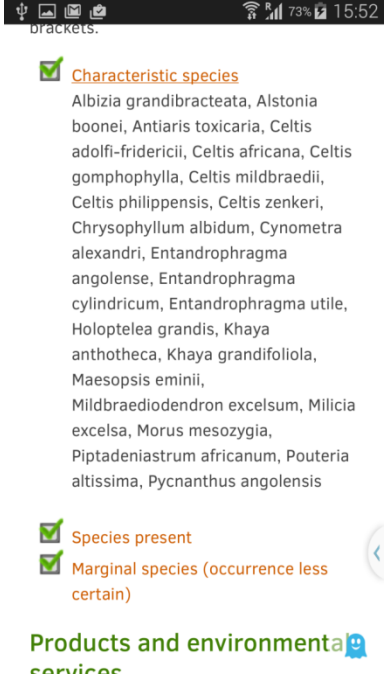
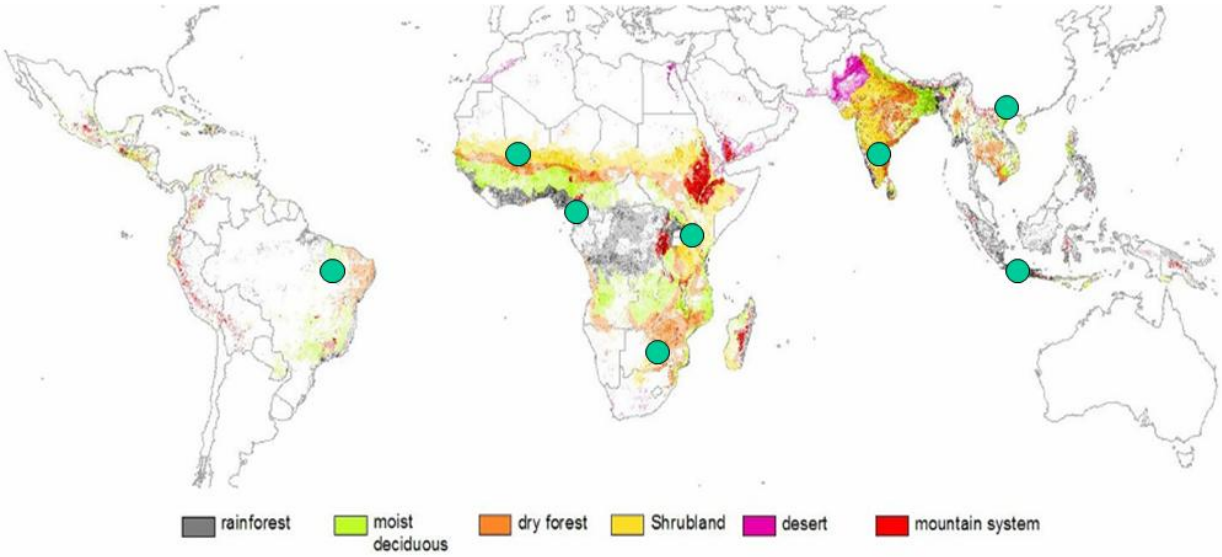


The Right Tree for the Right Place: the www.vegetationmap4africa.org and smart phone applications to support forest landscape restoration in Eastern Africa

Roeland Kindt (ICRAF, r.kindt@cgiar.org)

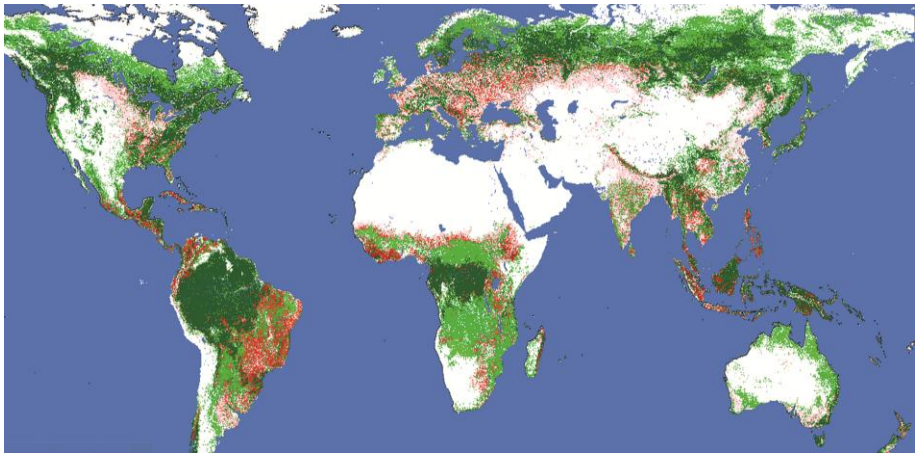
World Agroforestry Centre
(http://www.worldagroforestry.org/)



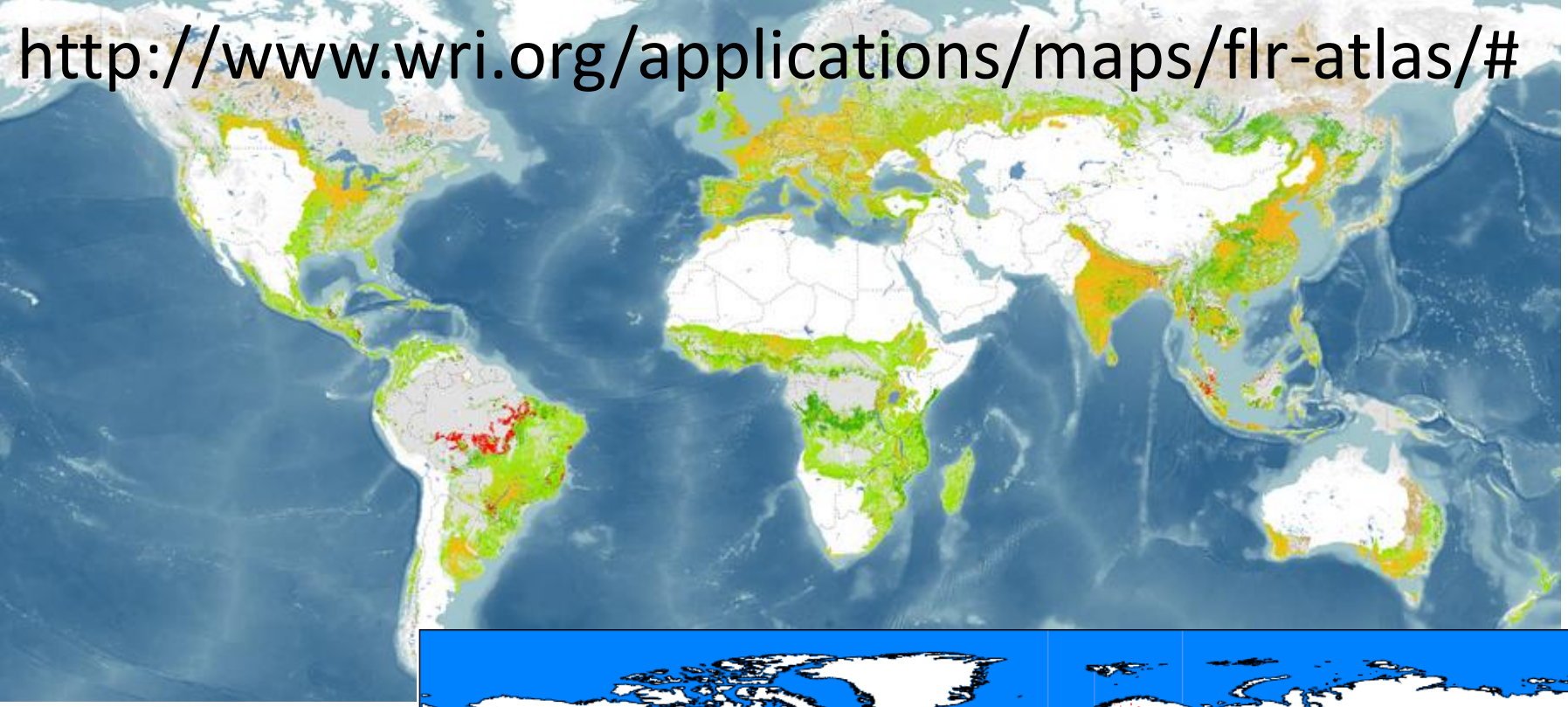
Collaborative programmes in different ecoregions

Trees in forests and on farms

Agroforestry is a dynamic, ecologically-based, natural resource management practice that, through the **integration of trees on farms and in the agricultural landscape**, diversifies and sustains production for increased social, economic and environmental benefits.

