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Linking demand with supply for tropical forage genetic resources to reach impact at scale

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The forage-based livestock sector plays a key role in:



FOOD
and nutrition
security



POVERTY
Alleviation

But it is also associated with **causing negative environmental impacts:**



EMISSIONS
of greenhouse
gases



LAND
degradation
and
deforestation



WATER
pollution and
depletion



DEFORESTATION



BIODIVERSITY
threatened

- ✓ **Improvements in animal feeding and sustainable intensification** are the most promising strategies for mitigating these impacts.
- ✓ The inclusion of **forage legumes in cattle production** systems has the potential to increase yield, efficiency and nutritional value of the forage, with less environmental impact.
- ✓ Health advantages of forage-based feed compared to concentrate based feeding.
- ✓ Less competition to human nutrition for ruminants (can digest feed of lower nutrient density/higher fibre) vs. monogastrics.
- ✓ But **adoption and use by the producers remain limited** due to:
 - Economic factors
 - Lack of knowledge
 - Limited perceived benefits by the producer
 - Risk aversion and uncertainty.

Main types of forages



Grasses: Most widely used and commercialized i.e., >> 150 Million ha worldwide

- Selection parameters: Biomass, forage quality, tolerance to biotic (pests and diseases) and abiotic stresses (scarcity and excess of water)
- Contribution to organic matter, favorable GHG balances and mitigating nitrate leaching and N₂O emissions



Legumes

- High protein content
- BNF and positive effect on GHG balances



Forage shrubs and trees (also mainly legumes)

- Nutrient cycling
- Often high drought tolerance
- Slow establishment but often longterm persistence

Bottlenecks for adoption and suggested solutions



Access to information and lack of awareness.

- Tools such as www.tropicalforages.info (see next slide) and www.feedipedia.org
- Social Media, Radio and TV
- Factsheets
- Collaboration with development actors including the private sector
- Capacity building

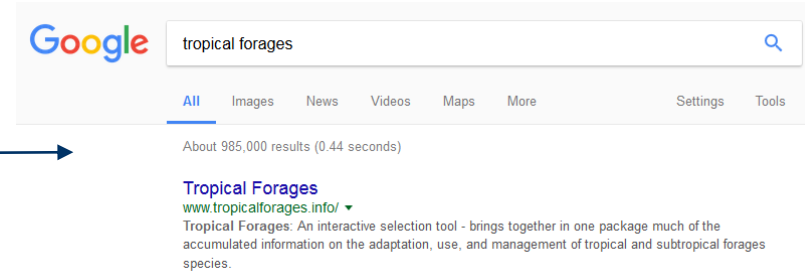
Policy support

- Regulatory framework for e.g., seed import, production of planting material, release processes and certification
- Policy support for livestock-forage-crop-tree systems
- Engagement through multi-stakeholder platforms such as roundtables

