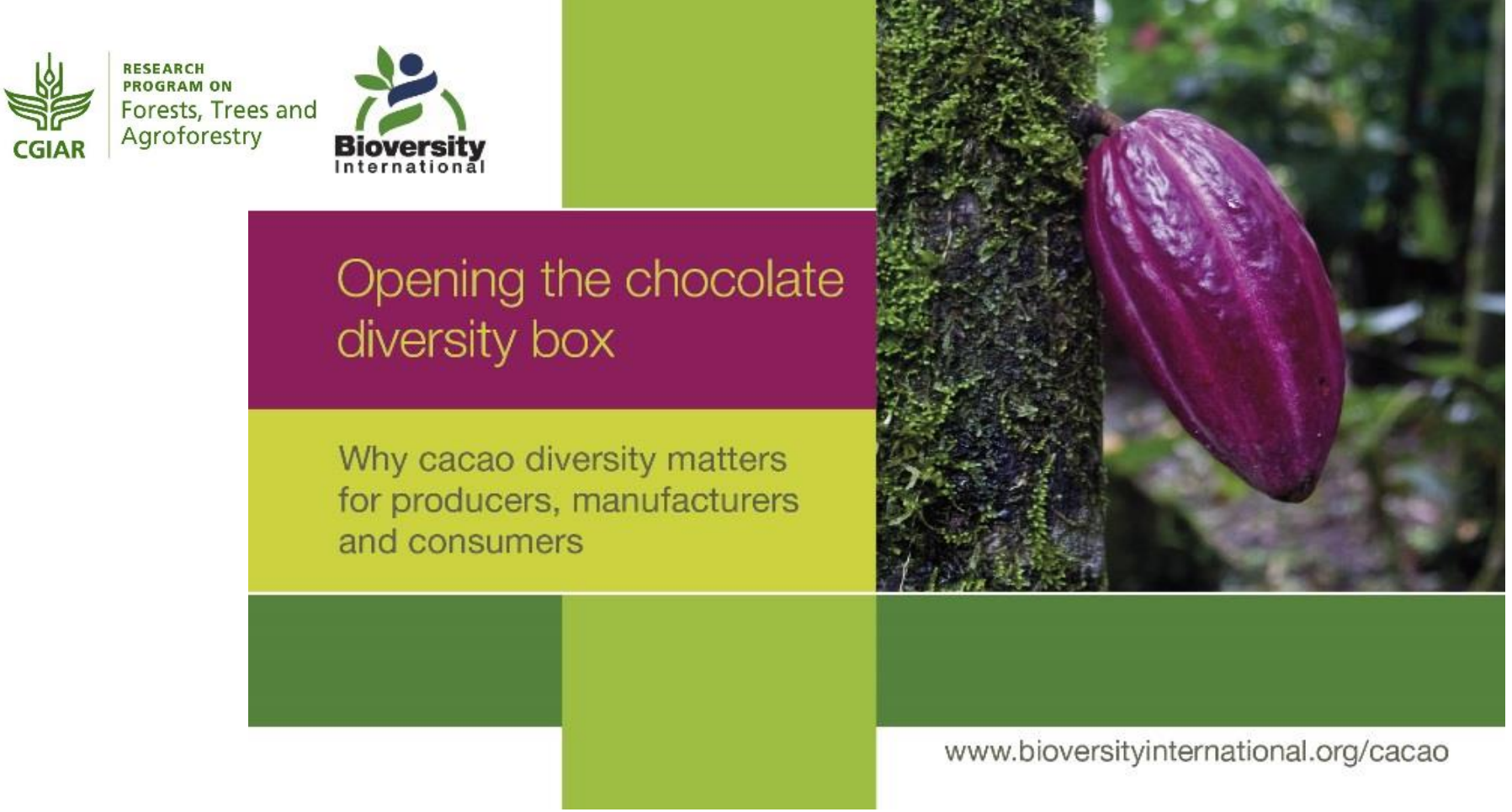

Cacao Genetic Resources - Legal and policy aspects of germplasm exchange (access and benefit sharing)

Brigitte Laliberte, Scientist, Cacao Genetic Resources and Diversity
2017 International Symposium on Cocoa Research (ISCR), Lima, Peru, 13-17 November 2017

Key issues and challenge

- **Conservation and facilitated access** of cacao genetic resources
- Use in research for **a better understanding of its potential** in the development of improved planting materials
- Address urgent priorities - **adaptation** to climate change, pest and diseases and quality and diversity of flavours in cocoa production.
- **Use** of diversity in *ex situ* collections, *in situ* and in farmers' fields is **not optimised**
- **Reluctance of countries to share** materials – unclear or restrictive policies
- **Ensure mutually benefiting terms and conditions** between providers of diversity and recipients

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The days of plant collecting

