The Multiple Benefits and Opportunities of Forest Landscape Restoration (FLR)

Многообразие выгод и возможностей от Восстановления лесных ландшафтов (ВЛЛ)
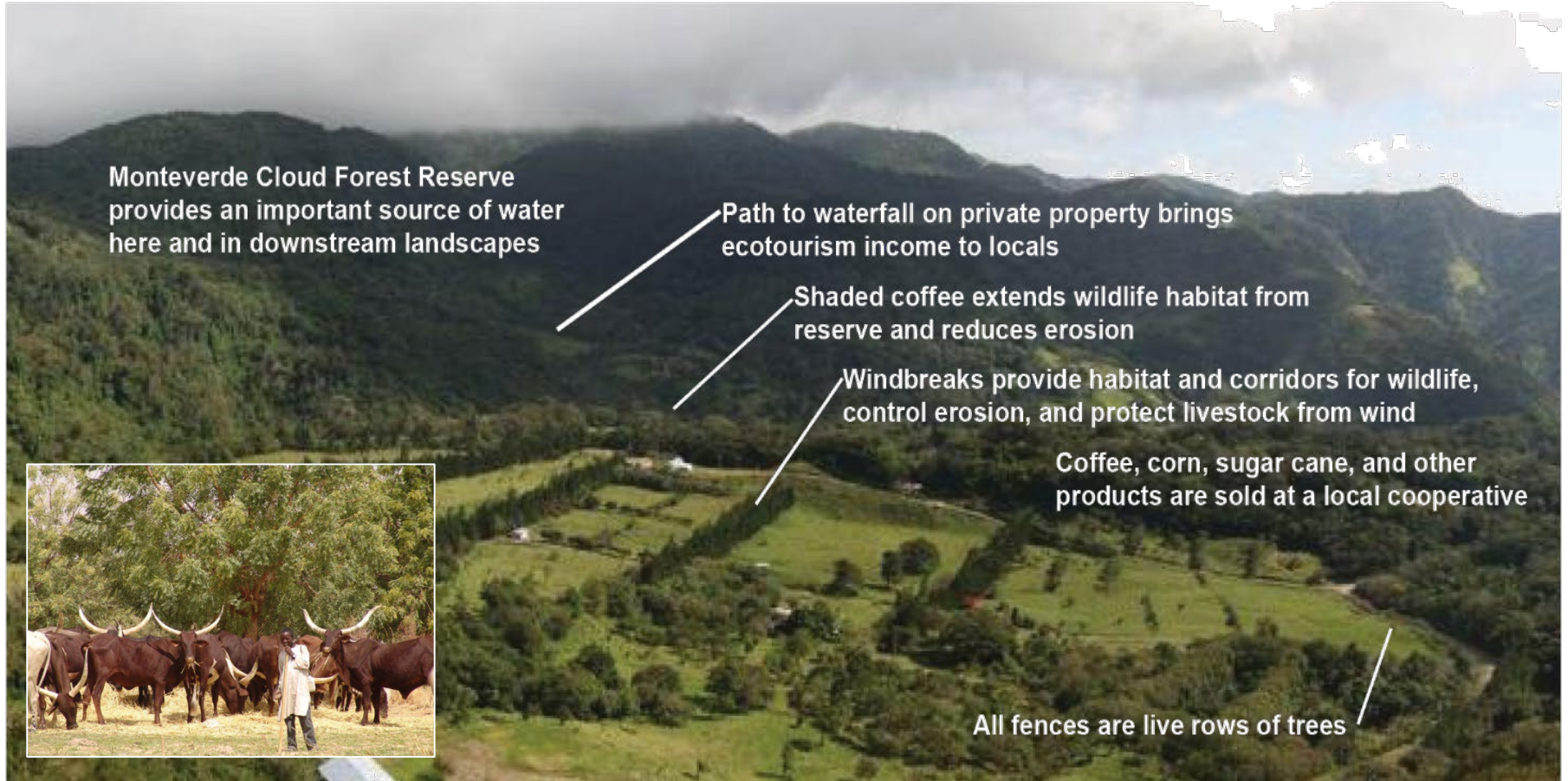
FOREST LOSS, DEGRADATION OF LAND AND NATURAL RESOURCES OCCUR AT GROWING RATE IN THE CAUCASUS AND CENTRAL ASIA

ПОТЕРЯ ЛЕСА, ДЕГРАДАЦИЯ ЗЕМЕЛЬНЫХ И ПРИРОДНЫХ РЕСУРСОВ ПРОИСХОДИТ С ВОЗРАСТАЮЩЕЙ СКОРОСТЬЮ НА КАВКАЗЕ И В ЦЕНТРАЛЬНОЙ АЗИИ

Tajikistan, Photo: IUCN

THE PROMISE OF FLR   /   ЦЕЛЬ ВЛЛ

To deliver a broad range of goods and services…

Предоставление широкого спектра товаров и услуг…

Monteverde Cloud Forest Reserve provides an important source of water here and in downstream landscapes

Path to waterfall on private property brings ecotourism income to locals

Shaded coffee extends wildlife habitat from reserve and reduces erosion

Windbreaks provide habitat and corridors for wildlife, control erosion, and protect livestock from wind

Coffee, corn, sugar cane, and other products are sold at a local cooperative

All fences are live rows of trees

©Nathan Dappen

…….for a wide range of stakeholders across different land-uses and providing multiple benefits

…в различных областях землепользования и обеспечивая множество выгод для широкого круга заинтересованных сторон…..