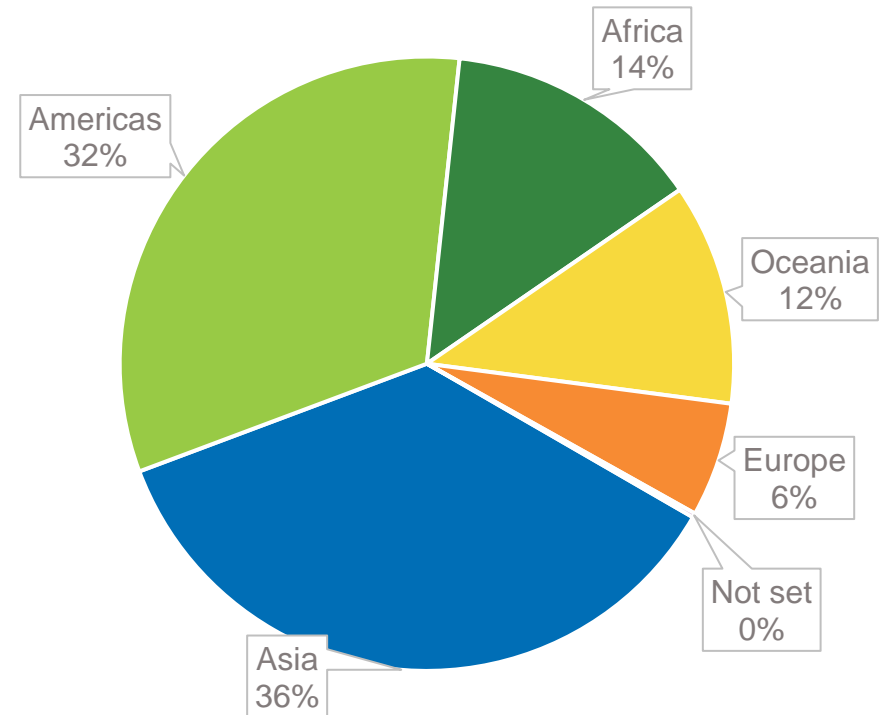
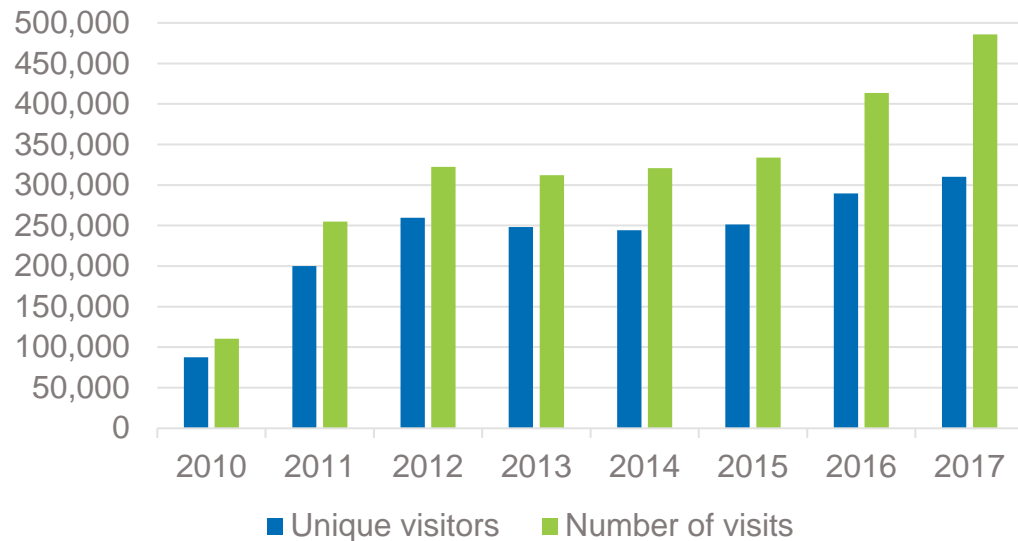


Tropical forages knowledge tool update

- #1 Result in Web search engines
- Preeminent source of information on tropical forages



Location of the users by continent (Aug-Dec/2020)



Partners:



Automatic translation in +90 languages

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Bottlenecks for adoption and suggested solutions

– Functional seed systems

Grasses – availability, affordability, and accessibility

Selections from the wild and increasingly bred lines



Availability relatively good

- Still limited seed supply systems in most African countries.
- Limited diversity
- Seed production and commercial viability affected by photoperiod.
- Cost for import related to scale.
- Bred lines IP protected though some enterprises allow small scale vegetative multiplication.
- Variable seed certification

Affordability

- Cost related to scale and packaging.
- Vegetative propagation can open market with/for smallholders.

Accessibility

- Often underdeveloped seed supply schemes for wide reach require novel business models (e.g., links with cooperatives, agrovet stores) and awareness creation.

Bottlenecks for adoption and suggested solutions

– Functional seed systems

Herbaceous legumes and trees/shrubs – Availability, affordability, accessibility

Mostly selections from the wild



Availability mostly insufficient

- Often limited knowledge on suitability of species and accessions and their management
- Limited new varieties in the last decades resulting in limited diversity.
- Seed production not strongly affected by photoperiod and few IP limitations.
- Little commercial production.
- Variable seed certification rules could hamper dissemination.

Affordability

- ??? As highly limited production.
- Could be an opportunity for small scale businesses.