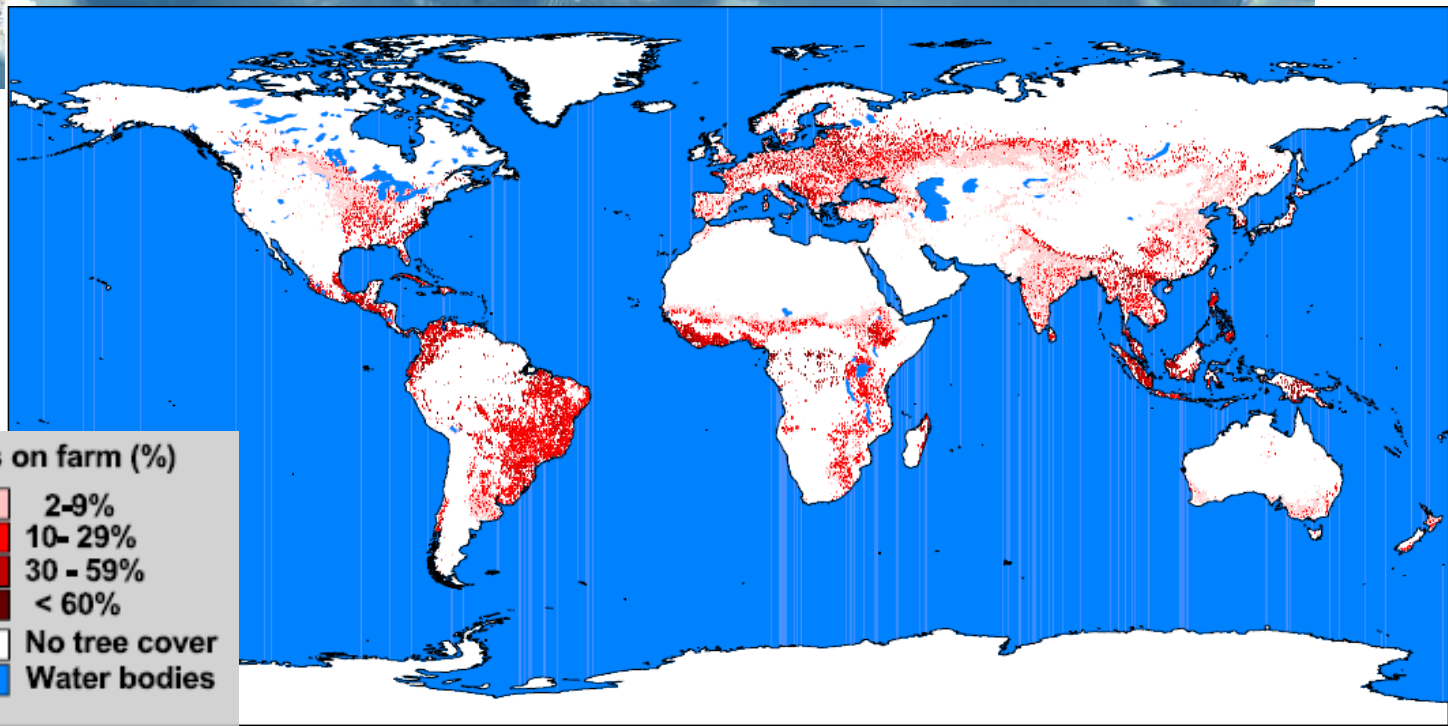


http://www.wri.org/applications/maps/flr-atlas/#



FOREST AND LANDSCAPE RESTORATION OPPORTUNITIES

- Wide-scale restoration
- Mosaic restoration
- Remote restoration



Trees on farm (%)

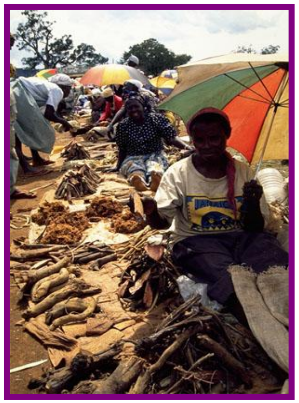
- 2-9%
- 10- 29%
- 30 - 59%
- < 60%
- No tree cover
- Water bodies

The Right Trees for the Right Place

A. Trees for Products

fruit

firewood



medicine

income

Sawn wood

fodder

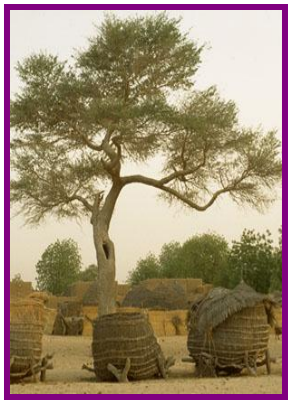
B. Trees for Services

Soil fertility

Carbon

erosion

watershed



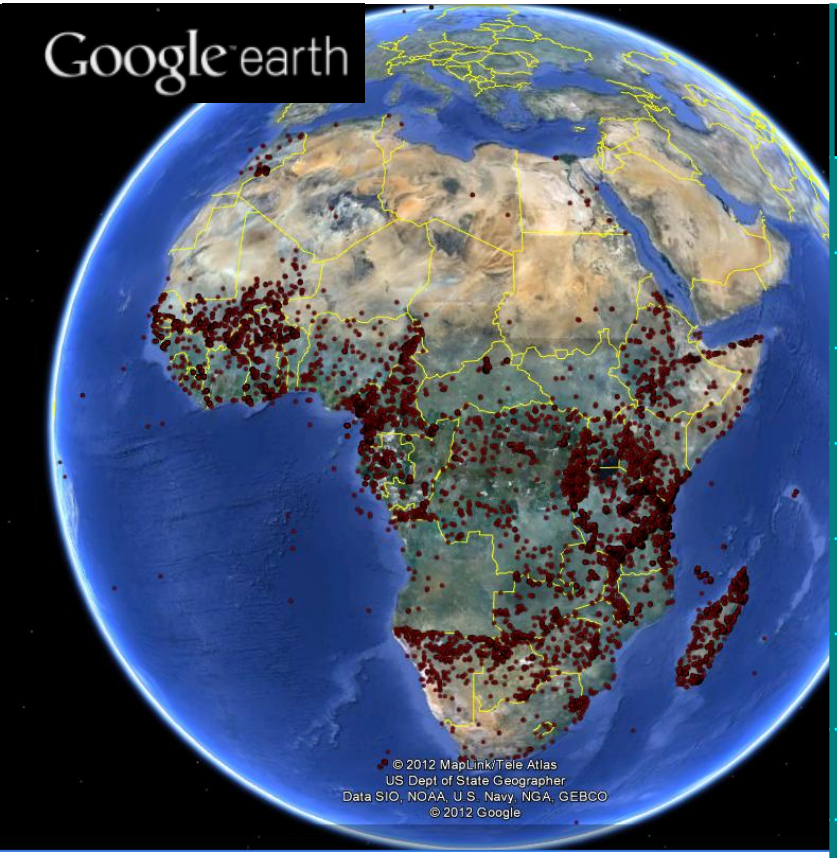
shade

biodiversity

C. Trees for right place…

Simple as ABC !?