- **1924-1934 - Nikolai Vavilov** - scattered across the globe existed “centers of origin and diversity” for our major food crops - explorations lead to world’s first genebank – crop wild relatives
- **1930-35 – F.J. Pound – exhaustive survey** in Trinidad and Tobago – 100 ICS - CRC consolidated earlier collections from the centre of origin in 1982 (ICGT) and formalized in 1984
- **1943 – Collection at CATIE created** – formalized in 1978 (IC3)
- **1985 – ICQC,R established** – service to RBG Kew and now most materials from ICGT and IC3 but also from national collections

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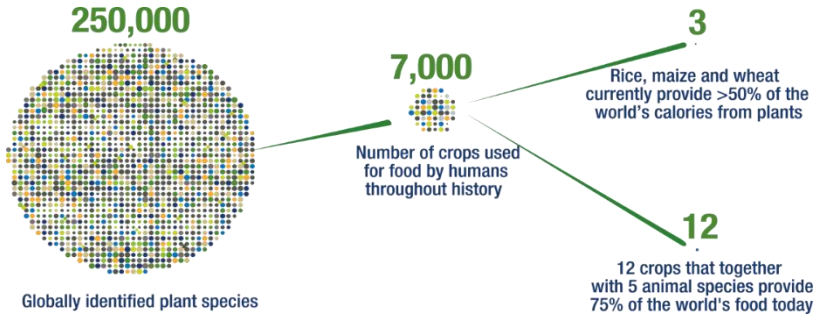
Loss of diversity



- Green revolution 50's – 60's – wheat – rice – **crop homogeneity**
- Urgency to collect, safeguard and study
- **All major international collections created** - urgent safeguard – diversity being lost very rapidly
- **1983 - International Undertaking** – only instrument on PGRFA – indispensable for genetic improvement of cultivated plants – insufficiently explored and in danger of erosion and loss
- **1989 – Farmers' rights adopted within the IT** – achieving a balance between rights of breeders and farmers – developing and developed countries
- Universally accepted principle – **PGR heritage of mankind and should be available without restriction,** for use for the benefit of present and future generations.

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Regions of diversity and interdependence