Forest Landscape Restoration Opportunities

Возможные цели ВЛЛ

STABLE & RICH SOILS
Защита почв

CARBON CAPTURE & STORAGE
Фиксация углерода

STABLE SUPPLIES OF CLEAN WATER
Стабильные источники чистой воды

BIODIVERISTY
Биоразнообрази

FOOD SECURITY & NUTRITION
Стабильность сельхоз. производства

TIMBER & FOREST PRODUCTS
Древесина и лесные продукты

RECREATION & ECOTOURISM
Рекреация и экотуризм

Forest Landscape Restoration <u>Strategies</u>

<u>Стратегии ВЛЛ</u>

ASSISTED REGENERATION ON SLOPES
Содействие возобновлению на склонах

IMPROVED TREE PLANTATION MGMT
Улучшенный менеджмент лесных культур

NATIVE SPECIES PLANTING
Дополнение коренными видам

TREE PLANTINGS ON WATER WAYS
Посадка деревьев вдоль водотоков

TREE CROPS MIXED WITH FIELD CROPS
Лесные породы вместе с сельхозкультурами

IMPROVED TREE PLANTATION MGMT
Улучшенный менеджмент лесных

NATURAL REGENERATION OF PARK BUFFERS
Естественное возобновление

How do we ensure success?

Successful FLR is **forward-looking** and **dynamic**, focussing on **strengthening the resilience of landscapes**. It is guided by a set of principles:

- Focus on landscapes
- Maintain and enhance natural ecosystems
- Engages stakeholders and supports participatory governance
- Tailors to the local context
- Restores multiple functions for multiple benefits
- Manages adaptively for long-term resilience

Как обеспечить успех?

Успешное ВЛЛ является дальновидным и динамичным, ориентируясь на повышение устойчивости ландшафтов. Руководствуется рядом принципов:

- – Приоритет на ландшафты
- – Поддержание и укрепление природных экосистем в пределах ландшафтов
- – Вовлечение заинтересованных сторон и поддержка всеобщего управления.
- – Адаптация к местным условиям с применением различных подходов
- – Восстановление нескольких функций для получения многочисленных выгод

You cannot squeeze FLR into a box

Вы не можете втиснуть ВЛЛ в коробку

It is not a single FLR intervention on the ground– but rather a suite of interventions that come together under an FLR framework

Это не одноразовая местная акция в области ВЛЛ, а набор приемов, которые объединяются в рамках системы ВЛЛ

NOT ALL DEGRADATION IS THE SAME
ДЕГРАДАЦИЯ МОЖЕТ БЫТЬ РАЗНОЙ

Burned

Chemically degraded, leaching of nutrients (abandoned)

Deforestation

Soil erosion
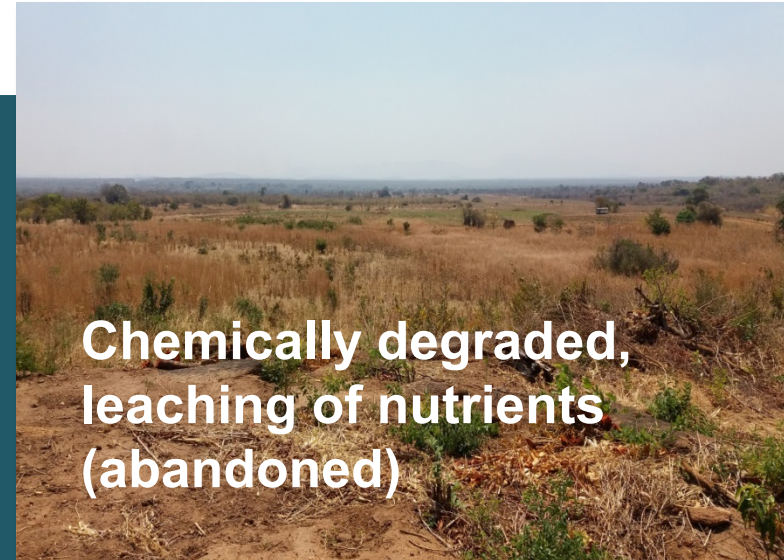
THE MANY FACES OF FLR
МНОГОБРАЗИЕ ВЛЛ

Landscape restoration can be both complex and contested

Восстановление ландшафта может быть и сложным, и неоднозначным

Heterogeneity of FLR opportunities
Lack of predictability – nature and human dimensions
Dynamic processes spatially and over time (unknowns)
Changing markets
Stakeholder and needs driven

Неоднородность возможностей ВЛЛ
Недостаточная предсказуемость - природа и человеческое измерение
Динамика процессов в пространстве и времени
Изменение рынков
Заинтересованные стороны и удовлетворение потребностей
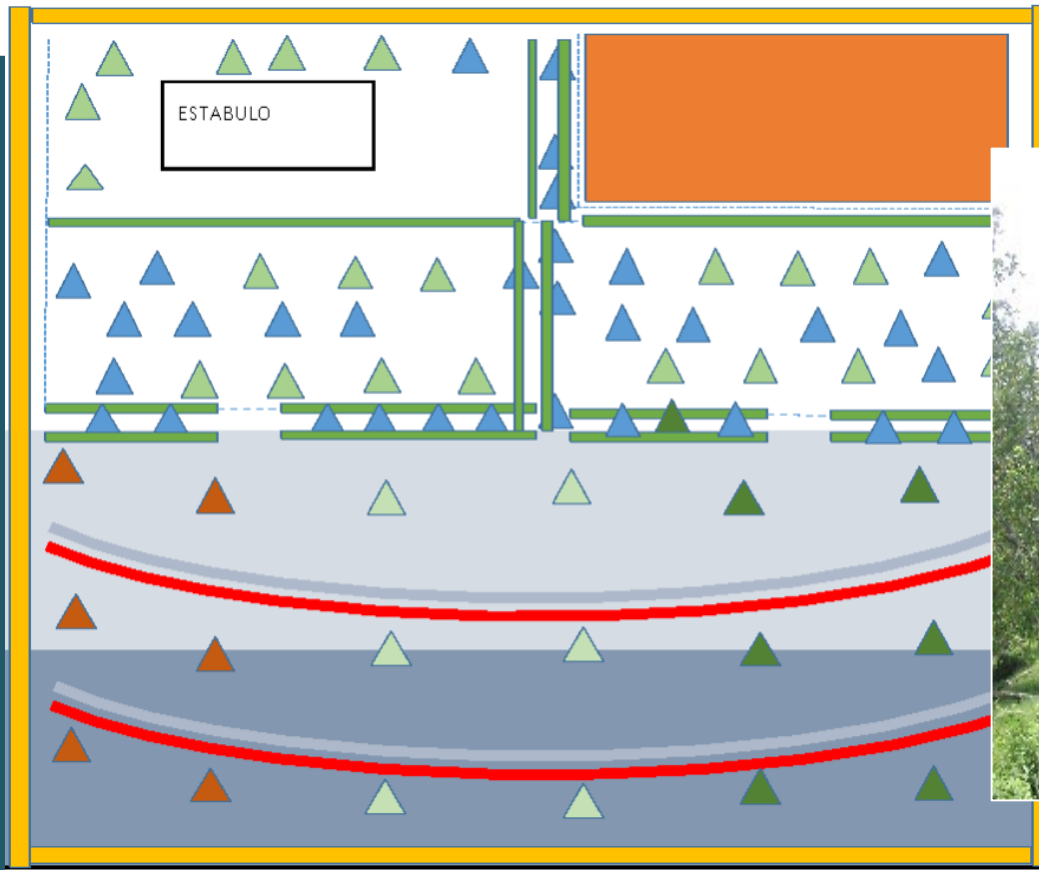
Silvopastoral and agroforestry system planting plan for hilly areas in need of water retention and slope stabilization.