Locations of 985 useful tree species www.gbif.org

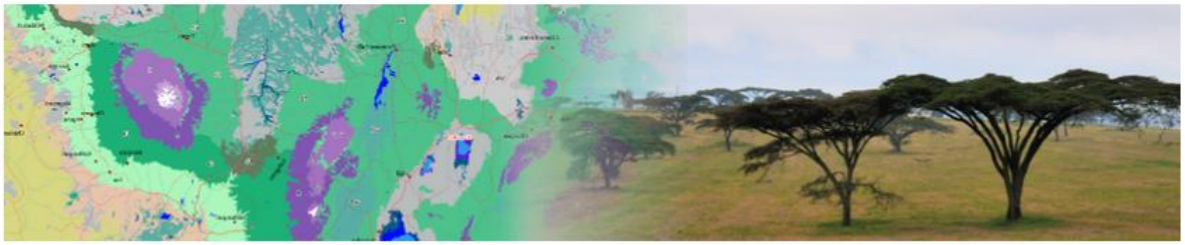


Occurrences	*Species*	*Percentage*	*Cum. Percentage*
300+	1	0.1%	0.1%
200-299	3	0.3%	0.4%
100-199	31	3.1%	3.6%
50-99	63	6.4%	9.9%
30-49	107	10.9%	20.8%
10-29	184	18.7%	39.5%
1-9	220	22.3%	61.8%
0	376	38.2%	100.0%
All	985	100.0%	100.0%

Biased locations … and some locations are wrong

vegetationmap4africa

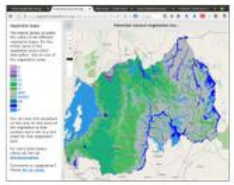
http://www.vegetationmap4africa.org/Vegetation_map.html



A vegetation map for eastern Africa

The map of potential natural vegetation of eastern Africa, gives the distribution of potential natural vegetation in Ethiopia, Kenya, Tanzania, Uganda, Rwanda, Burundi, Malawi and Zambia. The map distinguishes 48 vegetation types, divided in four main vegetation groups: 16 forest types, 15 woodland and wooded grassland types, 5 bushland and thicket types and 12 other types. Furthermore, a number of compound vegetation types are mapped, which include vegetation mosaics, catena's and transitional zones. The current version is 2.0. The map is available in various formats, listed below. Before using the maps, please consult the terms of use.

Web-based maps



View the interactive online map in your browser and quickly find out more about the natural vegetation and its species for any location. Click here

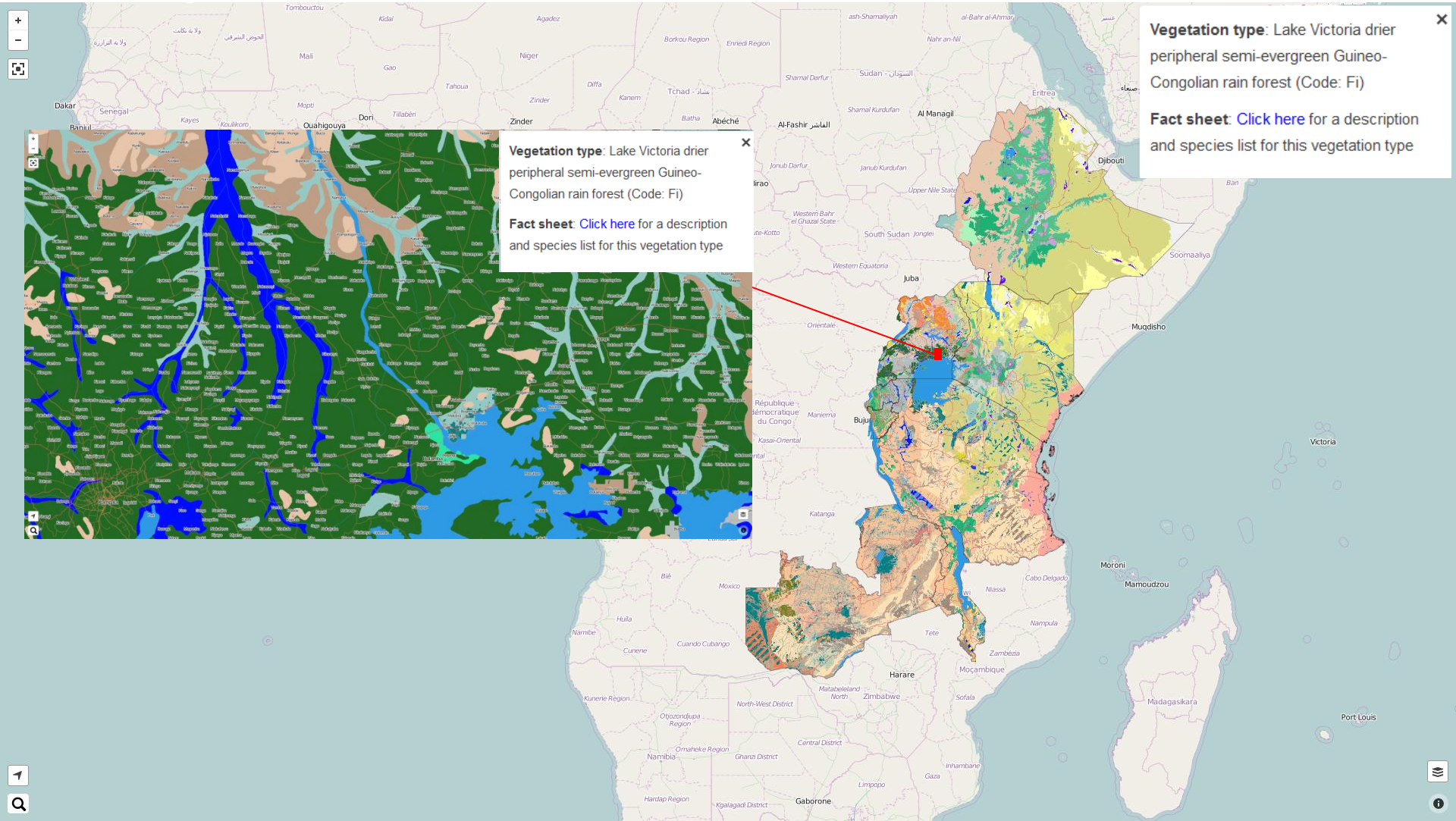
Maps in mobile format

Bring the map with you in the field and know the natural vegetation where ever you are. Download the map for use on your favorite mobile map viewer - Click here.

vegetationmap4africa

http://www.vegetationmap4africa.org/Vegetation_map.html

Web-based maps



www.vegetationmap4africa.org
selection of tree species

vecea.vegetationmap4africa.org/docs/Fa.html

Useful Tree Species for Eastern Africa

a species selection tool based on the VECEA Map

Afromontane rain forest (Fa)

Description

Afromontane rain forest is very similar in structure (physiognomy) to certain types of Guineo-Congolian rain forest. Species composition, however, is almost entirely different. Floristic differentiation between Afromontane rain forest and Guineo-Congolian rain forest includes the occurrence of tree ferns (Cyathea) and the occurrence of conifers (especially Podocarpus latifolius; White 1983 p. 164 - 165).

These forests occur mainly between 1200 and 2500 m on the slopes of certain mountains. However, the altitudinal limits vary greatly according to distance from the equator, proximity to the ocean, and size and configuration of the massif on which these forests occur (White 1983 p. 164). The mean annual rainfall lies mostly between 1250 and 2500 mm. Mists that frequently occur during the dry season of one to five months may explain the fact that Afromontane rain forest is much less deciduous than lowland semi-evergreen forests that receive similar rainfall. Only a few of the larger tree species (*Entandophragma excelsum* and *Pouteria adolfi-friedericii*) lose their leaves - and then only for a few days (White 1983 p. 164).

www.vegetationmap4africa.org
selection of tree species

vecea.vegetationmap4africa.org/docs/Fa.html

Plant species

The main species recorded to occur within this vegetation type are listed below. Clicking the name of any of these species will open the page for that species on the Agroforestry Species Switchboard. Between brackets the English vernacular name of the species and the documented country distribution of the species (B=Burundi, E=Ethiopia, K=Kenya, M=Malawi, R=Rwanda, T=Tanzania, U=Uganda, Z=Zambia) is provided.

Based on information on species presence in national manifestations of vegetation types, each species was classified as a regionally dominant, characteristic, present or marginal species for a vegetation type (Read more ...)

- Dominant - if the regional documentation classified the species as dominant.
- Characteristic - if the species was documented to be characteristic for at least half of all the national manifestations of the vegetation type and if the species was characteristic in at least two national manifestations of the vegetation type. Species were always classified as characteristic if the species was a regional indicator or regional characteristic species for the vegetation type.
- Present - if the species was documented to be characteristic in at least one of the national manifestations of the vegetation type or if the species was documented to be present in a least half of all the national manifestations of the vegetation type. Species that were already listed as characteristic were excluded.
- Marginal distribution - if some of the national documentation listed the species, but where the species was not included as characteristic or present.