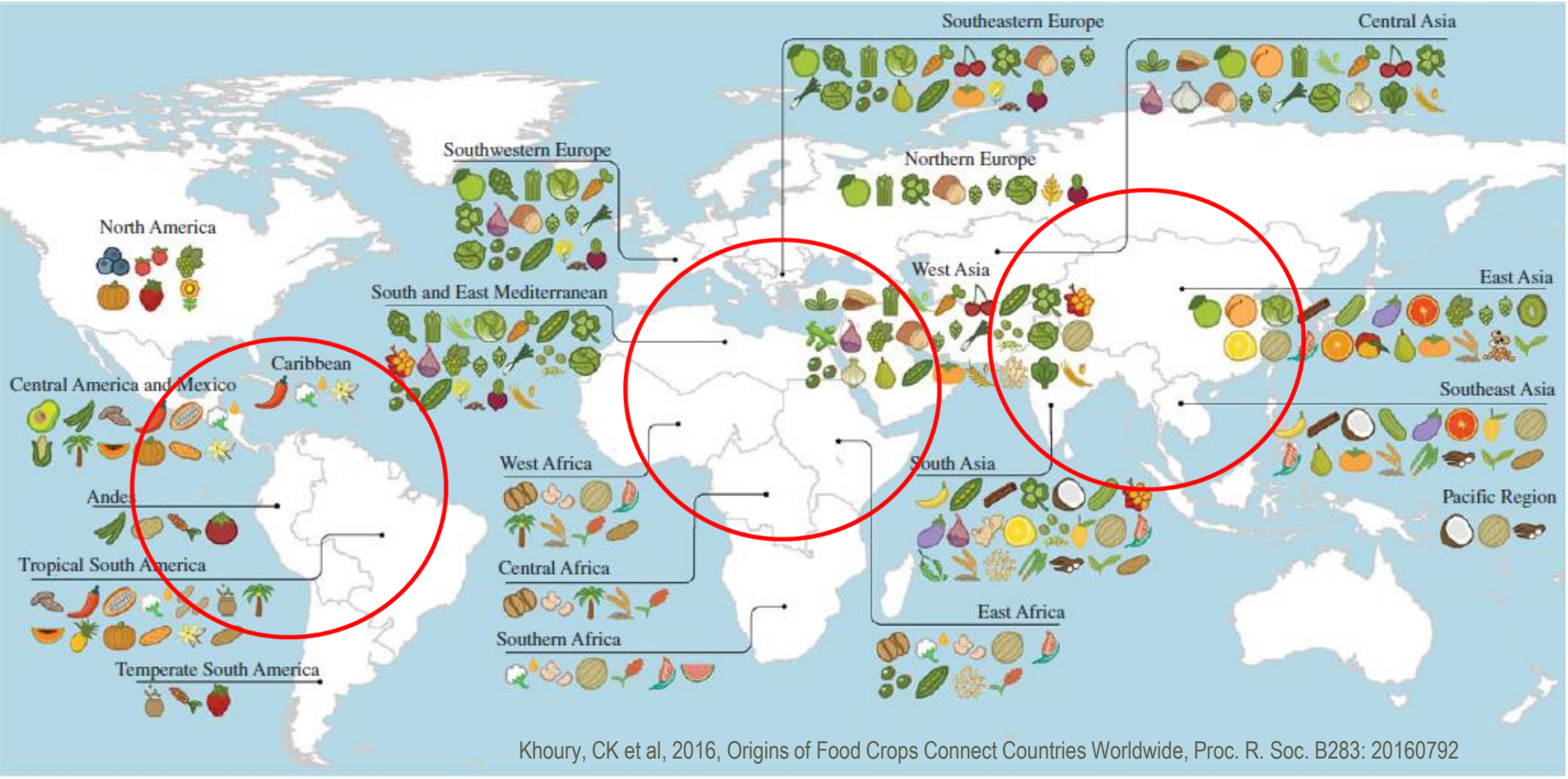
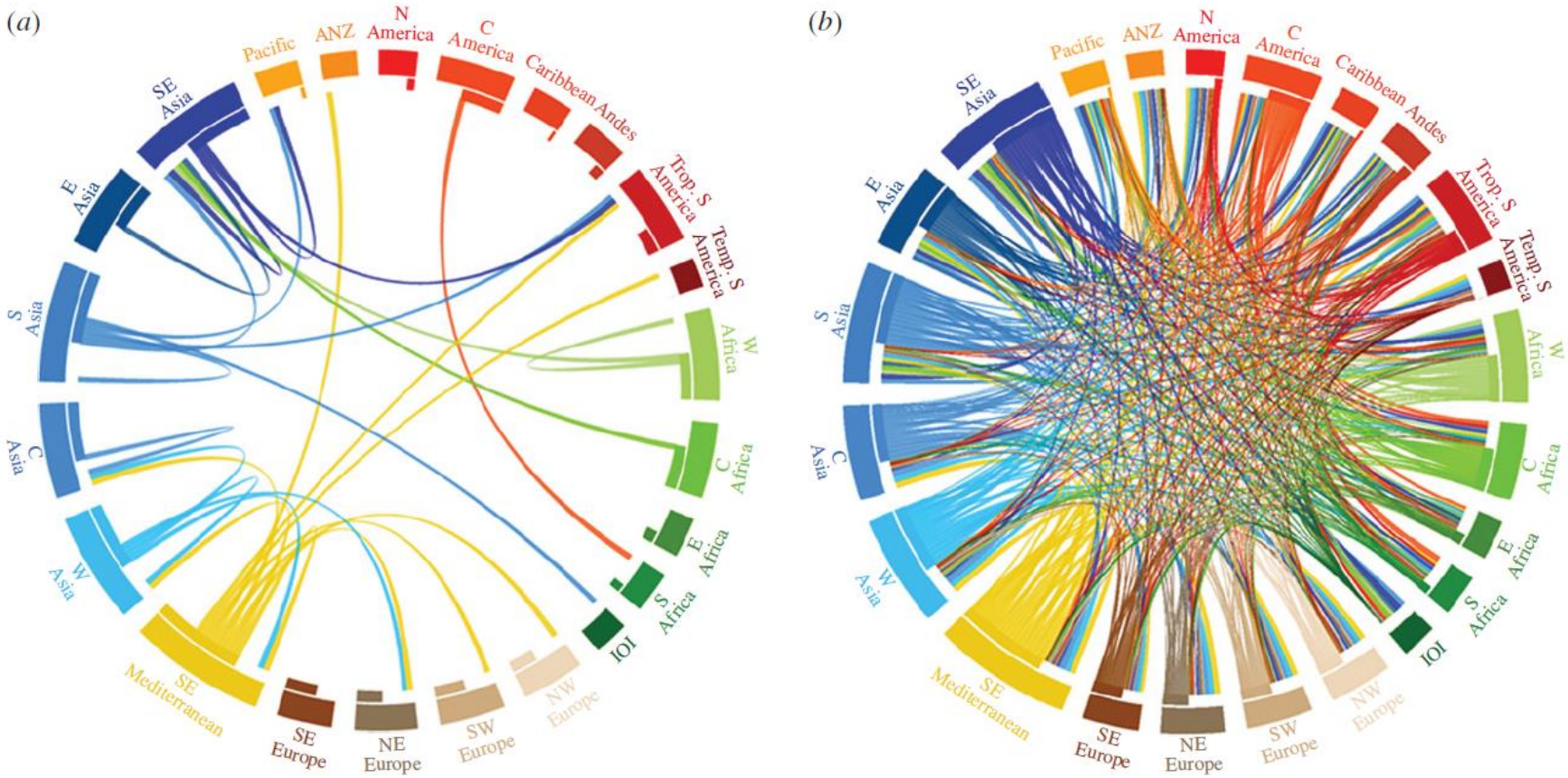


Figure 1. Primary regions of diversity of major agricultural crops worldwide. See electronic supplementary material, table S1 for a list of primary regions for all assessed crop commodities.