TEMPORAL ASPECTS OF FLR
ВРЕМЕННЫЕ АСПЕКТЫ ВЛЛ

Ecological restoration with agroforestry systems to reconcile conservation with production

Objective is biodiversity and food production

2-3 years

7-10+ years

20+ years
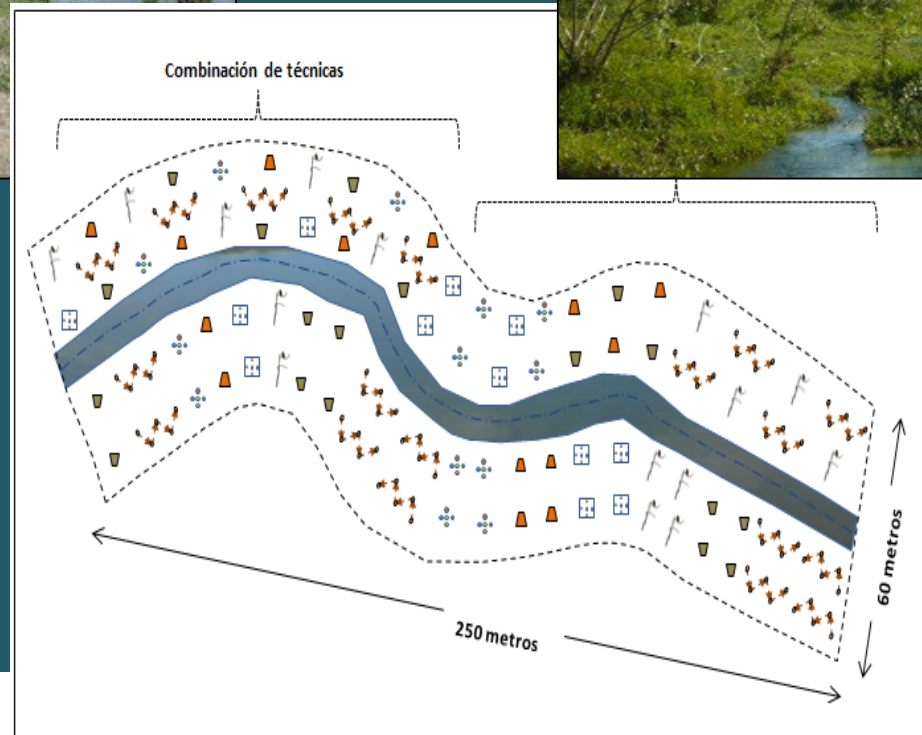
OPÇÃO 2: AGROFLORESTA BIODIVERSA PARA RESTAURAÇÃO DE APP

FLR INTERVENTIONS – Riparian example

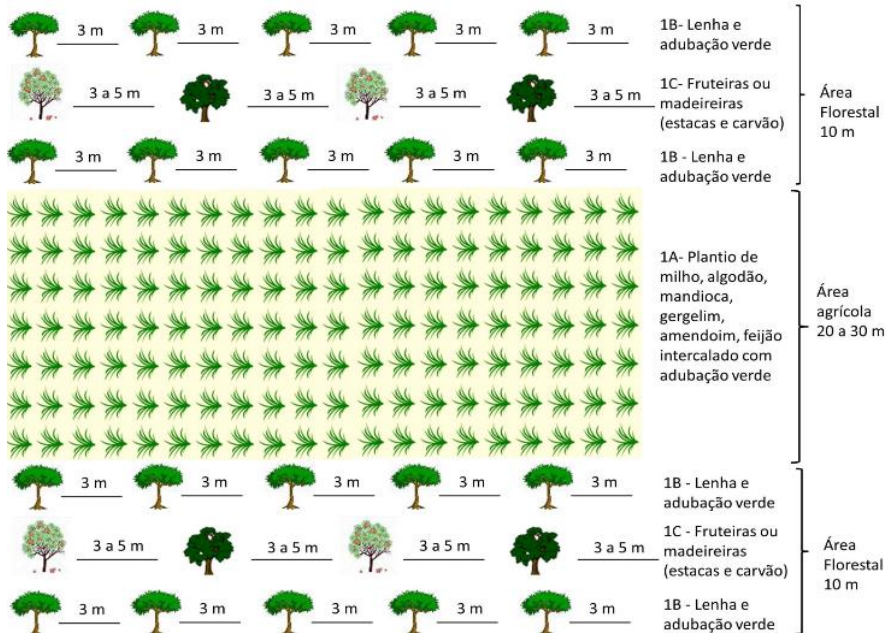Rivers /streams without riparian vegetation

After 3 years

Combinación de técnicas

60 metros

250 metros

FLR INTERVENTIONS – Silvopastoral

Jan. 2006

1.2 heads/ha; 1.7 L milk/day/cow

5.1 heads/ha; 4.1 L milk/day/cow
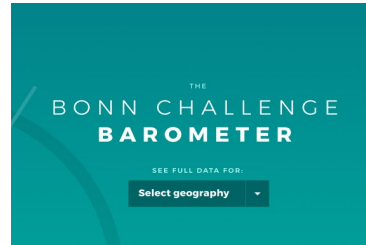
FLR INTERVENTIONS – Agroforestry example

1A - Agricultural belt with green manure

1B – Firewood trees line and manure production

1C – Trees line for wood, fruits, firewood and charcoal

But where do we start?