Characteristic species
Chrysophyllum gorungosanum (BKMRTUZ), Cola greenwayi (Hairy cola, KMTZ), Cyathea dregei (South African tree fern, EKMRTUZ), Cyathea humilis (KT), Cyathea manniana (BEKMRTU), Cylicomorpha parviflora (KMT), Diospyros abyssinica (Giant diospyros, EKMRTUZ), Entandrophragma excelsum (BMRTUZ), Ficalhoa laurifolia (BMRTUZ), Fleroya rubrostipulata (BEKMRTUZ), Macaranga capensis (River macaranga, BEKMTUZ), Myrianthus holstii (Giant yellow mulberry, BKMRTUZ), Ochna holstii (Red ironwood, BEKMRTUZ), Ocotea usambarensis (East African camphor wood, KMRTUZ), Olea capensis (Elgon teak, EKMRTUZ), Parinari excelsa (Rough-skinned plum, BMRTUZ), Podocarpus latifolius (East African yellow-wood, BKMRTUZ), Pouteria adolfi-friedericii (Aningeria, BEKMRTUZ), Prunus africana (Red stinkwood, BEKMRTUZ), Strombosia scheffleri (BKMRTU), Syzygium guineense (Guinea waterberry, BEKMRTUZ), Tabernaemontana stapfiana (Soccerball fruit, BKMRTU), Xymalos monospora (Lemonwood, BKMRTU)

Species present

Marginal species (occurrence less certain)

Products and environmental services of tree species

www.vegetationmap4africa.org
selection of tree species

vecea.vegetationmap4africa.org/docs/Fa.html

Products and environmental services of tree species

Documented products and environmental services for the tree species occurring in this vegetation type (Fa) are listed below. Clicking the name of any of these species will open the page for that species on the Agroforestry Species Switchboard. Between brackets information is given on the status of each species ('dom' indicates dominant species, 'cha' characteristic species, 'pre' other species and 'mar' species of marginal occurrence), the English vernacular name of the species and the documented country distribution of the species (B=Burundi, E=Ethiopia, K=Kenya, M=Malawi, R=Rwanda, T=Tanzania, U=Uganda, Z=Zambia).

Wood

- Firewood
- Charcoal
- Timber, Furniture, Construction

Chrysophyllum gorungosanum (Cha, BKMRTUZ), Cyathea manniana (Cha, BEKMRTU), Diospyros abyssinica (Cha, Giant diospyros, EKMRTUZ), Entandrophragma excelsum (Cha, BMRTUZ), Ficalhoa laurifolia (Cha, BMRTUZ), Fleroya rubrostipulata (Cha, BEKMRTUZ), Macaranga capensis (Cha, River macaranga, BEKMTUZ), Ocotea usambarensis (Cha, East African camphor wood, KMRTUZ), Olea capensis (Cha, Elgon teak, EKMRTUZ), Parinari excelsa (Cha, Rough-skinned plum, BMRTUZ), Podocarpus latifolius (Cha, East African yellow-wood, BKMRTUZ), Pouteria adolfi-friedericii (Cha, Aningeria, BEKMRTUZ), Prunus africana (Cha, Red stinkwood, BEKMRTUZ), Strombosia scheffleri (Cha, BKMRTU), Syzygium guineense (Cha, Guinea waterberry, BEKMRTUZ), Xymalos monospora (Cha, Lemonwood, BKMRTU), Acacia lahai (Pre, Red thorn, EKTU), Afrocarpus falcatus (Pre, Yellowwood, EKMRTU), Albizia grandibracteata (Pre, Large-leaved albizia, BEKRTU), Albizia gummifera (Pre, Peacock flower, BEKMRTU), Albizia schimperiana (Pre, Long-podded albizia, EKMTUZ), Allophylus abyssinicus (Pre, EKMRTUZ), Apodytes dimidiata (Pre, Pear wood, BEKMRTUZ), Balthasaria schliebenii (Pre, BRT), Bersama abyssinica (Pre, Winged bersama, BEKMRTUZ), Bridelia brideliifolia (Pre, BMRTU), Carapa procera (Pre, Uganda crab wood, BRTU), Casearia battiscombei (Pre, Forest sword-leaf, KMTU), Cassipourea malosana (Pre, Bastard onionwood, BEKMTUZ), Cassipourea ruwensorensis (Pre, BEKRTU), Catha edulis (Pre, Khat, EKMRTUZ), Celtis africana (Pre, White stinkwood, BEKMRTUZ), Cornus volkensii (Pre, Afrocrania, BKMRTU), Croton macrostachyus (Pre, Broad-leaved croton, BEKMRTUZ), Croton sylvaticus (Pre, Forest fever berry, EKMTUZ), Dombeya torrida (Pre, Forest dombeya, BEKMRTU), Dracaena steudneri (Pre, Steudner's dragon tree, BEKMRTUZ), Ehretia cymosa (Pre, EKMRU), Ekebergia capensis (Pre, Cape ash, BEKMRTUZ), Euphorbia abyssinica (Pre, Desert candle, EKMTU), Ficus sur (Pre, Cape fig, BEKMRTUZ), Galiniera saxifraga (Pre, BEKMRTU), Hagenia abyssinica (Pre, Hagenia, BEKMRTUZ), Harungana madagascariensis (Pre, Orange-milk tree, BKMRTUZ), Ilex mitis (Pre, African holly, BEKMRTUZ), Kigelia moosa (Pre, KRTU), Ocotea kenyensis (Pre, Bastard stinkwood, EKMRTU), Olea europaea (Pre, African wild olive, BEKMRTUZ), Pittosporum viridiflorum (Pre, Cape Cheesewood, EKMRTUZ), Polyscias fulva (Pre, Parasol tree, BEKMRTUZ), Pouteria altissima (Pre, Aningeria, EKRTUZ), Psydrax parviflora (Pre, Lady of the night, EKMRTUZ), Rapanea melanophloeos (Pre, Cape

www.vegetationmap4africa.org
selection of tree species

www.worldagroforestry.org/products/switchboard/index.php/name_like/Ocotea usambarensis

Agroforestry Species Switchboard 1.2

Suggested citation: Kindt R, Ordonez J, Smith E, Orwa C, Mosoti B, John I, Chege J, Harja D, Kehlenbeck K, Luedeling E, Lillesø J-P B, Muchugi A, Munjuga M, Mwanzia L, Sinclair F, Graudal L and Jamnadass R. 2015.
ICRAF Species Switchboard. Version 1.2. World Agroforestry Centre, Nairobi.

World Agroforestry Centre

Enter name and click search icon

Your results for the search term: **'Ocotea usambarensis'**

Names found	Current Name (Click to show links on the right)
Ocotea usambarensis	Ocotea usambarensis