Interdependence – centre of diversity



Khoury, CK et al, 2016, Origins of Food Crops Connect Countries Worldwide

Primary regions of diversity of food crops with current importance calories – a) most significant linkages b) full matrix of linkages

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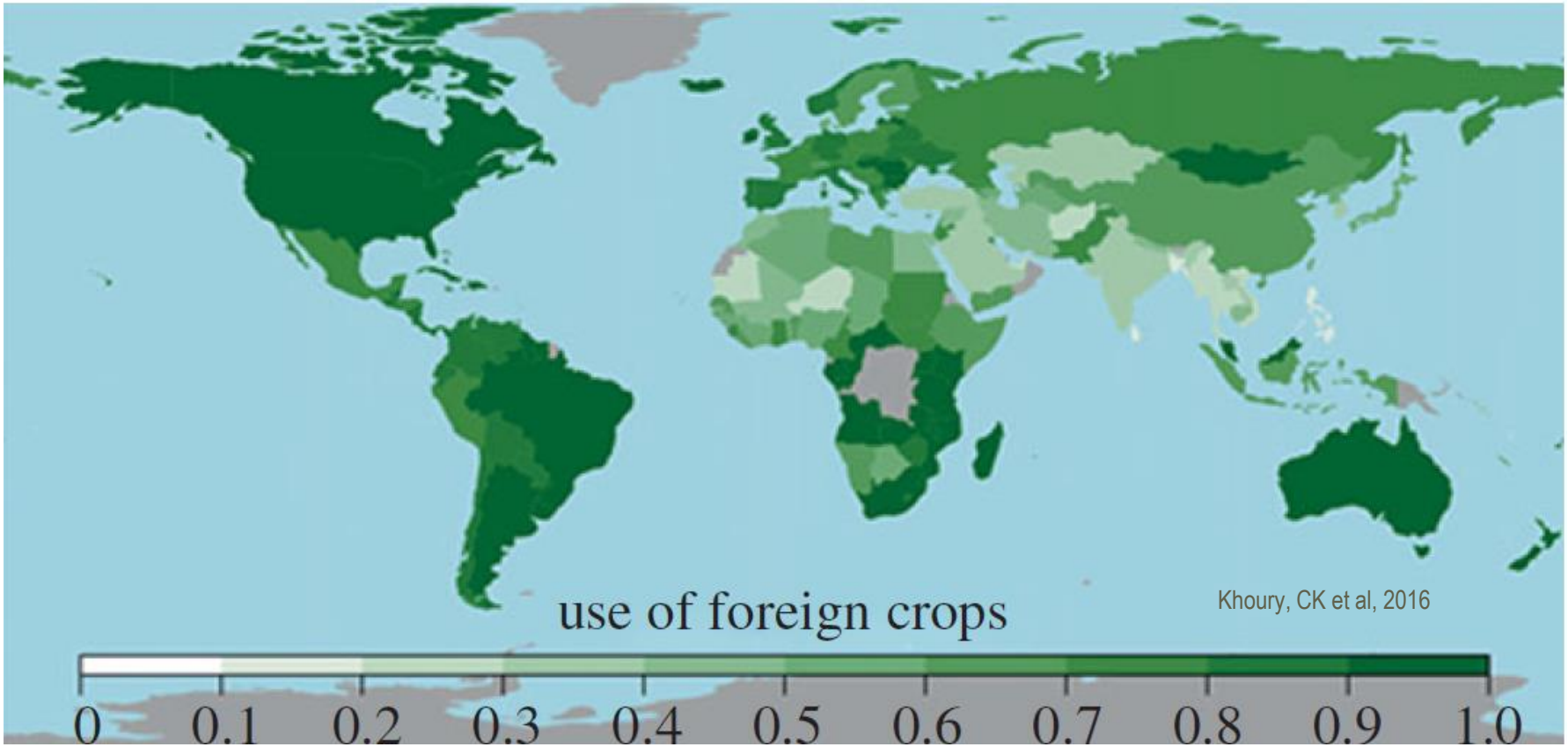
Use of foreign crops