….capacity, tools and restoration knowledge to implement 2.6 million hectares pledge in CCA.

- ROAM is a methodology to identify and prioritize FLR opportunities at the national and subnational level – and much more....

- Best practice guidance already exists for FLR implementation

- Bonn Challenge Barometer – tracking progress

- Capacity development

- Equipping decision-makers

- Finance – GCF, GEF, CPIC, Public Expenditure

С чего начать?
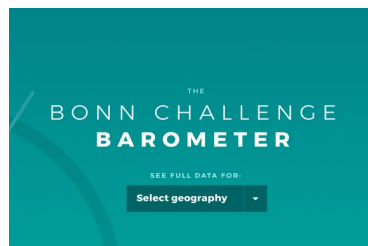
…. потенциал, инструменты и знания для реализации обязательств в 2,6 млн. га в КЦА:

- МОПВ - методология определения приоритетности возможностей ВЛЛ на национальном и субнациональном уровнях - и многое другое....

- Руководство по лучшей практике уже существует для внедрения FLR

- Bonn Challenge Barometer - отслеживание прогресса

- Развитие потенциала

- Оснащение лиц, принимающих решения

- Финансы - GCF, GEF, CPIC, государственные расходы

From pledges to action: FLR planning, scaling and tracking

Information and Data
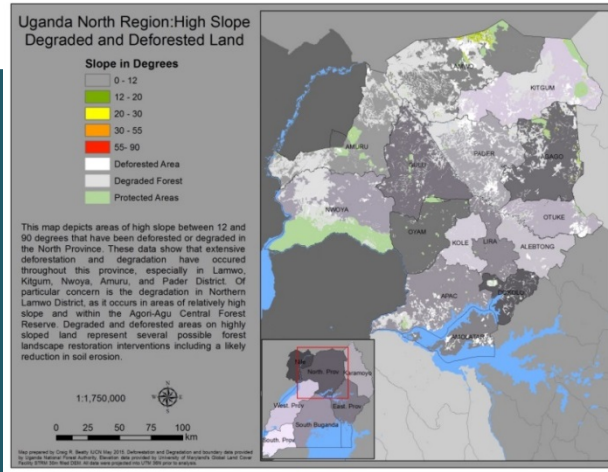
Best science
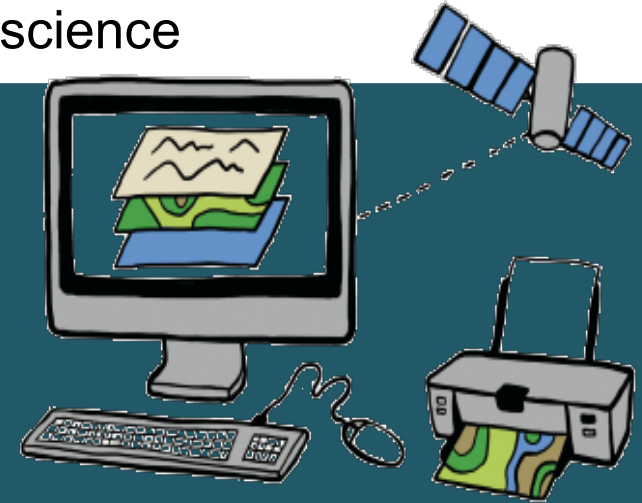
Best knowledge

Engagement of a wide variety of stakeholders

In CCA, the restoration of degraded and deforested landscapes using the forest landscape restoration (FLR) approach has gained recognition as a way for countries to achieve multiple national and international priorities on mitigating climate change, enhancing the resilience of vulnerable communities, improving livelihoods, reducing desertification and conserving biodiversity.