About the Switchboard
Email: **switchboard@cgiar.org**

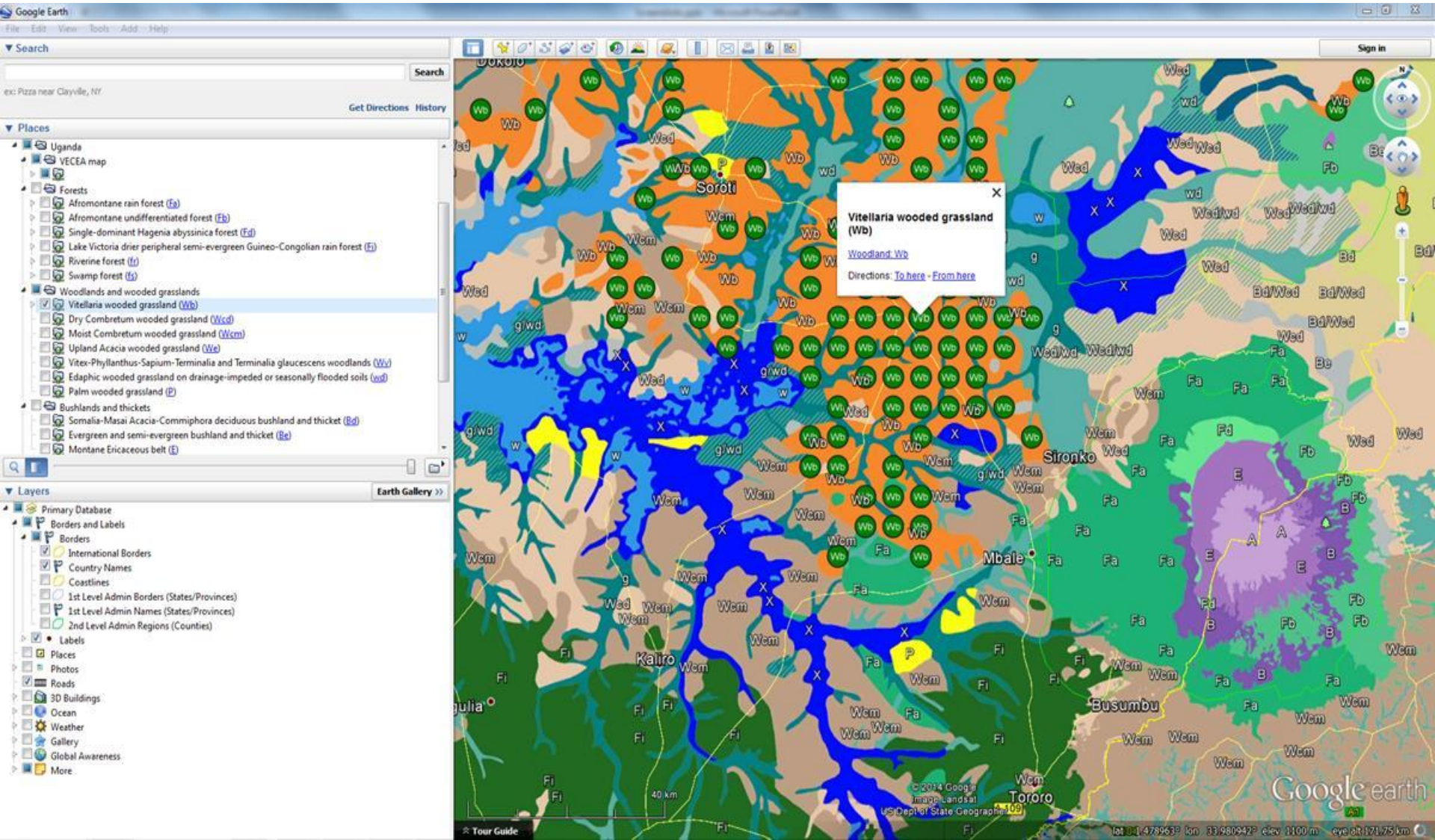
Links to ICRAF Databases	Links to Ocotea usambarensis
Agroforestree Database	View
Tree Seed Suppliers Directory	Not Listed
The African Wood Density Database	View
The Tree Functional Attributes and Ecological Database	View
The Useful Tree Species for Africa	Spreadsheet
The VECEA interactive vegetation map	View
Genetic Resources Database	Not Listed
Links to Other Databases	**Links to Ocotea usambarensis**
Árboles de Centroamérica project	Not Listed
CABI Invasive Species Compendium	Not Listed
DANIDA Species Leaflets	Not Listed
Eco-crop Database	View
MAPFORGEN Database	Not Listed
Pesticidal Trees Database	Not Listed
Plant Resources of South East Asia	Not Listed
Plant Resources of Tropical Africa	View
Tropical Forages	Not Listed
Tropitree Database	Not Listed
TRY Database	Not Listed
Global Wood Density Database	Spreadsheet
The Plant List	Search
Tropicos	Search
Royal Botanic Gardens, KEW	Search
The Global Biodiversity Information Facility	Search
The UNEP-WCMC Species Database	Search
Efloras Database	Search
Encyclopedia of Life	Search

Each species is linked to web-based databases such as the ICRAF agroforestree Database, the Plant Resources of Tropical Africa (PROTA), the CABI Invasive Species Compendium, Tropical Forages or FAO's ECOCROP database

26,135 plant species
33,813 including synonyms
242,505 hyperlinks (excluding 'search')