Khoury, CK et al, 2016

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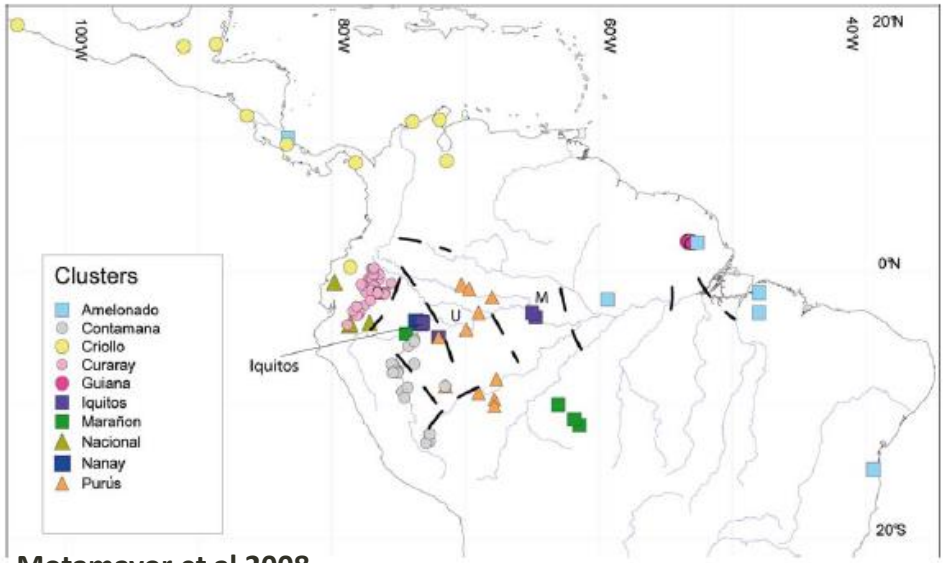
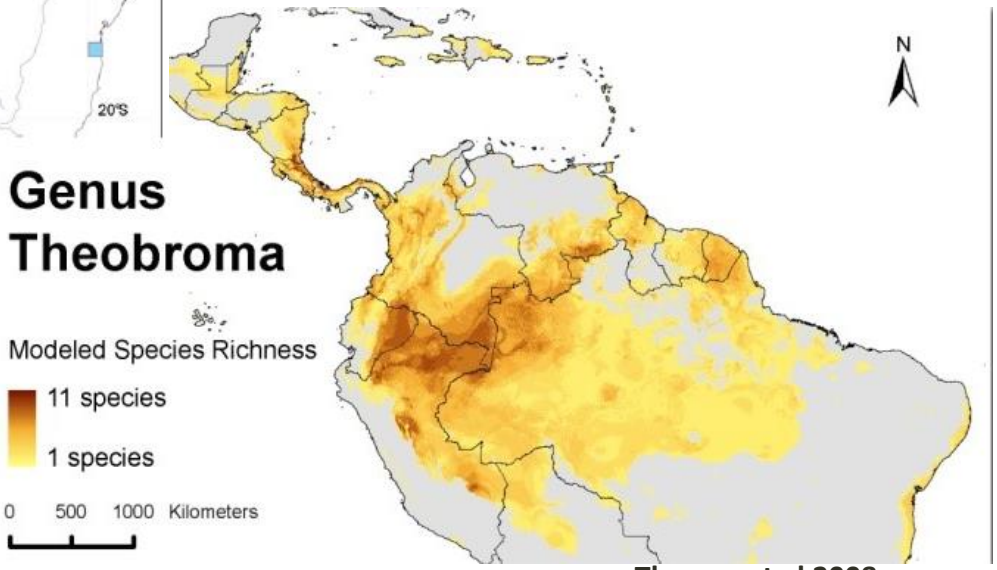
Cacao Diversity - Origin