В регионе КЦА восстановление деградированных и обезлесенных ландшафтов с использованием подхода восстановления лесных ландшафтов (FLR) получило признание как способ для стран достичь многочисленных национальных и международных приоритетов по смягчению последствий изменения климата, повышению устойчивости уязвимых сообществ, улучшению средств к существованию, сокращению опустынивание и сохранение биоразнообразия.
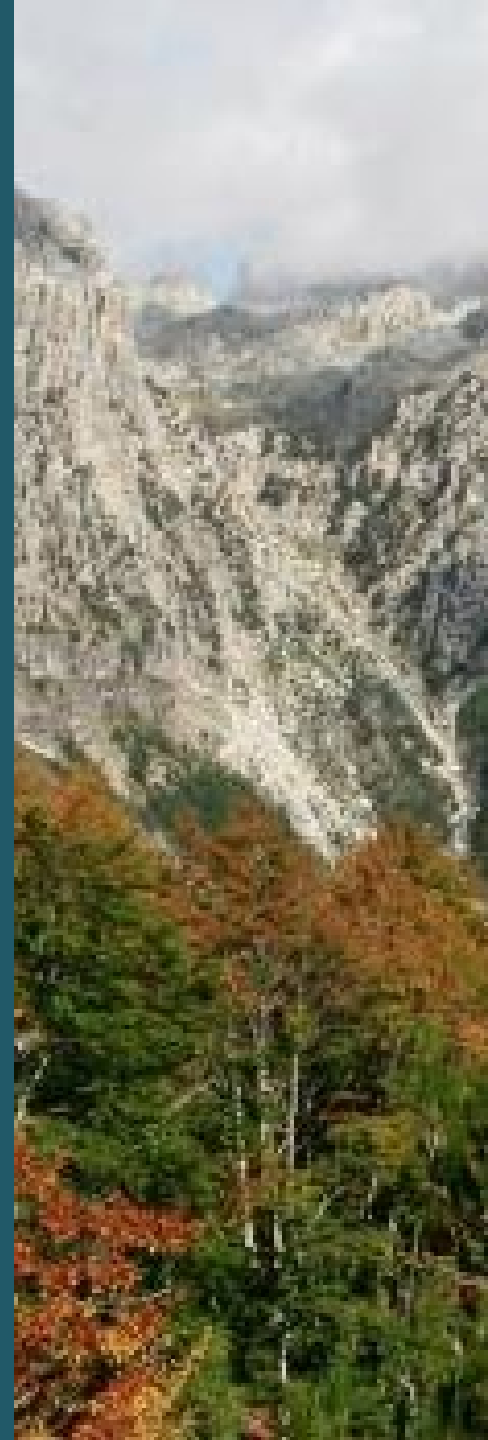
Forest Landscape Restoration Opportunity Assessment
Central Asia and the South Caucasus
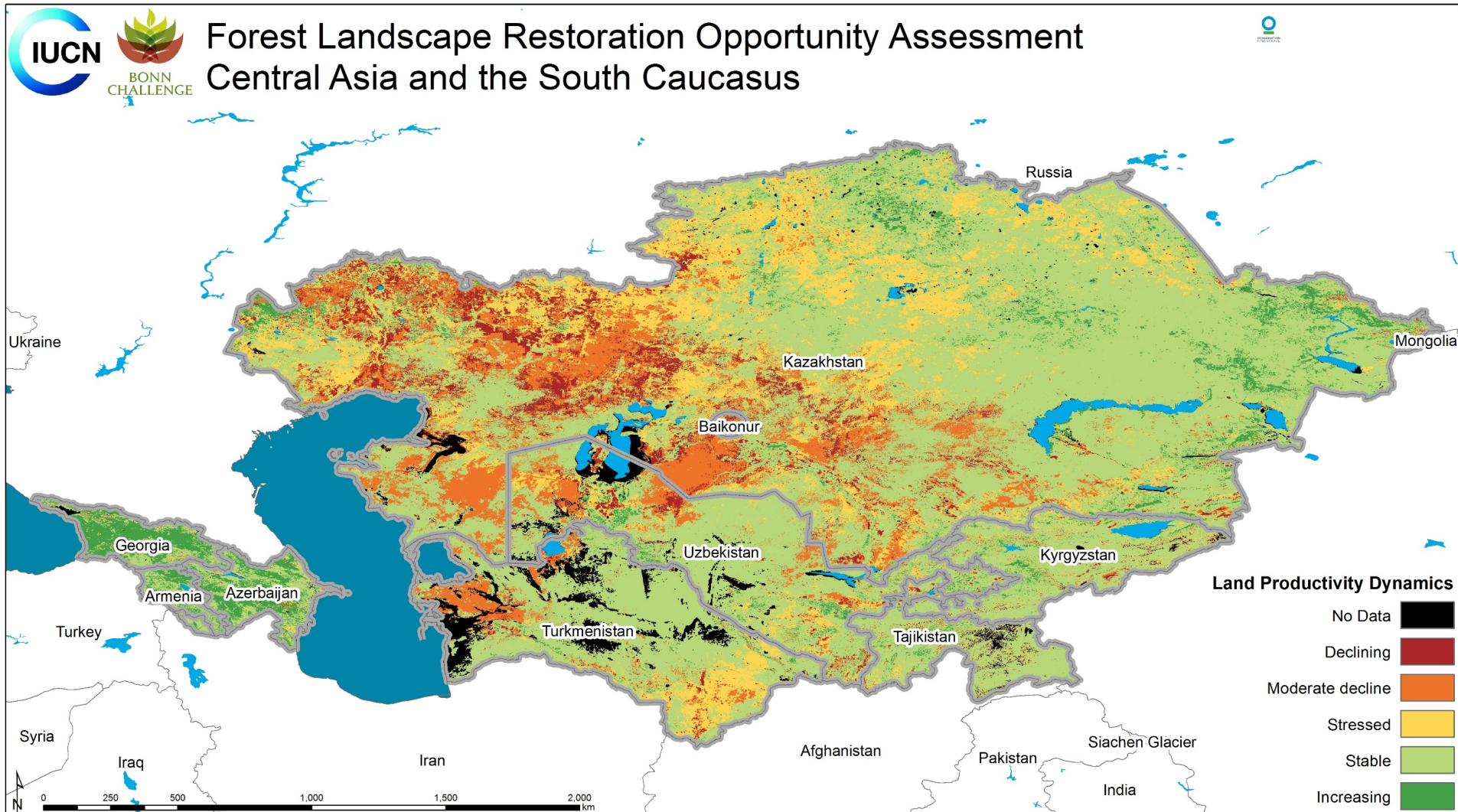
Capacity Development Programme: Forest Landscape Restoration in Caucasus and Central Asia
Программа развития потенциала: восстановление лесных ландшафтов на Кавказе и в Центральной Азии

Brought together the decision-makers and representatives of the ministries and governmental departments from Armenia, Georgia, Kyrgyz Republic, Tajikistan, Uzbekistan and Ukraine

IUCN

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Tbilisi, Georgia
November 6, 2018

ARMENIA

Ecosystems	Dominant species	Common land uses	Potential and existing interventions that can be improved using FLR principles
Steppes and meadow-steppes 	1,200-2,200m Xerophilous grasses in Poaceae family, high vascular plants, thorny cushion (Tragacanth) vegetation	Agricultural land, hay-making areas, pastureland	Restoration of degraded grasslands and pasturelands to enhance fodder production (GIZ 2015). Establishment of forest and other vegetative barriers (snow fences, windbreak) for livestock and agricultural land protection (Ahouissoussi, N., et al (2014)).
Arid open woodlands 	550-2,700m: Juniper woodlands Deciduous species incl. pistachio, maple, hackberry, buckthorn, Celtisglabrata, weeping pear, Amygdalusfenzliana, shibliak Increasing penetration of Paliurus spina-Christi and Rhamnus pallasii	Forestland (logging, forest product harvest), pastureland	Planted forests and assisted natural regeneration of socioeconomically key species including maple, pistachio, and other nut and fruit trees, and ecologically key species such as juniper that have been degraded by fuelwood removal, logging, and grazing (Ministry of Agriculture, 1996)