www.vegetationmap4africa.org

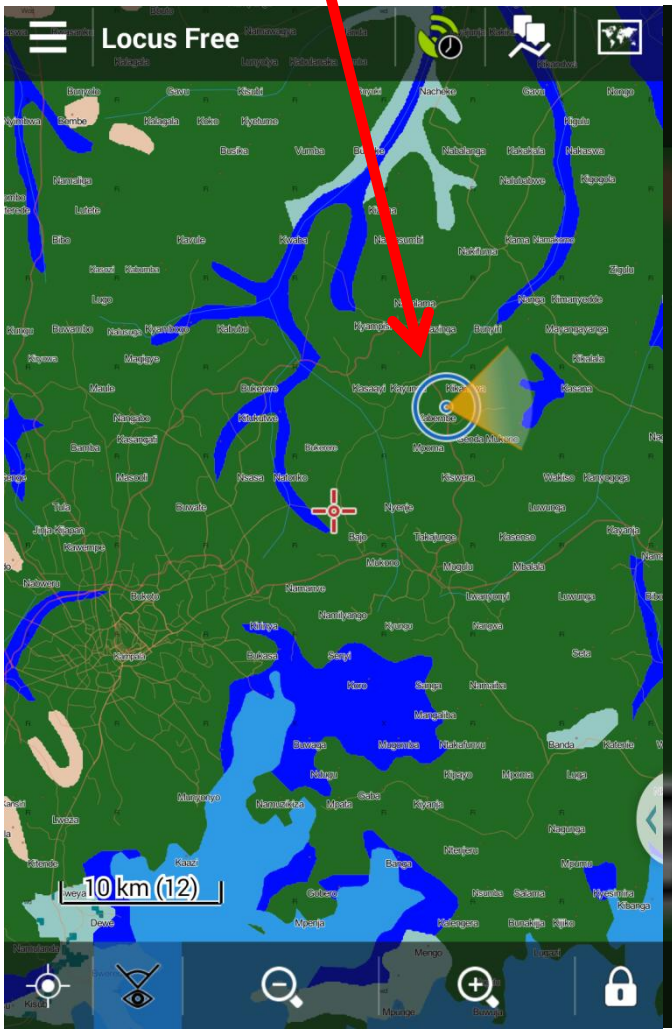
Google Earth version

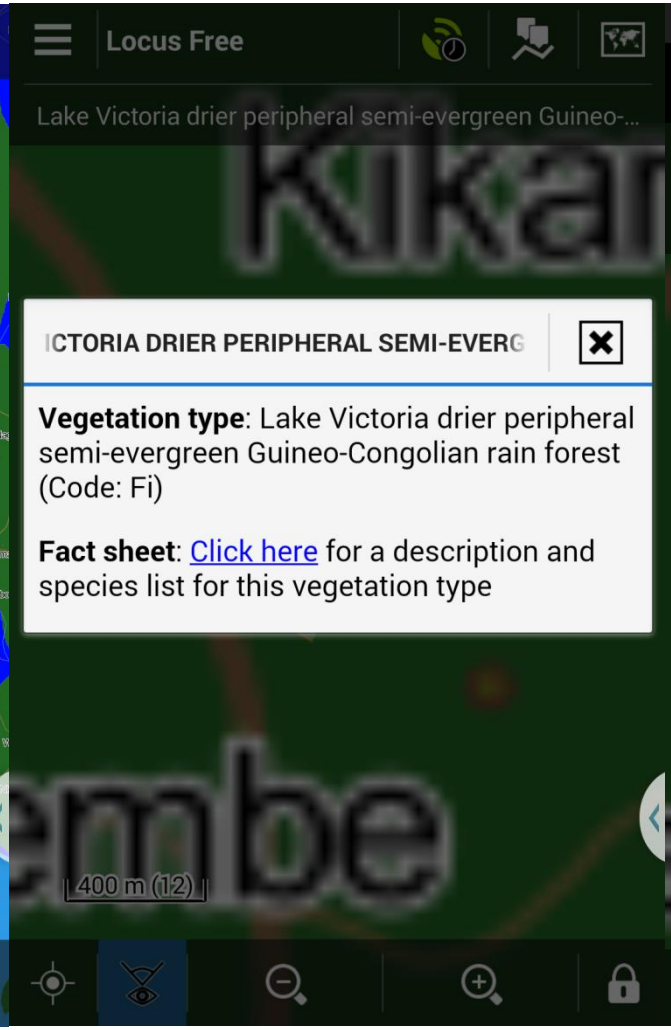


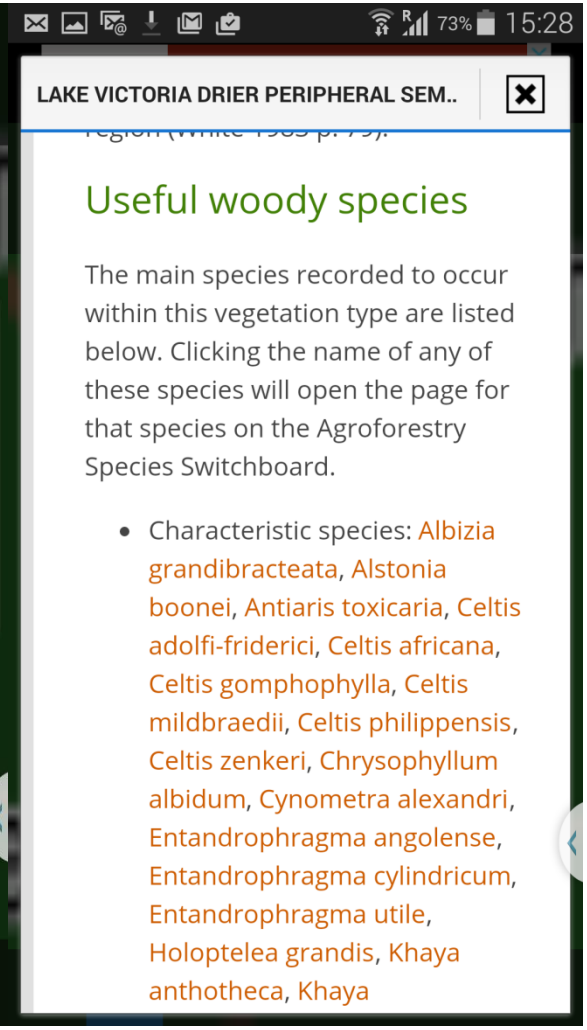
www.vegetationmap4africa.org

smart phone version (via Locus app)

Location of the user



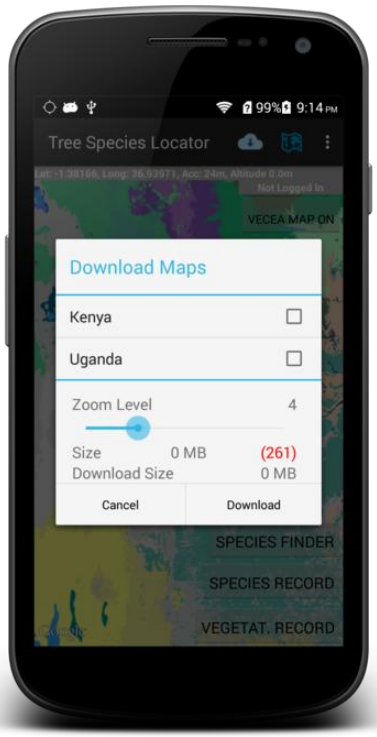


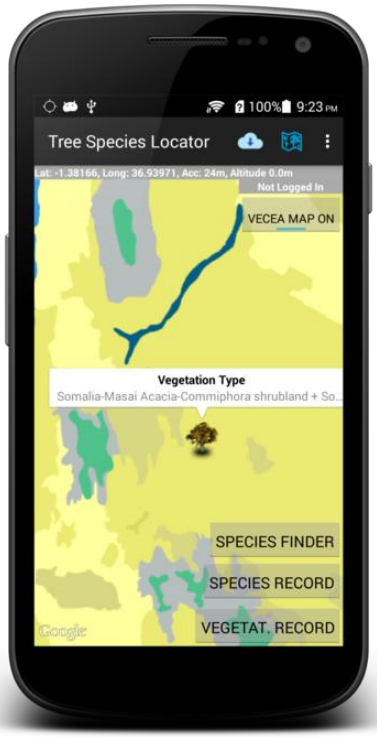


Africa Tree Finder

https://play.google.com/store/apps/details?id=org.icraf.gsl.iucn.treespecieslocator&hl=en

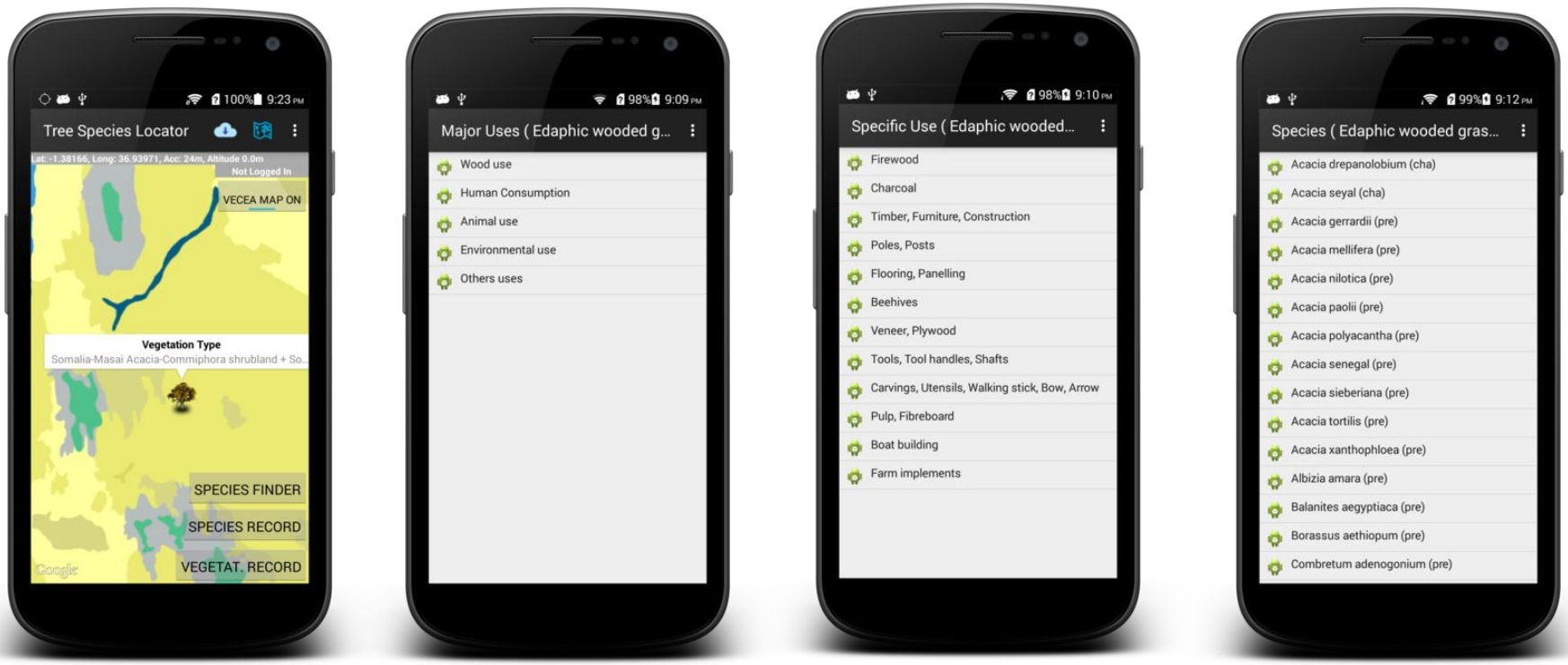
- App developed with IUCN in Know-for-FLR project (DFID)
- Stand-alone app for basic Android smart phone





Africa Tree Finder

- App developed with IUCN in KNOWFOR project (DFID)
- Same functions of selecting useful tree species
- Will include option to capture and upload species and vegetation images (citizen science, confirm/contest species presence, restoration monitoring)