Motamayor et al 2008



Thomas et al 2008

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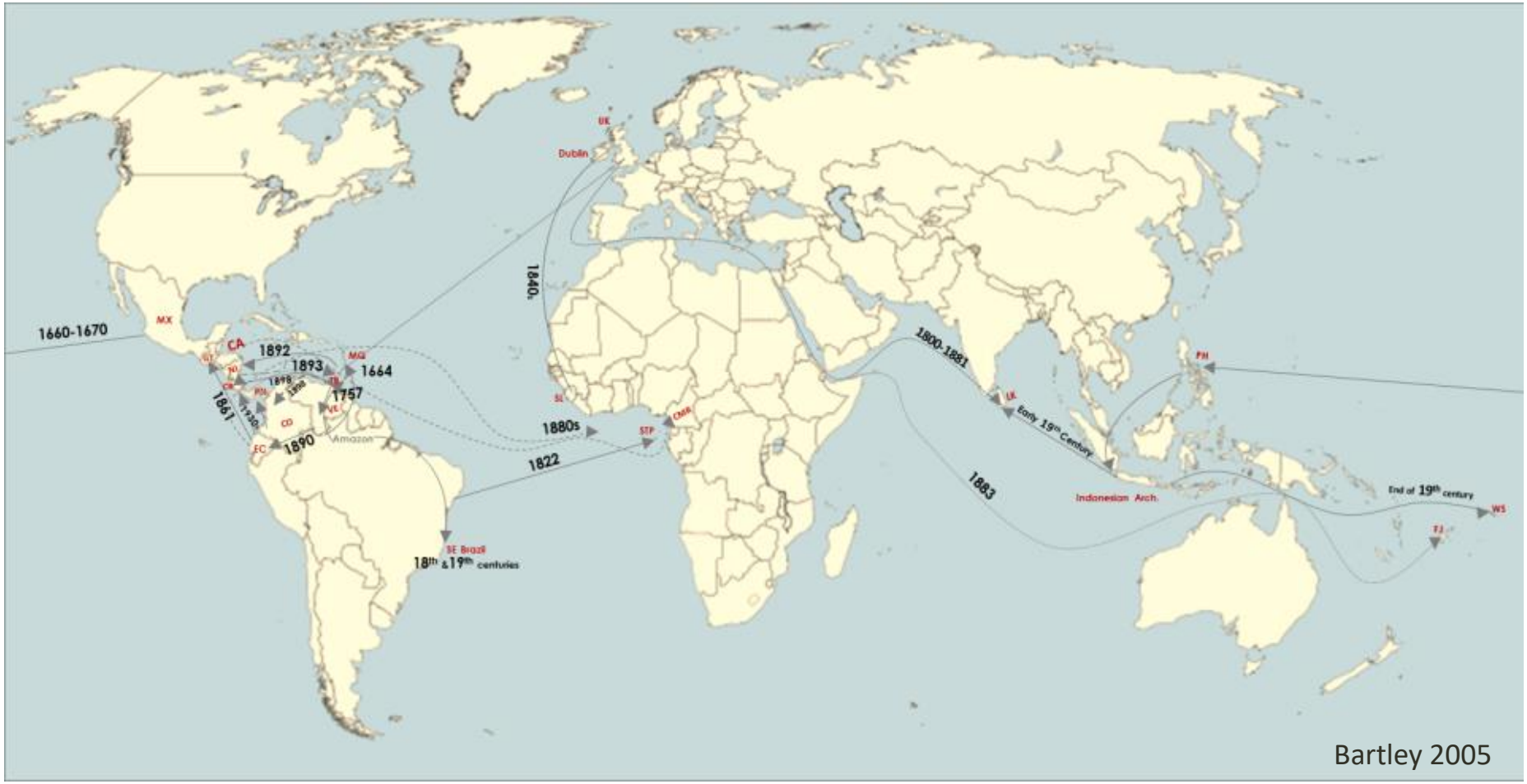
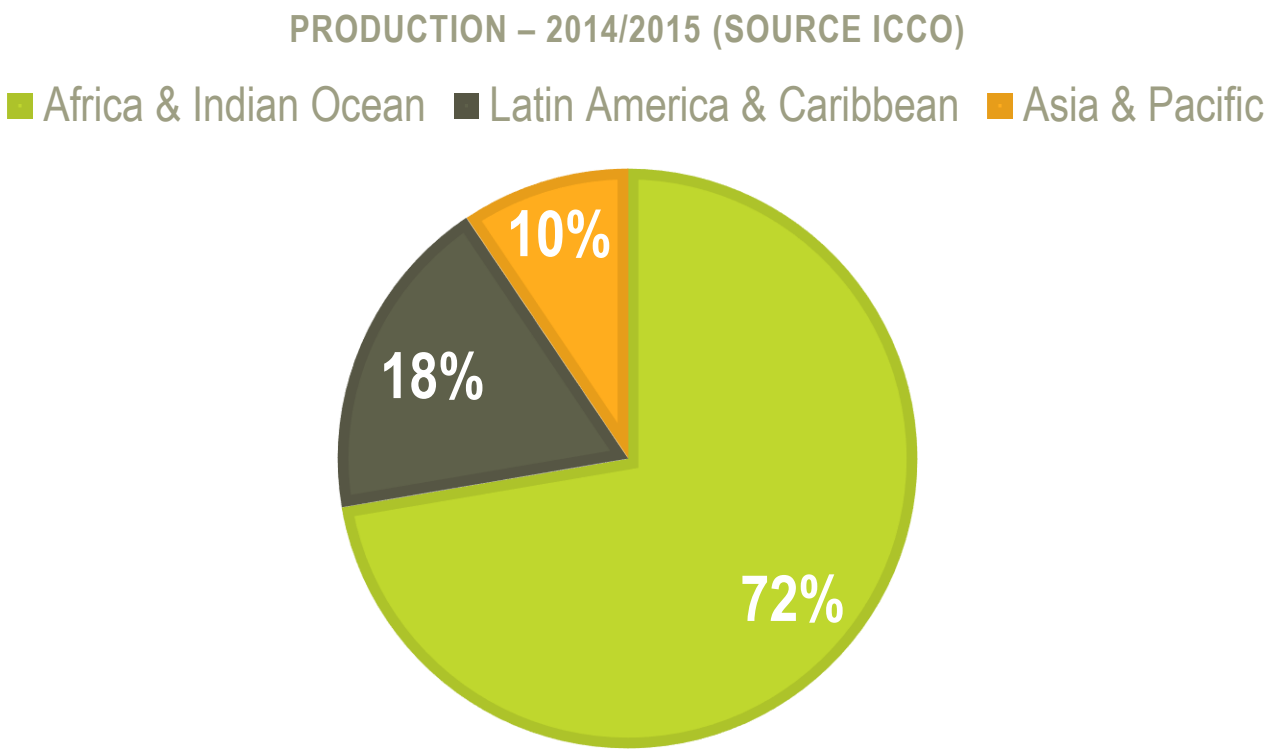
Cacao Diversity - Movement