Sources on ecosystems and land uses: Republic of Armenia 1999; CBD 2015, Government of the Republic of Armenia 2015. Ahouissoussi, N., et al (2014).
Sources for photos: cows grazing on meadow (Pavel); juniper habitat for leopards (A. Malkhasyan)
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PRELIMINARRY STOCKTAKE OF BROAD FLR OPTIONS
Предварительное изучение рамочных вариантов ВЛЛ

AZERBAIJAN

Ecosystems	Dominant species	Common land uses	Potential and existing interventions that can be improved <u>using FLR principles</u>
Steppes 	Key species: Dry scrub forests of juniper, and wild pistachio (Pistachio mutica), almond (Amygdalus fenzlianum), Caucasian pear (Pyrus caucasicum), Oriental apple (Malus orientalis) Festuca silcata, Stipa lessingiana, Onobrychis cornuta, and Medicago coerulea)	Much of the lower altitude steppe land is used for pastureland, fruit orchards and other crops.	Agroforestry: Planting of tree species such as apple, walnut, pear, Cornelian cherry, bush cherry in mountain steppes Establishment of green belt along roads (e.g. Shirvan National Park)
Forests (e.g. Garabag plain) 	Upper limit of the forests between 1,800–2,000m Key species: Beech (Fagus spp.), Eastern oak (Quercus macranthera), Hornbeam (Carpinus caucasica), Ash (Fraxinus excelsior)	Forestlands used for timber, fuelwood, medicinal plants, nuts and fruits	Planted forests and woodlots: fast-growing trees and bushes (e.g. oak, chestnut, ash, plane tree, cypress) for fuelwood, building materials, fruit, and timber Improved fallow: establishment and management of trees on low-productivity agricultural land Erosion control: windbreaks to control soil erosion on steep terrain

GEORGIA

Ecosystems	Dominant species	Common land uses	Potential and existing interventions that can be improved using FLR principles
Lowland hardwood and tugai forests (e.g. East Georgia, Colchis)	Riparian forests include oak, poplar, tamarisk, Russian olive, in flood-plain forests in eastern Georgia Lowland forests include oak, maple, lime, ash, pear	Agricultural land, protected areas. Roughly 10% of floodplain forest areas are completely protected	Land under permanent management Agroforestry: Mixed farming systems with tree crops, ground crops, and livestock (Ahoulssoussi et al. 2014), e.g. in homegardens incorporating pear (Bussman et al. 2016) Protective land/buffers Watershed protection and erosion control: Restoring riparian forest vegetation in ravines and river networks (Akhalkatsi 2015)
Lowland coniferous forests	Types of communities: pine with hornbeam, mixed pine-broad-leaved forest, Pitsunda pine forests of coastal area, etc. Other species: Caucasian silver fir, eastern fir, spruce	Logging for fuelwood and other household uses, agricultural land, pasture	Degraded forestland Silviculture: Redesigning tree plantations so timber/pulp commercial tree stands are alternated with silvipastoral woodland stands dominated by stone pine, etc. (Akhalkatsi 2015) Land under permanent management Agroforestry: Mixed farming systems with tree crops, ground crops, and livestock (Ahoulssoussi et al. 2014), e.g. in homegardens incorporating pine (Bussman at al. 2016)

Sources on ecosystems and land uses: Nakhutsrishvili 2013, Akhalkatsi et al. 2015., CBD n.d., Matcharashvili 2012.
Sources on interventions: Akhalkatsi 2015. Matcharashvili 2012.
Sources for photos: Open woodland in Eastern Georgia (M. Akhalkatsi). Tugai forest on Rioni River (Panoromio)
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PRELIMINARRY STOCKTAKE OF BROAD FLR OPTIONS
Предварительное изучение рамочных вариантов ВЛЛ

KAZAKHSTAN

Ecosystems	Dominant species	Common land uses	Potential and existing interventions that can be improved <u>using FLR principles</u>
Forests near settlements (e.g. Astana green belt) and mining sites	Broadleaf, honey plants, poaceae and asteraceae plants	Harvesting, grazing, protected forest, protective buffers, logging, mining dumps and pits	Silviculture for forests near mining sites (e.g. Kostanai region) and overgrazed land near settlements by enrichment planting of relevant forest species (e.g. broadleaf trees) and by establishing more controlled grazing patterns to increase soil fertility and water retention (suggestion based on FLR principles) Establishment of protective tree lines along roads and railways Restoration of forests and plantation of green belts around settlements, for use by local population (cultivation and harvesting hay or berries for income generation (e.g. Astana greenbelt)
Tugai forests and wetlands	Tugai, willow, tamarisk, salt tree	Cleared for agriculture, irrigation, tree felling, fuelwood collection, grazing	Silviculture: enrichment planting of tugai trees, local shrub and grass species and introducing more controlled grazing practices. (suggestion based on FLR principles) Planted forests: fast-growing trees on unused lands for timber and fuelwood, establishment of tugai nurseries Establishment of shelter belts against wind and soil erosion on agricultural lands

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Предварительное изучение рамочных вариантов ВЛЛ