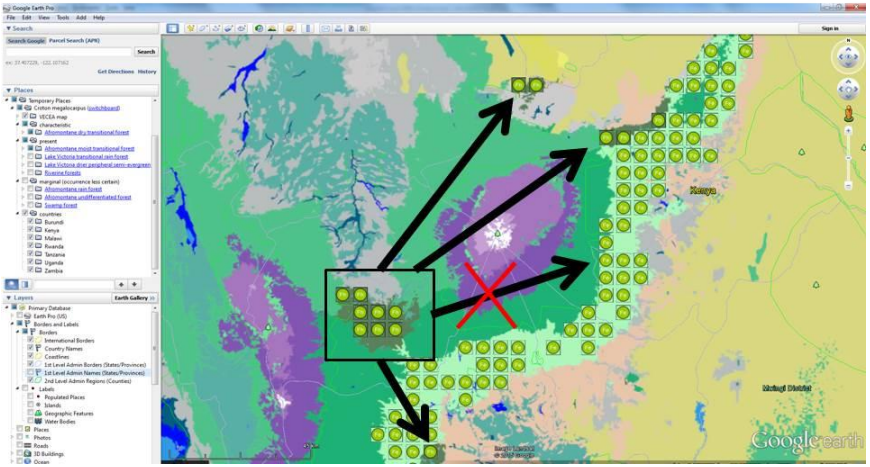
Uganda Tree Finder

Pilot testing in Mt. Elgon region with IUCN, ICRAF and restoration partners (Uganda government, NGOs)

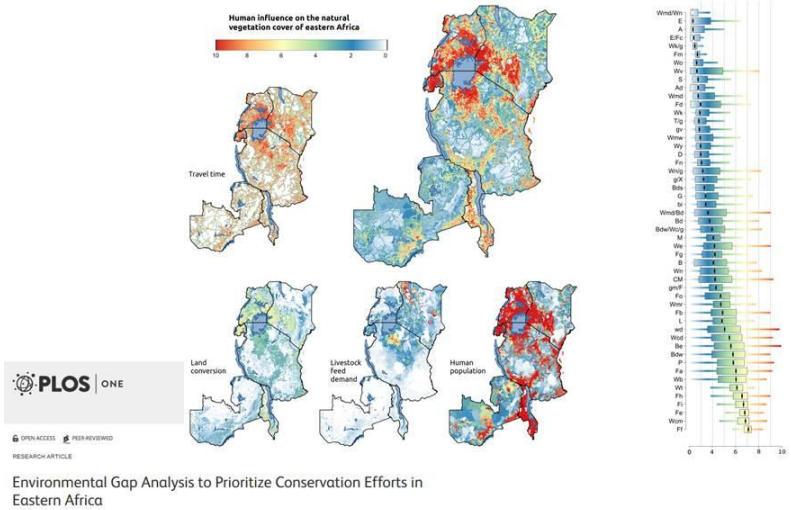
All agreed that app is useful and user-friendly

Some other application domains

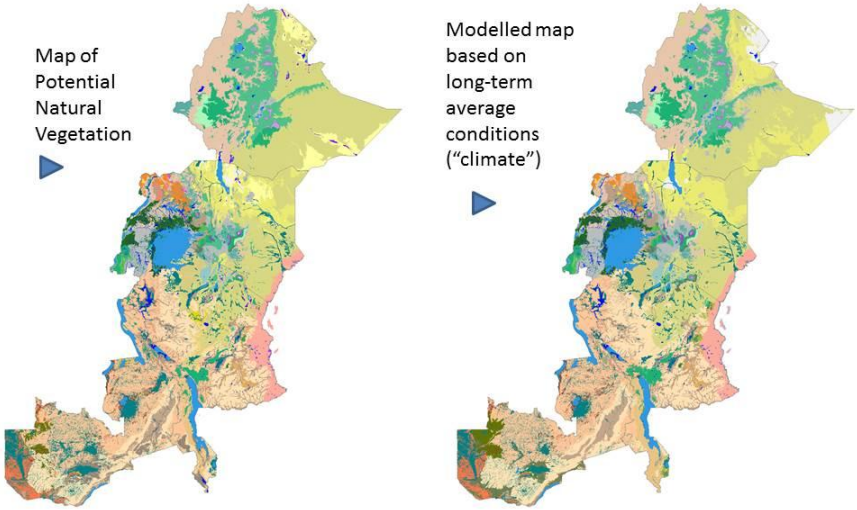
Species distribution mapping and seed source selection



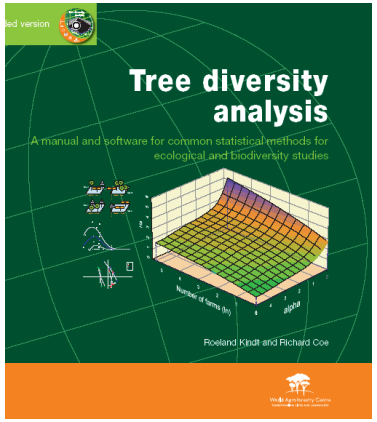
Conservation planning



Climate change modelling



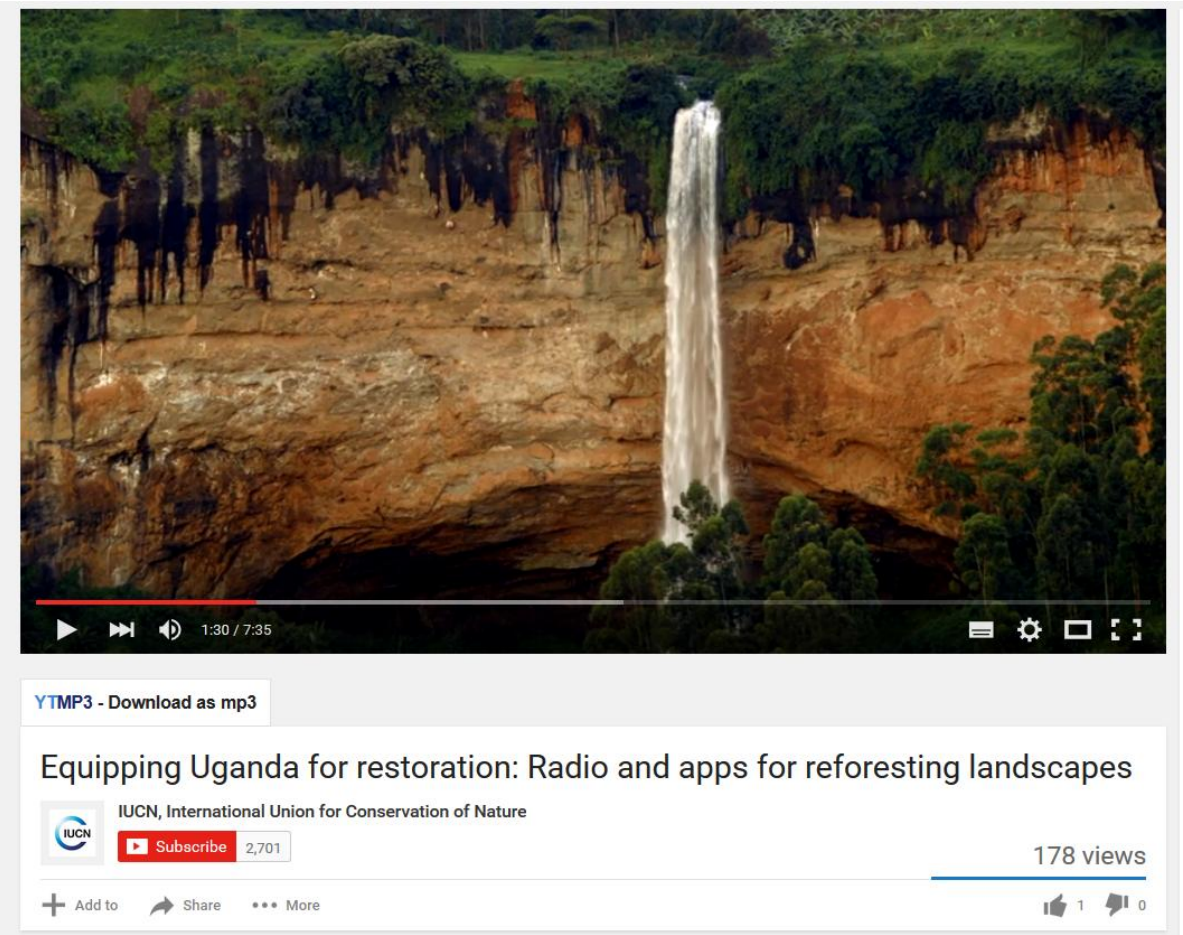
Biodiversity monitoring



BiodiversityR
Open-source
R package

YouTube video on IUCN-Farm Radio International-ICRAF collaboration in Uganda

https://www.youtube.com/watch?v=ZsmunU87Dgg&feature=youtu.be



Premiered in Paris on 5 Dec 2015 as a winner of the Global Landscapes Forum 2015 Partner Video Award