Cacao Diversity - Production



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In the 90s

- Realization that **natural resources need to be protected** – countries have sovereign rights – CBD – Rio summit 1992
- **Agriculture biological diversity included** – but does not make sense – interdependence, farmers' rights
- **Tensions around the exchange** of genetic resources
  - Public vs private sector
  - Conservation vs use
  - Farmers Rights vs Breeders Rights
  - Formal vs informal relationships
  - Germplasm vs information exchange
- **Urgent need to develop transparent ABS** arrangement for cacao genetic resources recognising the rights of the providers in the final product.

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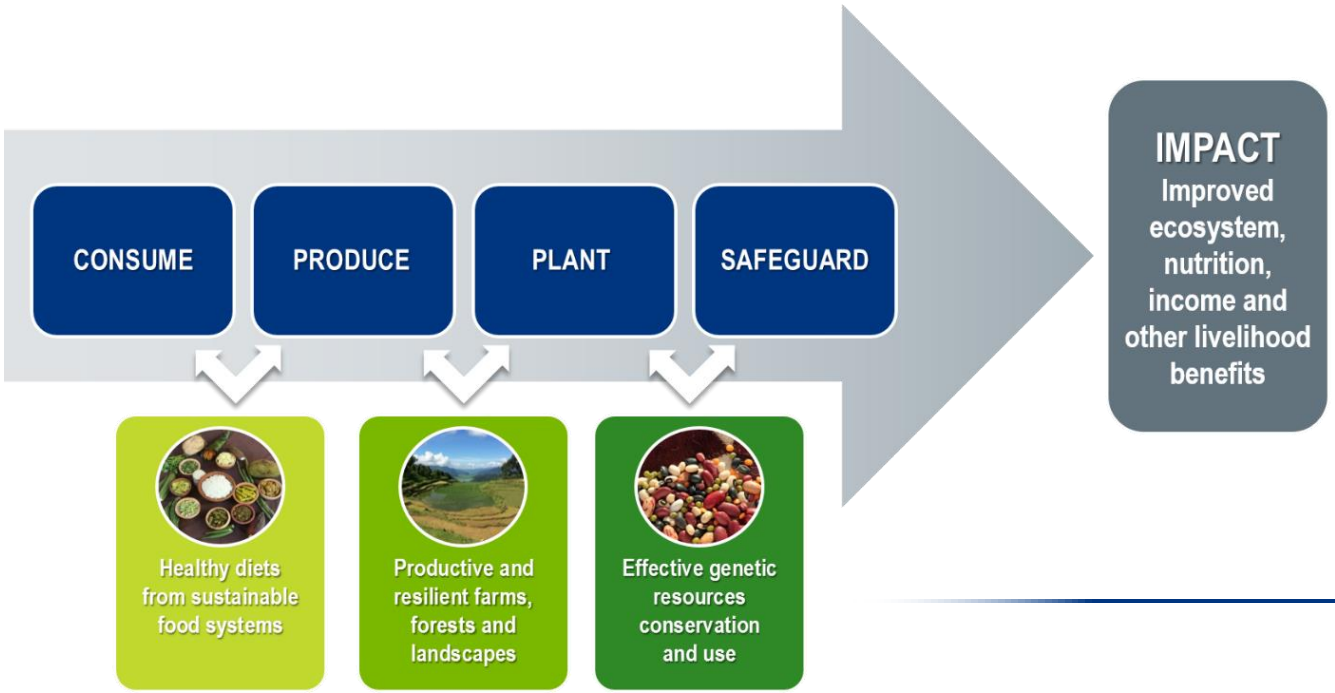
International *ex situ* collections