KYRGYZ REPUBLIC

Ecosystems	Dominant species	Common land uses	Potential and existing interventions that can be improved <u>using FLR principles</u>
Sub-Alpine forest and Alpine meadows	Sub-alpine: Juniper (3 200 m): Juniperus turkestanica, J. semiglobosaand J. seravshanica. Conifer (2 800 - 3 000 m): Spruce Alpine: shrubs and grass species such as bluegrass alpine, buckwheat viviparous, edelweiss, dandelions	Pasture, tourism	Degraded forest land Silviculture: controlled grazing of forested areas and enrichment planting to restore forest areas (especially spruce and juniper) (IUCN 2018, SAEPF 2015, World Bank 2015) Land under permanent management Agroforestry: silvopasture on sloping areas to increase crop annual crop production; domestication of wild fruit tree species to increase fruit productivity through forest gardening (Djanibekov et al 2016)
Forests near settlements and mining sites	Juniper forests: Juniperus turkestanica, J. semiglobosaand J. seravshanica. Tugai, willow, birch, poplar, sea buckthorn, spruce	Some mining activities (e.g. Jalal-Abad and Talas provinces) Tourism activities (e.g. Karakol)	Protective land/buffer Restoration of forests and plantation of green belts around settlement and tourist sites for use by local population (e.g. fruit harvesting) and to avoid damage and erosion (FAO, 2014) Degraded forest land (logging and grazing activities) Silviculture for forests near mining sites by enrichment planting of relevant forest species (e.g. spruce and juniper species) to increase soil fertility and water retention (FAO, 2014).

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TAJIKISTAN

Ecosystems	Dominant species	Common land uses	Potential and existing interventions that can be improved __using FLR principles__
Mid-mountain xerophilous light forests (shibliak, S and W Tajikistan) 	Deciduous trees and shrubs, mainly in light stands with grass cover. Key species: Amygdalus bucharia, Pistacia vera, Calophaca grandiflora, Cercis Griffithii and Rhus coriaria. Pistachio formations occur extensively on slopes and foothills in SW Tajikistan but are thinly stocked with large gaps.	Forestlands with fuelwood cutting, pasture	Agroforestry using living fences on pastures and around agricultural plots, using single or multiple rowed lines of woody species (Romer 2005) Agrosilvopasture with planting of fodder trees, understory fodder production-hay-making and grazing and cover-crops; sometimes with firewood and construction wood trees (e.g. homegardens) (Romer 2005, Djanibekov 2016) Assisted natural regeneration of pistachio forests for soil protection and water conservation, with pistachio income generation combined with controlled fuelwood gathering and improved grazing management
Tugai forests 	Combination of dense, streamside undergrowth and brush with massive Phragmite reedbeds and oxbow lakes, along rivers Main tugai species: Phragmites communis, Saccharum spontaneum, Erianthus ravennae, etc.	Pasture, fuelwood cutting, logging Conversion to agricultural land (largely for cotton)	Assisted natural regeneration of tugai forests to mitigate landslide, mudflow, and flood risks, e.g. by handing over tugai forests to local communities, which can stop illegal logging and restrict grazing to community members (Ergashev & Olimov 2018) Agroforestry: Tree strips alongside roads and irrigation channels using species for silkworm, fodder, construction wood, or fuelwood production, e.g. mulberry, willow, poplars, acacia (Romer 2005)

TURKMENISTAN

Ecosystems	Dominant species	Common land uses	Potential and existing interventions that can be improved using FLR principles
Lowland deserts (e.g. Karakum, Caspian shores)	Sandy deserts, sand-gravel deserts, salt deserts: Chenopodiaceae, saxaul, sand acacia, kandym ephedra	Pasture, irrigated agriculture, harvesting of fuelwood and building materials, protective buffers	Planted forests and silvopasture: Stabilize dunes, afforest sand tracts around oases and degraded pasture areas near settlements and farms by planting sand-tolerant species incl. saxaul, Calligonum, saltwort, ephedra, desert acacia, creating conditions for year-round pasture for livestock, combined with rotational grazing and other improved grazing management Assisted natural regeneration of saxaul species and other sand plants, such as Ammodendron, and nursery establishment of shrub plants, which could also be planted along local infrastructure (ex. train tracks) for protective measures Agroforestry: Runoff agriculture with food crops and agroforestry applications using takyrs while reducing irrigation. reclaim saline soils by planting halophyte species, e.g. Salicornia europaea, Suaeda acuminate, etc.
Desert plateaus (west and south, isolated)	Stony deserts: Dendrostellera turkmenorum, Calligonum spp., Asparagus turkestanicus. Badgyz: Savanna-like groves of wild pistachio with herbaceous communities of Carex pachystylis, Poa bulbosa, ephemeroids Tugai along valleys and terraces of large rivers such as Amudarya: poplars, jidda, willows, and tamarix, sometimes mixed with reeds and other wetland plants	Agriculture, forestland, harvesting of NTFPs, protective buffers	Natural regeneration of tugai forests (National Forest Program 2013-2020) Silviculture to restore tugai forests (National Forest Program 2013-2020) Planted forests of populus, tamarix, and salix for watershed conservation

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Предварительное изучение рамочных вариантов ВЛЛ

UZBEKISTAN

| Ecosystems	Dominant species	Common land uses	Potential and existing interventions that can be improved using FLR principles
Valley zone (e.g. Fergana Valley, Chirchik-Angren Valley, Zerafshan River Valley) 	Deciduous and fruit species, incl. poplar, mulberry, gida, sycamore, elm, walnut, almond, peach, apricot, plum, apple, pear, quince, fig, pomegranate	Agricultural lands (mostly irrigated), pasture, sericulture Some land at foothills: non-irrigated agriculture	Agroforestry: Windbreaks, e.g. with poplar trees, in wide spaced, single and multiple rows of trees in agricultural fields that mitigate wind impact and control erosion while increasing crop yields (e.g. wheat, maize, sugarbeet) (Djanibekov 2016) Silviculture: establishment of controlled grazing and harvesting practices in walnut forests, enhancement of walnut forests by establishment of nurseries, planting of walnut species along slopes with wild fruit trees and bushes to improve soil quality and productivity (Butkov, 2011)
Mountain zone (Western Tien Shan) 	Juniper (Chatkal range), Thai eastern, walnut (Nurata Range), pistachio Juniper forests (Alay, Turkestan, Zerafshan, Fergana, Chatkal, Kuramin ridges, SW branch of Gissar and Babatag ridges). Special vegetation belt at higher elevation	Agricultural lands (more rain-fed, forest plantations, harvest of forest products, animal husbandry, mining industry, nature reserves	Silviculture on sparse forests in mountainous areas (National Policy on Reforestation and Afforestation 2009), esp. of underrepresented vegetation types like pistachio, fig, persimmon, pomegranate, sumach, grapes, cenosises (Botman 2012) Watershed protection and erosion control: protective forest plantations through terracing of steep slopes in watershed areas with mudflow risk (National Policy on Reforestation and Afforestation 2009)