Tree Seeds for Farmers - toolkit

http://www.worldagroforestry.org/our_products/databases

Tree Seeds for Farmers

The toolkit contains three sections:

PART I: Strategies for scaling up seed production

- Chapter 1: Seed Production and Distribution Strategies
- Chapter 2: Research
- Chapter 3: Extension
- Chapter 4: Training
- Chapter 5: Information Sources
- Chapter 6: Species Selection

PART II: Technical guidelines in seed production

- Chapter 7: Seed Sourcing
- Chapter 8: Seed Collection
- Chapter 9: Seed Processing (see also videoclips listed below)
- Chapter 10: Seed Storage
- Chapter 11: Seed Dormacy and Pre-sowing Treatments (see also videoclips listed below)
- Chapter 12: Seed Quality – Physiological and Genetic
- Chapter 13: Seed Distribution
- Chapter 14: Seed Documentation

PART III: The private sector and seed production

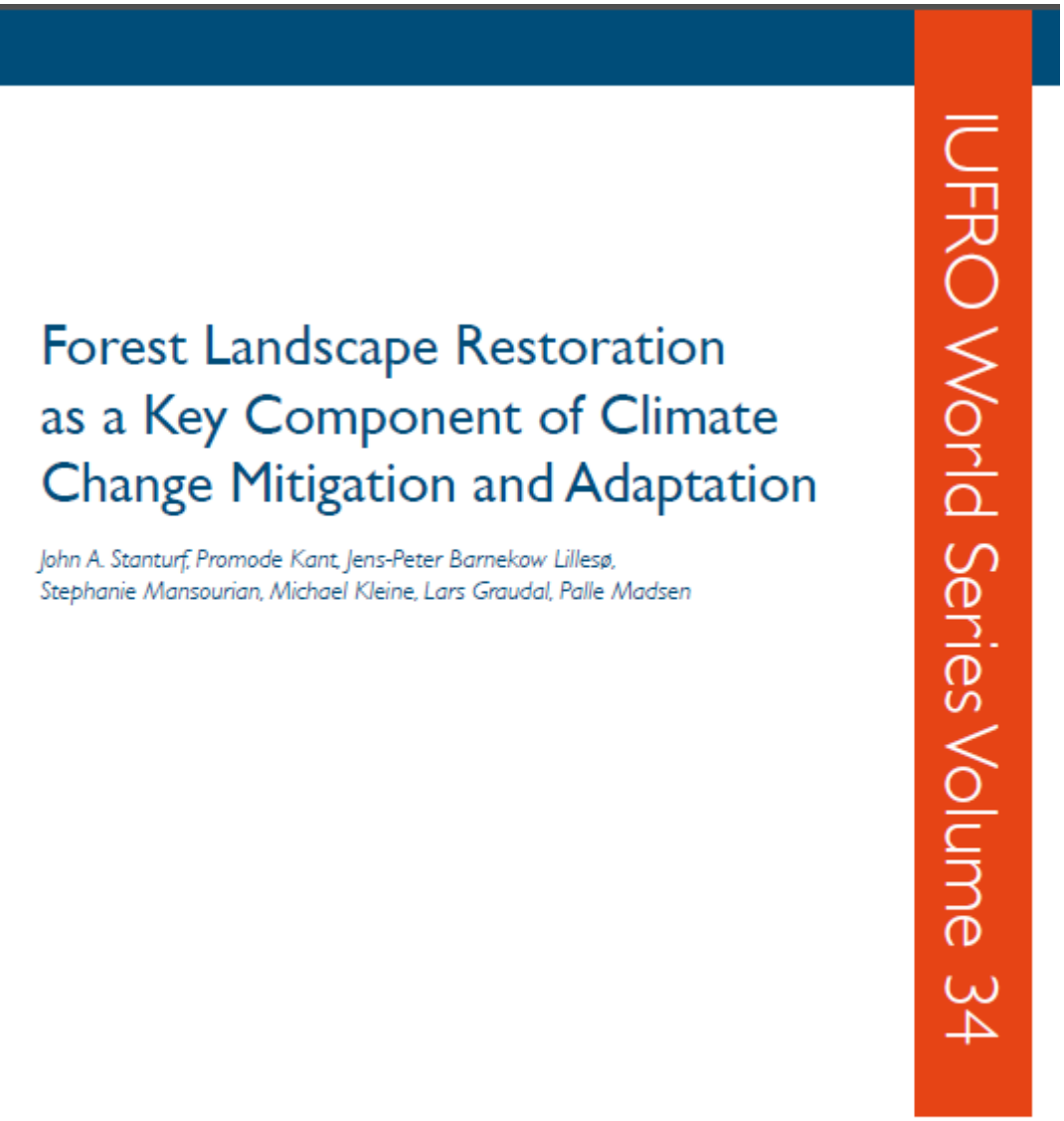
- Chapter 15: The Business Approach
- Chapter 16: Marketing Seed and Seedlings
- Chapter 17: Tree Nurseries as an Enterprise
- Chapter 18: Tree Seedling Quality
- Chapter 19: Tree Nursery Operators as Extension Agents

Download the Tree Seeds for Farmers toolkit. English Version | Spanish Version

Tree Seeds for Farmers

Suggestions for further reading:

- Schmidt, Lars. 2000. Guide to handling of tropical and subtropical forest seed. DANIDA Forest Seed Centre, Humlebaek, Denmark. Xxi+511 pp Download from Forest and Landscape Denmark
- Mulawarman, Roshetko JM, Sasongko SM and Irianto D. 2003. Tree seed management. Seed sources, seed collection and seed handling. A field manual for field workers and farmers. TFRI Extension Series No. 152. World Agroforestry Centre (ICRAF), Winrock International in collaboration with Indonesia Forest Seed Project, Bogor, Indonesia. 54 pp Download pdf
- Florabank guidelines for best practice for seed collection and use Download from Flora Bank
- Tropical trees: propagation and planting manuals produced by Longman
  - VOLUME 1: Rooting cuttings of tropical trees Download from FAO
  - VOLUME 2: raising seedlings of tropical trees Download from FAO
  - VOLUME 3: growing good tropical trees for planting Download from FAO
  - VOLUME 4: preparing to plant tropical trees Download from FAO
- Seed leaflets developed by the former Danida Forest Seed Centre Download from Forest and Landscape Denmark
- Nursery manuals developed by the World Agroforestry Centre Download
  - Wightman KE. 1999. Good tree nursery practices. Practical guidelines for community nurseries. World Agroforestry Centre (ICRAF), Nairobi, Kenya. 95 pp.
  - Jaenicke H. Good tree nursery practices. Practical guidelines for research nurseries. World Agroforestry Centre (ICRAF), Nairobi, Kenya. 90 pp.
- Business skills for small-scale seed producers produced by Soniia David and Beth Oliver Download from CIAT-Africa



World Series Vol. 34 - Forest Landscape Restoration as a Key Component of Climate Change Mitigation and Adaptation. By John A. Stanturf, Promode Kant, Jens-Peter Barnekow Lillesø, Stephanie Mansourian, Michael Kleine, Lars Graudal, Palle Madsen. Vienna 2015; 72 p. ISBN 978-3-902762-50-4 ISSN 1016-3263

For download: http://www.iufro.org/download/file/22340/1303/ws34_pdf/

The Right Tree for the Right Place: the www.vegetationmap4africa.org and smart phone applications to support forest landscape restoration in Eastern Africa

Thank you very much for your attention

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