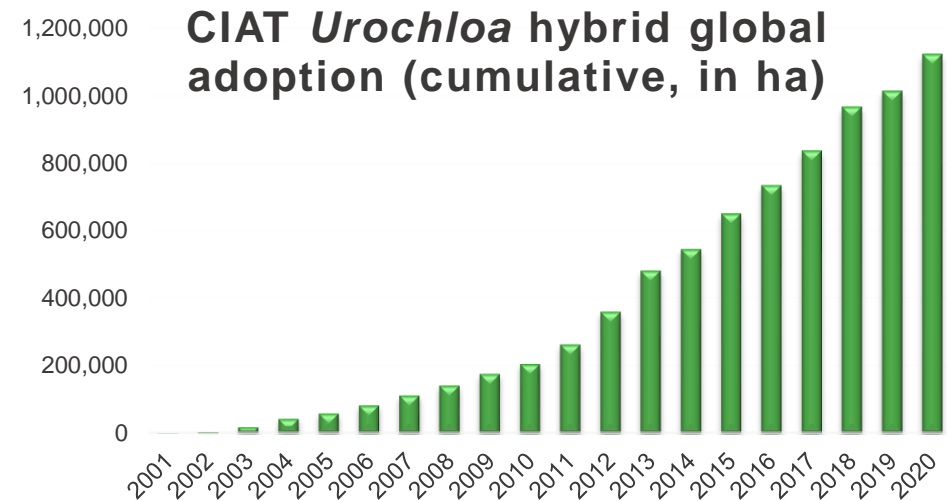
Accessibility

- So far limited adoption thus reduced incentives for production of planting material
- Requires integrated approach for awareness creation and business models for production and dissemination.
- Strong reliance on propagation and dissemination through e.g., farmer to farmer distribution, development actors and small to medium scale business involving farmers through contract farming.
- For trees and shrubs knowledge dissemination and capacity building is critical.

Examples of success in adoption of planted forages

Table 1. Area planted with *Urochloa* hybrids released under a PPP of the Alliance of Bioversity International and CIAT and Papalotla

based on a seed rate of 7 kg/ha Region	vegetative propagation not accounted for Cultivated area in ha			
	Total	2000-2011	2012-2014	2015-2020
Latin America and Caribbean	1,074,674	244,186	274,710	555,778
Africa	5,905	400	2,291	3,213
Asia	12,992	2,951	2,137	8,530
Elsewhere	29,388	16,143	3,589	9,656
TOTAL	1,122,959	263,056	282,726	577,177



- During the COVID year 2020 seed sales globally increased compared to 2019; sales were largely maintained in LAC, reduced in Asia. In Eastern Africa seed sales doubled from about 2t in 2019 to 5t in 2020, with another doubling projected for 2021.
- There are also steep increases in import of seed of other forages into the region, by government institutions, development actors and the private sector

Examples of success in adoption of planted forages

- Estimates by Fuglie et al. (2021, unpublished) indicate that across Latin America, Africa, and Asia (excluding China and southern cone countries of South America), it is likely that there are at least 158 million hectares (compared to 157 million ha of rice) under cultivated forage crops producing yield worth around \$63 billion per year (at 2014-2016 prices), comparable to the gross value of cassava and sweet potato produced in developing countries (\$60 billion, combined).
- For Sub-Saharan Africa (excluding South Africa and Sudan), estimates that forage crops may be cultivated on as much as 3.3 million hectares yielding a forage value of \$1,490 million per year in these countries. This area and value are about evenly split between Eastern and Southern African, with Western African accounting for less than 1% of the total.

Conclusions and outlook

- Expected continued and growing demand for animal-source food in consumer baskets in the developing world.
- One of the major costs of livestock production is feed production, while at the same time environmental concerns for livestock production are rising.
- Improved forages could be a pathway to sustainable intensification and resilience, addressing cost of production, productivity of increasingly constrained land resources, providing ecosystems services, and maintaining soil fertility.
- Adoption of forages however is still below its potential in particular in tropical Africa and Asia.
- In intensifying systems however, we observe an increasing demand for improved forages
- In various countries, in particular in Eastern Africa, we observe rapidly increasing adoption of improved forages and expect to see at least 100,000 forage adopters over the next 5 years (starting from 2019).





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Thank you!



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