EXAMPLES: FLR Opportunites Assessments
Примеры оценок возможности ВЛЛ
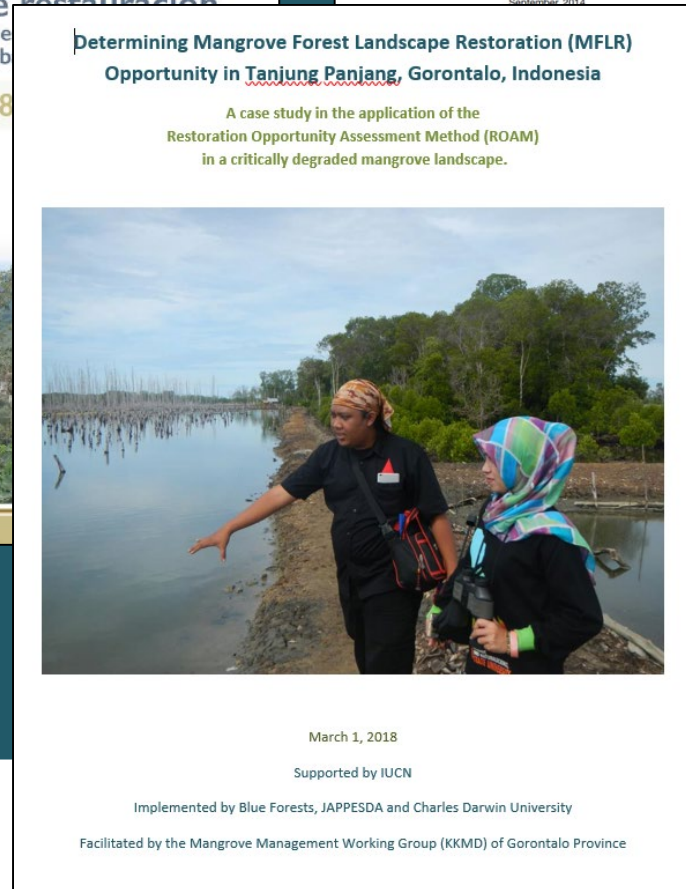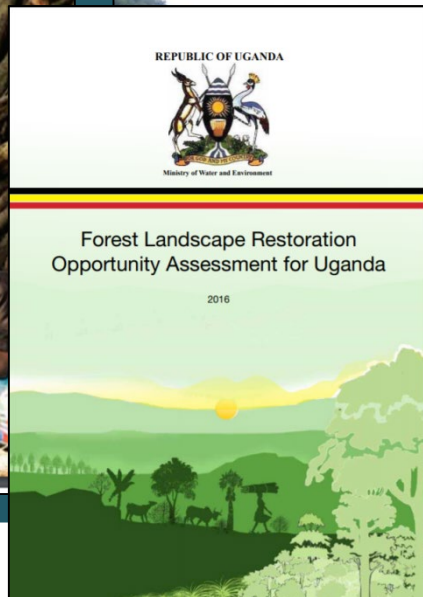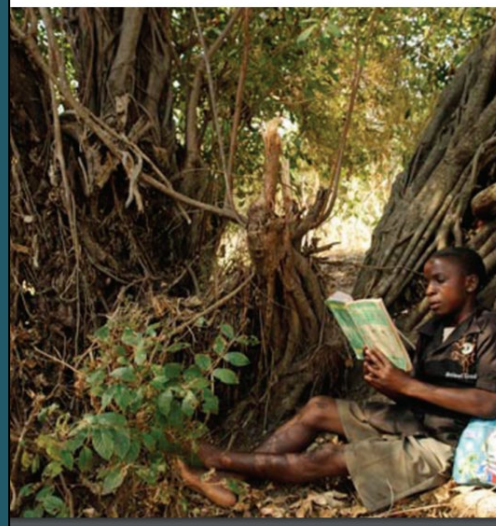
Validated FLR Opportunities Assessments lead to National FLR Strategy and Policy

Валидированные оценки возможностей ведут к разработке национальной стратегии и политики ВЛЛ

Restoration Technical Guides for Specific ecosystem Services and Production Commodities: coffee, cocoa, sugar cane, grains etc

Технические руководства по восстановлению для конкретных экосистемных услуг и товаров производства: кофе, какао, сахарный тростник, зерно и т. д.

Guía técnica para la restauración en El Salvador
Renovación de cafetales
Francisco Fonseca, Tony Nello, Leander Raes, Javier Saborío, Óscar Chacón

Guía técnica para la restauración en El Salvador
Restauración de manglar y bosque de galería
Tony Nello, Francisco Fonseca, Leander Raes, Andrés Sanchún, Javier Saborío, Óscar Chacón

Guía técnica para la restauración en El Salvador
Sistemas agroforestales de cacao
Tony Nello, Francisco Fonseca, Leander Raes, Andrés Sanchún, Javier Saborío, Óscar Chacón

Guía técnica para la restauración en El Salvador
Sistema agroforestal en granos básicos
Tony Nello, Francisco Fonseca, Leander Raes, Andrés Sanchún, Javier Saborío, Óscar Chacón

Guía técnica para la restauración en El Salvador
Zafra verde en caña de azúcar
Francisco Fonseca, Tony Nello, Leander Raes, Andrés Sanchún, Javier Saborío, Óscar Chacón

Guía técnica para la restauración en El Salvador
Sistemas silvopastoril y agrosilvopastoril
Tony Nello, Francisco Fonseca, Leander Raes, Andrés Sanchún, Javier Saborío, Óscar Chacón

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Thank you!
Спасибо!

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