1. **1994 -** CATIE and CRC (+ 12 CGIAR centres) signed agreement with FAO – designated germplasm "in trust for the benefit of the international community"
2. **2005-2008** – CATIE and CRC (+ 12 CGIAR centres) – International Treaty on PGRFA – Article 15 – replacing the 1994 FAO agreement



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Legal and Policy Frameworks

- **1983 - International Undertaking** - universally accepted principle that PGR are a heritage of mankind and consequently should be available without restriction, for use, for the benefit of present and future generations.
- **1992 – Convention on Biological Diversity** - basic principles:
  - National sovereignty over natural resources
  - Access is subject to Prior-Informed Consent (PIC)
  - Access granted on Mutually-Agreed Terms (MAT) (of national competent authority)
- **2004 – International Treaty** on Plant Genetic Resources for Food and Agriculture – IT-PGRFA and its SMTA
- **2014 – Nagoya Protocols** (CBD – ABS)

SMTA - Clear Rules on ABS - Provider

- Access must be **expeditious and free of charge**, or at minimum cost.
- All **available passport data and other associated** available non-confidential descriptive information must be made available.
- Access to **PGRFA under development at discretion of the developer** during the period of development.
- **Provider must periodically inform the Treaty's** Governing Body about transfers with the SMTAs.

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SMTA - Clear Rules on ABS - Recipient

- Materials used or conserved only for **research, breeding and training** for food and agriculture.
- IPRs that limit access to material in the form received **must not be claimed**.
- If for conservation, **must make material and related information available to users**, using the SMTA.
- **Further transfer must also be subject to the SMTA** and notified to the Governing Body.

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National collections

- CBD and Nagoya protocol on ABS (2014) or other national law
- Access subject to authorization of country of origin according to ABS rules.
- **Complex or unknown ABS national regulations** and authorities with competence to authorize access of results in no action.
- In many cases, **several institutions involved,** creating confusion and lack of coordination such as between the Ministries (Env - Ag) responsible for access to GR.
- **General lack of understanding** regarding permits and ABS regulations.
- **Situation resulted in fragmented approaches,** informal exchanges of germplasm and thus, benefits generated not recognized.
- With exception of CATIE, CRC, USDA and CIRAD - **little international exchange of germplasm.**
- Access to national cacao germplasm becoming **progressively more restrictive.**

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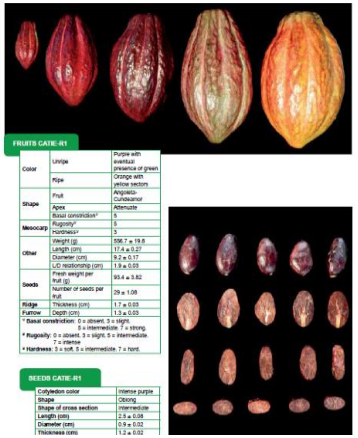
Global Collaboration – Benefits of Exchange

- **Broad range of diversity** and related information
- **Healthy germplasm thought safe-movement -** ICQCR
- **Improved material back** to country of origin
- **Evaluated germplasm included** in national selection trials
- Enhanced **breeding populations**
- **Support for characterization** activities
- **Support for information management** systems
- **Support for conservation** in national genebanks
- **Technologies, procedures and methods** to conserve, improve and breed cacao
- **Network of evaluation trials** and standard methodologies - **participatory**



FRUITS CATIE-R1

Color	Unripe	Purple with eventual presence of green
	Ripe	Orange with yellow sectors
Shape	Fruit	Angosta-curcubiacrior
	Apex	Attenuate
Mesocarp	Basal constriction*	5
	Rugosity*	5
	Hardness*	5
Other	Weight (g)	556.7 ± 19.8
	Length (cm)	17.4 ± 0.27
	Diameter (cm)	9.2 ± 0.17
	L/D relationship (cm)	1.9 ± 0.03
Seeds	Fresh weight per fruit (g)	93.4 ± 3.82
	Number of seeds per fruit	29 ± 1.06
Ridge	Thickness (cm)	1.7 ± 0.03
Furrow	Depth (cm)	1.3 ± 0.03

* Basal constriction: 0 = absent, 5 = slight, 5 = intermediate, 7 = strong.
* Rugosity: 0 = absent, 3 = slight, 5 = intermediate, 7 = intense
* Hardness: 3 = soft, 5 = intermediate, 7 = hard

SEEDS CATIE-R1

Cotyledon color	Intense purple
Shape	Oblong
Shape of cross section	Intermediate
Length (cm)	2.5 ± 0.08
Diameter (cm)	0.9 ± 0.02
Thickness cotts	1.2 ± 0.02

Review of the CFC/ICCO/Bioversity project on cacao germplasm evaluation (1998-2010)

November 2017

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Thank you

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